ARAC | AVIATION RULEMAKING ADVISORY COMMITTEE

**June 22, 2022**

**Brandon Roberts**
**Executive Director, Office of Rulemaking, ARM-1**
**Federal Aviation Administration**
**800 Independence Avenue, SW**
**Washington, DC 20591**

***Re: Airman Certification System working group; Call-to-Action Subgroup Final Recommendation Report***

Dear Mr. Roberts,

On behalf of the Aviation Rulemaking Advisory Committee (ARAC), I am pleased to submit the enclosed Final Recommendation Report from the Airman Certification System working group's Call-to-Action Subgroup. Jackie Spanitz, the subgroup lead, summarized the report and its five recommendations during the June 16, 2022 ARAC meeting in Washington, DC. The report and its recommendations were made unanimously by the subgroup's membership without any dissenting views or positions.

ARAC members who attended the June 16 meeting, in-person and virtually, accepted the report, as presented, with the exception of the Aircraft Electronics Association (AEA), who abstained from the vote.

I want to thank the members of the Call-to-Action Subgroup for their dedication and diligent work over the course of the last year – directly responding to the Congressional request made in H.R. 133-1160. The subgroup's thorough review and recommendations stand to improve the certification process and standards for pilots, once implemented, for years to come.

Sincerely,

David Oord
ARAC Chair

Enclosure: ACSWG CtA Final Recommendation Report

Aviation Rulemaking Advisory Committee (ARAC)
Airman Certification Standards (ACS) Work group (WG)
**Call to Action (CtA) Subgroup (SG)**

TO: ACS WG Leads – David Oord, Susan Parson
FROM: ACS CtA SG Lead – Jackie Spanitz
DATE: June 1, 2022
SUBJECT: Call to Action Final Recommendation Report Cover Letter

This report is in response to the Congressional requests made in H.R. 133-1160, with recommendations based on the review of Federal Aviation Administration (FAA) airman certification standards by a group of dedicated volunteers consisting of community and FAA partners.

**https://www.congress.gov/116/bills/hr133/BILLS-116hr133enr.pdf**

**H.R. 133-1160: Page 1158, Sec. 119. Domestic and International Pilot Training. (c) (2) (D):**

**"a review of revisions made to the airman certification standards for certificates over the last 4 years, including any possible effects on pilot competency in basic manual flying skills"**

**H.R. 133-1160: Pages 1159-1160, Sec. 119. Domestic and International Pilot Training. (d) (1); (d) (2) (A), (B), and (C); and (d) (3):**

**"(d) CALL TO ACTION ON AIRMAN CERTIFICATION STANDARDS.—**

**(1) . . . Not later than 60 days after the date of enactment of this title . . . initiate a call to action safety review of pilot certification standards in order to bring stakeholders together to share lessons learned, best practices, and implement actions to address any safety issues identified.**

**(2) . . . shall include—**

**(A) a review of . . . regulations, guidance, and directives related to the pilot certification standards, including the oversight of those processes;**

**(B) a review of revisions made to the pilot certification standards for certificates over the last 5 years, including any possible effects on pilot competency in manual flying skills and effectively managing automation to improve safety; and**

This Call to Action Sub Group (CtA SG) convened April 29, 2021 and met bimonthly thereafter to discuss and conduct research on the assigned tasks. An initial work plan was submitted for the June ARAC 2021 meeting. An Interim Recommendation Report was submitted for the August ARAC 2021 meeting. Two research projects were completed. This research informed the five recommendations included in the Final Recommendation Report.

We hope this report and these recommendations will be useful to the FAA, DOT and Congress to move forward with the airman certification process and Airman Certification Standards (ACS). The CtA SG members appreciate the opportunity to provide feedback and thank you for this opportunity. Please let us know if we can provide anything further.

Sincerely,

Jackie Spanitz, ACSWG CtA Subgroup Lead
General Manager, Aviation Supplies & Academics, Inc.

Aviation Rulemaking Advisory Committee (ARAC)
Airman Certification Standards (ACS) Work group (WG)
**Call to Action (CtA) Subgroup (SG)**

**DESCRIPTION** ARAC ACS WG – CtA SG Final Recommendation Report

**DATE** June 1, 2022

**SUMMARY** This report is in response to the Congressional requests made in H.R. 133-1160, with recommendations based on the review of Federal Aviation Administration (FAA) airman certification standards.

**THE TEAM**

**ARAC ACS WG Leads:** David Oord (Wisk Aero), Susan Parson (FAA, AFX-001)
**CtA SG Community Lead:** Jackie Spanitz (Aviation Supplies & Academics, Inc.)
**CtA SG Program Manager:** Shelly Waddell Smith (FAA, AFS-630)

**Community Partners:**

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| Paul Cairns | ERAU | Dr. Janeen Kochan | Aviation Research, Training & Services |
| Kevin Comstock | ALPA | Justin Madden | AMFA/Southwest Airlines |
| Chris Cooper | AOPA | Crystal Maguire | ATEC |
| Mariellen Couppee | Mobido Creative | Jimmy Rollison | FedEx *(Retired)* |
| Eric Crump | Polk State College | Kevin Semler | Leonardo Helicopters |
| Maryanne DeMarco | CAPA | Roger Sharp | Pilot/Instructor *(original ARC ACS WG Member)* |
| David Earl | Flight Safety International | | |

**FAA**

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| Amanda Hlubin | Safety Analysis | Amanda Thiesen | Certification & Flight Training |
| Dr. Barry Hyde | Airman Testing Standards | | |

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## EXECUTIVE SUMMARY

Congress mandated the FAA conduct a Call to Action[1] to review pilot certification standards. This review was completed by the Call to Action Work Group (CtA WG) and unanimously concluded that the Airman Certification Standards (ACS) and corresponding process as established by the previous work groups is a safe and effective means to facilitate airman training and testing.

The ACS are the product of a highly successful decades-long collaboration between the FAA and flight training industry that follows an established Quality Management System (QMS). What started with the Aviation Rulemaking Committee (ARC) and continued with the Aviation Rulemaking Advisory Committee (ARAC) ACS Working Group (ACS WG), the evolution of the ACS is a model for government-industry cooperation and change management. This collaborative process is threatened by recent and overly restrictive interpretations of the Administrative Procedure Act, specifically language on *ex- parte* communications. Moreover, in October 2021, the FAA required the ACS be published via Incorporation by Reference (IBR). Since then, the FAA is unable to provide a timeline or process to publish these time-critical standards, informational documents, and test updates, bringing the safety-critical information and agency/constituencies/industry collaboration to a near halt.

The collaborative environment that established the ACS system is seemingly at risk. The breakdown started with rulemaking associated with the 14 CFR Part 147 Maintenance Schools which is tied to the Aviation Mechanic ACS, followed by the FAA decision to use an IBR process to publish ACS. The negative consequences of the stalled publication of the ACS and the lack of communication with the ACS WG under the pretense of *ex parte* communications are *significant and accumulating*. In the absence of new and/or revised certification testing standards, aviation training and testing providers rely on outdated Practical Test Standards (PTS), ACS documents that have no path to be updated with current safety information, or no published standard at all. With the rapid proliferation of new entrants into the National Airspace System (e.g., drones, powered lift, vertical takeoff and landing, and urban air mobility), a pathway forward for the publication of ACS documents and a reactivation of the standards and testing framework envisioned by the FAA and industry is urgently needed. Similarly, the lack of a reliable schedule for the referenced informational documents (such as the FAA-H-8083 handbook publications) as well as a lack of public data to support the FAA Knowledge Exams has further complicated and, in some cases altogether, blocked the cohesion between the aviation training and testing components associated with airman certification.

The IBR process for publishing the ACS and associated informational documents has yet to be established or communicated and may not align with the success associated with the ACS QMS. As a result, industry partners have been very limited in their ability to understand or influence a path forward. Questions and concerns voiced by industry partners are often met with a declination to provide information due to *ex parte* concerns and the connotation that an open and complete response would be unethical. Stifling the free flow of ideas threatens the entire ACS system, and categorically labeling all communications with public stakeholders as unlawful is not supported by the law. To ensure continued improvements to the certification system, the FAA must take a more welcoming and unrestricted approach to public stakeholder feedback, while clearly and broadly communicating how the agency can properly receive non-governmental feedback through both written and verbal forms.

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[1] Aircraft Certification, Safety, and Accountability Act, Pub. L. No. 116-260, div. V, § 119(d) (2020).\

While the ACS WG understands and appreciates the need to avoid rulemaking by policy or requirements that could impose an undue burden on the public, the Aviation Rulemaking Advisory Committee (ARAC) process and the ACS have proven to be a highly efficient, effective, and transparent means to create and manage certification testing elements for a highly dynamic industry where safety remains the highest priority. The process includes opportunities for both expert input through the ARAC and public comment that achieves transparency. Through ARAC, the FAA benefits from stakeholder collaboration and input that helps to maintain systematic alignment among certification testing requirements flowing from topics defined in regulation, reference documentation, and testing. This process also provides the flexibility needed to ensure that certification testing standards can be regularly revised, in a timely and systematic way, to support both advances in technology and evolving safety issues.

Part of the challenge in identifying improvements needed to the ACS publication process is that the ACS IBR publication and change process (including for handbooks and knowledge exams) is still being finalized and implemented by the FAA. However, through regular meetings and research, this Call to Action work group completed the Congressionally-mandated review with the following findings:

- The ACS system is the accepted means to establish and maintain airman certificates and ratings for all current aircraft categories and classes.
- The process established under the ARAC for transitioning between existing PTS and new ACS is effective in meeting regulatory requirements for practical exams. [See Appendix 6]
- The "Change Driver" process is an effective means to manage and implement feedback from agencies and stakeholders to ensure ongoing improvements to the airman certification system. [See Appendix 11]
- A gap analysis concluded pilot competencies, including for manual flying skills and managing automation, are covered in the applicable ACS. [See Appendix 7]
- The ACS is an effective means to gather and provide data applicable to stakeholders involved with airman training and testing.

As a result of this review and the subsequent findings, this report proffers solutions through five recommendations further detailed in the report:

**Recommendation 1**: Congress immediately engage with the Department of Transportation (DOT) to eliminate the recent and unnecessarily restrictive interpretations of the Administrative Procedure Act, which are delaying publishing time-critical aviation safety information, and implement a transparent pathway for effectively and efficiently publishing and maintaining the ACS documents that accommodates safety needs (including NTSB, FAA, and stakeholder input), permits timely changes, provides for predictable revisions, permits for public consultation, promotes continued communication and interaction with community partners.

**Recommendation 2**—Establish a semi-permanent industry/agency collaborative body within FAA to maintain and update the ACS to ensure that training and testing remains correlated and corresponds to current regulations, procedures, equipment, aviation infrastructure, and safety trends. This could be accomplished through the continuation of the ACS WG under the ARAC as a permanent industry/agency body, to see this large task, and other taskings within the ACS WG completed.

**Recommendation 3**—Publish an ex parte policy that supports a more welcoming approach to public stakeholder feedback, clearly and broadly defines informal rulemaking and handling of non-governmental feedback, and incorporates into a process that supports ongoing development of the ACS, informational documents and FAA Knowledge Exams using the agency/industry collaboration that resulted in the successful pilot ACS already published. This will require creation and implementation of an ex parte training session to ensure all affected parties are educated on the policy, what constitutes informal rulemaking, when a communication is considered ex parte, and how to properly give and receive ex parte communications.

**Recommendation 4**—Establish a means for ongoing data evaluation based on the ACS codes, airman knowledge test reports, and practical exam reports for the purpose of ongoing improvement and collaboration between training and testing and to support emerging technologies.

**Recommendation 5**—Establish a process for continual improvement to the FAA standards, guidance, and testing with change management and communication maintained with the training community, including, but not limited to, methods to ensure a balanced test map and means to include new and/or change existing requirements for a sound airman certification process.

The ACS WG is aware of the FAA having worked with the Air Carrier Training Aviation Rulemaking Committee (ACT ARC) to advance pilot training related topics discussed in the Aircraft Certification, Safety, and Accountability Act (ASCAA) of 2020, specifically the ACT ARC Flight Standardization Board Report (FSBR) Working Group. This group provided its recommendations to the FAA in 2020 and 2021. The recommendations from the ACT ARC are available on the FAA's website. The FAA addressed the ACT ARC recommendations through a formal response.[2] The FAA, in its response to Congress related to the CtA, may want to consider including the agency's response to the ACT ARC in addition to the content of this report.

We respectfully request that Congress and the FAA consider these recommendations and implement them as a course of action as soon as practical, and that the FAA seek any necessary legislative authority to accomplish the foregoing if current law does not provide the agency with sufficient flexibility.

## BACKGROUND

Prior FAA Aviation Rulemaking Committees (ARC) and safety recommendations have influenced the development of the ACS and provided technical expertise for the corresponding informational documents. [See Appendix 1: ARC Final Report; Appendix 2: ATST Final Report; Appendix 3: ARAC Final Report.] The ACS framework originated in 2011, when a diverse group of aviation community stakeholders convened in the Airman Testing Standards and Training ARC, which recommended this approach to the FAA. A succession of ARAC-chartered work groups (WGs) and subgroups (SGs), starting in 2012, have since invested countless hours in developing this integrated approach to defining the elements for use in airman certification testing.

The ACS, building on the legacy of Practical Test Standards, integrate knowledge, risk management and skills into a single comprehensive framework for pilot certification while also providing a clear bridge between the regulatory requirements in Part 61 and FAA informational documents, such as handbooks. By providing a comprehensive framework for what a well-trained applicant should know, consider, and do to qualify for a certificate or rating, these documents have significant importance in contributing to the safety of the U.S. aviation system.

[2] Bill Nolen, March 5, 2022, letter to Don Dillman, Chair of ACT ARC.

The FAA published the first two ACS in 2016 and subsequently released several additional ACS, as well as revisions to the original documents in 2017, 2018, and 2019[3]. The ACS significantly improves on the PTS by adding the knowledge and risk management sections that correspond to the skills section, as well as adding ACS Codes to track test questions with informational documents and ACS elements supporting the overall airman certification system, which includes: (1) initial training; (2) FAA Knowledge Exam resulting in airman knowledge test report; (3) retraining based on airman knowledge test report; and (4) retesting based on airman knowledge test report plus overall testing of context-based knowledge, risk management, and skills. This ACS format (knowledge, risk management, skills, and ACS codes) allows for a more effective means to correlate training and testing. It also provides a means of continuous improvement for review and changes over time. The U.S. aviation community has fully accepted this approach and embraces the ACS testing framework as a significantly improved guide to ensuring certification training activity focuses on overall proficiency to help prevent rote memorization or performance of tasks without context.

The transition from PTS to the ACS that was initiated in the 2012 ARC recommendations and the technical work under the ARAC culminated in the issuance of the Airmen Certification Standards for several certificates and rating. The initial work primarily shifted existing technical content from the PTS and knowledge learning statements codes while also integrating risk management considerations into the ACS for the first time. (The PTS had been mostly silent on risk management considerations apart from the introduction of a preamble in 2006 that presented an academic approach to risk management.) The transition to the ACS involved the FAA, academic, and industry experts through the cooperative framework under the ARAC working group. This cooperative framework is intended to enable the FAA to introduce safety improvements to pilot training based on data and the involvement of agency and external experts to help advance the content of the documents (e.g., advance loss-of-control training, handling increased automation including through establishing standards for how to conduct manual flying in an automated aircraft, and advance pilot's understanding of practical risk management considerations). The new framework under the ACS has already advanced the content of FAA training standards related to slow flight. This ACS framework will be the conduit for continued improvements to safety, including a focus on maneuvers and all states of slow flight, stalls, upset recovery, and maintaining coordinated flight, that will alleviate Inflight Loss of Control (ILOC).

The collaborative process that developed the ACS and associated FAA informational documents (such as the FAA-H-series handbooks) has also offered greater transparency, fairness, and trust between aviation community stakeholders and the FAA. In addition to using the ARAC ACS WG to develop and update ACS documents, the FAA has made completed ACS available for public comment and review on the agency's website, as well as through *Federal Register* Notices of Availability.

While development of and revision work on ACS documents continues (there are ten completed ACS, with more in progress) the ACS WG and the broader industry remains frustrated by the fact that no new ACS documents have been published or revised since 2019. Moreover, much of the former collaboration between agency and industry has halted under the pretense that communication on the subject is prohibited due to *ex parte*. The ACS WG understands this delay arises from the previous administration's concerns that the ACS (along with the legacy Practical Test Standards [PTS]) imposes testing requirements not explicitly listed in 14 CFR Part 61 and other regulations.[4] However, the current Administration's decisions have eliminated this

[3] "Airman Certification Standards," Federal Aviation Administration, https://www.faa.gov/training_testing/testing/acs/.
[4] Administrative Rulemaking, Guidance and Enforcement Procedures, 84 FR 71714, published Dec. 27, 2019.

roadblock[5]. In addition, the action by the DOT to amend 49 CFR Part 5 also provided an important step toward reestablishing a process for ACS publication.

In October 2021, the FAA announced the requirement for ACS to be published via Incorporation by Reference (IBR). Since then, the FAA has been unable to provide a timeline or process for the ACS, handbooks, and test updates to be published. This ACS WG is set to expire in December 2022. A regulatory ID number (RIN) has yet to be assigned, nor has the ACS through IBR been published in the DOT's Unified Agenda. Meanwhile, other regulatory initiatives are in process, all of which will need the support of an ACS (to include the forthcoming 14 CFR Part 147, changes to flight instructor certificate expiration date as published in the Fall 2021 Unified Agenda, MOSAIC rules impacting drones and crewed aircraft sharing airspace, as well as changes to the Powered Lift and other aircraft categories, etc.). The ACS is just one of numerous agency priorities. The shift to require ACS to publish through IBR has resulted in a near halt of any progress and collaboration with the work group.

## Call to Action Tasking

In response to questions in certain circles about air carrier pilots' proficiency in manual flightpath management amidst unanticipated cascading failures, cautions, and warnings, Congress enacted the Aircraft Certification, Safety, and Accountability Act, a requirement of Division V of the Consolidated Appropriations Act (Pub. L. No. 116-260, div. V) in December 2020. [See Appendix 4.] The ARAC tasking occurred March 18, 2021. The CtA WG began meeting April 29, 2021, submitted an interim report to ARAC June 15, 2021, and has continued with ongoing bimonthly meetings. [See Appendix 5.]

The ACS WG CtA group completed the FAA tasking, which included:

- Conduct a safety review of the pilot certification standards. The CtA WG concluded that the established ACS system is effective at maintaining airman certification across all certificates and ratings (mechanic, remote, sport, recreational, private, commercial, instructor, airline transport, instrument, land/sea, single/multi-engine),as well as all aircraft categories and classes (airplane, helicopter, balloon, vertical takeoff and land, etc.).
- Investigate and identify significant differences on FAA knowledge tests and pilot applicant performance on the FAA practical tests pre- and post- ACS in the Areas of Operations associated with manual flying skills and automation management (See Appendix 6 [(PTC-ACS Outcome Comparison)].
- Assess whether specific tasks and/or elements associated with manual flying skills and automation management are adequately represented in the ACSs and to determine if any were missing or significantly changes from the ACSs from the previous version of the PTS. [See Appendix 7 (ACS Mapping and Gap Analysis).]
- Review the associated regulations. The CtA WG confirmed the ACS was in compliance with regulations (14 CFR Parts 61, 65, 107, 141, 142), informational documents (FAA-H-8083 handbooks and Advisory Circulars), directives (Order 8900.1 Inspector Guidance), and FAA Memo confirming correlation between PTS and ACS for Part 141 schools. (See Appendix 8.)
- Determine if the oversight of the development and implementation is effective when using the established Quality Management System processes. [See Appendices 9 and 10.]

[5] Repeal of (a) DOT's 2018 Policies and Procedures for Rulemaking, (b) a 2018 General Counsel Memorandum on the "Review and Clearance of Guidance Documents," (c) a 2019 General Counsel Memorandum on "Procedural Requirements for DOT Enforcement Actions," and (d) a 2019 Rule on Administrative Rulemaking, Guidance and Enforcement procedures.

- Establish an ongoing process for aviation stakeholders to provide and discuss observations, feedback, lessons learned, and best practices, in collaboration with the DOT and FAA, including majority and dissenting opinions and rationale for each position. [See Appendices 9, 10 and 11.]

In order to be representative of the U.S. aviation community and obtain a comprehensive perspective, the ACS process required collaboration across multiple aviation organizations and entities. Participatory aviation stakeholders included vetted representatives from training and education institutions, aviation and airworthiness instructors and students, publishers, designated examiners, pilots, mechanics, airline and labor representatives, manufacturers, and aviation safety experts. These industry representatives worked with FAA representatives from multiple areas including Air Carrier Training and Voluntary Safety, Certification and Flight Training, Safety Analysis, Airman Testing Standards, and Regulatory Support to provide and discuss observations, feedback, lessons learned, and best practices. The multiple ACS work groups and subgroups formed from this collaboration worked interactively to address the comprehensive range of designated airman certification areas representing the knowledge and skill required for those areas of certification.

The ACS WG focused on identifying the wide array of knowledge and skills necessary to perform the specific job identified with the various certification areas. Additionally,prime importance was given to those risk management aspects related to safety. The multiple ACS developed addressed all aspects of the aviation certification areas represented, standardizing with airman must know, consider and do to qualify for an FAA certificate or rating. The differing ACS developed will evolve as the multiple aspects of aviation also advance, accounting for new equipment, technologies, and safety practices. It is not a static process. The ACS coding system is the tool used to convey the knowledge, skills, and considerations (risk) in which airmen may be strong or weak, relative to the expected standard, and to ensure training and testing remain correlated, deficient knowledge is retested, and the practical exam confirms that all knowledge, risk management, and skills meet the FAA standard.

The CtA WG met virtually bimonthly to review progress, and research was conducted to complete the tasking. [See Appendix 5, 6 and 7.] This CtA Final Recommendations Report provides results of this review, including recommended actions, to the FAA.

## AIRMAN CERTIFICATION

Pilot and mechanic applicants must meet the experience and testing requirements as defined in Title 14 of the Code of Federal Regulations; this is a tightly regulated certification system that includes training, testing, retraining, and retesting. Applicants must successfully complete the FAA Knowledge Exam specific to the certificate or rating they seek, retrain on knowledge proven deficient on this test, and then successfully complete the FAA Practical Exam which includes retesting the proven deficiency on the knowledge exam and demonstrating proficiency in the skills defined in the ACS. The ACS defines the expected knowledge, risk management, and skills for all applicants who must be issued an FAA certificate or rating.

The ACS originated from the Practical Test Standards (PTS). Knowledge and risk management elements were added to the PTS-based skill elements for each task within an area of operation, to create a single reference for what applicants must know, consider, and do to earn an airman certificate or rating. The PTS "Special Emphasis Items" were transitioned into actionable risk management considerations in the ACS. Each task (pilot) and subject (mechanic) include a list of curated government references, which provides the corresponding information to correlate to the expected knowledge, risk management aspects, and skill. ACS codes are applied to each task/subject element; these were created to replace Learning Statement Codes for use on the Airman Knowledge Test Report as well as within all airman training and testing. This ties the expected knowledge, skill, and risk management to informational documents (identified in the references associated with each task), testing, retraining, retesting, and ultimately a successful or failed airman application.

These ACS must be maintained and updated to ensure the training and testing corresponds to current regulations, procedures, equipment, aviation infrastructure, and safety trends. The Change Driver process was created to manage input and revisions to all affected components of the airman certification system: Standards, Informational Documents, Testing, and Public Data and related Change Management activities. [See Appendix 12.]

While the ACS WG continued to work on the ACS, and WG members submitted Change Drivers in compliance with the established process, the FAA standards, informational documents and the public data associated with testing has been paused for more than two (2) years. This is a result of the Administrative Rulemaking, Guidance and Enforcement Procedures, 84 FR 71714, published Dec. 27, 2019, that continues currently following an FAA decision to utilize IBR while they implement the IBR process. The ACS WG is significantly/extremely concerned; the FAA needs to publish the ACS in a timely manner to maintain a safe National Airspace System (NAS) and airman certification system, while maintaining agility, efficiency, and collaboration at the highest level.

## Ex Parte Communications

Conversations between public stakeholders and regulators may be severely hampered by limitations and misunderstandings surrounding *ex parte* communications. For example, as 14 CFR Part 147 rulemaking progressed, the FAA stopped communicating the ongoing development of the corresponding Mechanic ACS. This Mechanic ACS evolution resulted in additional updates to the existing pilot ACS; however, has not communicated what these specific changes will be. As another example, the ACS WG submitted and ARAC has recommended to the FAA new ACS documents for the Powered Lift aircraft category, for which a PTS does not yet exist. These Powered Lift ACS are needed to address the new aircraft in development now, including Vertical Takeoff and Landing (VTOL). The FAA has not communicated any further development or timeline, since the Powered Lift ACS were recommended from ARAC beginning in 2018, leaving all training and testing in limbo. The FAA should clarify among staff the requirements of the APA with respect *ex parte* communications and ensure that staff do not adopt an unnecessarily restrictive approach toward such communications.

Active stakeholder participation is vital to the creation of a durable rule and the most direct, nimble, and robust safety outcome. Misconceptions surrounding *ex parte* communications—primarily the idea that all communications that occur during rulemaking are *ex parte* and therefore unlawful—deter meaningful discussion and collaboration Rules governing the handling of industry feedback must therefore be clearly defined and understood by all stakeholders to ensure productive collaboration is not unduly discouraged.

*Ex parte* communications are not prohibited during informal rulemaking; indeed, the regulation[6] largely focuses on ways to properly receive *ex parte* communications and mitigate the risk of these communications disrupting the rulemaking process. A restrictive interpretation of the regulation by agency officials is not in the

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[6] See 49 CFR § 5.5, Public contacts in informal rulemaking.

best interest of safety; that common interest is best served when all stakeholders are at the table with an opportunity to be heard, understood and to learn from one another.

As set forth in a 2014 report of the Administrative Conference of the United States (ACUS),[7] current technology allows a mechanism to effectively and efficiently receive and disseminate *ex parte* communications for public review. This same mechanism could, and should, be embraced to facilitate open feedback and collaboration amongst members of the ACS work group.

In addition, carrying out several recommendations made in the ACUS report would further facilitate open collaboration among work group members, including:

- Publication of an agency-wide policy that supports a more welcoming and attainable approach to public stakeholder feedback and clearly and broadly defines informal rulemaking and handling of non-governmental feedback.[8]
- Creation and implementation of a training session to ensure all affected parties are educated on the policy, what constitutes informal rulemaking, when a communication is considered *ex parte*, and how to properly provide and receive *ex parte* communications.

The agency should take a vested interest to ensure open collaboration, with all public stakeholders who share the government's interest, in order to ensure a quality aviation workforce and continued safety in flight.

## Pilot Certification Standards Review

The FAA has published ten (10) ACS in the last five (5) years, to include revisions:

- Private Pilot Airplane, Instrument Rating Airplane, and Commercial Pilot Airplane—originally published in 2016 and updated in 2019.
- Remote Pilot and , Small Unmanned Aircraft System—published in 2018.
- Airline Transport Pilot (ATP) Airplane—published in 2019.
- Aviation Mechanic General, Airframe, Powerplant—published in March 2022 (pending missing information and effective date and listing November 2021 on the title page).

Additionally, the ACS WG has submitted ACS and Handbook recommendations to the ARAC, who in turn has supported and recommended these to the FAA. However, all of these have been stalled due to the delays currently attributed to the lack of processes in place to publish under IBR. The list of ARAC recommended documents not yet published by the FAA include:

FAA Certification Standards

- Aviation Mechanic – General, Airframe, Powerplant (FAA-S-ACS-1) - 2018
- Private Pilot – Helicopter (FAA-S-ACS-15) – August 2018
- Instrument Rating – Powered Lift (FAA-S-ACS-3) – August 2018
- Inspection Authorization Testing Standard (FAA-S-TS-25) – November 2018

[7] Sferra-Bonistalli, E. (2014, May 1). Ex Parte Communications in Informal Rulemaking. Administrative Conference of the United States, available at https://www.acus.gov/sites/default/files/documents/2014-4%20Report.pdf.

[8] The work group acknowledges the definitions and guidance provided on this topic in FAA Order 7400.2N, Procedures for Handling Airspace Matters, available at https://www.faa.gov/air_traffic/publications/atpubs/pham_html/chap2_section_1.html. However, the policy does not delineate between formal and informal rulemaking and seemingly discourages *ex parte* communications, a position not supported by the regulation.

- Instructor – Airplane (FAA-S-ACS-9) – November 2018
- Private Pilot – Powered Lift (FAA-S-ACS-13) – June 2019
- Commercial Pilot – Powered Lift (FAA-S-ACS-2) – June 2019
- Commercial Pilot – Helicopter (FAA-S-ACS-16) – June 2019
- Instrument Rating – Helicopter (FAA-S-ACS-14) – June 2019
- Airline Transport Pilot and Type Rating for Powered Lift (FAA-S-ACS-17) – August 2019
- Instructor – Powered Lift (FAA-S-9, Section 4) – June 2020
- Private Pilot – Balloon (FAA-S-ACS-18) – June 2020
- Airline Transport Pilot – Helicopter (FAA-S-ACS-5) – June 2020
- Instrument Instructor – Powered Lift (FAA-S-ACS-X) – September 2020
- Private Pilot – Airship (FAA-S-ACS-X) – September 2020
- Remote Pilot – unmanned aircraft (FAA-S-ACS-24, replacing ACS-10A) – November 2020

Handbooks
- Helicopter Flying Handbook, new edition (FAA-H-8083-21) – August 2018
- Powered Lift Flying Handbook (FAA-H-8083-November 2019
- Risk Management Handbook, new edition (FAA-H-8083-2) – September 2020
- Unmanned Aircraft Systems Operations (FAA-H-8083-24) – November 2020
- Balloon Flying Handbook (FAA-H-8083-11) – November 2020

The list of ACS publications the ACS WG has not yet completed and are part of the WG tasking:
- Commercial Pilot – Gyroplane (FAA-S-ACS-4) – June 2019
- Commercial Pilot – Balloon (FAA-S-ACS-19) – June 2020
- Sport Pilot – Model Specific (FAA-S-ACS-20)
- Sport Pilot – Airplane, Gyroplane, Glider, and Flight Instructor (FAA-S-ACS-21)
- Sport Pilot – Airship, Balloon and Flight Instructor (FAAS-ACS-22)
- Sport Pilot – Weight Shift Control, Powered Parachute, and Flight Instructor (FAA-S-ACS-23)

The maintenance of the ACS is of critical importance. Aviation is continuously evolving, and as new technologies are incorporated and procedures are amended or established, they should be evaluated and included on a regular basis to ensure the most robust standard possible. A diverse group of aviation community stakeholders worked with the FAA to develop the ACS, and this collaboration should continue in a way that does not inhibit honest communication and critical feedback. The FAA should consider a standing committee or another available option that can continue this requisite collaboration.

## Practical test standards – Airman Certification Standards Comparison Study

The purpose of this two-part analysis was to investigate and identify significant differences in applicant performance on the FAA Airman (a) Practical Tests, and (b) Knowledge Tests. Investigation into factors that contribute to the training and testing for manual flying skills and automation management were under investigation. To evaluate the differences in practical tests, the Areas of Operation that were deemed unsatisfactory for the Private Pilot Airplane, Instrument Rating Airplane, Commercial Pilot Airplane, and Airline Transport Pilot and Type Rating Airplane practical test results from pre- and post- ACS implementation were analyzed. The data were also normalized for the total number of practical tests given in the selected years. The knowledge test results for pre- and post- ACS were also evaluated (See Appendix 6).

The method of this study was to compare and contrast the Area of Operations, Tasks, and Elements that were deemed unsatisfactory on airmen practical tests when using the FAA Practical Test Standards (PTS) to those deemed *since* the Airman Certification Standards (ACS) were implemented. The goal was to (a) investigate and identify significant differences in pilot applicant performance on the FAA practical tests pre- and post ACS implementation (b) evaluate the differences in the total *rates* of unsatisfactory performance on the practical tests, and (c) identify Areas of Operation found unsatisfactory under the ACS associated with manual flying skills and automation management. This could be used to directly address the knowledge, risk management and/or skills in need of attention.

The first part of the study included four ACSs; Private Pilot Airplane, Instrument Rating Airplane, Commercial Pilot Airplane, and Airline Transport Pilot and Type Rating Airplane practical test results. The second part looked at the associated FAA Knowledge Test results for Private Pilot Airplane, Instrument Rating Airplane, Commercial Pilot Airplane, and Airline Transport Pilot and Type Rating Airplane. The Commercial Pilot Airplane, Instrument Rating Airplane and Private Pilot Airplane data from 2014 and 2015 (pre-ACS implementation) and 2018 and 2019 (post-ACS implementation) were compared. These years were chosen to be representative of the pilot applicant population without significant disruptions to the aviation system in process (e.g., the 2020 pandemic). However, the ATP data comparison uses 2014, 2015, and 2018 compared to 2020 as the ATP Airplane ACS was not introduced until mid-2019. A year-by-year analysis was also conducted to identify trends in the practical test failure rates. Data sources were obtained from the FAAs' Flight Standards, Safety Analysis and Promotion Division FS-900 through Excel Spreadsheets or FAA public domain websites.

The elements that were deemed to be unsatisfactory on practical tests were entered as variables and coded into categories that included the concepts of "manual flying skills" and "effective management of automation." The failure rates were shown as raw numbers as well as percentage of the failure rates. A chi-square test of equal frequencies was conducted to investigate differences in the frequencies of the failures in Areas of Operation found under the PTSs and ACSs. The chi-square indicates whether the frequencies (number of values) in each category or group are statistically different from each other.

The results of the practical test analysis showed several significant differences in pilot performance between the PTS and ACS years. Pertinent to manual flying skills, the most notable change was in the ATP Airplane Stall Prevention Area of Operation where there was a significant *decrease* in the number of failures pre- and post-ACS implementation (24% and 5% respectively). However, equally of interest is an increase in the failures for the Instrument Procedures Area of Operation for the ATP Airplane where there was a significant *increase* in the failures pre- and post- ACS implementation (20% and 34% respectively). The number of overall unsatisfactory practical tests shows significant increase in the number of failures on the ATP Airplane and Instrument Rating Airplane practical tests.

The results of the Knowledge Test comparison showed no significant differences in the pre- and post ACS implementation scores, though all have increased (improved) slightly. This may be an artifact of the more specific language used in the ACS elements and the coordination between the knowledge test and the ACS that has been built in to the airman certification.

## ACS MAPPING AND GAP ANALYSIS STUDY AND FINDINGS

The purpose of the Airman Certification Standards Mapping Task and Gap Analysis for Manual Flying Skills and Automation Management was to determine (a) whether specific Tasks and/or their underlying Elements were described in the ACS under investigation (ACS Mapping) and then to (b) evaluate if there were Tasks and/or Elements identified that were missing from the ACSs (Gap Analysis) from either the previous PTSs or in view of expert judgment of the ACS (See Appendix 7).

To begin, we recorded the applicable ACS Tasks and Elements in an Excel Spreadsheet for each of the three areas (Knowledge, Risk Management, and Skill) for the Private Pilot-Airplane, Instrument Rating-Airplane, Commercial Pilot - Airplane, and ATP Airplane ACSs with respect to the two concepts (Manual Flying Skills and Automation Management). The total number of tasks associated with manual flying skills and automation management were counted and percentages of the total tasks were calculated. This showed a relative coverage of these tasks in each of the ACSs broken out by knowledge, risk management, and skill elements.

Careful consideration of the percentages of Tasks and Elements included in the ACSs for the topics of interest showing an emphasis on Manual Flying Skills for the Private, Commercial, and Instrument Rating Airplane ACSs. Additionally, there is a strong target on Automation Management in all three focused areas of Knowledge, Risk Management, and Skills. The lower percentages of Tasks and Elements for the ATP ACS still shows more than 35% of the Tasks associated with Manual Flying Skills and almost 20% directly associated with Automation Management.

After the ACS Mapping was complete, a gap analysis was performed to capture gaps and suggested enhancements for the ACSs. Using the ACS Tasks and Elements identified in the mapping, an analysis was conducted to determine if there are gaps in the existing document with respect to manual flying skills and automation management. The intent was to discover (a) if any knowledge, risk management, or skill previously listed in the former Practical Test Standards had been overlooked or the intent changed, and (b) given the dynamic nature of the industry, if there are knowledge, risk management, and/or skills that should be added to enhance the training and testing of the target topics.

To accomplish this, the investigators reviewed revisions made to the certification standards (PTSs and ACSs) for certificates over the last 5 years, searching for any possible changes that may have an effect on pilot competency in basic manual flying skills and effective automation management. Regulations, guidance, and directives related to pilot certification standards, including the oversight process, were also taken into consideration.

The results of the analyses showed that the ACSs evaluated capture the requirements for airman to know, consider and do to effectively balance flying the plane, using combinations of automation and manual flying, to build and retain all skills necessary for flight path management.

## Recommendations

As a function of this review, the CtA WG provides the following recommendations:

**Recommendation 1— Congress immediately engage with the Department of Transportation (DOT) to eliminate the recent and unnecessarily restrictive interpretations of the Administrative Procedure Act that are delaying publishing time-critical aviation safety information, and implement a transparent pathway for effectively and efficiently publishing and maintaining the ACS documents that accommodates safety needs (including NTSB, FAA, and stakeholder input), permits timely changes, provides for predictable revisions, permits for public consultation, promotes continued communication and interaction with community partners.**

The ACS are the product of a highly successful decades-long collaboration between the FAA and flight training industry that follows an established Quality Management System (QMS). The evolution of the ACS is a model for government-industry cooperation and change management. This collaborative process is now threatened by recent and overly restrictive interpretations of the Administrative Procedure Act, specifically language on ex parte communications. In October 2021, the FAA required the ACS be published via Incorporation by Reference (IBR), and since then, the FAA is unable to provide a timeline or process to publish these time-critical standards, handbooks, and test updates, bringing the safety-critical information and agency/constituencies/industry collaboration to a near halt.

**Recommendation 2—Establish a semi-permanent industry/agency collaborative body within FAA to maintain and update the ACS to ensure that training and testing remains correlated and corresponds to current regulations, procedures, equipment, aviation infrastructure, and safety trends. This could be accomplished through the continuation of the ACS WG under the ARAC as a permanent industry/agency body, to see this large task, and other taskings within the ACS WG completed.**

The maintenance of the ACS is of critical importance. Aviation is continuously evolving, and as new technologies are incorporated and procedures are amended or established, they should be evaluated and included on a regular basis to ensure the most robust standard possible. A diverse group of aviation community stakeholders worked with the FAA to develop the ACS, and this collaboration should continue in a way that does not inhibit honest communication and critical feedback. The FAA should consider a standing committee or another available option that can continue this requisite collaboration.

While the ACS WG understands and appreciates the need to avoid rulemaking by policy or requirements that could impose an undue burden on the public, the Aviation Rulemaking Advisory Committee (ARAC) process and the ACS have proven to be an extremely (or a highly) efficient, effective, and transparent means to create and manage certification testing elements for a highly dynamic industry where safety remains the highest priority. The process includes opportunities for both expert input through the ARAC and public comment that achieves transparency. Through ARAC, the FAA benefits from stakeholder collaboration and input that helps to maintain systematic alignment among certification testing requirements flowing from topics defined in regulation, referenced informational documents, and testing. This process also provides the flexibility needed to ensure that certification testing standards can be regularly revised, in a timely and systematic way, to support both advances in technology and evolving safety issues.

**Recommendation 3—Publish an *ex parte* policy that supports a more welcoming approach to public stakeholder feedback, clearly and broadly defines informal rulemaking and handling of non-governmental feedback, and incorporates into a process that supports ongoing development of the ACS, informational documents and FAA Knowledge Exams using the agency/industry collaboration that resulted in the successful pilot ACS already published. This will require creation and implementation of an *ex parte* training session to ensure all affected parties are educated on the policy, what constitutes informal rulemaking, when a communication is considered *ex parte*, and how to properly give and receive *ex parte* communications.**

Active stakeholder participation is vital to creation of a durable rule and the most direct, nimble, and robust safety outcome. Misconceptions surrounding ex parte communications—primarily the idea that all communications that occur during rulemaking are ex parte and therefore unlawful—deter meaningful discussion. Rules governing the handling of industry feedback must therefore be clearly defined and understood by all stakeholders to ensure productive collaboration and communication is not unduly discouraged. This can be accomplished by the FAA creating a welcoming policy that is clearly communicated to all stakeholders with associated training to ensure proper implementation.

**Recommendation 4—Establish a means for ongoing data evaluation based on the ACS codes, airman knowledge test reports, and practical exam reports for the purpose of ongoing improvement and collaboration between training and testing and to support emerging technologies.**

The Airman Certification system that evolved as a direct result of the creation of the Airman Certification Standards must include a regular review of safety, training and test data to ensure the correlated training and testing are addressing the current needs for safe and effective airman. This data analysis should be done at least biannually so airmen are being properly trained and tested for what they must know, consider and do to operate safely and effectively within the National Airspace System and with today's aviation equipment.

**Recommendation 5—Establish a process for continual improvement to the FAA standards, guidance, and testing with change management and communication maintained with the training community, to include methods to ensure a balanced test map and means to include new and/or change existing requirements for a sound airman certification process.**

The ACS is an effective means to communicate what airmen must know, consider and do to effectively balance flying the plane, using combinations of automation and manual flying, to build and retain all skills necessary for flight path management. These important documents must be created and maintained in collaboration with agency and community stakeholders to ensure applicants seeking airman certification are being trained and tested on the information critical to safely operating today's equipment being used in the National Airspace System.

## Conclusion

The intent of the ACS is to communicate the knowledge, risk management, and skills to all the parties involved with the airman certification process: applicants, instructors, schools, and evaluators. These documents are critical to aviation safety, by establishing a standard on which expectations can be made for an individual holding an FAA certificate or rating and ensure training and testing remain correlated.

Publication of ACS must begin again to avoid compromising aviation safety. The process needs to be transparent, allow for industry collaboration, timely in creating new ACS, as well as for updating existing documents. The process needs to account for concerns with ex parte communications, to ensure the process remains effective for revisions and continued transition from PTS to ACS.

The path forward must include formulating a recurring work group, prior to the ARAC WG Charter expiration on December 31, 2022, as much work remains incomplete. Existing ACS are in dire need of updates, more than 30 Practical Test Standards need to be transitioned to the improved ACS format, handbooks need new editions, and FAA Knowledge Exams need to be revised. All of this must happen with an established change management process that ensures training and testing are correlated and the airman certification system remains valid and meaning.

This report provides five (5) recommendations that Congress and the FAA should carefully consider and implement promptly. These recommendations include addressing the publication and ongoing maintenance of the ACS in a timely and transparent manner with the continued collaboration of the aviation community. The implementation of these recommendations will help provide the essential safety that the national airspace system (NAS) requires.

## Appendices

Appendix 1: A Report from the Airman Testing Standards and Training Aviation Rulemaking Committee to the Federal Aviation Administration, April 13, 2012.

Appendix 2: A Report from the Airman Testing Standards + Training Work group to the Aviation Rulemaking Advisory Committee, September 4, 2013.

Appendix 3: Interim Recommendation Report, Aviation Rulemaking Advisory Committee, Airman Certification System Work group, May 21, 2018.

Appendix 4: HR 133-1160 applicable excerpts—Airman Certification System (ACS) Work group (WG): Call to Action Safety Review of Pilot Certification Standards.

Appendix 5: ARAC ACS WG—CtA SG Interim Recommendation Report, August 12, 2021.

Appendix 6: Practical Test Standards Transition to Airman Certification Standards: Comparison of Airman Performance, Aviation Rulemaking Advisory Committee, ACS Work group, Call to Action Subgroup, May 3, 2022.

Appendix 7: Airman Certification Standards Mapping Task and Gap Analysis for Manual Flying Skills and Automation Management, Aviation Rulemaking Advisory Committee, ACS Work group, Call to Action Subgroup, May 3, 2022.

Appendix 8: FAA Memo: Use of Airman Certification Standards (ACS) in lieu of Practical Test Standards, June 16, 2014.

Appendix 9: Alignment of Airman Certification Standards Development Review Revision Work Instructions for AFS-630 and ARAC ACS Work group (QMS Work Instructions version 6.2).

Appendix 10: Airman Knowledge Test Question Development, Review and Revision (QPM AFS 600-005), August 26, 2009.

Appendix 11: Change Driver Process—Office Procedures Manual: Work Process, Airman Testing Standards Branch (AFS-630), October 31, 2021.

Appendix 12: Airman Certification System: Changes (slide), Federal Aviation Administration.

*A Report from the*

# *Airman Testing Standards and Training Aviation Rulemaking Committee to the Federal Aviation Administration*

Recommendations to Enhance the Airman Knowledge Test Content and Its Processes and Methodologies for Training and Testing.

*April 13, 2012*

April 13, 2012

Ms. Margaret Gilligan
Associate Administrator for Aviation Safety, Federal Aviation Administration (FAA)
800 Independence Avenue, SW.
Washington, DC 20571

Dear Ms. Gilligan,

The FAA established the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) on September 21, 2011, with the objective for industry to provide the FAA with its experience and expertise in the elements of aeronautical knowledge and aeronautical experience required for safe operation in the National Airspace System.

On behalf of the ARC members, per section 5b of the ARC charter, I am providing you the recommendations and associated report in response to the four tasks identified by the FAA. The ARC's nine recommendations to the FAA are outlined in the Executive Summary of the report. A detailed review of the recommendations and detailed background and supporting material for each are provided in the main body of the report.

The ARC looks forward to the FAA's response to these recommendations and offers to assist with their implementation, as well as any needed public communication about changes to the airman testing process.

Sincerely,

Jens C. Hennig

Jens C. Hennig
Industry Chair, Airman Testing Standards and Training ARC

Cc: Susan Parson, AFS–3, Designated Federal Official
Van Kerns, AFS–600

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# EXECUTIVE SUMMARY

## Background

The aviation training community has raised concerns to the Federal Aviation Administration (FAA) over the past few years about how the airman standards, handbooks, and testing materials are not keeping pace with aviation training methods and technology. The aviation community has also faulted the FAA for its piecemeal and often unilateral efforts to revise standards, training material, and testing methodologies. The FAA responded by chartering the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) in 2011. The ARC was established to comprehensively address the feedback from the aviation industry and provide recommendations to improve the process. See Appendix C, ARC Charter.

This report contains the ARC's recommendations to enhance the airman testing process by setting standards that result in improved relevance of the material being tested and a better correlation between airman testing and the education and training of applicants for FAA certification. Additionally, this report seeks to leverage the aviation community's resources to interact with the FAA for the mutual goal of increasing aviation safety through better training and assessment.

## Description of Tasks Assigned to the ARC

The FAA asked the ARC to review and provide recommendations in four areas:

1. *A prioritized list of up to five pilot and/or instructor certificates and/or ratings its work will address.*
2. *An aeronautical knowledge standard for the selected certificates and ratings. The aeronautical knowledge standard for each certificate and/or rating should set forth the overall precepts that will conceptually frame, guide, and justify its specific technical subject areas.*
3. *Methods for regular industry participation in the planning, development, production, and review of technical information (e.g., training handbooks, knowledge test guides, and supplements) intended to convey the elements of the knowledge standard.*
4. *Precepts for development and appropriate review of updated knowledge tests that will accurately and reliably measure the airman's mastery of the aeronautical knowledge standard. This task should include recommendations on types of questions to be included.*

This report does not map directly to the four task assignments, but instead provides a prioritized set of recommendations that propose changes to the content, process, and methodology by which airman testing is conducted.

## Summary of the ARC's Process to Complete the Assigned Tasks

The ARC began its work in early October 2011 and established an aggressive schedule to provide its recommendations to the FAA by March 31, 2012, leaving an additional 6 months for follow up questions and to address any additional tasks from the FAA before the term of the ARC expires.

The ARC met in October, December, January, and March in four face-to-face meetings, conducted numerous conference calls, and convened in subgroups to work offline. Through these meetings, the ARC developed its position on a practical way forward to improve airman testing, with the goal of enhancing safety by ensuring that applicants for pilot certification and other aviation personnel are properly qualified to execute their responsibilities.

The ARC identified several other efforts focused on qualifying and evaluating pilots, including multiple ARCs created in response to the Airline Safety and Federal Aviation Administration Extension Act of 2010 (Public Law 111–216). Although these activities were restricted by the FAA's ex parte limits of rulemaking, the ARC took steps to fully understand the work of these other committees.

The ARC, however, benefitted from its charter's focus on the specific subject of testing and evaluation of applicants for initial application for a certificate or rating, as well as from the FAA selecting committee membership from organizations and companies specifically dedicated to the airman certification process. As shown by the recommendations and supporting material in this report, the ARC's discussions focused on the mechanics, theories, and current methodologies for effectively communicating required knowledge and the processes by which applicants' understanding and retention of that knowledge can be assessed.

## Benefits of Effective Airman Certification

The testing and evaluation of applicants for airman certification is an essential element in assuring aviation safety. The FAA asked the ARC to examine the aeronautical knowledge standards, the current test process and content, and the training handbooks.

The ARC believes dedicating resources to make airman certification testing more effective is key to enhancing aviation safety. Beyond improving safety, the ARC's recommended changes to the airman certification standards and process will benefit the aviation system by standardizing the training and evaluation of airmen, raising the aviation community's perception of testing credibility and providing a clear link between the regulations, guidance, handbooks, test standards, and knowledge test.

The airman certification regulations contained in parts 61 and 141 of Title 14 of the Code of Federal Regulations identify the broad aeronautical knowledge areas for airman training and testing. The handbooks and testing guides provide essential, detailed descriptions of the knowledge and practical skills that must be taught by instructors for applicants to achieve the standards and pass specific tests. These standards, tests, and handbooks are the primary mechanisms by which the FAA communicates the knowledge and skills necessary to operate safely in the aviation system. The knowledge test, in combination with the practical test administered by a designated pilot examiner, is the method by which the FAA evaluates and verifies that the knowledge and skills developed by the applicant during training adequately meet safety standards.

It is the ARC's opinion that many applicants view the knowledge test only as a trivial hurdle to overcome before moving on to the final certification test (the practical test) instead of a key point at which the FAA determines the applicant's ability to operate safely in the system. Fully linking the different components used to train and assess applicants will provide a systems view for how to best leverage each step in the process, including better communicating to trainers the important areas of emphasis during the training process and providing a feedback loop for the FAA.

Finally, recognizing the FAA's limited resources, the ARC—responding directly to the task regarding methods for industry participation—recommends several ways the FAA can leverage the aviation industry's expertise and resources to enhance training and testing processes.

## ARC Recommendations

The ARC makes nine consensus recommendations in this report with proposed timelines, where applicable. Each recommendation is followed by a summary of the committee's discussions and supporting background information.

The ARC recommends the FAA leverage aviation industry expertise for airman testing standards, handbooks, and test questions while also ensuring key FAA policy offices directly engage in the process (see recommendations 1 and 2). Additionally, the ARC recommends a more effective structure for identifying the standards for airman qualification through the creation of airman certification standards documents, an evolution from today's practical test standards (PTS), test guides, and learning statement codes, while expanding the foundational philosophy for knowledge test questions and directly communicating to the aviation training community changes to tests and the aggregate test results (see recommendations 3, 4, 7, and 8). The airman certification standards for each certificate will become the main guide for applicants to determine the required knowledge, skills, and risk management, as well as the degree of mastery applicants must achieve during their training to pass the test for certification. Questions will fully leverage rote learning where appropriate, while challenging the applicant to understand the needed knowledge without being concerned with trick questions or inconsequential direct excerpts from specific documents.

The ARC expended significant time to determine the best approach for reviewing test questions for relevance. It recommends, at least for the near term, the FAA return the knowledge test item question bank to the public domain (see recommendation 5). The ARC recognizes this recommendation is controversial, but returning the question bank to the public domain—where it previously resided—is the most effective way by which the aviation industry and FAA can work cooperatively to review, revise, and better focus what knowledge applicants must demonstrate during knowledge tests.

Several of these recommendations also require a substantial modernization of the technological infrastructure used by the FAA to administer the airman testing, for which the ARC recommends the FAA urgently provide the necessary resources to acquire testing technology that is commercially available and proven in many similar applications (see recommendation 6).

Finally, the ARC evaluated whether safety would be improved by establishing a pass rate for individual sections of a test, which other industry forums have advocated. The ARC recommends the FAA retain a single knowledge test for each certificate or rating and not move to a system of scoring individual subject areas (see recommendation 9). The ARC believes focusing FAA resources on improving the quality of questions and aligning what is tested with safety priorities far outweighs any perceived benefit from the administration of multiple subtests.

## List of ARC Recommendations

### Recommendation 1

The ARC recommends the FAA establish by September 30, 2012, a stakeholder body or coordinated bodies of subject matter experts and relevant FAA policy offices to—

- Assist with the development and boarding of knowledge questions.
- Provide continuous review of standards.
- Undertake the review and development of handbook content.
- Assist with the review of the current bank of FAA knowledge test questions for validity and quality.

### Recommendation 2

The ARC recommends the FAA revise the quality management system (QMS) process through which key policy offices, including AFS–200, AFS–300, AFS–800, AVP, and ATO[1], make recommendations to the FAA Airman Testing Standards Branch (AFS–630) about needed changes to training and testing documents.

### Recommendation 3

The ARC recommends the FAA transition to a single testing standards document, the airman certification standards (an update to the PTS), to include—

- Knowledge,
- Skills, and
- Risk management.

The ARC proposes a schedule for transitioning to the airman certification standards for each certificate in the following order:

- Certificated flight instructor (CFI) (develop and publish by March 31, 2013; with an effective date within 6 months),
- Private pilot (develop and publish by September 30, 2013; with an effective date within 6 months),
- Instrument rating (develop and publish by March 31, 2014; with an effective date within 6 months), and
- Commercial pilot (develop and publish by September 30, 2014; with an effective date within 6 months).

[1] Air Transportation Division (AFS–200), Aircraft Maintenance Division (AFS–300), General Aviation and Commercial Division (AFS–800), Office of Accident Investigation (AVP), and Air Traffic Organization (ATO).

### Recommendation 4

The ARC recommends the following concerning the philosophy of question development:

- The FAA should maintain discretion to write questions that reference multiple documents such that applicants must correlate data.
- Although questions must refer to specific FAA guidance documents, the FAA should not use exact quotes from specific passages unless testing specific required rote knowledge.
- Test questions should be written to be pertinent to safe operations and necessary for sound airmanship.
- Tests should incorporate scenario-based questions that assess the applicant's ability to manage the many risks of flying.
- Test questions should not only be relevant to the way pilots operate in the real world, utilizing current technologies both in and outside the cockpit, but also test how those technologies can be used to facilitate proper risk management skills.
- The FAA should adopt a continuous review process to ensure test questions are relevant to the current technology used in aviation, with priority given to removing obsolete information from the tests.

### Recommendation 5

The FAA should return the knowledge test item question bank to the public domain by December 31, 2012, in a way that maintains the integrity of questions requiring calculations or interpolations in accordance with the guidance below:

- Remove numbers from questions that require calculations or interpolations.
- For scenario-based questions testing risk management skills, remove any facts and numbers that determine the appropriate course of action, such as wind direction.
- For questions that appropriately test rote knowledge, provide a sufficient number and variety of questions to ensure broad knowledge (such as airspace requirements, regulations, and airport signage and markings).

After 3 to 5 years, the FAA should determine whether it is appropriate to make the question bank, completely or in part, nonpublic, provided the following conditions have been met:

- The advisory group identified in recommendation 1 has been operating for a minimum of 3 years and will continue to operate for knowledge tests for every certificate or rating.
- The advisory group has reviewed all test questions in use.
- Correlation between knowledge tests and practical tests indicates that the new testing system has not been effective in creating airmen who demonstrate improved knowledge and risk management skills.

### Recommendation 6

The ARC recommends the FAA urgently allocate additional resources to AFS–630 for an improved computer system (including both hardware and software) for development, maintenance, and delivery of knowledge tests that can—

- Randomly generate tests that include all required knowledge areas (instead of manually created form tests).
- Display onscreen images with regularly updated figures in place of FAA computer testing supplements.
- Improve data management.
- Be updated and maintained as technology improves.

### Recommendation 7

The ARC recommends the FAA improve the feedback mechanism subsequent to knowledge testing by June 30, 2013, by—

- Providing the applicant and instructor the specific missed question(s) to identify the deficient knowledge by review of the Airman Knowledge Test Report.
- Publishing the aggregate results of knowledge testing failure areas to provide a mechanism through which training organizations, providers, and publishers can improve and better target their instruction.
- Reviewing the benefit of integrating the results of aggregate knowledge testing into the Aviation Safety Information Analysis and Sharing (ASIAS) system.

### Recommendation 8

The ARC recommends the FAA establish and continuously communicate a schedule for publishing standards, handbooks, and knowledge test questions by June 30, 2013.

To communicate new important safety information while adhering to the publication schedule, the ARC recommends the FAA establish a process through which high priority topics are identified and communicated to stakeholders by use of "hot sheets" that provide time-sensitive information critical to flight safety between scheduled publication dates.

### Recommendation 9

The ARC recommends the FAA continue to administer a single knowledge test for each certificate or rating and not transition to testing and scoring individual required subject areas.

# SAFETY CONCERNS

The general aviation (GA) fatal accident rate has stalled and remains at an unacceptable level of approximately 1.3 fatal accidents per 100,000 hours, or approximately one fatal accident per 75,000 flight hours. If a typical pilot flies 1,000 hours, 1 in 75 will perish. Stated differently, the GA fatality rate is eight times that of cars on a per-mile basis.[2] These statistics are far from the near-zero probability of being involved in a fatal scheduled air carrier accident.

Recent safety initiatives in the commercial air carrier industry have reduced its accident rate by an impressive 80 percent over the past 15 years, and additional efforts are underway to meet the FAA's goal for the air carrier industry of reducing the safety risk by 50 percent by 2020. Similarly, the FAA's goal for GA safety is a reduction to no more than one fatal accident per 100,000 hours by 2018.

Although both the GA and commercial accident rates provide the clinical statistics for safety, the human story of each event cannot be overlooked. Most people engaged in GA know of someone who has been killed in an airplane accident.[3] Many of these pilots did not court risk, but inadvertently exposed themselves and their passengers to risks they did not fully understand.

Pilots may not fully understand the risks involved with flying because the system through which they are trained and tested currently has limitations. Looking specifically within the scope of the ARC and assuming the knowledge tests are fully relevant to identifying the risks, one problem lies in the way test results are reported. It is possible for a person to—

- Take and pass the required knowledge test,
- Receive incomplete training on subjects they did not answer correctly on the knowledge test, and
- Receive incomplete training from an instructor (who also may have had incomplete training) for the practical test in a way that fails to address the subjects not answered correctly on the knowledge test.

If the designated examiner also fails to identify these discrepancies during the practical test, the applicant becomes a pilot without fully understanding the risks involved.

Though this scenario is an extreme example of the problem, it does occur. The aviation industry has adopted new risk management tools for pilots and incorporated a systems approach to training and safety. The next logical step is integrating those tools into the airman testing process.

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[2] In 2009, the National Highway Transportation Safety Administration reported a rate of 1.13 fatal car accidents per 100 million vehicle miles, compared with the 2009 National Transportation Safety Board statistic showing an aircraft fatal accident rate of 1.32 per 100,000 hours flown in GA aircraft (assuming typical aircraft speed of 150 miles per hour).

[3] An aviation speaker on the ARC has made it a habit for the last decade to ask for a show of hands of the attendees at seminars in the FAA pavilions in Oshkosh, Wisconsin, and Lakeland, Florida, and other venues, of those who have known someone personally who was killed in a GA accident. In every case, a strong majority of attendees have raised their hands.

The ARC recognizes the GA accident rate will always be higher than the commercial air carrier accident rate.  Air carriers incorporate multiple professionals—dispatchers, managers, schedulers, flight crew, and others—involved with ensuring the safety of every flight and have access to more advanced training and resources than GA.  Still, the ARC believes revising the training and testing methods used in GA likely will improve safety among all affected categories of flight.

# PURPOSE OF THE KNOWLEDGE TEST

The knowledge test plays an important role in assessing the aeronautical knowledge of the applicant; the test is the first in the airman certification process and the only test in the process the Federal Aviation Administration (FAA) issues directly. The oral and flight tests that comprise the practical test are normally administered by designated pilot examiners (DPE) who are designated by, but do not work for, the FAA.

When analyzing the overall approach to knowledge testing, the ARC members discussed the purpose and goals of the knowledge testing process.

Knowledge tests are one phase of a multistep certification process that involves training and evaluation to a minimum standard across aeronautical knowledge areas defined by Title 14 of the Code of Federal Regulations (14 CFR).[4] The airman certification process includes training and aeronautical experience requirements certified by an authorized instructor, aeronautical knowledge validated by the FAA knowledge tests and practical tests, and flight proficiency validated by the practical tests. In consideration of this, FAA knowledge tests should be considered one of the key components in the airman certification process.

The Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) believes the primary purpose of the knowledge test is to establish that applicants have obtained a satisfactory base level of knowledge before they can test for certification. The test should therefore sample from the knowledge a pilot candidate is expected to know, with reference to specific FAA guidance and documentation. Another purpose of the knowledge test is to identify deficient areas of knowledge that require additional training by the endorsing flight instructor before an applicant is allowed to proceed to the practical test.

As such, the process of knowledge testing serves as a vital communication tool to the aviation community and is the only direct contact between the FAA and the applicant. When test questions are realistic and based on current and relevant information, the test results and content communicate what is important for pilots to know and emphasize those knowledge areas most likely to impact flight safety.

Rote learning of facts may assist in understanding and is often a necessary part of learning. A 2008 European Aviation Safety Agency (EASA) study[5] concludes: "In terms of regulations and knowledge of procedures and essential flight statistics … some meaningful learning does occur with rote learning." Some areas of the test require verbatim recall of specific data and knowledge of aviation that simply has to be memorized. Surface learning is an important first step in the learning strategy to further "deep learn" materials; memorizing some information is critical for a flight student to master the wide variety of knowledge necessary to safely operate an airplane. The ARC, however, does not believe the knowledge test should stop at evaluating the applicant's rote ability; the philosophy of the test should shift to include questions to better assess what the applicant has learned about managing the risks associated with flight.

[4] See Appendix E, ICAO and 14 CFR part 61 Requirements for Knowledge Testing.
[5] Moebus Aviation Consulting (Moebus), "Impact assessment of the publication of questions of theoretical examinations for Part 66 and Part FCL" for the European Aviation Safety Agency, Research Contract EASA.2008.C52, 7 August 2009, p. 8.

The EASA study identified assessment as possibly the single most important influence on student learning, such that it informs what students learn, how they learn, and how much they learn.[6] As a result, the FAA knowledge test can and should be a powerful communication tool to directly and succinctly convey to aviators those areas of knowledge critical to safety of flight. Student pilots have multiple motivations to learn, not only to pass the knowledge test with a high score, but also to know what they need to be safe, competent pilots. Better training results in better pilots, and better tests result in better training.

The FAA should also leverage the knowledge test as a tool by which new areas of emphasis can be placed on topics important to aviation safety. As an example, the FAA could explore the feasibility of focusing question selection by conducting safety analyses of accidents and incidents as well as the National Aeronautics and Space Administration's (NASA) Aviation Safety Reporting System to ensure knowledge testing items are representative of those most likely to impact flight safety. Additionally, ongoing efforts such as the Commercial Aviation Safety Team (CAST) and the General Aviation Joint Steering Committee (GAJSC) identify areas on which to focus training and education, and may provide opportunities for targeted emphasis on certain topics.

[6] Moebus, p. 23.

# RECOMMENDATIONS

## RECOMMENDATIONS 1 AND 2

**Recommendation 1:** The ARC recommends the FAA establish by September 30, 2012, a stakeholder body or coordinated bodies of subject matter experts (SME) and relevant FAA policy offices to—

- Assist with the development and boarding of knowledge questions.
- Provide continuous review of standards.
- Undertake the review and development of handbook content.
- Assist with the review of the current bank of FAA knowledge test questions for validity and quality.

**Recommendation 2:** The ARC recommends the FAA revise the quality management system (QMS) process through which key policy offices, including AFS–200, AFS–300, AFS–800, AVP, and ATO[7], make recommendations to the FAA Airman Testing Standards Branch (AFS–630) about needed changes to training and testing documents.

The FAA specifically tasked the ARC with providing recommendations about establishing regular stakeholder participation in the development of test questions.

The ARC charter states "the ARC may propose standing committees, working groups, forums, or processes to vet various proposals for revised standards, handbooks, and/or tests. The ARC should also consider how to select appropriate representation for any standing committees or working groups." For the ARC charter, see appendix C to this report.

The ARC reviewed the FAA's current process for developing and reviewing knowledge test questions. The ARC's recommendations on how to expand participation of key FAA and industry stakeholders are discussed below. The ARC also conducted a review of the National Business Aviation Association's Certified Aviation Manager (CAM) certification process, in which industry successfully participates in the development and boarding of knowledge tests for the certification of aviation managers.

### Overview of Current QMS Process

The ARC requested the FAA provide an overview of its current process for developing and reviewing knowledge test questions within the FAA Regulatory Support Division, Airman Testing Standards Branch (AFS–630) as well as the mechanisms for broader FAA input. The FAA presented the existing process at the ARC's first face-to-face meeting in October 2011.

[7] Air Transportation Division (AFS–200), Aircraft Maintenance Division (AFS–300), General Aviation and Commercial Division (AFS–800), Office of Accident Investigation (AVP), and Air Traffic Organization (ATO).

AFS–630 is responsible for ensuring certificated airmen have the knowledge and skills to operate safely in the National Airspace System (NAS). The branch accomplishes this by developing and updating airman certification publications including FAA orders, handbooks and manuals, knowledge test guides, knowledge test questions, and practical test standards (PTS). In total, the branch manages over 80 publications and over 12,000 knowledge test questions in the domestic FAA knowledge test item question bank (hereinafter referred to as the "question bank").[8]

AFS–630 manages 81 knowledge tests covering various airman certificates and ratings, including aircraft dispatchers, aviation maintenance technicians, and pilots. The ARC charter specifically requested the ARC focus on training, testing, and evaluation related to pilot certification. Although the ARC's deliberations focused on these topics, the presentation provided by AFS–630 and the ARC's review and recommendations are applicable to broader airman testing.

AFS–630 has a staff of 13 employees, including aviation safety inspectors (ASI) (operations and airworthiness), educational program specialists, editors, program analysts, and a statistician.[9] Over time, the branch's resources dedicated to developing and maintaining the FAA knowledge test have decreased, while resource requirements and costs for activities such as maintaining outdated technological infrastructure have increased. See recommendation 6 for a discussion of the technological infrastructure and associated limitations.

The ARC spent significant time reviewing the Airman Knowledge Test Question Development, Review, and Revision Process flowchart[10], which identifies the work between the ASIs that develops or reviews the knowledge review questions as well as the process for board review, comments, updates, and editorial changes.

The multistep process begins by identifying the need for a new question, or reviewing an existing question, and progresses after development to a point where the question is subject to a review by an internal board. The board has the discretion to concur with the question or provide comments and suggest changes. This is followed by an editorial review of the question and, after approval, activation of the question in the next cycle roll. Cycle roll updates of the active database occur three times per calendar year.

The FAA also receives external feedback through a post-test survey and a feedback process managed by the Designee Standardization Branch (AFS–640).

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[8] The FAA maintains approximately 11,000 questions in an international bank contracted to select foreign civil aviation authorities.

[9] In 1997, AFS–630 had 23 employees, 15 of which were ASIs. Between 1997 and 2005, AFS–630 lost 5 ASIs, reducing the branch to 18 employees. Since then, the branch lost has lost an additional ASI every year except 2008, with only 6 ASIs remaining (2 in airworthiness and 4 in operations).

[10] See Appendix D, AFS 600–005. The FAA process for airman knowledge test development and review is maintained in AFS 600–005, Airman Knowledge Test Question Development, Review and Revision, a seven-page document that was provided to the ARC for review. AFS 600–005 was originally established in 2004; the branch currently works with a 2009 version.

## Establishment of Stakeholder Participation

The ARC believes a stakeholder group should be established to bolster the test question development process. The ARC focused its initial discussions about the FAA process on two areas: the mechanism for identifying priorities and the use of expertise outside of AFS–630 to review and develop test questions and handbooks. The term "stakeholder" in this report includes representatives of the broader aviation community with subject matter expertise that will support the FAA's efforts to enhance aviation safety through better testing and training. Specific segments of the aviation community the ARC views as appropriate for engagement include but are not limited to—

- Academia,
- Training professionals,
- Manufacturers,
- Examiners, and
- Providers of aviation training materials.

### *Use of FAA Expertise External to AFS–630 in the Development of Knowledge Tests*

Currently, AFS–630 is exclusively responsible for developing, reviewing, and updating knowledge test questions. Although the branch interacts with other FAA offices, such as AFS–800, AFS–300, and ATO, the ARC has identified these interactions as mostly informal in nature.

The ARC believes a more formal process is needed through which other FAA offices can provide input on focus areas and topics subject to testing. As an example, the ARC discussed the recent emphasis on runway safety and prevention of loss-of-control in GA at policy offices in AFS–800 and AVP respectively. The ARC noted that AFS–630 funds work related to both runway safety and loss-of-control, but the initiation of this work primarily resulted from informal interactions between offices as opposed to a specific triggering event.

### *Use of Aviation Community Expertise in the Development of Knowledge Tests*

The ARC discussed implementing a more formal policy that would define a triggering event at key FAA policy offices in which current activities could drive engagement with AFS–630 on revised or updated test questions.

Additionally, the aviation community has firsthand experience with the use of knowledge and practical testing in the training environment and can provide expertise about safety issues, training practices, research findings, and current testing processes. Although stakeholders can submit recommendations for changes through an existing mechanism[11], they receive no feedback about adoption of the proposed changes, and no structured working environment exists through which industry stakeholders can interact with and provide expertise to the FAA about safety issues, training practices, and research findings.[12]

One of the primary tasks in the ARC charter is to recommend—

> *Methods for regular industry participation in the planning, development, production, and review of technical information (e.g., training handbooks, knowledge test guides and supplements) intended to convey the elements of the knowledge standard.*[13]

The material on which the FAA tests applicants through the knowledge test is retained in several FAA handbooks. For a student to be tested on a question, the material must be maintained in both a supporting handbook and handbook source material such as the Aeronautical Information Manual (AIM) or advisory circulars (AC). As a result, the update of a knowledge test depends on a similar update of its supporting handbooks. See figure 1 below.

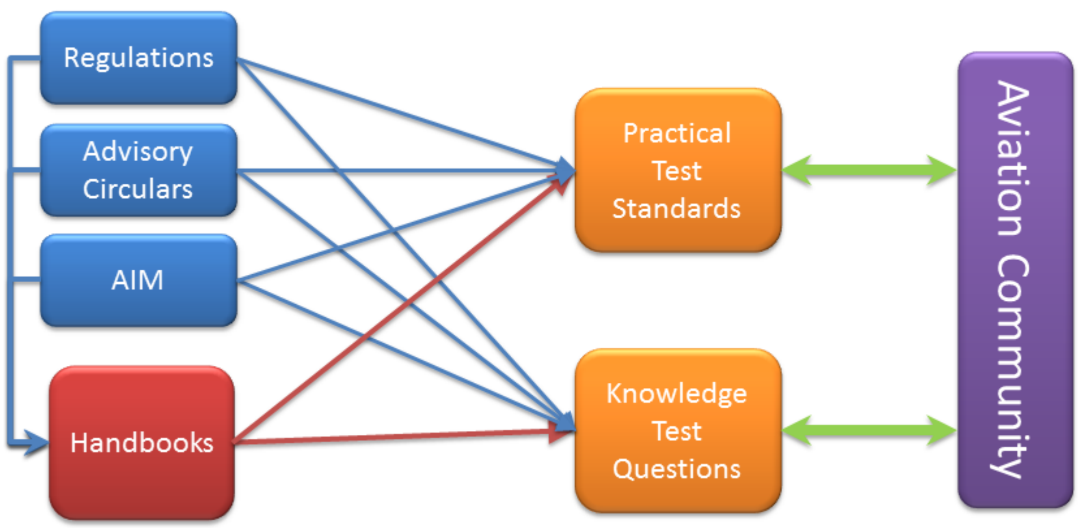


**Figure 1—Sources of Testing Content**

[11] AFS–630 has established an email inbox at afs630comments@faa.gov through which input is collected. The address is made available in the preamble to each document.
[12] AFS–630 holds an annual stakeholder meeting during which key offices' changes are presented, but this is not a formally chartered activity and does not provide a "working environment" for discussion and review of specific questions.
[13] Airman Testing Standards and Training ARC charter, paragraph 3.c.

The ARC determined four primary areas in which broader involvement by both FAA and industry stakeholders would improve the products and result in a better training environment:

1. The establishment and review of standards for knowledge and practical tests;
2. The development and review of key handbooks used for airman training;
3. The development and review, through boarding, of knowledge test questions; and
4. Concise, consistent, and timely communication with the aviation community.

Based on job task analysis, the ARC believes the cycle for introducing changes in training or subject areas must occur in a logical sequence, beginning with new standards. (See Appendix F, Advanced Qualification Program, and Appendix G, Certified Aviation Manager Exams.) Applicable guidance material should then be introduced, followed by the introduction of new knowledge test questions.

### Stakeholder Role in Establishment and Review of Standards for Knowledge and Practical Tests

The requirements for obtaining an airman certificate are based on regulations that are further defined through FAA ACs, handbooks, and PTSes. As an example, the requirements for a private pilot certificate are in 14 CFR part 61, subpart E, including aeronautical knowledge (§ 61.105), flight proficiency for training (§ 61.107), and the required aeronautical experience (§ 61.109). The FAA has further defined the aeronautical knowledge through handbooks (such as FAA–H–8083–3A, Airplane Flying Handbook, and FAA–H–8083–25A, Pilot's Handbook of Aeronautical Knowledge), ACs (such as AC 00–45, Aviation Weather Services, and AC 91–74, Pilot Guide Flight in Icing Conditions), test guides (FAA–G–8082–17A), and learning statement codes (LSC). The FAA has defined the required flight proficiency through PTS.

The ARC recognizes that a number of existing groups provide feedback to the FAA regarding aviation safety and training, including CAST, the GAJSC, and numerous other ARCs. The ARC believes these groups can lend valuable expertise to any newly established standards for airman training and testing.

Currently, the FAA serves as the testing arm of the airman certification process, while the aviation industry provides the corresponding training. Involving the aviation community in establishing and reviewing standards for the tests provides a more integrated and comprehensive process that would result in enhanced training and testing products. Further, a more cohesive process will result in safer pilots and a more efficient and effective training and certification environment.

### Stakeholder Role in the Development and Review of Key Handbooks Used for Airman Training

The inventory of handbooks is the baseline for guiding day-to-day training in the GA industry. The FAA currently reviews handbooks every 3 years per FAA Order 1320.1E. However, in-house FAA resources allocated to this task have consistently declined over the last 15 years, and corresponding costs have increased. This has resulted in large delays in the review and production process associated with handbook development, with handbooks now revised every

3 to 30 years, depending on the subject. This delayed development and unpredictable release schedule for new editions has a direct effect on training innovations, as FAA handbooks define the standards on which all curriculums are based. Private industries are reluctant to invest in training innovations because "pending" FAA standards may nullify the investment with unanticipated changes. Therefore, the aviation industry responds with new training innovations only after pending FAA documents are released.

Handbook review begins with establishing a set of requirements for the requested changes. As an example, the FAA recently decided to amend the Pilot's Handbook of Aeronautical Knowledge to include separate chapters related to loss-of-control and runway safety. The FAA then either undertakes the development of new text or contracts the development to the aviation industry. Following the development of new draft text, the updated handbook is coordinated per FAA Order 8900.1 by the Technical Information and Communications Programs Branch (AFS–140), which incorporates comments from key offices and collects senior-level endorsements, and the new handbook is published. The ARC believes the aviation industry must stay involved and, more importantly, be informed when changes to documents are released so these changes can be implemented in training curriculums. In the case of the runway safety and loss-of-control addition, industry only learned about this change through the ARC. Without a policy in place to notify the intended reader, it is difficult, if not impossible to ensure applicants, instructors, and training providers include the requirements or new topics as the FAA intended.

Additionally, to address the timeline for the FAA's internal review of the handbook, the ARC believes the FAA should review how each office conducts its internal handbook review, including its priority among other documents subject to internal coordination. Although FAA Order 1320.1E requires policy and procedures be reviewed every 3 years, many of the FAA handbooks are long overdue for revision. The industry segments with knowledge of current training practices and equipment in use can help with prioritization, along with other agencies such as NASA, the National Transportation Safety Board (NTSB), and other branches within the FAA.

### Case Study: Working with Industry Can Achieve Positive Results

In the early 2000s, the GA industry faced a substantial change to the type of piston-engine-powered airplanes sold to customers and in use at flight schools because of the introduction of fully or partially integrated electronic cockpits, or "glass cockpits." At that time, the FAA handbooks did not address glass cockpit technology because aviators did not encounter it until they started operating more sophisticated turbine airplanes. A representative of the aviation industry stated in January 2005[14] —

> *With the introduction of new technology—specifically integrated "glass" cockpits in piston airplanes … [industry] believes that it is important that FAA's training and testing standards also reflect this change. As [the FAA] knows, by summer 2005 all piston airplanes coming off of the production line will either*

[14] See January 27, 2005, letter from the General Aviation Manufacturers Association to Robert Wright, Manager, General Aviation and Commercial Division, FAA. http://www.gama.aero/files/GAMA_Letter_to_AFS-800_-_01282005.pdf Accessed April 10, 2012.

*come standard with an integrated cockpit or have it as an option. Therefore, we believe that:*

1. *Training materials for integrated "glass" cockpits need to be included in the FAA Instrument Flying Handbook, which currently does not address the topic properly.*
2. *Relevant testing standards should be included in the practical test standards.*

In response to a petition from the aviation industry, the FAA chartered the GAJSC to establish a working group to review the handbooks, PTS, and knowledge test questions. The working group included representatives from the Aircraft Owners and Pilots Association; General Aviation Manufacturers Association; Cessna Aircraft Company; Garmin; AeroTech, Inc.; Eclipse Aircraft; Small Aircraft Manufacturers Association; and several universities including Embry-Riddle Aeronautical University, University of North Dakota, and Western Michigan University. The working group provided its recommendations to the FAA in December 2005 and the FAA published the resulting change to the Instrument Flying Handbook in 2007.

Participants learned the following lessons from the GAJSC process:

- The working group reviewed the Instrument Flying Handbook because of a specific system change (the introduction of glass cockpits). A more systematic and continuous engagement between key stakeholders and the FAA would lend itself to continued improvement of the handbook documents.
- The work on changing the handbook to address glass was fortuitous in that it occurred when the Instrument Flying Handbook was already scheduled for review. It is not clear if the FAA would have been in a position to reprogram its schedule for this handbook to address the aviation industry's recommendations.
- The GAJSC provided an effective forum for interaction between the FAA and the aviation industry, but at that time the working group did not have any official standing or role in updating the handbook. At times, this resulted in a strained engagement between the working group, the FAA, and the contractors involved, because expectations varied as to what would be produced in support of the rewrite.
- The proposed rewrite was based on a significant technology change and the FAA benefited from the presence of the aviation industry to explain several of the unique features of glass cockpit avionics, including how events such as equipment failure should be taught to new pilots.
- The GAJSC provided its input upfront, but was not part of the follow-on review of handbook draft versions. The review, internal to the FAA, was done by key offices and it is unclear to the ARC the degree of priority the handbook review was given for each person's work assignments or it fell into "other duties as assigned."

Aviation industry engagement in the review process benefitted the FAA in several ways. The volunteer industry representatives brought direct experience from using the existing handbook in day-to-day flight training and introduced means by which material could be more effectively presented. The main part of the change involved technology; manufacturers brought in the principal avionics engineers involved with the development of the devices as well as the training staff of each manufacturer to discuss the correct way to demonstrate and train for use of the equipment.

Overall, the ARC believes the interaction that occurred for the Instrument Flying Handbook in 2005 was positive and can be used to build a more formal process to make changes to handbooks. A similar process was attempted in the follow-on updates of the Aviation Instructor Handbook (in February 2006) and the Pilot's Handbook of Aeronautical Knowledge (in May 2007), but these occurred in a less structured way and did not result in the same level of engagement.

### Stakeholder Role in the Development and Review, through Boarding, of Knowledge Test Questions

The ARC has extensively discussed whether the FAA should return the question bank to the public domain or attempt to keep the question bank nonpublic. A detailed review of public versus nonpublic questions can be found under recommendation 5 and appendix G to this report.

Independent of the public or nonpublic nature of the question bank, the ARC believes the involvement of technical experts from the aviation industry in the development and review of questions would improve their quality.

The current process, as depicted by the AFS 600–005 process flowchart in appendix D to this report, lays out the steps the FAA takes to identify a trigger that forces a question to be developed or revised through review, first by an ASI, then by an internal AFS–630 board, and finally by an editor. The question is then activated in the question bank as a question out for validation. It is not included in the applicant's overall score but instead is used to alert the AFS–630 ASI of how the question performs on the test. For example, if the question performs poorly on a test where the applicant is consistently scoring highly, the problem may lie in the way it is worded or interpreted. Any question that perform poorly must be sent back to the ASI that developed it. If that ASI determines the question is "good" regardless of its performance, it may be activated on a live exam and put into the question bank. The problem with this is that depending on how applicants interpret a question based on their personal experience, it may read differently than the ASI intended. It is therefore ideal for multiple individuals from multiple backgrounds with aviation expertise to review questions and suggest wording changes to clarify these poor performing questions.

The ARC reviewed multiple processes used by industries to develop and board questions. The ARC identified the CAM certification process, through which CAMs participate as experts in the development and boarding of questions as an applicable example. See appendix F to this report. The ARC strongly believes this process applies to the development and boarding of airman test questions.

The ARC sees an opportunity for specific aviation industry involvement at two points in the existing QMS process:

- Triggering the need to develop a new question or review an existing question (see QMS step 1.1) and its follow-on work when the question is developed (see QMS step 1.2.1.2.1). See appendix D to this report.
- Adding multiple industry experts to participate in the board review (see QMS step 1.4) of the new, existing, or revised question.

The recruitment of a volunteer committee of SMEs will result in input to the question development and boarding process at very little cost to the FAA. In fact, the total cost of this change could result in a savings and allow the FAA to leverage the aviation industry as a resource. Over the last 15 years, AFS–630 has seen a decrease in SME personnel while costs associated with maintaining the tests have increased. This increase in costs is related to—

- Maintaining increasingly obsolete technologies and
- Attempting to maintain multiple-item databanks, such as—
    - Form tests consisting of active questions,
    - A reservoir of questions to be implemented into the tests as form tests change, and
    - The public database used to correlate training to testing.

The FAA should review other processes for testing, such as the CAM certification process, as a potential framework for establishing a forum and process for the development and boarding of questions.

## Recommendation 3

**Recommendation 3:** The ARC recommends the FAA transition to a single testing standards document, the airman certification standards (an update to the PTS), to include—

- Knowledge,
- Skills, and
- Risk management.

The ARC proposes a schedule for transitioning to the airman certification standards for each certificate in the following order:

- Certificated flight instructor (CFI) (develop and publish by March 31, 2013; with an effective date within 6 months),
- Private pilot (develop and publish by September 30, 2013; with an effective date within 6 months),
- Instrument rating (develop and publish by March 31, 2014; with an effective date within 6 months), and
- Commercial pilot (develop and publish by September 30, 2014; with an effective date within 6 months).

The current airman certification process references multiple documents including test guides and LSCs for the FAA knowledge exam and the PTS for the practical test. The proposed airman certification standards correlate all of these documents into a single source. The airman certification standards integrate knowledge training with the practical test. The ARC provides two examples below of how the FAA should structure the proposed airman certification standards.

The ARC drew from the effective Advanced Qualification Program (AQP) process in which the knowledge, skills, and attitudes (KSA) required for successful completion of a given objective are derived, and testing, followed by training programs, are constructed to meet those KSAs. See appendix F to this report. Creating airman certification standards from which to derive both the knowledge and practical tests will—

- Improve the knowledge test by linking the LSCs to the airman certification standards.
- Increase the perceived relevance of the knowledge test.
- Improve the testing process by defining the applicable LSCs that drive more relevant test questions.

- Reduce the number of LSCs the FAA must manage.
- Help the applicant and CFI to understand the LSC in the appropriate context, allowing the CFI to provide meaningful retraining.
- Enable the examiner to more effectively evaluate deficient areas on the Airman Knowledge Test Report.

Developing the airman certification standards for the two example tasks was not a particularly difficult or time-consuming process, and significantly simplifies the issue of what questions to write for the knowledge test.

The ARC recognizes adopting a single testing standards document will result in a significant change to the training system, and therefore recommends the development of an aggressive joint FAA/industry communication and deployment plan. The communication plan must include outreach to DPEs, flight instructors, and training organizations. The logic of prioritizing the CFI is to train the trainer first.

To accomplish this transition, the FAA should use the private pilot testing standards demonstration examples on pages 17–19 of this report as framework for the changes.

The ARC created the proposed airman certification standards by doing the following:

- Reorganizing the two current PTS tasks into three sections:
    - Knowledge,
    - Skills, and
    - Risk management.[15]

  These three areas comprise the airman certification standards and the attributes a pilot must possess to safely operate in the NAS. The ARC selected the “Weather Information” and “Normal and Crosswind Takeoff and Climb” tasks from the Private Pilot–Airplane PTS for the examples below because the weather task is primarily achieved by academic learning whereas the takeoff task is primarily learned by physical practice.
- Incorporating information from the test guides (FAA–G–8082 documents) into the introduction.
- Applying current LSCs to the knowledge section of the specific PTS tasks (these remain in the knowledge section of the sample airman certification standards provided below).[16]
- Combining or deleting redundant or irrelevant LSCs.

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[15] The FAA, in other training guidance, uses “aptitude,” “attitude,” or “attribute,” but the ARC has elected to use the terminology “risk management” to capture the same concept. It refers to the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities.
[16] The LSCs served as the bridge between the current testing system and what the ARC proposes should be the next generation of knowledge testing. The LSCs can be viewed as the legacy of decades of flight training and testing, and have grown with a certain amount of guidance at various points in their development, but with no apparent general oversight. This is evident when LSCs are reviewed for repetition, cogency, and cohesion.

- Refining language in the remaining LSCs for clarity.
- Adding new LSCs needed for the specific PTS task.
- Removing acronyms with no practical value (such as TWEB (Transcribed Weather Broadcast), WFO (Weather Forecast Office), and TCP (Tropical Cyclone Public Advisory)).
- Reorganizing the PTS objectives to include knowledge, skills, and risk management as appropriate, instead of what is currently described broadly as "skills."
- Making minor additions to skills (see examples).
- Adding the "risk management" section to outline tasks that support conservative attitudes and behaviors, and risk management awareness and application.

## Example 1

**Task:** Weather Information (ASEL and ASES).

**References:** 14 CFR part 91, AC 00–6, AC 00–45, AC 61–23/FAA–H8083–25, AC 61–84, and AIM.

**Objective.** To determine the applicant has the knowledge, skills, and risk management required to gather and use the available weather information for purposes of assessing the meteorological situation affecting the planned flight, and making a go/no-go as well as en route flight decisions.

**Knowledge:** (Reduced from 68 possible LSCs.)

Demonstrates practical understanding of—

- Atmospheric adiabatic process.
- Isobars/associated winds.
- Aviation Routine Weather Report (METAR)/Non-routine (Special) Aviation Weather Report (SPECI).
- Pilot Report (PIREP).
- Radar Summary Product.
- Significant Meteorological Information (SIGMET.)
- Significant Weather Prognostic Product.
- Convective Outlook Product.
- Surface Analysis Product.
- Terminal Aerodrome Forecast (TAF).
- Weather Depiction Product.
- Winds and Temperatures Aloft Forecast Product.
- Automatic Terminal Information Service (ATIS), Automated Weather Observation System (AWOS), and Automated Surface Observation System (ASOS) product.
- Weather associated with frontal activity and air masses.
- Weather conditions: temperature, moisture, and dewpoint.
- Weather services available inflight.
- How temperature affects weather formations.
- Squall lines: formation, characteristics, resulting weather.
- Thunderstorms: types, characteristics, formation, hazards.
- Fog: formation, characteristics.
- Icing: formation, characteristics.
- Microbursts: formation, characteristics.
- Turbulence: types, characteristics, reporting, and minimizing its effects.

**Skills:** Exhibits knowledge of the elements related to weather information by analyzing weather reports, charts, and forecasts from various sources with emphasis on—

- METAR, TAF, and Area Forecast (FA).
- Surface Analysis chart.
- Radar Summary chart.
- Winds and Temperature Aloft chart.
- Significant Weather Prognostic charts.
- Convective Outlook chart.
- ATIS, AWOS, and ASOS reports.

Makes a competent "go/no-go" decision based on available weather information.

**Risk Management:** Demonstrates the ability to identify and manage risks associated with—

- The limitations of weather reports and forecasts,
- The need to continually update weather information, and
- Resources available.

## Example 2

**Task:** Normal and Crosswind Takeoff and Climb

**Note:** If a crosswind condition does not exist, the applicant's knowledge of crosswind elements shall be evaluated through oral testing.[17]

**Objective:** To determine the applicant has the knowledge, skills, and risk management required for safe completion of this task.

**Knowledge:** Demonstrates practical understanding of—

- The elements related to a normal and crosswind takeoff, climb operations, and rejected takeoff procedures;
- Calculations of takeoff and climb performance[18];
- Procedures for normal takeoff;
- Procedures for crosswind takeoff;
- Calculating crosswind and headwind components;
- Crosswind takeoff control technique;
- Rejected takeoff procedures; and
- Selecting the most conservative performance values for existing conditions.

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[17] FAA–H–8083–3; POH/AFM.
[18] For example, selecting the most conservative data when using a chart that requires interpolation. This tests the applicant's application of the data instead of simple calculation. This assumption is made with any performance calculation required in related tasks.

**Skills:** Demonstrates the ability to safely complete a normal takeoff and landing through the following:

- Briefs takeoff procedures and actions in the event of engine failure during and after rotation.
- Taxies into the takeoff position and aligns the airplane on the runway center/takeoff path.
- Advances the throttle smoothly to takeoff power.
- Aborts the takeoff if performance parameters are not achieved.
- Establishes and maintains the most efficient liftoff attitude.
- Lifts off at the recommended airspeed and accelerates to $V_Y$.
- Establishes a pitch attitude that will maintain $V_Y$ +10/-5 knots.
- Retracts the landing gear and flaps after a positive rate of climb is established.
- Maintains takeoff power and $V_Y$ +10/-5 knots to a safe maneuvering altitude.
- Maintains directional control and proper wind-drift correction throughout the takeoff and climb.
- Completes the appropriate checklist.

**Risk Management:** Demonstrates the ability to identify and manage risks associated with—

- Calculating takeoff performance,
- Calculating climb performance,
- Crosswind component,
- Engine failure after takeoff,
- Wind condition on taking the runway,
- Landing gear retraction,
- Flap retraction,
- Altitude and airspeed for maneuvering,
- Voluntary noise abatement procedures, and
- Use of checklists.

## Priority for Executing Transition to Airman Certification Standards

The FAA specifically asked the ARC which certificates or ratings should be the highest priority when work commences to change the process for developing standards, handbooks, and test questions, as well as the proposed airman certification standard.

Based on feedback from ARC members and their constituents, the following priority of certificate focal areas was agreed on: certificated flight instructor, private pilot, instrument rating, and commercial pilot.

The order of priority for consideration was initially chosen based on training the trainer, followed by (1) the overall volume of tests given for each certificate and the sequential order in which applicants typically train, (2) direct applicability to the overall training process, (3) variety of the question material base, and (4) impact on the overall pilot training process.

## Recommendation 4

**Recommendation 4:** The ARC recommends the following concerning the philosophy of question development:

- The FAA should maintain discretion to write questions that reference multiple documents such that applicants must correlate data.
- Although questions must refer to specific FAA guidance documents, the FAA should not use exact quotes from specific passages unless testing specific required rote knowledge.
- Test questions should be written to be pertinent to safe operations and necessary for sound airmanship.
- Tests should incorporate scenario-based questions that assess the applicant's ability to manage the many risks of flying.
- Test questions should not only be relevant to the way pilots operate in the real world, utilizing current technologies both in and outside the cockpit, but also test how those technologies can be used to facilitate proper risk management skills.
- The FAA should adopt a continuous review process to ensure test questions are relevant to the current technology used in aviation, with priority given to removing obsolete information from the tests.

### Current Knowledge Test Question Development Process

The Federal Aviation Regulations mandate the aeronautical subject knowledge required of airmen, which is tested by the FAA knowledge test. The test is a required step in the certification process for all airmen, and its questions must be defendable by reference to FAA documents. The FAA assigns an LSC to all FAA knowledge test questions; these LSCs are intended to identify both the subject and the associated supporting FAA references. The LSCs are printed on the Airman Knowledge Test Report the applicant receives on completion of the FAA knowledge test to identify the subjects missed on the test. The applicant is required to obtain an endorsement from an authorized instructor certifying the applicant has demonstrated satisfactory knowledge of the subject areas in which the applicant was deficient on the airman knowledge test.

Instructors must be able to accurately identify the knowledge deficiencies to perform their role in the certification process. The ARC has determined that the process by which the test is created and managed, in which LSCs are assigned to the questions, has resulted in problems with test effectiveness.

Currently, LSCs can apply to multiple reference documents and multiple subjects.[19] In some instances, the correct answer to a question will change depending on the reference. As a result, LSCs do not provide enough guidance for the flight instructor to accurately assess inadequate knowledge and provide the required endorsement, nor are they effective for the DPE to understand where emphasis should be placed on the practical test to integrate the knowledge test into the certification process.[20]

In addition, the ARC has determined the questions used on the knowledge exams do not accurately assess an airman's knowledge of a given subject. Airmen can be very knowledgeable about a particular subject but not demonstrate this on the knowledge exam. Alternatively, applicants can demonstrate poor knowledge during the practical test but show complete subject mastery during the knowledge exam, due largely to the questions not targeting the specific knowledge needed to be a safe and effective pilot.

While many questions in the FAA knowledge test bank are valid, relevant, and good indicators of an applicant's ability to correlate information, many other questions are written to be an exact lift of a specific passage from an FAA document, without direct application to safety of flight or necessary airman knowledge. This requires the applicant to train with an emphasis on rote memorization rather than understanding the big picture and application to operations. It also is used in place of scenario-based questions that would require an applicant to correlate information from multiple resources and apply that information to multiple subjects. This test item from the private pilot question bank provides an example:

```
How many satellites make up the Global Positioning
System (GPS)?

      A – 25.

      B – 22.

      C – 24.
```

The correct answer is "C." This question has no practical value to a pilot because it is merely a direct lift from the AIM 1–1–19 a.7. Additionally, the "correct" answer is not necessarily accurate because new satellites are launched and existing satellites are decommissioned regularly.

The ARC acknowledges that after several years of input, this GPS satellite constellation question has, according to the FAA, been removed. The remaining frustration, however, is that its removal has not been formally communicated to the aviation training industry, and therefore the topic is still included in training programs. The ARC believes that relating knowledge test questions to the proposed airman certification standards will assist in eliminating questions such as this that do not have practical relevance.

[19] For example, Private Pilot Airplane (FAA–G–8082–17E), "PLT141" refers to 14 CFR part 91, AIM and the Airplane Flying Handbook (FAA–H–8083–3A).
[20] For example, Private Pilot Airplane (FAA–G–8082–17E), "PLT147" refers to Regulations/14 CFR part 91/Airport Operations, Aircraft Operations/Lighting/PAPI (and VASI).

Information specific to what the FAA is testing on knowledge exams is insufficient. For example, only 22 sample representative questions currently exist for the private pilot knowledge test (compared with 805 sample questions in 2005 and 650 sample questions in 2008), and only 26 sample questions exist for the commercial pilot knowledge test. In addition, much of the public information is inaccurate, driving the training community to spend time in areas less relevant to key aviation knowledge that could otherwise be focused on knowledge pilots should attain. This insufficient public information is due in part to the limitations associated with the current software used to manage test data (see recommendation 6 of this report).

Also, many test questions require the applicant to train with an emphasis on discerning the FAA's intent rather than the application to actual flight operations. This question from the airline transport pilot knowledge test question database provides an example:

```
What is the trip time corrected for wind under Operating
Conditions Z-1?

      A – 58.1 minutes.

      B – 51.9 minutes.

      C – 54.7 minutes.
```

The correct answer is "B." The answer choices in this question are so close together they misrepresent how this information is gathered and used in actual operations. Many of the flight planning questions currently on the knowledge tests require an unrealistic level of precision to arrive at the correct answer, which may also suggest to the applicant this method of cutting it close is safe or advised.

Questions such as this encourage rote memorization and do not reflect an accurate assessment of training and critical thinking skills. As such, they compromise the significance of learning important aeronautical knowledge required for effective and safe operations.

Clearly some required aeronautical information must be committed to memory and in these cases, rote testing is appropriate. The following question from the private pilot question bank is an example of appropriate rote testing:

```
If the control tower uses a light signal to direct a
pilot to give way to other aircraft and continue
circling, the light will be—

      A – Flashing red.

      B – Steady red.

      C – Alternating red and green.
```

The correct answer is "B." Although information such as the above light-gun signal example is suitable for rote testing, it could still be incorporated into a scenario-based question requiring that knowledge for a correct response.

The following is an example of a question in the private pilot bank that would normally test important memorized knowledge (in this case, visual flight rules (VFR) transponder beacon code) but becomes tricky and is frequently missed because it throws in both an obscure term and a "red herring" term that might "sound right":

```
When operating under VFR below 18,000 feet MSL, unless
otherwise authorized, what transponder code should be
selected?

      A – Mode 3/A code 1200.

      B – Mode F code 1200.

      C – Mode 3/A code 7700.
```

The correct answer is "A." This is inappropriate rote testing. The first choice is the correct answer, but no value to risk management and safe operations exists that requires a pilot to know the transponder they set in a four-digit code is mode 3/A and not mode F. Testing with questions such as this reinforces the impression that the test is a barrier and not an important assessment. The tests should be purged of any questions that (1) only discern whether the applicant memorized a specific passage from a specific FAA publication, (2) contain a correct answer that is subjective to how the question is interpreted, or (3) are based on obscure or trivial information.

The following example question from the instrument rating database also demonstrates an exact lift and requires memorization of obscure information found in AC 120-58.[21]

```
Test data indicate that ice, snow, or frost having a
thickness and roughness similar to medium or coarse
sandpaper on the leading edge and upper surface of an
airfoil can

      A – Reduce lift by as much as 50 percent and
          increase drag by as much as 50 percent.

      B – Increase drag and reduce lift by as much as
          25 percent.

      C – Reduce lift by as much as 30 percent and
          increase drag by 40 percent.
```

The correct answer is "C." From AC 120–58: "Test data indicate that ice, snow, or frost formations having a thickness and surface roughness similar to medium or coarse sandpaper on the leading edge and upper surface of a wing can reduce wing lift by as much as 30 percent and increase drag by 40 percent."

Information in publications widely considered primary training guidance such as the Pilot's Handbook of Aeronautical Knowledge, Airplane Flying Handbook, Instrument Flying Handbook, and AIM describe the effects of frost, snow, or ice as decreasing lift and increasing drag, but specific numbers are not provided.

[21] AC 120–58, *Pilot Guide Large Aircraft Ground Deicing,* issued in September 1992.

More recently, questions were introduced to test human factors on the Aviation Maintenance Technician–General test. These questions required the applicant to memorize exact passages from FAA guidance to know which answer was "correct." Without this rote memorization of the passage, multiple choices could be "right" given basic understanding of the subject.
For example—

```
The "SHEL" model is another human factors tool, the goal
is to determine not only what the problem is, but also—
      A - Where and why it exists.
      B - How we prevent the problem.
      C - How many factors contribute to the error.
```

Answer "A" is correct. However, answer "B" is also a plausible choice given information found throughout other parts of the same FAA guidance document.

```
The three types of human error are—
      A - Mental, situational, and physiological.
      B - Active, latent, and stressor.
      C - Omission, commission, and extraneous.
```

Answer "C" is correct. While answer "C" refers to the FAA's focus on human factors research and investigation, it is not a particular error model. Answers "A" and "B" are both plausible answers as well, but do not reflect the errors specifically noted in the FAA guidance document.

For many years, the FAA weather briefing sources provided plain-language versions for those not nurtured on the obscure and outdated teletype-brevity codes. Interpretation of weather information is an essential skill for risk management, but decoding basic METARs and TAFs is not. Weather interpretation is best tested in scenarios in the knowledge test and the flight planning portion of a practical test. Because METAR and TAF codes are unnecessary in practical operations, new pilots are no more likely to choose to learn them than they are to learn Morse code. If a practical test applicant chooses to use the FAA basic format, they should be able to decode the reports and forecasts, but it makes no sense to test every applicant on them.

The following is an example of a TAF question in the private pilot question bank:

```
(Refer to figure 15.)  What is the forecast wind for KMEM
from 1600Z until the end of the forecast?
      A - Variable in direction at 4 knots.
      B - No significant wind.
      C - Variable in direction at 6 knots.

Figure 15 excerpt:
      KMEM  121720Z 121818 20012KT 5SM HZ BKN030 PROB40 2022 1SM TSRA
            OVC008CB
            FM2200 33015G20KT P6SM BKN015 OVC025 PROB40 2202 3SM SHRA
            BECMG 1012 00000KT 3SM BR SKC TEMPO 1214 1/2SM FG
            FM1600 VRB06KT P6SM SKC=
```

The correct answer is "C". While this information is not particularly difficult for pilots to learn, it is unnecessary because most weather briefings are now accomplished without codes.

In many instances, multiple answer choices could be correct or partially correct, and the only way for an applicant to know which answer choice is "right" is to know how these questions historically have been graded. The following two questions provide examples:

```
Which is true regarding flight operations to or from a
satellite airport, without an operating control tower,
within the Class C airspace area?

     A – Prior to entering that airspace, a pilot must
         establish and maintain communication with the
         ATC serving facility.

     B – Aircraft must be equipped with an
         ATC transponder.

     C – Prior to takeoff, a pilot must establish
         communication with the ATC controlling
         facility.
```

The correct answer is "A." However, the question is not specific with regard to the meaning of "Class C airspace area." Does this mean the airport is in the surface area, under the shelf area, or within the outer area? The question is not explicitly clear. Any of the answer choices could be correct depending on where the airport is located within the Class C airspace. This question is unanswerable without additional information.

```
Which is true regarding pilot certification requirements
for operations in Class B airspace?

     A – The pilot in command must hold at least a
         private pilot certificate with an
         instrument rating.

     B – The pilot in command must hold at least a
         private pilot certificate.

     C – Solo student pilot operations are
         not authorized.
```

The correct answer is "B." While answer "A" may be easily disregarded as incorrect, the remaining two choices are both valid responses. Because the stem refers to "Class B airspace" rather than "primary airport in Class B airspace," applicants must assume student pilot operations would be acceptable with an instructor endorsement. With that in mind, both answers "B" and "C" are equally correct, and the applicant must guess between two correct options as to what the actual correct answer is.

These types of questions do not accurately assess an applicant's knowledge. An applicant can be well-versed in airspace and still get these types of questions wrong because the answer choices are dependent on the test writer's discernment of what the correct response should be.

It is the consensus of the ARC that knowledge testing is not keeping pace with current practices in training including the technology available for preflight planning and reference materials available in the cockpit.

Scenario-based training (SBT) emphasizes the development of critical thinking and flight management skills, rather than focusing solely on traditional maneuver-based skills. The goal of this training philosophy is the accelerated acquisition of higher-level risk management skills. Such skills are necessary to prevent pilot-induced accidents.

Research has proven that learning is enhanced when training is realistic. In addition, the underlying skills needed to make good judgments and decisions are teachable. Both the military and commercial air carriers have embraced these principles through the integration of line oriented flight training (LOFT) and crew resource management (CRM) training into their qualification programs. Both LOFT and CRM lessons mimic real-life scenarios as a means to expose pilots to realistic operations and critical risk management opportunities. The most significant shift in these programs has been the movement from traditional maneuver-based training to the incorporation of SBT.[22]

Many flight training providers are incorporating the use of SBT into their syllabi. For example, the Cessna Flight Training System implements SBT and a scenario-based syllabus throughout the course for both the sport/private certificate and the instrument rating applicants. Redbird Flight Simulations, in cooperation with King Schools, also has a scenario-driven syllabus. Many additional flight schools have gained FAA/Industry Training Standards (FITS) acceptance of their scenario-based syllabi. A number of approved 14 CFR part 141 schools have also deployed scenario-based syllabi in their training programs by using the FITS-accepted curriculums. These syllabi include risk management and other single-pilot resource management (SRM) elements, as well as training for proper use of technology and automation.

Whereas the practical test has contained a scenario-based element for some time, the knowledge test currently does not. The FAA has previously cited difficulties preparing scenario-based questions for the knowledge exam due to the requirement to use a specific reference and questions applying to a single subject. If the knowledge test is to be viewed as relevant, encouraging best practices in training and evaluating risk management skills, the test must incorporate scenario-based questions. See table 1 below for examples.

Even flight schools that do not incorporate the use of SBT in their syllabi encourage the use of current technologies in gathering “all available information” required for proper preflight planning. Anyone with a computer can now access numerous Web sites providing weather and flight planning programs. The need to test an applicant’s ability to interpret coded METARs and TAFs becomes increasingly obsolete, as weather reports and forecasts are readily available in decoded plain English format. For pilots without access to a computer, a phone call to 1–800–WXBRIEF yields a briefer who speaks in English, not code. Despite these advances, applicants are still tested on teletype technology.

It follows that testing should be used to determine the applicant’s ability to use the information obtained in a weather briefing or online to make a viable go/no-go decision, rather than the ability to merely decipher coded reports.

[22] Managing Risk through Scenario Based Training, Single Pilot Resource Management, and Learner Centered Grading, FAA 2007.

**Table 1—Enhancing Knowledge Exam Questions**

| Current sample FAA test question | Revised questions emphasizing scenario-based, risk management, and critical to safety of flight |
|---|---|
| [Refer to METAR.] What are the wind conditions at Wink, Texas (KINK)? | [Refer to standard briefing.] What runway should you anticipate landing on at Wink, Texas (KINK)? |
| [Refer to TAF report.] What is the valid period for the TAF for KMEM? | [Refer to TAF report.] What kind of visibilities can you expect around 1830Z? |
| How should the 500-pound weight be shifted to balance the plank on the fulcrum?<br>(Note: the answer to this question is “1 inch to the left.”) | Where should the golf clubs be placed to ensure the airplane remains balanced?<br>(Note: the answer to this question should require the applicant to decide between baggage compartment and back seat.) |
| Determine the density altitude for these conditions. | Will aircraft takeoff and climb performance be better or worse than standard given these conditions? |

Many Web sites provide flight planning services that are capable of computations exceeding most pilots’ abilities, yielding highly accurate flight logs, including FAA Direct User Access Terminal Service (DUATS) providers[23], yet the knowledge test fails to test an applicant’s knowledge of these services.

It is difficult at times for the aviation education industry to keep pace with rapid advancements in technology. For example, the iPad, in a little over 1year, has revolutionized not only the way information is gathered, but also the availability of this information in the cockpit. Electronic flight bags are quickly replacing paper. The advancement of glass panels (few, if any, new airplanes are delivered with “legacy” instrumentation) and Wide Area Augmentation System (WAAS)-enabled, certified GPS units, along with corresponding autopilots, have now made this equipment the norm.

Unfortunately the knowledge test lags far behind in the testing of not only the proper use of this equipment, but more importantly an applicant’s ability to compile data gained through all the available technology into meaningful pieces of information and use the acquired knowledge to apply it to accomplish the planned flight (that is, what are the risks on the flight, what affect will they have, and how can they be mitigated?). Proper SRM mandates the use of all available tools. Virtually all flight training now incorporates as much of this new technology as possible, from panel-mounted, certified equipment to handheld devices. The knowledge test should begin testing the use of these tools and removing references to obsolete technologies. Doing so will make it a more effective assessment tool. The knowledge test will verify training and correlate the required knowledge to the practical test if it tests applicants on the same knowledge they must learn to become safe and effective pilots in the aircraft they operate.

[23] Provided by Computer Sciences Corporation (CSC) at www.duats.com and Data Transformation Corporation (DTC) at www.duat.com. Accessed April 11, 2012.

Most fatal accidents are a result of poor or nonexistent risk management. Current training trends incorporate SBT to teach pilots the skills necessary to manage the risks of flying. If the fatal accident rate is to be reduced, the knowledge test must be part of this process and reinforce these risk management skills through scenario-based questions when possible and are in part predicated on the modern technological tools currently available to all pilots.

## RECOMMENDATION 5

**Recommendation 5:** The FAA should return the knowledge test item question bank to the public domain by December 31, 2012, in a way that maintains the integrity of questions requiring calculations or interpolations in accordance with the guidance below:

- Remove numbers from questions that require calculations or interpolations.
- For scenario-based questions testing risk management skills, remove any facts and numbers that determine the appropriate course of action, such as wind direction.
- For questions that appropriately test rote knowledge, provide a sufficient number and variety of questions to ensure broad knowledge (such as airspace requirements, regulations, and airport signage and markings).

After 3 to 5 years, the FAA should determine whether it is appropriate to make the question bank, completely or in part, nonpublic, provided the following conditions have been met:

- The advisory group identified in recommendation 1 has been operating for a minimum of 3 years and will continue to operate for knowledge tests for every certificate or rating.
- The advisory group has reviewed all test questions in use.
- Correlation between knowledge tests and practical tests indicates that the new testing system has not been effective in creating airmen who demonstrate improved knowledge and risk management skills.

### Proposal for Public Question Bank

The FAA historically had a public question bank. Before computer-based testing, the complete bank of test questions was available for purchase from the Government Printing Office as an AC, and later as an FAA question book (FAA–T–8080–XX). This question book later evolved to the FAA computer testing supplements (FAA–CT–8080–XX), to include the question figures, with the database of questions being published on an FAA Web site. Over time, this public database has not been maintained and is no longer an accurate reflection of the knowledge exams currently being issued, due in part to the limitations of the software used to manage the tests (see recommendation 6 of this report). The public data deteriorated without a process in place to maintain a correlation between training and testing. Returning the question bank to the public domain will assist students learning facts and materials exclusively by rote, but several mitigating factors can be used to discourage rote learning as the focus of study.

Students who employ rote learning strategies will do so whether questions are public or not. The risks of a closed test far outweigh the benefits, and the benefits of an open test far outweigh the risks. Flashcards, study guides, and memory aids are all established techniques of learning in any educational environment. Accurate study is more important than guessing the content of a test, and a quality test is more important than a statistically valid one.

Based on the state of the tests and the FAA's recent history of question development, returning the question bank to the public domain is the fastest, most cost-efficient, and effective way to realign training with testing and establish a quality control process. The ARC believes the realignment of testing and training is an immediate need solved by returning the question bank to the public domain. As the FAA implements other ARC recommendations, process improvements may allow for alternative long-term solutions.

Returning the question bank to the public domain does not eliminate the ability to use it for assessment. The immediate benefit of releasing the question bank is that it ensures applicants have an integrated training process that retains the required aeronautical knowledge in the context of the rest of the training curriculum. Releasing the question bank also ensures applicants are not wasting efforts studying the wrong material, which is the result when information is gathered through hearsay rather than an official public release. Releasing the question bank will allow a joint FAA/industry effort to identify and revise questions to meet the overall testing philosophy described in recommendation 4.

The examiner will then be able to accurately review the Airman Knowledge Test Report in correlation with the public question bank to determine exactly where the weak areas lie. This will result in a more sound practical test.

One of the most detailed debates among ARC members related to whether or not the question bank should return to the public domain. The ARC considered five options:[24]

- Alternative 1: The FAA should continue to attempt to keep the question bank nonpublic.
- Alternative 2: The FAA should return the question bank to the public domain, but replace all numbers with an "X" in questions requiring calculations to derive the answers. SMEs who are known to the public should help create and evaluate questions.
- Alternative 3: The FAA should return the question bank to the public domain. SMEs who are known to the public should help create and evaluate questions.
- Alternative 4: The FAA should make public a sample of each category of questions actually used on the test. SMEs who are known to the public should help create and evaluate questions.
- Alternative 5: The FAA should make public only example questions not used on the test. SMEs who are known to the public should help create and evaluate questions.

An overview of the pros and cons of each alternative can be found in Appendix H, Discussion of Pros and Cons of Each Alternative.

[24] Alternatives 2 through 5 require an expert group nondisclosure agreement.

After significant debate, the ARC recommends the FAA return the question bank in its entirety to the public domain in a way that maintains the integrity of questions requiring calculations or interpolations, at least in the near term.

FAA knowledge tests should ensure pilots have the knowledge needed to properly assess and manage risk. Unfortunately, it is the opinion of the ARC that the tests are not fully achieving that objective. The knowledge test should sample the effectiveness of the training and the knowledge each applicant has achieved. The test composition should not focus exclusively on assessing study habits or confirming an applicant read all the required handbooks, but instead communicate what is critical to safe flight.

Many of the knowledge test questions require applicants to regurgitate obscure or trivial knowledge, including the previously discussed GPS constellation question. Additionally, the knowledge test includes questions that are out of context as to how the knowledge will be used to manage the risks of flight, such as "The term angle of attack is defined as the angle…" The test also contains questions that may be adverse to safety. For example, the test may include a question regarding takeoff performance that requires interpolations, suggesting to the applicant a level of precision that could lead to unsafe risk management. Similarly, questions on icing require test takers to know an exact percentage of lift degradation and drag increase from a coating of frost, suggesting flight might be acceptable if one can compensate for these factors. The ARC believes these types of questions diminish the applicant's view of the FAA evaluation process, and the FAA is missing an opportunity to provide guidance to pilots about what is safe when operating an aircraft.

Per the previous section, the ARC has considered a number of options for how to approach test questions. It is the ARC's position that at least in the short term, the question bank should return to the public domain because of the concerns regarding reliability and validity of the current question bank. Once a better system of test development, validation, implementation, and correlation with training can be established, the FAA should reevaluate the option of "closing" the question bank. As long as testing standards are well developed and state clear learning objectives, a closed test could be beneficial.

The ARC is concerned that the current knowledge tests are not an effective assessment of required aeronautical knowledge because they contain questions that are not relevant to managing real-world risks applicants will face. The reasons for this are—

- In the recent past, the FAA has removed questions from the public domain.
- Previously all of the questions in the question bank were available in the public domain and many are still being published on Web sites and in courses.
- New questions are reported by the test takers to their flight instructors, who are seeking to understand exactly what their students did not know, and to course producers, who wish to better prepare their students.
- Officially removing the questions from the public domain has deprived the FAA test writers of input from the aviation community, and does not allow for open dialogue for fear of revealing question content.

Returning the question bank to the public domain will allow for the establishment of correlation and accountability between training and testing, and develop a means to provide and process feedback on the test from the aviation community.

The ARC recommends masking numbers and figures required for calculations and interpretation to avoid rote memorization.

### *Example 1: Masking Numbers Requiring Calculation*

```
An aircraft is loaded XXXX pounds over maximum
certificated weight. If fuel (gasoline) is drained to
bring the aircraft weight within limits, how much fuel
should be drained?
```

"XXXX" is used instead of numbers so applicants perform the calculation instead of memorizing the answer.

### *Example 2: Masking Specific Location to Require Interpretation*

```
The wind direction and velocity at XXXX is from:
```

The figure to be provided with this example question would include multiple locations. Using "XXXX" in place of a specific airport identifier will ensure applicants study the complete figure instead of memorizing a specific location.

### *Example 3: Masking Details*

```
When approaching Lincoln Municipal from the XXXX at
noon for purposes of landing, initial communications
should be with:
```

In this example, "XXXX" represents the direction from which the aircraft is arriving.

## Rationale

The ARC's key proposal is to involve stakeholders in the boarding of questions, a direct response to one of the FAA assignments to the ARC. The aviation industry has considered several approaches or mechanisms through which this can be accomplished, and one key issue is the FAA's ability to share questions with a small group of people. After significant debate, the ARC recommends the FAA release all questions in the manner specified above for a 3-year period at minimum, during which the questions would be in the public domain and reviewed in detail by the expert group identified in recommendation 1. Following that time, the FAA must meet the set of criteria established in recommendation 5; if met, the FAA could consider, with input from the aviation industry, evolving to a semi-nonpublic question bank that maintains the integrity of the correlation between training and testing.

The ARC's critique of the quality of the questions is not a negative reflection of the FAA test writers' abilities, but the attempt at secrecy deprives the test writers the benefit of aviation industry input that could improve the quality and relevance of the questions. Returning the question bank to the public domain allows qualified SMEs to participate in developing questions and providing feedback without a conflict of interest. Writing insightful, meaningful, relevant questions that reinforce the critical tools pilots need to manage risks is difficult. Expecting a handful of test writers to write relevant questions that reflect the philosophies in recommendation 4, without collaboration with instructors who are actively teaching and flying is not practical.

Similar feedback is a critical component of Safety Management Systems and AQP, which are widely used in the aviation industry.

Precedents for a public question bank include the FAA knowledge exams until the recent past, Federal Communications Commission radio operator certification, and the U.S. citizenship naturalization test.  Appendix I, Review of Non-Aviation Testing includes examples of both public and nonpublic question banks and how these tests are developed and maintained by governments and other industries.

Where the current test may ask, "The angle of attack at which an airplane wing stalls will…" for which the applicant should answer, "remain constant regardless of gross weight," the new and improved test could include insightful and life-saving questions such as, "Shortly after takeoff, the pilot sees a thin, low-level cloud layer ahead.  What is a primary consideration in determining the appropriate climb angle while trying to maintain VMC?"  For this question, the applicant should answer, "the critical angle of attack."

The ARC believes the improvement in question quality and the focus on risk management will save lives that otherwise would be needlessly lost.

## RECOMMENDATION 6

**Recommendation 6:** The ARC recommends the FAA urgently allocate additional resources to AFS–630 for an improved computer system (including both hardware and software) for development, maintenance, and delivery of knowledge tests that can—

- Randomly generate tests that include all required knowledge areas (instead of manually created form tests).
- Display onscreen images with regularly updated figures in place of FAA computer testing supplements.
- Improve data management.
- Be updated and maintained as technology improves.

### Necessary Technological Changes to Implement ARC Recommendations and Modernize Airman Testing

The knowledge test is administered through FAA-designated organizations using software developed in 1992 through the Airman Knowledge Test Delivery (AKTD) system, which delivers exams using an outdated technology. Currently, only one person within AFS–630 can manage the data in the system. The AKTD is not compatible with current hardware, resulting in testing sites either keeping old computers to administer FAA knowledge tests, or choosing not to offer FAA knowledge tests anymore. The ARC views this as a major concern.

AFS–630 currently uses Item Bank Solutions (IBS) to develop and manage test items and form tests. IBS provides the FAA with the means to develop, review, revise, and maintain airman knowledge test questions and exams. The application is comprised of a structured query language (SQL) server back-end and a Visual Basic 6.0 front-end. IBS provides the following functions:

- Question maintenance,
- Form test maintenance,
- Site management,
- Cycle change administration,
- Question review, and
- Statistical output.

One of the many limitations of the current system is its inability to display graphs, which forces individual test centers to use printed paper test supplements, slowing the ability to update these supplements regularly. Being limited to printed test supplements greatly constrains the FAA’s ability to develop advanced questions and provide questions built around multiple scenarios. More complex test supplements also limit applicants’ ability to memorize material).

Another limitation of the current system is the FAA's inability to provide accurate information to the training community about the tests being administered. As discussed in recommendations 4 and 5 of this report, the information provided to the public for correlating training and testing is limited, inaccurate, and not current to the tests being given. The data available to the public through the FAA Web site is not a true representation of the test composition.

The ARC believes upgrading the knowledge testing systems to use current technology can significantly improve knowledge test development and administration, provide the aviation community a better correlation between training and testing, and improve presentation of supplementary material (currently printed FAA–CT–8080 documents) to applicants. Investing in modern testing capabilities will reduce long-term costs and simplify the way the tests are reviewed and updated.

Not only is new technology rapidly changing the way risk is managed in aviation, but it also provides significantly better methods of testing applicant knowledge for all certificates and ratings. For example, FAA–CT–8080 documents are issued at the testing centers and allow applicants to view the figures referenced in questions in the FAA knowledge test. These documents include illustrations, charts, and pictures, and are used to supplement the knowledge tested in the questions. However, these documents are currently provided in a printed format and many are grossly outdated, especially in light of the technological advancements changing the way flights are planned and executed.

Beginning as early as 2004, the FAA department responsible for the tests and FAA–CT–8080 documents stated the information contained in the supplements would be reviewed and moved to an online depiction of the figures, reducing the need for the printed FAA–CT–8080 files. As of 2012, this process has not been completed. The FAA continues to state the supplements are in revision with the goal of moving as many question figures as possible to an online depiction; however, most of the FAA–CT–8080 documents have not been updated extensively for years and contain obsolete information. Table 2 below shows the most recent updates. This means the knowledge test applicant is required to study obsolete information for purposes of passing this step in the certification process. The FAA cites limited resources as the reason these FAA–CT–8080 documents cannot be updated in a more timely fashion.

For the aforementioned reasons, AFS–630 is pursuing the purchase of a more robust and technologically up to date item banking and test delivery system. However, it does not have the resources to realize this goal. The ARC concluded the FAA needs to allocate additional resources.

**Table 2—Updates to Computer Testing Supplements**

| Computer Testing Supplement | Last Updated |
|---|---|
| Aviation Mechanic, CT–8080–4E | 2005 |
| Sport Pilot, Sport Instructor, CT–80801–10A | 2005 |
| Private and Recreational Pilot, CT–800–2E | 2004 |
| Instrument Rating, CT–8080–3E | 2005 |
| Commercial Pilot, CT–8080–1C | 2005 |
| Flight and Ground Instructor, CT–8080–5E | 2001 |
| Flight Engineer, CT–8080–6A | 1999 |
| Airline Transport Pilot, Aircraft Dispatcher, CT–8080–7C[25] | 2005 |

New technologies can also be used in the way form tests are created and reviewed, reducing the costs and associated man-hours needed to achieve this. The FAA testing system currently relies on form tests, which are manually created by the in-office ASIs. For each FAA knowledge test, between 8 and 11 form tests exist, which are issued through the computer testing centers. This is a labor-intensive process, requiring the ASIs to manually review each form test any time a change is needed. This also limits the number of questions used on the tests from the complete question bank. The ability to use onscreen images is limited.

Additionally, applicants retain the ability to request a "hand score" any time they believe there is a problem with the test, such as "bad" questions or improper test composition; this process is not automated and takes the ASI an average of 4 hours for each hand score request. When a change in regulations, procedures, or technology is made, the ASI must manually update all form tests and associated public data and update as necessary or remove the obsolete information. At a time when budgets are constrained, the FAA must use current technologies to evolve to a testing system that is sustainable for the existing resources and can grow for improved assessment.

[25] Supplemental figures released June 2011.

## RECOMMENDATION 7

**Recommendation 7:** The ARC recommends the FAA improve the feedback mechanism subsequent to knowledge testing by June 30, 2013, by—

- Providing the applicant and instructor the specific missed questions to identify the deficient knowledge by review of the Airman Knowledge Test Report.
- Publishing the aggregate results of knowledge testing failure areas to provide a mechanism through which training organizations, providers, and publishers can improve and better target their instruction.
- Reviewing the benefit of integrating the results of aggregate knowledge testing into the Aviation Safety Information Analysis and Sharing (ASIAS) system.

### Review of LSCs and Their Use to Enhance Training and Development of National Statistics on Testing

Currently, one of the primary feedback processes to applicants and instructors is the listing of LSCs[26], sometimes referred to as "failure codes," on the airman test report. Following the administration of a knowledge test, the applicant will review the LSCs with their instructor as mandated by the PTS, which state "An applicant … is required by 14 CFR part 61 to … have an endorsement certifying that the applicant has demonstrated satisfactory knowledge of the subject areas in which the applicant was deficient on the airman knowledge test."

Some of the LSCs are generic in nature and do not communicate the applicant's specific knowledge deficiency for the instructor to ensure knowledge is sufficient before issuing the endorsement for the practical test. As an example, "PLT001 Calculate a course intercept" is specific in nature, whereas "PLT014 VOR" is too broad to determine where the applicant's knowledge is deficient.

The FAA testing of airmen and applicants for airman certification is accomplished through several data systems including the FAA knowledge and practical tests. Often referred to as the "check ride," the practical test consists of two components—the oral test and the practical flight test. This three-pronged testing system involves a system of checks and balances: the CFI manages training and endorsements, the FAA issues the FAA knowledge test, and the DPE issues the practical test. The certification process is effective and depends on the successful correlation between training and testing.

[26] See Learning Statement Reference Guide for Airman Knowledge Testing, AFS–600 Regulatory Support Division, October 17, 2011, at http://www.faa.gov/training_testing/testing/airmen/media/LearningStatementReferenceGuide.pdf. Accessed April 11, 2012.

Additionally, although the FAA administers tens of thousands of knowledge tests each year, no direct feedback loop exists for training providers about areas in which all applicants for airman certification have high degrees of failure.

This information was previously available from the FAA. During the 1960s and 1970s, the FAA released "Exam-O-Grams" for both VFR and instrument flight rules pilots. These documents stated—

> *Exam-O-Grams are brief and timely explanations of important aeronautical knowledge items. These items include concepts and procedures that are critical to aviation safety, common misconceptions among airman applicants, and areas which cause difficulty in written tests … Exam-O-Grams are developed on a continuing basis, only as needs arise, and not on a regularly scheduled basis. They are distributed free to airman applicants, pilots, ground and flight instructors, educational institutions, airman training centers, flying clubs, and other interested groups and individuals. Exam-O-Grams may be reproduced without further permission from [the] FAA.*[27]

The FAA written test was first published in ACs, then in question books (FAA–T–8080s), and then evolved into the electronically issued knowledge test, while the Exam-O-Grams were replaced with the public database available on the FAA Web site. As a result, there is no longer a reliable source of information from the FAA that gives training providers the information they need to meet their obligations to the applicant.

## Correlation of Training and Testing

The FAA is evolving into a safety management-driven organization. As part of this effort, the FAA is working to identify additional data, specifically incident data opportunities that can help proactively prevent accidents and improve pilots' training and education. The aggregate results of the failure areas for each certificate and rating identify areas where potential common issues exist with training and instruction at the national or local level. This data, however, is not made available to training providers.

The aviation training industry sees benefit in better understanding the areas of failure to help continuously improve training and instruction. This understanding is critical for flight instructors to meet their responsibilities, with the endorsement certifying the applicant has demonstrated satisfactory knowledge of the missed subject areas. This information is also critical to the DPE to conduct effective practical tests. The distribution of de-identified data regarding commonly failed subject areas for each certificate and rating would provide another opportunity to make these changes, similar to the way AQP methods of evaluation and feedback have become crucial to improvements in training at air carriers.

Additionally, the FAA is expanding the ASIAS system, which provides a mechanism for integration, analysis, and sharing of aviation safety data and information. The ASIAS system, if it does not already integrate the results of failure data, should evolvee to also capture knowledge testing results.

[27] FAA. "VFR Pilot Exam-O-Grams." Available at http://www.birdbird.org/aviation/examogram/index.html. Accessed April 11, 2012.

## Recommendation 8

> **Recommendation 8:** The ARC recommends the FAA establish and continuously communicate a schedule for publishing standards, handbooks, and knowledge test questions by June 30, 2013.
>
> To communicate new important safety information while adhering to the publication schedule, the ARC recommends the FAA establish a process through which high priority topics are identified and communicated to stakeholders by use of "hot sheets" that provide time-sensitive information critical to flight safety between scheduled publication dates.

As discussed in recommendation 1, the publication schedule is important to the aviation training industry in developing testing and training material. Currently, however, a number of handbooks have been in internal FAA coordination for several months. No formal process exists to notify stakeholders of impending changes to handbooks and other source document materials.

The ARC recommends the FAA establish a process for notifying the public about new standards, handbooks, and knowledge test questions, such as a Web-based subscriber list.

One issue that seems to occur frequently is that as the FAA approaches the deadline for publication of a new handbook or document, issues arise, resulting in the delay of a number of new training materials.

The ARC recognizes these new topics are important to quickly and effectively communicate to the aviation training industry, but believes the delay of handbook publication fails to achieve the timely communication of other issues. The ARC proposes a two-pronged approach to making changes:

1. The FAA should publish the publication schedule for standards, handbooks, and test questions.
2. When new issues emerge during the publication cycle, the FAA should issue targeted "hot sheets" to address these issues and communicate them to the aviation training industry. These hot sheet topics would then be integrated into the next scheduled revision cycle of the relevant source documents.

Issuing hot sheets provides the additional benefit of allowing two-way communication between the FAA and the aviation community through which the topic area can be further vetted and developed before implementation and inclusion in the next publication cycle for the relevant source documents.

## Recommendation 9

**Recommendation 9:** The ARC recommends the FAA continue to administer a single knowledge test for each certificate or rating and not transition to testing and scoring individual required subject areas.

### Consideration of Subtesting and Its Inclusion on FAA Pilot Knowledge Tests

In addition to a consideration of the passing score percentage threshold,[28] the ARC reviewed requests for minimum subtest scores on topics within FAA pilot knowledge tests. This discussion was undertaken outside the scope of the specific tasks listed in the ARC charter in consideration of the recommendations that have been made by the NTSB and others in the aviation community. A 2005 NTSB recommendation addressed this topic:

> *The Safety Board also notes that, unlike the practical test standards in which failure of one "area of operation" is grounds for failure of the entire test, no minimum number of questions must be answered correctly within a given "knowledge area" on the knowledge test. For example, an average of 12 out of 60 questions on the private pilot certification knowledge test are weather-related. A pilot could answer all 12 questions incorrectly and still receive a score as high as 80 percent, which is well above the minimum passing score of 70 percent. The Safety Board concludes that a pilot can incorrectly answer all questions relating to weather on an airman knowledge test and still receive a passing score on the test.*
>
> *The Safety Board believes that a basic understanding of aviation weather is an important prerequisite to obtaining any pilot certificate or rating. Therefore, the Safety Board recommends that the FAA establish a minimum number of weather-related questions that must be answered correctly in order to pass FAA airman knowledge tests. The establishment of such requirements will further ensure that pilots who pass a knowledge test will have demonstrated a basic understanding of aviation weather.*[29]

Below is one of the six weather-related safety recommendations set forth in the NTSB recommendation.

> *Establish a minimum number of weather-related questions that must be answered correctly in order to pass Federal Aviation Administration airman knowledge tests.*[30]

[28] See Appendix J, Consideration of Passing Score Percentage Threshold, and Appendix O, Percentage of Correct Responses by Topic for Selected Knowledge Tests.
[29] Weather-Related GA Accidents, dated October 12, 2005 (refer to A–05–24 through A–05–029). Available at http://www.ntsb.gov/doclib/recletters/2005/A05_24_29.pdf. Accessed April 10, 2012.
[30] A–05–026.

The ARC considered minimum subtest scoring in its overall deliberation of airman testing standards and training, with the objective of increasing pilot knowledge, competency, and risk management skills to reduce GA accident rates. It is the view of the ARC that the FAA should devote its resources to improving the overall pilot knowledge testing process, rather than divert to a system centered on minimum subtest scores. Although it is possible for an applicant to miss every question on a given subject, all areas of deficiency must be reviewed and retrained to a satisfactory level of knowledge before proceeding with the certification process.

Although the ARC members agree that knowledge in each testing subject area is important, the ARC maintains its position that the purpose of a knowledge test is to sample overall knowledge. The instruction and learning process should then address areas of deficiency found on the knowledge test, followed by a final testing process that ends with the practical test.

Subtesting may seem to enhance the ability of the testing environment to better analyze an applicant's knowledge, but the practical application of this testing approach may not be feasible in the current pilot training and testing system. The ARC raised concerns about completing specific subject matter testing because of (1) the need for a valid subset in each subject area, (2) the selection process for each knowledge area, (3) the need for additional questions and a process for managing each test, and (4) the limitation subtesting imposes on the use of scenario-based questions as outlined here.

### *Valid Subset for Each Subject Matter*

If the tests are to be kept at their current lengths, the ARC believes it unlikely that an appropriate number of subset topics could be included and still allow for valid sampling of an applicant's knowledge of each subject area.

Currently, the private pilot knowledge test contains between 1 and 12 questions in each of the 13 topics for a total of 60 questions. See Appendix N, Private Pilot Knowledge Test Topics for the question count for each topic and test. Transitioning to subtesting would require tests to contain more questions for each subtest to be statistically valid and to ensure it adequately samples an applicant's knowledge of each subject area. Developing more questions would require the FAA to focus resources on increasing the quantity of questions in the item bank rather than developing quality questions.

### *Selection Process for Each Knowledge Area*

If the FAA transitioned to subtesting, great care would have to be taken in framing the scope of each subject area and balancing that topic against the importance of other subject areas. As an example, if the subject area is too broad, such as "weather," critical knowledge may be perceived to be missed in the testing process. If the subject area is too focused, it is necessary to create too many subject areas to effectively test all knowledge areas. Breaking up the broad "weather" subject area may require creating sub-subject areas for "types of clouds," "weather fronts," "sources of aviation weather," "reading aviation weather charts," "thunderstorms," and "fog."

The length of the test would again come into question, as would the need for a required passing grade for each sub-subject area. Additionally, the use of subject or sub-subject areas raises the question of how to determine which subgroups to include in the test. Balancing the priorities of multiple safety areas and their scoring would likely become difficult to manage. The authors of a NASA report noted civil aviation authorities that have adopted the use of subtesting have transitioned to multiple exams with increased time and expense required to obtain a rating without a clear benefit to safety.[31]

### *Need for Additional Questions and a Process for Managing Each Test*

Adopting subtesting would drive the FAA to expand its question bank for each test area to ensure multiple questions and types of questions are available. The ARC believes additional resources and infrastructure would likely be required to manage the subtesting processes for each test.

### *Scenario-based Questions versus Targeted Knowledge*

The ARC recommends the FAA shift from questions that test rote knowledge in a single subject area to scenario-based questions, requiring applicants to apply knowledge from a broad set of subject areas. The ARC believes subtesting will require placing each question into a single category, which is contrary to the scenario-based testing concept.

Due to these and other concerns, the ARC is concerned that the overall effect on testing would be to drastically increase both the length of the tests and the workload of the test developers and maintenance staff without any quantifiable increase in overall safety or knowledge base in the pilot applicants.

It is the opinion of the ARC that the overall goal of pilot knowledge tests is to sample the overall knowledge base a pilot has developed to allow them to advance in their training and testing process. This approach does not require each specific subject area to be tested in detail to test the overall aptitude of the applicant. In this approach to testing, subtesting requirements for performance are not necessary to evaluate overall applicant knowledge and performance.

[31] Stephen M. Casner, Karen M. Jones, Antonio Puentes, and Homi Irani, "FAA Pilot Knowledge Test: Learning or Rote Memorization?" *NASA/TM-2004-212814* (January 2004), 12.

# APPENDIX A—ARC MEMBERS, SUBJECT MATTER EXPERTS, AND PRESENTERS

### Airman Testing Standards and Training ARC Chairman

Mr. Jens Hennig, General Aviation Manufacturers Association (GAMA)

### Aircraft Owners and Pilots Association, (AOPA)

Ms. Kristine Hartzell

### Aviation Accreditation Board International (AABI)

Mr. Gary Kiteley

### Aviation Supplies & Academics (ASA)

Ms. Jackie Spanitz

### Cessna Pilot Center

Mr. Kirby Ortega

### Gleim Publications

Dr. Irv Gleim

Mr. Garret Gleim

### Jeppesen

Ms. Julie Filucci

Mr. David Wright

### King Schools

Mr. John King

Mr. John "Mac" McWhinney

### National Air Transport Association (NATA)

Ms. Rebecca Mulholland

### National Association of Flight Instructors (NAFI)

Mr. Jason Blair

### Redbird Flight Simulations

Mr. Roger Sharp

### Society of Aviation and Flight Educators (SAFE)

Mr. Doug Stewart

### Sportys Academy

Mr. Eric Radtke

### University Aviation Association (UAA)

Capt. Carmen "Corkey" Romeo

Mr. B.J. Galloway

### SUBJECT MATTER EXPERTS

Mr. Jay Evans, National Business Aviation Association (NBAA)

Mr. Lou Nemeth, CAE

Dr. Doug Farrow, FAA

Mr. Larry Culver, FAA

### PAI CONSULTING

Mr. Scott Harper

Mr. Brian Boardman

Mr. Jeff Hayes

Mr. David Binswanger

### FEDERAL AVIATION ADMINISTRATION

Ms. Susan Parson, Designated Federal Official, AFS–003

Mr. Van Kerns, AFS–600

Mr. Stanley Roberts, AFS–600

Mr. Jeffrey Smith, AFS–800

Ms. Sabrina Jawed, Attorney, Office of the Chief Council Regulations Division

# APPENDIX B—ACRONYMS

| | |
|---|---|
| AC | advisory circular |
| AFS | FAA Flight Standards Service |
| AIM | Aeronautical Information Manual |
| AKTD | Airman Knowledge Test Delivery |
| AQP | Advanced Qualification Program |
| ARC | Aviation Rulemaking Committee |
| ASI | aviation safety inspector |
| ASIAS | Aviation Safety Information Analysis and Sharing |
| ATO | FAA Air Traffic Organization |
| AVP | FAA Office of Accident Investigation |
| CAM | Certified Aviation Manager |
| CAMGB | CAM Governing Board |
| CAST | Commercial Aviation Safety Team |
| CFI | certificated flight instructor |
| CFR | Code of Federal Regulation |
| CRM | crew resource management |
| DPE | designated pilot examiner |
| EASA | European Aviation Safety Agency |
| FAA | Federal Aviation Administration |
| FITS | FAA/Industry Training Standards |
| FTD | flight training device |
| GA | general aviation |
| GAJSC | General Aviation Joint Steering Committee |
| GPS | Global Positioning System |

| | |
|---|---|
| IBS | Item Bank Solutions |
| ICAO | International Civil Aviation Organization |
| ICE | Institute for Credentialing Excellence |
| ISD | Instructional Systems Design |
| JTA | job task analysis |
| KSA | knowledge, skills, and attitudes |
| LOFT | line oriented flight training |
| LSC | learning statement code |
| METAR | Aviation Routine Weather Report |
| NAS | National Airspace System |
| NASA | National Aeronautics and Space Administration |
| NBAA | National Business Aviation Association |
| NCCA | National Commission for Certifying Agencies |
| NTSB | National Transportation Safety Board |
| OE | operating experience |
| PTS | practical test standards |
| QMS | quality management system |
| SBT | scenario-based training |
| SME | subject matter expert |
| SMT | Schroeder Measurement Technologies |
| SRM | single-pilot resource management |
| TAF | terminal aerodrome forecast |
| VFR | visual flight rules |

# APPENDIX C—ARC CHARTER

**U.S. DEPARTMENT OF TRANSPORTATION**
FEDERAL AVIATION ADMINISTRATION

Effective Date: Sept. 21, 2011

**SUBJ: Airman Testing Standards and Training Aviation Rulemaking Committee (ARC)**

**1. PURPOSE.** This document establishes the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) according to the Administrator's authority under Title 49 of the United States Code (49 U.S.C.), section 106(p)(5).

**2. BACKGROUND.**

**a.** The FAA Flight Standards Service (AFS) promotes safety by educating and advising users through the development, implementation, analysis and distribution of technical information. Among other responsibilities, AFS plans, develops, and maintains materials related to airman certification training and testing. These materials include airman knowledge and skill tests, computer testing supplements, knowledge test guides, practical test standards, training handbooks, and computer testing sites listing. Stakeholders include the public, private industry, and other components of AFS.

**b.** To carry out the FAA's safety mandate, AFS must ensure that the technical information related to airman knowledge and skill tests, computer testing supplements, knowledge test guides, practical test standards, and training handbooks is regularly updated. These updates must enhance safety and meet the needs of stakeholders by incorporating the most current and relevant standards, policies, procedures, and techniques for airman certification, training, and testing. To that end, the FAA is chartering the Airman Testing Standards and Training ARC to make recommendations on the content, planning, development, production, and review of the aforementioned technical information.

**3. OBJECTIVES AND SCOPE OF THE ARC**. The Airman Testing Standards and Training ARC will provide a forum for the U.S. aviation community to offer its experience and expertise in the elements of aeronautical knowledge and aeronautical experience required for safer operation in today's National Airspace System (NAS). Specifically, the ARC will develop and recommend:

**a.** A prioritized list of up to five pilot and/or instructor certificates and/or ratings its work will address.

**b.** An aeronautical knowledge standard for the selected certificates and ratings. The aeronautical knowledge standard for each certificate and/or rating should set forth the overall precepts that will conceptually frame, guide, and justify its specific technical subject areas.

**c.** Methods for regular industry participation in the planning, development, production, and review of technical information (e.g., training handbooks, knowledge test guides, and supplements) intended to convey the elements of the knowledge standard.

**d.** Precepts for development and appropriate review of updated knowledge tests that will accurately and reliably measure the airman's mastery of the aeronautical knowledge standard. This task should include recommendations on types of questions to be included.

The ARC's initial session should address how its recommendations will be accomplished. For example, the ARC may propose standing committees, working groups, forums, or processes to vet various proposals for revised standards, handbooks, and/or tests. The ARC should also consider how to select appropriate representation for any standing committees or working groups.

Within sixty (60) days of its initial meeting, the ARC will complete the prioritized list described in 3(a) and submit it to the Associate Administrator for Aviation Safety for approval. The ARC will submit a report of its final recommendations on Tasks 3(b)-3(e) within 12 months of its initial meeting.

**4. ARC PROCEDURES.**

The ARC provides advice and recommendations to the Associate Administrator for Aviation Safety. The committee acts solely in an advisory capacity

The ARC will discuss and present information, guidance, and recommendations that its members consider relevant in addressing the objectives.

**5. ORGANIZATION, MEMBERSHIP, AND ADMINISTRATION.**

**a.** The FAA will establish an ARC representing the aviation community, including industry associations, universities, training providers, and professional associations.

**i.** The ARC will consist of no more than 20 representatives.

**ii.** The FAA will invite selected organizations and individuals to participate as a member in the ARC.

**iii.** The FAA will identify the number of ARC members that each organization may select to participate. The FAA will then request that each organization name its representative(s). Only the representative for the organization will have authority to speak for the organization or group that he or she represents.

**iv.** The ARC may establish specialized work groups that will include at least one committee member and invited subject matter experts from industry and Government, as necessary.

**v.** Active participation and commitment by members will be essential for achieving the committee objectives and for continued membership on the ARC.

**vi.** Although not required, committee meeting quorum is desirable.

**a.** The Associate Administrator for Aviation Safety will receive the committee recommendations and reports.

**b.** The Associate Administrator for Aviation Safety is the sponsor of the ARC and will select an industry chair from its membership. Also, the Associate Administrator will select the FAA-designated representative(s) for the committee. Once appointed, the chair will:

**i.** Determine, in coordination with the other members of the ARC, when a meeting is required.

**ii.** Arrange notification to ARC members of time and place for each meeting.

**iii.** Draft an agenda for each meeting and conduct the meeting.

**iv.** Ensure that a Record of Discussions of ARC meetings is kept.

**6. PUBLIC PARTICIPATION.** The Airman Testing Standards and Training ARC meetings are not open to the public. Persons or organizations that are not members of this ARC and are interested in attending a meeting must request and receive approval before the meeting from the chair or the designated Federal representative.

**7. AVAILABILITY OF RECORDS.** Consistent with the Freedom of Information Act, 5 U.S.C. § 522, records, reports, agendas, working papers, and other documents that are made available to or prepared for or by the ARC will be available for public inspection and copying at the FAA Flight Standards Service, 800 Independence Avenue SW, Washington, DC 20591. Fees will be charged for information furnished to the public according to the fee schedule published in Title 49 of the Code of Federal Regulations part 7.

**8. PUBLIC INTEREST.** Forming the Airman Testing Standards and Training ARC is determined to be in the public interest to fulfill the performance of duties imposed on FAA by law.

**9. EFFECTIVE DATE AND DURATION.** This ARC is effective upon issuance. The ARC will remain in existence for a period not to exceed eighteen months unless sooner terminated or extended by the Administrator.

J. Randolph Babbitt
Administrator

# APPENDIX D—AFS 600–005

| | AVS Quality Management System | QPM # AFS 600-005 | Revision 6 |
|---|---|---|---|
| Title: Airman Knowledge Test Question Development, Review and Revision | | Effective Date: August 26, 2009 | Page 1 of 7 |

## AFS 600 – 005

## Airman Knowledge Test Question Development, Review and Revision

**Purpose:** This process documents how the Airman Testing Standards Branch (AFS-630) develops, reviews, revises, and maintains airman knowledge test questions. This includes airman knowledge tests for the following certification areas: Aircraft Dispatcher, Airline Transport Pilot, Aviation Mechanic, Commercial Pilot, Designated Mechanic Examiner, Designated Parachute Rigger Examiner, Flight Engineer, Flight Instructor, Flight Navigator, Ground Instructor, Inspection Authorization, Instrument Rating, Military Competency, Parachute Rigger, Pilot Examiner, Private Pilot, Recreational Pilot, and Sport Pilot.

**Scope:** This process applies to all branch employees (both government and contract) who are responsible for the conduct and support of airman knowledge testing activities. This process is accomplished in accordance with applicable FAA policies and guidance and Work Instruction AFS-600-005-WI01.

**Approval:** [signature]
Acting Manager, Regulatory Support Division

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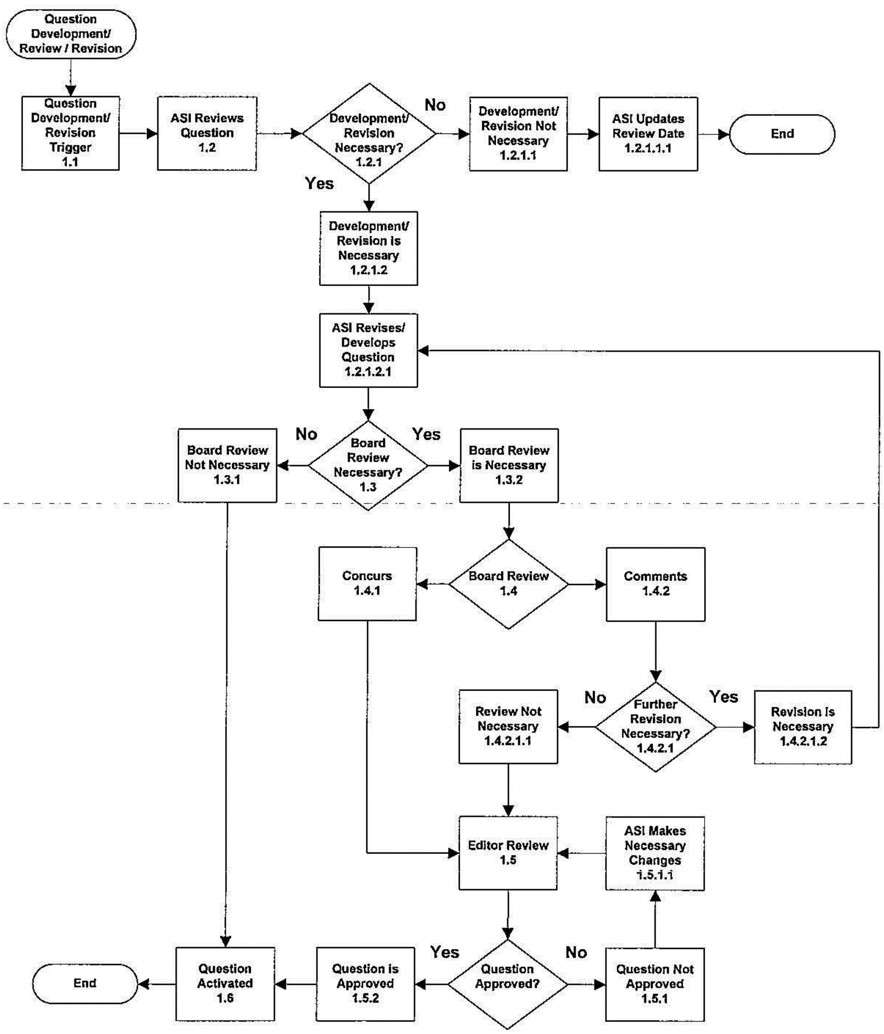
| REVISION HISTORY | | |
|---|---|---|
| **Rev** | **Description of Change** | **Effective Date** |
| 0 | Original | 07/07/04 |
| 1 | Renamed & revised AFS-630 Business Product 1 | 12/29/04 |
| 2 | Made editorial changes | 02/09/05 |
| 3 | Revised flowchart & made editorial changes | 08/23/05 |
| 4 | Revised process & flowchart | 06/20/06 |
| 5 | Revised process & flowcharts | 08/10/06 |
| 6 | 4/15/09: Converted format to most recent AVS QMS process template. Rearranged decision point paragraphs, as needed for consistency, in sections 1.0 and 2.0. Rewrote par. 2-1 to list triggers for test question revision/development. Revised flowcharts as needed to correspond with minor changes and rearrangement of text. Added Customer Satisfaction, Process Performance, and Product Conformity Measures throughout process, including Measures paragraph on last page. Added References paragraph on last page. 8/7/09: Renamed process. Added acronyms section on page 2. Removed section 1.0. Removed "References" section. Document reduced from 12 to 7 pages. | 08/07/09 |

## ACRONYMS

| | |
|---|---|
| AFS-630 | Airman Testing Standards Branch |
| AOD | Analysis of Data |
| ASI | Aviation Safety Inspector |
| CFR | Code of Federal Regulations |
| FAA | Federal Aviation Administration |
| IAW | In Accordance With |
| LAN | Local Area Network |
| SOW | Statement of Work |

| | AVS Quality Management System | QPM # AFS 600-005 | Revision 6 |
|---|---|---|---|
| Title: Airman Knowledge Test Question Development, Review and Revision | | Effective Date: August 26, 2009 | Page 4 of 7 |

## Airman Knowledge Test Question Development, Review, and Revision Process Flow Chart

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# 1.0 Airman Knowledge Test Question Development, Review, and Revision

Airman knowledge test question development and revision is an ongoing, continual improvement process. It is a completely automated process accomplished through an application called "ItemBank", which is a sophisticated, interactive software tool for managing a large test development and delivery environment. All phases of test question development, review, revision, and other actions taken are conducted, recorded, and maintained electronically in ItemBank. A variety of data regarding test questions, including reference sources, relevant regulations, topic/content/specific categories, notes, and statistics on the performance of the question are also maintained in the application, and are readily available to the ASI in charge of each certification area/bank.

**1.1** Test question development/revision is initiated by one or more of the following triggers: quarterly review of applicant survey comments regarding FAA test questions; statistical analysis of active test question performance and validation test question performance; biennial review of questions; and/or a variety of non-scheduled outside sources, such as technological advances in aviation, updated references, changes to the CFR, and public feedback.

**1.2** The responsible ASI reviews the question(s) identified via the trigger(s). (Test question/bank assignments are based on information contained in Form AFS-600-005-F02, ASI Certification Area of Responsibility.)

**1.2.1** The ASI determines if development/revision is necessary using the edit question screen in ItemBank, the Item Writing and Evaluation Guidelines, and applicable aviation publications.

**1.2.1.1** If revision is not necessary:

**1.2.1.1.1** The ASI updates the "review date" in ItemBank to reflect that the question was reviewed and left unchanged. Review dates will be monitored on a quarterly basis to ensure that all questions are reviewed at least every 2 years. **(Process Performance Measure)**

**1.2.1.2** If development/revision is necessary:

**1.2.1.2.1** The ASI develops a new question or revises the existing question. (AFS-600-005-WI01)

**1.3** The ASI determines if a board review of the question is necessary. All new questions and major changes (as defined in AFS-600-005-WI01) require board review. **(Product Conformity Measure)**

**1.3.1** If a board review is not necessary, the revised question will be activated with the next cycle roll. (Proceed to step 1.6.)

**1.3.2** If a board review is necessary, the question will be forwarded to the board.

**1.4** Members of the review board will conduct their review and concur or make comments.

**1.4.1** If the board concurs with the developed/revised question, the assigned ASI will forward the question to the Editor.

**1.4.2** If the board has comments on the developed/revised question:

**1.4.2.1** The assigned ASI will determine if further revision is necessary using the edit question screen in ItemBank, the Item Writing and Evaluation Guidelines, and applicable aviation publications.

**1.4.2.1.1** If further revision is not necessary, the question is forwarded to the Editor.

**1.4.2.1.2** If further revision is necessary, the question is revised and boarded again. (Return to step 1.2.1.2.1.)

**1.5** The Editor will conduct an editorial review to determine approval of the question.

**1.5.1** If the Editor does not approve due to comments, the question is returned to the ASI.

**1.5.1.1** The ASI makes the necessary changes and forwards the question back to the Editor. This process will be repeated until the Editor approves the question.

**1.5.2** If the Editor approves the question, the question becomes available for use in the test bank and on a form test(s).

**1.6** The approved question may be activated during the next cycle roll. (Cycle rolls for new and updated questions and form tests are processed three times per calendar year. A new cycle roll updates the active database with question and form test changes made since the last scheduled cycle roll completion.)

**End of Airman Knowledge Test Question Development, Review, and Revision Process.**

## Measures:

AFS-630's stakeholders include: academia and aviation industry representatives; 14 CFR parts 61 and 65 operators; 14 CFR part 141 and 147 schools; students and airman applicants; private company, military-based, and alternate arrangement test providers; international entities, and numerous other internal and external customers. Customer feedback regarding airman knowledge test questions may be captured through several sources:

- Responses to airman applicant surveys (offered at the close of the knowledge test administration process);
- Responses to customer satisfaction surveys (returned from contacts documented in the "ScratchPad" application);
- Comments received in AFS-630's email inbox (afs630comments@faa.gov);
- Comments submitted on Form AVS-001-003-F1, AVS Stakeholder/Customer Feedback.

Customer satisfaction, process performance, and product conformity is continuously monitored. The branch Statistician analyzes and reports on customer satisfaction in the quarterly AOD meetings. Examples of measures which may be reported in the AOD meetings are: airman applicant survey results, customer satisfaction survey results, customer comments and stakeholder feedback, and test question biennial review/development/revision activity.

# APPENDIX E—ICAO AND 14 CFR PART 61 REQUIREMENTS FOR KNOWLEDGE TESTING

Both the International Civil Aviation Organization (ICAO) and the Federal Aviation Administration (FAA) address knowledge test requirements by certificate type, and the methods of both organizations have many parallels.

For each certificate, ICAO provides standards in which the following "knowledge" requirement paragraph appears, followed by a list of topics:

> *The applicant shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of … [a] pilot license and appropriate to the category of aircraft intended to be included in the license, in at least the following subjects.*[32]

The standard ICAO prescribes for private pilot applicants[33] requires the applicant demonstrate knowledge in at least the following areas:

- Air law;
- Aircraft general knowledge for airplanes;
- Airship, helicopters, and powered lifts;
- Flight performance;
- Planning and loading;
- Human performance;
- Meteorology;
- Navigation;
- Operational procedures;
- Principles of flight; and
- Radio telephony.

In comparison, the FAA private pilot knowledge areas are—

- Applicable Federal Aviation Regulations of this chapter that relate to private pilot privileges, limitations, and flight operations;
- Accident reporting requirements of the National Transportation Safety Board;
- Applicable portions of the FAA Aeronautical Information Manual and FAA advisory circulars;

[32] Annex 1 to the Convention on International Civil Aviation, Tenth Edition. Montreal, Canada. July 2006, paragraph 2.3.1.2
[33] Annex 1 to the Convention on International Civil Aviation, Tenth Edition. Montreal, Canada. July 2006, paragraph 2.3.1.2.

- Aeronautical charts for visual flight rules navigation using pilotage, dead reckoning, and navigation systems;
- Radio communication procedures;
- Recognition of critical weather situations from the ground and in flight, windshear avoidance, and the procurement and use of aeronautical weather reports and forecasts;
- Safe and efficient operation of aircraft, including collision avoidance and wake turbulence recognition and avoidance;
- Effects of density altitude on takeoff and climb performance;
- Weight and balance computations;
- Principles of aerodynamics, powerplants, and aircraft systems;
- Stall awareness, spin entry, spins, and spin recovery techniques for the airplane and glider category ratings;
- Aeronautical risk management and judgment; and
- Preflight action that includes—
  - How to obtain information on runway lengths at airports of intended use, data on takeoff and landing distances, weather reports and forecasts, and fuel requirements; and
  - How to plan for alternatives if the planned flight cannot be completed or delays are encountered.

ICAO does not prescribe the method for evaluating whether applicants have the required knowledge. It delegates the method to member states:

> *An applicant for any pilot license or rating shall demonstrate, in a manner determined by the Licensing Authority, such requirements for knowledge and skill as are specified for that license or rating.*[34]

No conflicts or potential conflicts exist between the Aviation Rulemaking Committee's recommendations and ICAO requirements, current FAA knowledge testing, or changes to FAA knowledge testing.

[34] Annex 1 to the Convention on International Civil Aviation, Tenth Edition. Montreal, Canada. July 2006, paragraph 2.1.1.3.1.

# APPENDIX F—ADVANCED QUALIFICATION PROGRAM

## Overview of Advances in Training

The Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) discussed a number of advances that have occurred in aviation training outside the area of issuance of new certificates, including the Advanced Qualification Program (AQP) for air carriers and the Certified Aviation Manager (CAM) process used for corporate aviation managers. This appendix and appendix G to this report provide an overview of AQP and CAM.

## Overview of AQP and the Applicability of Its Best Practices

From the mid-1970s to the 1980s, the Federal Aviation Administration (FAA) investigated ways to redesign air carrier training programs to manage the increasing complexity of cockpit human factors. In 1987, the Joint Government-Industry Task Force on Flightcrew Performance was formed to address the issue with consultation from representatives of major air carriers, air carrier associations, flight crewmember associations, manufacturers, and government organizations. One of the issues the task force discussed was flight crewmember performance. This meeting led to the creation of the Joint Government-Industry Task Force on Flightcrew Performance. The three areas of focus were man/machine interface, flight crewmember training, and operating environment.[35]

Recommendations from this task force became the foundation on which the FAA developed the AQP.

## AQP—Job Task Analysis, Qualification Standards, and Proficiency Objectives

AQP is a systematically developed, continuously maintained, and empirically validated proficiency-based training system. They allow for the systematic analysis, design, development, implementation, progressive evaluation, and maintenance of self-correcting training programs that include integrated crew resource management, improved instructor/evaluator standardization, scenario-based evaluation, and a comprehensive data-driven quality assurance system.[36]

AQP is a process that incorporates task analysis, training, testing, and evaluation, plus a feedback loop to produce a systems approach to flight training. Although new in concept to the general aviation (GA) community, AQP has been in use within the FAA Title 14, Code of Federal Regulations part 121 environment since the early 1990s.

AQP takes a systems design approach to training and evaluation and has its roots within the U.S. Air Force Instructional Systems Design (ISD), dating back to the late 1940s. ISD is the practice of creating "instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing."[37] In ISD, qualification standards and associated curriculum content should be based on a documented analysis of the job tasks, skills, and knowledge required for job proficiency.

[35] FAA Advisory Circular (AC) 120–54A.
[36] FAA AC 120–54A.
[37] Merrill, M. D., Drake, L., Lacy, M. J., Pratt, J., & ID2_Research_Group. (1996). Reclaiming instructional design. Educational Technology, 36(5), 5–7.

First, the objective "task" is defined. The task is broken down into its elements, which are then analyzed for the knowledge, skills, and attitudes (KSA) or objectives for each task or elements. This process is defined as the job task analysis (JTA) within AQP. The final result is determined first (this is, what KSA level the pilot should meet for each task) and then the training is developed based on the tasks and KSA level defined for each. There is much debate concerning GA's conventional training model as to whether or not "training to the test" is appropriate, though in some respects this is exactly how AQP is developed. The KSA objectives are developed first and the training is designed to meet those KSAs.

A qualification standard is a job task proficiency objective linked to an evaluation strategy. A certificate holder's qualification standards define the requirements of mastery for specific duty positions and replace the practical test standards (PTS) for certification under AQP. The qualification standards document is the single most important part of any AQP. It provides the complete proficiency baseline for all duty positions and serves as the basis for curriculum development for both the Qualification Curriculum and Continuing Qualification Curriculum. The first step in the development of qualification standards is the development of proficiency objectives from the JTA.[38]

In GA, the PTS is the qualification standard for the maneuvers required in the practical test. However, the FAA does not currently publish qualification standards for the required knowledge tasks.

## Maneuvers Training and Scenario-Based Training

AQP implements a system of phases that build on each other in training. First is the systems training and systems knowledge validation. The intent of the systems knowledge validation session is to ensure an individual's systems knowledge is at an appropriate level before progressing into the next training phase. Next is procedures training and procedures validation, which is an assessment of an individual's systems integration knowledge and skill. This validation addresses the individual's ability to assimilate system and procedural knowledge into the appropriate execution of procedures. This validation session typically takes place in a flight training device (FTD) before beginning simulator training. Evaluation is often made through a written test and/or an oral test. The next phase is maneuvers training, which is very similar to the conventional training in GA. Each maneuver is trained to proficiency and is not necessarily taught in context of a flight "scenario." This phase is completed with a maneuvers validation before moving on to the line-oriented flight scenarios. Line oriented flight training (LOFT) and line oriented evaluation is the final phase of training and evaluation before an air carrier pilot flies in revenue service. They then begin operating experience (OE), which provides hands-on experience in performing all the duties of a newly assigned position under the supervision of a current and qualified evaluator (check airman). Captain candidates must complete a line check at the completion of the OE phase.

[38] FAA AC 120–54A.

In GA training, phased training concepts should be incorporated into revisions of the training and checking of knowledge and skills. Many flight training providers are beginning to incorporate some of these concepts into training through use of computer-based training software, FTDs, and simulators in the initial phase of training. It would be beneficial to also incorporate scenario-based (or FAA/Industry Training Standards) training into the final stages of training after mastery of the individual maneuvers has been achieved.

### Evaluation and Revision of Training and Testing Criteria

During the entire AQP training process the applicant is evaluated, but more importantly the training system is evaluated as well. The results of data collected along the entire process is then analyzed, and information gleaned is returned to the course developers who in turn revise the training curriculum and the whole process begins again, providing constant improvement. The development of the KSAs of each element, data collection, and feedback loop is what makes AQP such a unique training process.

### Applying AQP Principles to General Aviation

GA training, testing, and evaluation has not kept up with advanced concepts in flight training and evaluation. The methods of teaching, learning, and evaluating have changed little over the years and are very similar to methods used since World War II. Although some aspects of AQP may not be practically implemented in GA, the objectives of AQP relate directly to the objectives that GA should aspire to. The FAA defines AQP objectives as—

- Supporting safe operations by continuously improving training and evaluation.
- Remaining responsive to continuing changes in the industry, including new aircraft technology, changing operational environments, and new training methods and equipment.
- Remaining responsive to continuing changes and best practices relative to training and evaluation.[39]

These objectives are certainly relevant to GA.

In GA terms, the FAA written test is AQP's systems evaluation. The FAA recommendation ride is the AQP's first look. The maneuvers validation happens when an examiner has the applicant perform to PTS standards the maneuvers necessary for the rating sought. When the examiner asks the applicant to veer from the planned exercise, the applicant is performing the LOFT portion of the evaluation. The only item not completed is the feedback loop. Currently the examiner does not formally evaluate the training system, and weak areas are only identified to the applicant, which does not allow for continuous improvement. Additionally, the training system is never analyzed in depth to understand the whats, whys and hows (KSAs) of what the FAA is asking of the applicant.

[39] FAA AC 120–54A, section 1–2

An AQP-style process can address the shortfalls within the GA training, testing, and evaluating environment. First, it would establish all the necessary tasks an applicant must know for the rating sought. Those tasks would then be analyzed by a subject matter expert for their individual components (KSAs) and a JTA would be completed.

1. Ground Operations
2. Takeoff
    - 2.1 Perform Normal Takeoff
        - 2.1.1 Assess Performance and Environmental Factors
        - 2.1.2 Perform Takeoff Roll
        - 2.1.3 Perform Rotation and Liftoff
            - 2.1.3.1 Rotate Aircraft at VR to Target Pitch Angle [PF]
            - 2.1.3.2 Observe Barometric/ADC Altimeter Increase [PF]
            - 2.1.3.3 Call Out Positive Rate [PM]
            - 2.1.3.4 Retract Gear [PF, PM]
            - 2.1.3.5 Establish Climb Speed [PF]
    - 2.2 Perform Instrument Takeoff
    - 2.3 Perform Engine Failure After V1 Takeoff
    - 2.4 Perform Rejected Takeoff
3. Climb Operations
4. Cruise Operations
5. Descent Operations
6. Approach Operations
    - 6.1 Perform Approach
        - 6.1.1 Perform Visual Approach
        - 6.1.2 Perform Nonprecision Approach Procedures (VOR, NDB, LOC, LOC/BC, LDA, SDF, ASR, RNav/FMS, GPS)
        - 6.1.3 Perform Cat II ILS
        - 6.1.4 Perform Cat IIIb ILS
        - 6.1.5 Perform Coupled Autopilot Approach and Autoland Procedures
    - 6.2 Perform One Engine Inoperative Cat I ILS Approach and Landing
    - 6.3 Perform One Engine Inoperative Missed Approach
    - 6.4 Perform Visual Approach and Rejected Landing
7. Landing Operations
    - 7.1 Normal Configuration
    - 7.2 Auto Land
    - 7.3 No-flap
8. After Landing Operations
9. Aircraft Systems Operations
10. Abnormals and Emergency Procedures
11. Supplementary Procedures

**Figure F–1—Sample Pilot Job Task Listing**

Each individual element has an associated knowledge, skill, or attitude. From this view it is easily apparent if the element is a KSA item. This information would then determine where and how that individual task needs to be trained, how standards should be set, and how and where the task would be evaluated. Although labor-intensive at first, the end result is a single source document from which the student, instructor, and evaluator can work. The end result is a more standardized approach to training, testing, and evaluation that incorporates a feedback loop into training, thereby increasing the system's overall capabilities and efficiency.

### *Scenario-Based Training and Evaluation*

Most accidents are caused by a chain of errors that build up over the course of a flight and which, if undetected or unresolved, may result in a fatal error. Traditional training programs, with their maneuver-based training and evaluation, artificially segment simulation events in such a way as to prevent the realistic buildup of the error chain. Under AQP, both training and evaluation are scenario-based, simulating more closely the actual flight conditions known to cause most fatal carrier accidents.

# APPENDIX G—CERTIFIED AVIATION MANAGER EXAMS

The National Business Aviation Association (NBAA) briefed the Aviation Rulemaking Committee (ARC) on the process it has employed through consultation with Schroeder Measurement Technologies (SMT) and the standards developed by the Institute for Credentialing Excellence (ICE) for writing, reviewing, and revising its Certified Aviation Manager (CAM) exams.

ICE is a nonprofit, 501(c)(3) organization dedicated to providing educational, networking, and advocacy resources for the credentialing community. ICE's accrediting body, the National Commission for Certifying Agencies (NCCA), evaluates certification organizations for compliance with the NCCA Standards for the Accreditation of Certification Programs. The NCCA standards exceed the requirements set forth by the American Psychological Association and the U.S. Equal Employment Opportunity Commission.

SMT is a company that assists its clients in applying the most appropriate technologies, methodologies, and psychometric models in developing credentialing programs. To accomplish this, its staff first works with each client to thoroughly understand the organization's values, business practices, and procedures.

The CAM Governing Board (CAMGB) oversees the development and direction of NBAA's CAM program. The program identifies qualified flight department leaders though a testing process that measures proficiency in five subject areas: leadership, human resources, operations, technical and facilities services, and business management. The CAMGB is composed of flight department professionals, who are CAMs themselves, and representatives from the education community.

Writing valid, reliable, written, multiple-choice exams is a complex process. Different people, with differing experiences and backgrounds interpret questions and answer choices in different ways. All members of the CAMGB testing committee must participate in a training session provided through SMT to ensure they have the skills to write exam questions. The CAMGB testing committee members are provided reference material that directs them to—

- Review a question or issue to ensure it is relevant to the duties under the certification being sought, and if if it is not, write a new question.
- Ensure the question fits into the Job Analysis
- Ensure the correct answer to the question can be found in reference material.
- Take detailed notes of each question's references and how they are used, to assist reviewers checking the question's accuracy.
- Make the question an "application or analysis" level of learning. (That is, a problem to solve based on real world issues. It may include a scenario requiring problem solving.)
- Reference other questions that have been vetted and approved as guidance when writing new questions.

After being trained in test writing, CAMGB testing committee members are mentored through participation in various item writing groups in the testing committee.

The CAMGB testing committee has two face-to-face meeting per year; these are typically 3 days long. Participation in these meetings is mandatory for all qualified members. Beyond the face-to-face meetings, NBAA’s CAMGB testing committee conducts a conference call/Web meeting once a month as part of an online item writing process.

The CAMGB testing committee uses secure software that allows the entire test writing and review process to be conducted online at any time. Drafting and initial review takes place online before the conference calls and face-to-face meeting so that time is spent most productively during meetings.

CAMGB testing committee members log on to a secure Web site managed by SMT to write test questions using the online item writing method. Each CAMGB testing committee member is issued a unique password to access the Web site. An initial question is marked as a draft question and the CAMGB testing committee member who wrote the draft is tasked with tracking it throughout the review process. When the original author feels the draft is ready for review, they tag it “Ready for Review,” which alerts another CAM to review it and provide feedback. In addition, the CAMGB testing committee can review questions and provide feedback on its monthly conference call. Once the first review is finished, the question status becomes “Reviewed by One” and then “Accepted.” Once accepted, it is ready to go to the next CAMGB testing committee face-to-face meeting. Each question will be reviewed by at least four other CAMs, including a small group to check the questions accuracy.

After the CAMGB testing committee has fully evaluated and edited a question, it is inserted into the current exam as a “pretest question,” which is not scored, but statistically evaluated. A report is generated to grade each question’s performance and whether or not it meets the standards required to be deemed a valid and relevant question.

Finally, all questions on all exams are scheduled for periodic review and revision. Any question up for review goes through a process similar to initial question development.

# APPENDIX H—DISCUSSION OF PROS AND CONS OF EACH ALTERNATIVE

## ALTERNATIVE 1

**The Federal Aviation Administration (FAA) should continue to attempt to keep the knowledge test questions nonpublic.**

### Pros

- Effective secrecy prevents applicants from memorizing the answers to questions.
- The FAA maintains the public perception of test integrity and efficacy.
- The concept that all questions are not available might provide an incentive for applicants to study the whole topic rather than just the specific questions thought to be on the test.
- Secrecy enables use of more discriminating questions to provide a bell curve.
- Fewer questions are needed to ensure a broad understanding.

### Cons

- Attempting to keep the tests nonpublic is ineffective and means that large-volume course preparers have an advantage due to feedback from their students.
- Trivial "gotcha" questions appear unfair to the applicant and provide a powerful incentive to applicants to share questions to remedy the perceived unfairness.
- Attempted secrecy deprives the FAA of its most powerful communications tool.
  - The FAA knowledge tests are an enormously effective instrument for aviation safety and regulation compliance.
  - Most FAA communications to pilots are filtered through a flight school or instructor, or delivered by an advisory circular (AC) which pilots may or may not read.
  - Knowledge tests, on the other hand, provide a standardized, direct, unfiltered means of communication requiring active student involvement.
    - They are a way to ensure items that might otherwise be overlooked in the normal course of instruction are thoroughly learned by students.
    - Including an item on the knowledge test implies, with a powerful impact that no other method has, that a particular topic is one the FAA considers extremely important.
  - The result is a high level of learning focused on vitally important issues with active student participation required.
- Attempted secrecy cuts the safety chain of communications (accident → National Transportation Safety Board (NTSB) investigation → NTSB report → FAA AC → FAA test questions → instructors and course preparers → applicants).
  - The knowledge tests are a vital link in that chain and are only fully effective when the test questions are public.

        - An ARC member, who is a flight instructor and aviation educator, observed his role in the communication chain was more effective when questions were made public than when he was deprived of the details of the questions.
        - The ARC member also observed the vague feedback he received when the test questions were not in the public domain led him to misdirect students because the questions were not related to training practices and educators had to speculate on what the tests were trying to ask.
    - It makes no sense to isolate safety and enforcement issues of highest importance, write well-focused, incisive questions about them, and then keep them nonpublic.
- Without public oversight, the quality of questions deteriorates, tending to focus on trick questions and insignificant or obscure distinctions.
    - Applicants are then being tested on specific material for which they have not had an opportunity to prepare. Because the applicants are blindsided, they have not studied this material and miss these questions.
    - Some questions have answer choices where multiple provided answers could be correct. Answers to questions are subjective; the only way an applicant can get a question "right" is if they know how the question has historically been graded.
- Because the FAA is attempting to keep the questions nonpublic, it does not provide the question after the session so students can study it.
    - Further, when students get their test results, they are not told specifically which questions they missed, so they do not have an opportunity to go back and make sure they understand the point of the questions.
    - The net result is that these applicants still do not know what they should about the subject.
- Irrelevant questions reduce the respect of the applicant for the FAA and its rules and regulations and tend to place applicants and instructors in an adversarial, rather than cooperative, role with the FAA.

## ALTERNATIVE 2

**The FAA should return the question bank to the public domain, but replace all numbers with "X"s in questions requiring calculations to derive answers when they are released to the public.**

**Subject matter experts (SME) who are known to the public should help create and evaluate questions. (Requires expert group nondisclosure agreement (NDA).)**

### Pros

- All the cons of alternative 1 are remedied (attempting secrecy).
- Applicants are prevented from memorizing the answers to questions requiring numbers in their answers.

- Feedback from the public to the SMEs and their participation will greatly improve question quantity, quality, and relevance.
- A dramatic increase in the number of questions will force applicants to study the whole topic rather than just the few questions that are thought to be on the test.
- With relevant, insightful, life-saving questions, having an applicant know all the questions except those requiring calculations to derive answers would be desirable.

#### Cons

- More test questions are required to ensure a broad understanding than if all questions were nonpublic
- Coordination with SMEs is required.

### ALTERNATIVE 3

**The FAA should return the question bank to the public domain. SMEs who are known to the public should help create and evaluate questions. (Requires expert group NDA.)**

#### Pros

- All the pros of alternative 2 still apply (questions are public except for those requiring calculations to derive the answer) except that questions requiring calculations to derive the answer could still be memorized.
- Eliminates all the cons of alternative 1 (attempted secrecy).

#### Cons

- If there is not a sufficient number of questions, the questions (including those requiring calculations to derive answers) could be memorized.

### ALTERNATIVE 4

**The FAA should make public a sample of each category of questions actually used on the test. SMEs who are known to the public should help create and evaluate questions. (Requires expert group NDA.)**

#### Pros

- Feedback from the public to the SMEs and their participation will greatly improve question quantity, quality, and relevance.
- All the pros from alternative 1 (attempted secrecy) still apply.

#### Cons

- Loss of secrecy on the sample questions means that occasionally applicants will be given a question they are familiar with.
- Except for the sample questions, all the cons from alternative 1 (attempted secrecy) still apply.

- Historically, sample questions have not provided a true representation of the other questions on the test.

## ALTERNATIVE 5

**The FAA should only make public example questions not used on the test. SMEs who are known to the public should help create and evaluate questions. (Requires expert group NDA.)**

### Pros

- All the pros of alternative 4 (sample questions) still apply.

### Cons

- All the cons of alternative 4 (sample questions) still apply except for loss of secrecy of sample questions.

# APPENDIX I—REVIEW OF NON-AVIATION TESTING

**Table I–1—Non-Aviation Testing Data**

| | Test | Cost | Test Results in Certification | Public Database | Format | Environment | Pass/Fail Criteria |
|---|---|---|---|---|---|---|---|
| **Pilots** | FAA Knowledge Exam | $150 | No; more testing required | No. | Computerized, multiple-choice form tests | Testing center | ≥70% |
| **Air Traffic Controllers** | AT–SAT | Free | No; more testing required | No. | Seven cognitive, one non-cognitive, variety of formats, computerized | Pre-established testing locations | ≥70% |
| **Doctors** | USMLE | $535 | No; more testing required | No | Multiple choice | | A score of 188 is needed to pass the test |
| **Nurses** | NCLEX | $200 or more | No; more testing required | No | Primarily multiple choice, but also includes image identification, performing calculations, fill-in | | |
| **Lawyers** | Multi-State Bar | $585 (WA)<br>$375 (VA) | No; more testing required | No | Paper and pencil, multiple choice (4 answer choices) | Large classroom or hall with 50 to 5000 testing at once | Varies from 70 to 75% |
| **Teachers** | Praxis 1 | $50 registration<br>$80 each test<br>$130 all tests | Varies by state | No | Computer or paper | | Varies by state |
| **Accountants** | Uniform CPA Examination | $575–$800<br>For all four sections | Yes, provided all other required training has been completed | No | Computer | | |
| **Coast Guard** | 20 different ratings[40] | Issued by the service; not available to the public | No; more testing required | No[41] | Multiple choice, computer, and paper (where Internet is not available) | Issued via Internet or paper by approved testing facilities | ≥ 80% |

[40] Including Rating Advancement Test (RAT), marine science technician, aviation electronics technician, aviation survival technician, aviation machinery technician, and operations specialist.

[41] However, this test is open book (reference materials used on the job may be used during test). Also, the test objective is very specific, so although the actual test questions are not public, applicants who can successfully perform each required performance qualification should be able to answer the associated test items on the RAT. Answers to the RAT questions can be found in the RPQs or associated references.

## PILOTS

### *Description of test*

The Federal Aviation Administration (FAA) knowledge exam is required before final testing for certification. There is no public database. Tests are administered at a designated testing center at a desk or cubicle-type environment. A passing grade is 70 percent or better.

FAA Flight and Ground Instructor Knowledge Test Guide:
http://www.faa.gov/training_testing/testing/airmen/test_guides/media/FAA-G-8082-7f.pdf

### *How to prepare for the exam*

Limited information is provided by the FAA at:
http://www.faa.gov/training_testing/testing/airmen/test_questions/

Commercial products are also available.

## AIR TRAFFIC CONTROLLERS

The AT–SAT exam is required testing for most who enter this program. Tests are administered at a pre-established testing location, and consist of seven tests ranging from multiple choice to computerized aptitude exercises. A passing grade is 70 percent or better.

Bureau of Labor Statistics: Occupational Outlook—Air Traffic Controllers:
http://www.bls.gov/oco/ocos108.htm

### *How to prepare for the exam*

Commercial products are available.

## DOCTORS[42]

There is a three-part exam.

### *How are the test questions created, and who creates them?*

> *Examination committees composed of medical educators and clinicians prepare the examination materials. Committee members broadly represent the teaching, practicing, and licensing communities across the United States. At least two of these committees critically appraise each test item or case. They revise or discard any materials that are in doubt.*[43]

[42] United States Medical Licensing Examination. http://www.usmle.org Accessed April 10, 2012.
[43] Examination Committees, USMLE Web site. Available at http://www.usmle.org/bulletin/overview/#examcontent. Accessed April 10, 2012.

### *Cost of exam*

| | | |
|---|---|---|
| *Step 1* | *$535* | *Three month eligibility periods beginning* |
| *Step 2 Clinical Knowledge (CK)* | *$535* | *November 1, 2011 through January 31, 2012 and ending October 1, 2012 through December 31, 2012* |
| *Step 1 and 2CK* | *$65* | *Eligibility Period Extension (requests received starting January 1, 2012)* |
| *Step 2 Clinical Skills (CS)* | *$1,140* | *For completed applications received starting January 1, 2012.* |

### *How to prepare for the exam*

The United States Medical Licensing Examination (USMLE) helps candidates pass the exam. Commercial products are also available.

***USMLE Step 1:*** U.S. medical students usually take Step 1 at the end of the second year of medical school. It is an 8-hour computer-based exam consisting of 322 multiple-choice questions (MCQs) divided into 7 blocks each consisting of 46 questions.

***USMLE Step 2:*** Two separate exams:

- USMLE Step 2 CK is designed to assess clinical knowledge through a traditional, multiple-choice examination. It is a 9-hour exam consisting of 8 blocks of 44 questions each. One hour is given for each block of questions. The subjects included in this exam are clinical sciences such as medicine, surgery, pediatrics, psychiatry and obstetrics and gynecology.
- USMLE Step 2 CS is designed to assess clinical skills through simulated patient interactions, in which the examinee interacts with standardized patients portrayed by actors. Each examinee faces 12 Standardized Patients (SPs) and has 15 minutes to complete history taking and clinical examination for each patient, and then 10 more minutes to write a patient note describing the findings, initial differential diagnosis list and a list of initial tests. Administration of the Step 2 CS began in 2004. The examination is only offered in five cities across the country.

***USMLE Step 3*** is the final exam in the USMLE series designed to assess whether a medical school graduate can apply medical knowledge and understanding of biomedical and clinical science essential for the unsupervised practice of medicine. Graduates of U.S. medical schools typically take this exam at the end of the first year of residency. Foreign medical graduates can take Step 3 before starting residency in about 10 U.S. states. Connecticut is frequently chosen for such purpose because it does not require simultaneous application for licensure, unlike New York.

Step 3 is a16-hour examination divided over 2 days. Each day of testing must be completed within 8 hours. The first day of testing includes 336 multiple-choice items divided into 7 blocks, each consisting of 48 items. Examinees must complete each block within 60 minutes.

The second day of testing includes 144 multiple-choice items, divided into 4 blocks of 36 items. Examinees are required to complete each block within 45 minutes. Approximately 3 hours are allowed for these multiple-choice item blocks. Also on the second day are nine Clinical

Case Simulations, where the examinees are required to "manage" patients in real-time case simulations. Examinees enter orders for medications and/or investigations into the simulation software, and the condition of the patient changes accordingly. Each case must be managed in a maximum of 25 minutes of actual time.

Approximately 45 minutes to an hour is available for break time on each of the 2 days of testing.

## LAWYERS[44]

The Multistate Bar Examination (MBE) contains 200 multiple-choice questions, 190 of which are scored. The 10 unscored questions are evaluated for future use. The database is not public, though the National Conference of Bar Examiners (NCBE) publishes study aids containing questions that have been retired from use.

Testing takes place in a large classroom or hall with a number of applicants, with as many as 5000 testing at once. Test format is multiple choice using computer-scanned answer sheets.

### *Development of the MBE*

MBE questions are developed by drafting committees composed of recognized experts in the various subject areas. Before a test question is selected for inclusion in the MBE, it undergoes a multistage review process over the course of several years. Besides intensive review by the drafting committee members and testing specialists, each test question is reviewed by other national and state experts. All test questions must successfully pass all reviews before they are included in the MBE. After an MBE is administered, the performance of each test question is reviewed and evaluated by content and testing experts. This final review is conducted to ensure that the exam is graded fairly, particularly with regard to any questions affected by recent changes in the law.

### *How to prepare for the exam*

The NCBE publishes retired questions from the exam. It also sells practice exams. The NCBE provides the Multistate Bar Examination Information Booklet available at http://www.ncbex.org/assets/media_files/Information-Booklets/MBEIB2012.pdf.

Commercial products are also available.

## NURSES[45]

The NCLEX–RN examination can be anywhere from 75 to 265 items. Of these items, 15 are pretest items that are not scored. Regardless of the number of items administered, the time limit for this examination is 6 hours.

The NCLEX–PN examination can be anywhere from 85 to 205 items. Of these items, 25 are pretest items that are not scored. The time limit for this examination is five hours.

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[44] Multistate Bar Examination. http://www.ncbex.org/multistate-tests/mbe/. Accessed April 10, 2012.
[45] National Council of State Boards of Nursing. https://www.ncsbn.org/. Accessed April 10, 2012.

### *How to prepare for the exam*

The National Council of State Boards of Nursing provides detailed test plans for candidates and educators at https://www.ncsbn.org/1287.htm.

Commercial products for study are also available.

### *Cost of exam*

The exam costs $200, plus other licensure fees required by the board of nursing in the jurisdiction in which the applicant is applying.

### *How the tests are created*

New questions to these exams undergo a great deal of review before they are included in a test. See https://www.ncsbn.org/2324.htm for NCLEX exam development frequently asked questions.

## ACCOUNTANTS[46]

The CPA Exam is comprised of four sections: Auditing and Attestation (AUD), Business Environment and Concepts (BEC), Financial Accounting and Reporting (FAR), and Regulation (REG). All four sections contain multiple-choice questions (MCQs). AUD, FAR, and REG sections have an additional portion for task-based simulation (TBS) questions; BEC has a portion for written communication questions, but no TBS questions.

### *How tests are created*

#### *Method—adaptive testing*

The Uniform CPA exam is administered using a modified adaptive testing model. Each CPA candidate begins the exam with a multiple-choice item testlet of moderate difficulty, after which an ability estimate based on item response theory is made. If the candidate's ability estimate is sufficiently high, the second testlet administered is more difficult. If the estimate fails to meet that threshold, another moderately difficult testlet is administered. After completing the second testlet, a new ability estimate is computed. If that estimate exceeds a predetermined threshold, a difficult testlet is administered as the third testlet. If not, a moderately difficult testlet is administered. On sections that contain simulations, these are administered after the third multiple-choice testlets. The simulations are *not* administered adaptively. That is, there is no relationship between a candidate's ability estimate and the simulations administered to the candidate.

[46] The Professional Accounting Society of America. http://www.thepasa.org/news/cpa-exam-insider-information.html. Accessed April 10, 2012.

### *Informing candidates of changes*

It has proven challenging to prepare candidates for change. Candidates often do not take seriously their responsibility to review program materials, tutorials, and practice tests. They rely more on word of mouth and information provided by review course providers. As a result, each time a change is introduced, candidate complaints increase and often there is a perception that there are errors in the exam. The amount of confusion caused will be less if changes are introduced sequentially, but, as with the risk exposure, overall the confusion will be of longer duration.

Each time change is introduced, it can require revisions to candidate materials. Depending on the change, revisions may be required to candidate bulletins, notices to schedule, the American Institute of CPAs (AICPA) tutorial and practice test, and websites maintained by the AICPA, National Association of State Boards of Accountancy, state boards, and review course providers. Course materials used in preparatory reviews offered by review course providers and academic institutions may also require revision. The lead time for revisions to some of these publications may be as long as a year.

### ***How to prepare for the exam***

Commercial products are available.

## TEACHERS[47]

> *The tests are developed by educators for educators. Advisory committees of distinguished teachers, teacher educators, key administrators and professional organizations help determine test content and review, revise and approve all questions and exercises. The Praxis Series is grounded in current research, including a comprehensive analysis of the most important tasks and skills required of beginning teachers and extensive surveys to confirm test validity.*[48]

Each state sets its own teaching exam requirements and determines the scores needed to become a certified teacher.

**Praxis 1—Computer Delivered**

| ***Test*** | ***Fee*** | ***Number of Questions*** | ***Testing Time*** |
|---|---|---|---|
| *Reading* | *$80* | *46* | *75 minutes* |
| *Mathematics* | *$80* | *46* | *75 minutes* |
| *Combined Test – Break (Optional)* | *$130* | *-* | *15 minutes* |
| *Writing (2 sections)* | *$80* | *44* | *38 minutes* |
| | | *1 essay* | *30 minutes* |

[47] Educational Testing Service. The Praxis Series Information Bulletin, 2011–12. Available at http://www.ets.org/Media/Tests/PRAXIS/pdf/01361.pdf. Accessed April 10, 2012.
[48] Educational Testing Service. "Frequently Asked Questions about the Praxis Tests." Available at http://www.ets.org/praxis/institutions/faq. Accessed April 10, 2012.

### Praxis 1—Paper Delivered

| ***Test*** | ***Fee*** | ***Number of Questions*** | ***Testing Time*** |
|---|---|---|---|
| *Reading* | *$40* | *40* | *60 minutes* |
| *Mathematics* | *$40* | *40* | *60 minutes* |
| *Writing (2 sections)* | *$40* | *38* | *30 minutes* |
| | | *1 essay* | *30 minutes* |

### *How to prepare for the exam*

Commercial products are available.

# APPENDIX J—CONSIDERATION OF PASSING SCORE PERCENTAGE THRESHOLD

In considering the purpose of the Federal Aviation Administration (FAA) knowledge test, the Aviation Rulemaking Committee (ARC) decided to also review minimum passing scores, which have been discussed in other forums. The current threshold for passing knowledge tests is a score of 70 percent. The ARC discussed both the issue of subtesting and the possibility of creating a higher threshold for passing.

The ARC does not know what reasoning or logic the FAA used to establish the minimum passing score of 70 percent; however, without clear evidence or data indicating that raising the passing threshold would enhance safety or the learning process, modifying the minimum threshold offers no advantage. Although the ARC recognizes that some minimum proficiency level must be established, it does not have a measurable means to indicate that the current 70 percent level is inappropriate or any corollary data to indicate that lower scoring pilots have a greater propensity for accidents or incidents historically than those who scored highly on their knowledge tests. The ARC instead focused, as seen in its recommendations, on strengthening the process of developing individual questions and enhancing the questions' relevance to assessing applicant knowledge.

Additionally, although the minimum passing threshold is 70 percent, all candidates are trained to proficiency before certification in the current system. Candidates who meet the minimum passing threshold of 70 percent but do not score 100 percent are certified by the endorsing flight instructor before the practical test as having been trained in all knowledge areas identified as deficient on the knowledge testing report. These deficient knowledge areas can be further evaluated by the examiner during the practical test, who will also have access to the knowledge testing report.

As an overview of passing score percentages, the ARC reviewed data from the 2010 FAA knowledge test statistics. The statistical data on all tests given in 2010 can be found in Appendix K, 2010 Airman Knowledge Tests. Table J–1 contains a review of high-volume tests for pilots and the performance of the applicants.

**Table J–1—High-Volume Airman Knowledge Tests**

| | Total Volume | Pass Rate | Average Score | Volume Score 70-79 | Percent of Total Volume 70-79 | Volume Score 80-100 | Percent of Total Volume 80-100 |
|---|---|---|---|---|---|---|---|
| Air Transport Pilot Airplane (CFR 121) | 4,925 | 96% | 87 | 692 | 14% | 4,049 | 82% |
| Air Transport Pilot Airplane (14 CFR part 135) | 692 | 94% | 84 | 135 | 20% | 515 | 74% |
| Commercial Pilot Airplane | 7,693 | 97% | 87 | 1,148 | 15% | 6,283 | 82% |
| Flight Instructor Airplane | 3,127 | 94% | 84 | 713 | 23% | 2,221 | 71% |
| Flight Instructor Instrument Airplane | 2,731 | 96% | 85 | 499 | 18% | 2,117 | 78% |
| Fundamentals of Instructing | 4,271 | 97% | 88 | 470 | 11% | 3,656 | 86% |
| Instrument Rating Airplane | 11,692 | 85% | 80 | 3,252 | 28% | 6,742 | 58% |
| Private Pilot Airplane | 23,737 | 92% | 84 | 4,580 | 19% | 17,216 | 73% |
| Sport Pilot Airplane | 743 | 97% | 87 | 94 | 13% | 625 | 84% |

The last two columns indicate the total percentage of applicants who scored below the current passing score of 70 percent and what that percentage would be if the passing score was raised to 80 percent. The change in passing threshold would represent a statically significant change in the pass rate for tests, but without further data correlation the effect on knowledge or pilot quality is unclear based solely on these statistical data points.

The ARC also reviewed the testing practices of other professions, including the U.S. Coast Guard, air traffic controllers, nurses, doctors, lawyers, teachers, and accountants. In most of these cases it was found that a passing threshold for their testing requirements was similar to the 70 percent threshold used in FAA testing. Each of these tests has different study materials used in preparation; they vary in delivery mechanism (paper or electronic) and the test guidance documents available. In some cases, the tests were open book and others have a public database of test questions. The ARC notes that professional tests with nonpublic databases have established a correlation between training and testing in the development and boarding of questions before they are entered into question banks, as shown in the ARC's review of non-aviation tests per appendix I to this report. In some professions the tests were the final hurdle before certification or authorization to serve in the profession, but others also required additional testing. For example, the U.S. Coast Guard test is both developed and conducted by the Coast Guard, which helps ensure that training and testing remain aligned.

Although the ARC does not recommend a change in the passing threshold, it noted the quality of the test questions is most important to the overall knowledge base of applicants who test. The ARC believes significant time should be spent developing high-quality test questions based on material intended to improve the overall quality of applicants for ratings and certificates. The ARC believes industry collaboration in the development and review of testing questions can be a positive process that improves the overall quality of testing material, resulting in improved knowledge quality of applicants who complete knowledge tests. In effect, the ARC posits improving test content quality will increase applicant knowledge more than modifying the passing score threshold.

The ARC members agree that if data indicates a correlation between higher knowledge testing scores and increased performance on pilot practical tests or an enhancement to safety, the FAA should consider increasing the passing score threshold. Absent that data, the ARC believes simply changing the passing score in a system that already requires a satisfactory level of knowledge would not equate to enhanced safety or knowledge transfer in applicants. The ARC indicates that other areas of greater impact can be addressed without an arbitrary change for perceived value.

### Dissenting Opinion from Jeppesen, SAFE, and AABI: Proposal to Raise Passing Grade for Flight Instructor Knowledge Test to 80 percent

Of all pilot certificates, none carries greater accountability than the flight instructor certificate. The flight instructor bears the burden of teaching safe and prudent operating procedures to their clients, as well as ensuring their clients have all the requisite knowledge necessary to operate in the National Airspace System as safe, responsible pilots.

Because the rule of primacy in learning is immutable, and it is the flight instructor that builds the foundation on which every pilot establishes their knowledge and skill, this places the flight instructor in a position of high responsibility. Thus it becomes imperative that the flight instructor be able to demonstrate a level of knowledge that exceeds the minimums required for other certificates. In many ways, a flight instructor certificate can be equated with a graduate degree in other areas of education.

Under current regulations, "[the] administrator shall specify the minimum passing grade for the knowledge test,"[49] the passing grades for the knowledge test for all certificates and ratings has traditionally been 70 percent. However, the FAA states in the introduction to every practical test standards (PTS) that "[b]ecause of the impact of their teaching activities in developing safe, proficient pilots, flight instructors should exhibit a high level of knowledge, skill, and the ability to impart that knowledge and skill to students." As a result, a minority position was provided that recommends raising the minimum passing score to 80 percent for the knowledge tests complying with § 61.185(a) (1) through (3) of Title 14 of the Code of Federal Regulations (14 CFR).

Although it is true that any applicant for any practical test must "have an endorsement certifying that the applicant has demonstrated satisfactory knowledge of the subject areas in which the applicant was deficient on the airman knowledge test,"[50] the phrase "satisfactory knowledge" is subjective and totally dependent on the endorsing instructor's understanding and integrity. It is, however, quite possible for an applicant for a flight instructor practical test to *not* receive the requisite training to correct for the deficiencies to the "high level of knowledge" mandated by the PTS.

"2010 Knowledge Test Results," a document created by the FAA Airman Testing Standards Branch (AFS–630), reported that 23 percent of applicants for the Flight Instructor, Airplane; Flight Instructor, Airplane (Added Rating); and Flight Instructor Sport Airplane (the three instructor ratings that teach entry-level student pilots, where the rule of primacy would have the greatest impact) certificates scored between 70 and 79 percent. Raising the passing grade to 80 percent would effectively prevent applicants receiving scores between 70 and 79 percent from slipping through the cracks that result from the subjectivity of the "satisfactory knowledge" endorsement requirements of 14 CFR § 61.39(a)(6)(iii).

Raising the minimum passing score to 80 percent for these flight instructor knowledge tests would have multiple benefits:

- It would reinforce the PTS statement requiring flight instructors to have a "high" level of knowledge. A higher passing score could be equated with higher levels of knowledge.
- It would bring the passing grade to a level of parity with graduate-level degrees.
- Flight instructors with higher levels of knowledge, and the tools to impart that knowledge, would be better prepared to educate their clients, thus raising the level of knowledge and safety throughout the pilot ranks.

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[49] Title 14, Code of Federal Regulations (14 CFR) § 61.35(b).
[50] 14 CFR part 61.

Raising the minimum passing score for flight instructor certificates does not require any regulatory change and can easily be accomplished at any time at the discretion of the administrator.

A flight instructor certificate can be easily equated to a graduate degree. In all of academia, any grade at the graduate level less than a "B" is a failing grade. Raising the minimum passing score to 80 percent for all of the flight instructor knowledge tests puts the passing grade on par with all other graduate degrees, and provides an inherent message to aspiring flight instructor candidates that the FAA does not accept a "C" grade as a passing level for this advanced rating. Holding the flight instructor to a higher standard of knowledge and skill is vitally important to reduce the fatal accident rate and improve flight safety. Moving to a minimum passing score of 80 percent would advance the achievement of this goal.

Additionally, the Aviation Accreditation Board International (AABI), a specialized accreditor that accredits collegiate flight education programs, has over its 20-plus-year history raised the bar for its 30 accredited flight programs by requiring institutions to provide AABI visiting teams evidence of what students learn beyond what is taught. FAA knowledge test scores are considered a baseline and many AABI-accredited programs have chosen to require 80 percent or more for awarding academic credit or, because FAA knowledge test questions are public, the majority of programs administer their own tests to determine credit and grade.

The value of AABI accreditation was recognized by the First Officer Qualifications ARC final report, which gives the highest non-military flight hour credit (350) toward qualification of first officers for FAA hiring requirements for completion of a 4-year aviation university/college accredited flight training program. This recognition was based on empirical data provided by the *2010 Pilot Source Study* of 2,300 pilots hired by regional air carriers and their performance as a new hire.

However, the proposal to raise the passing grade on the flight instructor exams to 80 percent is only valid if certain other ARC recommendations are accepted—particularly those establishing airman certification standards (recommendation 3), increasing industry participation in the creation and boarding of questions (recommendations 1 and 2), and updating question creation philosophy (recommendation 4), which would improve the quality of the test questions on the knowledge exam. Without a more relevant knowledge exam to assess, raising the minimum passing score becomes moot.

# APPENDIX K—2010 AIRMAN KNOWLEDGE TESTS

***Total Volume: 96,746***

| | Total Volume | Pass Rate | Average Score | Volume Score 70-79 | Percent of Total Volume 70-79 | Volume Score 80-100 | Percent of Total Volume 80-100 |
|---|---|---|---|---|---|---|---|
| **Air Transport Pilot Airplane (Title 14, Code of Federal Regulations (14 CFR) part 121)** | 4,925 | 96% | 87 | 692 | 14% | 4,049 | 82% |
| **Air Transport Pilot Airplane (14 CFR part 135)** | 692 | 94% | 84 | 135 | 20% | 515 | 74% |
| **Aircraft Dispatcher** | 961 | 82% | 79 | 262 | 27% | 523 | 54% |
| **Airline Transport Pilot Airplane (14 CFR part 135) (Added Rating)** | 14 | 93% | 86 | 2 | 14% | 11 | 79% |
| **Airline Transport Pilot Canadian Conversion** | 103 | 94% | 83 | 21 | 20% | 76 | 74% |
| **Airline Transport Pilot Helicopter (14 CFR part 135)** | 430 | 99% | 88 | 35 | 8% | 389 | 90% |
| **Airline Transport Pilot Helicopter (14 CFR part 135) (Added Rating)** | 48 | 94% | 82 | 16 | 33% | 29 | 60% |
| **Aviation Mechanic Airframe** | 6,921 | 93% | 84 | 1,570 | 23% | 4,841 | 70% |
| **Aviation Mechanic General** | 7,678 | 93% | 84 | 1,517 | 20% | 5,637 | 73% |
| **Aviation Mechanic Powerplant** | 6,637 | 91% | 82 | 1,789 | 27% | 4,257 | 64% |
| **Commercial Pilot Airplane** | 7,693 | 97% | 87 | 1,148 | 15% | 6,283 | 82% |
| **Commercial Pilot Airship** | 1 | 100% | 88 | 0 | 0% | 1 | 100% |
| **Commercial Pilot Balloon - Hot Air** | 55 | 98% | 88 | 2 | 4% | 52 | 95% |
| **Commercial Pilot Canadian Conversion** | 83 | 89% | 84 | 13 | 16% | 61 | 73% |
| **Commercial Pilot Glider** | 51 | 98% | 90 | 1 | 2% | 49 | 96% |
| **Commercial Pilot Gyroplane** | 2 | 100% | 84 | 1 | 50% | 1 | 50% |
| **Commercial Pilot Helicopter** | 997 | 96% | 88 | 129 | 13% | 833 | 84% |
| **Flight Engineer Reciprocating Engine (Added Rating)** | 0 | 0% | 0 | 0 | 0% | 0 | 0% |
| **Flight Engineer Reciprocating Engine (Basic)** | 7 | 100% | 87 | 1 | 14% | 6 | 86% |
| **Flight Engineer Turbojet (Added Rating)** | 0 | 0% | 0 | 0 | 0% | 0 | 0% |
| **Flight Engineer Turbojet (Basic)** | 226 | 99% | 94 | 7 | 3% | 217 | 96% |
| **Flight Engineer Turboprop (Added Rating)** | 1 | 100% | 80 | 0 | 0% | 1 | 100% |
| **Flight Engineer Turboprop (Basic)** | 19 | 100% | 87 | 2 | 11% | 17 | 89% |
| **Flight Instructor Airplane** | 3,127 | 94% | 84 | 713 | 23% | 2,221 | 71% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Flight Instructor Airplane (Added Rating)** | 57 | 82% | 82 | 13 | 23% | 34 | 60% |
| **Flight Instructor Glider** | 35 | 100% | 87 | 5 | 14% | 30 | 86% |
| **Flight Instructor Glider (Added Rating)** | 76 | 92% | 85 | 13 | 17% | 57 | 75% |
| **Flight Instructor Gyroplane** | 2 | 100% | 88 | 0 | 0% | 2 | 100% |
| **Flight Instructor Gyroplane (Added Rating)** | 7 | 100% | 83 | 3 | 43% | 4 | 57% |
| **Flight Instructor Helicopter** | 601 | 97% | 87 | 92 | 15% | 491 | 82% |
| **Flight Instructor Helicopter (Added Rating)** | 89 | 98% | 89 | 10 | 11% | 77 | 87% |
| **Flight Instructor Instrument Airplane** | 2,731 | 96% | 85 | 499 | 18% | 2,117 | 78% |
| **Flight Instructor Instrument Airplane (Added Rating)** | 68 | 93% | 86 | 7 | 10% | 56 | 82% |
| **Flight Instructor Instrument Helicopter** | 486 | 97% | 85 | 98 | 20% | 375 | 77% |
| **Flight Instructor Instrument Helicopter (Added Rating)** | 49 | 92% | 87 | 7 | 14% | 38 | 78% |
| **Flight Instructor Sport Airplane** | 39 | 92% | 84 | 9 | 23% | 27 | 69% |
| **Flight Instructor Sport Glider** | 1 | 100% | 87 | 0 | 0% | 1 | 100% |
| **Flight Instructor Sport Gyroplane** | 2 | 100% | 81 | 0 | 0% | 2 | 100% |
| **Flight Instructor Sport Powered Parachute** | 7 | 86% | 79 | 3 | 43% | 3 | 43% |
| **Flight Instructor Sport Weight-Shift-Control** | 11 | 100% | 89 | 0 | 0% | 11 | 100% |
| **Flight Navigator** | 2 | 50% | 74 | 0 | 0% | 1 | 50% |
| **Fundamentals of Instructing** | 4,271 | 97% | 88 | 470 | 11% | 3,656 | 86% |
| **Ground Instructor (Advanced)** | 1,079 | 97% | 87 | 148 | 14% | 895 | 83% |
| **Ground Instructor (Basic)** | 72 | 86% | 80 | 20 | 28% | 42 | 58% |
| **Ground Instructor Instrument** | 811 | 95% | 85 | 148 | 18% | 623 | 77% |
| **Inspection Authorization** | 1,090 | 84% | 81 | 265 | 24% | 655 | 60% |
| **Instrument Rating Airplane** | 11,692 | 85% | 80 | 3,252 | 28% | 6,742 | 58% |
| **Instrument Rating Canadian Conversion** | 40 | 90% | 83 | 6 | 15% | 30 | 75% |
| **Instrument Rating Foreign Pilot** | 200 | 84% | 81 | 36 | 18% | 131 | 66% |
| **Instrument Rating Helicopter** | 784 | 92% | 83 | 193 | 25% | 526 | 67% |
| **Military Competence Airplane** | 1,335 | 100% | 93 | 20 | 1% | 1,310 | 98% |
| **Military Competence Helicopter** | 1,532 | 99% | 90 | 76 | 5% | 1,443 | 94% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Military Competence Instructor** | 2,044 | 99% | 93 | 58 | 3% | 1,974 | 97% |
| **Parachute Rigger** | 185 | 84% | 78 | 51 | 28% | 104 | 56% |
| **Parachute Rigger Military Competence** | 75 | 87% | 86 | 6 | 8% | 59 | 79% |
| **Private Pilot Airplane** | 23,737 | 92% | 84 | 4,580 | 19% | 17,216 | 73% |
| **Private Pilot Airplane/Recreational Pilot - Transition** | 22 | 95% | 86 | 2 | 9% | 19 | 86% |
| **Private Pilot Airship** | 1 | 100% | 83 | 0 | 0% | 1 | 100% |
| **Private Pilot Balloon - Hot Air** | 87 | 89% | 83 | 21 | 24% | 56 | 64% |
| **Private Pilot Canadian Conversion** | 98 | 91% | 84 | 18 | 18% | 71 | 72% |
| **Private Pilot Glider** | 255 | 94% | 87 | 42 | 16% | 197 | 77% |
| **Private Pilot Gyroplane** | 2 | 100% | 94 | 0 | 0% | 2 | 100% |
| **Private Pilot Helicopter** | 1,438 | 95% | 86 | 235 | 16% | 1,137 | 79% |
| **Private Pilot Helicopter/Recreational Pilot - Transition** | 3 | 100% | 91 | 0 | 0% | 3 | 100% |
| **Private Pilot Powered Parachute** | 4 | 100% | 76 | 3 | 75% | 1 | 25% |
| **Private Pilot Weight-Shift-Control** | 1 | 0% | 67 | 0 | 0% | 0 | 0% |
| **Recreational Pilot Airplane** | 75 | 88% | 81 | 17 | 23% | 49 | 65% |
| **Recreational Pilot Helicopter** | 1 | 100% | 84 | 0 | 0% | 1 | 100% |
| **Sport Pilot Airplane** | 743 | 97% | 87 | 94 | 13% | 625 | 84% |
| **Sport Pilot Glider** | 2 | 50% | 78 | 0 | 0% | 1 | 50% |
| **Sport Pilot Gyroplane** | 8 | 100% | 86 | 2 | 25% | 6 | 75% |
| **Sport Pilot Lighter-Than-Air (Balloon)** | 0 | 0% | 0 | 0 | 0% | 0 | 0% |
| **Sport Pilot Powered Parachute** | 73 | 95% | 86 | 10 | 14% | 59 | 81% |
| **Sport Pilot Weight Shift Control** | 52 | 100% | 90 | 3 | 6% | 49 | 94% |

# APPENDIX L—HISTORY

At times in the past, the Federal Aviation Administration (FAA) knowledge test item question banks have been available in the public domain, including availability through the Government Printing Office as advisory circulars, and then FAA question books (FAA-T-8080–XX). These question books were later replaced with FAA computer testing supplements (FAA–CT–8080–XX) for the question figures and an online database of the questions. A 2004 National Aeronautics and Space Administration report[51] included concerns that releasing test questions may encourage students to focus their study on memorizing test questions. In addition, the FAA noted knowledge test questions were being answered in seconds on the actual test, with applicants completing the entire 60-to-100-question test in under 10 minutes in some instances. According to the Aviation Instructor's Handbook:

> *While test preparation materials may be effective in preparing students for FAA tests, the danger is that students may learn to pass a given test, but fail to learn other critical information essential to safe piloting and maintenance practices. In addition, FAA inspectors and designated examiners have found that student applicants often exhibit a lack of knowledge during oral questioning, even though many have easily passed the FAA knowledge test. A major shortcoming of test preparation materials is that the emphasis is on rote learning, which is the lowest of all levels of learning.*
>
> *Test preparation materials, as well as instructors, that dwell on teaching the test are shortchanging student applicants. All instructors who use test preparation publications should stress that these materials are not designed as stand-alone learning tools. They should be considered as a supplement to instructor-led training.*[52]

These facts resulted in a concerted effort by the FAA to focus on the integrity and validity of the assessment process. Beginning in 2004, the FAA began removing question bank items from the public domain, theoretically preventing applicants from memorizing the questions and protecting the FAA's estimated $6 million investment in the database itself. For example, there were 819 questions published in 2004 for the Private Pilot Knowledge Test; this number has decreased each test cycle, with the public data set for this question bank in 2012 including only 22 sample test questions. As editorial changes were made to the test, new content was added, and other content was removed, more information about these changes could have been communicated to the training industry. The public data was removed without putting in place a mechanism to maintain a correlation between training and testing. More emphasis was placed on statistical analysis than on test quality, correlation to training, or the impact this would have on parties involved in the certification process.

Although the FAA remains focused on increasing the size of the question bank for purposes of test validity and integrity, none of the tests have been rewritten in their entirety. As the question bank moved to a closed test, the industry noted a marked decrease in the quality of questions.

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[51] Stephen M. Casner, Karen M. Jones, Antonio Puentes, and Homi Irani, "FAA Pilot Knowledge Test: Learning or Rote Memorization?" *NASA/TM-2004-212814* (January 2004).

[52] Aviation Instructor's Handbook (2008 Edition, FAA–H–8083–9A).

Test questions became more irrelevant and obscure, but with the inability to accurately convey problems with specific test questions, industry was no longer able to provide feedback to the FAA for improvements. The FAA currently relies on test statistics, in-house review, and feedback from the test applicants themselves to establish and maintain test quality with no external vetting of questions, quality, or content.

As the tests continued to evolve without collaboration with the training community, curriculums placed a separate emphasis on test preparation materials to ensure students could pass the test with the grades expected by high-achieving applicants. Test preparation materials are therefore no longer accurately aligned with the actual knowledge test, as the "bad" fundamentals of instructing questions removed from the test are still covered in training, detracting from the learning objective. Despite this, students are required to "learn the test" for fear of failing. Rote learning test preparation materials used *in context* will facilitate learning; acquiring the aeronautical knowledge required to successfully complete the FAA knowledge test as part of an integrated training program is the most efficient and effective learning process, for a knowledgeable, safe pilot. The European Aviation Safety Agency has stated that—

> *In terms of regulations and knowledge of procedures and essential flight statistics, both the literature review as well as the experimental study support the conclusion that some meaningful learning does occur with rote learning. ... If students believe that they will have to connect and apply the material to be learned they are going to engage in meaningful learning, and as has been shown, rote learning helps to store the information in long-term memory.*[53]

Without a correlation between training and testing, however, test preparation is typically a separate, non-integrated step for applicants, thus preventing the knowledge to be learned in context.

[53] Moebus Aviation Consulting, "Impact assessment of the publication of questions of theoretical examinations for Part 66 and Part FCL" for the European Aviation Safety Agency, Research Contract EASA.2008.C52, 7 August 2009.

# APPENDIX M—FAA HANDBOOKS—UPHOLDING CONTENT

The Federal Aviation Administration (FAA) Regulatory Support Division, Airman Testing Standards Branch (AFS–630) publishes FAA handbooks related to airman certification training and testing. These handbooks detail the techniques and procedures associated with the standards established by the FAA. The handbooks are public domain and are printed and distributed throughout the aviation industry. Although nearly all handbooks list the FAA as the author, a wide discrepancy of quality and content exists between the various printed and eBook versions. In some instances, the information in what appears to be an official FAA handbook can be missing, modified, or obsolete (replaced by newer editions by the FAA) without any discernible way for the reader to know they are not reading the official information as it was originally published by the FAA.

Because these handbooks are in the public domain, the FAA historically has not responded to what is essentially a misrepresentation of its original book. However, with more companies printing public domain documents and the trend toward electronic publications, the misrepresentation of these FAA handbooks is becoming more of a safety-of-flight issue, without any way for the reader to know they do not, in fact, have the “official” FAA content. An Aviation Rulemaking Committee (ARC) member searched popular online bookstores and found several examples of what appear to be FAA publications, but are instead reprints by other organizations. Customer reviews indicate some vendors’ reprints may be unreadable or incomplete.

It is the ARC’s view that FAA resources should not be spent trying to police the publishing or printing industry, as the industry’s use and distribution of these important training documents should not be hindered. However, it is critical to safety of flight for the FAA to uphold the content of its publications as they originally were intended. This may be accomplished through a variety of methods, including a letter of agreement with those publishing public domain documents (where, once approved, an “official seal” may be used) or “official list of accepted reprints” on the FAA Web site (in which publishers must submit a printed copy to receive approval). The FAA would remain responsible for maintaining the original electronic distribution of its publications, with a policy in place to support further distribution of these titles through nonpublic channels (whether in printed or electronic form) and a method for readers to identify “official” content versus modified variations.

# APPENDIX N—PRIVATE PILOT KNOWLEDGE TEST TOPICS

| Number of Questions | Topic Name | Content Name |
|---|---|---|
| 1 | Aerodynamics | Load Factor |
| 1 | Aerodynamics | Principles of Flight |
| 1 | Air Traffic Control Procedures | En Route |
| 1 | Aircraft Performance | Atmospheric Effects |
| 2 | Aircraft Performance | Computations |
| 4 | Aircraft Systems | Flight Instruments |
| 3 | Aircraft Systems | Powerplant |
| 1 | Airport Operations | Lighting |
| 2 | Airport Operations | Marking/Signs |
| 2 | Airport Operations | Taxiing |
| 1 | Airport Operations | Uncontrolled |
| 1 | Airspace | Controlled |
| 1 | Airspace | Special Use |
| 1 | Flight Operations | Night |
| 1 | Flight Operations | Wake Turbulence |
| 1 | Human Factors | Aeromedical Factors |
| 9 | Navigation | Pilotage |
| 2 | Navigation | Radio |
| 1 | Publications | Airport Facility Directory |
| 1 | Regulations | 14CFR Part 1 |
| 1 | Regulations | 14CFR Part 61 |
| 1 | Regulations | 14CFR Part 71 |
| 7 | Regulations | 14CFR Part 91 |
| 1 | Regulations | NTSB Part 830 |
| 1 | Weather | Aeronautical Weather Forecasts |
| 3 | Weather | Aeronautical Weather Reports |
| 1 | Weather | Charts/Maps |
| 7 | Weather | Meteorology |
| 1 | Weight and Balance | Center of Gravity |

# APPENDIX O—PERCENTAGE OF CORRECT RESPONSES BY TOPIC FOR SELECTED KNOWLEDGE TESTS

Data is from Cycle Year 2011

| Topic | Content | % Correct PVT | % Correct IRA | % Correct COM | % Correct CFI[54] |
|---|---|---|---|---|---|
| Aerodynamics | Airspeed | 100% | - | 66% | 50% |
| Aerodynamics | Flight Characteristics | - | 60% | - | 93% |
| Aerodynamics | Load Factor | 81% | - | 84% | 78% |
| Aerodynamics | Performance | - | - | 88% | - |
| Aerodynamics | Principles of Flight | 94% | 86% | 84% | 87% |
| Aerodynamics | Stability / Control | 87% | - | 83% | 84% |
| Aerodynamics | Stall / Spins | 93% | - | - | 95% |
| Air Traffic Control Procedures | Approach | - | 86% | - | - |
| Air Traffic Control Procedures | Arrival | - | 86% | - | - |
| Air Traffic Control Procedures | Communications | 89% | 93% | - | - |
| Air Traffic Control Procedures | En Route | 96% | - | - | - |
| Aircraft Performance | Atmospheric Effects | 91% | - | 94% | 81% |
| Aircraft Performance | Charts | 96% | - | 81% | 66% |
| Aircraft Performance | Computations | 84% | - | 85% | 85% |
| Aircraft Performance | Density Altitude | - | - | 91% | 87% |
| Aircraft Performance | Limitations | - | - | 88% | 82% |
| Aircraft Systems | Avionics | 86% | 94% | 95% | 99% |
| Aircraft Systems | De-Icing / Anti-Icing | - | 48% | 85% | 80% |
| Aircraft Systems | Electrical | 75% | - | - | 99% |
| Aircraft Systems | Environmental | - | - | 99% | 80% |
| Aircraft Systems | Flight Controls / Primary | 97% | - | 92% | 90% |
| Aircraft Systems | Flight Controls / Secondary | 94% | - | 82% | 79% |
| Aircraft Systems | Flight Instruments | 84% | 83% | 94% | 82% |
| Aircraft Systems | Fuel/Oil | 93% | - | 92% | 92% |
| Aircraft Systems | Landing Gear | - | - | 94% | - |
| Aircraft Systems | Pitot / Static | 96% | 87% | 21% | 85% |
| Aircraft Systems | Powerplant | 88% | - | 93% | 86% |
| Aircraft Systems | Propeller | 81% | - | 90% | 85% |
| Aircraft Systems | Rotor | - | - | 95% | 92% |
| Aircraft Systems | Structures | 100% | - | - | 93% |
| Aircraft Systems | Transmission | - | - | 95% | 93% |
| Airport Operations | Communications | 74% | - | - | 85% |
| Airport Operations | LAHSO | 96% | - | 77% | - |
| Airport Operations | Lighting | 83% | 86% | 90% | 90% |
| Airport Operations | Marking/Signs | 84% | 82% | 82% | 81% |
| Airport Operations | Preflight | 95% | | 100% | - |
| Airport Operations | Runway Conditions | - | 92% | - | 69% |
| Airport Operations | Taxiing | 82% | - | - | 86% |
| Airport Operations | Tower Controlled | 94% | - | - | 84% |
| Airport Operations | Traffic Patterns | 100% | - | 87% | 92% |
| Airport Operations | Uncontrolled | 84% | 89% | - | - |

[54] Private Pilot (PVT), Instrument Rating – Airplane (IRA), Commercial Pilot (COM), Certificated Flight Instructor (CFI).

| Topic | Content | % Correct PVT | % Correct IRA | % Correct COM | % Correct CFI[54] |
|---|---|---|---|---|---|
| Airport Operations | Wake Turbulence | 94% | - | - | 93% |
| Airspace | Cloud Clearances / Visibility | - | - | 85% | - |
| Airspace | Communications | 100% | - | - | 98% |
| Airspace | Controlled | 79% | 87% | 90% | 88% |
| Airspace | Other | 85% | - | - | - |
| Airspace | Procedures | 93% | - | 35% | 98% |
| Airspace | Special Use | 81% | 85% | 82% | 88% |
| Airspace | Uncontrolled | 74% | 90% | 77% | 98% |
| Flight Operations | Approach | 89% | 83% | 95% | 87% |
| Flight Operations | Climb | 81% | 47% | 92% | - |
| Flight Operations | Collision Avoidance | 81% | - | 94% | 89% |
| Flight Operations | Cruise | 91% | - | 100% | 93% |
| Flight Operations | Descent | - | - | 100% | - |
| Flight Operations | Emergency Procedures | 91% | 87% | 92% | 88% |
| Flight Operations | Landing | 81% | 85% | 95% | 89% |
| Flight Operations | Launch Procedures | 93% | - | 91% | 77% |
| Flight Operations | Maneuvers | 94% | - | 92% | 79% |
| Flight Operations | Night | 93% | - | 90% | - |
| Flight Operations | Normal Procedures | 85% | - | - | - |
| Flight Operations | Positive Aircraft Control | - | - | - | 80% |
| Flight Operations | Soaring Techniques | 93% | - | 96% | 90% |
| Flight Operations | Takeoff | 97% | - | 95% | 87% |
| Flight Operations | Wake Turbulence | 86% | 91% | 89% | - |
| Flight Operations | X-C | 87% | - | - | - |
| Fundamentals of Instruction | Critique/Evaluation | - | - | 85% | 65% |
| Fundamentals of Instruction | Effective Communication | - | - | 95% | 92% |
| Fundamentals of Instruction | Human Behavior | - | - | 90% | 75% |
| Fundamentals of Instruction | Instructional Aids | - | - | 94% | - |
| Fundamentals of Instruction | Instructor Responsibilities | - | - | 94% | - |
| Fundamentals of Instruction | Learning Process | - | - | 87% | 65% |
| Fundamentals of Instruction | Planning Instructional Activity | - | - | 83% | 77% |
| Fundamentals of Instruction | Professionalism | - | - | 93% | - |
| Fundamentals of Instruction | Teaching Methods | - | - | 94% | 96% |
| Fundamentals of Instruction | Teaching Process | - | - | 78% | - |
| Fundamentals of Instruction | Techniques-Flight Instruction | - | - | 93% | 66% |
| Human Factors | ADM | 80% | - | 88% | 89% |
| Human Factors | Aeromedical Factors | 91% | 81% | 93% | 90% |
| Instructional Guidelines | Critique / Evaluation | - | - | - | 76% |
| Instructional Guidelines | Effective Communication | - | - | - | 79% |
| Instructional Guidelines | Human Behavior | - | - | - | 77% |
| Instructional Guidelines | Instructional Aids / Training Technologies | - | - | - | 82% |
| Instructional Guidelines | Instructor Responsibilities / Professionalism | - | - | - | 80% |
| Instructional Guidelines | Learning Process | - | - | - | 79% |
| Instructional Guidelines | Planning Instructional Activity | - | - | - | 83% |
| Instructional Guidelines | Teaching Methods | - | - | - | 86% |
| Instructional Guidelines | Teaching Process | - | - | - | 91% |
| Instructional Guidelines | Techniques-Flight Instruction | - | - | - | 73% |
| Instrument Procedures | Air Traffic Control | - | 80% | - | - |

| Topic | Content | % Correct PVT | % Correct IRA | % Correct COM | % Correct CFI[54] |
|---|---|---|---|---|---|
| Instrument Procedures | Approach Procedures | - | 75% | 85% | - |
| Instrument Procedures | Attitude Instrument Flying | - | 80% | - | 93% |
| Instrument Procedures | Basic Flight Instruments | - | 82% | - | 97% |
| Instrument Procedures | Communications | 90% | 83% | 96% | - |
| Instrument Procedures | Departure | - | 79% | 100% | - |
| Instrument Procedures | En Route | - | 82% | 100% | - |
| Instrument Procedures | Flight Planning | - | 78% | 92% | - |
| Instrument Procedures | Radar Operations | - | 99% | - | - |
| Instrument Procedures | Terminal Area Operations | - | 75% | - | - |
| Navigation | Dead Reckoning | 65% | - | 87% | 73% |
| Navigation | Pilotage | 82% | - | 84% | 82% |
| Navigation | Radio | 73% | 77% | 84% | 81% |
| Publications | Advisory Circulars | 81% | - | - | - |
| Publications | Aeronautical Charts | 85% | 83% | - | 97% |
| Publications | AIM | 86% | 80% | - | - |
| Publications | Airport Facility Directory | 93% | 70% | - | 98% |
| Publications | NOTAMs | 64% | - | - | - |
| Regulations | 14CFR Part 1 | 81% | - | 86% | 93% |
| Regulations | 14CFR Part 39 | 100% | - | - | - |
| Regulations | 14CFR Part 43 | 87% | - | - | - |
| Regulations | 14CFR Part 61 | 85% | 79% | 89% | 85% |
| Regulations | 14CFR Part 71 | 82% | - | - | - |
| Regulations | 14CFR Part 91 | 86% | 85% | 85% | 89% |
| Regulations | 14CFR Part 97 | - | 67% | - | - |
| Regulations | 14CFR Part 119 | - | - | 93% | - |
| Regulations | NTSB Part 830 | 81% | 93% | 90% | 87% |
| Regulations | Additional Category Ratings | - | - | - | 85% |
| Regulations | Aircraft Inspections | - | - | - | 73% |
| Regulations | Aircraft Lights | - | - | - | 91% |
| Regulations | Aircraft Maintenance | - | - | - | 89% |
| Regulations | Airspace Classes | - | - | - | 84% |
| Regulations | Alcohol / Drugs | - | - | - | 96% |
| Regulations | Class B Airspace | - | - | - | 79% |
| Regulations | Class D Airspace | - | - | - | 90% |
| Regulations | Commercial Pilot | - | - | - | 85% |
| Regulations | Documentation | - | - | - | 69% |
| Regulations | Eligibility | - | - | - | 75% |
| Regulations | Equipment | - | - | - | 84% |
| Regulations | FAA Certificates | - | - | - | 92% |
| Regulations | Flight Altitude | - | - | - | 76% |
| Regulations | Flight Instructor | - | - | - | 80% |
| Regulations | Flight Review | - | - | - | 94% |
| Regulations | Flight Training | - | - | - | 84% |
| Regulations | Fuel | - | - | - | 85% |
| Regulations | Knowledge / Practical Test | - | - | - | 97% |
| Regulations | Medical Certificate | - | - | - | 92% |
| Regulations | Minimum Safe Altitude | - | - | - | 88% |
| Regulations | Operating Pressurized Aircraft | - | - | - | 99% |
| Regulations | Operational Procedures | - | - | - | 90% |

| Topic | Content | % Correct PVT | % Correct IRA | % Correct COM | % Correct CFI[54] |
|---|---|---|---|---|---|
| Regulations | Pilot in Command | - | - | - | 94% |
| Regulations | Pre-Flight | - | - | - | 91% |
| Regulations | Pressure Altitude | - | - | - | 82% |
| Regulations | Private Pilot | - | - | - | 98% |
| Regulations | Second in Command | - | - | - | 99% |
| Regulations | Student Certificate | - | - | - | 89% |
| Regulations | Student Pilot | - | - | - | 91% |
| Regulations | Type Rating | - | - | - | 97% |
| Regulations | Universal Signals | - | - | - | 81% |
| Regulations | VFR Flight Plan | - | - | - | 94% |
| Regulations | Weather Minimums | - | - | - | 80% |
| Weather | Aeronautical Weather Forecasts | 89% | 79% | 88% | 85% |
| Weather | Aeronautical Weather Reports | 90% | 81% | 88% | 89% |
| Weather | Charts/Maps | 74% | 81% | 83% | 78% |
| Weather | Hazardous | 57% | 64% | 90% | 88% |
| Weather | Meteorology | 84% | 83% | 89% | 86% |
| Weight and Balance | Aircraft Loading | 90% | - | 84% | 82% |
| Weight and Balance | Center of Gravity | 82% | - | 90% | 86% |

# Aviation Rulemaking Advisory Committee

## Airman Testing Standards + Training Working Group

A REPORT FROM THE
AIRMAN TESTING STANDARDS + TRAINING WORKING GROUP
TO THE AVIATION RULEMAKING ADVISORY COMMITTEE

September 4, 2013

## LETTER TO AVIATION RULEMAKING ADVISORY COMMITTEE CHAIR

September 4, 2013

Mr. Dan Elwell
Chairman, Aviation Rulemaking Advisory Committee
Federal Aviation Administration
800 Independence Avenue, SW
Washington, D.C. 20591

Dear Mr. Elwell,

On behalf of the Airman Testing Standards and Training Working Group (ATST WG), we are pleased to submit the attached report and recommendations to the Aviation Rulemaking Advisory Committee (ARAC) for consideration.

The ATST WG was established to act upon the Airman Testing Standards and Training Aviation Rulemaking Committee's (ARC) recommendation for the FAA to integrate knowledge, skills, and risk management into each major task in the current Practical Test Standards (PTS) into a single Airman Certification Standard (ACS).

The report contains integrated Airman Certification Standards (ACS) documents for the Private, Commercial, and Instructor certificates and the instrument rating. Also included is a detailed proposal to align, streamline and consolidate existing FAA handbooks and guidance material with the ACS documents. Additionally, the working group has proposed recommendations for knowledge test development, evaluation, and management.

The report contains specific recommendations for the adoption and implementation of an Airman Certification System through standards, guidance and testing and recommendations on effectively managing the system through both stakeholder participation and a comprehensive Quality Management System (QMS).

The members of the working group look forward to the ARAC's acceptance of these recommendations in their entirety and offer to assist with any follow on efforts. We look forward to continuing the partnership to improve pilot training and testing; making both more meaningful and relevant to today's flight training environment.

Sincerely,

Jason Blair
ATST WG Co-Chair

David Oord
ATST WG Co- Chair

CC: Lirio Liu – Director, FAA Office of Rulemaking, ARAC Designated Federal Official
ARAC Membership
ATST WG Membership

AVIATION RULEMAKING ADVISORY COMMITTEE
AIRMAN TESTING STANDARDS AND TRAINING WORKING GROUP

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## EXECUTIVE SUMMARY

In accordance with its tasking from the Federal Aviation Administration (FAA) Aviation Rulemaking Advisory Committee (ARAC), the Airman Testing Standards and Training Working Group (ATST WG) has reviewed the existing standards and guidance material for airman training and testing and developed the following framework and recommendations.

1. The ATST WG drafted Airman Certification Standards (ACS) documents for the private pilot, authorized instructor, and commercial pilot certificates and the instrument rating. By aligning, defining, and integrating the aeronautical knowledge topics required by Title 14 of the Code of Federal Regulations (14 CFR) Part 61 with the Part 61 flight proficiency metrics enumerated in the existing Practical Test Standards (PTS), the recommended ACS approach:

    - Creates a clear standard for FAA knowledge testing and the industry-developed training it drives;
    - Provides both the conceptual foundation and the tools (e.g., ACS-based coding system) needed to align testing standards with FAA guidance materials and test questions, and to maintain that alignment; and
    - Enhances safety by listing specific risk management behaviors appropriate to each Area of Operation.

    Three of the four draft ACS documents provided in the appendices to this report (Private Pilot – Airplane ACS in Appendix A, Instrument Rating ACS in Appendix B, and Authorized Instructor ACS in Appendix D) reflect comments and suggestions received from the public through the formal notice and comment process as published in the *Federal Register*, and the documents were made available in public dockets that the FAA established on behalf of the ATST WG (FAA Docket Numbers: FAA-2013-0316 and FAA-2013-0649).

2. The ATST WG formulated recommendations to align and, where appropriate, consolidate FAA handbooks (FAA-H-8083-XX series) and computer testing supplements (FAA-CT-8080-XX series) with the ACS, as well as recommendations for updating these materials and coordinating, distributing, and communicating changes with/to stakeholders in a timely fashion.

3. The ATST WG also discussed the airman knowledge testing framework and devised recommendations for knowledge *test development*, to include both test question development and allocation of test question topics; knowledge *test evaluation*, to include review ("boarding") of proposed questions; and overall knowledge *test management* consistent with professionally-accepted standards and best practices.

The ATST WG's specific recommendations, as set forth in Chapter 7.0 of this report, fall under two categories, as described below.

> ***Adoption and Implementation of the Airman Certification System*:** The first set of recommendations describes the steps needed for the FAA to adopt and implement the three components of a fully integrated airman certification system: testing standards in the form of the ACS, associated guidance material, and the knowledge test itself. These recommendations include consideration for a carefully constructed beta test of the ACS approach with representative segments of the stakeholder community.
>
> ***Management of the Integrated Airman Certification System*:** The second set of recommendations lists the steps needed for the FAA to effectively manage the integrated airman certification system. These recommendations include establishment of a government/industry Airman Certification System Working Group (ACSWG) and development of a comprehensive internal Quality Management System (QMS) process that incorporates all three components of the airman certification system. The recommended QMS process should also define channels and procedures for input from, and feedback to, both internal and external stakeholders.

The ATST WG strongly believes that comprehensive adoption of its recommendations will enable the FAA to provide an integrated airman certification system that enhances aviation safety and better serves the aviation community.

# 1.0 AIRMAN TESTING STANDARDS + TRAINING WORKING GROUP

For a number of years, the general aviation (GA) training community has sharply criticized Federal Aviation Administration (FAA) pilot/instructor certification standards, training, and testing materials as being outdated, irrelevant, and out of touch with current technology and education/training methods. Industry has also faulted the agency for its piecemeal and unilateral efforts to make revisions.

These long-simmering concerns reached a boiling point in early 2011, when changes to the flight instructor knowledge (written) test on fundamentals of instructing caused the failure rate to skyrocket. In fielding questions on this topic at a May 2011 pilot training reform symposium sponsored by the Society of Aviation and Flight Educators (SAFE), then-FAA Administrator Randy Babbitt indicated support for a government/industry group to address these concerns.

## 1.1 Airman Testing Standards and Training Aviation Rulemaking Committee

On September 21, 2011, the FAA chartered the Airman Testing Standards and Training Aviation Rulemaking Committee (ATST ARC) to provide a forum for the U.S. aviation community to share its experience and expertise on more effective training and testing in the areas of aeronautical knowledge and flight proficiency required for safer operation in the evolving National Airspace System (NAS).

The FAA's charge to the ARC was to help ensure that the FAA's technical information related to existing standards for airman knowledge and skill tests, computer testing supplements, knowledge test guides, practical test standards, and associated training handbooks incorporates the most current, relevant, and effective approaches to training and testing. The FAA specifically tasked the ARC to provide recommendations on a process for ongoing stakeholder participation in developing the content of these materials, as well as methodologies for developing better knowledge test item bank questions. The FAA also asked the ARC to develop a prioritized list of certificates and ratings for update using the new process/methodology.

The ARC submitted its report and nine recommendations to the FAA on April 13, 2012.[1] The ARC's key recommendation on content called for the FAA to integrate knowledge, skills, and risk management elements for each major task in the current Practical Test Standards (PTS) into a single Airman Certification Standards (ACS) document for each airman certificate and rating. The ARC believed that this approach would support the FAA's goal of reducing the fatal GA accident rate, because clearly aligning the aeronautical knowledge testing standards required by Title 14 of the Code of Federal Regulations (14 CFR) part 61 with the flight proficiency standards in the existing PTS would significantly improve the relevance, quality, usability, and effectiveness of aeronautical knowledge testing and training materials for all stakeholders.

[1] A Report from the Airman Testing Standards and Training Aviation Rulemaking Committee to the Federal Aviation Administration (April 13, 2012). (www.faa.gov/aircraft/draft_docs/arc)

## 1.2 Formation of ARAC ATST WG

To accomplish this task and certain other ARC recommendations, the FAA accepted the ARC's process and methodology recommendations to establish a stakeholder body of industry subject matter experts (SME). In August 2012, the FAA assigned this task to the Aviation Rulemaking Advisory Committee (ARAC), a formal standing committee comprised of industry and aviation association representatives. The ARAC provides industry input in the form of information, advice and recommendations to be considered in the full range of FAA rulemaking activities, including regulatory support.

The FAA announced the ARAC's acceptance of this task through a Notice in the *Federal Register* published on September 12, 2012.[2] This Notice described the undertaking and solicited participants for the ARAC Airman Testing Standards and Training Working Group (ATST WG). The ARAC tasked the ATST WG to address content and methodologies for the private pilot certificate, flight instructor certificate, and instrument rating testing and training materials by developing an integrated ACS document for each certificate/rating. The FAA also tasked the ATST WG to develop a detailed proposal to realign and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., FAA-H-8083-XX series handbooks) with the integrated ACS documents, and to propose knowledge test item bank questions whose content and structure are consistent with both the ACS documents and the test question development principles set forth in the ATST ARC's recommendations.

The ATST WG was established and, under the leadership of industry co-chairs representing the Aircraft Owners and Pilots Association (AOPA) and the National Association of Flight Instructors (NAFI), began its work in November 2012. ATST WG members and FAA participants are listed in Appendix U to this report.

[2] Notice—Aviation Rulemaking Advisory Committee (ARAC); New Task Assignment for the ARAC: Establishment of Airman Testing Standards and Training Working Group, 77 FR 56251 (September 12, 2012).

# 2.0 BACKGROUND

The ATST WG was established to assist the FAA in implementing the ATST ARC recommendations, and the ATST WG tasking reflects the practical nature of the ARAC's instructions. The ATST WG was also expected to develop work product and submit a number of deliverables.

## 2.1 ARAC ATST WG Tasking

In order to support the FAA's goal to enhance GA safety and reduce the fatal GA accident rate, the FAA specifically tasked the ATST WG to provide: [3]

(1) An integrated Airman Certification Standards document that aligns the aeronautical knowledge testing standards required by 14 CFR part 61 with the flight proficiency standards (''Areas of Operation'') set out in 14 CFR part 61 and the existing PTS for (a) the private pilot and (b) flight instructor certificates and (c) the instrument rating. To accomplish this task, the ATST WG should follow the ATST ARC's recommendations to integrate appropriate elements of aeronautical knowledge and risk management into each Area of Operation in the current PTS documents for the private pilot and flight instructor certificates, as well as the instrument rating.

(2) A recommendation on priorities for revision of additional certificates and ratings, along with ways to ensure expert review of any revisions to these documents.

(3) A detailed proposal to realign and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., the FAA-H-8083-XX series handbooks listed in the *Federal Register* Notice) with the integrated ACS documents developed in accordance with the task above. The ATST WG was also tasked to develop and recommend a process for review and revision of these materials.

(4) Proposed knowledge test item bank questions that are consistent with both the newly developed Airman Certification Standards documents and the test question development principles set forth in the ATST ARC's recommendations The ATST WG was also tasked to recommend options that provide for expert outside review (''boarding'') of proposed questions while safeguarding the integrity of the testing process.

The assignment also required the ATST WG to develop this report. The ATST WG Final Report addresses the methodology by which the ATST WG completed the tasks outlined above and developed the associated deliverables, as well as documents the ATST WG's recommendations for implementation and future management of the Airman Certification System.

[3] 77 FR 56251, 56252.

In formulating its recommendations and developing the ACS concept, the ATST WG consulted the following testing and training materials for the private pilot certificate, the flight instructor certificate, and the instrument rating:

- Aeronautical knowledge standards set forth in 14 CFR part 61, Certification: Pilots, Flight Instructors, and Ground Instructors
- Flight proficiency standards set forth in 14 CFR part 61, Certification: Pilots, Flight Instructors, and Ground Instructors
- FAA Airman Knowledge Test Guides (FAA-G-8082-XX series)
- Learning Statement Reference Guide for Airman Knowledge Testing (http://www.faa.gov/training_testing/testing/media/LearningStatementReferenceGuide.pdf)
- FAA Airman Knowledge Testing Test Matrix Applicant Identification, Information Verification & Authorization Requirements Matrix (http://www.faa.gov/training_testing/testing/media/testing_matrix.pdf)
- Current PTS documents for Private Pilot – Airplane (FAA-S-8081-14B); Flight Instructor—Airplane ( FAA-S-8081-6C); and Instrument Rating for Airplane, Helicopter, and Powered Lift (FAA-S-8081-4E)
- Current FAA guidance material and handbooks, to include the *Pilot's Handbook of Aeronautical Knowledge* (FAA-H-8083-25A); the *Airplane Flying Handbook* (FAA-H-8083-3A); the *Aviation Instructor's Handbook* (FAA-H-8083-9A); the *Instrument Flying Handbook* (FAA-H-8083-15A); and the *Instrument Procedures Handbook* (FAA-H-8261-1A).
- *A Report to the FAA from the Airman Testing Standards and Training Aviation Rulemaking Committee: Recommendations to Enhance Airman Knowledge Test Content and Its Processes and Methodologies for Training and Testing* (www.faa.gov/aircraft/draft_docs/arc)

## 2.2 Justification for Change

During the course of its work, and as the ATST WG completed various aspects of the assigned tasks, the members noted and documented a variety of reasons supporting adoption of the ACS concept.

### 2.2.1 ACS Philosophy

The ATST WG requested public comment on several draft documents developed in accordance with its tasking. Appendix C and Appendix E to this report include the associated notices published in the *Federal Register,* as well as a summary of the comments received and the ATST WG's strategy for dispositioning and addressing those comments. In response to the documents, the ATST WG received comments questioning the justification for the significant change represented by the ACS approach. In general, these commenters expressed the view that changes to the PTS are tantamount to "fixing something that isn't broken," and that the focus should instead be on fixing the FAA's knowledge tests.

As described in Section 2.1, the ATST WG's tasking, including development of the ACS, arose from recommendations made by the ATST ARC. The ARC, in turn, was chartered in 2011 as a result of the FAA's desire for expert stakeholder assistance in making improvements to the knowledge testing component of the airman certification system.

A number of the ATST WG members also served on the ARC that recommended the changes for which the ATST WG developed the specific and detailed proposals in this report. Thus, the ATST WG believes it is appropriate to offer the rationale for the ACS approach.

To many stakeholders, the FAA airman knowledge testing (AKT) process is one of the most visible and, to some, the most visibly flawed component of the current airman certification system. Early in its deliberations, the ARC concluded that it is not possible to fix knowledge tests in an effective and sustainable manner without addressing the underlying systemic issues that have created the present framework.

One such issue identified by the ARC is the lack of a clearly defined knowledge test standard. Flight proficiency skills for each certificate and rating are enumerated in 14 CFR Part 61. The FAA developed the PTS to define metrics for acceptable performance of these skills.

While Part 61 also lists the broad areas of knowledge an airman must master in order to earn certification, the lack of a knowledge test standard corresponding to the PTS gives rise to several problems, including:

- Overly broad, outdated, and sometimes irrelevant knowledge test questions (e.g., navigation questions on Automatic Direction Finder/Non-Directional Beacon (ADF/NDB) rather than Area Navigation (RNAV); performance questions that focus on multi-part calculations rather than understanding and application of safety-critical knowledge, including task-specific risk management);
- Inadequate calibration of knowledge test questions to the certificate or rating level;
- Lack of a framework to evaluate, incorporate, and manage changes deemed critical to safety (e.g., runway safety, loss of control) and/or special emphasis items in a coherent way; and
- Insufficient information (including meaningful post-test feedback) to stakeholders, which is critical for effective training and preparation, correlation between training and testing, and correlation between all the stakeholders involved with the certification process.

These deficiencies have led many stakeholders – applicants, instructors, training providers, and even evaluators – to regard the knowledge test as little more than a rote memorization "box-checking" exercise. In the view of the ARC, the lack of a knowledge test standard has thus reduced the potential aviation safety and training value of the FAA knowledge test, as well as its educational effectiveness.

To address the issues arising from the lack of a knowledge standard, the ARC briefly considered proposing a "Knowledge Test Standards" (KTS) document that would serve as the knowledge test companion to the skill-focused PTS. For several reasons, the ARC discarded this approach as unworkable. ARC members feared that creation of a separate KTS document could contribute to greater long-term divergence between the KTS and the PTS. It would burden stakeholders with an additional set of documents, and it would require a greater expenditure of shrinking FAA resources to develop, deploy, and maintain a full range of KTS documents.

The ARC ultimately concluded that aviation safety and stakeholder needs, including the core desire for a more relevant AKT process, would be best served by integrating specific aeronautical knowledge elements into each Area of Operation/Task in the existing PTS, and by adding appropriate risk management elements for each Area of Operation/Task.

> Beyond improving safety, the ARC's recommended changes to the airman certification standards and process will benefit the aviation system by standardizing the training and evaluation of airmen, raising the aviation community's perception of testing credibility and providing a clear link between the regulations, guidance, handbooks, test standards, and knowledge test.[4]

### 2.2.2 Sound Educational Principles

In addition to avoiding the obvious challenges likely to arise from a separate KTS, the ARC – whose membership included several representatives from the academic community – determined that an integrated ACS approach is consistent with today's principles for effective adult education and meaningful testing.

In considering the ARC's rationale for the ACS concept, the ATST WG further noted that the FAA's traditional philosophical approach to aviation instruction is heavily tilted toward behaviorism. Although the agency's recent emphasis on scenario-based training (SBT) expands the "FAA-approved" toolbox for aviation education and training methodologies, the knowledge testing component of the agency's airman certification system – and the type of training it drives in the GA community – is still rooted in outdated and ineffective practices.

The goal is to ensure that standards, curriculum development, and assessment (testing) are aligned so that instructors, learners, and evaluators all have a clear idea of expected learning outcomes. Problems arise when testing diverges from standards or curriculum, because high-stakes test preparation degenerates into much-maligned and educationally bankrupt "teaching to the test" practices that favor rote memorization and test-taking strategies over genuine conceptual understanding. Members of the ATST WG concurred with the ARC, and all assert that the misalignment of FAA knowledge tests with standards and curricula forces the training community to take this approach. The primary goal of the ACS concept is to restore meaning to the knowledge testing component by aligning test questions with the knowledge and guidance material.

The ACS approach is also consistent with the principles of adult learning espoused by Malcolm Knowles.[5] According to Knowles, effective instruction and education of adults requires an approach that accounts for certain characteristics of adult learners. For instance, adults learn best when they:

- Perceive a need for certain knowledge or skills (goal-oriented);
- Understand how the area of learning relates to what they want to achieve (relevancy-oriented); and
- Recognize how the area of learning applies to the life or work context (practical).

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[4] ATST ARC Report at page viii.
[5] Knowles, 1984.

By integrating specific aeronautical knowledge elements and actionable risk management practices with the flying skill performance metrics in the existing PTS, the ACS meets these needs and, in the opinion of the ATST WG, significantly enhances the educational value of the FAA knowledge test(s), especially when the written knowledge test is linked directly to the ACS.

### 2.2.3 Industry Standards and Best Practices

Accepted industry practices for any certification process stipulate that it be based on a job/task analysis. The certification process must analyze, define, and publish the domains and tasks that are a part of the certification process. It must further identify the knowledge and skills associated with performance of those tasks. The required knowledge and skills become the basis for development of assessment activities.

The ACS documents provide a more effective "map" for assessment because they specifically define the knowledge and skills needed to perform at the level of the target certificate or rating. The ACS approach thus better serves the applicant, the instructor, and the evaluator. Because the process of developing the ACS required a thorough review and update of knowledge and skills for airman certification, it also aligns with certification industry standards requiring periodic review and revision of the job/task analysis.

### 2.2.4 Safety Management System Methodology

Another shortcoming discussed in the ARC's report is the lack of systemic integration of the three airman certification process components. Both the ARC and the ATST WG note that the FAA uses a documented Quality Management System (QMS) process for knowledge test question development. However, no such processes exist for development and management of the underlying standards (i.e., the knowledge test standard) or for the FAA-H-8083-XX series handbooks and other guidance documents that are intended to provide the critical link between the areas of knowledge enumerated in 14 CFR part 61 and items assessed via knowledge test questions.

The ARC addressed this issue in its recommendation for the FAA to develop a QMS process that treats all three components – knowledge standards, guidance, and knowledge testing – as part of a comprehensive airman certification system. The ARAC ATST strongly supports the ARC's recommendation as a means to integrate and manage the three major components of the airman certification process. The proposed ACS, along with the ATST WG's proposals for guidance and test management, provide a crucial part of the conceptual framework necessary to develop this comprehensive QMS process. The ATST WG also believes that a comprehensive QMS process that provides for structured coordination with both internal and external stakeholders further maximizes the FAA's increasingly limited resources.

The ARC further noted that the integrated ACS approach will benefit the FAA. First, it provides a "flight plan" that clearly maps aeronautical knowledge, and thus guidance and test questions, to the specific skills and performance standards deemed necessary for safe operation in today's NAS. Second, it contributes to better integration of all components in the airman certification system (*see below*). Third, it maximizes FAA resources by minimizing the number of documents the agency will need to create and maintain.

The ACS approach further benefits both stakeholders and the FAA because it is consistent with the safety management system (SMS) framework, which provides a systematic approach to achieving acceptable levels of safety risk.

The ATST WG constructed the ACS framework, associated guidance, and test item bank question components of the airman certification system around the four functional components of SMS:

- ***Safety Policy*** that demonstrates FAA senior management commitment to continually improve safety through enhancements to the airman certification testing and training system; specifically, better integration of the aeronautical knowledge, flight proficiency, and risk management components of the airman certification system;
- ***Safety Risk Management*** processes that create a structured means of safety risk management decision making to identify, assess, and determine acceptable level of risk associated with regulatory changes, safety recommendations, or other factors requiring modification of airman testing and training materials;
- ***Safety Assurance*** processes which allow increased confidence on the part of industry and FAA stakeholders in risk controls through a continual review of FAA products and the systematic, prompt and appropriate incorporation of changes arising from new regulations, data analysis, and safety recommendations; and
- ***Safety Promotion*** framework to support a positive safety culture in the form of training and ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

The ACS approach is thus designed as a foundation for the FAA's transition to a more integrated and systematic approach to airman certification testing and training.

## 2.3 Constituencies Represented

In its tasking to the ARAC, the FAA stated that the ATST WG should be:

> [C]omprised of aviation professionals with experience and expertise in airman training and testing, and technical experts having an interest in the assigned task. The FAA would like a wide range of members to ensure that all aspects of airman testing and training, including best practices, are considered in the development of its recommendations.[6]

In response to the *Federal Register* notice published on September 12, 2012, a number of individuals and organizations contacted the FAA to request participation on the ATST WG. The FAA selected its membership to comprise aviation professionals who could collectively represent all major sectors of the industry.

[6] 77 FR 56251, 56253.

### 2.3.1 Certificated Flight Instructors/Designated Pilot Examiners

Certificated flight instructors (CFI) and designated pilot examiners (DPE) are clearly on the front lines of airman testing and training. To benefit from the "real world" knowledge and expertise that CFIs and DPEs bring to this matter, the FAA selected a number of individuals with CFI and/or DPE qualifications to serve on the ATST WG. The ATST WG industry members include 13 CFIs and three DPEs. These individuals actively instruct and evaluate in both the 14 CFR part 61 and part 141 environments, and they bring a highly practical and pragmatic perspective to the work.

### 2.3.2 Aviation Academic Community

To ensure that the ATST WG's products are educationally sound and consistent with current, accepted principles and best practices in testing and training, the FAA selected several individuals who have academic as well as aviation credentials. In the course of completing the tasks assigned to the ATST WG, these members drew not only from their own expertise, but also from the knowledge of academic colleagues. For example, the University Aviation Association (UAA) participant recruited a number of individuals from UAA member institutions to provide feedback on materials in development and to assist in developing sample test questions consistent with the ACS.

### 2.3.3 Industry Advocacy Associations

Industry advocacy associations bring an important perspective to this task. Among other contributions, ATST WG members from this sector consistently provided an economic reality check. These participants helped ensure that the group's recommendations to the FAA, if implemented, would add value to the airman certification process and the associated testing and training experience without imposing substantial new costs on aviation community stakeholders.

### 2.3.4 Training and Test Preparation Providers

In addition to holding aviation and, in some cases, academic credentials as well, ATST WG members from the training and test preparation provider community provided the group with invaluable and essential "tires-meet-tarmac" insight on how the FAA's testing and training doctrine is translated into the products that airmen-in-training use to prepare themselves for certification testing. In addition to many substantive proposals for improving the content of the FAA's testing and training materials via the ACS approach, ATST WG members from this sector developed a number of practical proposals to improve communication and feedback between the FAA and its diverse group of stakeholders.

### 2.3.5 FAA Subject Matter Experts

Implementation of the ATST WG's recommendations will require coordination with a large number of internal FAA stakeholders at virtually all levels of the agency. To help ensure that the agency has a full understanding of the ATST WG's work and the rationale for its recommendations, the FAA assigned SMEs from a number of policy divisions to attend ATST WG meetings. FAA attendees included individuals from the Flight Standards Service (AFS) director's office, the General Aviation and Commercial Division (AFS-800), the Regulatory Support Division (AFS-600), the Air Transportation Division (AFS-200), and the Flight Technologies and Procedures Division (AFS-400). FAA SME also included a representative from the Office of the Chief Counsel (AGC). In addition to learning from the ATST WG's discussions, FAA SMEs were available to provide the agency perspective and to answer questions that arose in connection with development of the ATST WG's products and recommendations.

Appendix U provides a complete list of ATST WG members, including biographic information.

## 2.4 Methodology

The practical nature of the ATST WG tasking necessitated a number of concurrent processes in order for the members to accomplish the objectives and develop the associated deliverables.

### 2.4.1 Work Plan

The ATST WG Work Plan tracked the three primary tasks assigned to ATST WG. The Work Plan was divided in three phases designed around a "map" to document the alignment of 14 CFR aeronautical knowledge areas to 14 CFR flight proficiency areas of operation and to appropriate risk management knowledge and skills. The ATST WG used the "map" to facilitate consistency and comprehensiveness by documenting the purpose, rationale, and regulatory justification for each element in the integrated airman testing standards and training system.

In order to complete the tasks within the allocated timeframe, the ATST WG members participated in multiple member-led subgroups to work on each deliverable and proposed process improvement. The ATST WG also used the subgroup structure to develop initial recommendations later discussed and refined by the membership as a whole.

The Work Plan was structured around multiple tasks divided into the following three phases:

- Phase I: Airman Certification Standards
- Phase II: Align Handbooks and Guidance to ACS
- Phase III: Develop Appropriate Test Questions and Structures

### 2.4.2 Meetings and Teleconferences

During the course of the ATST WG tasking, the members held four face-to-face meetings in Washington, DC, as well as weekly teleconferences to complete the various tasks assigned by the ARAC.[7] The subgroups (discussed below) also held teleconferences to complete each phase of the ATST WG Work Plan.

### 2.4.3 ACS Development

To accomplish the Phase I tasks involving development of the ACS documents, the Working Group divided into subgroups. Each subgroup was tasked with the development of an ACS document—Private Pilot, Instrument Rating, and Instructor. The subgroups used a worksheet approach to ensure the members followed the ARC's recommendations to integrate appropriate elements of aeronautical knowledge and risk management into each Area of Operation while including the applicable knowledge and skill elements from the current PTS.

In order to ensure consistency among the three foundational ACS documents, the ATST WG members developed ACS documents for the private pilot certificate, the flight instructor certificate, and the instrument rating. Each ACS document was developed using the same series of job aids. Each ACS used a worksheet development methodology to document the transition and incorporated a standardized and streamlined introduction, as applicable to the specific document. (See Appendix P.)

Since time permitted, the subgroups continued the effort and developed draft Commercial Pilot and Airline Transport Pilot (ATP) ACS documents. Based on the aligned tasks, the Private Pilot Subgroup transitioned its work product to the Commercial Pilot Subgroup, and the Instrument Subgroup transitioned its work product to the ATP Subgroup. The members tracked all changes against the current PTS and noted overlapping tasks to ensure consistency in the initial launch of the ACS documents. Chapter 4.0 of this report details the ACS development process and the associated ATST WG observations and suggestions.

The Private Pilot and Instrument Rating ACS documents were published by the ATST WG for comment.[8] (See Appendix C.) Based on the comments, the Authorized Instructor, Commercial Pilot, and ATP ACS documents were further refined. In keeping with its tasking, the ATST WG also published the Authorized Instructor ACS, as well as updated drafts of the Private Pilot and Instrument Rating ACS documents for comment.[9] (See Appendix E.) The draft Commercial Pilot – Airplane ACS is included as Appendix F to this report. In light of the Pilot Certification and Qualification Requirements for Air Carrier Operations Final Rule promulgated by the FAA, the ATST WG did not finalize its pending draft ATP ACS and will submit its work product to the FAA for further review.[10]

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[7] At the time of submission of this report, the ATST WG scheduled an additional face-to-face meeting to discuss implementation strategy.
[8] Notice of availability; request for comments—Aviation Rulemaking Advisory Committee (ARAC) Airman Testing Standards and Training Working Group (ATSTWG), 78 FR 24289 (April 24, 2013).
[9] Notice of Request for Comment—Aviation Rulemaking Advisory Committee (ARAC) Airman Testing Standards and Training Working Group (ATSTWG), 78 FR 44619 (July 24, 2013).
[10] Final Rule—Pilot Certification and Qualification Requirements for Air Carrier Operations, 78 FR 42324 (July 15, 2013), as subsequently corrected.

### 2.4.4 Aligning Handbooks and Guidance Material

To accomplish the Phase II tasks related to aligning, streamlining, and consolidating existing FAA guidance material with the integrated ACS documents, the ATST WG formed a Guidance Material Subgroup to conduct the initial assessment and develop recommendations to realign and, as appropriate, streamline and consolidate existing FAA guidance material with the integrated ACS documents developed during Phase I of the Work Plan. The ATST WG also developed and proposed a process for review and revision of those materials.

In cataloging existing guidance, the Guidance Material Subgroup reviewed a number of documents, including:

- Handbooks (FAA-H-8083-XX series) and Computer Testing Supplements (FAA-CT-8080-XX series)
- Documents referenced in current PTS Documents
- FAA Order 8900.1, Flight Standards Information Management System
- FAA Order 8900.2, General Aviation Airman Designee Handbook

The ATST WG recommendations on aligning handbooks and guidance material can be found in Chapter 5.0 of this report.

### 2.4.5 Developing Appropriate Test Questions and Structures

Phase III of the ATST WG Work Plan involved development, and documentation of a methodology for development, of proposed knowledge test item bank questions that are consistent with both the newly developed ACS documents and the test question development principles set forth in the ARC's recommendations. In order to accomplish the tasks associated with Phase III of the Work Plan, the WG formed a Question Development Subgroup and leveraged the expertise of members of the WG representing the academic community.

The Question Development Subgroup analyzed current processes and worked to develop recommendations addressing options that provide for expert outside review of proposed questions while safeguarding the integrity of the testing process.

The Question Development Subgroup was able to work from a completed ACS and guidance "map" for each ACS to show the type of knowledge to be tested (rote, understanding, application, correlation), as well as proposed questions in accordance with the principles established by the ARC. In conducting its analysis, the Subgroup also developed a proposal for an "appropriate" test that measures mastery of required knowledge as outlined in the ACS and explained in handbooks, to address the number of questions and distribution of questions by subject. The Question Development Subgroup also developed the framework for an industry/agency partnership approach to the testing process, which evolved into the ATST WG's recommendation for establishment of an Airman Certification System Working Group (ACSWG) to continue the effort.

The WG's recommendations on the testing process also include expert "boarding" of questions by the ACSWG, taking into account standard practices in other fields that require certification and licensing exams. The ATST WG review of and recommendations to improve the knowledge test process are discussed in Chapter 6.0 of this report.

## 3.0 CURRENT AIRMAN TRAINING + TESTING FRAMEWORK

The FAA AFS Regulatory Support Division Airman Testing Standards Branch (AFS-630) is responsible for all aspects of airman training and testing, including planning, developing, and maintaining materials related to airman certification training and testing. This includes the PTS, airman knowledge tests, knowledge test guidance, computer testing supplements, and the computer testing sites listing. AFS-630 is also responsible for publishing training handbooks on a variety of topics.

### 3.1 Practical Test Standards

Current testing is based on the PTS (i.e., FAA-S-8081-XX series). Each PTS is developed by the FAA to establish the standards for successful completion of practical test for a certain certificate or rating. FAA inspectors, designated pilot examiners, and check airmen (or examiners) must conduct practical tests in compliance with these standards. Flight instructors and applicants may use the standards to prepare for the practical test. Instructors are expected to address all of the elements contained in applicable PTS when preparing applicants for practical tests. Applicants are expected to be familiar with the PTS and refer to these standards during their training. AFS-630 reviews and maintains the PTS for each certificate/rating. When revisions and or changes are published, a summary is included at the beginning of the document.

The FAA requires that all practical tests be conducted in accordance with the appropriate PTS and the policies set forth in the Introduction. The tasks, organized by area of operation, include an objective coupled with a series of knowledge/skill elements, which the examiner uses during the practical test.

The current PTS require applicants to be evaluated in **ALL** Tasks included in each Area of Operation of the appropriate PTS, unless otherwise noted. The current PTS also highlight special emphasis areas in the Introduction. For example, the Private Pilot-Airplane PTS asks examiners to place special emphasis upon 15 areas of aircraft operations considered critical to flight safety, including single-pilot risk management, as well as other areas deemed appropriate to any phase of the practical test.

### 3.2 Airman Knowledge Testing Program

Each certificate or rating requires the applicant to successfully complete both a practical test and a written knowledge test. The AKT Program encompasses airman knowledge tests as required by 14 CFR parts 61, 63, and 65. AFS-630 is responsible for knowledge exams covering 81 certification and rating areas.

The FAA has designated two Airman Knowledge Testing (AKT) Organization Designation Authorization (ODA) Holders, which sponsor hundreds of knowledge testing center locations. These testing centers offer a full range of airman knowledge tests (administered electronically through the FAA computer-assisted testing system) including: Aircraft Dispatcher, Airline Transport Pilot, Aviation Maintenance Technician, Commercial Pilot, Flight Engineer, Flight Instructor, Flight Navigator, Ground Instructor, Inspection Authorization, Instrument Rating, Parachute Rigger, Private Pilot, Recreational Pilot, Sport Pilot and Military Competence. AFS-630 maintains a list of computer testing sites.

### 3.2.1 Airman Knowledge Test Question Bank

Each knowledge test derives its questions from an associated Knowledge Test Question Bank. Currently, an AFS-630 SME is assigned to maintain each Knowledge Test Question Bank. The FAA computer-assisted testing system is supported by a series of supplement publications. These publications, available through several aviation publishers or on the AFS-630 website, include the graphics, legends, and maps that are needed to successfully respond to certain test items.

Under the current AFS-630 process, the SME (an FAA Aviation Safety Inspector (ASI)) operations or airworthiness, as applicable, is responsible for development, boarding, validation, review, revision, and maintenance of the Knowledge Test Question Bank. A variety of inputs are used in the process of managing the test bank, including: Applicant Survey Comments, Stakeholder Feedback, Statistical Analysis, Technological Advances, Reference Updates, and Safety Directives.

All test questions are the objective, multiple-choice type. Each question can be answered by the selection of a single response. Each test question is independent of other questions; therefore, a correct response to one does not depend upon, or influence, the correct response to another. The number of questions and length of time allotted for each Knowledge Test correlates to the complexity of the certificate or rating sought. For example, the Private Pilot–Airplane Knowledge Test includes 60 questions, and the applicant has 2 hours and 30 minutes to complete the test; while the ATP–Airplane Knowledge Test includes 80 questions, and the applicant has 3 hours to complete the test. Under the current knowledge testing system, the minimum passing score is 70 percent. The FAA publishes a sample exam for most knowledge exams. The sample exams are intended for study material and include a representation of the questions that can be found on the knowledge test.

### 3.2.2 Knowledge Test Guides

AFS-630 publishes a series of Knowledge Test Guides (i.e., FAA-G-8082-XX series) to provide guidance to the applicant. Each Knowledge Test Guide corresponds to a certificate or rating and includes information about the knowledge test itself, as well as the testing process. The Knowledge Test Guide also references the applicable Computer Testing Supplement(s) (discussed below). Each Test Guide includes the specific Learning Statement Codes (LSC) applicable to that active exams being administered for that certificate or rating.

### 3.2.3 Learning Statement Reference Guide

Learning statements, as used in airman knowledge testing, refer to a measurable level of knowledge a student should be able to demonstrate following a defined element of training. A comprehensive list of learning statements is published in the Learning Statement Reference Guide for Airman Knowledge Testing. These statements are also published in the Knowledge Test Guides specific to the applicable to the certificate or rating. The FAA provides learning statements to help instructors and students identify the area of knowledge missed, and therefore proven deficient during the knowledge test. The FAA's expectation is that instructors will use these LSCs to provide the remedial training required as a prerequisite to the practical exam. Examiners re-test these subject areas during the practical exam.

Beyond serving as a useful reference in preparing for an airman knowledge test, the Learning Statement Reference Guide is designed to assist the applicant and instructor in interpreting any learning statement codes that may appear on the applicant's Airman Knowledge Test Report. The applicant will receive a test report immediately upon completion of the test. This report lists learning statement codes for any questions the applicant has answered incorrectly. The applicant and instructor can match the codes on the test report to the information in the Test Guide or Learning Statement Reference Guide in order to obtain the corresponding areas of knowledge deficiency.

The instructor may be required to provide instruction on each of the areas of deficiency, and to provide a logbook or training record endorsement certifying the applicant demonstrated satisfactory knowledge in each area. Currently, the learning statement codes do not directly correlate to elements in the PTS. Also, definitions of the codes vary between the Learning Statement Reference Guide and the Test Guides. The history of the coding system is discussed in greater detail in Section 4.1.3 of this report.

In addition, the applicant is required to present the *original* Airman Knowledge Test Report to the examiner conducting the practical test. During the practical test, the examiner will refer to the learning codes and statements to evaluate the applicant's knowledge in the noted areas of deficiency.

### 3.2.4 Computer Testing Supplements

The FAA computer-assisted testing system is supported by a series of supplement publications. The Computer Testing Supplements (i.e., FAA-CT-8080-XX series), available through several aviation publishers and available for download from the AFS-630 website, include the graphics, legends, and maps needed to successfully respond to certain test items. ODA test center personnel provide these supplements to the applicant during the airman knowledge test.

## 3.3 Handbooks

AFS-630 is also responsible for publishing a number of handbooks and manuals for beginners and aviation professionals. The handbooks (FAA-H-8083- XX series) are designed for use by applicants and instructors preparing for certificate or rating tests. In many cases, the handbooks include basic reference material for knowledge testing, as well as flight training. The handbooks conform to the PTS, which is the current pilot training and certification concept established by the FAA. These publications are updated periodically to reflect new FAA regulatory requirements, guidance material, and technical developments.

# 4.0 DEVELOPMENT OF ACS DOCUMENTS

## 4.1 Development of an ACS (Approach to Future Documents)

### 4.1.1 ACS Structure

In accordance with the FAA's tasking to the ARAC, the ATST WG began with the task of developing proposed ACS for the private pilot certificate, the instrument rating, and the instructor certificate. Because the requirements for the instructor certificate are partially derived from Areas of Operation in the existing practical test standards for pilot certificates and ratings, the ATST WG initially tabled this part of the tasking pending development of the ACS for the private pilot certificate and the instrument rating.

To facilitate adoption and deployment of the ACS system for airman certification testing and the industry-developed training it drives, the ATST WG voluntarily developed baseline draft ACS documents for the commercial pilot and airline transport pilot (ATP) certificates. The proposed draft of the Commercial Pilot – Airplane ACS is included as Appendix F to this report. The ATST WG recommends that the FAA complete the ATP ACS and publish these documents for public comment at the earliest opportunity, and that the agency assign appropriate experts to the separately recommended ACSWG to review the comments and finalize the ACS for each of these certificates.

Recognizing that the ACS is intended to be a foundation for the entire airman certification testing and training system, the ATST WG invested considerable effort developing an ACS framework that can be consistently applied to the majority of airman certificates and ratings. Accordingly, the ATST WG's proposed Private Pilot – Airplane ACS (Appendix A), Commercial Pilot – Airplane ACS (Appendix F) and Instrument Rating ACS (Appendix B) are structured as follows:

> ***Introduction*****:** The ATST WG determined that the presentation of the introductory material in today's PTS documents undermines its effectiveness, because its length and complexity discourage the careful reading its content deserves. Consequently, the ATST WG significantly restructured this material. As proposed in the ACS, the brief introduction is designed only to present and explain the ACS concept. To promote greater safety, the ATST WG moved and expanded treatment of PTS special emphasis topics to the risk management section for the appropriate ACS Area of Operation. Finally, the ATST WG created topic-specific appendices (*see below*) for the technical "how to" material in the PTS introduction.
>
> ***Areas of Operation (Tasks)*****:** To promote product consistency, the ATST WG developed standardized formulations to introduce each section in the Areas of Operation (Objective, Knowledge, Skills, and Risk Management).
>
> The ACS Areas of Operation largely align with those in the existing PTS. There are exceptions for Areas of Operation and/or tasks that are more appropriately presented as separate elements. For example, the ATST WG separated the Certificates and Documents Area of Operation into elements for airmen and for aircraft. There are also exceptions to eliminate overlap. In the case of Runway Safety and Ground Operations, for instance, the ATST WG combined Areas of Operation and/or tasks.

In keeping with the goal of ensuring that the FAA airman knowledge test contributes more effectively to improving aviation safety, the ATST WG used the risk management section of each ACS Area of Operation to list the specific practical knowledge, skills, and behaviors that an applicant must demonstrate with respect to that Area of Operation.

***Appendices*:** The ATST WG determined that topic-focused appendices would offer the most effective and user-friendly presentation of other subjects addressed in the introduction of the existing PTS. For instance, the Appendix H of the ACS presents the detailed "how to" information on taking the knowledge test.

The ATST WG strongly believes that a standardized structure wherein each ACS has a consistent look and feel is important. This approach offers the greatest degree of usability for the broad range of stakeholders, and it also simplifies the FAA's document management task. Nevertheless, the ATST WG determined that the nature of aeronautical knowledge and flight proficiency required for instructor (versus pilot) certificates and ratings merits a modified approach.

The goal of the instructor certification process is to ensure the instructor-applicant is ready to prepare a learner to safely manage the risks of flight as pilot-in-command, consistent with the privileges of the certificate or rating to be exercised. The purpose of the Authorized Instructor ACS is to define the acceptable performance standards for instructional knowledge and skill, including the Fundamentals of Instructing (FOI) concepts listed in 14 CFR part 61. Accordingly, the FOI concepts are at the heart of the ATST WG's proposal for the Authorized Instructor ACS.

The ATST WG wishes to emphasize that its draft for the Authorized Instructor ACS stresses practical application of effective instructional concepts and techniques. For example, the Authorized Instructor ACS uses the term plan of action to describe the expectation that for any given Task, a competent instructor can develop and execute a flexible instructional plan of action to teach the knowledge, skill, and risk management requirements for that Task. Where appropriate to the Task, the instructional plan of action should incorporate realistic scenarios that require the learner to correctly apply and/or correlate the target knowledge, skill, and risk management to specific circumstances.

The Authorized Instructor ACS includes appendices that define the acceptable standards for knowledge, skill, and risk management in the aeronautical proficiency tasks unique to a particular instructor certificate or rating.

As stated in the introduction to the Authorized Instructor ACS, this product is not intended to be a stand-alone document. Rather, it is to be used in conjunction with the pilot certificate level or rating ACS for which the instructor-applicant seeks authorization to provide instruction. Therefore, in addition to mastery of the knowledge and skills defined in the Authorized Instructor ACS, the instructor-applicant must demonstrate instructional competence for Tasks in the ACS for the appropriate certificate level or rating, to include analyzing and correcting common learner errors.

While it was beyond the scope of the ATST WG's assignment to develop ACS documents for other non-pilot airman certificates and ratings (e.g., dispatcher, AMT), the ATST WG notes that it may in some cases be necessary to adapt the baseline ACS framework to accommodate the characteristics particular to these functions.

#### 4.1.2 ACS Development Process

In its April 2012 report to the FAA, the Airman Testing Standards and Training ARC recommended that the FAA develop a comprehensive QMS process to document the development and management of the integrated airman certification process (e.g., ACS, guidance, and testing).

The ATST WG recommends that the ACS component in the QMS process incorporate the following steps for transitioning each PTS to the ACS framework:

(1) Determine the nature of the airman certificate or rating to be converted:

- (a) *Pilot certificate or rating*: Use the Private Pilot ACS as the baseline model for conversion to the ACS structure.
  **NOTE:** The specific knowledge, skills, and risk management tasks in each Area of Operation should be calibrated "up" or "down" in accordance with the level of pilot certificate or rating.
- (b) *Instructor certificate or rating*: Use the Instructor ACS as the baseline model for conversion to the ACS structure.
- (c) *Other certificate or rating* (e.g., dispatcher, AMT): To the greatest possible extent, use the pilot certificate ACS as the structural model.

(2) Set up the appropriate worksheet template. (See Appendix P.)

(3) In consultation with appropriate internal stakeholders (e.g., FAA policy divisions) and external stakeholders, develop the ACS document:

- (a) *Introduction*: Use template language to the greatest practicable extent for the actual introduction. List special emphasis topics to be moved into the Areas of Operation. Following the appropriate model ACS, list the necessary appendices.
- (b) *Areas of Operation*: Use Areas of Operation in existing PTS as the point of departure to develop each section of the new ACS, bearing in mind that it may be appropriate to split or, in other cases, combine certain Areas of Operation and/or tasks:
  - (i) *Knowledge*: Ensuring that all aeronautical knowledge topics listed in 14 CFR part 61 are addressed in the appropriate Area(s) of Operation in the ACS, define the knowledge required to support the skill area for the level of airman certificate covered by the target ACS. The ATST WG notes that the calibration of knowledge to a particular airman certificate or rating level is among those activities most likely to benefit from expert stakeholder input. While calibration is unavoidably somewhat subjective, the ATST WG further notes that the use of standardized rubrics and a comprehensive task chart (i.e., a document that displays the required level of performance for each Area or Operation and/or task) would be helpful in this regard.
  - (ii) *Skills*: Except in cases where it is appropriate to separate or combine current PTS Area(s) of Operation and/or tasks, integrate the existing skills material into the ACS framework (i.e., modify stems and structure in accordance with standardized ACS formulations).

(iii) *Risk Management*: Drawing from the special emphasis topics and sources such as the FAA Risk Management Handbook (FAA-H-8083-2), develop specific, practical, risk management tasks, skills, or behaviors appropriate to each Area of Operation. The goal is to translate concepts into practical actions that enhance safety.

(c) *Appendices*: Revise PTS introductory material to align with ACS framework for appendices.

(4) Document the transition, to include:

(a) ACS disposition/transition of PTS Areas of Operation and tasks through the tracking matrix template (See Appendix P); and

(b) Calibration of standard(s) to level of airman certificate or rating. (See Appendix P.)

(5) Ensure that there is adequate guidance material to support the knowledge, skills, and risk management tasks in each ACS Area of Operation, and list the appropriate references in the space provided on the ACS worksheet template.

(6) Code the tasks in each ACS Areas of Operation in accordance with the scheme described in Section 4.1.3 of this report.

(7) Review process: The ATST WG strongly believes that comprehensive review of the ACS is critical to achieving the goal of a relevant, safety-oriented, and educationally-sound airman certification system. The work accomplished pursuant to this tasking benefited significantly from the ATST WG's decision to seek public comment on its draft ACS documents. Accordingly, the ATST WG recommends that the QMS process for the ACS element of the airman certification system include submission of the completed draft for review by:

(a) Internal stakeholders (e.g., FAA policy divisions and/or Offices of Primary Responsibility);

(b) Expert stakeholders (outside SMEs); and

(c) Public via publication in the Federal Register with invitation for comment.

### 4.1.3 Coding

As suggested by the discussion in Chapter 2.0 of this report, one of the overarching goals of this endeavor is to create an integrated, coherent airman certification system in which standards, guidance, and testing can be aligned, and maintained in alignment. Such symmetry is key to fully realizing the benefits the ACS system promises to both the FAA and its many stakeholders.

It is also key to conformance with accepted industry standards for certification programs. These standards require that items to be trained and tested be directly linked to the job/task analysis – in this case, the ACS. All assessment (testing) activity, whether written, oral, or practical, must correspond to the content delineated and specified in the job/task analysis.

To meet this goal, the ATST WG strongly recommends that the FAA adopt its proposal for a coding system anchored in the ACS. The proposed ACS codes would supersede the current system of LSCs, which is too limited to serve as the mechanism for alignment and too complex to effectively serve the needs of the FAA and the stakeholder community.

A more relevant coding system anchored in the ACS helps ensure that the all components of the certification testing process – written (knowledge), oral, and practical – are directly linked to the job/task analysis (i.e., the ACS). It also aids in conformance to certification industry standards that expect an ongoing process to ensure that the links between job/task analysis and assessment activity remain in alignment.

#### 4.1.3.1 Brief History of Airman Test Coding

For a number of years, the FAA used a series of Subject Matter Knowledge Codes (SMKC) that were defined in Advisory Circular AC 60-25. The SMKC codes were linked to a reference with chapter and subheading. For example, the J11 SMKC referred to the Aeronautical Information Manual, Services Available to Pilots.

In 2007, the FAA determined that the SMKC system had become overly cumbersome and work-intensive, because it required updates with every handbook revision. Consequently, the FAA replaced the SMKC system with the LSCs used today. The LSC concept is for each code to correspond to a measurable statement of knowledge. For example, PLT064 is the LSC for “Interpret information on a sectional chart” according to the Learning Statement Reference Guide, but the Private Pilot Test Guide (FAA-G-8082-17) defines the same code as “Airport Operations/Uncontrolled/Radio Communications.”.

#### 4.1.3.2 Issues Arising from Existing Code System

Unfortunately, neither the FAA nor the stakeholder community is well served by the LSC coding scheme. The most fundamental deficiency is the complete absence of a clear and traceable link from the LSC to a standard. Like SMKCs, today’s LSCs are tied to a specific reference. They are organized in terms of topic/content/specific point for that reference document, and they are applied only to test questions. This structure leads to several adverse consequences. The LSC system is:

***Subjective*:** The nature of the LSC structure leads to an unavoidable degree of subjectivity in the application of LSCs to test questions. Because LSCs are anchored in reference documents, many LSCs have the same or similar definitions. In addition, each type of test at a given certificate level (e.g., initial private pilot, transition private pilot) has its own set of LSC codes. The code for one test type may not have the same meaning when applied to another test type. This situation often leads test writers to code similar questions on a given topic with different LSCs.

For example, from the Private Pilot Airplane LSCs (as defined in FAA-G-8082-17I):

- Medical Certificates: PLT399, PLT427, PLT447
- ADF/NDB: PLT090, PLT091
- METAR: PLT026, PLT059
- Density Altitude: PLT005, PLT019, PLT124, PLT127

Alternatively, the same LSC can mean very different things:

- PLT194: En Route Radar or Aeromedical Factors Fitness for Flight
- PLT165: Meteorology/Temperature or Flight Instruments/Altimeter
- PLT064: Radio Communications, Class E, Military Training Routes, MOA, Charts, Parachute Jumping, Calculations, VOR, Airspace, Sectionals
- PLT376: Special VFR or Wildlife refuges

The result is confusion and frustration for stakeholders, substantial gaps in instructors' and evaluators' ability to provide accurate remedial training and retesting, and an overly burdensome number of codes for the FAA to manage.

***Unwieldy*:** Any update to reference-based LSCs requires a change in guidance documents (e.g., the FAA-G-8082 test guides), and *vice versa*. Change to LSCs complicates feedback to stakeholders, because it becomes necessary to correlate the date of the airman test report to the guidance document(s) in effect at that time (i.e., the current guidance document may not match the LSCs for a test report issued a couple of months ago). In addition, the complexity of the system and the sheer volume of LSC codes have contributed to issues such as differences in the LSC code legends used in the Learning Statement Reference Guide and the FAA-G-8082-XX series Test Guides. In other cases, applicants receive an airman test report with LSCs that do not match to any LSC on the Test Guides. This situation makes it difficult for applicants, instructors, and evaluators to identify the associated knowledge for a given test (i.e., identify the subject(s) requiring remedial training and retesting).

The LSC system is also unwieldy because it is not intuitive. On the contrary, its complexity requires multiple steps by applicants, instructors, and evaluators to get even a "ballpark" idea of the subject matter missed on the test. Stakeholders must review the airman test report and consult reference documents to decode the LSCs. Because the LSCs are so broad, the next step is to narrow the scope by consulting the sample questions in the public data. Unfortunately, the public data does not include a sample representative question for each LSC type used for each test, which consequently requires stakeholders to guess at the specific area(s) requiring remedial training and checking.

#### 4.1.3.3 Proposal for ACS Codes

Given the project goals and the shortcomings of the existing LSC system, the ATST WG recommends a coding process anchored in the ACS. An ACS-based coding scheme will:

- Clearly align guidance and test questions to the ACS;
- Make the airman test report meaningful to stakeholders (applicant, instructor, evaluator);
- Provide a means for automated generation of tests, whether using the existing test forms or future randomized selections; and
- Eliminate subjectivity and vastly simplify system management requirements for the FAA.

The ATST WG recommends that the FAA adopt a five-element ACS Coding System. The example below illustrates the coding methodology, which is founded in the ACS (as opposed to the reference document(s)).

**PA.X.A.K1.a:**

**PA** = Applicable ACS (private pilot airplane)*
**X** = Area of Operation (night operation)
**A** = Task (night preparation)
**K1** = Knowledge Task element 1 (physiological aspects of night flying as it relates to vision) **
**a** = rote*** – represents the level of learning and guides question development (e.g., rote would require the applicant to define, recall, list, name, match, label).

* IR = instrument rating, CA = commercial airplane, etc.
** S = skills elements, R = risk management elements
*** b = understanding, c = application, d = correlation (representing the level of learning which also informs the manner of the question (e.g., rote = define, recall, list, name, match, label))

### 4.1.3.4 Benefits of ACS Codes

A transparent, intuitive coding scheme anchored in the ACS will benefit both the FAA and its many stakeholders in the airman certification system. Benefits include:

Better safety education and training. A code system tied directly to the ACS provides a means to ensure that test questions are relevant and pertinent to safe airman operations, and that the associated guidance clearly reflects the material to be trained and tested.

It also provides better feedback to stakeholders. For the reasons described above, today's LSCs are not an effective means of communicating areas of deficiency in the applicant's knowledge. The ACS code system would accomplish the FAA's goals of focusing on the deficient knowledge, and not the specific missed test question, by driving airman test report results to a specific Area of Operation/Task/Task Element. Because the airman test report will list an ACS code that correlates to a specific Task Element for a given Area of Operation and Task, remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria.

Better testing and test management: In addition to providing much better guidance to test writers (because each question will correlate to a specific ACS task/element), the ACS coding system will facilitate test construction and management using the proposed test maps provided in Appendix I.

Better use of resources. Because the ACS coding system is anchored in the ACS, management of the entire airman certification system (standards, guidance, testing) becomes a much less work- and resource-intensive process for the FAA. A better managed system clearly benefits stakeholders, because the various elements of the testing and training system remain in alignment. Updates can be made objectively and consistently, and the process will also be transparent to all parties with (i.e., no guesswork required on how to re-code when there are changes to the ACS.

#### 4.1.3.5 Recommendations for ACS Codes

For all the reasons discussed in this report, the ATST WG strongly believes that a robust and stable coding system anchored in the ACS is essential to achieving the various goals for this endeavor.

The ATST WG therefore recommends that the FAA adopt and implement the ACS coding structure by:

(a) Coding each ACS in accordance with this scheme in the process of its development;
(b) Applying the appropriate codes to both existing and future knowledge test questions; and
(c) Considering a means by which the ACS codes could also be used to keep guidance documents aligned with the ACS and test questions.

To achieve the intended and desired results – various goals as previously discussed – coding is an essential part of ACS development – but codes have to be correctly matched to test questions and supported by guidance material.

## 4.2 Conversion Approach and Priorities

In its September 2011 charter to the Airman Testing Standards and Training ARC, the FAA requested recommendations on priorities for enhancing airman certificates and ratings. In its April 2012 report to the FAA, the ARC recommended that the FAA give priority to the private pilot certificate, the instrument rating, and the instructor certificate. The ARC justified this recommendation on the basis that these qualifications generate the greatest demand. In addition, they comprise the foundation of the flight training system.

In accordance with its assignment from the ARAC, the ATST WG created ACS documents for these qualifications. In addition, the ATST undertook to develop baseline ACS documents for the commercial and ATP pilot certificates. For the ATST WG's recommendations on sequencing the development/transition of additional ACS documents, please refer to the chart in Appendix N of this report.

The success of the conversion process will also hinge on education and training for evaluators. Concurrent with the conversion of the PTS to the ACS, the FAA should also establish a team (to include AFS-500, AFS-600, and AFS-800) to develop ACS-related training for designees and aviation safety inspectors. The training cycle for DPEs is two years, and it will take 24-36 months to ensure that all DPEs and ASIs are trained to the new ACS methodology.

## 5.0 GUIDANCE MATERIAL

The FAA's guidance material provides an essential link between the statutory certification requirements for airman certificates and ratings, the proficiency standards described in documents such as the ACS, and the knowledge test questions. For this reason, the FAA's tasking to the ATST WG included the request for a proposal to align and, as appropriate, streamline and consolidate existing FAA guidance material with the newly-developed ACS documents.

For the purposes of this endeavor, the ATST WG focused primarily on the range of guidance material developed and maintained by the FAA Flight Standards Service's Regulatory Support Division (AFS-600). These include the FAA-H-8083-XX series handbooks and the FAA-CT-8080-XX series computer testing supplements. The Handbooks/CTS Recommended Changes Matrix included in Appendix G to this report summarizes the ATST WG's document-specific recommendations with respect to substantive changes, possible consolidation, and sequence for revision. The ATST WG recommends that the Test Guide (FAA-G) series and Learning Statement Reference Guide be discontinued with the adoption of the ACS, as the information in these publications is incorporated into the ACS approach

Recognizing that the airman testing and training system uses a wide range of additional reference material, the ATST WG also developed a tracking document/matrix (see Appendix Q) to assist the FAA in updating the agency's internal guidance (e.g., Order 8900.1) and reference materials (e.g., Advisory Circulars) managed outside AFS-600. The PTS-to-ACS References Matrix lists those areas of FAA Order 8900.1, Flight Standards Information Management System, as well as other internal guidance documents where references to the PTS should be changed to ACS. The Reference Documents Tracking Matrix lists documents such as the Airport/Facility Directory and FAA Advisory Circulars that, in the opinion of the ATST WG, should be incorporated into the FAA-H series handbooks rather than retained as separate knowledge test reference material. (See Appendix H.)

To avoid the fragmentation and misalignment that bedevil the airman certification system today, the ATST WG believes it is essential for the FAA to develop a systemic, comprehensive change management mechanism that aligns both the guidance material housed in AFS-600 and the range of internal and external reference material with the terminology and content of the foundational ACS documents. The comprehensive QMS process recommended in Section 4 of this report is the recommended mechanism for the kind of robust change management system this task requires, and it should include a guidance management component that encompasses handbook changes and ensures alignment with the ACS, FAA reference documents, and regulatory changes.

The guidance management material component of the QMS process should provide a means to accomplish the following goals.

## 5.1 Updates

To ensure the proper management of updates to FAA-H-8083-XX series handbooks and FAA-CT-8080-XX series computer testing supplements, the FAA's integrated QMS process should document the means to:

- Obtain and incorporate input from a broad range of internal and external stakeholders to ensure that the FAA-H-8083-XX series handbooks, the FAA-CT-8080-XX series computer testing supplements, and reference materials provide information that aligns with the ACS and support the airman's acquisition of the ACS elements to be assessed via the knowledge test.
  - To facilitate this work, the ATST WG recommends that the FAA consider making proposed handbook and computer testing supplement series changes electronically available up to 12 months in advance of a new edition, with a provision for stakeholders to upload suggestions and recommendations for adjudication.
- Provide a systematic and controlled means of releasing mid-cycle information at defined regular intervals. This system should clearly distinguish between non-safety-related corrections (e.g., typos) and substantive updates or additions to existing material. For instance, the ATST WG recommends:
  - A periodically scheduled release of errata to disseminate non-safety-related corrections.
  - The use of the existing Information for Operators (InFO)/Safety Alert for Operators (SAFO) mechanisms to disseminate off-cycle safety-related corrections, additions, updates, or amendments.
- Provide a systematic and controlled means of incorporating and integrating new safety-related information into the handbook and computer testing supplement series documents at each regularly scheduled update. The current method of simply adding information as a new chapter, an appendix, or an addendum (vice integrating it into the appropriate part of the document) creates instability in the training environment, and it does not offer an educationally sound presentation to the applicant.
- Create and maintain a bibliography of advisory circulars (AC) and other reference documents not otherwise accounted for or cited in the handbook content.
- Create and maintain a single source "library" of figures (e.g., in the FAA-CT-8080-XX series computer testing supplements) referenced in the testing process to reduce redundancy and increase cost-savings.

## 5.2 Coordination

To ensure that both FAA policy divisions and external stakeholders have an opportunity to review and comment on proposed changes, the FAA's integrated QMS process should provide a systematic means of coordinating errata, updates, and other new information with the appropriate internal and external stakeholders.

### 5.3 Distribution

To facilitate efficient distribution of new and updated materials, the FAA's integrated QMS process should stipulate:

- Release of each FAA-H-8083-XX series handbook in both PDF and HTML form, with hyperlinked table of contents, figures, index tags, to enable distribution in eBook format.
- A publicly-accessible library of high-resolution images and illustrations, ideally organized by handbook and chapter, for public use in safety presentations, handouts, etc.

### 5.4 Communication

To ensure that stakeholders are informed of changes, updates, and new materials in a timely and predictable way, the FAA's integrated QMS process should provide for:

- Use of mechanisms such as SPANS, FAAST Blast, and other such tools to inform stakeholders when InFOs or SAFOs pertinent to the airman certification system are published, released, and/or effective. The FAA should also use these tools to inform stakeholders when current editions are canceled.
- A standardized set of data for each title, to include (a) date last updated; (b) current edition; (c) next edition expected; (d) InFO/SAFO updates; (e) how to submit feedback.
- Standardized periods of extension (vice “pending” notations) when handbook revisions are behind schedule. The term “pending” creates instability: Because it does not provide clear information on when stakeholders can expect updates, training providers suspend curricula and delay training changes pending release of new FAA guidance.
- Removal of obsolete terms, technologies, and associated sample questions from the public data. Retention of this material communicates incorrect information to applicants, training providers and other stakeholders, who waste time and effort to train / learn material that is no longer relevant to safe operation in today’s NAS.

# 6.0 QUESTION DEVELOPMENT + TESTING

Testing is the third and, in many ways, the most visible component in the airman certification process since testing is perceived as the major hurdle to obtaining an airman certificate or rating. As discussed in Chapter 2.0 of this report, aeronautical knowledge and flight proficiency skills for each certificate and rating are enumerated in 14 CFR part 61. The FAA developed the PTS to define metrics for acceptable performance of flight proficiency skills. The purpose of the ACS approach is to provide a knowledge test standard corresponding to the PTS, and to thus enhance both the quality and the safety value of the knowledge test.

In addition to proposing the ACS, the ARC made several general recommendations regarding the structure of the FAA knowledge test and test questions. Accordingly, the FAA asked the ATST WG to provide detailed proposals to align knowledge testing with the ACS, and help the agency improve the development, evaluation, and ongoing management of its knowledge testing system.

## 6.1 Test Development

The most fundamental recommendation for knowledge test development is to ensure that test questions are pertinent to safe operations as defined in the ACS document for the specific airman certificate or rating. In developing its test development recommendations and sample test questions, the ATST WG drew extensively from professionally-accepted standards (e.g., the National Commission for Certifying Agencies' Standards for the Accreditation of Certification Programs and the Standards for Educational and Psychological Testing) and best practices in both aviation and non-aviation industries (e.g., the National Business Aviation Association's Certified Aviation Manager accreditation program).

### 6.1.1 Content

For test question development, the ATST WG recommends that the knowledge testing portion of the FAA's future comprehensive QMS process for managing the airman certification system include guidelines such as those proposed in Appendix J. These include professionally-accepted test development rules for content and for construction of question stems, distractors, and general options.

The following basic considerations should be the starting point for any test question:

- Is the question content relevant for the airman certificate or rating being sought?
- Is this question pertinent and relevant to safe operations?
- Does this question test knowledge required to be a safe, competent aviator?
- Is it more effective to introduce this new question or revise an existing question?
- Does this question apply to other certificates and ratings?
- Is the subject matter relevant to the airman every day, or only occasionally?
- Where should this question be asked? (i.e., knowledge test or practical test)
- Is the reference valid?

Regarding references, the ATST WG recommends that test questions avoid using exact quotes from guidance or references unless they are intended to assess specific required rote knowledge.

Appendix H to this report sets forth additional recommendations on how to handle content in current reference documents, including the ATST WG's views on incorporating references such as ACs into the FAA-H-8083-XX handbook series.

Also with respect to content, the ATST WG recommends that the FAA limit questions requiring calculation, using them only when such calculations are clearly required for safe operations. For example, the pilot's ability to calculate a precise value for density altitude is far less important than his or her mastery of factors that increase density altitude and, still more important, ability to apply that knowledge to its impact on a specific aircraft and proposed operation.

In that connection, the ATST WG recommends that questions should generally not require multiple interpolations or "precision academics" that falsely imply a high level of accuracy. Rather, in keeping with the goal of ensuring that the knowledge test supports safety, the ATST WG recommends questions that assess the applicant's ability to understand and apply knowledge by selecting conservative numbers and applying an appropriate safety margin. The inclusion of safety risk management practices in knowledge testing ensures that instructors and training providers will include them at the very earliest stages of training.

### 6.1.2 Coding

As discussed in Chapter 4.0 of this report, the overarching goal is to create an integrated, coherent airman certification system in which standards, guidance, and testing can be aligned and maintained in alignment. To achieve this goal, the ATST WG has already recommended that the FAA adopt its proposal for a coding system anchored in the ACS. The proposed ACS codes would supersede the current system of LSCs, which is too limited to serve as the mechanism for alignment and too complex to effectively serve the needs of the FAA and the stakeholder community.

For all the reasons offered in Chapter 4.0, the ATST WG strongly believes that the use of ACS-based codes offers a stable, robust, intuitive, and effective mechanism to ensure that existing knowledge test questions are revised and new knowledge test questions are devised in alignment with the standards listed in the ACS. Use of the proposed ACS-based coding system would:

- Ensure the alignment of test questions with the ACS and associated guidance, thereby correlating training and testing.
- Ensure that test questions are relevant and pertinent to safe operation in the NAS.
- Specify the level of knowledge to be tested (e.g., rote, understanding, application, correlation)
- Provide essential feedback to applicants, instructors, and evaluators on areas to be retrained and retested.
- Assist the FAA in determining and maintaining the appropriate content in the public database of sample test questions.
- Simplify the test management process, to the benefit of both the FAA and stakeholders.
- Facilitate a balanced approach for constructing the test (e.g., test mapping).

### 6.1.3 Test Mapping

The FAA tasking also asked the ATST WG to provide recommendations on the number of test questions and on the appropriate distribution of test questions among topics. Appendix I provides the ATST WG's detailed response to this request, in the form of sample test maps for the Private Pilot and Instrument Rating knowledge tests. This framework could easily serve as a template for mapping test question distribution for other airman certificates and ratings.

The test map template could also assist the FAA's Regulatory Support Division in making a reasoned, data-driven response to demands for change in test question distribution. In today's environment, special emphasis areas (e.g., runway incursion avoidance, loss of control) often drive piecemeal changes in the allocation of questions on the knowledge test. The test map provides a helpful system management tool that, used in combination with a review of the ACS, associated guidance, and statistical analysis of accident data, can help the FAA ensure that special emphasis items are adequately represented at the appropriate point(s) in the certification process without displacing other important subjects that should be sampled via the knowledge test.

## 6.2 Test Evaluation

As noted in the ATST ARC's report to the FAA, the task of writing valid, reliable, multiple-choice exams is a complex process. It is inevitable that different people with differing experiences and backgrounds will interpret questions and answer choices in different ways. For that reason, and to ensure that test questions are constructed so as to accurately assess the applicant's knowledge of the desired content, best practices for test development involve extensive evaluation.

In the NBAA Certified Aviation Manager (CAM) test process summarized in the ARC's report, there are multiple levels of evaluation. An initial question is marked as a draft question. When the original author deems the draft ready for review, the draft question goes to other trained members of the testing committee for review and feedback. Members of the testing committee conduct additional review and feedback during a monthly conference call.

Once these evaluations have been completed, the draft question goes on the agenda for discussion at the testing committee's next face-to-face meeting where draft questions are reviewed by a small group of at least four individuals. Ultimately, each draft question also receives multiple reviews by several different individuals who have already earned Certified Aviation Manager credentials.

The ATST WG strongly believes that the importance of sound knowledge testing in the FAA's airman certification system demands a similarly rigorous level of review and evaluation. The ATST WG therefore recommends that the FAA establish a body comprised of both internal and external stakeholders to perform this and other functions associated with the airman certification system. Specifically, the ATST WG recommends that the FAA establish an ACSWG that would assist the FAA in all three components of the system (i.e., the ACS, guidance, and testing). A proposed charter for the ACSWG, modeled after that of the existing Operations Specifications Working Group (OSWG), is included as Appendix S to this report.

The ACSWG would provide a number of benefits to the FAA and to the airman certification system. Accepted practices in the certification industry call for the certifying entity to have a sufficient number of individuals with the necessary education, training, technical knowledge, and experience to perform the necessary functions, which increase in complexity with the size and scope of the certification activity. Today's budget realities make it impossible for the FAA to directly employ sufficient staff, and it is unrealistic to expect five FAA subject matter experts (SME), an instructional systems design specialist, an editor, and a statistician to manage a large certification system in-house.

By supplementing the corps of in-house SMEs, the ACSWG – comprised of members from other FAA policy divisions as well as external stakeholders – would also provide a means of conforming to industry standards for minimizing the potential for content error and test question bias. These standards and practices call for the use of qualified subject matter experts (SMEs) to review content and for periodic review of the ACS documents and guidance to ensure continued alignment of all certification system components.

In this connection, the ATST WG stresses that it is vital for the ACSWG to have a role in all three components of the system. A proper and effective certification process depends heavily upon the continued alignment of its interdependent components -- standards, guidance, and testing.

With respect to the knowledge test component, members of the ACSWG would be trained in industry-accepted test-writing and test question evaluation skills. In addition to writing, evaluating, and recommending questions, the ACSWG could assist the FAA by applying the new ACS coding to questions on existing (or recently retired) form tests, as well as ensuring that the composition of the overall form test is consistent with the test question subject distribution recommended in the proposed test map (Appendix I). This process would assist the FAA in several ways. Coding questions to the ACS is essential in order to implement and realize all the benefits of a fully aligned and integrated airman certification system. Also, the process of coding will accelerate the necessary process of culling the questions, or types of questions, that do not correlate to a specific task/element in the applicable ACS.

## 6.3 Test Management

The involvement of external stakeholders in the process of knowledge test question development and evaluation inevitably raises concerns about maintaining the integrity of the test item databank. Members of the ATST WG are fully cognizant of the dilemma this issue poses for the FAA. On the one hand, the active, ongoing involvement of expert external stakeholders such as those individuals and organizations represented on the ARC and now the ATST WG is essential to meeting the stated goals of the project. The FAA needs the "real-time, real-world" experience and expertise that these entities bring to the table. On the other hand, the involvement of these experts has the potential to create real or potential conflicts of interest, as well as perceptions of compromise.

The ATST WG believes there are multiple ways to strike a balance that will maximize the benefits of external stakeholder participation while minimizing the real or perceived compromise to test integrity. One of these methods -- having the ACSWG code test questions from recently retired form tests – is discussed above in the context of the recommendation to adapt and implement the proposed ACS-based coding system. Appendix S provides the ATST WG's detailed recommendations on the composition, qualifications, terms of service, and security guidelines for the proposed ACSWG.

### 6.3.1 Quality Management System (QMS)

A robust change management process is an essential component of the Safety Management System (SMS) approach to managing risk. As indicated in the previous sections of this report, a core recommendation of the ATST WG is for the FAA to use the QMS framework to accomplish this goal. Specifically, the FAA should develop a comprehensive QMS process for coordinated management of changes to each of the three components in the airman certification system: ACS, guidance, and testing. The ATST WG believes that the proposed ACSWG should be the mechanism for external stakeholder contributions to each component of the airman certification system.

As noted previously, the ATST WG further believes that both the terms of ACSWG membership and its "rules of engagement" can be structured to minimize real or perceived conflicts of interest. These could include limited terms or rotating membership on the ACSWG, and use of multiple independent sub-groups to "board" (evaluate) draft test questions. This approach would ensure that no single external stakeholder has access to, or direct knowledge of, more than a fraction of the overall test question databank. Finally, ATST WG members with experience with CAM or other test writing committees note that in a properly-structured multi-stage evaluation process, questions ultimately accepted for inclusion on the test usually bear little resemblance to the original draft.

### 6.3.2 Sample Questions

One of the shortcomings in today's knowledge testing is the large number of questions requiring calculation to very precise values. In addition to being often irrelevant or (ironically) inaccurate due to the false implication of decimal-point precision, such questions perpetuate the widespread practice of studying-by-memorizing the correct values.

Both the ARC and the ATST WG, which invested considerable time in developing sample questions aligned to the ACS, believe that such questions are largely unnecessary. The ATST WG "boarded" knowledge test questions whose structure drives the applicant to understanding, applying, and correlating rather than simply memorizing calculated values. Appendix K to this report includes examples of knowledge test questions before and after the knowledge test question guidelines were used to improve each question. The ATST WG notes that in addition to being more sound in educational terms, such questions could easily be released to the public without compromising the test in any way. On the contrary, the release of such questions will point applicants to concepts they need to understand and correctly apply for safe operation in the NAS.

The following example developed by the ATST WG illustrates the type of test question that can be released to the public since the information can be changed in the knowledge test item bank:

> You are 38 years old. You had your medical exam on March 18th this year and received a first class medical certificate. When can you no longer exercise the privileges as a private pilot with that medical certificate?
> (P.I.A.K9.a)
> (Reference: 14 CFR 61.23)
>
> A) March 18th, 2 years from this year.
> B) March 19th, 5 years from this year.
> **C) April 1st, 5 years from this year.**

In this example, the applicant must demonstrate an understanding of and apply medical certificate regulations, as opposed to simply memorizing the rule. The age and date in the example can be changed to create multiple questions for the knowledge test item bank.

### 6.3.3 Professional Test Management

In the parlance of assessment, a high-stakes test is an exam with significant consequences for the test taker: Passing conveys important benefits, and failing results in adverse consequences.

Both the knowledge exam and the practical test components of the FAA's airman certification testing process are high-stakes exams for the test-taker. Passing one or both of these exams is the key to obtaining any credential in the range of airman certificates, which include various pilot certificate levels (sport, recreational, private, commercial, ATP); instructor certificates (e.g., CFI); certificates necessary for employment (e.g., dispatcher), and ratings that convey an operating privilege (e.g., instrument rating, multi-engine rating).

The FAA's knowledge exam and practical test are also high-stakes tests for the FAA and, in a very real sense, for everyone with a stake in safety of the NAS. The airman certification testing process is intended to protect public safety and welfare by ensuring that each person operating in the NAS meets the standards prescribed by 14 CFR part 61 for aeronautical knowledge, experience, and flight proficiency.

For these reasons, it is essential for each component of the FAA's airman certification system, including testing, to have integrity – real and perceived – in terms of both substance and security.

From the substantive point of view, the content must be appropriate and relevant, and the questions must be valid, reliable, relevant and, ideally, constructed in the test format most appropriate to the subject and the assessment of its mastery by the applicant. Ideally, tests should include a range of question types (i.e., not confined to multiple choice). Also, the overall test should ideally be a randomly-generated instrument with test question subject allocation derived from the test question distribution map.

In addition to broadening the set of available questions for every subject, a randomly-generated test bolsters test integrity and security. If each test is essentially unique to an individual applicant, both the opportunities and the motivation for cheating diminish. Similarly, randomly-generated tests minimize other security-related threats to test integrity, such as test compromise, piracy, "harvesting" questions, and volatile re-takes.

To that end, one of the ARC's nine recommendations addressed the need to update and upgrade the FAA's test management infrastructure. [11]

> The ARC recommends the FAA urgently allocate additional resources to AFS–630 for an improved computer system (including both hardware and software) for development, maintenance, and delivery of knowledge tests that can—
>
> - Randomly generate tests that include all required knowledge areas (instead of manually created form tests).
> - Display onscreen images with regularly updated figures in place of FAA computer testing supplements.
> - Improve data management.
> - Be updated and maintained as technology improves.

While the ATST WG would welcome the implementation of this recommendation for test management, members recognize that current and ongoing budgetary constraints significantly constrain the FAA's ability to do so. Moreover, the ATST WG believes that acquisition of a new computer system for continued in-house management of the airman testing process would not be the best use of resources.

The FAA manages a system characterized by a vast number of questions (over 13,000), a large number of form tests (392), and a very high number of high-stakes certification tests administered each year (over 105,000 in 2012). No other high-stakes testing and certification organization attempts in-house management with even a fraction of the complexity inherent in the FAA's airman testing system. For these reasons, the ATST WG strongly recommends that the FAA urgently investigate options for contracting the range of test management functions, to include security, to a professional test management company.

[11] ATST ARC Report, Recommendation 6 at pages 13 and 37.

# 7.0 RECOMMENDATIONS

The ATST WG recommendations fall under two categories. The first set of recommendations addresses adoption and implementation of the Airman Certification System, and the second set of recommendations addresses management of the integrated Airman Certification System.

## 7.1 Recommendations on Adoption and Implementation of Airman Certification System

The ATST WG developed the framework for, and several components of, the Airman Certification System. The ATST WG recommends the FAA adopt and implement the ACS approach by taking the following steps.

### 7.1.1 Standards

The FAA should transition each PTS document into the ACS format, to include the five-element coding system described in Section 4.1.3 and Appendix R, by establishing an FAA project team incorporating members from all relevant headquarters policy divisions to:

- Review and finalize the ATST WG's draft ACS documents for the private, commercial, airline transport pilot, and authorized instructor certificates and the instrument rating for public comment via publication in the Federal Register.
- Begin ACS-conforming changes to the FAA's internal guidance, to include training materials for aviation safety inspectors and evaluators (designees).
- Use the conversion priorities proposed in Appendix N to establish a timeline for completion of the ATP ACS and development of additional ACS documents.
- Develop an implementation plan for private, commercial, ATP, authorized instructor, and instrument rating ACS documents, with consideration given to beta testing with a representative sample of the stakeholder community.
- Complete ATP ACS in accordance with Pilot Certification and Qualification Requirements for Air Carrier Operations Final Rule and other applicable guidance.

### 7.1.2 Guidance

The FAA should adapt the proposals listed in Chapter 5.0 of this report to align guidance (e.g., FAA-H-8083-XX series handbooks and FAA-CT-8080-XX series computer testing supplements) with the ACS and to manage:

- Updates (Section 5.1)
- Coordination (Section 5.2)
- Distribution (Section 5.3)
- Communication (Section 5.4)

#### 7.1.3 Testing

The FAA should improve the quality of the knowledge testing component by adopting the proposals outlined in Chapter 6.0 of this report. These include:

- ***Content*:** Adopt the professionally-accepted guidelines listed in Section 6.1.1 for test question content and construction of question stems, distractors, and general options, as well as for use of references and questions requiring calculation.
- ***Coding*:** Develop a plan apply the ACS codes described in Section 4.1.3 to existing test questions, starting with those applicable to the private, commercial, ATP, and authorized instructor certificates and the instrument rating.
- ***Mapping*:** Adopt and, in consultation with stakeholders, regularly review and revise the test topic distribution "map" presented in Section 6.1.3.
- ***Test Management*:** Urgently investigate options for contracting the range of test management functions, to include security, to a professional test management company.

### 7.2 Recommendations on Effectively Managing the Integrated Airman Certification System

In order to ensure systemic adoption of the Airman Certification System, the ATST WG formulated a series of recommendations intended to create a roadmap for implementation. The ATST WG recommends the FAA expeditiously take the following steps to establish mechanisms to enact and manage the integrated ACS approach to airman certification.

#### 7.2.1 Stakeholder Participation

The FAA should establish an FAA/industry working group (see proposal in Appendix S) to:

- Assist the agency in ensuring that the content of standards (ACS), guidance, and knowledge testing materials is relevant and up-to-date
- Ensure that all components of the airman certification system are maintained in alignment.

#### 7.2.2 QMS

The FAA should develop a comprehensive QMS process (see Appendix O) that encompasses all three components of the airman certification system: ACS, guidance, and test development/management. This process should provide for:

- Integrated management of these components and incorporate input from both internal stakeholders (e.g., FAA policy divisions) and external stakeholders (e.g., via the ACSWG discussed in Appendix S).
- Change management processes for each part of the airman certification system (e.g., what, who, when, how, how often).
- Mechanisms for timely feedback to internal and external stakeholders.

## 8.0 CONCLUSION

The FAA knowledge test is a vital component of the airman certification process. It is intended to measure an applicant's understanding of the rules, regulations, and knowledge areas required to earn an FAA airman certificate. The FAA, aviation community stakeholders, and the public thus have a compelling interest in an AKT process that provides an accurate and meaningful assessment of an applicant's fitness to operate safely in the NAS.

This effort began as an effort to "fix" knowledge testing, widely regarded as the most deeply flawed component of the FAA's airman certification system. In its present form, the airman knowledge test does not reflect a typical ground training program. Instead, applicants who have demonstrated knowledge and mastery in an approved ground and flight school curriculum must still conduct a comprehensive test prep to pass the knowledge test. Because the airman knowledge test is so disconnected from both training and the practical test, many regard it as a rote memorization exercise that has no real value for aviation safety education and training.

As the original ATST ARC quickly determined, there is no way to improve the airman knowledge test in a meaningful and sustainable way without addressing the systemic issues underlying the deficiencies in today's knowledge test. It was the ATST WG's task to define knowledge test standards, as well as to develop recommendations to align testing and guidance material with those standards. Accordingly, this report and its recommendations outline a holistic airman certification system based on the integrated ACS approach recommended by the original ATST ARC.

Having developed this and other ARC recommendations into specific products such as the ACS and detailed proposals for improving the guidance material and knowledge testing components of the airman certification system, the ATST WG is confident that the integrated ACS approach offers a significant improvement over the current state. The airman certification system is a comprehensive treatment of the airman certification process that:

- Recognizes that most aviation accidents some degree of deficiency in the pilot's knowledge, skill, and risk management abilities.
- Provides a way to ensure that all components of the certification process – standards, guidance, and testing – are correlated, aligned, and maintained in alignment.
- Aligns with principles for effective adult education and meaningful testing clearly linked to training.
- Comports with accepted industry standards and best practices for a certification process.
- Enhances the educational value of the FAA knowledge test, better serving both the FAA and its full range of stakeholders.

The ATST WG is pleased to provide its report and recommendations to the ARAC, and stands ready to assist the FAA in the important implementation work ahead.

# APPENDICES

## APPENDICES (continued)

# APPENDIX A: DRAFT PRIVATE PILOT ACS + TRACKING MATRIX

Appendix A includes the complete draft Private Pilot – Airplane Airman Certification Standards (ACS), as well as the Tracking Matrix documenting the transition from FAA-S-8081-14B, Private Pilot Practical Test Standards (PTS) for Airplane (SEL, MEL, SES, MES) to the Private Pilot – Airplane ACS. This draft incorporates the relevant comments received when the ATST WG published the first draft of the ACS for comment (Docket No. FAA-2013-0316), as well as the comments received when the second draft of the document was published for comment (Docket No. FAA-2013-0649).

**NOTE:** The Private Pilot Practical Test Standards Tracking Matrix appears first as an integrated component of this appendix, and the draft Private Pilot – Airplane ACS immediately follows as a stand-alone document.

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 1: Private Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| I.A. | Certificates and Documents (ASEL and ASES) | I.A. | Pilot Qualifications | Removed (ASEL and ASES) from name of task<br><br>Airman Certificate Questions/Regulatory Currency/Medical Certificate Questions should be separated from determining whether the aircraft is airworthy.<br><br>Change name of task to Pilot Qualifications.<br><br>Modified references to be specific to airman certificates. |
| I.B. | Airworthiness Requirements (ASEL and ASES) | I.B. | Airworthiness Requirements | Removed (ASEL and ASES) from name of task.<br><br>Added tasks from Certificates and Documents (now Pilot Qualifications) as they apply to aircraft airworthiness.<br><br>Added reference applicable to aircraft certificates and documents (14 CFR Part 43).<br><br>Accounted for differences with light sport A/C (how certified, how maintained). |
| I.C. | Weather Information (ASEL and ASES) | I.C. | Weather Information | Removed (ASEL and ASES) from name of task.<br><br>Removed obsolete reference (AC 61-84).<br><br>Need basic meteorology knowledge for risk assessment. |
| I.D. | Cross-Country Flight Planning (ASEL and ASES) | I.D. | Cross-Country Flight Planning | Removed (ASEL and ASES) from name of task.<br><br>Remove obsolete reference (AC61-84).<br><br>Task elements from current guidance relevant to planning and calculating flight plan have been moved to *Pilotage and Dead Reckoning* task. |
| I.E. | National Airspace System (ASEL and ASES) | I.E. | National Airspace System | Removed (ASEL and ASES) from name of task. |

| FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)<br>Section 1: Private Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation<br>Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| I.F. | Performance and Limitations (ASEL and ASES) | I.F. | Performance and Limitations | Removed (ASEL and ASES) from name of task.<br><br>Removed AC 61-84 (obsolete) from Reference. |
| I.G. | Operation of Systems (ASEL and ASES) | I.G. | Operation of Systems | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| I.H. | Water and Seaplane Characteristics (ASES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task |
| I.I. | Seaplane BASES, Maritime Rules, and Aids to Maritime Navigation (ASES) | | | Combined PTS I.H. and I.I. into a single Task; combined Sections 1 and 2 (single-engine and multi-engine) |
| I.J. | Aeromedical Factors (ASEL and ASES) | I.H. | Human Factors | Removed (ASEL and ASES) from name of task.<br><br>Added human factors and changed name of task to *Human Factors* .<br><br>Note: Two tasks (separate SRM). |
| | | I.J. | Principles of Flight - Engine (AMEL, AMES) | Merged PTS Section 2 (Multi-Engine) into ACS Section 1 |
| II.A | Preflight Inspection (ASEL and ASES) | II.A. | Preflight Assessment | Removed (ASEL and ASES) from name of task.<br><br>Change name of task to *Preflight Assessment* to capture risk management aspect of preflight planning. |
| II.B. | Cockpit Management (ASEL and ASES) | II.B. | Cockpit Management | Removed (ASEL and ASES) from name of task.<br><br>Added AC 91-21.1, Use of Portable Electronic Devices, to References. |
| II.C. | Engine Starting (ASEL and ASES) | II.C. | Engine Starting | Removed (ASEL and ASES) from name of task. |

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**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| II.D. | Taxiing (ASEL) | II.D. | Taxiing (ASEL, AMEL) | Added (AMEL) to name of task.<br><br>Absorbed Runway Markings, Signs and Lighting (Task III.C.) and Runway Incursion Avoidance (Task II.F.).<br><br>Added AFD, FAA-H-8083-25, AC 91-73, AC 150-5340-18 to References. |
| II.E. | Taxiing and Sailing (ASES) | II.E. | Taxiing and Sailing (ASES, AMES) | Combined PTS Sections 1 and 2 |
| II.F. | Runway Incursion Avoidance (ASEL and ASES) | – | COMBINED/ABSORBED | Absorbed in *Taxiing* ACS task. |
| II.G. | Before Takeoff Check (ASEL and ASES) | II.F. | Before Takeoff Check | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| III.A. | Radio Communications and ATC Light Signals (ASEL and ASES) | III.A. | Communications and Light Gun Signals | Removed (ASEL and ASES) from name of task. |
| III.B. | Traffic Patterns (ASEL and ASES) | III.B. | Traffic Patterns | Removed (ASEL and ASES) from name of task. |
| III.C. | Airport/Seaplane Base, Runway, and Taxiway Signs, Markings, and Lighting (ASEL and ASES) | – | COMBINED/ABSORBED | Absorbed in *Taxiing* ACS task. |
| IV.A. | Normal and Crosswind Takeoff and Climb (ASEL and ASES) | IV.A. | Normal Takeoff and Climb | Removed (ASEL and ASES) from name of task.<br><br>Changed name of the task to *Normal Takeoff and Climb* because there are three kinds of takeoffs (normal, short-field, soft-field), and the effects of wind must be considered for all three. |
| IV.B. | Normal and Crosswind Approach and Landing | IV.B. | Normal Approach and Landing | Changed name of task to *Normal Approach and Landing* because there are three kinds of approaches and landings (normal, short-field, soft-field). |

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**Section 1: Private Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| IV.C. | Soft-Field Takeoff and Climb (ASEL) | IV.C. | Soft-Field Takeoff and Climb (ASEL) | |
| IV.D. | Soft-Field Approach and Landing (ASEL) | IV.D. | Soft-Field Approach and Landing (ASEL) | |
| IV.E. | Short-Field Takeoff (Confined Area—ASES) and Maximum Performance Climb (ASEL and ASES) | IV.E. | Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL) | |
| IV.F. | Short-Field Approach (Confined Area—ASES) and Landing (ASEL and ASES) | IV.F. | Short-Field Approach and Landing (ASEL, AMEL | Added (AMEL) to name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| | | IV.G. | Confined Area Takeoff and Maximum Performance Climb (ASES, AMES) | Split sea task out of Short-Field Takeoff Land task |
| | | IV.H. | Confined Area Approach and Landing (ASES, AMES) | Split sea task out of Short-Field Approach Land task |
| IV.G. | Glassy Water Takeoff and Climb (ASES) | IV.I. | Glassy Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.H. | Glassy Water Approach and Landing (ASES) | IV.J. | Glassy Water Approach and Landing (ASES, AMES) | Added AMES to name of task |
| IV.I. | Rough Water Takeoff and Climb (ASES) | IV.K. | Rough Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.J. | Rough Water Approach and Landing (ASES) | IV.L. | Rough Water Approach and Landing (ASES, AMES) | Added AMES to name of task |
| IV.K. | Forward Slip to Landing (ASEL and ASES) | IV.M. | Forward Slip to Landing (ASEL, ASES) | |
| IV.L. | Go-Around/Rejected Landing (ASEL and ASES) | IV.N. | Go-Around/Rejected Landing | Removed (ASEL and ASES) from name of task. |
| V.A. | Steep Turns (ASEL and ASES) | V.A. | Steep Turns | Removed (ASEL and ASES) from name of task. |
| | | V.B. | Ground Reference Maneuvers (NEW TASK) | Combined: Rectangular Course; S-Turns; and Turns Around a Point into this new ACS task: *Ground Reference Maneuvers* . |

| FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)<br>Section 1: Private Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation<br>Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| VI.A. | Rectangular Course (ASEL and ASES) | – | COMBINED/ABSORBED | Combined Rectangular course, S-turns, and turns around a point into a single task: *Ground Reference Maneuvers* under “Performance Maneuvers” Area of Operation for increased flexibility for the circumstances surrounding the practical exam, while alleviating redundancies.<br><br>Added 14 CFR part 61 to References. |
| VI.B. | S-Turns (ASEL and ASES) | – | COMBINED/ABSORBED | Combined Rectangular course, S-turns, and turns around a point into a single task: *Ground Reference Maneuvers* under “Performance Maneuvers” Area of Operation for increased flexibility for the circumstances surrounding the practical exam, while alleviating redundancies.<br><br>Added 14 CFR part 61 to References. |
| VI.C. | Turns Around a Point (ASEL and ASES) | – | COMBINED/ABSORBED | Combined Rectangular course, S-turns, and turns around a point into a single task: *Ground Reference Maneuvers* under “Performance Maneuvers” Area of Operation for increased flexibility for the circumstances surrounding the practical exam, while alleviating redundancies.<br><br>Added 14 CFR part 61 to References. |
| VII.A. | Pilotage and Dead Reckoning (ASEL and ASES) | VI.A. | Pilotage and Dead Reckoning | Removed (ASEL and ASES) from name of task.<br><br>Absorbs flight planning elements from *Cross-Country Flight Planning* task. |
| VII.B. | Navigation Systems and Radar Services (ASEL and ASES) | VI.B. | Navigation Systems and Radar Services | Removed (ASEL and ASES) from name of task.<br><br>Eliminate ADF/NDB testing at the private pilot level. |
| VII.C. | Diversion (ASEL and ASES) | VI.C. | Diversion | Removed (ASEL and ASES) from name of task.<br><br>Suggest removing VHF Direction Finder from all knowledge exams. |

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**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| VII.D. | Lost Procedures (ASEL and ASES) | VI.D. | Lost Procedures | Removed (ASEL and ASES) from name of task.<br><br>Removed references to DF steer. |
| VIII.A. | Maneuvering During Slow Flight (ASEL and ASES) | VII.A. | Maneuvering During Slow Flight | Removed (ASEL and ASES) from name of task. |
| VIII.B. | Power-Off Stalls (ASEL and ASES) | VII.B. | Power-Off Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.C. | Power-On Stalls (ASEL and ASES) | VII.C. | Power-On Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.D. | Spin Awareness (ASEL and ASES) | VII.D. | Spin Awareness | Removed (ASEL and ASES) from name of task. |
| IX.A. | Straight-and-Level Flight (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |

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**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| IX.B. | Constant Airspeed Climbs (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| IX.C. | Constant Airspeed Descents (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |

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**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| IX.D. | Turns to Headings (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| IX.E. | Recovery from Unusual Flight Attitudes (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |

| FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)<br>Section 1: Private Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation<br>Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| IX.F. | Radio Communications, Navigation Systems/Facilities, and Radar Services (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| | | VIII.A. | Inadvertent IMC<br>(NEW TASK) | COMBINED: Straight and Level Flight; Constant Airspeed Climbs; Constant Airspeed Descents;<br>Turns to Headings; and Radio Communications, Navigation Systems/Facilities, and Radar Services into new *Inadvertent IMC* task. |
| X.A. | Emergency Descent (ASEL and ASES) | – | COMBINED/ABSORBED | Removed (ASEL and ASES) from name of task.<br><br>Absorbed into *Systems and Equipment Malfunctions* task. |
| X.B. | Emergency Approach and Landing (Simulated) (ASEL and ASES) | VIII.B. | Emergency Approach and Landing (Simulated) | Removed (ASEL and ASES) from name of task. |
| X.C. | Systems and Equipment Malfunctions (ASEL and ASES) | VIII.C. | Systems and Equipment Malfunctions | Removed (ASEL and ASES) from name of task.<br>Absorb Emergency Descent |
| X.D. | Emergency Equipment and Survival Gear (ASEL and ASES) | VIII.D. | Emergency Equipment and Survival Gear | Removed (ASEL and ASES) from name of task. |
| | | VIII.E. | Engine Failure During Takeoff before Vmc (Simulated (AMEL, AMES) | Incorporated mutli-engine Section 2 into ACS Section 1 |

| FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)<br>Section 1: Private Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation<br>Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| | | VIII.F. | Engine Failure After Lift-Off (AMEL, AMES() | Incorporated mutli-engine Section 2 into ACS Section 1 |
| | | VIII.G. | Approach and Landing with an Inoperative Engine (Simulated) (AMEL, AMES) | Incorporated mutli-engine Section 2 into ACS Section 1 |
| | | IX.A. | Maneuvering with One Engine Inoperative (AMEL, AMES) | Incorporated mutli-engine Section 2 into ACS Section 1 |
| | | IX.B. | Vmc Demonstration (AMEL, AMES) | Incorporated mutli-engine Section 2 into ACS Section 1 |
| | | IX.C. | Engine Failure During Flight (by reference to Instruments) (AMEL, AMES) | Incorporated mutli-engine Section 2 into ACS Section 1 |
| | | IX.D. | Instrument Approach and Landing with an Inoperative Engine (Simulated) by reference to Instruments (AMEL, AMES) | Incorporated mutli-engine Section 2 into ACS Section 1 |
| XI.A. | Night Preparation (ASEL and ASES) | X.A. | Night Preparation | Removed (ASEL and ASES) from name of task. |
| XII.A. | After Landing, Parking, and Securing (ASEL and ASES) | XI.A. | Parking, and Securing | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| XII.B. | Anchoring (ASES) | XI.B. | Seaplane Post-Landing Procedures | Combined PTS XII.B., C. D. into a single task |
| XII.C. | Docking and Mooring (ASES) | – | COMBINED/ABSORBED | |
| XII.D. | Ramping/Beaching (ASES) | – | COMBINED/ABSORBED | |

| FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)<br>Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation<br>Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| I.A. | Certificates and Documents (AMEL and AMES) | I.A. | Pilot Qualifications | Combined PTS Sections 1 and 2 into a single ACS Section 1; Removed (ASEL and ASES) from name of task<br><br>Airman Certificate Questions/Regulatory Currency/Medical Certificate Questions should be separated from determining whether the aircraft is airworthy.<br><br>Change name of task to Pilot Qualifications.<br><br>Modified references to be specific to airman certificates. |
| I.B. | Airworthiness Requirements (AMEL and AMES) | I.B. | Airworthiness Requirements | Removed (ASEL and ASES) from name of task.<br><br>Added tasks from Certificates and Documents (now Pilot Qualifications) as they apply to aircraft airworthiness.<br><br>Added reference applicable to aircraft certificates and documents (14 CFR Part 43).<br><br>Accounted for differences with light sport A/C (how certified, how maintained). |
| I.C. | Weather Information (AMEL and AMES) | I.C. | Weather Information | Removed (ASEL and ASES) from name of task.<br><br>Removed obsolete reference (AC 61-84).<br><br>Need basic meteorology knowledge for risk assessment. |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| I.D. | Cross-Country Flight Planning (AMEL and AMES) | I.D. | Cross-Country Flight Planning | Removed (ASEL and ASES) from name of task.<br><br>Remove obsolete reference (AC61-84).<br><br>Task elements from current guidance relevant to planning and calculating flight plan have been moved to *Pilotage and Dead Reckoning* task. |
| I.E. | National Airspace System (AMEL and AMES) | I.E. | National Airspace System | Removed (ASEL and ASES) from name of task. |
| I.F. | Performance and Limitations (AMEL and AMES) | I.F. | Performance and Limitations | Removed (ASEL and ASES) from name of task.<br><br>Removed AC 61-84 (obsolete) from Reference. |
| I.G. | Operation of Systems (AMEL and AMES) | I.G. | Operation of Systems | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| I.H. | Principles of Flight Engine Inoperative (AMEL and AMES) | I.J. | Principles of Flight Engine Inoperative (AMEL, AMES) | |
| I.I. | Water and Seaplane Characteristics (AMES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task |
| I.J. | Seaplane BASES, Maritime Rules, and Aids to Maritime Navigation (AMES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task; combined Sections 1 and 2 (single-engine and multi-engine) |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| I.K. | Aeromedical Factors (AMEL and AMES) | I.H. | Human Factors | Removed (ASEL and ASES) from name of task.<br><br>Added human factors and changed name of task to *Human Factors* .<br><br>Note: Two tasks (separate SRM). |
| II.A | Preflight Inspection (AMEL and AMES) | II.A. | Preflight Assessment | Removed (ASEL and ASES) from name of task.<br><br>Change name of task to *Preflight Assessment* to capture risk management aspect of preflight planning. |
| II.B. | Cockpit Management (AMEL and AMES) | II.B. | Cockpit Management | Removed (ASEL and ASES) from name of task.<br><br>Added AC 91-21.1, Use of Portable Electronic Devices, to References. |
| II.C. | Engine Starting (AMEL and AMES) | II.C. | Engine Starting | Removed (ASEL and ASES) from name of task. |
| II.D. | Taxiing (ASEL) | II.D. | Taxiing (ASEL, AMEL) | Added (AMEL) to name of task.<br><br>Absorbed Runway Markings, Signs and Lighting (Task III.C.) and Runway Incursion Avoidance (Task II.F.).<br><br>Added AFD, FAA-H-8083-25, AC 91-73, AC 150-5340-18 to References. |
| II.E. | Taxiing and Sailing (ASES) | II.E. | Taxiing and Sailing (ASES, AMES) | Combined PTS Sections 1 and 2 |
| II.F. | Runway Incursion Avoidance (AMEL and AMES) | – | COMBINED/ABSORBED | Absorbed in *Taxiing* ACS task. |
| II.G. | Before Takeoff Check (AMEL and AMES) | II.F. | Before Takeoff Check | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| III.A. | Radio Communications and ATC Light Signals (AMEL and AMES) | III.A. | Communications and Light Gun Signals | Removed (ASEL and ASES) from name of task. |
| III.B. | Traffic Patterns (AMEL and AMES) | III.B. | Traffic Patterns | Removed (ASEL and ASES) from name of task. |
| III.C. | Airport/Seaplane Base, Runway, and Taxiway Signs, Markings, and Lighting (AMEL and AMES) | – | COMBINED/ABSORBED | Absorbed in *Taxiing* ACS task. |
| IV.A. | Normal and Crosswind Takeoff and Climb (AMEL and AMES) | IV.A. | Normal Takeoff and Climb | Removed (ASEL and ASES) from name of task.<br><br>Changed name of the task to *Normal Takeoff and Climb* because there are three kinds of takeoffs (normal, short-field, soft-field), and the effects of wind must be considered for all three. |
| IV.B. | Normal and Crosswind Approach and Landing (AMEL and AMES) | IV.B. | Normal Approach and Landing | Changed name of task to *Normal Approach and Landing* because there are three kinds of approaches and landings (normal, short-field, soft-field). |
| IV.C. | Short-Field Takeoff (Confined Area—AMES) and Maximum Performance Climb (AMEL and AMES) | IV.C. | Soft-Field Takeoff and Climb (ASEL) | |
| IV.D. | Short-Field Approach (Confined Area—AMES) and Landing (AMEL and AMES) | IV.D. | Soft-Field Approach and Landing (ASEL) | |
| | | IV.G. | Confined Area Takeoff and Maximum Performance Climb (ASES, AMES) | Split sea task out of Short-Field Takeoff Land task |
| | | IV.H. | Confined Area Approach and Landing (ASES, AMES) | Split sea task out of Short-Field Approach Land task |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
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**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| IV.G. | Rough Water Takeoff and Climb (AMES) | IV.K. | Rough Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.H. | Rough Water Approach and Landing (AMES) | IV.L. | Rough Water Approach and Landing (ASES, AMES) | Added AMES to name of task |
| IV.I. | Go-Around/Rejected Landing (AMEL and AMES) | IV.N. | Go-Around/Rejected Landing | Removed (ASEL and ASES) from name of task. |
| V.A. | Steep Turns (AMEL and AMES) | V.A. | Steep Turns | Removed (ASEL and ASES) from name of task. |
| | | V.B. | Ground Reference Maneuvers (NEW TASK) | Combined: Rectangular Course; S-Turns; and Turns Around a Point into this new ACS task: *Ground Reference Maneuvers*. |
| VI.A. | Rectangular Course (AMEL and AMES) | – | COMBINED/ABSORBED | Combined Rectangular course, S-turns, and turns around a point into a single task: *Ground Reference Maneuvers* under "Performance Maneuvers" Area of Operation for increased flexibility for the circumstances surrounding the practical exam, while alleviating redundancies.<br><br>Added 14 CFR part 61 to References. |
| VI.B. | S-Turns (AMEL and AMES) | – | COMBINED/ABSORBED | Combined Rectangular course, S-turns, and turns around a point into a single task: *Ground Reference Maneuvers* under "Performance Maneuvers" Area of Operation for increased flexibility for the circumstances surrounding the practical exam, while alleviating redundancies.<br><br>Added 14 CFR part 61 to References. |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| VI.C. | Turns Around a Point (AMEL and AMES) | – | COMBINED/ABSORBED | Combined Rectangular course, S-turns, and turns around a point into a single task: *Ground Reference Maneuvers* under "Performance Maneuvers" Area of Operation for increased flexibility for the circumstances surrounding the practical exam, while alleviating redundancies.<br><br>Added 14 CFR part 61 to References. |
| VII.A. | Pilotage and Dead Reckoning (AMEL and AMES) | VI.A. | Pilotage and Dead Reckoning | Removed (ASEL and ASES) from name of task.<br><br>Absorbs flight planning elements from *Cross-Country Flight Planning* task. |
| VII.B. | Navigation Systems and Radar Services (AMEL and AMES) | VI.B. | Navigation Systems and Radar Services | Removed (ASEL and ASES) from name of task.<br><br>Eliminate ADF/NDB testing at the private pilot level. |
| VII.C. | Diversion (AMEL and AMES) | VI.C. | Diversion | Removed (ASEL and ASES) from name of task.<br><br>Suggest removing VHF Direction Finder from all knowledge exams. |
| VII.D. | Lost Procedures (AMEL and AMES) | VI.D. | Lost Procedures | Removed (ASEL and ASES) from name of task.<br><br>Removed references to DF steer. |
| VIII.A. | Maneuvering During Slow Flight (AMEL and AMES) | VII.A. | Maneuvering During Slow Flight | Removed (ASEL and ASES) from name of task. |
| VIII.B. | Power-Off Stalls (AMEL and AMES) | VII.B. | Power-Off Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.C. | Power-On Stalls (AMEL and AMES) | VII.C. | Power-On Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.D. | Spin Awareness (AMEL and AMES) | VII.D. | Spin Awareness | Removed (ASEL and ASES) from name of task. |

| FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)<br>Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation<br>Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| IX.A. | Straight-and-Level Flight (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is "Instrument training 101". This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| IX.B. | Constant Airspeed Climbs (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is "Instrument training 101". This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| IX.C. | Constant Airspeed Descents (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| IX.D. | Turns to Headings (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| IX.E. | Recovery from Unusual Flight Attitudes (ASEL and ASES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| IX.F. | Radio Communications, Navigation Systems/Facilities, and Radar Services (AMEL and AMES) | – | COMBINED/ABSORBED | Combined: Straight and Level Flight, Constant Airspeed Climbs, Constant Airspeed Descents, Turns to Headings, Recovery from Unusual Flight Attitudes, and Radio Communications, Navigation Systems/Facilities, and Radar Services into a single task now called *Inadvertent IMC* and moved into the "Emergency Operations" Area of Operation . This was done to shift and emphasize training focus, to ensure applicants understand these are emergency situations not normal – to discourage the perception this is “Instrument training 101”. This will increase safety and directly address the high rate of fatalities due to inadvertent flight into IMC. |
| | | VIII.A. | Inadvertent IMC (NEW TASK) | COMBINED: Straight and Level Flight; Constant Airspeed Climbs; Constant Airspeed Descents; Turns to Headings; and Radio Communications, Navigation Systems/Facilities, and Radar Services into new *Inadvertent IMC* task. |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| X.A. | Emergency Descent (AMEL and AMES) | – | COMBINED/ABSORBED | Removed (ASEL and ASES) from name of task.<br><br>Absorbed into *Systems and Equipment Malfunctions* task. |
| X.B. | Engine Failure During Takeoff Before $V_{MC}$ (Simulated) (AMEL and AMES) | VIII.E. | Engine Failure During Takeoff Before VMC (Simulated) (AMEL, AMES) | |
| X.C. | Engine Failure After Lift-Off (Simulated) (AMEL and AMES) | VIII.F. | Engine Failure After Lift-Off (Simulated) (AMEL, AMES) | |
| X.D. | Approach and Landing with an Inoperative Engine (Simulated) (AMEL and AMES) | VIII.G. | Approach and Landing with an Inoperative Engine (Simulatoed (AMEL, AMES) | |
| X.E. | Systems and Equipment Malfunctions (AMEL and AMES) | VIII.H. | Systems and Equipment Malfunctions (AMEL, AMES) | |
| X.F. | Emergency Equipment and Survival Gear (AMEL and AMES) | VIII.D. | Emergency Equipment and Survival Gear | |
| XI.A. | Maneuvering with One Engine Inoperative (AMEL and AMES) | IX.A. | Maneuvering with One Engine Inoperative (AMEL, AMES) | |
| XI.B. | $V_{MC}$ Demonstration (AMEL and AMES) | IX.B. | Vmc Demonstration (AMEL, AMES) | |
| XI.C. | Engine Failure During Flight (by Reference to Instruments) (AMEL and AMES) | IX.C. | Engine Failure During Flight (by Reference to Instruments) (AMEL, AMES) | |

**FAA-S-8081-14B, Private Pilot Practical Test Standards for Airplane (SEL, MEL, SES, MES)**
**Section 2: Private Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| XI.D. | Instrument Approach and Landing with an Inoperative Engine (Simulated) (by Reference to Instruments) (AMEL and AMES) | IX.D. | Instrument Approach and Landing with an Inoperative Engine (Simulated) (by Reference to Instruments) (AMEL, AMES) | |
| XII.A. | Night Preparation (AMEL and AMES) | X.A. | Night Preparation | Removed (ASEL and ASES) from name of task. |
| XIII.A. | After Landing, Parking, and Securing (AMEL and AMES) | XI.A. | Parking, and Securing | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| XIII.B. | Anchoring (AMES) | XI.B. | Seaplane Post-Landing Procedures | Combined PTS XII.B., C. D. into a single task |
| XIII.C. | Docking and Mooring (AMES) | – | COMBINED/ABSORBED | |
| XIII.D. | Ramping/Beaching (AMES) | – | COMBINED/ABSORBED | |

FAA-S-8081-XX

U.S. Department
of Transportation

**Federal Aviation Administration**

# PRIVATE PILOT – AIRPLANE

## Airman Certification Standards



**Date TBD**

**FLIGHT STANDARDS SERVICE**
**Washington, DC 20591**

## ACKNOWLEDGMENTS

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, AFS-630, P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

## AVAILABILITY

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

**FOREWORD**

The Federal Aviation Administration (FAA) has published the Private Pilot—Airplane Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, flight proficiency, and risk management standards for private pilot certification in the airplane category, single-engine land and sea; and multiengine land and sea classes. This ACS incorporates and supersedes the previous Practical Test Standards (PTS).

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing to an acceptable level. Specifically, the ACS, associated guidance, and test item bank question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which internal and external stakeholders identify and evaluate regulatory changes, safety recommendations, or other factors that require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

In this connection, the FAA gratefully acknowledges and deeply appreciates the many hours that aviation training experts throughout the industry have contributed to the development of this ACS, along with the associated guidance and a more systematic approach to knowledge test question development. This kind of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Acting Director, Flight Standards Service

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# INTRODUCTION

## *Airman Certification Standards Concept*

The goal of the airman certification process is to ensure the applicant possesses the knowledge and skill as well as the ability to manage the risks of flight in order to act as pilot in command consistent with the privileges of the certificate or rating being exercised. In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing.

Historically, these materials have included several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. The Practical Test Standards (PTS) defined the acceptable parameters of flight proficiency in the Areas of Operation listed in14 CFR part 61. FAA H-series handbooks, test supplements, and other materials provide guidance to applicants, instructors, and evaluators on aeronautical knowledge, flight proficiency, and risk management.

The FAA recognizes that safe operations in today's complex National Airspace System (NAS) require a more systematic integration of aeronautical knowledge, flight proficiency standards, and risk management. The FAA further recognizes the need to more clearly standardize knowledge, skills, and risk management according to the level of the certificate or rating. To that end, the FAA drew upon the expertise of organizations and individuals across the aviation community to develop the Airman Certification Standards (ACS). The ACS incorporates and supersedes the PTS.

Based on aeronautical knowledge and flight proficiency standards specified in 14 CFR part 61, the ACS integrates the knowledge, skills, and risk management abilities necessary for the safe conduct of each Task. In keeping with this integrated and systematic approach, the knowledge, skills, and risk management sections of each Task stipulate that the applicant must demonstrate understanding of each specific item. The applicant demonstrates this understanding by passing the knowledge exam and practical test.

Throughout this process, the FAA expects evaluators to assess the applicant's mastery of the topic in accordance with the level of learning (i.e., rote, understanding, application, or correlation) most appropriate for the specified Task. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge, experience, and information to the circumstances of the given scenario. The flight portion of the practical test requires the applicant to demonstrate flight proficiency, operational skill, and risk management in accordance with the ACS.

**NOTE:** As used in this ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector, designated pilot examiner, or other individual authorized to conduct a practical test.

## *Using the ACS*

The ACS consists of ***Areas of Operation,*** arranged in a logical sequence that begins with Preflight Preparation and ends with Postflight Procedures. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know and/or do. The ACS then lists the aeronautical knowledge, skills, and risk management considerations relevant to the specific Task, along with the conditions and acceptable standards for performance. The ACS uses ***Notes*** to emphasize special considerations. The FAA will revise the ACS as circumstances require.

The abbreviation(s) within parenthesis immediately following a Task refer to the category and/or class aircraft appropriate to that Task. The meaning of each abbreviation is as follows.

ASEL: Airplane – Single Engine Land
ASES: Airplane – Single-Engine Sea
AMEL: Airplane – Multi Engine Land
AMES: Airplane – Multi Engine Sea

**NOTE:** When administering a test based on this ACS, the Tasks appropriate to the class airplane (ASEL, ASES, AMEL, or AMES) used for the test shall be included in the plan of action. The absence of a class indicates the Task is for all classes.

Each Task in the ACS is coded according to a scheme that includes up to five elements. For example:

**PA.X.A.K1.a**:

**PA** = Applicable ACS (private pilot airplane)
**X** = Area of Operation (night operation)
**A** = Task (night preparation)
**K1**= Knowledge task element 1 (physiological aspects of night flying as it relates to vision)

**NOTE:** A fifth element may be used to indicate the level of learning: a=rote; b=understanding; c= application; d= correlation.

Knowledge test questions are mapped to the ACS codes, which replace the previous system of "Learning Statement Codes." Because the airman knowledge test report will list an ACS code that correlates to a specific Task Element for a given Area of Operation and Task, remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient skill(s).

Practical Tests will be based on the ACS in effect the day of the test. The FAA encourages applicants and instructors to use the ACS to measure progress during training, and as a reference to ensure the applicant is adequately prepared for the knowledge and practical tests.

Applicants for a combined private pilot certificate with instrument rating, in accordance with 14 CFR 61.65 (a) and (g), must pass all areas designated in the Private Pilot ACS and the Instrument Rating ACS. Examiners need not duplicate tasks. For example, only one preflight demonstration would be required; however, the Preflight Task from the Instrument Rating ACS may be more extensive than the Preflight Task from the Private Pilot ACS to ensure readiness for IFR flight.

A combined checkride should be treated as one practical test, requiring only one application and resulting in only one temporary certificate, disapproval notice, or letter of discontinuance, as applicable. Failure of any task will result in a failure of the entire test and application. Therefore, even if the deficient maneuver was instrument related and the performance of all VFR tasks was determined to be satisfactory, the applicant will receive a notice of disapproval.

The FAA expects evaluators to adhere to 14 CFR and this ACS. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The terms "should" and "may" denote items that are recommended, but not required.

The applicant must pass the knowledge test before taking the practical test. Further, the applicant must pass the oral portion of the practical test before beginning the flight portion because the oral portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test.

## AIRPLANE—SINGLE ENGINE, MULTI ENGINE LAND AND SEA AREAS OF OPERATION

### I. Preflight Preparation

| **Task** | ***A. Pilot Qualifications*** |
|---|---|
| **Reference** | 14 CFR parts 61, 91; FAA-H-8083-25, FAA-H-8083-23 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with airman and medical certificates including privileges, limitations, currency, and operating as pilot-in-command as a private pilot. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Required pilot documents. (PA.I.A.K1)<br>a. Currency<br>b. Privileges and limitations<br>c. Required endorsements<br>d. Certificate inspection<br>2. Logging pilot time. (PA.I.A.K2)<br>a. PIC, SIC, Safety Pilot<br>b. Required records<br>3. Compensation/Reimbursement. (PA.I.A.K3)<br>a. Towing<br>b. Charitable flights<br>c. Shared expenses<br>d. Search and rescue<br>e. Aircraft demonstration<br>f. Business trips |
| **Skills** | The applicant demonstrates the ability to apply requirements to act as PIC under Visual Flight Rules (VFR) in a scenario given by the evaluator. (PA.I.A.S1) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distinguishing proficiency vs. currency. (PA.I.A.R1)<br>2. Setting personal minimums. (PA.I.A.R2)<br>3. Maintaining fitness to fly. (PA.I.A.R3)<br>4. Flying unfamiliar aircraft. (PA.I.A.R4)<br>5. Flying with unfamiliar flight display systems or unfamiliar avionics. (PA.I.A.R5) |

| **Task** | ***B. Airworthiness Requirements*** |
|---|---|
| **Reference** | 14 CFR parts 39, 43, 91; FAA-H-8083-25 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with airworthiness requirements, including aircraft certificates. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. General airworthiness requirements and compliance for airplanes. (PA.I.B.K1)<br>a. Required certificates; location and expiration dates<br>b. Inspections; requirements, limitations/expiration dates<br>2. Individuals and limitations of who can perform maintenance. (PA.I.B.K2)<br>a. A&P, IA, Owner Operator<br>3. Flying with inoperative equipment. (PA.I.B.K3)<br>a. Minimum Equipment List<br>b. Kinds of Operation Equipment List<br>c. Type Certificate requirements<br>d. Special Flight Permit requirements<br>4. Experimental aircraft airworthiness, as applicable. (PA.I.B.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Locate aircraft airworthiness information. (PA.I.B.S1)<br>2. Determine the aircraft is airworthy in a scenario given by the evaluator. (PA.I.B.S2)<br>3. Explain requirements for flying with inoperative equipment. (PA.I.B.S3)<br>4. Explain requirements for obtaining and flying with a Special Flight Permit. (PA.I.B.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Flying with inoperative equipment. (PA.I.B.R1)<br>2. Equipment failure during flight. (PA.I.B.R2)<br>3. Recording, tracking, and resolving maintenance discrepancies. (PA.I.B.R3) |

| **Task** | ***C. Weather Information*** |
|---|---|
| **Reference** | 14 CFR part 91; AC 00-6, AC 00-45, FAA-H-8083-25; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with weather information for a flight under VFR. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Weather products required for preflight planning and enroute operations. (PA.I.C.K1)<br>2. Current and forecast weather for departure, arrival, enroute phases of flight. (PA.I.C.K2)<br>3. Meteorology applicable to local, departure, enroute, alternate, and destination of VFR flight in VMC to include expected climate and hazardous conditions such as: (PA.I.C.K3)<br>a. Atmospheric composition and stability<br>b. Wind<br>c. Temperature<br>d. Moisture<br>e. Weather system formation, including air masses and fronts<br>f. Clouds<br>g. Turbulence<br>h. Thunderstorms<br>i. Wind shear<br>j. Icing<br>k. Fog<br>l. Frost<br>4. Enroute weather resources. (PA.I.C.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use available aviation weather resources to obtain an adequate weather briefing. (PA.I.C.S1)<br>2. Correlate weather information to determine appropriate alternate(s). (PA.I.C.S2)<br>3. Correlate available weather information to make an ongoing go-no-go decision. (PA.I.C.S3)<br>4. Perform procedures to update/interpret weather in flight. (PA.I.C.S4)<br>5. Given a deteriorating weather scenario, divert to a suitable alternate. (PA.I.C.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Making an informed go/no go decision. (PA.I.C.R1)<br>2. Limitations of portable weather equipment. (PA.I.C.R2)<br>3. Limitations of aviation weather reports and forecasts. (PA.I.C.R3)<br>4. Limitations of inflight aviation weather resources. (PA.I.C.R4)<br>5. Identifying weather conditions that may affect the planned flight. (PA.I.C.R5)<br>6. Establishing personal weather minimums based on the parameters of the flight (ceilings, visibility, cross-wind component, etc.), and determining when existing and/or forecast weather conditions exceed these minimums. (PA.I.C.R6) |

| Task | *D. Cross-Country Flight Planning* |
|---|---|
| Reference | 14 CFR part 91; FAA-H-8083-25; Navigation Charts; A/FD; AIM; NOTAMS |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with cross-country flights and VFR flight planning. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Route planning. (PA.I.D.K1)<br>2. Applying universal coordinated time to flight planning. (PA.I.D.K2)<br>3. Calculating: (PA.I.D.K3)<br>a. Time, Rate, Distance<br>b. Heading, Course, Fuel Consumption<br>4. Charting symbology. (PA.I.D.K4)<br>5. Elements of a VFR flight plan. (PA.I.D.K5)<br>6. Options for activating a VFR flight plan in controlled and non-controlled airspaces. (PA.I.D.K6) |
| Skills | The applicant demonstrates the ability to:<br>1. Prepare a cross-country flight assigned by the evaluator. (PA.I.D.S1)<br>2. Select appropriate route, altitudes, and checkpoints. (PA.I.D.S2)<br>3. Recalculate fuel reserves based on a scenario provided by the evaluator. (PA.I.D.S3)<br>4. File and activate a VFR Flight plan. (PA.I.D.S4)<br>5. Interpret VFR chart symbology. (PA.I.D.S5)<br>6. Divert to an alternate. (PA.I.D.S6) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Flying in unfamiliar airspace, climates, or topography. (PA.I.D.R1)<br>2. Tendency to complete the flight in spite of worsening conditions. (PA.I.D.R2)<br>3. Not maintaining appropriate VFR altitudes. (PA.I.D.R3)<br>4. Limitations of ATC services. (PA.I.D.R4)<br>5. Establish Pfuel reserves and identify situations which would merit increasing minimum fuel reserves. (PA.I.D.R5)<br>6. Planning a route overflying significant environmental influences, such mountains, and large bodies of water. (PA.I.D.R6)<br>7. Overflying areas unsuitable for landing. (PA.I.D.R7)<br>8. Considerations unique to oceanic flights. (PA.I.D.R8) |

| **Task** | ***E. National Airspace System*** |
|---|---|
| **Reference** | 14 CFR parts 71, 91, 93; Navigation Charts; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the National Airspace System operating under VFR as a private pilot. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Kinds and classes of airspace. (PA.I.E.K1)<br>2. Requirements for flying in that airspace. (PA.I.E.K2)<br>3. Charting symbology. (PA.I.E.K3)<br>4. Special use airspace. (PA.I.E.K4)<br>5. Temporary flight restrictions. (PA.I.E.K5)<br>6. Special VFR operations(PA.I.E.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Determine the requirements for flying in particular classes of airspace. (PA.I.E.S1)<br>2. Determine the requirements for flying in special use airspace, and special flight rule airspace. (PA.I.E.S2)<br>3. Properly identify airspace and operate accordingly with regards to communication and equipment requirements. (PA.I.E.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Various classes of airspace. (PA.I.E.R1)<br>2. Flights through or in the vicinity of special use airspace. (PA.I.E.R2)<br>3. Effectively planning for flying in or avoiding specific use airspace. (PA.I.E.R3) |

| **Task** | ***F. Performance and Limitations*** |
|---|---|
| **Reference** | FAA-H-8083-1, FAA-H-8083-25; Pilots Operation Handbook (POH)/Airplane Flight Manual (AFM) |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with operating an aircraft safely within the parameters of the aircraft performance capabilities and limitations. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Elements related to performance and limitations (takeoff and landing, crosswind and headwind, density altitude, glide performance, weight and balance, climb, cruise, descent) by explaining the use of charts, tables, and data to determine performance. (PA.I.F.K1)<br>2. Factors affecting performance to include atmospheric conditions, pilot technique and aircraft condition, airport environment. (PA.I.F.K2)<br>3. Effects of adverse loading (weight and balance). (PA.I.F.K3)<br>4. Effects of weight and balance over the course of the flight. (PA.I.F.K4)<br>5. Aerodynamics applicable to principles of flight. (PA.I.F.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Given scenario, compute weight and balance, including practical techniques to resolve out-of-limits calculations. (PA.I.F.S1)<br>2. Use aircraft manufacturer's approved performance charts, tables, and data. (PA.I.F.S2)<br>3. Evaluate takeoff and landing performance based on the values calculated. (PA.I.F.S3)<br>4. Evaluate environmental conditions. (PA.I.F.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performance charts. (PA.I.F.R1)<br>2. Exceeding limitations. (PA.I.F.R2)<br>3. Variations in flight performance resulting in operational loads. (PA.I.F.R3)<br>4. Applying published aircraft performance data to expected performance. (PA.I.F.R4)<br>5. Establish personal minimums for runway length based on computed/expected aircraft takeoff and landing performance. Identify situations that would merit increasing these minimums. (PA.I.F.R5) |

| **Task** | ***G. Operation of Systems*** |
|---|---|
| **Reference** | FAA-H-8083-25, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the safe operation of systems on the airplane provided for the flight test. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Major components of the systems: (PA.I.G.K1)<br>a. Primary flight controls and trim<br>b. Flaps, leading edge devices, and spoilers<br>c. Powerplant and propeller (basic engine knowledge)<br>d. Landing gear<br>e. Fuel, oil, and hydraulic<br>f. Electrical<br>g. Avionics<br>h. Pitot-static, vacuum/pressure and associated flight instruments<br>i. Environmental<br>j. Deicing and anti-icing<br>k. Water rudders (ASES, AMES)<br>2. Normal operation of systems. (PA.I.G.K2)<br>3. Common mistakes made by pilots (operator error). (PA.I.G.K3)<br>4. Recognition of when a system is operating abnormally and description of procedures to address the abnormal operation. (PA.I.G.K4)<br>5. Systems interaction. (PA.I.G.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Explain operation of at least three systems/operate systems on the airplane provided for the flight test. (PA.I.G.S1)<br>2. Use checklist procedures. (PA.I.G.S2)<br>3. Use checklist memory items during emergency operations, as applicable. (PA.I.G.S3)<br>4. Ways to identify system failure, recognizing problems as they develop. (PA.I.G.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Handling failure or abnormal operation properly to include management of startle response.(PA.I.G.R1)<br>2. Pilot error, including improperly operating the system that creates failure or problem. (PA.I.G.R2)<br>3. Determining when to land as soon as practical, when to land as soon as possible, when to declare an emergency. (PA.I.G.R3)<br>4. Outside/environmental factors affecting the systems, including improper fueling, carburetor ice, extremely cold temperatures, vapor lock. (PA.I.G.R4) |

| **Task** | ***H. Human Factors*** |
|---|---|
| **Reference** | FAA-H-8083-25; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with personal health, flight physiology and human factors, as it relates to safety of flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The symptoms, recognition, causes, effects, and corrective actions associated with: (PA.I.H.K1)<br>a. hypoxia<br>b. hyperventilation<br>c. middle ear and sinus problems<br>d. spatial disorientation<br>e. motion sickness<br>f. carbon monoxide poisoning<br>g. stress and fatigue<br>h. dehydration and nutrition<br>i. hypothermia<br>2. The effects of alcohol, drugs, and over-the-counter medications, and associated regulations. (PA.I.H.K2)<br>3. The effects of excess nitrogen during scuba dives upon a pilot or passenger in flight. (PA.I.H.K3)<br>4. Aeronautical decision-making as affected by hazardous attitudes. (PA.I.H.K4)<br>5. Vision (including optical illusion, environmental impacts, day/night, haze, sloping runways). (PA.I.H.K5)<br>6. Collision Avoidance (Controlled Flight into Terrain (CFIT), scanning, wire strike avoidance). (PA.I.H.K6)<br>7. Human factors: vestibular illusions, spatial disorientation, especially involving distractions, and interaction with charts and avionics equipment. (PA.I.H.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform self-assessment including whether he or she is fit for flight. (PA.I.H.S1)<br>2. Show sound decision-making and judgment (based on reality of circumstances). (PA.I.H.S2)<br>3. Perform Safety Risk Management (SRM) tasks: Aeronautical Decision Making (ADM), risk management, automation management, task management, situational awareness, and avoidance of CFIT. (PA.I.H.S3)<br>4. Using examples, account for environmental impacts/visual cues at the airport, as well as at one airport vs. a different airport. (PA.I.H.S4)<br>5. Establish and adhere to personal limitations. (PA.I.H.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Environmental impacts on medication. (PA.I.H.R1)<br>2. Personal risk factors and the conflict between being goal oriented and personal limitations. (PA.I.H.R2)<br>3. Optical illusions, including awareness, being able to anticipate, and limiting the effects. (PA.I.H.R3<br>4. Circumstances of the flight (day/night, hot/cold) that affect the pilot’s physiology. (PA.I.H.R4)<br>5. Inadvertent continued VFR into Instrument Meteorological Conditions (IMC) (check Weather) (PA.I.H.R5)<br>6. Hazardous attitudes. (PA.I.H.R6) |

| | |
|---|---|
| **Task** | ***I. Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES)*** |
| **Reference** | FAA-H-8083-23; AIM; USCG Navigation Rules, International-Inland; POH/AFM; A/FD |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with water and seaplane characteristics, seaplane bases, maritime rules, and aids to marine navigation. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The characteristics of a water surface as affected by features, such as: (PA.I.I.K1)<br>a. size and location<br>b. protected and unprotected areas<br>c. surface wind<br>d. direction and strength of water current<br>e. floating and partially submerged debris<br>f. sandbars, islands, and shoals<br>g. vessel traffic and wakes<br>h. other features peculiar to the area<br>2. Float and hull construction, and their effect on seaplane performance. (PA.I.I.K2)<br>3. Causes of porpoising and skipping, and the pilot action required to prevent or correct these occurrences. (PA.I.I.K3)<br>4. How to locate and identify seaplane bases on charts or in directories. (PA.I.I.K4)<br>5. Operating restrictions at various bases. (PA.I.I.K5)<br>6. Right-of-way, steering, and sailing rules pertinent to seaplane operation. (PA.I.I.K6)<br>7. Marine navigation aids, such as buoys, beacons, lights, and sound signals. (PA.I.I.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Assess the water surface characteristics for today's flight. (PA.I.I.S1)<br>2. Locate and identify seaplane bases for the region. (PA.I.I.S2)<br>3. Identify restrictions at local bases. (PA.I.I.S3)<br>4. Perform correct right-of-way, steering, and sailing operations. (PA.I.I.S4)<br>5. Identify marine navigation aids in the local region. (PA.I.I.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Assessing the local conditions. (PA.I.I.R1)<br>2. The impact of marine traffic. (PA.I.I.R2) |

| **Task** | ***J. Principles of Flight – Engine Inoperative (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25; FAA-P-8740-19, POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the elements related to engine inoperative principles of flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The "critical engine." (PA.I.J.K1)<br>2. The effects of density altitude on the Vmc demonstration. (PA.I.J.K2)<br>3. The effects of airplane weight and center of gravity on control. (PA.I.J.K3)<br>4. Relationship of Vmc to stall speed. (PA.I.J.K4)<br>5. Reasons for loss of directional control. (PA.I.J.K5)<br>6. Indications of loss of directional control. (PA.I.J.K6)<br>7. Importance of maintaining the proper pitch and bank attitude, and the proper coordination of controls. (PA.I.J.K7)<br>8. Loss of directional control recovery procedure. (PA.I.J.K8)<br>9. Engine failure during takeoff including planning, decisions, and single-engine operations. (PA.I.J.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Properly plan for engine failure during takeoff. (PA.I.J.S1) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Single-engine operations. (PA.I.J.R1) |

## II. Preflight Procedures

| **Task** | ***A. Preflight Assessment*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with preparing for safe flight accounting for pilot, aircraft, environment, and external factors. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Pilot self-assessment. (PA.II.A.K1)<br>2. Determine if the aircraft is appropriate for the mission by considering load, range, equipment and aircraft ability. (PA.II.A.K2)<br>3. Aircraft preflight inspection including which items must be inspected, the reasons for checking each item, and how to detect possible defects, and the associated regulations. (PA.II.A.K3)<br>4. Environmental factors including weather and flight plan (terrain, route selection, obstructions). (PA.II.A.K4)<br>5. External pressures. (PA.II.A.K5)<br>6. Formation flying hazards (PA.II.A.K6)<br>7. Aviation security. (PA.II.A.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use checklist to systematically identify and manage pilot-related risks and personal minimums associated with the flight. (PA.II.A.S1)<br>2. Inspect the airplane with reference to an appropriate checklist. (PA.II.A.S2)<br>3. Verify the airplane is airworthy and in condition for safe flight. (PA.II.A.S3)<br>4. Assess the factors related to the environment (weather, airports, terrain, airspace). (PA.II.A.S4)<br>5. Given the requirements of the flight (load, distance, altitude, time constraints) determine if the aircraft is capable of making the flight. (PA.II.A.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Environmental factors. (PA.II.A.R1)<br>2. External pressures. (PA.II.A.R2)<br>3. Aviation security concerns. (PA.II.A.R3) |

| Task | ***B. Cockpit Management*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM; AC 91-21.1 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe cockpit management practices. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Pilot and passenger restraint and safety system rules and operational considerations. (PA.II.B.K1)<br>2. Oxygen use regulations, system operational guidelines, and system checks, if applicable. (PA.II.B.K2)<br>3. Passenger briefing requirements and appropriate information. (PA.II.B.K3)<br>4. PIC responsibility to have available material for the flight as planned. (PA.II.B.K4)<br>5. Purpose of a checklist. (PA.II.B.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure all loose items in the cockpit and cabin are secured. (PA.II.B.S1)<br>2. Organize, access, and determine suitability of material, equipment, and technology in an efficient manner. (PA.II.B.S2)<br>3. Brief occupants on the use of safety belts, shoulder harnesses, doors, sterile cockpit, flight control freedom of movement, and emergency procedures. (PA.II.B.S3)<br>4. Properly program the navigational equipment available to the pilot on that particular aircraft. (PA.II.B.S4)<br>5. Brief and execute positive exchange of flight controls and PIC responsibility. (PA.II.B.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Positive exchange of the flight controls. (PA.II.B.R1)<br>2. Suitability of using portable electronic devices. (PA.II.B.R2)<br>3. Ensuring technology is an asset and not a distraction. (PA.II.B.R3)<br>4. Abandoning technology when it is not appropriate. (PA.II.B.R4)<br>5. Recognizing impact of reported discrepancies. (PA.II.B.R5) |

| **Task** | ***C. Engine Starting*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25; AC 91-13, AC 91-55; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with recommended engine starting procedures including proper airplane positioning. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Options for starting with a weak or depleted battery. (PA.II.C.K1)<br>2. Starting under various atmospheric conditions. (PA.II.C.K2)<br>3. Starting procedures for carbureted and fuel injected engines.(PA.II.C.K3)<br>4. Equipment limitations (starter cycles). (PA.II.C.K4)<br>5. Proper positioning of the aircraft. (PA.II.C.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the airplane properly considering structures, other aircraft, and the safety of nearby persons and property. (PA.II.C.S1)<br>2. Utilize the appropriate checklist for starting procedure. (PA.II.C.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Propeller safety and awareness to include passenger briefing. (PA.II.C.R1)<br>2. Hand propping. (PA.II.C.R2)<br>3. Abnormal start. (PA.II.C.R3)<br>4. Cold weather operation. (PA.II.C.R4)<br>5. System failure following aircraft engine starts. (PA.II.C.R5) |

| **Task** | ***D. Taxiing (ASEL, AMEL)*** |
|---|---|
| **Reference** | A/FD; FAA-H-8083-3, FAA-H-8083-25; POH/AFM; AC 91-73, AC 150-5340-18 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe taxi operations, including runway incursion avoidance. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind. (PA.II.D.K1)<br>2. Airport markings (including hold short lines), signs, and lights. (PA.II.D.K2)<br>3. Aircraft lighting. (PA.II.D.K3)<br>4. Towered and non-towered airport operations. (PA.II.D.K4)<br>5. Visual indicators for wind. (PA.II.D.K5)<br>6. Airport information resources (A/FD, airport diagram). (PA.II.D.K6)<br>7. Good cockpit discipline during taxi, including maintaining a sterile cockpit, proper speed, separation between other aircraft and vehicles, communication procedures. (PA.II.D.K7)<br>8. Procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC. (PA.II.D.K8)<br>9. Rules for entering or crossing runways. (PA.II.D.K9)<br>10. Procedures unique to night operations. (PA.II.D.K10)<br>11. Hazards of low visibility operations. (PA.II.D.K11)<br>12. Proper engine management including leaning, per manufacturer recommendations (PA.II.D.K12)<br>13. Requesting progressive taxi instructions if there is any doubt on understanding or ability to comply with a taxi clearance. (PA.II.D.K13) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform a brake check immediately after the airplane begins moving. (PA.II.D.S1)<br>2. Position the flight controls properly for the existing wind conditions. (PA.II.D.S2)<br>3. Control direction and speed without excessive use of brakes. (PA.II.D.S3)<br>4. Exhibit procedures for steering, maneuvering, maintaining taxiway, runway position, and situational awareness to avoid runway incursions. (PA.II.D.S4)<br>5. Exhibit proper positioning of the aircraft relative to hold lines. (PA.II.D.S5)<br>6. Exhibit procedures to ensure clearances/instructions are received, recorded, and read back correctly. (PA.II.D.S6)<br>7. Exhibit situational awareness and taxi procedures in the event the aircraft is on a taxiway that is between parallel runways. (PA.II.D.S7)<br>8. Uses an Airport Diagram (if published) during taxi.(PA.II.D.S8)<br>9. Comply with airport/taxiway markings, signals, ATC clearances and instructions. (PA.II.D.S9)<br>10. Utilize procedures for eliminating pilot distractions to avoid other aircraft or vehicles and hazards. (PA.II.D.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi. (PA.II.D.R1)<br>2. Proper workload management. (PA.II.D.R2)<br>3. Confirmation or expectation bias as related to taxi instructions. (PA.II.D.R3)<br>4. Recording taxi instructions/clearances. (PA.II.D.R4)<br>5. Resource management. (PA.II.D.R5)<br>6. Sterile cockpit during taxi. (PA.II.D.R6) |

| **Task** | ***E. Taxiing and Sailing (ASES, AMES)*** |
|---|---|
| **Reference** | A/FD; FAA-H-8083-23, FAA-H-8083-25; POH/AFM; AC 91-73, AC 150-5340-18 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe taxiing and sailing operations, including runway incursion avoidance. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind, water and sailing procedures, including the use of flaps, doors, water rudder, and power so as to follow the desired course while sailing. (PA.II.E.K1)<br>2. Airport markings (including hold short lines), signs, and lights. (PA.II.E.K2)<br>3. Aircraft lighting. (PA.II.E.K3)<br>4. Towered and non-towered airport operations. (PA.II.E.K4)<br>5. Visual indicators for wind. (PA.II.E.K5)<br>6. Airport information resources (A/FD, airport diagram). (PA.II.E.K6)<br>7. Good cockpit discipline during taxi and sailing, including maintaining a sterile cockpit, proper speed, separation between other aircraft and vehicles, communication procedures. (PA.II.E.K7)<br>8. Procedures for appropriate cockpit activities during taxiing and sailing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC. (PA.II.E.K8)<br>9. Rules for entering or crossing runways. (PA.II.E.K9)<br>10.Procedures unique to night operations. (PA.II.E.K10)<br>11.Hazards of low visibility operations, other aircraft and vessels. (PA.II.E.K11)<br>12.Proper engine management including leaning, per manufacturer recommendations (PA.II.E.K12)<br>13.Requesting progressive taxi instructions if there is any doubt on understanding or ability to comply with a taxi clearance. (PA.II.E.K13)<br>14. Proper technique for the conditions, including idle, plow or step taxi, preventing and correcting for porpoising and skipping. (PA.II.E.K14) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform a brake check immediately after the airplane begins moving. (PA.II.E.S1)<br>2. Position the flight controls, flaps, doors, water rudder, and power correctly for the existing wind, water and sailing conditions and to prevent and correct for porpoising and skipping. (PA.II.E.S2)<br>3. Uses the appropriate idle, plow, or step taxi technique. (PA.II.E.S3)<br>4. Exhibit procedures for steering, maneuvering, maintaining taxiway, runway position, and situational awareness to avoid runway incursions. (PA.II.E.S4)<br>5. Plans and follows the most favorable course while taxiing or sailing. Considers wind, water current, water conditions, and maritime regulations, as appropriate. (PA.II.E.S5)<br>6. Exhibit procedures to ensure clearances/instructions are received, recorded, and read back correctly. (PA.II.E.S6)<br>7. Exhibit situational awareness and taxi procedures in the event the aircraft is on a taxiway that is between parallel runways. (PA.II.E.S7)<br>8. Uses an Airport Diagram during taxi.(PA.II.E.S8)<br>9. Comply with airport/taxiway markings, signals, ATC clearances and instructions. (PA.II.E.S9)<br>10.Utilize procedures for eliminating pilot distractions to avoid other aircraft or vehicles and hazards. (PA.II.E.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi. (PA.II.E.R1)<br>2. Proper workload management. (PA.II.E.R2)<br>3. Confirmation or expectation bias as related to taxi instructions. (PA.II.E.R3)<br>4. Recording taxi instructions/clearances. (PA.II.E.R4)<br>5. Resource management. (PA.II.E.R5)<br>6. Porpoising and skipping. (PA.II.E.R6)<br>7. Avoid other aircraft, vessels, and hazards while on the water. (PA.II.E.R7) |

| Task | *F. Before Takeoff Check* |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23 (ASES, AMES), POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the before takeoff check, including the reasons for checking each item, detecting malfunctions, and ensuring the airplane is in safe operating condition as recommended by the manufacturer. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Purpose of the runup. (PA.II.F.K1)<br>2. Aircraft performance given expected conditions. (PA.II.F.K2)<br>3. Wake turbulence avoidance. (PA.II.F.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the airplane properly considering other aircraft, vessels, and wind. (PA.II.F.S1)<br>2. Divide attention inside and outside the cockpit. (PA.II.F.S2)<br>3. Ensure that powerplant and instrumentation are suitable for runup and takeoff. (PA.II.F.S3)<br>4. Accomplish the before takeoff checklist and departure briefing. (PA.II.F.S4)<br>5. Brief takeoff performance, such as airspeeds, crosswind component, takeoff distance, departure procedures, the need for sterile cockpit and takeoff-emergency procedures.(PA.II.F.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Division of attention and scanning. (PA.II.F.R1)<br>2. Different runway than expected. (PA.II.F.R2)<br>3. Positive exchange of flight controls. (PA.II.F.R3)<br>4. Wake turbulence and vessel avoidance. (PA.II.F.R4)<br>5. Automation management. (PA.II.F.R5)<br>6. Sterile cockpit during the takeoff check. (PA.II.F.R6) |

## III. Airport and Seaplane Base Operations

| **Task** | ***A. Communications and Light Gun Signals*** |
|---|---|
| **Reference** | 14 CFR part 91; FAA-H-8083-25; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with normal and emergency radio communications and ATC light signals to conduct radio communications safely while operating the aircraft. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. How to obtain frequency. (PA.III.A.K1)<br>2. Standard communication procedures and ATC standard phraseology. (PA.III.A.K2)<br>3. ATC light signal recognition. (PA.III.A.K3)<br>4. Communication procedures. (PA.III.A.K4)<br>5. Transponders. (PA.III.A.K5)<br>6. Emergency Locator Transmitter. (PA.III.A.K6)<br>7. Radar assistance. (PA.III.A.K7)<br>8. Lost communication procedures. (PA.III.A.K8)<br>9. Use of automated weather and airport information. (PA.III.A.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select appropriate frequencies. (PA.III.A.S1)<br>2. Transmit using standard phraseology and procedures. (PA.III.A.S2)<br>3. Acknowledge radio communications and comply with instructions. (PA.III.A.S3)<br>4. Use of onboard communication equipment with emphasis on audio panel, if equipped (PA.III.A.S4)<br>5. Proper communications at towered and non-towered airports (PA.III.A.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Overcoming human factors associated with communication (PA.III.A.R1)<br>2. Overcoming human factors associated with declaring an emergency (PA.III.A.R2)<br>3. Equipment issues that could cause loss of communication. (PA.III.A.R3)<br>4. Automation management. (PA.III.A.R4) |

| **Task** | ***B. Traffic Patterns*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25, FAA-H-8083-23; AC 90-66; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe operations in and around the airport traffic patterns. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Towered and non-towered airport operations and runway selection. (PA.III.B.K1)<br>2. Airport markings, lighting, wind indicators. (PA.III.B.K2)<br>3. Collision avoidance. (PA.III.B.K3)<br>4. Right-of-way rules. (PA.III.B.K4)<br>5. Wake turbulence recognition and resolution. (PA.III.B.K5)<br>6. Wind shear avoidance. (PA.III.B.K6)<br>7. Runway incursion avoidance. (PA.III.B.K7)<br>8. Use of automated weather and airport information. (PA.III.B.K8)<br>9. Parachuting operations. (PA.III.B.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Properly identify and interpret airport/seaplane base runways, taxiways, markings, and lighting. (PA.III.B.S1)<br>2. Comply with proper traffic pattern procedures. (PA.III.B.S2)<br>3. Maintain proper spacing from other aircraft. (PA.III.B.S3)<br>4. Correct for wind drift to maintain the proper ground track. (PA.III.B.S4)<br>5. Maintain orientation with the runway/landing area in use. (PA.III.B.S5)<br>6. Maintain traffic pattern altitude, ±100 feet, and the appropriate airspeed, ±10 knots. (PA.III.B.S6)<br>7. Maintain an awareness of the position of other aircraft in the pattern. (PA.III.B.S7) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.III.B.R1)<br>2. Scanning. (PA.III.B.R2)<br>3. Wake turbulence. (PA.III.B.R3)<br>4. Lack of situational awareness. (PA.III.B.R4)<br>5. Aircraft separation and closure rates. (PA.III.B.R5)<br>6. Sterile cockpit. (PA.III.B.R6) |

## IV. Takeoffs, Landings, and Go-Arounds

| **Task** | ***A. Normal Takeoff and Climb*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a normal takeoff, climb operations, and rejected takeoff procedures.<br><br>**NOTE:** If a crosswind condition does not exist, the applicant's knowledge of crosswind elements shall be evaluated through oral testing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Takeoff distance. (PA.IV.A.K1)<br>2. Takeoff power. (PA.IV.A.K2)<br>3. Atmospheric conditions. (PA.IV.A.K3)<br>4. Minimum safe altitude. (PA.IV.A.K4)<br>5. Headwind, tailwind, crosswind component. (PA.IV.A.K5)<br>6. Application of $V_X$ or $V_Y$ and variations with altitude. (PA.IV.A.K6)<br>7. Emergency procedures during takeoff and climb. (PA.IV.A.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (PA.IV.A.S1)<br>2. Verify aircraft is on the assigned/correct runway. (PA.IVA.A.S2)<br>3. Ascertain wind direction with or without visible wind direction indicators. (PA.IV.A.S3)<br>4. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations (PA.IV.A.S4)<br>5. Position the flight controls for the existing wind conditions. (PA.IV.A.S5)<br>6. Clear the area; taxi into the takeoff position and align the airplane on the runway center/takeoff path. (PA.IV.A.S6)<br>7. Confirm takeoff power, and proper engine and flight instrument indications prior to rotation. (ASEL, AMEL); Retracts the water rudders, as appropriate, confirm takeoff power, and proper engine instrument indications prior to rotation, establishes and maintains the most efficient planning/lift-off attitude, and corrects for porpoising and skipping (ASES, AMES). (PA.IV.A.S7)<br>8. Rotate and lift off at the recommended airspeed and accelerates to $V_Y$. (PA.IV.A.S8)<br>9. Establish a pitch attitude that will maintain $V_Y$ +10/-5 knots. (PA.IV.A.S9)<br>10.Retract the landing gear and flaps in accordance with manufacturer guidance. (PA.IV.A.S10)<br>11.Maintain takeoff power and $V_Y$ +10/-5 knots to a safe maneuvering altitude. (PA.IV.A.S11)<br>12.Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (PA.IV.A.S12)<br>13.Comply with noise abatement and published departure procedures. (PA.IV.A.S13)<br>14.Complete the appropriate checklist. (PA.IV.A.S14)<br>15.Comply with manufacturer recommended emergency procedures relating to the takeoff sequence. (PA.IV.A.S15) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability, and aircraft limitations (PA.IV.A.R1)<br>2. Determining if crosswind component exceeds pilot ability or aircraft capability. (PA.IV.A.R2)<br>3. Windshear. (PA.IV.A.R3)<br>4. Tailwinds. (PA.IV.A.R4)<br>5. Wake turbulence. (PA.IV.A.R5)<br>6. Go/no go decision making. (PA.IV.A.R6)<br>7. Task management. (PA.IV.A.R7)<br>8. Low altitude maneuvering. (PA.IV.A.R8)<br>9. Wire strikes. (PA.IV.A.R9)<br>10.Situational awareness of obstacles on departure path. (PA.IV.A.R10)<br>11.Recognition of need for rejected takeoff and predetermines takeoff abort point. (PA.IV.A.R11)<br>12.Handling engine failure during takeoff and climb. (PA.IV.A.R12)<br>13.Criticality of takeoff distance available. (PA.IV.A.R13)<br>14.Plans for engine-failure after takeoff. (PA.IV.A.R14)<br>15.Sterile cockpit. (PA.IV.A.R15) |

| Task | ***B. Normal Approach and Landing*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23 (ASES, AMES); POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a normal approach and landing with emphasis on proper use and coordination of flight controls.<br><br>**NOTE:** If a crosswind condition does not exist, the applicant's knowledge of crosswind elements shall be evaluated through oral testing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (PA.IV.B.K1)<br>2. Stabilized approach. (PA.IV.B.K2)<br>3. Energy management. (PA.IV.B.K3)<br>4. Atmospheric conditions. (PA.IV.B.K4)<br>5. Headwind, tailwind, crosswind component. (PA.IV.B.K5)<br>6. Emergency procedures during approach and landing. (PA.IV.B.K6)<br>7. Land and hold short operations. (PA.IV.B.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway. (PA.IV.B.S1)<br>2. Scan the landing runway/areas and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (PA.IV.B.S2)<br>3. Complete the appropriate checklist. (PA.IV.B.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and selects a suitable touchdown point prior to the 1000 foot distance markers (if available), or within the first 1/3 of the runway length. (PA.IV.B.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjusts pitch attitude and power as required. (PA.IV.B.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, +10/-5knots. (PA.IV.B.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown (ASEL, AMEL); Make smooth, timely, and correct control application during the round out and touchdown to contact the water at the proper pitch attitude (ASES, AMES). (PA.IV.B.S7)<br>8. Touch down smoothly at a speed that provides little or no aerodynamic lift. (PA.IV.B.S8)<br>9. Touch down within the available runway, within 400 feet beyond a specified point with no drift, and with the airplane's longitudinal axis aligned with and over the runway centerline. (PA.IV.B.S9)<br>10. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.B.S10)<br>11. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (PA.IV.B.S11)<br>12. Utilize after landing runway incursion avoidance procedures. (PA.IV.B.S12) |

*Task continued on next page.*

| **Task** | ***B. Normal Approach and Landing*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability and aircraft limitations – considering possibility of selecting a runway at a different airport. (PA.IV.B.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations(PA.IV.B.R2)<br>3. Windshear. (PA.IV.B.R3)<br>4. Tailwinds. (PA.IV.B.R4)<br>5. Wake turbulence. (PA.IV.B.R5)<br>6. Task management. (PA.IV.B.R6)<br>7. Low altitude maneuvering. (PA.IV.B.R7)<br>8. Wire strikes. (PA.IV.B.R8)<br>9. Collision Avoidance. (PA.IV.B.R9)<br>10. Right-of-way. (PA.IV.B.R10)<br>11. Situational awareness of obstacles on approach and departure paths. (PA.IV.B.R11)<br>12. Recognition of need for go-around/rejected landing. (PA.IV.B.R12)<br>13. Stall/spin awareness. (PA.IV.B.R13)<br>14. Land and hold short operations. (PA.IV.B.R14)<br>15. Maintain a sterile cockpit. (PA.IV.B.R15) |

| **Task** | ***C. Soft-Field Takeoff and Climb (ASEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a soft-field takeoff, climb operations, and rejected takeoff procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Importance of weight transfer from wheels to wings. (PA.IV.C.K1)<br>2. Awareness of additional left turning tendencies. (PA.IV.C.K2)<br>3. Effects of aircraft configuration. (PA.IV.C.K3)<br>4. Effects of runway surface. (PA.IV.C.K4)<br>5. Takeoff distance. (PA.IV.C.K5)<br>6. Takeoff power. (PA.IV.C.K6)<br>7. Wind conditions and effects. (PA.IV.C.K7)<br>8. Density altitude. (PA.IV.C.K8)<br>9. Headwind, tailwind, crosswind component. (PA.IV.C.K9)<br>10. Application of $V_X$ or $V_Y$. (PA.IV.C.K10)<br>11. Emergency procedures during takeoff and climb. (PA.IV.C.K11)<br>12. Hazards of other than hard surfaced runway. (PA.IV.C.K12) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (PA.IV.S.S1)<br>2. Ensure the aircraft is properly configured. (PA.IV.C.S2)<br>3. Ensure the aircraft is on the correct takeoff runway. (PA.IV.C.S3)<br>4. Ascertain wind direction with or without visible wind direction indicators. (PA.IV.C.S4)<br>5. Calculate the crosswind component and determine if it is above his or her ability or that of the aircraft's capability. (PA.IV.C.S5)<br>6. Position the flight controls for the existing wind conditions. (PA.IV.C.S6)<br>7. Clear the area; taxi into the takeoff position and align the airplane on the runway center without stopping while advancing the throttle smoothly to takeoff power. (PA.IV.C.S7)<br>8. Confirm takeoff power, and proper engine and flight instrument indications prior to rotation. (PA.IV.C.S8)<br>9. Establish and maintain a pitch attitude that will transfer the weight of the airplane from the wheels to the wings as rapidly as possible. (PA.IV.C.S9)<br>10.Rotate and lift off at the lowest possible airspeed consistent with safety and remains in ground effect while accelerating to $V_X$ or $V_Y$, as appropriate. (PA.IV.C.S10)<br>11.Establish a pitch attitude for $V_X$ or $V_Y$, as appropriate, and maintains selected airspeed +10/-5 knots during the climb. (PA.IV.C.S11)<br>12.Retract landing gear and flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (PA.IV.C.S12)<br>13.Maintain takeoff power and $V_X$ or $V_Y$ +10/-5 knots to a safe maneuvering altitude. (PA.IV.C.S13)<br>14.Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (PA.IV.C.S14)<br>15.Comply with noise abatement and published departure procedures. (PA.IV.C.S15)<br>16.Complete the appropriate checklist. (PA.IV.C.S16)<br>17.Comply with manufacturer recommended emergency procedures relating to the takeoff sequence. (PA.IV.C.S17) |

*Task continued on next page.*

| **Task** | ***C. Soft-Field Takeoff and Climb (ASEL)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability, and aircraft limitations. (PA.IV.C.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations(PA.IV.C.R2)<br>3. Other than hard surfaced runway. (PA.IV.C.R3)<br>4. Windshear. (PA.IV.C.R4)<br>5. Tailwinds. (PA.IV.C.R5)<br>6. Wake turbulence. (PA.IV.C.R6)<br>7. Go/no go decision making. (PA.IV.C.R7)<br>8. Task management. (PA.IV.C.R8)<br>9. Low altitude maneuvering. (PA.IV.C.R9)<br>10. Wire strikes. (PA.IV.C.R10)<br>11. Minimum safe altitude for climb. (PA.IV.C.R11)<br>12. Situational awareness of obstacles on departure path. (PA.IV.C.R12)<br>13. Recognition of need for rejected takeoff and predetermines takeoff abort point. (PA.IV.C.R13)<br>14. Strategies for handling engine failure during takeoff and climb. (PA.IV.C.R14)<br>15. Make a determination of when a soft field takeoff technique is required. (PA.IV.C.R15)<br>16. Criticality of takeoff distance available. (PA.IV.C.R16)<br>17. Plans for engine-failure after takeoff. (PA.IV.C.R17)<br>18. Sterile cockpit. (PA.IV.C.R18) |

| **Task** | ***D. Soft-Field Approach and Landing (ASEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a soft-field approach and landing with emphasis on proper use and coordination of flight controls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (PA.IV.D.K1)<br>2. Hazards of other than hard surfaced runway. (PA.IV.D.K2)<br>3. Stabilized approach. (PA.IV.D.K3)<br>4. Energy management. (PA.IV.D.K4)<br>5. Wind conditions and effects. (PA.IV.D.K5)<br>6. Density altitude. (PA.IV.D.K6)<br>7. Headwind, tailwind, crosswind component. (PA.IV.D.K7)<br>8. Emergency procedures during approach and landing. (PA.IV.D.K8) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway. (PA.IV.D.S1)<br>2. Scan the landing runway and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (PA.IV.D.S2)<br>3. Complete the appropriate checklist. (PA.IV.D.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and selects a suitable touchdown point. (PA.IV.D.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjusts pitch attitude and power as required. (PA.IV.D.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, +10/-5knots. (PA.IV.D.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown and, for tricycle gear airplanes, keep the nose wheel off the surface until loss of elevator effectiveness. (PA.IV.D.S7)<br>8. Touch down softly with no drift, and with the airplane's longitudinal axis aligned in the runway center. (PA.IV.D.S8)<br>9. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.D.S9)<br>10. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (PA.IV.D.S10)<br>11. Maintain proper position of the flight controls and sufficient speed to taxi on the soft surface. (PA.IV.D.S11) |

*Task continued on next page.*

| **Task** | ***D. Soft-Field Approach and Landing (ASEL)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability and aircraft limitations – considering possibility of selecting a runway at a different airport. (PA.IV.D.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (PA.IV.D.R2)<br>3. Other than hard-surfaced runway. (PA.IV.D.R3)<br>4. Windshear avoidance. (PA.IV.D.R4)<br>5. Tailwinds. (PA.IV.D.R5)<br>6. Wake turbulence. (PA.IV.D.R6)<br>7. Task management. (PA.IV.D.R7)<br>8. Low altitude maneuvering. (PA.IV.D.R8)<br>9. Wire strikes. (PA.IV.D.R9)<br>10. Collision avoidance. (PA.IV.D.R10)<br>11. Right-of-way. (PA.IV.D.R11)<br>12. Situational awareness of obstacles on approach and departure paths. (PA.IV.D.R12)<br>13. Recognition of need for go-around/rejected landing. (PA.IV.D.R13)<br>14. Stall/spin awareness. (PA.IV.D.R14)<br>15. How to accomplish soft field landing without the use of power in power failure situation. (PA.IV.D.R15)<br>16. Maintaining a sterile cockpit environment. (PA.IV.D.R16) |

| Task | ***E. Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a short-field takeoff, maximum performance climb operations, and rejected takeoff procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Effects of aircraft configuration. (PA.IV.E.K1)<br>2. Effects of runway surface. (PA.IV.E.K2)<br>3. Takeoff distance. (PA.IV.E.K3)<br>4. Takeoff power. (PA.IV.E.K4)<br>5. Obstruction clearance. (PA.IV.E.K5)<br>6. Wind conditions and effects. (PA.IV.E.K6)<br>7. Minimum safe altitude. (PA.IV.E.K7)<br>8. Density altitude. (PA.IV.E.K8)<br>9. Headwind, tailwind, crosswind component. (PA.IV.E.K9)<br>10. Application of $V_X$ or $V_Y$. (PA.IV.E.K10)<br>11. Emergency procedures during takeoff and climb. (PA.IV.E.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify proper aircraft configuration. (PA.IV.E.S1)<br>2. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (PA.IV.E.S2)<br>3. Ensure the aircraft is on the correct takeoff runway. (PA.IV.E.S3)<br>4. Ascertain wind direction with or without visible wind direction indicators. (PA.IV.E.S4)<br>5. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations. (PA.IV.E.S5)<br>6. Position the flight controls for the existing wind conditions. (PA.IV.E.S6)<br>7. Clear the area; taxi into takeoff position utilizing maximum available takeoff area and align the airplane on the runway center line. (PA.IV.E.S7)<br>8. Apply brakes (if appropriate), while configuring aircraft power setting to achieve maximum performance.(PA.IV.E.S8)<br>9. Confirm takeoff power prior to brake release and proper engine and flight instrument indications prior to rotation. (PA.IV.E.S9)<br>10. Rotate and lift off at the recommended airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$. (PA.IV.E.S10)<br>11. Establish a pitch attitude that will maintain the recommended obstacle clearance airspeed, or $V_X$, +10/-5 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface. (PA.IV.E.S11)<br>12. After clearing the obstacle, establish the pitch attitude for $V_Y$, accelerate to $V_Y$, and maintain $V_Y$, +10/-5 knots, during the climb. (PA.IV.E.S12)<br>13. Retract landing gear and flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (PA.IV.E.S13)<br>14. Maintain takeoff power and $V_X$ or $V_Y$ +10/-5 knots to a safe maneuvering altitude. (PA.IV.E.S14)<br>15. Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (PA.IV.E.S15)<br>16. Comply with noise abatement and published departure procedures. (PA.IV.E.S16)<br>17. Complete the appropriate checklist. (PA.IV.E.S17)<br>18. Comply with manufacturer recommended emergency procedures relating to the takeoff sequence.(PA.IV.E.S18) |

*Task continued on next page.*

| Task | *E. Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL)* |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind and pilot capability and aircraft limitations. (PA.IV.E.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (PA.IV.E.R2)<br>3. Other than hard-surfaced runway. (PA.IV.E.R3)<br>4. Obstruction clearance. (PA.IV.E.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (PA.IV.E.R5)<br>6. Windshear. (PA.IV.E.R6)<br>7. Tailwinds. (PA.IV.E.R7)<br>8. Wake turbulence. (PA.IV.E.R8)<br>9. Go/no go decision making. (PA.IV.E.R9)<br>10. Task management. (PA.IV.E.R10)<br>11. Low altitude maneuvering. (PA.IV.E.R11)<br>12. Wire strikes. (PA.IV.E.R12)<br>13. Minimum safe altitude for climb. (PA.IV.E.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (PA.IV.E.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (PA.IV.E.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (PA.IV.E.R16)<br>17. Criticality of takeoff distance available. (PA.IV.E.R17)<br>18. Plans for engine-failure after takeoff. (PA.IV.E.R18)<br>19. Sterile cockpit. (PA.IV.E.R19) |

| **Task** | ***F. Short-Field Approach and Landing (ASEL, AMEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a short-field approach and landing with emphasis on proper use and coordination of flight controls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (PA.IV.F.K1)<br>2. Hazards of other than hard-surfaced runways. (PA.IV.F.K2)<br>3. Obstruction clearance. (PA.IV.F.K3)<br>4. Stabilized approach. (PA.IV.F.K4)<br>5. Energy management. (PA.IV.F.K5)<br>6. Wind conditions and effects. (PA.IV.F.K6)<br>7. Density altitude. (PA.IV.F.K6)<br>8. Headwind, tailwind, crosswind component. (PA.IV.F.K7)<br>9. Emergency procedures during approach and landing.<br>10. Land and hold short operations. |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway. (PA.IV.F.S1)<br>2. Scan the landing runway and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (PA.IV.F.S2)<br>3. Complete the appropriate checklist. (PA.IV.F.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point. (PA.IV.F.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (PA.IV.F.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, +10/-5knots. (PA.IV.F.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown. (PA.IV.F.S7)<br>8. Touch down smoothly at manufacturer's recommended airspeed. (PA.IV.F.S8)<br>9. Touch down within the available runway, at or within 200 feet beyond a the approach end of the runway, threshold markings or runway numbers, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over the runway center line. (PA.IV.F.S9)<br>10. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.F.S10)<br>11. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (PA.IV.F.S11)<br>12. Apply brakes as necessary, to stop in the shortest distance consistent with safety. (PA.IV.F.S12) |

*Task continued on next page.*

| Task | *F. Short-Field Approach and Landing (ASEL, AMEL)* |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability and aircraft limitations – considering possibility of selecting a runway at a different airport. (PA.IV.F.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations (PA.IV.F.R2)<br>3. Other than hard surfaced runway. (PA.IV.F.R3)<br>4. Obstruction clearance. (PA.IV.F.R4)<br>5. Windshear. (PA.IV.F.R5)<br>6. Hazards of tailwinds. (PA.IV.F.R6)<br>7. Wake turbulence. (PA.IV.F.R7)<br>8. Task management. (PA.IV.F.R8)<br>9. Low altitude maneuvering. (PA.IV.F.R9)<br>10. Wire strikes. (PA.IV.F.R10)<br>11. Collision Avoidance. (PA.IV.F.R11)<br>12. Right-of-way. (PA.IV.F.R12)<br>13. Situational awareness of obstacles on approach and departure paths. (PA.IV.F.R13)<br>14. Recognition of need for go-around/rejected landing. (PA.IV.F.R14)<br>15. Stall/spin awareness. (PA.IV.F.R15)<br>16. Land and Hold Short Operations. (PA.IV.F.R16)<br>17. Maintaining a sterile cockpit environment. (PA.IV.F.R17) |

| **Task** | ***G. Confined Area Takeoff and Maximum Performance Climb (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a confined area takeoff, maximum performance climb operations, and rejected takeoff procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Effects of aircraft configuration. (PA.IV.G.K1)<br>2. Effects of water surface. (PA.IV.G.K2)<br>3. Takeoff distance. (PA.IV.G.K3)<br>4. Takeoff power. (PA.IV.G.K4)<br>5. Obstruction clearance. (PA.IV.G.K5)<br>6. Wind conditions and effects. (PA.IV.G.K6)<br>7. Minimum safe altitude. (PA.IV.G.K7)<br>8. Density altitude. (PA.IV.G.K8)<br>9. Headwind, tailwind, crosswind component. (PA.IV.G.K9)<br>10. Application of $V_X$ or $V_Y$. (PA.IV.G.K10)<br>11. Emergency procedures during takeoff and climb. (PA.IV.G.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify proper aircraft configuration. (PA.IV.G.S1)<br>2. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (PA.IV.G.S2)<br>3. Ensure the aircraft is on the correct takeoff center path. (PA.IV.G.S3)<br>4. Ascertain wind direction with or without visible wind direction indicators. (PA.IV.G.S4)<br>5. Determine if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (PA.IV.G.S5)<br>6. Position the flight controls for the existing wind conditions. (PA.IV.G.S6)<br>7. Clear the area and select an appropriate takeoff path for the existing conditions; taxi into takeoff position utilizing maximum available takeoff area and align the airplane on the takeoff path. (PA.IV.G.S7)<br>8. Configure aircraft power to achieve maximum performance and confirm takeoff power and proper engine and flight instrument indications prior to rotation.(PA.IV.G.S8)<br>9. Establish and maintain the most efficient planning/lift-off attitude and correct for porpoising and skipping. (PA.IV.G.S9)<br>10. Rotate and lift off at the recommended airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$. (PA.IV.G.S10)<br>11. Establish a pitch attitude that will maintain the recommended obstacle clearance airspeed, or $V_X$, +10/-5 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface. (PA.IV.G.S11)<br>12. After clearing the obstacle, establish the pitch attitude for $V_Y$, accelerate to $V_Y$, and maintain $V_Y$, +10/-5 knots, during the climb. (PA.IV.G.S12)<br>13. Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (PA.IV.G.S13)<br>14. Maintain takeoff power and $V_X$ or $V_Y$ +10/-5 knots to a safe maneuvering altitude. (PA.IV.G.S14)<br>15. Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (PA.IV.G.S15)<br>16. Comply with noise abatement and published departure procedures. (PA.IV.G.S16)<br>17. Complete the appropriate checklist. (PA.IV.G.S17)<br>18. Comply with manufacturer recommended emergency procedures relating to the takeoff sequence.(PA.IV.G.S18) |

*Task continued on next page.*

| Task | *G. Confined Area Takeoff and Maximum Performance Climb (ASES, AMES)* |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate takeoff path based on wind and pilot capability and aircraft limitations. (PA.IV.G.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (PA.IV.G.R2)<br>3. Water conditions. (PA.IV.G.R3)<br>4. Obstruction clearance. (PA.IV.G.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (PA.IV.G.R5)<br>6. Windshear. (PA.IV.G.R6)<br>7. Tailwinds. (PA.IV.G.R7)<br>8. Wake turbulence. (PA.IV.G.R8)<br>9. Go/no go decision making. (PA.IV.G.R9)<br>10. Task management. (PA.IV.G.R10)<br>11. Low altitude maneuvering. (PA.IV.G.R11)<br>12. Wire strikes. (PA.IV.G.R12)<br>13. Minimum safe altitude for climb. (PA.IV.G.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (PA.IV.G.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (PA.IV.G.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (PA.IV.G.R16)<br>17. Criticality of takeoff distance available. (PA.IV.G.R17)<br>18. Plans for engine-failure after takeoff. (PA.IV.G.R18)<br>19. Sterile cockpit. (PA.IV.G.R19)<br>20. Confirms gear retracted in amphibious aircraft. (PA.IV.G.R20) |

| **Task** | ***H. Confined Area Approach and Landing (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a confined area approach and landing with emphasis on proper use and coordination of flight controls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (PA.IV.H.K1)<br>2. Hazards of a confined area. (PA.IV.H.K2)<br>3. Obstruction clearance. (PA.IV.H.K3)<br>4. Stabilized approach. (PA.IV.H.K4)<br>5. Energy management. (PA.IV.H.K5)<br>6. Wind conditions and effects. (PA.IV.H.K6)<br>7. Density altitude. (PA.IV.H.K7)<br>8. Headwind, tailwind, crosswind component. (PA.IV.H.K8)<br>9. Emergency procedures during approach and landing. (PA.IV.H.K9)<br>10. Land and hold short operations. (PA.IV.H.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway and adequately survey the intended landing area. (PA.IV.H.S1)<br>2. Scan the landing area and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (PA.IV.H.S2)<br>3. Complete the appropriate checklist. (PA.IV.H.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and select the proper landing path. (PA.IV.H.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (PA.IV.H.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, +10/-5knots. (PA.IV.H.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown. (PA.IV.H.S7)<br>8. Contact the water at the minimum safe airspeed with the proper pitch attitude for the surface conditions. (PA.IV.H.S8)<br>9. Touch down within the available water landing area, at or within 200 feet beyond a specified point, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over the landing center area. (PA.IV.H.S9)<br>10. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.H.S10)<br>11. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (PA.IV.H.S11)<br>12. Apply elevator control as necessary, to stop in the shortest distance consistent with safety. (PA.IV.H.S12) |

*Task continued on next page.*

| **Task** | ***H. Confined Area Approach and Landing (ASES, AMES)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of landing area based on wind, pilot capability and aircraft limitations – considering possibility of selecting an area at a different location. (PA.IV.H.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations (PA.IV.H.R2)<br>3. Water conditions. (PA.IV.H.R3)<br>4. Obstruction clearance. (PA.IV.H.R4)<br>5. Windshear. (PA.IV.H.R5)<br>6. Hazards of tailwinds. (PA.IV.H.R6)<br>7. Wake turbulence. (PA.IV.H.R7)<br>8. Task management. (PA.IV.H.R8)<br>9. Low altitude maneuvering. (PA.IV.H.R9)<br>10. Wire strikes. (PA.IV.H.R10)<br>11. Collision Avoidance. (PA.IV.H.R11)<br>12. Right-of-way. (PA.IV.H.R12)<br>13. Situational awareness of obstacles on approach and departure paths. (PA.IV.H.R13)<br>14. Recognition of need for go-around/rejected landing. (PA.IV.D.R14)<br>15. Stall/spin awareness. (PA.IV.H.R15)<br>16. Land and Hold Short Operations. (PA.IV.H.R16)<br>17. Maintaining a sterile cockpit environment. (PA.IV.H.R17) |

| **Task** | ***I. Glassy Water Takeoff and Climb (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a glassy water takeoff and climb.<br>**NOTE:** If a glassy water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Water effects on operations. (PA.IV.I.K1)<br>2. Effects of glassy water on acceleration and lift-off. (PA.IV.I.K2)<br>3. When and why to use the glassy water takeoff and climb technique. (PA.IV.I.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the flight controls and flaps for the existing conditions. (PA.IV.I.S1)<br>2. Clear the area; select an appropriate takeoff path considering surface hazards and/or vessels and surface conditions. (PA.IV.I.S2)<br>3. Retract the water rudders as appropriate; advance the throttle smoothly to takeoff power. (PA.IV.I.S3)<br>4. Establish and maintain an appropriate planning attitude, directional control, and correct for porpoising, skipping, and increase in water drag. (PA.IV.I.S4)<br>5. Utilize appropriate techniques to lift seaplane from the water considering surface conditions. (PA.IV.I.S5)<br>6. Establish proper attitude/airspeed, and accelerate to Vy +10/-5 knots during the climb. (PA.IV.I.S6)<br>7. Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (PA.IV.I.S7)<br>8. Maintain takeoff power Vy +10/-5 to a safe maneuvering altitude. (PA.IV.I.S8)<br>9. Maintain directional control and proper wind-drift correction throughout takeoff and climb. (PA.IV.I.S9)<br>10. Complete the appropriate checklist (PA.IV.I.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate takeoff path based on wind and pilot capability and aircraft limitations. (PA.IV.I.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (PA.IV.I.R2)<br>3. Water conditions. (PA.IV.I.R3)<br>4. Obstruction clearance. (PA.IV.I.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (PA.IV.I.R5)<br>6. Windshear. (PA.IV.I.R6)<br>7. Tailwinds. (PA.IV.I.R7)<br>8. Wake turbulence. (PA.IV.I.R8)<br>9. Go/no go decision making. (PA.IV.I.R9)<br>10. Task management. (PA.IV.I.R10)<br>11. Low altitude maneuvering. (PA.IV.I.R11)<br>12. Wire strikes. (PA.IV.I.R12)<br>13. Minimum safe altitude for climb. (PA.IV.I.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (PA.IV.I.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (PA.IV.I.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (PA.IV.I.R16)<br>17. Criticality of takeoff distance available. (PA.IV.I.R17)<br>18. Plans for engine-failure after takeoff. (PA.IV.I.R18)<br>19. Sterile cockpit. (PA.IV.I.R19)<br>20. Confirms gear retracted in amphibious aircraft. (PA.IV.I.R20) |

| Task | ***J. Glassy Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a glassy water approach and landing.<br>**NOTE:** If a glassy water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. When and why glassy water techniques are used. (PA.IV.J.K1)<br>2. How a glassy water approach and landing is executed. (PA.IV.J.K2)<br>3. Landing distance. (PA.IV.J.K3)<br>4. Stabilized approach. (PA.IV.J.K4)<br>5. Energy management. (PA.IV.J.K5)<br>6. Wind conditions and effects. (PA.IV.J.K7)<br>7. Density altitude. (PA.IV.J.K8)<br>8. Headwind, tailwind, crosswind component. (PA.IV.J.K9)<br>9. Emergency procedures during approach and landing. (PA.IV.J.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Adequately survey the intended landing area. (PA.IV.J.S1)<br>2. Consider the wind conditions, water depth, hazards, surrounding terrain, and other watercraft. (PA.IV.J.S2)<br>3. Select the most suitable approach path and touchdown area. (PA.IV.J.S3)<br>4. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (PA.IV.J.S4)<br>5. Maintain a stabilized approach and the recommended approach airspeed, +10/-5 knots and maintain a touchdown pitch attitude and descent rate from the last altitude reference until touchdown. (PA.IV.J.S5)<br>6. Make smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown. (PA.IV.J.S6)<br>7. Contact the water in the proper pitch attitude, and slow to idle taxi speed. (PA.IV.J.S7)<br>8. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.J.S8)<br>9. Complete the appropriate checklist. (PA.IV.J.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performing a go-around/rejected landing. (PA.IV.J.R1)<br>2. Importance of landing in direction of momentum, with wheels pointed forward on touchdown. (PA.IV.J.R2)<br>3. Stall/spin awareness. (PA.IV.J.R3)<br>4. Windshear. (PA.IV.J.R4)<br>5. Tailwinds. (PA.IV.J.R5)<br>6. Wake turbulence. (PA.IV.J.R6)<br>7. Task management. (PA.IV.J.R7)<br>8. Low altitude maneuvering. (PA.IV.J.R8)<br>9. Wire strikes. (PA.IV.J.R9)<br>10. Collision avoidance. (PA.IV.J.R10)<br>11. Right-of-way. (PA.IV.J.R11)<br>12. Situational awareness of obstacles on approach and departure paths. (PA.IV.J.R12)<br>13. Sterile cockpit. (PA.IV.J.R13) |

| Task | *K. Rough Water Takeoff and Climb (ASES, AMES)* |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a rough water takeoff and climb.<br><br>**NOTE:** If a rough water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Water effects on operations. (PA.IV.K.K1)<br>2. Effects of rough water on acceleration and lift-off. (PA.IV.K.K2)<br>3. When and why to use the rough water takeoff and climb technique. (PA.IV.K.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the flight controls and flaps for the existing conditions. (PA.IV.K.S1)<br>2. Clear the area; select an appropriate takeoff path considering surface hazards and/or vessels and surface conditions. (PA.IV.K.S2)<br>3. Retract the water rudders as appropriate; advance the throttle smoothly to takeoff power. (PA.IV.K.S3)<br>4. Establish and maintain an appropriate planning attitude, directional control, and correct for porpoising, skipping, and increase in water drag. (PA.IV.K.S4)<br>5. Lift off at minimum airspeed and accelerate to Vy, +10/-5 knots before leaving ground effect. (PA.IV.K.S5)<br>6. Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (PA.IV.K.S6)<br>7. Maintain takeoff power Vy +10/-5 to a safe maneuvering altitude. (PA.IV.K.S7)<br>8. Maintain directional control and proper wind-drift correction throughout takeoff and climb. (PA.IV.K.S8)<br>9. Complete the appropriate checklist (PA.IV.K.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate takeoff path based on wind and pilot capability and aircraft limitations. (PA.IV.K.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (PA.IV.K.R2)<br>3. Water conditions. (PA.IV.K.R3)<br>4. Obstruction clearance. (PA.IV.K.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (PA.IV.K.R5)<br>6. Windshear. (PA.IV.K.R6)<br>7. Tailwinds. (PA.IV.K.R7)<br>8. Wake turbulence. (PA.IV.K.R8)<br>9. Go/no go decision making. (PA.IV.K.R9)<br>10. Task management. (PA.IV.K.R10)<br>11. Low altitude maneuvering. (PA.IV.K.R11)<br>12. Wire strikes. (PA.IV.K.R12)<br>13. Minimum safe altitude for climb. (PA.IV.K.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (PA.IV.K.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (PA.IV.K.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (PA.IV.K.R16)<br>17. Criticality of takeoff distance available. (PA.IV.K.R17)<br>18. Plans for engine-failure after takeoff. (PA.IV.K.R18)<br>19. Sterile cockpit. (PA.IV.K.R19)<br>20. Confirms gear retracted in amphibious aircraft. (PA.IV.K.R20) |

| **Task** | ***L. Rough Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a rough water approach and landing.<br><br>**NOTE:** If a rough water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. When and why rough water techniques are used. (PA.IV.L.K1)<br>2. How a rough water approach and landing is executed. (PA.IV.L.K2)<br>3. Landing distance. (PA.IV.L.K3)<br>4. Stabilized approach. (PA.IV.L.K4)<br>5. Energy management. (PA.IV.L.K5)<br>6. Wind conditions and effects. (PA.IV.L.K7)<br>7. Density altitude. (PA.IV.L.K8)<br>8. Headwind, tailwind, crosswind component. (PA.IV.L.K9)<br>9. Emergency procedures during approach and landing. (PA.IV.L.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Adequately survey the intended landing area. (PA.IV.L.S1)<br>2. Consider the wind conditions, water depth, hazards, surrounding terrain, and other watercraft. (PA.IV.L.S2)<br>3. Select the most suitable approach path and touchdown area. (PA.IV.L.S3)<br>4. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (PA.IV.L.S4)<br>5. Maintain a stabilized approach and the recommended approach airspeed, or in its absence not more than 1.3 Vso +10/-5 knots with wind gust factor applied. (PA.IV.L.S5)<br>6. Make smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown. (PA.IV.L.S6)<br>7. Contact the water in the proper pitch attitude, considering the type of rough water. (PA.IV.L.S7)<br>8. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.L.S8)<br>9. Complete the appropriate checklist. (PA.IV.L.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performing a go-around/rejected landing. (PA.IV.L.R1)<br>2. Importance of landing in direction of momentum, with wheels pointed forward on touchdown. (PA.IV.L.R2)<br>3. Stall/spin awareness. (PA.IV.L.R3)<br>4. Windshear. (PA.IV.L.R4)<br>5. Tailwinds. (PA.IV.L.R5)<br>6. Wake turbulence. (PA.IV.L.R6)<br>7. Task management. (PA.IV.L.R7)<br>8. Low altitude maneuvering. (PA.IV.L.R8)<br>9. Wire strikes. (PA.IV.L.R9)<br>10. Collision avoidance. (PA.IV.L.R10)<br>11. Right-of-way. (PA.IV.L.R11)<br>12. Situational awareness of obstacles on approach and departure paths. (PA.IV.L.R12)<br>13. Sterile cockpit. (PA.IV.L.R13) |

| **Task** | ***M. Forward Slip to a Landing (ASEL, ASES)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a forward slip to a landing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. When and why forward slips are used and differences between side and forward slips. (PA.IV.M.K1)<br>2. How forward slips are executed. (PA.IV.M.K2)<br>3. Landing distance. (PA.IV.M.K3)<br>4. Stabilized approach. (PA.IV.M.K4)<br>5. Energy management. (PA.IV.M.K5)<br>6. Effects of forward slips changing indicated airspeed vs. true airspeed. (PA.IV.M.K6)<br>7. Wind conditions and effects. (PA.IV.M.K7)<br>8. Density altitude. (PA.IV.M.K8)<br>9. Headwind, tailwind, crosswind component. (PA.IV.M.K9)<br>10. Emergency procedures during approach and landing. (PA.IV.M.K10)<br>11. Land and hold short operations. (PA.IV.M.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select runway based on wind and pilot capability and aircraft limitations. (PA.IV.M.S1)<br>2. Determine if crosswind component is above his or her ability or that of the aircraft's capability. (PA.IV.M.S2)<br>3. Select touchdown point. (PA.IV.M.S3)<br>4. Establish the slipping attitude at the point from which a landing can be made using the recommended approach and landing configuration and airspeed; adjust pitch attitude as required. (PA.IV.M.S4)<br>5. Maintain a ground track aligned with the runway centerline and an airspeed, which results in minimum float during the round out. (PA.IV.M.S5)<br>6. Make smooth, timely, and correct control application during the recovery from the slip, the round out, and the touchdown. (PA.IV.M.S6)<br>7. Touch down within 400 feet beyond a specified point with no drift, and with the airplane's longitudinal axis aligned with and over the runway centerline. (PA.IV.M.S7)<br>8. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.IV.M.S8)<br>9. Complete the appropriate checklist. (PA.IV.M.S9)<br>10.Execute a timely go-around decision when the approach cannot be made within the tolerances specified above. (PA.IV.M.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performing a go-around/rejected landing. (PA.IV.M.R1)<br>2. Importance of landing in direction of momentum, with wheels pointed forward on touchdown. (PA.IV.M.R2)<br>3. Correlating any cross wind effects with direction of forward slip and transition to side slip for landing. (PA.IV.M.R3)<br>4. Stall/spin awareness. (PA.IV.M.R4)<br>5. Windshear. (PA.IV.M.R5)<br>6. Land and hold short operations. (PA.IV.M.R6)<br>7. Tailwinds. (PA.IV.M,R7)<br>8. Wake turbulence. (PA.IV.M.R8)<br>9. Task management. (PA.IV.M.R9)<br>10. Low altitude maneuvering. (PA.IV.M.R10)<br>11. Wire strikes. (PA.IV.M.R11)<br>12. Collision avoidance. (PA.IV.M.R12)<br>13. Right-of-way. (PA.IV.M.R13)<br>14. Situational awareness of obstacles on approach and departure paths. (PA.IV.M.R14)<br>15. Risks associated with forward slip operations, including fuel flowage, tail stalls with flaps, and airspeed control. (PA.IV.M.R15)<br>16. Sterile cockpit. (PA.IV.M.R16) |

| **Task** | ***N. Go-Around/Rejected Landing*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a go around/rejected landing with emphasis on factors that contribute to landing conditions that may require a go around. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (PA.IV.N.K1)<br>2. Stabilized approach. (PA.IV.N.K2)<br>3. Energy management. (PA.IV.N.K3)<br>4. Wind conditions and effects. (PA.IV.N.K4)<br>5. Headwind, tailwind, crosswind component. (PA.IV.N.KI5)<br>6. Emergency procedures during approach and landing. (PA.IV.N.K6)<br>7. Communication procedures. (PA.IV.N.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Make a timely decision to discontinue the approach to landing. (PA.IV.N.S1)<br>2. Promptlyandsmoothlyapplypowerwhileconfiguringtheairplaneinaccordancewiththemanufacturer'sinstructionstoachievemaximumperformance. (PA.IV.N.S2)<br>3. Retract the landing gear in accordance with manufacturer guidance. (PA.IV.N.S3)<br>4. Maneuver to the side of the runway/landing area when necessary to clear and avoid conflicting traffic.(PA.IV.N.S4)<br>5. Maintain takeoff power $V_Y$ +10/-5 to a safe maneuvering altitude. (PA.IV.N.S5)<br>6. Maintain directional control and proper wind-drift correction throughout the climb. (PA.IV.N.S6)<br>7. Complete the appropriate checklist. (PA.IV.N.S7) |
| **Risk Manageme nt** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Timeliness for making and executing decision. (PA.IV.N.R1)<br>2. Task management. (PA.IV.N.R2)<br>3. Low altitude maneuvering. (PA.IV.N.R3)<br>4. Slow flight. (PA.IV.N.R4)<br>5. Wire strikes. (PA.IV.N.R5)<br>6. Collision avoidance. (PA.IV.N.R6)<br>7. Right-of-way. (PA.IV.N.R7)<br>8. Situational awareness of obstacles on approach and departure paths. (PA.IV.N.R8)<br>9. Spin awareness. (PA.IV.N.R9)<br>10. Elevator trim stalls. (PA.IV.N.R10)<br>11. Pilot changing mind regarding the go-around decision (PA.IV.N.R11)<br>12. Sterile cockpit. (PA.IV.N.R12) |

## V. Performance Maneuvers

| **Task** | ***A. Steep Turns*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with steep turns. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Coordinated flight. (PA.V.A.K1)<br>2. Attitude control at various airspeeds. (PA.V.A.K2)<br>3. Maneuvering speed, including changes in weight. (PA.V.A.K3)<br>4. Controlling rate and radius of turn. (PA.V.A.K4)<br>5. Accelerated stalls. (PA.V.A.K5)<br>6. Overbanking tendencies. (PA.V.A.K6)<br>7. Use of trim in a turn. (PA.V.A.K7)<br>8. Aerodynamics associated with steep turns. (PA.V.A.K8)<br>9. Aerobatic requirements and limitations(PA.V.A.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Establish the manufacturer's recommended airspeed or if one is not stated, a safe airspeed not to exceed $V_A$. (PA.V.A.S1)<br>2. Coordination entering, during, andexitinga45bankturnfor360degrees. (PA.V.A.S2)<br>3. Perform the task in the opposite direction, as specified by the evaluator. (PA.V.A.S3)<br>4. Maintain the entry altitude, ±100 feet, airspeed, ±10 knots, bank, and ±5 °; and roll out on the entry heading, ±10°. (PA.V.A.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dividing attention between airplane control and orientation. (PA.V.A.R1)<br>2. Task management. (PA.V.A.R2)<br>3. Energy management. (PA.V.A.R3)<br>4. Stall/spin awareness. (PA.V.A.R4)<br>5. Situational awareness. (PA.V.A.R5)<br>6. Rate and radius of turn with confined area operations. (PA.V.A.R6) |

| **Task** | ***B. Ground Reference Maneuvers*** |
|---|---|
| **Reference** | FAA-H-8083-3; 14 CFR part 61 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with ground reference maneuvering which may include a rectangular course, s-turns, or turns around a point. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Effects of wind on ground track and relation to a ground reference point. (PA.V.B.K1)<br>2. Effect of bank angle and groundspeed on rate and radius of turn.(PA.V.B.K2)<br>3. Entry/exit requirements of maneuver. (PA.V.B.K3)<br>4. Relation of maneuver to airport traffic pattern. (PA.V.B.K4)<br>5. Emergency landing considerations during conduct of the maneuver, including entry and exit. (PA.V.B.K5)<br>6. Correlation of S-Turns as one option to increase separation from other aircraft. (PA.V.B.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Clear area of terrain, obstacles, possible airspace incursion and other aircraft. (PA.V.B.S1)<br>2. Select a suitable ground reference.(PA.V.B.S2)<br>3. Identify a suitable emergency landing area. (PA.V.B.S3)<br>4. Plan the maneuver: (PA.V.B.S4)<br>a. Rectangular course: enter a left or right pattern, 600 to 1,000 feet Above Ground Level (AGL) at an appropriate distance from the selected reference area, 45° to the downwind leg<br>b. S-turns: enter perpendicular to the selected reference line, 600 to 1,000 feet AGL at an appropriate distance from the selected reference area.<br>c. Turns Around a Point: enter at an appropriate distance from the reference point, 600 to 1,000 feet AGL at an appropriate distance from the selected reference area.<br>5. Apply adequate wind-drift correction during straight-and turning flight to maintain a constant ground track if around a rectangular reference area or to track a constant radius turn on each side of the selected reference line. (PA.V.B.S5)<br>6. If performing a pattern such as s-turns, reverse the turn directly over the selected reference line; if performing turns around a point, complete turns in either direction around the selected reference point. (PA.V.B.S6)<br>7. Divide attention between airplane control, traffic avoidance and the ground track while maintaining coordinated flight. (PA.V.B.S7)<br>8. Maintain altitude, ±100 feet; maintains airspeed, ±10 knots. (PA.V.B.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.V.B.R1)<br>2. CFIT avoidance. (PA.V.B.R2)<br>3. Task management. (PA.V.B.R3)<br>4. Wire strike avoidance. (PA.V.B.R4)<br>5. Airmanship as exhibited by positive aircraft control. (PA.V.B.R5)<br>6. Planning for a suitable landing area in the case of an engine failure. (PA.V.B.R6) |

## VI. Navigation

| Task | *A. Pilotage and Dead Reckoning* |
|---|---|
| **Reference** | FAA-H-8083-25; 14 CFR part 61; Navigation Chart |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with pilotage and dead reckoning. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Navigation process selection. (PA.VI.A.K1)<br>2. Determining heading, speed, course. (PA.VI.A.K2)<br>3. Estimating time, speed, and distance.(PA.VI.A.K3)<br>4. True airspeed and density altitude. (PA.VI.A.K4)<br>5. Wind correction angle. (PA.VI.A.K5)<br>6. Checkpoint selection. (PA.VI.A.K6)<br>7. Planned vs. actual flight plan calculations and required corrections. (PA.VI.A.K7)<br>8. Topography. (PA.VI.A.K8)<br>9. Plotting a course. (PA.VI.A.K9)<br>10. Magnetic compass errors. (PA.VI.A.K10)<br>11. Route selection. (PA.VI.A.K11)<br>12. Altitude selection. (PA.VI.A.K12)<br>13. Power setting selection. (PA.VI.A.K13) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Prepare a document or electronic equivalent to be used in flight for comparisons with planned fuel usages and times over waypoints while dead reckoning. (PA.VI.A.S1)<br>2. Follow the preplanned course by reference to landmarks. (PA.VI.A.S2)<br>3. Identify landmarks by relating surface features to chart symbols. (PA.VI.A.S3)<br>4. Navigate by means of pre-computed headings, groundspeeds, and elapsed time. (PA.VI.A.S4)<br>5. Demonstrate use of magnetic direction indicator in navigation, to include turns to headings(PA.VI.A.S5)<br>6. Correct for and record the differences between preflight groundspeed, fuel consumption, and heading calculations and those determined en route. (PA.VI.A.S6)<br>7. Verify the airplane's position within 3 nautical miles of the flight-planned route. (PA.VI.A.S7)<br>8. Arrive at the en route checkpoints within 5 minutes of the initial or revised ETA and provide a destination estimate. (PA.VI.A.S8)<br>9. Maintain the selected altitude, ±200 feet and headings, ±15°. (PA.VI.A.S9)<br>10. Determine compass heading based on wind, magnetic variation, and deviation. (PA.VI.A.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. CFIT risk avoidance plan. (PA.VI.A.R1)<br>2. Avoiding/recovering from misidentification of landmarks. (PA.VI.A.R2)<br>3. Bracketing strategy. (PA.VI.A.R3)<br>4. Selecting an alternate. (PA.VI.A.R4)<br>5. Situational awareness. (PA.VI.A.R5)<br>6. Task management. (PA.VI.A.R6)<br>7. Actual vs. planned fuel consumption. (PA.VI.A.R7)<br>8 Exit strategies. (PA.VI.A.R8)<br>9. Preflight pilot/operation risk assessment and planning. (PA.VI.A.R9)<br>10. Determine the impact of corrected groundspeed, time enroute and fuel consumption on the overall safety of flight to destination. (PA.IV.A.R10) |

| **Task** | ***B. Navigation Systems and Radar Services*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-6, FAA-H-8083-25; Navigation Equipment Operation Manuals; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with navigation systems and radar services. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Ground-based navigation (orientation, course determination, equipment, tests and regulations). (PA.VI.B.K1)<br>2. Global Positioning System (GPS) (equipment, regulations, databases authorized use, Receiver Autonomous Integrity Monitoring (RAIM)). (PA.VI.B.K2)<br>3. Radar assistance to VFR aircraft (operations, equipment, available services, traffic advisories). (PA.VI.B.K3)<br>4. Transponder (Mode A, C, and S). (PA.VI.B.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Demonstrate the ability to use installed electronic navigation system. (PA.VI.B.S1)<br>2. Locate the airplane's position using the navigation system. (PA.VI.B.S2)<br>3. Intercept and track a given course, radial, or bearing, as appropriate. (PA.VI.B.S3)<br>4. Recognize and describe the indication of station passage, if appropriate. (PA.VI.B.S4)<br>5. Recognize signal loss and take appropriate action. (PA.VI.B.S5)<br>6. Use proper communication procedures when utilizing radar services. (PA.VI.B.S6)<br>7. Maintain the appropriate altitude, ±200 feet and headings ±15°. (PA.VI.B.S7) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Automation management. (PA.VI.B.R1)<br>2. Task management. (PA.VI.B.R2)<br>3. Situational awareness. (PA.VI.B.R3)<br>4. Limitations of the navigation system in use. (PA.VI.B.R4)<br>5. Planning to avoid automation distractions. (PA.VI.B.R5) |

| **Task** | ***C. Diversion*** |
|---|---|
| **Reference** | FAA-H-8083-25; AIM; Navigation Chart |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with diversion. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Selecting divert destination. (PA.VI.C.K1)<br>2. Deviating from ATC instructions and/or the flight plan. (PA.VI.C.K2) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an appropriate diversion airport and route. (PA.VI.C.S1)<br>2. Make an accurate estimate of heading, groundspeed, arrival time, and fuel consumption to the divert airport. (PA.VI.C.S2)<br>3. Maintain the appropriate altitude, ±200 feet and heading, ±15°. (PA.VI.C.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate airport. (PA.VI.C.R1)<br>2. Timely decision to divert. (PA.VI.C.R2)<br>3. Improving situation by diversion. (PA.VI.C.R3)<br>4. Maintaining airmanship during diversion. (PA.VI.C.R4)<br>5. Collision avoidance. (PA.VI.C.R5)<br>6. CFIT. (PA.VI.C.R6)<br>7. Task management. (PA.VI.C.R7)<br>8. Situational awareness. (PA.VI.C.R8)<br>9. Utilizing all available resources (automation, ATC, cockpit planning aids). (PA.VI.C.R9) |

| **Task** | ***D. Lost Procedures*** |
|---|---|
| **Reference** | FAA-H-8083-25; AIM; Navigation Chart |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with lost procedures and taking appropriate steps to achieve a satisfactory outcome if lost. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Understands value of recording time at waypoints. (PA.VI.D.K1)<br>2. Assistance available if lost (radar services, communication procedures). (PA.VI.D.K2)<br>3. Responsibility and authority of PIC. (PA.VI.D.K3)<br>4. Deviation from ATC instructions. (PA.VII.D.K4)<br>5. Declaring an emergency. (PA.VI.D.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an appropriate course of action. (PA.VI.D.S1)<br>2. Maintain an appropriate heading and climbs, if necessary. (PA.VI.D.S2)<br>3. Identify prominent landmarks. (PA.VI.D.S3)<br>4. Use navigation systems/facilities and/or contacts an ATC facility for assistance, as appropriate. (PA.VI.D.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Following a procedure of recording times over waypoints. (PA.VI.D.R1)<br>2. Task management. (PA.VI.D.R2)<br>3. Situational awareness. (PA.VI.D.R3)<br>4. CFIT. (PA.VI.D.R4)<br>5. Collision avoidance. (PA.VI.D.R5)<br>6. Recognition of a deteriorating situation and seeking assistance. (PA.VI.D.R6)<br>7. Knowing when to declare an emergency. (PA.VI.D.R7) |

## VII. Slow Flight and Stalls

| **Task** | ***A. Maneuvering During Slow Flight*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with maneuvering during slow flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Maneuver relative to a real-life portion of a flight. (PA.VII.A.K1)<br>2. Relationship between Airport Operations Area (AOA), airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (PA.VI.A.K2)<br>3. Importance of reliance on aircraft performance indications (aircraft buffet) instead of artificial warning systems (stall horn). (PA.VII.A.K3)<br>4. The difference between AOA and aircraft attitude during all flight conditions and how it relates to aircraft performance. (PA.VII.A.K4)<br>5. How environmental elements affect aircraft performance. (PA.VII.A.K5)<br>6. Importance of the 1,500 foot AGL minimum altitude. (PA.VII.A.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) ***OR*** 3,000 feet AGL (AMEL, AMES). (PA.VII.A.S1)<br>2. Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in an immediate stall. (PA.VII.A.S2)<br>3. Accomplish coordinated straight-and-level flight, turns, climbs, and descents with landing gear and flap configurations specified by the evaluator. (PA.VII.A.S3)<br>4. Divide attention between airplane control, traffic avoidance and orientation. (PA.VII.A.S4)<br>5. Maintain the specified altitude, ±100 feet; specified heading, ±10°; airspeed, +10/-0 knots; and specified angle of bank, ±10°. (PA.VII.A.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (PA.VII.A.R1)<br>2. Reliance on aircraft performance indications, such as aircraft buffet instead of artificial warning systems such as a stall horn. (PA.VII.A.R2)<br>3. Understanding how environmental elements affect aircraft performance. (PA.VII.A.R3) |

| **Task** | ***B. Power-Off Stalls*** |
|---|---|
| **Reference** | FAA-H-8083-3; AC 61-67; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with power-off stalls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Importance of the 1,500 foot AGL minimum altitude. (PA.VII.B.K1)<br>2. Relating the maneuver to a real-life portion of a flight. (PA.VII.B.K2)<br>3. Components of a stabilized descent. (PA.VII.B.K3)<br>4. Approach to stall indications. (PA.VII.B.K4)<br>5. Full stall indications. (PA.VII.B.K5)<br>6. Determining which aircraft inputs are required to meet heading or bank angle requirements. (PA.VII.B.K6)<br>7. Determining the most efficient stall recovery procedure. (PA.VII.B.K7)<br>8. Importance of establishing the correct aircraft configuration during the recovery process and the consequences of failing to do so. (PA.VII.B.K8)<br>9. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (PA.VII.B.K9)<br>10. Circumstances that can lead to an inadvertent stall or spin. (PA.VII.B.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) ***OR*** 3,000 feet AGL (AMEL, AMES). (PA.VII.B.S1)<br>2. Establish a stabilized descent in the approach or landing configuration, as specified by the evaluator. (PA.VII.B.S2)<br>3. Transition smoothly from the approach or landing attitude to a pitch attitude that will induce a stall. (PA.VII.B.S3)<br>4. Maintain a specified heading, ±10°, if in straight flight; maintain a specified angle of bank not to exceed 20°, ±10°; if in turning flight, while inducing the stall. (PA.VII.B.S4)<br>5. Recognize and recover promptly after a full stall has occurred. (PA.VII.B.S5)<br>6. Retract the flaps to the recommended setting; retract the landing gear, if retractable, after a positive rate of climb is established. (PA.VII.B.S6)<br>7. Execute stall recovery in accordance with procedures set forth in the POH. (PA.VII.B.S7)<br>8. Accelerates to $V_X$ or $V_Y$ speed before the final flap retraction; returns to the altitude, heading and airspeed specified by the examiner. (PA.VII.B.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (PA.VII.B.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as a stall horn. (PA.VII.B.R2)<br>3. Understanding how environmental elements affect aircraft performance. (PA.VII.B.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (PA.VII.B.R4) |

| **Task** | ***C. Power-On Stalls*** |
|---|---|
| **Reference** | FAA-H-8083-3; AC 61-67; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with power-on stalls.<br><br>**NOTE:** In some high performance airplanes, the power setting may have to be reduced below the practical test standards guideline power setting to prevent excessively high pitch attitudes (greater than 30° nose up). |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Importance of the 1,500 foot AGL minimum altitude. (PA.VII.C.K1)<br>2. Relating the maneuver to a real-life portion of a flight. (PA.VII.C.K2)<br>3. Rationale for power setting variances. (PA.VII.C.K3)<br>4. Approach to stall indications. (PA.VII.C.K4)<br>5. Full stall indications. (PA.VII.C.K5)<br>6. Determining which aircraft inputs are required to meet heading or bank angle requirements. (PA.VII.C.K6)<br>7. Determining the most efficient stall recovery procedure. (PA.VII.C.K7)<br>8. Importance of establishing the correct aircraft configuration during the recovery process and the consequences of failing to do so. (PA.VII.C.K8)<br>9. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (PA.VII.C.K9)<br>10. Circumstances that can lead to an inadvertent stall or spin. (PA.VII.C.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) ***OR*** 3,000 feet AGL (AMEL, AMES). (PA.VII.C.S1)<br>2. Establish the takeoff, departure, or cruise configuration as specified by the evaluator. (PA.VII.C.S2)<br>3. Set power (as assigned by evaluator) to no less than 65 percent available power. (PA.VII.C.S3)<br>4. Transition smoothly from the takeoff or departure attitude to the pitch attitude that will induce a stall. (PA.VII.C.S4)<br>5. Maintain a specified heading, ±10°, if in straight flight; maintain a specified angle of bank not to exceed 20°, ±10°, if in turning flight, while inducing the stall. (PA.VII.C.S5)<br>6. Recognize and recover promptly after a fully developed stall occurs. (PA.VII.C.S6)<br>7. Retract the flaps to the recommended setting; retract the landing gear if retractable, after a positive rate of climb is established. (PA.VII.C.S7)<br>8. Accelerate to $V_X$ or $V_Y$ speed before the final flap retraction; return to the altitude, heading, and airspeed specified by the evaluator. (PA.VII.C.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (PA.VII.C.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as stall horn. (PA.VII.C.R2)<br>3. Understanding how environmental elements affect aircraft performance. (PA.VII.C.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (PA.VII.C.R4) |

| Task | D. Spin Awareness |
|---|---|
| **Reference** | FAA-H-8083-3; AC 61-67; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with spins, flight situations where unintentional spins may occur and procedures for recovery from unintentional spins. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (PA.VII.D.K1)<br>2. Circumstances that can lead to an inadvertent stall or spin. (PA.VII.D.K2)<br>3. Different spin types, causes, recovery strategies. (PA.VII.D.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Assess and avoid situations where unintentional spins may occur. (PA.VII.D.S1)<br>2. Explain procedures for recovery from unintentional spins. (PA.VII.D.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (PA.VII.D.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as stall horn. (PA.VII.D.R2)<br>3. Understanding how environmental elements affect aircraft performance. (PA.VII.D.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (PA.VII.D.R4)<br>5. Uncoordinated flight. (PA.VII.D.R5) |

## VIII. Emergency Operations

**NOTE (AMEL, AMES):** Examiners shall select an entry altitude that will allow the single engine demonstrations task to be completed no lower than 3,000 feet AGL or the manufacturer's recommended altitude, whichever is higher. At altitudes lower than 3,000 feet AGL, engine failure shall be simulated by reducing throttle to idle and then establishing zero thrust.

| **Task** | ***A. Inadvertent IMC*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-H-8083-15 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with inadvertent flight into IMC, including controlling the airplane solely by instrument reference, recognizing and recovering from unusual attitudes and using available communication and navigation facilities and services. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Flight instrument function and operation. (PA.VIII.A.K1)<br>2. Flight instrument sensitivity, limitations, and potential errors in unusual attitudes. (PA.VIII.A.K2)<br>3. Flight instrument correlation (pitch instruments/bank instruments). (PA.VIII.A.K3)<br>4. Aerodynamic factors related to maintaining straight flight and level flight, constant airspeed climb and descent, establishing and making turns while climbing, descending, and maintaining level flight and returning to level flight. (PA.VIII.A.K4)<br>5. Aerodynamic factors related to unusual pitch and bank attitudes and returning to level flight. (PA.VIII.A.K5)<br>6. Appropriate pitch, bank, and power settings for airplane being flown. (PA.VIII.A.K6)<br>7. Hazards of inappropriate control response to stabilizing an unusual attitude. (PA.VIII.A.K7)<br>8. How to determine the minimum safe altitude for location. (PA.VIII.A.K8)<br>9. Radio communications equipment and procedures. (PA.VIII.A.K9)<br>10. Air traffic control facilities and services. (PA.VIII.A.K10)<br>11. Installed navigation equipment function and displays. (PA.VIII.A.K11) |
| **Skills** | The applicant demonstrates the ability to control the aircraft solely by reference to instruments:<br>1. Performs an instrument scan and instrument cross-check. (PA.VIII.A.S1)<br>2. Straight-and-level flight, Constant airspeed climbs, Constant airspeed Descents: Perform coordinated, smooth control application to correct for altitude, heading, airspeed, and bank deviations during straight-and-level, climb, descent, and return to level off. (PA.VIII.A.S2)<br>3. Standard-rate turns and Turns to Headings: Perform coordinated, smooth control application to establish a standard-rate turn and to correct for altitude and bank deviations and rollout on specified heading. (PA.VIII.A.S3)<br>4. Promptly recognizes unusual flight attitudes solely by reference to instruments; recovers promptly to a stabilized level flight attitude using proper instrument cross-check and interpretation and smooth, coordinated control application in the correct sequence. (PA.VIII.A.S4)<br>5. Perform appropriate trimming to relieve control pressures. (PA.VIII.A.S5)<br>6. Maintain altitude ±200 feet, heading ±10°, and airspeed ±10 knots. (PA.VIII.A.S6)<br>7. Maintain controlled flight while selecting proper communications frequencies and setting up navigation equipment to select desired course. (PA.VIII.A.S7)<br>8. Maintain aircraft control while complying with ATC instructions. (PA.VIII.A.S8)<br>9. Maintain aircraft control while navigating using radio aids. (PA.VIII.A.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Maintaining proficiency in flight by reference to instruments. (PA.VIII.A.R1)<br>2. Good cockpit management. (PA.VIII.A.R2)<br>3. Awareness of the direction for nearest VMC. (PA.VIII.A.R3)<br>4. Avoiding continuing flight into IMC or any conditions outside of personal minimums. (PA.VIII.A.R4)<br>5. Awareness of the potential risks of losing situational awareness during low visibility and/or instrument conditions. (PA.VIII.A.R5)<br>6. Benefits of conducting straight-descents and level-turns when controlling flight by reference to instruments. (PA.VIII.A.R6)<br>7. Correlating the relationship between recovery techniques and load factor. (PA.VIII.A.R7) |

| **Task** | ***B. Emergency Approach and Landing (Simulated)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with emergency approach and landing procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Glide speed, distance. (PA.VIII.B.K1)<br>2. Landing distance. (PA.VIII.B.K2)<br>3. Hazards of other than hard surfaced runway. (PA.VIII.B.K3)<br>4. Stabilized approach. (PA.VIII.B.K4)<br>5. Energy management. (PA.VIII.B.K5)<br>6. Wind conditions and effects. (PA.VIII.B.K6)<br>7. Density altitude. (PA.VIII.B.K7)<br>8. Headwind, tailwind, crosswind component. (PA.VIII.B.K8)<br>9. Emergency procedures. (PA.VIII.B.K9)<br>10. Communications. (PA.VIII.B.K10)<br>11. Regulations pertaining to emergencies safe altitudes. (PA.VIII.B.K11)<br>12. ATC clearance deviations. (PA.VIII.B.K12)<br>13. Minimum fuel. (PA.VIII.B.K13)<br>14. Selecting a landing location. (PA.VIII.B.K14)<br>15. ELTs. (PA.VIII.B.K15)<br>16. Radar assistance to VFR aircraft. (PA.VIII.B.K16)<br>17. Transponder. (PA.VIII.B.K17) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Analyze the situation and select an appropriate course of action. (PA.VIII.B.S1)<br>2. Establish and maintain the recommended best-glide airspeed, ±10 knots. (PA.VIII.B.S2)<br>3. Plan and follow a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions that would allow a safe landing. (PA.VIII.B.S3)<br>4. Prepare for landing, or go-around, as specified by the evaluator. (PA.VIII.B.S4)<br>5. Completes the appropriate checklist. (PA.VIII.B.S5)<br>6. Makes appropriate radio calls. (PA.VIII.B.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Accounting for wind. (PA.VIII.B.R1)<br>2. Selecting a suitable landing area. (PA.VIII.B.R2)<br>3. Planning and following a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions. (PA.VIII.B.R3)<br>4. Task management. (PA.VIII.B.R4)<br>5. Low altitude maneuvering. (PA.VIII.B.R5)<br>6. Manages startle response. (PA.VIII.B.R6)<br>7. Wire strike avoidance. (PA.VIII.B.R7)<br>8. Collision Avoidance. (PA.VIII.B.R8)<br>9. Right-of-way. (PA.VIII.B.R9)<br>10. Situational awareness of obstacles on approach and departure paths. (PA.VIII.B.R10)<br>11. Stall/Spin Awareness. (PA.VIII.B.R11) |

| | |
|---|---|
| **Task** | ***C. Systems and Equipment Malfunction*** |
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with system and equipment malfunctions appropriate to the airplane provided for the practical test and analyzing the situation and take appropriate action for simulated emergencies. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Elements related to system and equipment malfunctions appropriate to the airplane, including the following— (PA.VIII.C.K1)<br>a. partial or complete power loss.<br>b. engine roughness or overheat.<br>c. carburetor or induction icing.<br>d. loss of oil pressure.<br>e. fuel starvation.<br>f. electrical malfunction.<br>g. vacuum/pressure, and associated flight instruments malfunction.<br>h. pitot/static system malfunction.<br>i. landing gear or flap malfunction.<br>j. inoperative trim.<br>k. inadvertent door or window opening.<br>l. structural icing.<br>m. smoke/fire/engine compartment fire.<br>n. any other emergency appropriate to the airplane.<br>2. Supplemental oxygen. (PA.VIII.C.K2)<br>3. Load factors. (PA.VIII.C.K3)<br>4. High drag versus low drag. (PA.VIII.C.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Analyze the situation and take appropriate action for simulated emergencies appropriate to the airplane provided for at least three of the system and equipment malfunctions in the knowledge element. (PA.VIII.C.S1)<br>2. Completes appropriate checklist or procedure. (PA.VIII.C.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Hazardous attitudes. (PA.VIII.C.R1)<br>2. Preflight inspections. (PA.VIII.C.R2)<br>3. Maintenance. (PA.VIII.C.R3)<br>4. Checklist usage. (PA.VIII.C.R4)<br>5. Recognizing situations, such as depressurization (if applicable), cockpit smoke, and/or fire that require an emergency descent. (PA.VIII.C.R5)<br>6. Orientation, division of attention, and proper planning. (PA.VIII.C.R6)<br>7. Energy management. (PA.VIII.C.R7) |

| **Task** | ***D. Emergency Equipment and Survival Gear*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with emergency equipment, personal, and survival gear appropriate to the airplane and environment encountered during flight and identifying appropriate equipment that should be onboard the airplane. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Emergency equipment. (PA.VIII.D.K1)<br>2. Climate extremes (hot/cold). (PA.VIII.D.K2)<br>3. Mountainous terrain. (PA.VIII.D.K3)<br>4. Overwater operations. (PA.VIII.D.K4)<br>5. Gear to meet basic physical needs until rescue. (PA.VIII.D.K5)<br>6. ELT operation, limitations and testing requirements. (PA.VIII.D.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Identify appropriate equipment that should be onboard the airplane. (PA.VIII.D.S1)<br>2. Identify appropriate personal gear to meet physical needs until rescue. (PA.VIII.D.S2)<br>3. Brief the proper use of the fire extinguisher, if installed. (PA.VII.D.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Meeting basic needs (water, clothing, shelter) for 48 to 72 hours until search and rescue is made. (PA.VIII.D.R1) |

| Task | ***E. Engine Failure During Takeoff Before Vmc (Simulated) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an engine failure during takeoff before Vmc.<br><br>**NOTE:** Engine failure (simulated) shall be accomplished before reaching 50 percent of the calculated Vmc. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (PA.VIII.E.K1)<br>2. Runway distances. (PA.VIII.E.K2) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Close the throttles smoothly and promptly when simulated engine failure occurs. (PA.VIII.E.S1)<br>2. Maintain directional control and apply brakes, as necessary. (PA.VIII.E.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Emergency planning and communications. (PA.VIII.E.R1)<br>2. Task management. (PA.VIII.E.R2)<br>3. Low altitude maneuvering. (PA.VIII.E.R3)<br>4. Wire strike avoidance. (PA.VIII.E.R4)<br>5. Collision Avoidance. (PA.VIII.E.R5)<br>6. Right-of-way. (PA.VIII.E.R6)<br>7. Situational awareness of obstacles on approach and departure paths. (PA.VIII.E.R7)<br>8. Stall/Spin Awareness. (PA.VIII.E.R8) |

| **Task** | ***F. Engine Failure After Lift-Off (Simulated) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an engine failure after lift-off.<br><br>**NOTE:** Simulated engine failure of the most critical engine shall be demonstrated after lift-off. However, the failure of an engine shall not be simulated until attaining at least Vsse/Vxse/Vyse and at an altitude not lower than 400 feet AGL. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (PA.VIII.F.K1)<br>2. Runway distances. (PA.VIII.F.K2)<br>3. Drag reduction. (PA.VIII.F.K3)<br>4. How to identify the inoperative engine. (PA.VIII.F.K4)<br>5. Aircraft configuration for best performance during single-engine operations. (PA.VIII.F.K5)<br>6. Feathering and zero-thrust procedures. (PA.VIII.F.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize a simulated engine failure promptly, maintain control and utilize appropriate emergency procedures. (PA.VIII.F.S1)<br>2. Reduce drag, identify and verify the inoperative engine after simulated engine failure. (PA.VIII.F.S2)<br>3. Simulate feathering the propeller on the inoperative engine. Evaluator shall then establish a zero-thrust on the inoperative engine. (PA.VIII.F.S3)<br>4. Establish Vyse; if obstructions are present, establish Vxse or Vmc +5 knots, whichever is greater, until obstructions are cleared. Then transition to Vyse. (PA.VIII.F.S4)<br>5. Bank toward the operating engine as required for best performance. (PA.VIII.F.S5)<br>6. Monitor operating engine and make adjustments as necessary. (PA.VIII.F.S6)<br>7. Recognize the airplane's performance capabilities. If a climb is not possible at Vyse, maintain Vyse and return to the departure airport for landing, or initiate an approach to the most suitable landing area available. (PA.VIII.F.S7)<br>8. Simulate securing the inoperative engine. (PA.VIII.F.S8)<br>9. Maintain heading +10 degrees, and airspeed ±5 knots. (PA.VIII.F.S9)<br>10. Complete appropriate emergency checklist. (PA.VIII.F.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Emergency planning and communications. (PA.VIII.F.R1)<br>2. Task management. (PA.VIII.F.R2)<br>3. Low altitude maneuvering. (PA.VIII.F.R3)<br>4. Wire strike avoidance. (PA.VIII.F.R4)<br>5. Collision Avoidance. (PA.VIII.F.R5)<br>6. Right-of-way. (PA.VIII.F.R6)<br>7. Situational awareness of obstacles on approach and departure paths. (PA.VIII.F.R7)<br>8. Stall/Spin Awareness. (PA.VIII.F.R8) |

| **Task** | ***G. Approach and Landing with an Inoperative Engine (Simulated) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an approach and landing with an engine inoperative, including engine failure on final approach. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (PA.VIII.G.K1)<br>2. Runway distances. (PA.VIII.G.K2)<br>3. Drag reduction. (PA.VIII.G.K3)<br>4. How to identify the inoperative engine. (PA.VIII.G.K4)<br>5. Aircraft configuration for best performance during single-engine operations. (PA.VIII.G.K5)<br>6. Feathering and zero-thrust procedures. (PA.VIII.G.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure and take appropriate action, maintain control, and utilize manufacturer's recommended emergency procedures. (PA.VIII.G.S1)<br>2. Bank toward the operating engine, as required, for best performance. (PA.VIII.G.S2)<br>3. Monitor the operating engine and make adjustments as necessary. (PA.VIII.G.S3)<br>4. Maintain the manufacturer's recommended approach airspeed +10/-5, and landing configuration with a stabilized approach, until landing is assured. (PA.VIII.G.S4)<br>5. Make smooth, timely, and correct control applications, during round out and touchdown. (PA.VIII.G.S5)<br>6. Touch down on the first one-third of available runway, with no drift and the airplane's longitudinal axis aligned with and over the runway center path. (PA.VIII.G.S6)<br>7. Maintain crosswind correction and directional control throughout the approach and landing sequence. (PA.VIII.G.S7)<br>8. Complete appropriate checklists. (PA.VIII.G.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Accounting for wind. (PA.VIII.G.R1)<br>2. Selecting a suitable landing area. (PA.VIII.G.R2)<br>3. Planning and following a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions. (PA.VIII.G.R3)<br>4. Task management. (PA.VIII.G.R4)<br>5. Low altitude maneuvering. (PA.VIII.G.R5)<br>6. Wire strike avoidance. (PA.VIII.G.R6)<br>7. Collision Avoidance. (PA.VIII.G.R7)<br>8. Right-of-way. (PA.VIII.G.R8)<br>9. Situational awareness of obstacles on approach and departure paths. (PA.VIII.G.R9)<br>10. Stall/Spin Awareness. (PA.VIII.G.R10) |

## IX. Multiengine Operations

**NOTE:** If the applicant does not hold an instrument rating airplane, Tasks C and D need not be accomplished. All other Tasks need to be completed.

| **Task** | ***A. Maneuvering with One Engine Inoperative (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with one engine inoperative.<br><br>**NOTE:** The feathering of one propeller shall be demonstrated in flight, unless the manufacturer prohibits the intentional feathering of the propellers during flight. The maneuvers shall be performed at altitudes above 3,000 feet AGL or the manufacturer's recommended altitude, whichever is higher, and positions where safe landings on established airports can be readily accomplished. In the event a propeller cannot be unfeathered during the practical test, it shall be treated as an emergency. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (PA.IX.A.K1)<br>2. Drag reduction. (PA.IX.A.K3)<br>3. How to identify the inoperative engine. (PA.IX.A.K4)<br>4. Aircraft configuration for best performance during single-engine operations. (PA.IX.A.K5)<br>5. Feathering and zero-thrust procedures. (PA.IX.A.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure and maintain control. (PA.IX.A.S1)<br>2. Set the engine controls, reduce drag, identify and verify the inoperative engine, and feather appropriate propeller. (PA.IX.A.S2)<br>3. Establish and maintain a bank toward the operating engine as required for best performance in straight and level flight. (PA.IX.A.S3)<br>4. Follow the manufacturer's prescribed checklists to verify procedures for securing the inoperative engine. (PA.IX.A.S4)<br>5. Monitor the operating engine and make necessary adjustments. (PA.IX.A.S5)<br>6. Demonstrate coordinated flight with one engine inoperative (propeller feathered). (PA.IX.A.S6)<br>7. Restart the inoperative engine using appropriate manufacturer's restart procedures. (PA.IX.A.S7)<br>8. Maintain altitude ±100 feet or minimum sink as appropriate and heading ±10 degrees. (PA.IX.A.S8)<br>9. Complete the appropriate checklist. (PA.IX.A.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.IX.A.R1)<br>2. CFIT avoidance. (PA.IX.A.R2)<br>3. Task management. (PA.IX.A.R3)<br>4. Wire strike avoidance. (PA.IX.A.R4)<br>5. Situational awareness. (PA.IX.A.R5) |

| **Task** | ***B. Vmc Demonstration (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a Vmc demonstration.<br><br>**NOTE:** An applicant seeking an airplane-multiengine land rating, “Limited to Center Thrust,” is not required to be evaluated on this Task.<br><br>**NOTE:** Airplane with normally aspirated engines will lose power as altitude increases because of the reduced density of the air entering the induction system of the engine. This loss of power will result in a Vmc lower than the stall speed at higher altitudes. Therefore, recovery should be made at the first indication of loss of directional control, stall warning, or buffet. Do not perform this maneuver by increasing the pitch attitude to a high angle with both engines operating and then reducing power on the critical engine. This technique is hazardous and may result in loss of airplane control. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc and factors affecting Vmc. (PA.IX.B.K1)<br>2. Cause of loss of directional controls at airspeeds less than Vmc. (PA.IX.B.K2)<br>3. Safe recovery procedures. (PA.IX.B.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Configure the airplane in accordance with the manufacturer’s recommendation, in the absence of the manufacturer’s recommendations, then at Vsse/Vyse, as appropriate-(PA.IX.B.S1)<br>a. Landing gear retracted.<br>b. Flaps set for takeoff.<br>c. Cowl flaps set for takeoff.<br>d. Trim set for takeoff.<br>e. Propellers set for high RPM.<br>f. Power on critical engine reduce to idle.<br>g. Power on operating engine set to takeoff or maximum available power.<br>2. Establish a single-engine climb attitude with the airspeed at approximately 10 knots above Vsse. (PA.IX.B.S2)<br>3. Establish a bank toward the operating engine, as required for best performance and controllability. (PA.IX.B.S3)<br>4. Increase the pitch attitude slowly to reduce the airspeed at approximately 1 knot per second while applying rudder pressure to maintain directional control until full rudder is applied. (PA.IX.B.S4)<br>5. Recognize indications of loss of directional control, stall warning, or buffet. (PA.IX.B.S5)<br>6. Recover promptly by simultaneously reducing power sufficiently on the operating engine while decreasing the angle of attack as necessary to regain airspeed and directional control. Recovery SHOULD NOT be attempted by increasing the power on the simulated failed engine. (PA.IX.B.S6)<br>7. Recover within 20 degrees of the entry heading. (PA.IX.B.S7)<br>8. Advance power smoothly on operating engine and accelerate to Vxse/Vyse, as appropriate, +10/-5 knots, during the recovery. (PA.IX.B.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.IX.B.R1)<br>2. CFIT avoidance. (PA.IX.B.R2)<br>3. Task management. (PA.IX.B.R3)<br>4. Wire strike avoidance. (PA.IX.B.R4)<br>5. Situational awareness. (PA.IX.B.R5) |

| **Task** | ***C. Engine Failure During Flight (by reference to instruments) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with instrument flight with one engine inoperative. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Instrument procedures used with one engine inoperative. (PA.IX.C.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure, set the engine controls, reduce drag, identify and verify the inoperative engine, and feather appropriate engine propeller. (PA.IX.C.S1)<br>2. Establish and maintain a bank toward the operating engine as required for best performance in straight-and-level. (PA.IX.C.S2)<br>3. Follow the prescribed checklists to verify procedures for securing the inoperative engine. (PA.IX.C.S3)<br>4. Monitor the operating engine and make necessary adjustments. (PA.IX.C.S4)<br>5. Demonstrate coordinated flight with one engine inoperative. (PA.IX.C.S5)<br>6. Maintain altitude ±100 feet, or minimum sink as appropriate and heading ±10 degrees bank, bank ±5 degrees, and levels off from climbs and descents within ±100 feet. (PA.IX.C.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.IX.C.R1)<br>2. CFIT avoidance. (PA.IX.C.R2)<br>3. Task management. (PA.IX.C.R3)<br>4. Wire strike avoidance. (PA.IX.C.R4)<br>5. Situational awareness. (PA.IX.C.R5) |

| | |
|---|---|
| **Task** | ***D. Instrument Approach and Landing with an Inoperative Engine (Simulated) by Reference to Instruments (AMEL, AMES)*** |
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with executing a published instrument approach with one engine inoperative. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Instrument approach procedures used with one engine inoperative. (PA.IX.D.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure, set the engine controls, reduce drag, identify and verify the inoperative engine, and feather appropriate engine propeller. (PA.IX.D.S1)<br>2. Establish and maintain a bank toward the operating engine, as required for best performance in straight-and-level flight. (PA.IX.D.S2)<br>3. Follow the manufacturer's prescribed checklists to verify procedures for securing the inoperative engine. (PA.IX.D.S3)<br>4. Monitor the operating engine and make necessary adjustments. (PA.IX.D.S4)<br>5. Request and receive an actual or a simulated ATC clearance for an instrument approach. (PA.IX.D.S5)<br>6. Follow the actual or a simulated ATC clearance for an instrument approach. (PA.IX.D.S6)<br>7. Maintain altitude within 100 feet, the airspeed within ±10 knots if within the aircraft's capability, and heading +-10 degrees. (PA.IX.D.S7)<br>8. Establish a rate of descent that will ensure arrival at the MDA or DH/DA, with the airplane in a position from which a descent to a landing, on the intended runway can be made, either straight in or circling as appropriate. (PA.IX.D.S8)<br>9. On final approach segment, no more than three-quarter-scale deflection of the CDI/glide slope indicator. For RMI or ADF indicators, within 10 degrees of the course. (PA.IX.D.S9)<br>10. Avoid loss of aircraft control, or attempted flight contrary to the engine-inoperative operating limitations of the aircraft. (PA.IX.D.S10)<br>11. Comply with the published criteria for the aircraft approach category when circling. (PA.IX.D.S11)<br>12. Complete landing and appropriate manufacturer's checklists. (PA.IX.D.S12) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.IX.D.R1)<br>2. CFIT avoidance. (PA.IX.D.R2)<br>3. Task management. (PA.IX.D.R3)<br>4. Wire strike avoidance. (PA.IX.D.R4)<br>5. Situational awareness. (PA.IX.D.R5) |

## X. Night Operation

| Task | ***A. Night Preparation*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25; AIM; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with night operations. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Physiological aspects of night flying as it relates to vision. (PA.X.A.K1)<br>2. Lighting systems identifying airports, runways, taxiways and obstructions, as well as pilot controlled lighting. (PA.X.A.K2)<br>3. Airplane equipment requirements for night operations. (PA.X.A.K3)<br>4. Airplane lighting systems – type, interpretation in flight, when to use what. (PA.X.A.K4)<br>5. Personal equipment essential for night flight. (PA.X.A.K5)<br>6. Night orientation, navigation, and chart reading techniques. (PA.X.A.K6)<br>7. Safety precautions and emergencies unique to night flying. (PA.X.A.K7)<br>8. Somatogravic illusion and black hole approach illusion. (PA.X.A.K8)<br>9. Disorientation experienced in unusual attitudes at night. (PA.X.A.K9)<br>10. Visual scanning techniques during night operations. (PA.X.A.K10)<br>11. Hazards of inadvertent IMC. (PA.X.A.K11) |
| **Skills** | [Not generally evaluated in flight. If the practical test is conducted at night, all PTS tasks are evaluated in that environment, thus there is no need for explicit task elements to exist here.] |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (PA.X.A.R1)<br>2. CFIT avoidance. (PA.X.A.R2)<br>3. Task management. (PA.X.A.R3)<br>4. Wire strike avoidance. (PA.X.A.R4)<br>5. Situational awareness. (PA.X.A.R5)<br>6. Environmental considerations at night: i.e. IMC; terrain (roads), etc. (PA.X.A.R6)<br>7. Maintaining VFR at night underneath airspace. (PA.X.A.R7) |

## XI. Postflight Procedures

| **Task** | ***A. Parking, and Securing*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with after landing, parking, and securing procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind. (PA.XI.A.K1)<br>2. Familiarity with airport markings (including hold short lines), signs, and lights. (PA.XI.A.K2)<br>3. Aircraft lighting. (PA.XI.A.K3)<br>4. Towered and non-towered airport operations. (PA.XI.A.K4)<br>5. Visual indicators for wind. (PA.XI.A.K5)<br>6. Airport information resources (A/FD, airport diagram). (PA.XI.A.K6)<br>7. Good cockpit discipline during taxi. (PA.XI.A.K7)<br>8. Appropriate taxi speeds. (PA.XI.A.K8)<br>9. Exhibiting procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC. (PA.XI.A.K9)<br>10. Procedures unique to night operations. (PA.XI.A.K10)<br>11. Hazards of low visibility operations. (PA.XI.A.K11)<br>12. Importance of documenting any in-flight/post-flight discrepancies. (PA.XI.A.K12)<br>13. NTSB accident/incident reporting. (PA.XI.A.K13) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Utilize after landing runway incursion avoidance procedures. (PA.XI.A.S1)<br>2. Park in an appropriate area, considering the safety of nearby persons and property. (PA.XI.A.S2)<br>3. Follow the appropriate procedure for engine shutdown. (PA.XI.A.S3)<br>4. Completes the After Landing checklist after the airplane is stopped. (PA.XI.A.S4)<br>5. Plan the taxi route to the ramp up. (PA.XI.A.S5)<br>6. Complete the Engine Shutdown Checklist. (PA.XI.A.S6)<br>7. Disembark passengers safely and remain aware of passenger movement while on the ramp area. (PA.XI.A.S7)<br>8. Record aircraft discrepancies and notes for possible service needs before next flight. (PA.XI.A.S8)<br>9. Conduct an appropriate post flight inspection, secure the aircraft. (PA.XI.A.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi and parking. (PA.X.A.R1)<br>2. Proximity of other aircraft/vehicles/people when operating on airport surfaces. (PA.XI.A.R2)<br>3. Propeller safety. (PA.XI.A.R3)<br>4. Proper workload management. (PA.XI.A.R4)<br>5. Confirmation or expectation bias. (PA.XI.A.R5)<br>6. Automation Management. (PA.XI.A.R6)<br>7. Airport security. (PA.XI.A.R7) |

| **Task** | ***B. Seaplane Post-Landing Procedures (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with anchoring, docking, mooring, and ramping/beaching.<br>**NOTE:** The examiner shall select at least one after-landing procedure (anchoring, docking and mooring, or ramping/beaching). |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Mooring. (PA.XI.B.K1)<br>2. Docking. (PA.XI.B.K2)<br>3. Anchoring. (PA.XI.B.K3)<br>4. Ramping/beaching. (PA.XI.B.K4)<br>5. Post-landing procedures. (PA.XI.B.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Selects a suitable area for anchoring, considering seaplane movement, water depth, tide, wind, and weather changes. (PA.XI.B.S1)<br>2. Uses an adequate number of anchors and lines of sufficient strength and length to ensure the seaplane's security. (PA.XI.B.S2)<br>3. Approaches the dock or mooring buoy in the proper direction considering speed, hazards, wind, and water current. (PA.XI.B.S3)<br>4. Approaches the ramp/beach considering persons and property, in the proper attitude and direction, at a safe speed, considering water depth, tide, current, and wind. (PA.XI.B.S4)<br>5. Ensures seaplane security in a manner that will protect it from the harmful effect of wind, waves, and changes in water level. (PA.XI.B.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi and parking. (PA.XI.B.R1)<br>2. Proximity of other aircraft/vehicles/people when operating on airport surfaces. (PA.XI.B.R2)<br>3. Propeller safety. (PA.XI.B.R3)<br>4. Proper workload management. (PA.XI.B.R4)<br>5. Confirmation or expectation bias. (PA.XI.B.R5)<br>6. Automation Management. (PA.XI.B.R6)<br>7. Airport security. (PA.XI.B.R7)<br>8. Water and environmental impacts on securing a seaplane. (PA.XI.B.R8) |

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## APPENDIX 1: THE KNOWLEDGE TEST

The knowledge test is an important part of the airman certification process. Applicants must pass the knowledge test before taking the practical test.

### *Knowledge Test Description*

The knowledge test consists of objective, multiple-choice questions. There is a single best response for each test question. Each test question is independent of other questions. A correct response to one does not depend upon, or influence, the correct response to another.

| Test Code | Test Name | Number of Questions | Allotted Time | Passing Score |
|---|---|---|---|---|
| PAR | Private Pilot Airplane | 60 | 2.5 | 70% |
| PAT | Private Pilot Airplane/Recreational Pilot – Transition | 30 | 1.5 | 70% |
| PCP | Private Pilot Canadian Conversion | 40 | 2.0 | 70% |



### *Knowledge Test Eligibility Requirements*

For information concerning eligibility for Private Pilot certification, please refer to:

- Medical Certificates: Requirement and Duration: 14 CFR 61.23
- Knowledge Test: Prerequisites and Passing Grades: 14 CFR 61.35
- Eligibility: 14 CFR 61.83; 14 CFR 61.96; 14 CFR 61.103

### *Knowledge Test Centers*

The FAA authorizes hundreds of knowledge testing center locations. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

### *Test Authorization*

In order to take the Private Pilot knowledge test, you must provide one of the following:

- Graduation certificate issued by a Federal Aviation Administration (FAA) certificated pilot school (14 CFR 61.71), or a
- Written statement or logbook endorsement from an authorized instructor certifying that the applicant completed an applicable ground training or home study course and is prepared for the knowledge test (14 CFR 61.35, 61.96(b)(3) or 61.103(d)(2)).

Acceptable forms of authorization for PCP only:

- Confirmation of Verification Letter issued by the Airmen Certification Branch (AFS-760).

Acceptable forms of retest authorization for ALL Private Pilot tests:

- Original failed, passing, or expired Airman Knowledge Test Report, provided the applicant still has the test report in his or her possession.

  **NOTE**: If the applicant no longer possesses the original test report, he or she may present an 'expired test/credit' letter issued by AFS-760.

- An applicant retesting AFTER FAILURE is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training. The endorsement must certify that the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.

***Knowledge Test Procedures***

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software).

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
|---|---|---|
| *Supplement book provided by proctor* | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators |
| *All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions* | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| *Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages* | Magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature. |
| *Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test* | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| *Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures* | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

### *FAA Knowledge Test Question Coding*

Each task in the Airman Certification Standard includes an Airman Certification Standards (ACS) code. This ACS code is displayed on the airman test report to indicate what task element was proven deficient on the Knowledge Exam. Instructors can then provide remedial training in the deficient areas and evaluators can re-test this element during the practical exam.

The ACS coding consists of 5 elements. For example: this code is deciphered accordingly: **PA.X.A.1.a**

**PA.X.A.K1.a**:

**PA** = Applicable ACS (private pilot airplane)
**X** = Area of Operation (night operation)
**A** = Task (night preparation)
**K1**= Knowledge task element 1 (physiological aspects of night flying as it relates to vision)
**a** = rote; **b** = understanding; **c** = application; **d**= correlation), representing the level of learning which also informs the manner of the question (rote = define, recall, list, name, match, label)

Every question is correlated to a specific ACS task/element. This coding methodology will be useful to all involved with airman certification—the applicant, the evaluator, and the flight instructor. It indicates what test subjects (tasks) were satisfactorily passed and what tasks need to be reviewed prior to the practical test.

### *Testing Procedures for Applicants Requesting Special Accommodations*

An applicant with a learning or reading disability may request approval from AFS-630 through the local Flight Standards District Offices (FSDO) or International Field Offices (IFO) to take an airman knowledge test using one of the three options listed below, in preferential order:

**Option 1**: Use current testing facilities and procedures whenever possible.

**Option 2**: Use a self-contained, electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

**NOTE:** The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.

**Option 3**: Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO inspector must contact the Airman Testing Standards Branch (AFS-630) for assistance in selecting the test site and assisting the proctor. Before approving any option, the FSDO or IFO inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

### *Cheating or Other Unauthorized Conduct*

Computer testing centers must follow strict security procedures to avoid test compromise in accordance with FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. Testing centers will terminate a test any time the test proctor suspects an occurrence of cheating.

The FAA will conduct an investigation of the incident. If the investigation determines that cheating or unauthorized conduct occurred, any airman certificate or rating the applicant holds may be revoked. In addition, the applicant may be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of one year.

### *Airman Knowledge Test Report*

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report documenting the score with the testing center's raised, embossed seal. The applicant must retain the original Airman Knowledge Test Report and present it to the evaluator conducting the practical test.

An Airman Knowledge Test Report expires 24-calendar months from the month the applicant completes the knowledge test. If the Airman Knowledge Test Report expires before completion of the practical test, the applicant must retake the knowledge test.

To obtain a duplicate Airman Knowledge Test Report due to loss or destruction of the original, the applicant can send a signed request accompanied by a check or money order for $1.00, payable to the FAA to:

> Federal Aviation Administration
> Airmen Certification Branch, AFS-760
> P.O. Box 25082
> Oklahoma City, OK 73125

## APPENDIX 2: THE PRACTICAL TEST

The evaluator must conduct the practical test in accordance with this ACS. The evaluator must assess the applicant on all tasks included in each Area of Operation of the ACS unless otherwise noted.

**NOTE:** The applicant must pass the knowledge test before taking the practical test, and the applicant must pass the oral portion of the practical test before beginning the flight portion.

For an applicant who holds at least a private pilot certificate and seeks an additional airplane category and/or class rating at the private pilot level, the examiner shall evaluate that applicant in the Areas of Operation and Tasks listed in the Additional Rating Task Table. Please note, however, that the evaluator has the discretion to evaluate the applicant's competence in the remaining Areas of Operation and Tasks.

If the applicant holds two or more category or class ratings at least at the private level, and the ratings table indicates differing required Tasks, the "least restrictive" entry applies. For example, if "ALL" and "NONE" are indicated for one Area of Operation, the "NONE" entry applies. If "B" and "B, C" are indicated, the "B" entry applies.

### *Conduct of the Practical Test*

The evaluator must develop a written Plan of Action to conduct the test, which includes all required Areas of Operation and Tasks. The Plan of Action will include a scenario that evaluates as many of the required Areas of Operation and Tasks as possible. As the scenario unfolds during the test, the examiner will interject problems and emergencies the applicant must manage.

The evaluator has the discretion and flexibility to change the Plan of Action in order to accommodate unexpected situations as they arise. The evaluator will evaluate any selected Task in its entirety. The evaluator may elect to suspend a scenari006F and then resume the scenario in order to assess certain tasks.

If performing aspects of a given maneuver, such as emergency procedures, would jeopardize safety, the evaluator will ask the applicant to simulate that portion of the maneuver.

### *Use of Checklists*

Throughout the practical test, the applicant is evaluated on the use of an approved manufacturer's checklist or equivalent.

**NOTE:** If there is no published manufacturer's checklist, the applicant may use the appropriate FAA handbook or equivalent checklist.

Assessing proper checklist use depends upon the specific Task. In all cases, the evaluator should determine the applicant appropriately divides attention and uses proper visual scanning. In some situations, reading the actual checklist may be impractical or unsafe. In such cases, the evaluator should assess the applicant's performance of published or recommended immediate action "memory" items along with his or her review of the appropriate checklist once conditions permit.

### *Use of Distractions*

Research and accident analysis indicate that pilot distraction during critical phases of flight is a factor in many accidents. The evaluator will cause realistic distractions during the flight portion of the practical test in order to evaluate the applicant's ability to use and maintain proper control technique while dividing attention both inside and/or outside the cockpit.

### *Positive Exchange of Flight Controls*

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls."

Pilots should follow this procedure during any exchange of flight controls, including any occurrence during the practical test. The FAA also recommends that both pilots use a visual check to verify that the exchange has occurred. There must never be any doubt as to who is flying the aircraft.

### *Stall and Spin Awareness*

During flight training and testing, the applicant and the instructor or evaluator must always recognizeandavoidoperationthatcouldleadtoaninadvertentstallorspin

### *Possible Outcomes of the Practical Test*

There are three possible outcomes of the practical test :( 1) pass, (2) fail, or (3) discontinuance.

<u>Pass</u>

Satisfactory performance requires the applicant to:

- Perform the Tasks specified in the Areas of Operation for the certificate or rating sought within the approved standards;
- Demonstrate mastery of the aircraft by performing each Task successfully;
- Demonstrate proficiency and competency in accordance with the approved standards;
- Demonstrate sound judgment and exercise aeronautical decision-making/risk management;
- Demonstrate single-pilot competence if the aircraft is type certificated for single-pilot operations.

Satisfactory performance will result in the issuance of a temporary certificate.

**NOTE:** The tolerances listed in the ACS represent the performance expected in good flying conditions.

<u>Fail</u>

If, in the judgment of the evaluator, the applicant does not meet the standards for any Task, the applicant fails the Task and associated Area of Operation, the test is unsatisfactory, and the examiner issues a Notice of Disapproval. When the examiner issues a Notice of Disapproval, he or she shall list the Area of Operation in which the applicant did not meet the standard. The Notice of Disapproval must also list the Area(s) of Operation not tested, and the number of practical test failures.

The examiner or the applicant may end the test if the applicant fails a Task. The examiner may continue the test only with the consent of the applicant and examiner, and the applicant is entitled to credit for only those Areas of Operation and the associated Tasks performed satisfactorily. Though not required, the examiner has discretion to reevaluate any Task, including those previously passed, during the retest.

Typical areas of unsatisfactory performance and grounds for disqualification include:

- Any action or lack of action by the applicant that requires corrective intervention by the examiner to maintain safe flight.
- Failure to use proper and effective visual scanning techniques to clear the area before and while performing maneuvers.
- Consistently exceeding tolerances stated in the Objectives.
- Failure to take prompt corrective action when tolerances are exceeded.
- Failure to exercise Risk Management

Discontinuance

When it is necessary to discontinue a practical test for reasons other than unsatisfactory performance (e.g., equipment failure, weather, illness), the evaluator returns all the test paperwork to the applicant. The evaluator must prepare, sign, and issue a Letter of Discontinuance that lists those Areas of Operation the applicant successfully completed and the time remaining to complete the test. The evaluator should advise the applicant to present the Letter of Discontinuance to the evaluator when the practical test resumes in order to receive credit for the items successfully completed. The Letter of Discontinuance becomes part of the applicant's certification file.

***Prerequisites for the Test***

According to 14 CFR part 61, an applicant for the Private Pilot Practical Test must:

- Be able to read, speak, write, and understand the English language as detailed in AC 60-28;
- Have passed the appropriate private pilot knowledge test since the beginning of the 24th month before the month in which he or she takes the practical test;
- Have satisfactorily accomplished the required training and obtained the prescribed aeronautical experience;
- Possess at least a current third class medical certification or, when a military pilot of the U.S. Armed Forces, show and present evidence of an up-to-date medical examination by the U.S. Armed Forces authorizing pilot status;
- Have an endorsement from an authorized instructor certifying that the applicant has received and logged training time within two (2) calendar months preceding the date of application in preparation for the practical test, and is prepared for the practical test;
- Receive and log ground training from an authorized instructor or complete a home-study course on the aeronautical knowledge areas of 14 CFR part 61.105 paragraph (b) that apply to the aircraft category and class rating sought; and
- Have an endorsement certifying that the applicant has demonstrated satisfactory knowledge of the subject areas in which the applicant was deficient on the airman knowledge test (not required for power aircraft to non-power aircraft or power aircraft to power aircraft for additional category or class rating).

### *Aircraft and Equipment Required for the Practical Test*

The Private Pilot—Airplane applicant is required by 14 CFR 61.45 to provide an airworthy, certificated aircraft for use during the practical test. This section states that the aircraft must:

- Be of U.S., foreign, or military registry of the same category, class, and type, if applicable, for the certificate and/or rating for which the applicant is applying;
- Have fully functioning dual controls, except as provided for in 14 CFR 61.45(c) and (e); and
- Be capable of performing all Areas of Operation appropriate to the rating sought and have no operating limitations which prohibit its use in any of the Areas of Operation required for the practical test.

### *Instructor Responsibilities*

Instructors are responsible for training the applicant to acceptable standards in knowledge, skills, and risk management procedures in all the Tasks, even if the applicant is simply adding an additional Private pilot certificate.

### *Evaluator Responsibilities*

The evaluator who conducts the practical test is responsible for determining the applicant meets the acceptable standards of aeronautical knowledge, skills, and risk management for each Task in the appropriate ACS.

The evaluator must test at least one item in each of the Knowledge and Risk Management elements for every Task, emphasizing the topics (if any) the applicant missed on the Knowledge Test. The evaluator must test each item in the Skills elements unless otherwise noted in the Task.

Applicants must complete the oral portion of the practical test before the flight portion; however, oral questioning will continue throughout the flight. To the greatest extent practicable, evaluators shall test the applicant's ability to apply and correlate information, and only use rote questions when appropriate for the material being tested.

If the evaluator determines that a Task is incomplete, or the outcome is uncertain, the evaluator may require the applicant to repeat that Task, or portions of that Task. The FAA made this provision in the interest of fairness, but it does not mean that instruction, practice, or the repetition of an unsatisfactory task is permitted during the practical test.

On multiengine practical tests, where the failure of the most critical engine after liftoff is required, the examiner must give consideration to local atmospheric conditions, terrain, and type of aircraft used. However, the failure of an engine shall not be simulated until attaining at least $V_{SSE}/V_{XSE}/V_{YSE}$ and at an altitude not lower than 400 feet AGL.

During simulated engine failures on multiengine practical tests, the examiner shall set zero thrust after the applicant has simulated feathering the propeller. The examiner shall require the applicant to demonstrate at least one landing with a simulated-feathered propeller with the engine set to zero thrust. The feathering of one propeller shall be demonstrated in flight, unless the manufacturer prohibits the intentional feathering of the propellers during flight.

The evaluator will assess the applicant's use of visual scanning and collision avoidance procedures throughout the entire test.

## APPENDIX 3: ADDITIONAL RATING TASK TABLES

### Addition of an Airplane Single-Engine Land Rating to an existing Private Pilot Certificate

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| | PRIVATE PILOT RATING(S) HELD | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASES** | **AMEL** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G | F,G | F,G | F,G | F,G | F,G | F,G | F,G |
| **II** | D | D | D | A,C,D, F | A,D,F | ALL | ALL | ALL |
| **III** | B | NONE | B | B | NONE | B | B | B |
| **IV** | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N |
| **V** | NONE | NONE | NONE | ALL | A | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B,C | B,C | B,C | ALL | ALL | ALL | ALL | ALL |
| **IX** | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE |
| **X** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | ALL |
| **XI** | A | NONE | A | A | A | A | A | A |

**Addition of an Airplane Single-Engine Sea Rating to an existing Private Pilot Certificate**

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| PRIVATE PILOT RATING(S) HELD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASEL** | **AMEL** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G,I | F,G | F,G,,I | F,G,I | F,G,I | F,G,I | F,G,I | F,G,I |
| **II** | E | E | E | ALL | A,B,E, F | ALL | ALL | ALL |
| **III** | B | B | NONE | B | B | B | B | B |
| **IV** | A,B,G, H,J,K,L | A,B,G, H,I,J,K,L | A,B,G, H,I,J,K,L | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N |
| **V** | NONE | NONE | NONE | ALL | A | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B | B | B | ALL | ALL | ALL | ALL | ALL |
| **IX** | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE |
| **X** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | ALL |
| **XI** | B | NONE | B | B | B | B | B | B |

**Addition of an Airplane Multi-Engine Land Rating to an existing Private Pilot Certificate**

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| PRIVATE PILOT RATING(S) HELD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASEL** | **ASES** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G,J | F,G,J | F,G | F,G,J | F,G,J | F,G,J | F,G,J | F,G,J |
| **II** | ALL | ALL | D | ALL | ALL | ALL | ALL | ALL |
| **III** | NONE | B | B | B | NONE | B | B | B |
| **IV** | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D,N | A,B,C,D,N | A,B,C,D,N | A,B,C,D,N | A,B,C,D,N |
| **V** | A | A | NONE | ALL | A | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | ALL | ALL | NONE | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B,C,D,E,F,G | B,C,D,E,F,G | E,G,C | ALL | ALL | ALL | ALL | ALL |
| **IX** | ALL | ALL | NONE | ALL | ALL | ALL | ALL | ALL |
| **X** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | ALL |
| **XI** | NONE | A | A | A | A | A | A | A |

**Addition of an Airplane Multi-Engine Sea Rating to an existing Private Pilot Certificate**

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation

| PRIVATE PILOT RATING(S) HELD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **AMEL** | **ASEL** | **ASES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G,I | F,G,I,J | F,G,J | F,G,I,J | F,G,I,J | F,G,I,J | F,G,I,J | F,G,I,J |
| **II** | E | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **III** | B | B | NONE | B | B | B | B | B |
| **IV** | A,B,G, H,J,K,L | A,B,G, H,I,J,K,L | A,B,G, H,I,J,K,L | ALL | ALL | ALL | ALL | ALL |
| **V** | NONE | A | A | ALL | A | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | ALL | NONE | ALL | ALL | ALL |
| **VII** | NONE | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B,C,D, E,F,G | B,C,D, E,F,G | B,C,D, E,F,G | ALL | ALL | ALL | ALL | ALL |
| **IX** | NONE | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **X** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | ALL |
| **XI** | B | B | NONE | ALL | B | ALL | ALL | ALL |

## APPENDIX 4: PRACTICAL TEST CHECKLIST

### *Applicant's Practical Test Checklist*

**Appointment with Evaluator**

**Evaluator's Name:** ______________________________

**Location:** ______________________________

**Date/Time:** ______________________________

**ACCEPTABLE AIRCRAFT**

- ☐ Aircraft Documents:
  - ☐ Airworthiness Certificate
  - ☐ Registration Certificate
  - ☐ Operating Limitations
- ☐ Aircraft Maintenance Records:
  - ☐ Logbook Record of Airworthiness Inspections and AD Compliance
- ☐ Pilot's Operating Handbook, FAA-Approved Aircraft Flight Manual

**PERSONAL EQUIPMENT**

- ☐ View-Limiting Device
- ☐ Current Aeronautical Charts (Printed or Electronic)
- ☐ Computer and Plotter
- ☐ Flight Plan Form
- ☐ Flight Plan Form and Flight Logs (printed or electronic)
- ☐ Airport Facility Directory, Airport Diagrams and Appropriate Publications
- ☐ Current AIM

**PERSONAL RECORDS**

- ☐ Identification—Photo/Signature ID
- ☐ Pilot Certificate
- ☐ Current Medical Certificate
- ☐ Completed FAA Form 8710-1, Airman Certificate and/or Rating Application with Instructor's Signature
- ☐ Original Knowledge Test Report
- ☐ Pilot Logbook with appropriate Instructor Endorsements
- ☐ FAA Form 8060-5, Notice of Disapproval (if applicable)
- ☐ Letter of Discontinuance (if applicable)
- ☐ Approved School Graduation Certificate (if applicable)
- ☐ Evaluator's Fee (if applicable)

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## APPENDIX 5: REFERENCES

This ACS is based on the following 14 CFR parts, FAA guidance material, manufacturer's publications, and other documents.

| | |
|---|---|
| **14 CFR part 39** | Airworthiness Directives |
| **14 CFR part 43** | Maintenance, Preventive Maintenance, Rebuilding, and Alteration |
| **14 CFR part 61** | Certification: Pilots, Flight Instructors, and Ground Instructors |
| **14 CFR part 71** | Designation of Class A, B, C, D and E Airspace Areas; Air Traffic Service Rotes; and Reporting Points |
| **14 CFR part 91** | General Operating and Flight Rules |
| **14 CFR part 93** | Special Air Traffic Rules |
| **AC 00-6** | Aviation Weather |
| **AC 00-45** | Aviation Weather Services |
| **AC 60-28** | English Language Skill Standards Required by 14 CFR Parts 61, 63 and 65 |
| **AC 61-67** | Stall and Spin Awareness Training |
| **AC 90-66** | Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports Without Operating Control Towers |
| **AC 91-13** | Cold Weather Operation of Aircraft |
| **AC 91-21.1** | Use of Portable Electronic Devices Aboard Aircraft |
| **AC 91-55** | Reduction of Electrical System Failures Following Aircraft Engine Starting |
| **AC 91-73** | Part 91 and 135 Single-Pilot Procedures During Taxi Operations |
| **AC 150-5340-18** | Standards for Airport Sign Systems |
| **AIM** | Aeronautical Information Manual |
| **A/FD** | Airport Facility Directory |
| **FAA-H-8083-1** | Aircraft Weight and Balance Handbook |
| **FAA-H-8083-3** | Airplane Flying Handbook |
| **FAA-H-8083-6** | Advanced Avionics Handbook |
| **FAA-H-8083-23** | Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook |
| **FAA-H-8083-25** | Pilot's Handbook of Aeronautical Knowledge |
| **NOTAM** | Notices to Airmen |
| **POH/AFM** | Pilot's Operating Handbook/FAA-Approved Aircraft Flight Manual |
| | |
| **Other** | Navigation Charts |
| | Navigation Equipment Manual |

**NOTE:** Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.

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## APPENDIX 6: ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this ACS.

| | |
|---|---|
| **14 CFR** | Title 14 of the Code of Federal Regulations |
| **AC** | Advisory Circular |
| **ACS** | Airman Certification Standards |
| **ADM** | Aeronautical Decision-Making |
| **AFS** | Flight Standards Service |
| **AGL** | Above Ground Level |
| **AMEL** | Airplane Multiengine Land |
| **AMES** | Airplane Multiengine Sea |
| **AOA** | Airport Operations Area |
| **ASEL** | Airplane Single Engine Land |
| **ASES** | Airplane Single Engine Sea |
| **ATC** | Air Traffic Control |
| **CFIT** | Controlled Flight Into Terrain |
| **ELT** | Emergency Locator Transmitter |
| **FAA** | Federal Aviation Administration |
| **FSDO** | Flight Standards District Office |
| **GPS** | Global Positioning System |
| **IFO** | International Field Office |
| **IMC** | Instrument Meteorological Conditions |
| **NAS** | National Airspace System |
| **NTSB** | National Transportation Safety Board |
| **PAR** | Private Pilot Airplane |
| **PAT** | Private Pilot Airplane/Recreational Pilot – Transition |
| **PCP** | Private Pilot Canadian Conversion |
| **POH** | Pilot's Operating Handbook |
| **PTS** | Practical Test Standards |
| **RAIM** | Receiver Autonomous Integrity Monitoring |
| **SRM** | Safety Risk Management |
| **SMS** | Safety Management System |
| **VFR** | Visual Flight Rules |
| **VOR** | Very High Frequency Omni-Directional Range |
| $V_X$ | Best Angle of Climb Speed |
| $V_Y$ | Best Rate of Climb Speed |
| $V_{S0}$ | Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration |

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# APPENDIX B: DRAFT INSTRUMENT RATING ACS + TRACKING MATRIX

Appendix B includes the draft Instrument Rating Airman Certification Standards (ACS), as well as the Tracking Matrix documenting the transition from FAA-S-8081-4E, Instrument Rating Practical Test Standards (PTS) for Airplane, Helicopter, and Powered Lift to the Instrument Rating ACS. This draft incorporates the relevant comments received when the ATST WG published the first draft of the ACS for comment (Docket No. FAA-2013-0316), as well as the comments received when the second draft of the document was published for comment (Docket No. FAA-2013-0649).

**NOTE:** The Instrument Rating Practical Test Standards Tracking Matrix appears first as an integrated component of this appendix, and the draft Instrument Rating ACS immediately follows as a stand-alone document.

**FAA-S-8081-4E, Instrument Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| I.A. | Pilot Qualifications | I.A. | Pilot Qualifications | Added Risk Management elements related to this task.<br><br>Added physiological factors specific to instrument flying. |
| I.B. | Weather Information | I.B. | Weather Information | Removed Note: If adequate flight planning information is not available, the applicant cannot be properly evaluated.<br><br>Removed list of specific weather products to allow flexibility in weather planning sources.<br><br>Added Risk Management elements related to this task. |
| I.C. | Cross-Country Flight Planning | I.C. | Cross-Country Flight Planning | Added risk management elements related to this task. |
| II.A. | Aircraft Systems Related to IFR Operations | II.A. | Aircraft Systems Related to IFR Operations | |
| II.B. | Aircraft Flight Instruments and Navigation Equipment | II.B. | Aircraft Flight Instruments and Navigation Equipment | |
| II.C. | Instrument Cockpit Check | II.C. | Instrument Cockpit Check | Addressed the tendency to rationalize equipment failures as merely erroneous readings. |
| III.A. | Air Traffic Control Clearances | III.A. | Air Traffic Control Clearances | Many applicants are only familiar with one way of obtaining a clearance, either through clearance delivery or ground control. Some are familiar with obtaining a clearance at a non-towered airport, but quite typically many pilots are only familiar with one way. Added the word "copy" as it is a necessary skill often lacking in applicants.<br><br>Expanded and added greater objectivity/specificity. Accentuates the hazards of being in a hurry and/or rushing that a short void time can create. It further reinforces the responsibilities of PIC. The number of CFIT accidents associated with airborne pickups necessitates this task. |

**FAA-S-8081-4E, Instrument Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes & Rationale for Changes |
|---|---|---|---|---|
| III.B. | Compliance with Departure, En Route, and Arrival Procedures and Clearances | III.B. | Compliance with Departure, En Route, and Arrival Procedures and Clearances | Addressed glass cockpits with heading and altitude bugs and altitude pre-select (if installed), as well as proper programming of GPS/FMS. |
| III.C. | Holding Procedures | III.C. | Holding Procedures | Added risk management elements. |
| IV.A. | Basic Instrument Flight Maneuvers (IA, IH, PL, AA, HA, PLA, PC) | IV.A. | Basic Instrument Flight Maneuvers (IA, IH, PL, AA, HA, PLA, PC) | |
| IV.B. | Recovery from Unusual Flight Attitudes | IV.B. | Recovery from Unusual Flight Attitudes | Countermeasure to the loss-of-control problem. |
| V.A. | Intercepting and Tracking Navigational Systems and DME Arcs | V.A. | Intercepting and Tracking Navigational Systems and DME Arcs | |
| VI.A. | Nonprecision Approach (NPA) | VI.A. | Nonprecision Approach (NPA) | Added knowledge element to insure applicant understands when GPS switches to approach mode. |
| VI.B. | Precision Approach (PA) | VI.B. | Precision Approach (PA) | Added knowledge element to insure applicant understands when GPS switches to approach mode. |
| VI.C. | Missed Approach | VI.C. | Missed Approach | Added knowledge element to ensure applicant knows when to cancel “suspend” and sequence the GPS/FMS to the MAP holding waypoint.<br><br>Added element to ensure applicant knows proper AP usage in a MAP.<br><br>Added element to ensure applicant understands PIC responsibilities and has a “plan B” in place before executing the approach.<br><br>Added element as an “antidote” to “impulsivity”. |
| VI.D. | Circling Approach | VI.D. | Circling Approach | |
| VI.E. | Landing From a Straight-In or Circling Approach | VI.E. | Landing From a Straight-In or Circling Approach | |

| FAA-S-8081-4E, Instrument Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift Change Tracking Matrix | | | | |
|---|---|---|---|---|
| **PTS Task Reference** | **Name of PTS Task** | **ACS Task Reference** | **Name of ACS Task** | **Notes & Rationale for Changes** |
| VII.A. | Loss of Communications | VII.A. | Loss of Communications | |
| VII.B. | One Engine Inoperative During Straight-and-Level Flight and Turns (Multiengine Airplane) | VII.B. | One Engine Inoperative During Straight-and-Level Flight and Turns (Multiengine Airplane) | |
| VII.C. | One Engine Inoperative -- Instrument Approach (Multiengine Airplane) | VII.C. | One Engine Inoperative -- Instrument Approach (Multiengine Airplane) | |
| VII.D. | Approach with Loss of Primary Flight Instrument Indicators | VII.D. | Approach with Loss of Primary Flight Instrument Indicators | |
| VIII.A. | Checking Instruments and Equipment | VIII.A. | Checking Instruments and Equipment | |

FAA-S-8081-XX

U.S. Department
of Transportation

**Federal Aviation Administration**

# INSTRUMENT RATING – AIRPLANE

## Airman Certification Standards

**Date TBD**

**FLIGHT STANDARDS SERVICE**
**Washington, DC 20591**

## ACKNOWLEDGMENTS

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, AFS-630, P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

## AVAILABILITY

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

## FOREWORD

The Federal Aviation Administration (FAA) has published the Instrument Rating—Airplane Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, flight proficiency, and risk management standards for the instrument rating in the airplane category, single-engine land and sea; and multiengine land and sea classes. This ACS incorporates and supersedes the previous Practical Test Standards (PTS).

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing to an acceptable level. Specifically, the ACS, associated guidance, and test item bank question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which internal and external stakeholders identify and evaluate regulatory changes, safety recommendations, or other factors that require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

In this connection, the FAA gratefully acknowledges and deeply appreciates the many hours that aviation training experts throughout the industry have contributed to the development of this ACS, along with the associated guidance and a more systematic approach to knowledge test question development. This kind of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Acting Director, Flight Standards Service

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## TABLE OF CONTENTS

# INTRODUCTION

## Airman Certification Standards Concept

The goal of the airman certification process is to ensure the applicant possesses the knowledge and skill as well as the ability to manage the risks of flight in order to act as pilot in command consistent with the privileges of the certificate or rating being exercised. In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing.

Historically, these materials have included several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. The Practical Test Standards (PTS) defined the acceptable parameters of flight proficiency in the Areas of Operation listed in14 CFR part 61. FAA H-series handbooks, test supplements, and other materials provide guidance to applicants, instructors, and evaluators on aeronautical knowledge, flight proficiency, and risk management.

The FAA recognizes that safe operations in today's complex National Airspace System (NAS) require a more systematic integration of aeronautical knowledge, flight proficiency standards, and risk management. The FAA further recognizes the need to more clearly calibrate knowledge, skills, and risk management according to the level of the certificate or rating. To that end, the FAA drew upon the expertise of organizations and individuals across the aviation community to develop the Airman Certification Standards (ACS). The ACS incorporates and supersedes the PTS.

Based on aeronautical knowledge and flight proficiency standards specified in 14 CFR part 61, the ACS integrates the knowledge, skills, and risk management abilities necessary for the safe conduct of each Task. In keeping with this integrated and systematic approach, the knowledge, skills, and risk management sections of each Task stipulate that the applicant must demonstrate understanding of each specific item. The applicant demonstrates this understanding by passing the knowledge exam and practical test.

Throughout this process, the FAA expects evaluators to assess the applicant's mastery of the topic in accordance with the level of learning (i.e., rote, understanding, application, or correlation) most appropriate for the specified Task. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge, experience, and information to the circumstances of the given scenario. The flight portion of the practical test requires the applicant to demonstrate flight proficiency, operational skill, and risk management in accordance with the ACS.

**NOTE:** As used in this ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector, designated pilot examiner, or other individual authorized to conduct a practical test.

## Using the ACS

The ACS consists of ***Areas of Operation,*** arranged in a logical sequence that begins with Preflight Preparation and ends with Postflight Procedures. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know and/or do. The ACS then lists the aeronautical knowledge, skills, and risk management considerations relevant to the specific Task, along with the conditions and acceptable standards for performance. The ACS uses ***Notes*** to emphasize special considerations. The FAA will revise the ACS as circumstances require.

Each Task in the ACS is coded according to a scheme that includes up to five elements. For example:

**IR.VIII.A.K1.a**:

**IR** = Applicable ACS (instrument rating)
**VIII** = Area of Operation (postflight procedures)
**A** = Task (checking instruments and equipment);
**K1** = Knowledge task element 1 (the requirements for documenting equipment malfunctions)

**NOTE:** A fifth element may be used to indicate the level of learning: a=rote; b=understanding; c= application; d= correlation.

Knowledge test questions are mapped to the ACS codes, which replace the previous system of “Learning Statement Codes.” Because the airman knowledge test report will list an ACS code that correlates to a specific Task Element for a given Area of Operation and Task, remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient skill(s).

Practical Tests will be based on the ACS in effect the day of the test. The FAA encourages applicants and instructors to use the ACS to measure progress during training, and as a reference to ensure the applicant is adequately prepared for the knowledge and practical tests.

The FAA expects evaluators to adhere to 14 CFR and this ACS. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The terms "should" and "may" denote items that are recommended, but not required.

The applicant must pass the knowledge test before taking the practical test. Further, the applicant must pass the oral portion of the practical test before beginning the flight portion because the oral portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test.

## AREAS OF OPERATION

### I. Preflight Preparation

| **Task** | ***A. Pilot Qualifications*** |
|---|---|
| **Reference** | 14 CFR 61, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with the requirements to act as pilot-in-command under Instrument Flight Rules (IFR). |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. When an instrument rating is required. (IR.I.A.K1)<br>2. Recent instrument flight experience requirements. (IR.I.A.K2)<br>3. Meteorological requirements necessary to qualify for logging currency. (IR.I.A.K3)<br>4. Requirements when recent instrument rating flight experience has not been met. (IR.I.A.K4)<br>5. Pilot logbook/record-keeping. (IR.I.A.K5)<br>6. Physiological factors that might affect the pilot's ability to fly under instrument conditions. |
| **Skills** | The applicant demonstrates the ability to:<br>1. Apply requirements to act as PIC under IFR in a scenario given by the evaluator. (IR.I.A.S1) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Maintaining currency versus proficiency. (IR.I.A.R1)<br>2. Setting personal minimums. (IR.I.A.R2)<br>3. Flying with unfamiliar flight display systems. (IR.I.A.R3) |

| Task | ***B. Weather Information*** |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with obtaining, understanding, and applying weather information for a flight under IFR. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Weather products required for preflight planning, enroute operations, and proceeding to the destination or alternate. (IR.I.B.K1)<br>2. General elements of weather systems. (IR.I.B.K2)<br>3. Types and hazards of icing. (IR.I.B.K3)<br>4. Meteorology to include: (IR.I.B.K4)<br>a. Weather system formation, including air masses and fronts (IR.I.B.K4a)<br>b. Cloud types and hazards (IR.I.B.K4b)<br>c. Turbulence (IR.I.B.K4c)<br>d. Thunderstorms (IR.I.B.K4d)<br>e. Wind shear (IR.I.B.K4e)<br>f. Fog (IR.I.B.K4f)<br>g. Frost (IR.I.B.K4g)<br>5. Enroute weather resources. (IR.I.B.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use available aviation weather resources to obtain an adequate weather briefing. (IR.I.B.S1)<br>2. Correlate weather information to determine alternate requirements. (IR.I.B.S2)<br>3. Correlate weather information to make a competent go-no go decision. (IR.I.B.S3)<br>4. Obtain weather in-flight. (IR.I.B.S4) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Limitations of aviation weather reports and forecasts. (IR.I.B.R1)<br>2. Limitations of inflight aviation weather resources. (IR.I.B.R2)<br>3. Identifying alternate airports along the intended route of flight. (IR.I.B.R3)<br>4. Anticipating circumstances that would make diversion prudent. (IR.I.B.R4)<br>5. Identifying hazardous weather conditions that may affect the planned flight. (IR.I.B.R5)<br>6. Flying in known or forecast icing conditions. (IR.I.B.R6) |

| Task | C. Cross-Country Flight Planning |
|---|---|
| Reference | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with planning and filing an IFR cross-country flight. |
| Knowledge | The applicant demonstrates understanding of:<br>1. How to compute fuel reserves. (IR.I.C.K1)<br>2. Definitions of minimum or emergency fuel. (IR.I.C.K2)<br>3. Conditions conducive to icing, windshear, microbursts, and turbulence. (IR.I.C.K3)<br>4. Symbology found on IFR enroute charts. (IR.I.C.K4)<br>5. Where to locate and how to apply preferred IFR routing. (IR.I.C.K5)<br>6. Elements of an IFR flight plan. (IR.I.C.K6)<br>7. Procedures for activating and closing an IFR flight plan in controlled and non-controlled airspace. (IR.I.C.K7) |
| Skills | The applicant demonstrates the ability to:<br>1. Recalculate fuel reserves based on a scenario provided by the evaluator. (IR.I.C.S1)<br>2. Create and file an IFR flight plan for a route assigned by the evaluator. (IR.I.C.S2)<br>3. Interpret Departure, Enroute, Arrival, and Instrument Approach Procedures. (IR.I.C.S3)<br>4. Divert to a suitable alternate. (IR.I.C.S4) |
| Risk Management | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Selecting inappropriate IFR altitudes. (IR.I.C.R1)<br>2. Strategies for dynamic, changing weather. (IR.I.C.R2)<br>3. Managing inadvertent icing encounters. (IR.I.C.R3)<br>4. Understanding the limitations of ATC services. (IR.I.C.R4)<br>5. Establish fuel reserves and identify situations which would merit increasing minimum fuel reserves. (IR.I.C.R5)<br>6. Not declaring minimum or emergency fuel. (IR.I.C.R6)<br>7. Planning a route overflying significant environmental influences, mountains, and large bodies of water. (IR.I.C.R7)<br>8. Managing human factors that may impact making an initial, and on-going, go-no go decision. (IR.I.C.R8) |

## II. Preflight Procedures

| **Task** | ***A. Aircraft Systems Related to IFR Operations*** |
|---|---|
| **Reference** | FAA 8083-15, AFM, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with Anti-Icing and De-Icings systems. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. General operational characteristics and limitations of anti-icing and de-icing equipment. (IR.II.A.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Understand and operate anti-icing and deicing equipment, applicable to their aircraft, in icing conditions. (IR.II.A.S1) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Fuselage, wing, tailplane, propeller, carburetor and intake pitot icing. (IR.II.A.R1)<br>2. Anti and deicing equipment limitations. (IR.II.A.R2)<br>3. Limitations of systems certified for flight into known icing. (IR.II.A.R3) |

| Task | *B. Aircraft Flight Instruments and Navigation Equipment* |
|---|---|
| Reference | 14 CFR 91, FAA 8083-15, AFM, FAA 8083-2 |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with managing instruments appropriate for an IFR flight. |
| Knowledge | The applicant demonstrates understanding of:<br>1. General operation of flight instruments. (IR.II.B.K1)<br>2. General characteristics of navigation instruments. (IR.II.B.K2)<br>3. General characteristics and common failure modes of autopilot systems. (IR.II.B.K3)<br>4. Common failure modes of flight and navigation instruments. (IR.II.B.K4)<br>5. Difference between approved and non-approved navigation devices. (IR.II.B.K5)<br>6. Limitations of portable navigation devices for guidance or reference. (IR.II.B.K6) |
| Skills | The applicant demonstrates the ability to:<br>1. Operate and manage installed flight control and navigation equipment. (IR.II.B.S1) |
| Risk Management | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Improper Automation Management. (IR.II.B.R1)<br>2. Operating and interpreting unfamiliar flight and navigation instruments. (IR.II.B.R2)<br>3. Distractions created by programming advanced avionics. (IR.II.B.R3)<br>4. Using an electronic flight bag. (IR.II.B.R4) |

| Task | *C. Instrument Cockpit Check* |
|---|---|
| Reference | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with preflighting the aircraft instruments necessary for an IFR flight. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Purpose of performing an instrument cockpit check. (I.II.C.K1)<br>2. Procedures for flying with inoperative equipment. (IR.II.C.K2)<br>3. Required documentation for flying with inoperative equipment. (IR.II.C.K3)<br>4. Limitations of flying with inoperative equipment. (IR.II.C.K4)<br>5. Requirement for having a current aviation database. (IR.II.C.K5) |
| Skills | The applicant demonstrates the ability to:<br>1. Perform an adequate preflight inspection of installed flight instruments and navigation equipment. (IR.II.C.S1)<br>2. Make a determination if the aircraft is legal and/or safe to fly with inoperative equipment. (IR.II.C.S2)<br>3. Properly document inoperative equipment. (IR.II.C.S3)<br>4. Determine if data bases are current. (IR.II.C.S4) |
| Risk Management | The applicant applies risk management identification, assessment, and mitigation principles to<br>1. Flying with inoperative equipment. (IR.II.C.R1)<br>2. Programming avionics during taxi. (IR.II.C.R2)<br>3. Flying with outdated navigation publications or databases. (IR.II.C.R3) |

## III. Air Traffic Control Clearances and Procedures

| Task | ***A. Compliance with Air Traffic Control Clearances*** |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with understanding and complying with ATC clearances and procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Responsibilities associated with accepting a clearance. (IR.III.A.K1)<br>2. Requirements to read back ATC clearances. (IR.III.A.K2)<br>3. Pilot in Command (PIC) emergency authority associated while flying under IFR. (IR.III.A.K3)<br>4. Methods to obtain ATC clearances. (IR.III.A.K4)<br>5. Terrain clearance requirements associated with departure procedures.<br>6. Lost communication procedures. (IR.III.A.K5)<br>7. Purpose of “expect” in a clearance. (IR.III.A.K6)<br>8. Procedures involved for departure, enroute, and arrival procedures. (IR.III.A.K7)<br>9. Position reporting. (IR.III.A.K8) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use and understand standard phraseology. (IR.III.A.S1)<br>2. Correctly copy, read back, interpret, and comply with ATC clearances. (IR.III.A.S2)<br>3. Correctly set up communication frequencies, navigation systems and transponder codes in compliance with the ATC clearance. (IR.III.A.S3)<br>4. Establish two-way communication with the proper controlling agency, in a timely manner, using standard phraseology. (IR.III.A.S4)<br>5. Maintain the applicable airspeed within ±10 knots; headings within ±10°; altitude within ±100 feet; and tracks a course, radial, or bearing within ¾-scale deflection of the CDI on a procedure. (IR.III.A.S5) |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:<br>1. Accepting ATC clearances the PIC does not fully understand. (IR.III.A.R1)<br>2. ATC issuing an inappropriate clearance. (IR.III.A.R2)<br>3. Accepting clearances if the aircraft lacks the performance and /or navigation capability to comply with the clearance. (IR.III.A.R3)<br>4. Accepting short void times. (IR.III.A.R4)<br>5. Obtaining a clearance while airborne. (IR.III.A.R5)<br>6. Terrain avoidance on takeoff and managing those risks in a non-radar environment. (IR.III.A.R6)<br>7. Accepting another aircraft's clearance. (IR.III.A.R7)<br>8. Using outdated navigation publications and databases. (IR.III.A.R8)<br>9. Accepting incomplete or incorrect clearance. (IR.III.A.R9) |

| Task | *B. Holding Procedures* |
|---|---|
| Reference | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with holding procedures. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Purpose of holding. (IR.III.B.K1)<br>2. Reporting criteria associated with holding patterns. (IR.III.B.K2)<br>3. Recommended entry procedures. (IR.III.B.K3)<br>4. Definitions of Minimum and Emergency Fuel. (IR.III.B.K4)<br>5. Wind corrections in holding. (IR.III.B.K5)<br>6. Using the autopilot (if equipped) for holding. (IR.III.B.K6) |
| Skills | The applicant demonstrates the ability to:<br>1. Update fuel reserve calculations based on EFC times. (IR.III.B.S1)<br>2. Maintain the airspeed within ±10 knots; altitude within ±100 feet; headings within ±10°; and track a selected course, radial or bearing within ¾-scale deflection of the CDI. (IR.III.B.S2)<br>3. Use appropriate navigation displays, as supplementary devices, to maintain prescribed ground track. (IR.III.B.S3)<br>4. Use proper wind correction procedures to maintain the desired pattern and to arrive over the fix as close as possible to a specified time. (IR.III.B.S4)<br>5. Comply with restrictions, if applicable, associated with the holding pattern. (IR.III.B.S5)<br>6. Set appropriate power settings for fuel conservation. (IR.III.B.S6) |
| Risk Management | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Inadequate fuel reserves if assigned unexpected further clearance time. (IR.III.B.R1)<br>2. Not declaring Minimum or Emergency fuel. (IR.III.B.R2)<br>3. Scenarios which could lead to being assigned holding. (IR.III.B.R3)<br>4. Possibility of deteriorating weather while holding and/or at the destination. (IR.III.B.R4) |

## IV. Flight by Reference to Instruments

| **Task** | ***A. Instrument Flight*** |
|---|---|
| **Reference** | FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing basic instrument flight maneuvers. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Concepts of instrument flight references. (IR.IV.A.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Maintain altitude within ±100 feet during level flight, headings within ±10°, airspeed within<br>2. ±10 knots, and bank angles within ±5° during turns. (IR.IV.A.K2)<br>3. Use proper instrument crosscheck and interpretation, and apply the appropriate pitch, bank, power, and trim corrections when applicable. (IR.IV.A.K3) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Situations that can degrade instrument cross-check. (IR.IV.A.R1)<br>2. Being distracted by passengers. (IR.IV.A.R2)<br>3. Physiological factors that can degrade instrument cross-check. (IR.IV.A.R3) |

| **Task** | ***B. Recovery From Unusual Flight Attitudes*** |
|---|---|
| **Reference** | FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing unusual flight attitudes. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Physiological factors that can lead to, or hinder recovery from, unusual attitudes. (IR.IV.B.K1)<br>2. Systems and equipment failures that could lead to unusual attitudes. (IR.IV.B.K2)<br>3. Environmental factors that can lead to unusual attitudes. (IR.IV.B.K3)<br>4. Recovery process to restore the aircraft to normal flight attitude. (IR.IV.B.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize, confirm, and recover from unusual attitudes (nose-high and nose-low; low or high speed). (IR.IV.B.S1)<br>2. Apply proper instrument cross-check and interpretation, and apply the appropriate pitch, bank, and power corrections, in the correct sequence, to return the aircraft to a stabilized level flight attitude. (IR.IV.B.S2) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Situations that could lead to loss of control. (IR.IV.B.R1)<br>2. Encountering unusual attitudes associated with stress, high workload, task saturation, and distractions. (IR.IV.B.R2)<br>3. Managing startle response during unexpected events (IR.IV.B.R3)<br>4. Making control inputs without confirming the aircraft attitude. (IR.IV.B.R4)<br>5. Performing incorrect recovery procedures. (IR.IV.B.R5) |

## V. Navigation System

| Task | *A. Intercepting and Tracking Navigational Systems* |
|---|---|
| **Reference** | FAA 8083-15, AFM, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with intercepting and tracking navigation aids.<br><br>**NOTE:** Reference to specific navigational equipment will be disregarded if the aircraft is not equipped with those systems. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Procedures for intercepting and tracking. (IR.V.A.K1)<br>2. Course guidance indications. (IR.V.A.K2)<br>3. Indications of navigation systems failures. (IR.V.A.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Tune and correctly identify the navigation facility. (IR.V.A.S1)<br>2. Set and correctly orient the course to be intercepted. (IR.V.A.S2)<br>3. Intercept the specified course at a predetermined angle, inbound to or outbound from a navigational facility. (IR.V.A.S3)<br>4. Maintain airspeed within ±10 knots, altitude within ±100 feet, and selected headings within<br>5. ±5°. (IR.V.A.S4)<br>6. Apply proper correction to maintain a course, allowing no more than ¾-scale deflection of the CDI or within ±10° in case of an RMI. (IR.V.A.S5)<br>7. Determine the aircraft position relative to the navigational facility or waypoint. (IR.V.A.S6)<br>8. Intercept an arc, if applicable for the procedure being flown, and maintain that arc within ±1 nautical mile. (IR.V.A.S7)<br>9. Recognize navigational receiver or facility failure, and when required, report the failure to ATC. (IR.V.A.S8)<br>10. Use MFD and other graphical navigation displays to monitor position, track wind drift, and other parameters to intercept and maintain the desired flightpath. (IR.V.A.S9)<br>11. Properly program the autopilot to intercept courses. (IR.V.A.S10) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Incorrectly intercepting and tracking courses. (IR.V.A.R1)<br>2. Intercepting and tracking courses using secondary display information in advanced avionics aircraft. (IR.V.A.R2) |

## VI. Instrument Approach Procedures

| Task | *A. Nonprecision Approach* |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2<br><br>**NOTE:** The applicant must accomplish at least two nonprecision approaches (one of which must include a procedure turn or, in the case of an En Route RNAV approach, a Terminal Arrival Area procedure). At least one nonprecision approach must be flown without the use of autopilot and without the assistance of radar vectors. (The yaw damper and flight director are not considered parts of the autopilot for purpose of this part). If the equipment allows, at least one nonprecision approach shall be conducted without vertical guidance. The evaluator will select nonprecision approaches that are representative of the type that the applicant is likely to use. |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing nonprecision approach procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Procedures and limitations associated with nonprecision approach procedures. (IR.VI.A.K1)<br>2. Differences between Localizer Performance (LP) and Lateral Navigation (LNAV) approach guidance. (IR.VI.A.K2)<br>3. Annunciations expected during a Global Positioning System (GPS) approach. (IR.VI.A.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select and comply with the appropriate instrument approach procedure to be performed. (IR.VI.A.S1)<br>2. Establish two-way communications with ATC, as appropriate, to the phase of flight or approach segment, and uses proper communication phraseology. (IR.VI.A.S2)<br>3. Select, tune, identify, and confirm the operational status of navigation equipment to be used for the approach procedure. (IR.VI.A.S3)<br>4. Comply with all clearances issued by ATC or the evaluator. (IR.VI.A.S4)<br>5. Recognize if any flight instrumentation is inaccurate or inoperative, and take appropriate action. (IR.VI.A.S5)<br>6. Advise ATC or the evaluator anytime the aircraft is unable to comply with a clearance. (IR.VI.A.S6)<br>7. Establish the appropriate aircraft configuration and airspeed considering turbulence and wind shear, and complete the aircraft checklist items appropriate to the phase of the flight. (IR.VI.A.S7)<br>8. Maintain, prior to beginning the final approach segment, altitude within ±100 feet, heading within ±10° and allows less than ¾-scale deflection of the CDI or within ±10° in the case of an RMI, and maintain airspeed within ±10 knots. (IR.VI.A.S8)<br>9. Apply the necessary adjustments to the published MDA and visibility criteria for the aircraft approach category when required. (IR.VI.A.S9)<br>10. Establish a stabilized approach profile with a rate of descent and track that will ensure arrival at the MDA prior to reaching the MAP. (IR.VI.A.S10)<br>11. Maintain, while on the final approach segment, no more than a ¾-scale deflection of the CDI or within 10° in case of an RMI, and maintain airspeed within ±10 knots of that desired. (IR.VI.A.S11)<br>12. Maintain the MDA, when reached, within +100 feet, −0 feet to the MAP. (IR.VI.A.S12)<br>13. Execute the missed approach procedure when the required visual references for the intended runway are not distinctly visible and identifiable at the MAP. (IR.VI.A.S13)<br>14. Execute a normal landing from a straight-in or circling approach when instructed by the evaluator. (IR.VI.A.S14)<br>15. Use MFD and other graphical navigation displays, if installed, to monitor position, track wind drift and other parameters to maintain desired flightpath. (IR.VI.A.S15)<br>16. Confirm appropriate annunciations during a GPS approach. (IR.VI.A.S16) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Not following prescribed procedures. (IR.VI.A.R1)<br>2. Excessive decent rates. (IR.VI.A.R2)<br>3. Continuing an approach in worsening conditions. (IR.VI.A.R3)<br>4. Not flying a stabilized approach. (IR.VI.A.R4) |

| Task | ***B. Precision Approach*** |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing precision approach procedures.<br><br>**NOTE:** A precision approach, utilizing aircraft NAVAID equipment for centerline and vertical guidance, must be accomplished in simulated or actual instrument conditions to Decision Altitude. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Procedures and limitations associated with precision approach procedures. (IR.VI.B.K1)<br>2. Annunciations expected during a GPS approach. (IR.VI.B.K2)<br>3. Decent rates to maintain vertical guidance. (IR.VI.B.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Establish two-way communications with ATC using the proper communications phraseology, as required for the phase of flight or approach segment. (IR.VI.B.S1)<br>2. Comply, in a timely manner, with all clearances, instructions, and procedures. (IR.VI.B.S2)<br>3. Advise ATC anytime the applicant is unable to comply with a clearance. (IR.VI.B.S3)<br>4. Establish the appropriate airplane configuration and airspeed/V-speed considering turbulence, wind shear, microburst conditions, or other meteorological and operating conditions. (IR.VI.B.S4)<br>5. Complete the aircraft checklist items appropriate to the phase of flight or approach segment, including engine out approach and landing checklists, if appropriate. (IR.VI.B.S5)<br>6. Prior to beginning the final approach segment, maintain the desired altitude ±100 feet, the desired airspeed within ±10 knots, the desired heading within ±10°; and accurately tracks radials, courses, and bearings. (IR.VI.B.S6)<br>7. Select tune, identify, and monitors the operational status of ground and airplane navigation equipment used for the approach. (IR.VI.B.S7)<br>8. Apply the n0ecessary adjustments to the published Decision Altitude (DA)/Decision Height (DH and visibility criteria for the airplane approach category as required. (IR.VI.B.S8)<br>9. Establish a predetermined rate of descent at the point where the electronic glideslope begins, which approximates that required for the aircraft to follow the glideslope. (IR.VI.B.S9)<br>10. Maintain a stabilized final approach, from the Final Approach Fix to Decision Altitude (DA)/Decision Height (DH) allowing no more than ¾-scale deflection of either the glideslope or localizer indications and maintains the desired airspeed within ±10 knots. (IR.VI.B.S10)<br>11. Immediately initiate the missed approach procedures when at the DA/DH, and the required visual references for the runway are not unmistakably visible and identifiable. (IR.VI.B.S11)<br>12. Transition to a normal landing approach only when the aircraft is in a position from which a descent to a landing on the runway can be made at a normal rate of descent using normal maneuvering. (IR.VI.B.S12)<br>13. Maintain localizer and glideslope within ¾-scale deflection of the indicators during the visual descent from DA/DH to a point over the runway where glideslope must be abandoned to accomplish a normal landing. (IR.VI.B.S13)<br>14. Use MFD and other graphical navigation displays, if installed, as a supplementary way to monitor position, track wind drift and other parameters to maintain desired flightpath. (IR.VI.B.S14)<br>15. Confirms annunciations during a GPS approach. (IR.VI.B.S15) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Not following prescribed procedures. (IR.VI.B.R1)<br>2. Descending below DA without proper visual references. (IR.VI.B.R2)<br>3. Improper aircraft configurations during approach and missed approach. (IR.VI.B.R3)<br>4. Human factors that might impact continuing an approach in worsening conditions. (IR.VI.B.R4)<br>5. Not flying a stabilized approach. (IR.VI.B.R5) |

| Task | *C. Missed Approach* |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing missed approach procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Procedures and limitations associated with missed approach procedures. (IR.VI.C.K1)<br>2. Proper MAP procedures associated with GPS/Flight Management System (FMS). (IR.VI.C.K2)<br>3. Proper autopilot management procedures associated with MAP procedures. (IR.VI.C.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Initiate the missed approach promptly by applying power, establishing a climb attitude, and reducing drag in accordance with the aircraft manufacturer's recommendations. (IR.VI.C.S1)<br>2. Report to ATC beginning the missed approach procedure. (IR.VI.C.S2)<br>3. Uncouple and re-couples autopilot at appropriate times during the MAP procedure (if installed). (IR.VI.C.S3)<br>4. Comply with the published or alternate missed approach procedure. (IR.VI.C.S4)<br>5. Advise ATC or evaluator anytime the aircraft is unable to comply with a clearance, restriction, or climb gradient. (IR.VI.C.S5)<br>6. Follow the recommended checklist items appropriate to the go-around procedure. (IR.VI.C.S6)<br>7. Request, if appropriate, ATC clearance to the alternate airport, clearance limit, or as directed by the evaluator. (IR.VI.C.S7)<br>8. Maintain the recommended airspeed within ±10 knots; heading, course, or bearing within ±10°; and altitude(s) within ±100 feet during the missed approach procedure. (IR.VI.C.S8)<br>9. Use MFD and other graphical navigation displays, if installed, to monitor position and track to help navigate the missed approach. (IR.VI.C.S9) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Not following prescribed procedures. (IR.VI.C.R1)<br>2. Options of holding, diverting, or electing to fly the approach again. (IR.VI.C.R2)<br>3. Establishes Missed Approach "plan" prior to final fix. (IR.VI.C.R3)<br>4. Executing a missed approach procedure before the missed approach point. (IR.VI.C.R4) |

| **Task** | ***D. Circling Approach*** |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing circling approach procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Procedures and limitations associated with circling approaches. (IR.VI.D.K1)<br>2. Approach categories and relevant airspeed limitations. (IR.VI.D.K2) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select and comply with the appropriate circling approach procedure considering turbulence and wind shear and considering the maneuvering capabilities of the aircraft. (IR.VI.D.S1)<br>2. Confirm the direction of traffic and adheres to all restrictions and instructions issued by ATC and the evaluator. (IR.VI.D.S2)<br>3. Maintain the appropriate circling altitude until in a position from which a descent to a normal landing can be made. (IR.VI.D.S3)<br>4. Maneuver the aircraft, after reaching the authorized MDA and maintains that altitude within +100 feet, −0 feet and a flightpath that permits a normal landing on a runway. The runway selected must be such that it requires at least a 90° change of direction, from the final approach course, to align the aircraft for landing. (IR.VI.D.S4) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Not following prescribed circling approach procedures. (IR.VI.D.R1)<br>2. Executing a circling approach at night. (IR.VI.D.R2)<br>3. Losing sight of the runway during a circling approach. (IR.VI.D.R3)<br>4. Accepting a circling approach in marginal visibility. (IR.VI.D.R4) |

| Task | *E. Landing from an Instrument Approach* |
|---|---|
| Reference | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing the procedures for landing from an instrument approach. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Procedures and limitations associated with landing from an instrument approach. (IR.VI.E.K1)<br>2. Purpose of a stabilized approach. (IR.VI.E.K2)<br>3. Regulatory requirements for landing from an instrument approach. (IR.VI.E.K3)<br>4. Approach lighting systems. (IR.VI.E.K4) |
| Skills | The applicant demonstrates the ability to:<br>1. Transition at the DA, MDA, or VDP to a visual flight condition, allowing for safe visual maneuvering and a normal landing. (IR.VI.E.S1)<br>2. Adhere to all ATC (or evaluator) advisories, such as NOTAMs, wind shear, wake turbulence, runway surface, braking conditions, and other operational considerations. (IR.VI.E.S2)<br>3. Complete appropriate checklist items for the prelanding and landing phase. (IR.VI.E.S3)<br>4. Maintain positive aircraft control throughout the complete landing maneuver. (IR.VI.E.S4) |
| Risk Management | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Landing from an unstabilized instrument approach. (IR.VI.E.R1)<br>2. Flying below glidepath. (IR.VI.E.R2)<br>3. Runway incursion after landing from an approach. (IR.VI.E.R3)<br>4. Transitioning to visual references for landing. (IR.VI.E.R4) |

## VII. Emergency Operations

| **Task** | ***A. Loss of Communications*** |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated performing the procedures associated with loss of communication. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Procedures for lost communication at various phases of flight. (IR.VII.A.K1)<br>2. Criteria for beginning an approach procedure at the destination. (IR.VII.A.K2)<br>3. When to deviate from an IFR clearance. (IR.VII.A.K3)<br>4. Techniques for re-establishing communications. (IR.VII.A.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize loss of communication. (IR.VII.A.S1)<br>2. Accomplish actions to re-establish communication. (IR.VII.A.S2)<br>3. Continue to destination. (IR.VII.A.S3)<br>4. Begin an approach at the appropriate time. (IR.VII.A.S4) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Remaining Visual Flight Rules (VFR) in marginal weather conditions. (IR.VII.A.R1)<br>2. Not following prescribed loss of communication procedures. (IR.VII.A.R2) |

| Task | *B. One Engine Inoperative—Instrument Approach (Multiengine Airplane)* |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated the procedures for recovering the aircraft with an inoperative engine. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The procedures and/or differences used during an instrument approach in a multiengine aircraft with one engine inoperative versus all engines operating. (IR.VII.B.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failures simulated by the evaluator. (IR.VII.B.S1)<br>2. Set all engine controls, reduce drag, and identify and verify the inoperative engine. (IR.VII.B.S2)<br>3. Establish the best engine-inoperative airspeed, or airspeed appropriate for the phase of flight, and trim the aircraft. (IR.VII.B.S3)<br>4. Attempt to determine the reason for the engine failure. (IR.VII.B.S4)<br>5. Accomplish prescribed checklist procedures for restarting and/or securing the inoperative engine. (IR.VII.B.S5)<br>6. Establish and maintain the recommended flight attitude and configuration for the best performance during the instrument approach procedures. (IR.VII.B.S6)<br>7. Monitor all engine control functions and make necessary adjustments. (IR.VII.B.S7)<br>8. Follow the actual or a simulated ATC clearance for a straight-in or circling instrument approach. (IR.VII.B.S8)<br>9. Establish a rate of descent that will ensure arrival at the MDA/DA prior to reaching the MAP with the aircraft continuously in a position from which descent to a landing on the intended runway can be made. (IR.VII.B.S9)<br>10. Maintain, where applicable, the specified altitude within ±100 feet, the airspeed within ±10 knots if within the aircraft's capability, and the heading within ±10°. (IR.VII.B.S10)<br>11. Set the navigation and communication equipment used during the approach and use the proper communications technique. (IR.VII.B.S11)<br>12. Avoid loss of aircraft control, or attempted flight contrary to the engine-inoperative operating limitations of the aircraft. (IR.VII.B.S12)<br>13. Use MFD and other graphical navigation displays, if installed, to monitor position and enhance situational awareness. (IR.VII.B.S13)<br>14. Comply with the published minima for the approach. (IR.VII.B.S14)<br>15. Allow, while on final approach segment, no more than ¾-scale deflection of either the localizer or glideslope or GPS indications, or within ±10° or ¾-scale deflection of the nonprecision final approach course. (IR.VII.B.S15)Complete a safe landing. (IR.VII.B.S16) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Not maintaining adequate airspeed. (IR.VII.B.R1)<br>2. Managing startle response during unexpected events. (IR.VII.B.R2)<br>3. The increased probability of loss of aircraft control. (IR.VII.B.R3)<br>4. Executing a missed approach with an inoperative engine. (IR.VII.B.R4) |

| **Task** | ***C. Approach with Loss of Primary Flight Instrument Indicators*** |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with performing an approach with the loss of primary flight control instruments.<br><br>**NOTE:** This task should evaluate the most realistic failure mode(s) of the aircraft equipment used for the test. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Likely failure modes of vacuum and electric attitude instruments. (IR.VII.C.K1)<br>2. Recognizing and confirming likely malfunctions, and how to correct or minimize the effect of their loss. (IR.VII.C.K2) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Advise ATC or evaluator anytime the aircraft is unable to comply with a clearance. (IR.VII.C.S1)<br>2. Completes a nonprecision instrument approach without the use of the primary flight instrument using the objectives of the nonprecision approach. (IR.VII.C.S2) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Using secondary flight displays. (IR.VII.C.R1)<br>2. Not using moving map guidance to increase situational awareness. (IR.VII.C.R2) |

## VIII. Postflight Procedures

| Task | *A. Checking Instruments and Equipment* |
|---|---|
| **Reference** | 14 CFR 91, FAA 8083-15, FAA 8083-2 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills, and risk management associated with checking flight instruments after flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The requirements for documenting equipment malfunctions. (IR.VIII.A.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Check all flight equipment for proper operation. (IR.VIII.A.S1)<br>2. Note all equipment and/or aircraft malfunctions and makes appropriate documentation of improper operation or failure of such equipment. (IR.VIII.A.S2) |
| **Risk Management** | The applicant applies risk management identification, assessment, and mitigation principles to:<br>1. Not performing a proper post-flight inspection. (IR.VIII.A.R1)<br>2. Not properly documenting aircraft discrepancies. (IR.VIII.A.R2) |

## APPENDIX 1: THE KNOWLEDGE TEST

The knowledge test is an important part of the airman certification process. Applicants must pass the knowledge test before taking the practical test.

### *Knowledge Test Description*

The knowledge test consists of objective, multiple-choice questions. There is a single best response for each test question. Each test question is independent of other questions. A correct response to one does not depend upon, or influence, the correct response to another.

| Test Code | Test Name | Number of Questions | Allotted Time | Passing Score |
|---|---|---|---|---|
| IRA | Instrument Rating—Airplane | 60 | 2.5 | 70% |
| IRH | Instrument Rating—Helicopter | 60 | 2.5 | 70% |
| IFP | Instrument Rating—Foreign Pilot | 50 | 3.5 | 70% |

### *Knowledge Test Eligibility Requirements*

For information concerning eligibility for Instrument Rating certification, please refer to:

- Knowledge Test: Prerequisites and Passing Grades: 14 CFR 61.35
- Eligibility: 14 CFR 61.65

### *Knowledge Test Centers*

The FAA authorizes hundreds of knowledge testing center locations. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

### *Test Authorization*

In order to take the Instrument Rating knowledge test, you must provide one of the following:

- Graduation certificate issued by a Federal Aviation Administration (FAA) certificated pilot school (14 CFR 61.71), or a
- Written statement or logbook endorsement from an authorized instructor certifying that the applicant completed an applicable ground training or home study course and is prepared for the knowledge test (14 CFR 61.55).

Acceptable forms of retest authorization for Instrument Rating tests:

- The original failed, passed, or expired Airman Knowledge Test Report, provided the applicant still has the test report in his or her possession.

**NOTE:** If the applicant no longer possesses the original test report, he or she may present an 'expired test/credit' letter issued by AFS-760.

- An applicant retesting after failure is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training. The endorsement must certify the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.

### *Knowledge Test Procedures*

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software).

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
|---|---|---|
| *Supplement book provided by proctor* | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators |
| *All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions* | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| *Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages* | Magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature. |
| *Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test* | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| *Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures* | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

### *Testing Procedures for Applicants Requesting Special Accommodations*

An applicant with a learning or reading disability may request approval from AFS-630 through the local Flight Standards District Offices (FSDO) or International Field Offices (IFO) to take an airman knowledge test using one of the three options listed below, in preferential order:

**Option 1**: Use current testing facilities and procedures whenever possible.

**Option 2**: Use a self-contained, electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

**NOTE:** The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.

**Option 3**: Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO inspector must contact the Airman Testing Standards Branch (AFS-630) for assistance in selecting the test site and assisting the proctor. Before approving any option, the FSDO or IFO inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

### *Cheating or Other Unauthorized Conduct*

Computer testing centers must follow strict security procedures to avoid test compromise in accordance with FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. Testing centers will terminate a test any time the test proctor suspects an occurrence of cheating.

The FAA will conduct an investigation of the incident. If the investigation determines that cheating or unauthorized conduct occurred, any airman certificate or rating the applicant holds may be revoked. In addition, the applicant may be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of one year.

### *Airman Knowledge Test Report*

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report documenting the score with the testing center's raised, embossed seal. The applicant must retain the original Airman Knowledge Test Report and present it to the evaluator conducting the practical test.

An Airman Knowledge Test Report expires 24-calendar months from the month the applicant completes the knowledge test. If the Airman Knowledge Test Report expires before completion of the practical test, the applicant must retake the knowledge test.

To obtain a duplicate Airman Knowledge Test Report due to loss or destruction of the original, the applicant can send a signed request accompanied by a check or money order for $1.00, payable to the FAA to:

> Federal Aviation Administration Airmen Certification Branch, AFS-760
> P.O. Box 25082
> Oklahoma City, OK 73125

### *FAA Knowledge Test Question Coding*

Each task in the Airman Certification Standard includes an Airman Certification Standards (ACS) code. This ACS code is displayed on the airman test report to indicate what task element was proven deficient on the Knowledge Exam. Instructors can then provide remedial training in the deficient areas and evaluators can re-test this element during the practical exam.

The ACS coding consists of 5 elements. For example: this code is deciphered accordingly: **IR.VIII.A.1.a**

**IR.VIII.A.K1.a**:

**IR** = Applicable ACS (instrument rating)
**VIII** = Area of Operation (postflight procedures)
**A** = Task (checking instruments and equipment);
**K1** = Knowledge task element 1 (the requirements for documenting equipment malfunctions)
**a** = rote; **b** = understanding; **c** = application; **d**= correlation), representing the level of learning which also informs the manner of the question (rote = define, recall, list, name, match, label)

Every question is correlated to a specific ACS task/element. This coding methodology will be useful to all involved with airman certification—the applicant, the evaluator, and the flight instructor. It indicates what test subjects (tasks) were satisfactorily passed and what tasks need to be reviewed prior to the practical test.

# APPENDIX 2: THE PRACTICAL TEST

The evaluator must conduct the practical test in accordance with this Airman Certification Standards (ACS). The evaluator must assess the applicant on all tasks included in each Area of Operation of the ACS unless otherwise noted.

**NOTE:** The applicant must pass the knowledge test before taking the practical test, and the applicant must pass the oral portion of the practical test before beginning the flight portion.

### *Conduct of the Practical Test*

The evaluator must develop a written Plan of Action to conduct the test, which includes all required Areas of Operation and Tasks. The Plan of Action will include a scenario that evaluates as many of the required Areas of Operation and Tasks as possible. As the scenario unfolds during the test, the examiner will interject problems and malfunctions the applicant must manage.

The evaluator has the discretion and flexibility to change the Plan of Action in order to accommodate unexpected situations as they arise. The evaluator will evaluate any selected Task in its entirety. The evaluator may elect to suspend and then resume the scenario in order to assess certain tasks.

If performing aspects of a given maneuver, such as emergency procedures, would jeopardize safety, the evaluator will ask the applicant to simulate that portion of the maneuver.

### *Use of Checklists*

The evaluator will assess the applicant's use of an approved manufacturer's checklist or equivalent during the practical test.

**NOTE:** If there is no published manufacturer's checklist, the applicant may use the appropriate FAA handbook or equivalent checklist.

Assessing proper checklist use depends upon the specific Task. In all cases, the evaluator should determine the applicant appropriately divides attention and uses proper visual scanning. In some situations, reading the actual checklist may be impractical or unsafe. In such cases, the evaluator should assess the applicant's performance of published or recommended immediate action "memory" items along with his or her review of the appropriate checklist once conditions permit.

### *Use of Distractions*

Research and accident analysis indicate that pilot distraction during critical phases of flight is a factor in many accidents. The evaluator will cause realistic distractions during the flight portion of the practical test in order to evaluate the applicant's ability to use and maintain proper control technique while dividing attention both inside and/or outside the cockpit.

### *Positive Exchange of Flight Controls*

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls."

Pilots should follow this procedure during any exchange of flight controls, including any occurrence during the practical test. The FAA also recommends that both pilots use a visual check to verify that the exchange has occurred. There must never be any doubt as to who is flying the aircraft.

### *Stall and Spin Awareness*

During flight training and testing, the applicant and the instructor or evaluator must always maintain situational awareness with respect to operations that could lead to an inadvertent stall or spin.

### *Possible Outcomes of the Practical Test*

There are three possible outcomes of the practical test: (1) pass, (2) fail, or (3) discontinuance.

<u>Pass</u>

Satisfactory performance requires the applicant to:

- Perform the Tasks specified in the Areas of Operation for the certificate or rating sought within the approved standards;
- Demonstrate mastery of the aircraft by performing each Task successfully;
- Demonstrate proficiency and competency in accordance with the approved standards;
- Demonstrate sound judgment, exercise aeronautical decision-making, and risk management;
- Demonstrate single-pilot competence if the aircraft is type certificated for single-pilot operations. Satisfactory performance will result in the issuance of a temporary certificate.

**NOTE:** The tolerances listed in the ACS represent the performance expected in good flying conditions.

<u>Fail</u>

If, in the judgment of the evaluator, the applicant does not meet the standards for any Task, the applicant fails the Task and associated Area of Operation, the test is unsatisfactory, and the examiner issues a Notice of Disapproval. When the examiner issues a Notice of Disapproval, he or she shall list the Area of Operation in which the applicant did not meet the standard. The Notice of Disapproval must also list the Area(s) of Operation not tested, and the number of practical test failures.

The examiner or the applicant may end the test if the applicant fails a Task. The examiner may continue the test only with the consent of the applicant and examiner, and the applicant is entitled to credit for only those Areas of Operation and the associated Tasks performed satisfactorily. Though not required, the examiner has discretion to reevaluate any Task, including those previously passed, during the retest.

Typical areas of unsatisfactory performance and grounds for disqualification include:

- Any action or lack of action by the applicant that requires corrective intervention by the examiner to maintain safe flight.
- Failure to use proper and effective visual scanning techniques and collision avoidance procedures to clear the area before and while performing maneuvers.
- Consistently exceeding tolerances stated in the Objectives.
- Failure to take prompt corrective action when tolerances are exceeded.
- Failure to exercise Risk Management Discontinuance

When it is necessary to discontinue a practical test for reasons other than unsatisfactory performance (e.g., equipment failure, weather, illness), the evaluator returns all the test paperwork to the applicant. The evaluator must prepare, sign, and issue a Letter of Discontinuance that lists those Areas of Operation the applicant successfully completed and the time remaining to complete the test. The evaluator should advise the applicant to present the Letter of Discontinuance to the evaluator when the practical test resumes in order to receive credit for the items successfully completed. The Letter of Discontinuance becomes part of the applicant's certification file.

### *Prerequisites for the Test*

According to 14 CFR 61.65, an applicant for the Instrument Rating Practical Test must:

- Be at least 17 years of age;
- Hold at least a private pilot certificate, or be concurrently testing for a private pilot certificate, appropriate to the category of aircraft instrument rating sought.
- Be able to read, speak, write, and understand the English language as detailed in AC 60-28;
- Have passed the appropriate knowledge test since the beginning of the 24th month before the month in which he or she takes the practical test;
- Have satisfactorily accomplished the required training and obtained the prescribed aeronautical experience;
- Possess at least a current third class medical certification or, when a military pilot of the U.S. Armed Forces, show and present evidence of an up-to-date medical examination by the U.S. Armed Forces authorizing pilot status;
- Have an endorsement from an authorized instructor certifying the applicant has received and logged three hours of training time within two (2) calendar months preceding the month of application in preparation for the practical test, and is prepared for the practical test;
- Receive and log ground training from an authorized instructor or complete a home-study course on the aeronautical knowledge areas of 14 CFR part 61.65 that apply to the rating sought; and
- Have an endorsement certifying that the applicant has demonstrated satisfactory knowledge of the subject areas in which the applicant was deficient, if any, on the airman knowledge test.

### *Aircraft and Equipment Required for the Practical Test*

An applicant is required by 14 CFR 61.45 to provide an airworthy, certificated aircraft for use during the practical test. In addition, the aircraft must have a current navigational database.

### *Role of Instructor*

Instructors are responsible for training the applicant to the acceptable standards in all subject matter areas, procedures, and maneuvers included in all the Tasks, even if the applicant is simply adding a category to his or her instrument rating.

### *Role of Evaluator*

The evaluator who conducts the practical test is responsible for determining the applicant meets the acceptable standards of aeronautical knowledge, skills, and risk management for each Task in the appropriate ACS.

The FAA does not expect the evaluator to test every Knowledge and Risk Management element on the Practical Test, as the Knowledge Test assessed the applicant’s mastery of these areas. The evaluator must, however, test at least one item in each of the Knowledge and Risk Management elements for every Task, emphasizing the topics (if any) the applicant missed on the Knowledge Test. The evaluator must test each item in the Skills elements unless otherwise noted in the Task.

Applicants must complete the oral portion of the practical test before the flight portion; however, oral questioning will continue throughout the flight. To the greatest extent practicable, evaluators shall test the applicant’s ability to apply and correlate information, and only use rote questions when appropriate for the material being tested.

If the evaluator determines that a Task is incomplete, or the outcome is uncertain, the evaluator may require the applicant to repeat that Task, or portions of that Task. The FAA made this provision in the interest of fairness, but it does not mean that instruction, practice, or the repetition of an unsatisfactory task is permitted during the practical test.

The evaluator will assess the applicant’s use of visual scanning and collision avoidance procedures throughout the entire test.

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## APPENDIX 3: INSTRUMENT PROFICIENCY CHECK

Instructors and evaluators conducting an Instrument proficiency check must ensure the pilot meets the standards established in the ACS for the following Areas of Operation and Tasks:

Guidance on how to conduct an Instrument Proficiency Check can be found at: http://www.faa.gov

| Area of Operation | Task(s) |
|---|---|
| **Preflight Procedures** | **Instrument Cockpit check** |
| **Air Traffic Control Clearances** | **Compliance with Departure, En Route and Arrival Procedures and Clearances**<br>**Holding** |
| **Flight By Reference to Instruments** | **Recovery From Unusual Flight Attitudes** |
| **Navigation Systems** | **Intercepting and Tracking Navigation Systems** |
| **Instrument Approach Procedures** | **Non Precision Approach Precision Approach**<br>**Missed Approach**<br>**Landing From an Approach** |

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## APPENDIX 4: USE OF A FLIGHT SIMULATION TRAINING DEVICE (FSTD)

### Task vs. Flight Simulation Training Device (FSTD) Credit

- Evaluators must verify the specific FSTD is authorized for testing by consulting the Letter of Authorization for that device.
- Instrument approach procedures in the FSTD are limited to one precision and one non-precision approach.
- Evaluators must evaluate tasks in the FSTD according to the appropriate ACS task

### Use of Chart

X = May be evaluated in the FSTD
A = May be evaluated if the appropriate systems are installed and operating

**NOTE:** With the exception of *Landing from an Instrument Approach* in a Level A device, all Tasks below may be evaluated in a Level A, B, C or D FSTD.

**TASK** **FSTD LEVEL**

| **Area of Operation** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|
| | | | | |
| **Preflight Procedures** | | | | |
| Instrument Cockpit Check | A | A | X | X |
| **Air Traffic Control Clearances and Procedures** | | | | |
| Compliance with Departure, En Route, and | | | | |
| Arrival Procedures and Clearances | A | A | X | X |
| Holding Procedures | ___ | ___ | X | X |
| **Flight by Reference to Instruments** | | | | |
| Basic Instrument Flight Procedures | ___ | ___ | X | X |
| Recovery from Unusual Flight Attitudes | ___ | ___ | ___ | X |
| **Navigation Systems** | | | | |
| Intercepting and Tracking Navigational Systems | ___ | A | X | X |
| **Instrument Approach Procedures** | | | | |
| Nonprecision Approach | ___ | ___ | X | X |
| Precision Approach | ___ | ___ | X | X |
| Missed Approach | ___ | ___ | X | X |
| Circling Approach | ___ | ___ | ___ | ___ |
| Landing From and Instrument Approach | ___ | ___ | ___ | ___ |
| **Emergency Operations** | | | | |
| Loss of Communications | ___ | ___ | X | X |
| One Engine Inoperative-Instrument Approach | | | | |
| (Multiengine Airplane) | ___ | ___ | ___ | ___ |
| Approach with Loss of Primary Flight Instrument | | | | |
| Indicators | ___ | ___ | X | X |
| **Postflight Procedures** | | | | |
| Checking instruments and Equipment | ___ | A | X | X |

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## APPENDIX 5: PRACTICAL TEST CHECKLIST

### *Applicant's Practical Test Checklist*

Appointment with Evaluator

Evaluator's Name: ______________________________

Location: ____________________________________

Date/Time: _____________________________________

ACCEPTABLE AIRCRAFT

- ☐ Aircraft Documents:
- ☐ Airworthiness Certificate
- ☐ Registration Certificate
- ☐ Operating Limitations
- ☐ Aircraft Maintenance Records:
- ☐ Logbook Record of Airworthiness Inspections and AD Compliance
- ☐ Pilot's Operating Handbook, FAA-Approved Aircraft Flight Manual

PERSONAL EQUIPMENT

- ☐ View-Limiting Device
- ☐ Current Aeronautical Charts (Printed or Electronic)
- ☐ Computer and Plotter
- ☐ Flight Plan Form
- ☐ Flight Logs
- ☐ Current AIM, Airport Facility Directory, and Appropriate Publications

PERSONAL RECORDS

- ☐ Identification—Photo/Signature ID
- ☐ Pilot Certificate
- ☐ Current Medical Certificate
- ☐ Completed FAA Form 8710-1, Airman Certificate and/or Rating Application with Instructor's Signature
- ☐ Original Knowledge Test Report
- ☐ Pilot Logbook with appropriate Instructor Endorsements
- ☐ FAA Form 8060-5, Notice of Disapproval (if applicable)
- ☐ Letter of Discontinuance (if applicable)
- ☐ Approved School Graduation Certificate (if applicable)
- ☐ Evaluator's Fee (if applicable)

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## APPENDIX 6: REFERENCES

This ACS is based on the following 14 CFR parts, FAA guidance material, manufacturer's publications, and other documents.

| | |
|---|---|
| 14 CFR part 61 | Certification: Pilots, Flight Instructors, and Ground Instructors |
| 14 CFR part 91 | General Operating and Flight Rules |
| AC 60-28 | English Language Skill Standards Required by 14 CFR Parts 61, 63 and 65 |
| AIM | Aeronautical Information Manual |
| FAA-H-8083-2 | Risk Management Handbook |
| FAA-H-8083-15 | Instrument Flying Handbook |
| NOTAMs | Notices to Airmen |
| POH/AFM | Pilot's Operating Handbook/FAA-Approved Aircraft Flight Manual |

**NOTE:** Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.

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## APPENDIX 7: ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this ACS.

| | |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| ADM | Aeronautical Decision-Making |
| AFM | Airplane Flight Manual |
| AFS | Flight Standards Service |
| ATC | Air Traffic Control |
| CDI | Configuration Deviation Indicator |
| DA | Decision Altitude |
| EFC | Expect Further Clearance |
| FAA | Federal Aviation Administration |
| FMS | Flight Management System |
| FSDO | Flight Standards District Office |
| GPS | Global Positioning System |
| IFO | International Field Office |
| IFR | Instrument Flight Rules |
| LNAV | Lateral Navigation |
| LP | Localizer Performance |
| MDA | Minimum Descent Altitude |
| NAS | National Airspace System |
| NAVAID | Navigation Aid |
| NTSB | National Transport Safety Board |
| PIC | Pilot in Command |
| POH | Pilot's Operating Handbook |
| PTS | Practical Test Standards |
| RNAV | Area Navigation |
| SMS | Safety Management System |
| VDP | Visual Descent Point |
| VFR | Visual Flight Rules |

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## APPENDIX C: FEDERAL REGISTER NOTICE + COMMENTS ON PRIVATE PILOT + INSTRUMENT RATING ACS DOCUMENTS

The ATST WG published the first draft of the Private Pilot – Airplane Airman Certification Standards (ACS) and Instrument Rating ACS documents for comment on April 24, 2013.[12] This appendix includes the original Notice published in the *Federal Register*, as well as a summary of the 302 comments received and reviewed by the ATST WG.

The comment period for the notice published on April 24, 2013 (78 FR 24289) closed May 24, 2013, and was reopened until July 8, 2013.[13]

**NOTE:** The Summary of Comments appears on the next page as an integrated component of this appendix, and the Notice of availability; request for comments published in the *Federal Register* on April 24, 2013 immediately follows as a stand-alone document.

### Summary of Comments in Response to *Federal Register* Notice of Availability (Docket No. FAA-2013-0316)

The ATST WG received 302 comments on the following documents, which were published in Docket No. FAA-2013-0316:

- Background Information: Industry-Led Changes to FAA Airman Testing Standards and Training
- Draft Private Pilot – Airplane Airman Certification Standards
- Draft Change Tracking Matrix for Private Pilot Practical Test Standards
- Draft Instrument Rating Airman Certification Standards
- Draft Change Tracking Matrix for Instrument Rating Practical Test Standards

Several commenters submitted multiple comments, and the ATST WG tracked all comments received. In order to manage disposition of the comments, the ATST WG grouped the comments as follows:

(1) General Comments on the ACS Concept: The ATST WG reviewed and considered the positive and negative comments on the ACS concept. In responding to these comments, the ATST WG developed a Frequently Asked Questions (FAQ) document, which was further refined and published for review and further comment (Docket No. FAA-2013-0649).

[12] 78 FR 24289 (Docket No. FAA-2013-0316).
[13] Notice of Availability; reopening of comment period—Aviation Rulemaking Advisory Committee (ARAC) Airman Testing Standards and Training Working Group (ATSTWG), 78 FR 34423 (June 7, 2013).

(2) Comments addressing Loss of Thrust on Takeoff (LOTOT): The ATST WG considered and agreed with the commenters noting that under Takeoff Tasks, Risk Management elements include items to specifically address: (1) criticality of takeoff distance available; (2) plans for engine-failure after takeoff.

(3) Comments addressing the General Aviation Accident Rate and/or Education on Prevention of Accidents: The ATST WG incorporated many of the concepts in to the introduction to the ACS documents, as well as the FAQs. The ATST WG further noted that "Inadvertent Flight into IMC" was added to Area of Operation VIII (Emergency Operations) in the Private Pilot ACS.

(4) Comments on Draft Private Pilot ACS: The Private Pilot Subgroup reviewed and addressed each specific comment on the draft Private Pilot ACS, and the majority of the specific comments were addressed by revisions to the document.

(5) Comments on Draft Instrument Rating ACS: The Instrument Subgroup reviewed and addressed each specific comment on the draft Instrument ACS, and the majority of the specific comments were addressed by revisions to the document.

(6) Comments on Instructor Guidance Material: The ATST WG noted the general comments on the need for revised/aligned Flight Instructor guidance documents. The members further noted that the Authorized Instructor ACS would be published for comment at a later time.

(7) Comments on Terminology: The ATST WG noted that the term "airman" is used in 14 CFR to encompass the full range of aviation functions that require an FAA certificate or rating. The members further noted not all airman certificates and ratings are for pilots or aviators; some apply to aircraft maintenance technicians, dispatchers, and other specialties. In addition, changes to 14 CFR fall outside the scope of the ATST WG tasking.

(8) Miscellaneous Comments: The ATST WG addressed comments regarding the length of the comment period by re-opening the comment period for 30 days. Miscellaneous and unrelated comments were tracked and forwarded to the appropriate FAA office for consideration.

## Strategy for Dispositioning Comments

The ATST WG tracked the 302 comments, including commenter and date of submission. Multiple ATST WG subgroups reviewed and dispositioned the comments by noting whether the comment was incorporated (in the case of specific substantive comments) in a subsequent draft of the applicable ACS document(s) and/or how the comment was addressed. The complete matrix will be submitted to the FAA for further review and consideration with the complete package of documents comprising the ATST WG work product developed as a part of this endeavor.

DOT–OST–2012–204 and DOT–OST–2012–205 and addressed to U.S. Department of Transportation, Docket Operations, (M–30, Room W12–140), 1200 New Jersey Avenue SE., West Building Group Floor, Washington, DC 20590, and should be served upon the parties listed in Attachment A to the order.

**FOR FURTHER INFORMATION CONTACT:** Catherine J. O'Toole, Air Carrier Fitness Division (X–56, Room W86–469), U.S. Department of Transportation, 1200 New Jersey Avenues SE., Washington, DC 20590, (202) 366–9998.

Dated: April 15, 2013.

**Susan L. Kurland,**

*Assistant Secretary for Aviation and International Affairs.*

[FR Doc. 2013–09557 Filed 4–23–13; 8:45 am]

**BILLING CODE M**

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

**[Docket No FAA–2013–0316]**

### Aviation Rulemaking Advisory Committee (ARAC) Airman Testing Standards and Training Working Group (ATSTWG)

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of availability; request for comments

**SUMMARY:** This notice announces the availability of draft Airman Certification Standards (ACS) documents developed by the ATSTWG for the private pilot certificate and the instrument rating. These documents are available for public review, download, and comment.

**DATES:** Send comments on or before May 24, 2013.

**ADDRESSES:** Send comments identified by docket number FAA–2013–0316 using any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov* and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M–30; U.S. Department of Transportation (DOT), 1200 New Jersey Avenue SE., Room W12–140, West Building Ground Floor, Washington, DC 20590–0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at (202) 493–2251.

*Privacy:* The FAA will post all comments it receives, without change, to *http://www.regulations.gov,* including any personal information the commenter provides. Using the search function of the docket Web site, anyone can find and read the electronic form of all comments received into any FAA dockets, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the **Federal Register** published on April 11, 2000 (65 FR 19477–19478), as well as at *http://DocketsInfo.dot.gov.*

*Docket:* Background documents or comments received may be read at *http://www.regulations.gov* at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Van L. Kerns, Manager, Regulatory Support Division, FAA Flight Standards Service, AFS 600, FAA Mike Monroney Aeronautical Center P.O. Box 25082 Oklahoma City, OK 73125; telephone (405) 954–4431, email van.l.kerns@faa.gov.

**SUPPLEMENTARY INFORMATION:**

### Background

The FAA has established Docket No. FAA–2013–0316 for the purpose of enabling the public to comment on several draft documents developed by the Airman Testing Standards and Training Working Group. The following documents have been placed in that docket for public review and comment:

(1) Background Information; Industry-Led Changes to FAA Airman Testing Standards and Training

(2) Draft PRIVATE PILOT—AIRPLANE Airman Certification Standards;

(3) Draft Change Tracking Matrix referenced to FAA–S–8081–14B, Private Pilot Practical Test Standards for Airplane (Single Engine Land and Single-Engine Sea Areas of Operation); Section 1: Private Pilot

(4) Draft INSTRUMENT RATING—Airman Certification Standards; and

(5) Draft Change Tracking Matrix referenced to FAA–S–8081–4E, Instrument Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift

On August 30, 2012, the ARAC Executive Committee accepted the FAA's assignment of a new task arising from recommendations of the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC). The ARC recommended ways to ensure that the FAA's airman testing and training materials better support reduction of fatal general aviation accidents. The new task instructed the ARAC to integrate aeronautical knowledge and flight proficiency requirements for the private pilot and flight instructor certificates and the instrument rating into a single ACS document for each type of certificate and rating; to develop a detailed proposal to realign FAA training handbooks with the ACS documents; and to propose knowledge test item bank questions consistent with the integrated ACS documents and the principles set forth in the ARC's recommendations.

The FAA announced the ARAC's acceptance of this task through a **Federal Register** Notice published on September 12, 2012 [77 FR 56251]. This Notice described the task elements and solicited participants for the ATSTWG, which subsequently formed and began its work in November 2012.

Consistent with the initial part of this tasking, the ATSTWG has developed draft ACS documents for the private pilot certificate and the instrument rating. These documents align the aeronautical knowledge testing standards with the flight proficiency standards set out in the existing Practical Test Standards (PTS). In addition to supporting the FAA's effort to improve the relevance, reliability, validity, and effectiveness of aeronautical testing and training materials, the draft ACS documents support the FAA's goal of reducing fatal general aviation accidents by incorporating task-specific risk management considerations into each Area of Operation.

The ATSTWG continues the necessary work to develop the authorized instructor ACS document and complete its remaining assignments. These include developing a detailed proposal to realign and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., handbooks) with each integrated ACS document; and to propose methodologies to ensure that knowledge test item bank questions are consistent with both the ACS documents and the test question development principles set forth in the ARC's recommendations.

The ACS documents are designed as the foundation for transitioning to a more integrated and systematic approach to airman certification testing and training. To accomplish this objective and achieve its overall safety goals, the ACS documents support the safety management system (SMS) framework. SMS methodology provides a systematic approach to achieving acceptable levels of safety risk. The ATSTWG is constructing ACS, associated guidance, and test item bank question components of the airman certification system around the four functional components of SMS:

• *Safety Policy* that demonstrates FAA senior management commitment to continually improve safety through enhancements to the airman certification testing and training system; specifically, better integration of the aeronautical knowledge, flight proficiency, and risk management components of the airman certification system;

• *Safety Risk Management* processes that create a structured means of safety risk management decision making to identify, assess, and determine acceptable level of risk associated with regulatory changes, safety recommendations, or other factors requiring modification of airman testing and training materials;

• *Safety Assurance* processes which allow increased confidence on the part of industry and FAA stakeholders in risk controls through a continual review of FAA products and the systematic, prompt and appropriate incorporation of changes arising from new regulations, data analysis, and safety recommendations; and

• *Safety Promotion* framework to support a positive safety culture in the form of training and ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

Given the foundational nature of the ACS documents and their importance in the ongoing evolution of the FAA's airman certification testing and training system, the ATSTWG wishes to make draft ACS documents for the private pilot certificate and the instrument rating available to the public for review and comment. The ATSTWG will use the comments it receives to refine and inform its continuing work on this project. Future drafts developed by the ATSTWG may also be published for this purpose.

Issued in Washington, DC on April 19, 2013.

**Brenda D. Courtney,**

*Alternate Designated Federal Officer, Aviation Rulemaking Advisory Committee.*

[FR Doc. 2013–09684 Filed 4–23–13; 8:45 am]

BILLING CODE 4910–13–P

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

### Furlough Implementation

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice.

**SUMMARY:** This action gives notice to the American public and aviation industry of the FAA's Aviation Safety Office's (AVS) furlough implementation. Under the Balanced Budget and Emergency Deficit Control Act of 1985, as amended by the Budget Control Act of 2011 and the American Taxpayer Relief Act of 2012, across-the-board budget cuts require the FAA to implement furloughs. AVS and its Services/Offices will implement the required 11 days of furlough beginning April 21, 2013 and continuing through September 30, 2013. AVS will continue to focus resources on those initiatives that would have the highest safety and economic value for the American public and aviation industry. The furlough days vary, with each office scheduling those days in accordance with mission requirements, workload considerations, and applicable collective bargaining agreements. For specific information, please see the FAA Web site at *http://www.faa.gov/about/office_org/headquarters_offices/avs/operations_sequestration*.

**DATES:** The furlough will take place beginning April 21 through September 30, 2013.

**SUPPLEMENTARY INFORMATION:** For specific information, please see the FAA Web site at *http://www.faa.gov/about/office_org/headquarters_offices/avs/operations_sequestration*.

Issued in Washington, DC, on April 22, 2013.

**Lirio Liu,**

*Director, Office of Rulemaking.*

[FR Doc. 2013–09775 Filed 4–22–13; 11:15 am]

BILLING CODE 4910–13–P

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

**[Summary Notice No. PE–2013–17]**

### Petition for Exemption; Summary of Petition Received

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of petition for exemption received.

**SUMMARY:** This notice contains a summary of a petition seeking relief from specified requirements of 14 CFR. The purpose of this notice is to improve the public's awareness of, and participation in, this aspect of FAA's regulatory activities. Neither publication of this notice nor the inclusion or omission of information in the summary is intended to affect the legal status of the petition or its final disposition.

**DATES:** Comments on this petition must identify the petition docket number and must be received on or before May 14, 2013.

**ADDRESSES:** You may send comments identified by Docket Number FAA–2013–0156 using any of the following methods:

• *Government-wide rulemaking Web site:* Go to *http://www.regulations.gov* and follow the instructions for sending your comments electronically.

• *Mail:* Send comments to the Docket Management Facility; U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building Ground Floor, Room W12–140, Washington, DC 20590.

• *Fax:* Fax comments to the Docket Management Facility at 202–493–2251.

• *Hand Delivery:* Bring comments to the Docket Management Facility in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

*Privacy:* We will post all comments we receive, without change, to *http://www.regulations.gov*, including any personal information you provide. Using the search function of our docket Web site, anyone can find and read the comments received into any of our dockets, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (65 FR 19477–78).

*Docket:* To read background documents or comments received, go to *http://www.regulations.gov* at any time or to the Docket Management Facility in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Mr. Mark B. James, Aerospace Engineer, Standards Office (ACE–111), Small Airplane Directorate, Aircraft Certification Service, FAA; telephone number (816) 329–4137, fax number (816) 329–4090, email at *mark.james@faa.gov.* Andrea Copeland, ARM–208, Office of Rulemaking, FAA,

# APPENDIX D: DRAFT AUTHORIZED INSTRUCTOR ACS + TRACKING MATRIX

Appendix D includes the draft Authorized Instructor Airman Certification Standards (ACS), as well as the Tracking Matrix documenting the transition from FAA-S-8081-6D, Flight Instructor Practical Test Standards (PTS) for Airplane, to the Authorized Instructor ACS. The draft Authorized Instructor ACS incorporates the relevant comments received when the ATST WG published the first draft of the Authorized Instructor ACS for comment (Docket No. FAA-2013-0649).

The Authorized Instructor ACS is not a stand-alone document. Rather, it is to be used in conjunction with the pilot certificate level or rating ACS for which the instructor-applicant seeks authorization to provide instruction. Therefore, in addition to mastery of the knowledge and skills defined in the Authorized Instructor ACS, the instructor-applicant must demonstrate instructional competence with the Tasks in the ACS for the appropriate certificate level or rating, to include analyzing and correcting common learner errors.

The Flight Instructor Practical Test Standards Tracking Matrix illustrates only the transition from FAA-S-8081-6D, Flight Instructor Practical Test Standards for Airplane, to the Authorized Instructor ACS; however the final Authorized Instructor ACS will replace the following PTS documents (and tasks):

- FAA-S-8081-9D, Flight Instructor Instrument Practical Test Standards for Airplane and Helicopter;
- FAA-S-8081-7B, Flight Instructor Practical Test Standards for Rotorcraft (Helicopter and Gyroplane);
- FAA-S-8081-8B, Flight Instructor Instrument Practical Test Standards for Glider; and
- Sport Pilot Instructor tasks incorporated in:
  - FAA-S-8081-29, Sport Pilot Practical Test Standards for Airplane, Gyroplane, Glider, and Flight Instructor
  - FAA-S-8081-30, Sport Pilot Practical Test Standards for Airship, Balloon, and Flight Instructor
  - FAA-S-8081-31, Sport Pilot Practical Test Standards for Weight Shift Control, Powered Parachute, and Flight Instructor

**NOTE:** The Flight Instructor Practical Test Standards Tracking Matrix appears first as an integrated component of this appendix, and the draft Authorized Instructor ACS immediately follows as a stand-alone document.

## Flight Instructor Practical Test Standards Tracking Matrix

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE)<br>Section 1: Flight Instructor – Airplane Single-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| **I. Fundamentals of Instructing** | | | |
| A. Human Behavior and Effective Communication | AI | I. Fundamentals of Instructing | B-Human Behavior and Effective Communication |
| B. The Learning Process | AI | I. Fundamentals of Instructing | A-Learning Process |
| C. The Teaching Process | AI | I. Fundamentals of Instructing | C-Teaching Process |
| D. Assessment and Critique | AI | I. Fundamentals of Instructing | E- Assessment |
| E. Instructor Responsibilities and Professionalism | AI | I. Fundamentals of Instructing | F-Flight Instructor Characteristics and Responsibilities |
| F. Techniques of Flight Instruction | AI | I. Fundamentals of Instructing | D-Teaching Methods |
| G. Risk Management | AI | Introduction | RM incorporated into all ACS proficiency tasks for which the instructor-applicant will demonstrate instructional knowledge |
| **II. Technical Subject Areas** | | | |
| A. Aeromedical Factors | COM | I. Preflight Preparation | H-Human Factors |
| B. Runway Incursion Avoidance | COM | II. Preflight Procedures | D-Taxiing |
| C. Visual Scanning and Collision Avoidance | COM | I. Preflight Preparation | H-Human Factors |
| – | COM | III. Airport Operations | B-Traffic Patterns |
| – | COM | IV. Takeoffs, Landings, and Go-Arounds | B-Normal Approach and Landing<br>D-Soft-Field Approach and Landing |
| – | COM | V. Performance Maneuvers | B-Chandelles<br>C-Lazy Eights |
| – | COM | V. Performance Maneuvers | A-Eights on Pylons |
| – | COM | VIII. Emergency Operations | B-Emergency Descent and Landing (Simulated) |
| D. Principles of Flight | AI | II. Technical Subject Areas | A-Principles of Flight |
| E. Airplane Flight Controls | PVT | I. Preflight Preparation | G-Operation of Systems |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 1: Flight Instructor – Airplane Single-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| F. Airplane Weight and Balance | COM | I. Preflight Preparation | F-Performance and Limitations |
| G. Navigation and Flight Planning | COM | I. Preflight Preparation | D-Cross-Country Flight Planning |
| H. Night Operations | PVT | X. Night Operation | A- Night Preparation |
| I. High Altitude Operations | COM | X. High Altitude Operations | A-Supplemental Oxygen<br>B- Pressurization |
| J. 14 CFR and Publications | AI | II. Technical Subject Areas | B-14 CFR and Publications |
| K. National Airspace System | COM | I. Preflight Preparation | E-National Airspace System |
| L. Navigation Systems and Radar Services | COM | VI. :Navigation | B-Navigation Systems and Radar Services |
| M. Logbook Entries and Certificate Endorsements | AI | II. Technical Subject Areas | C-Logbook Entries and Certificate Endorsements |
| N. Water and Seaplane Characteristics (ASES) | COM | I. Preflight Preparation | I-Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES) |
| O. Seaplane Bases, Rules, and Aids to Marine Navigation (ASES) | COM | I. Preflight Preparation | I-Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES) |
| **III. Preflight Preparation** | | | |
| A. Certificates and Documents | COM | I. Preflight Preparation | A-Pilot Qualifications |
| | AI | I. Preflight Preparation | A-Certificates and Documents:<br>Add training requirements and privileges and limitations and logbook entries for pilot certificates up through commercial. |
| B. Weather Information | COM | I. Preflight Preparation | C-Weather Information |
| C. Operation of Systems | PVT | I. Preflight Preparation | G-Operation of Systems |
| D. Performance and Limitations | COM | I. Preflight Preparation | F-Performance and Limitations |
| E. Airworthiness Requirements | COM | I. Preflight Preparation | B-Airworthiness Requirements |
| **IV. Preflight Lesson on a Maneuver to be Performed in Flight** | | | |
| A. Maneuver Lesson | AI | IV. Preflight Lesson on a Maneuver to be Performed in Flight | A-Maneuver Lesson |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 1: Flight Instructor – Airplane Single-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| **V. Preflight Procedures** | | | |
| A. Preflight Inspection (ASEL and ASES) | COM | II. Preflight Procedures | A-Preflight Assessment |
| B. Cockpit Management (ASEL and ASES) | COM | II. Preflight Procedures | B-Cockpit Management |
| C. Engine Starting (ASEL and ASES) | COM | II. Preflight Procedures | C-Engine Starting |
| D. Taxiing—Landplane (ASEL) | COM | II. Preflight Procedures | D-Taxiing |
| E. Taxiing—Seaplane (ASES) | COM | II. Preflight Procedures | E-Taxiing and Sailing (ASES, AMES) |
| F. Sailing (ASES) | COM | II. Preflight Procedures | E-Taxiing and Sailing (ASES, AMES) |
| G. Before Takeoff Check (ASEL and ASES) | COM | II Preflight Procedures | F-Before Takeoff Check |
| **VI. Airport and Seaplane Base Operations** | | | |
| A. Radio Communications and ATC Light Signals (ASEL and ASES) | COM | III. Airport Operations | A-Radio Communications and ATC Light Signals |
| B. Traffic Patterns (ASEL and ASES) | COM | III. Airport Operations | B-Traffic Patterns |
| C. Airport/Seaplane Base, Runway and Taxiway Signs, Markings, and Lighting (ASEL and ASES) | COM | II. Preflight Procedures | D-Taxiing (ASEL, AMEL)<br>E-Taxiing and Sailing (ASES, ASEL) |
| **VII. Takeoffs, Landings, and Go-Arounds** | | | |
| A. Normal and Crosswind Takeoff and Climb (ASEL and ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | A-Normal Takeoff and Climb |
| B. Short-Field (Confined Area ASES) Takeoff and Maximum Performance Climb (ASEL and ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | E-Short-Field Takeoff and Maximum Performance Climb |
| C. Soft-Field Takeoff and Climb (ASEL) | COM | IV. Takeoffs, Landings, and Go-Arounds | C-Soft-Field Takeoff and Climb |
| D. Glassy-Water Takeoff and Climb (ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | I-Glassy Water Takeoff and Climb (ASES, AMES) |
| E. Rough-Water Takeoff and Climb (ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | K- Rough Water Takeoff and Climb (ASES, AMES) |
| F. Normal and Crosswind Approach and Landing (ASEL and ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | B-Normal Approach and Landing |
| G. Slip to a Landing (ASEL and ASES) | PVT | IV. Takeoffs, Landings, and Go-Arounds | G-Forward Slip to a Landing |
| H. Go-Around/Rejected Landing (ASEL and ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | M-Go-Around/Rejected Landing |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 1: Flight Instructor – Airplane Single-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| I. Short-Field (Confined Area ASES) Approach and Landing (ASEL and ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | F-Short Field Approach and Landing |
| J. Soft-Field Approach and Landing (ASEL) | COM | IV. Takeoffs, Landings, and Go-Arounds | D-Soft-Field Approach and Landing |
| K. Power-Off 180° Accuracy Approach and Landing (ASEL) | COM | IX. Emergency Operations | B-Emergency Descent and Landing (Simulated) |
| L. Glassy-Water Approach and Landing (ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | J- Glassy Water Approach and Landing (ASES, AMES) |
| M. Rough-Water Approach and Landing (ASES) | COM | IV. Takeoffs, Landings, and Go-Arounds | L- Rough Water Approach and Landing (ASES, AMES) |
| **VIII. Fundamentals of Flight** | | | |
| A. Straight-and-Level Flight (ASEL and ASES) | AI | V. Fundamentals of Flight | A-Straight-and-Level Flight |
| B. Level Turns (ASEL and ASES) | AI | V. Fundamentals of Flight | B-Level Turns |
| C. Straight Climbs and Climbing Turns (ASEL and ASES) | AI | V. Fundamentals of Flight | C-Straight Climbs and Climbing Turns |
| D. Straight Descents and Descending Turns (ASEL and ASES) | AI | V. Fundamentals of Flight | D-Straight Descents and Descending Turns |
| **IX. Performance Maneuvers** | | | |
| A. Steep Turns (ASEL and ASES) | COM | V. Performance Maneuvers | A-Steep Turns |
| B. Steep Spirals (ASEL and ASES) | COM | IX. Emergency Operations | B-Emergency Descent and Landing (Simulated) |
| C. Chandelles (ASEL and ASES) | COM | V. Performance Maneuvers | B-Chandelles |
| D. Lazy Eights (ASEL and ASES) | COM | V. Performance Maneuvers | C-Lazy Eights |
| **X. Ground Reference Maneuvers** | | | |
| A. Rectangular Course (ASEL and ASES) | PVT | V. Performance Maneuvers | B-Ground Reference Maneuvers |
| B. S-Turns Across a Road (ASEL and ASES) | PVT | V. Performance Maneuvers | S-Turns, Rectangular Course, and Turns Around a Point all combined into Ground Reference Maneuvers |
| C. Turns Around a Point (ASEL and ASES) | PVT | V. Performance Maneuvers | S-Turns, Rectangular Course, and Turns Around a Point all combined into Ground Reference Maneuvers |
| D. Eights on Pylons (ASEL and ASES) | COM | V. Performance Maneuvers | D-Eights on Pylons |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 1: Flight Instructor – Airplane Single-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| **XI. Slow Flight, Stalls, and Spins** | | | |
| A. Maneuvering During Slow Flight (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | A-Maneuvering During Slow Flight |
| B. Power-On Stalls (Proficiency) (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | B-Power-On Stalls (Proficiency) |
| C. Power-Off Stalls (Proficiency) (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | C-Power-Off Stalls (Proficiency) |
| D. Cross-controlled Stalls (Demonstration) (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | D-Cross-controlled Stalls (Demonstration) |
| E. Elevator Trim Stalls (Demonstration) (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | E-Elevator Trim Stalls (Demonstration) |
| F. Secondary Stalls (Demonstration) (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | F-Secondary Stalls (Demonstration) |
| G. Spins (ASEL) | AI | VI. Slow Flight, Stalls, and Spins | G. Spins |
| H. Accelerated Maneuver Stalls (Demonstration) (ASEL and ASES) | AI | VI. Slow Flight, Stalls, and Spins | H. Accelerated Maneuver Stalls (Demonstration) |
| **XII. Basic Instrument Maneuvers** | | | |
| A. Straight-and-Level Flight (ASEL and ASES) | PVT | VIII. Emergency Operations | A-Inadvertent IMC |
| B. Constant Airspeed Climbs (ASEL and ASES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| C. Constant Airspeed Descents (ASEL and ASES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| D. Turns to Headings (ASEL and ASES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| E. Recovery from Unusual Flight Attitudes (ASEL and ASES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| **XIII. Emergency Procedures** | | | |
| A. Emergency Approach and Landing (Simulated) (ASEL and ASES) | COM | VIII. Emergency Operations | A-Power Failure at Altitude (Simulated) |
| B. Systems and Equipment Malfunctions (ASEL and ASES) | COM | VIII. Emergency Operations | B-Emergency Descent and Landing (Simulated) |
| C. Emergency Equipment and Survival Gear (ASEL and ASES) | COM | VIII. Emergency Operations | D-Emergency Equipment and Survival Gear |
| D. Emergency Descent (ASEL and ASES) | COM | VIII. Emergency Operations | B-Emergency Descent and Landing (Simulated) |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE)<br>Section 1: Flight Instructor – Airplane Single-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| **XIV. Postflight Procedures** | | | |
| A. Postflight Procedures (ASEL and ASES) | COM | XI. Postflight Procedures | A-Parking, and Securing |
| B. Anchoring (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |
| C. Docking and Mooring (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |
| D. Beaching (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |
| E. Ramping (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 2: Flight Instructor – Airplane Multi-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| **I. Fundamentals of Instructing** | | | |
| A. Human Behavior and Effective Communication | AI | I. Fundamentals of Instructing | B-Human Behavior and Effective Communication |
| B. The Learning Process | AI | I. Fundamentals of Instructing | A-Learning Process |
| C. The Teaching Process | AI | I. Fundamentals of Instructing | C-Teaching Process |
| D. Assessment and Critique | AI | I. Fundamentals of Instructing | E- Assessment |
| E. Instructor Responsibilities and Professionalism | AI | I. Fundamentals of Instructing | F-Flight Instructor Characteristics and Responsibilities |
| F. Techniques of Flight Instruction | AI | I. Fundamentals of Instructing | D-Teaching Methods |
| G. Risk Management | AI | Introduction | RM incorporated into all ACS proficiency tasks for which the instructor-applicant will demonstrate instructional knowledge |
| **II. Technical Subject Areas** | | | |
| A. Aeromedical Factors | COM | I. Preflight Preparation | H-Human Factors |
| B. Runway Incursion Avoidance | COM | II. Preflight Procedures | D-Taxiing |
| C. Visual Scanning and Collision Avoidance | COM | I. Preflight Preparation | H-Human Factors |
| – | COM | III. Airport Operations | B-Traffic Patterns |
| – | COM | IV. Takeoffs, Landings, and Go-Arounds | B-Normal Approach and Landing<br>D-Soft-Field Approach and Landing |
| – | COM | V. Performance Maneuvers | B-Chandelles<br>C-Lazy Eights |
| – | COM | V. Performance Maneuvers | A-Eights on Pylons |
| – | COM | VIII. Emergency Operations | B-Emergency Descent and Landing (Simulated) |
| D. Principles of Flight | AI | II. Technical Subject Areas | A-Principles of Flight |
| E. Airplane Flight Controls | PVT | I. Preflight Preparation | G-Operation of Systems |
| F. Airplane Weight and Balance | COM | I. Preflight Preparation | F-Performance and Limitations |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 2: Flight Instructor – Airplane Multi-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| G. Navigation and Flight Planning | COM | I. Preflight Preparation | D-Cross-Country Flight Planning |
| H. Night Operations | PVT | X. Night Operation | A- Night Preparation |
| I. High Altitude Operations | COM | X. High Altitude Operations | A-Supplemental Oxygen<br>B- Pressurization |
| J. 14 CFR and Publications | AI | II. Technical Subject Areas | B-14 CFR and Publications |
| K. National Airspace System | COM | I. Preflight Preparation | E-National Airspace System |
| L. Navigation Systems and Radar Services | COM | VI. :Navigation | B-Navigation Systems and Radar Services |
| M. Logbook Entries and Certificate Endorsements | AI | II. Technical Subject Areas | C-Logbook Entries and Certificate Endorsements |
| N. Water and Seaplane Characteristics (AMES) | COM | I. Preflight Preparation | I-Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES) |
| O. Seaplane Bases, Rules, and Aids to Marine Navigation (AMES) | COM | I. Preflight Preparation | I-Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES) |
| **III. Preflight Preparation** | | | |
| A. Certificates and Documents | COM | I. Preflight Preparation | A-Pilot Qualifications |
| | AI | I. Preflight Preparation | A-Certificates and Documents:<br>Add training requirements and privileges and limitations and logbook entries for pilot certificates up through commercial. |
| B. Weather Information | COM | I. Preflight Preparation | C-Weather Information |
| C. Operation of Systems | PVT | I. Preflight Preparation | G-Operation of Systems |
| D. Performance and Limitations | COM | I. Preflight Preparation | F-Performance and Limitations |
| E. Airworthiness Requirements | COM | I. Preflight Preparation | B-Airworthiness Requirements |
| **IV. Preflight Lesson on a Maneuver to be Performed in Flight** | | | |
| A. Maneuver Lesson | AI | IV. Preflight Lesson on a Maneuver to be Performed in Flight | A-Maneuver Lesson |
| **V. Preflight Procedures** | | | |
| A. Preflight Inspection (AMEL and AMES) | COM | II. Preflight Procedures | A-Preflight Assessment |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 2: Flight Instructor – Airplane Multi-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| B. Cockpit Management (AMEL and AMES) | COM | II. Preflight Procedures | B-Cockpit Management |
| C. Engine Starting (AMEL and AMES) | COM | II. Preflight Procedures | C-Engine Starting |
| D. Taxiing—Landplane (AMEL) | COM | II. Preflight Procedures | D-Taxiing |
| E. Taxiing—Seaplane (AMES) | COM | II. Preflight Procedures | E-Taxiing and Sailing (ASES, AMES) |
| F. Sailing (AMES) | COM | II. Preflight Procedures | E-Taxiing and Sailing (ASES, AMES) |
| G. Before Takeoff Check (AMEL and AMES) | COM | II Preflight Procedures | F-Before Takeoff Check |
| **VI. Airport and Seaplane Base Operations** | | | |
| A. Radio Communications and ATC Light Signals (AMEL and AMES) | COM | III. Airport Operations | A-Radio Communications and ATC Light Signals |
| B. Traffic Patterns (AMEL and AMES) | COM | III. Airport Operations | B-Traffic Patterns |
| C. Airport/Seaplane Base, Runway and Taxiway Signs, Markings, and Lighting (AMEL and AMES) | COM | II. Preflight Procedures | D-Taxiing (ASEL, AMEL)<br>E-Taxiing and Sailing (ASES, ASEL) |
| **VII. Takeoffs, Landings, and Go-Arounds** | | | |
| A. Normal and Crosswind Takeoff and Climb (AMEL and AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | A-Normal Takeoff and Climb |
| B. Short-Field (Confined Area AMES) Takeoff and Maximum Performance Climb (AMEL and AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | E-Short-Field Takeoff and Maximum Performance Climb |
| C. Glassy-Water Takeoff and Climb (AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | I-Glassy Water Takeoff and Climb (ASES, AMES) |
| D. Rough-Water Takeoff and Climb (AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | K- Rough Water Takeoff and Climb (ASES, AMES) |
| E. Normal and Crosswind Approach and Landing (AMEL and AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | B-Normal Approach and Landing |
| F. Go-Around/Rejected Landing (AMEL and AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | M-Go-Around/Rejected Landing |
| G. Short-Field (Confined Area AMES) Approach and Landing (AMEL and AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | F-Short Field Approach and Landing |
| H. Glassy-Water Approach and Landing (AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | J- Glassy Water Approach and Landing (ASES, AMES) |
| I. Rough-Water Approach and Landing (AMES) | COM | IV. Takeoffs, Landings, and Go-Arounds | L- Rough Water Approach and Landing (ASES, AMES) |
| **VIII. Fundamentals of Flight** | | | |
| A. Straight-and-Level Flight (AMEL and ASES) | AI | V. Fundamentals of Flight | A-Straight-and-Level Flight |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 2: Flight Instructor – Airplane Multi-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| B. Level Turns (AMEL and ASES) | AI | V. Fundamentals of Flight | B-Level Turns |
| C. Straight Climbs and Climbing Turns (AMEL and AMES) | AI | V. Fundamentals of Flight | C-Straight Climbs and Climbing Turns |
| D. Straight Descents and Descending Turns (AMEL and AMES) | AI | V. Fundamentals of Flight | D-Straight Descents and Descending Turns |
| **IX. Performance Maneuvers** | | | |
| A. Steep Turns (AMEL and AMES) | COM | V. Performance Maneuvers | A-Steep Turns |
| **X. Ground Reference Maneuvers** | | | |
| A. Rectangular Course (AMEL and AMES) | PVT | V. Performance Maneuvers | B-Ground Reference Maneuvers |
| B. S-Turns Across a Road (AMEL and AMES) | PVT | V. Performance Maneuvers | S-Turns, Rectangular Course, and Turns Around a Point all combined into Ground Reference Maneuvers |
| C. Turns Around a Point (AMEL and AMES) | PVT | V. Performance Maneuvers | S-Turns, Rectangular Course, and Turns Around a Point all combined into Ground Reference Maneuvers |
| **XI. Slow Flight, Stalls, and Spins** | | | |
| A. Maneuvering During Slow Flight (AMEL and AMES) | AI | VI. Slow Flight, Stalls, and Spins | A-Maneuvering During Slow Flight |
| B. Power-On Stalls (AMEL and AMES) | AI | VI. Slow Flight, Stalls, and Spins | B-Power-On Stalls (Proficiency) |
| C. Power-Off Stalls (AMEL and AMES) | AI | VI. Slow Flight, Stalls, and Spins | C-Power-Off Stalls (Proficiency) |
| D. Accelerated Maneuver Stalls (Demonstration) (AMEL and AMES) | AI | VI. Slow Flight, Stalls, and Spins | H. Accelerated Maneuver Stalls (Demonstration) |
| **XII. Basic Instrument Maneuvers** | | | |
| A. Straight-and-Level Flight (AMEL and AMES) | PVT | VIII. Emergency Operations | A-Inadvertent IMC |
| B. Constant Airspeed Climbs (AMEL and AMES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| C. Constant Airspeed Descents (AMEL and AMES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| D. Turns to Headings (AMEL and AMES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| E. Recovery from Unusual Flight Attitudes (AMEL and AMES) | PVT | VIII. Emergency Operations | All BIM tasks combined into Inadvertent IMC. |
| **XIII. Emergency Procedures** | | | |

| FAA–S-8081-6D (FLIGHT INSTRUCTOR PTS – AIRPLANE) Section 2: Flight Instructor – Airplane Multi-Engine | ACS | ACS AREA OF OPERATION | ACS TASK |
|---|---|---|---|
| A. Systems and Equipment Malfunctions (AMEL and AMES) | COM | VIII. Emergency Operations | C-Emergency Descent and Landing (Simulated) |
| B. Engine Failure during Takeoff Before Vmc (AMEL and AMES) | COM | VIII. Emergency Operations | E-Engine Failure During Takeoff Before Vmc (Simulated) (AMEL, AMES) |
| C. Engine Failure After Lift-Off (AMEL and AMES) | COM | VIII. Emergency Operations | F-Engine Failure After Lift-Off (Simulated) (AMEL, AMES) |
| D. Approach and Landing with an Inoperative Engine (AMEL and AMES) | COM | VIII. Emergency Operations | G- Approach and Landing with an Inoperative Engine (AMEL and AMES) |
| E. Emergency Descent (AMEL and AMES) | COM | VIII. Emergency Operations | B-Emergency Descent and Landing (Simulated) |
| F. Emergency Equipment and Survival Gear (AMEL and AMES) | COM | VIII. Emergency Operations | E-Emergency Equipment and Survival Gear |
| **XIV. Multiengine Operations** | | | |
| A. Operation of Systems (AMEL and AMES) | COM | I. Preflight Preparation | G-Operation of Systems |
| B. Performance and Limitations (AMEL and AMES) | COM | I. Preflight Preparation | F-Performance and Limitations |
| C. Flight Principles – Engine Inoperative (AMEL and AMES) | COM | I. Preflight Preparation | J-Principles of Flight – Engine Inoperative (AMEL, AMES) |
| D. Maneuvering with One Engine Inoperative (AMEL and AMES) | COM | IX. Multiengine Operations | A-Maneuvering with One Engine Inoperative (AMEL, AMES) |
| E. Demonstrating the Effects of Various Airspeeds and Configurations during Engine Inoperative Performance (AMEL and AMES) | COM | IX. Multiengine Operations | D-Instrument Approach and Landing with an Inoperative Engine (Simulated) by Reference to Instruments (AMEL, AMES) |
| **XV. Postflight Procedures** | | | |
| A. Postflight Procedures (AMEL and AMES) | COM | XI. Postflight Procedures | A-Parking, and Securing |
| B. Anchoring (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |
| C. Docking and Mooring (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |
| D. Beaching (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |
| E. Ramping (ASES) | COM | XI. Postflight Procedures | B- Seaplane Post-Landing Procedures (ASES, AMES) |

Legend:

| | | | |
|---|---|---|---|
| Authorized Instructor ACS | Not Covered - Added to AI | Private (PVT) ACS | Commercial (COM) ACS |

FAA-S-8081-XX

U.S. Department
of Transportation

**Federal Aviation
Administration**



# AUTHORIZED INSTRUCTOR

## Airman Certification Standards

**Date TBD**

**FLIGHT STANDARDS SERVICE
Washington, DC 20591**

**ACKNOWLEDGMENTS**

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, AFS-630, P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

**AVAILABILITY**

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

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## FOREWORD

The Federal Aviation Administration (FAA) has published the Authorized Instructor Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, flight proficiency, and risk management standards for authorized instructor certification. This ACS incorporates and supersedes the previous Practical Test Standards (PTS).

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing to an acceptable level. Specifically, the ACS, associated guidance, and test item bank question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which internal and external stakeholders identify and evaluate regulatory changes, safety recommendations, or other factors that require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

In this connection, the FAA gratefully acknowledges and deeply appreciates the many hours that aviation training experts throughout the industry have contributed to the development of this ACS, along with the associated guidance and a more systematic approach to knowledge test question development. This kind of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Acting Director, Flight Standards Service

## INTRODUCTION

### *Airman Certification Standards Concept*

The aviation instructor plays a critical role in safety of the National Airspace System (NAS). Accordingly, the goal of the certification process for instructors is to ensure the instructor-applicant is ready to teach the knowledge and skills consistent with the privileges of the certificate or rating to be exercised and prepare the learner to safely manage the risks of flight as pilot-in-command. In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing.

Historically, these materials have included several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. The Practical Test Standards (PTS) defined the acceptable parameters of flight proficiency in the Areas of Operation listed in 14 CFR part 61. FAA handbooks (FAA-H-8083-XX series), computer testing supplements (FAA-CT-8080-XX series), and other materials provide guidance to applicants, instructors, and evaluators on aeronautical knowledge, flight proficiency, and risk management.

The FAA recognizes that safe operations in today's complex NAS require a more systematic integration of aeronautical knowledge, flight proficiency standards, and risk management. The FAA further recognizes the need to more clearly calibrate knowledge, skills, and risk management according to the level of the certificate or rating. To that end, the FAA drew upon the expertise of organizations and individuals across the aviation community to develop the Airman Certification Standards (ACS). The ACS incorporates and supersedes the PTS.

**NOTE:** As used in this ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector, designated pilot examiner, or other individual authorized to conduct a practical test.

### *Using the ACS*

The ACS consists of ***Areas of Operation*** arranged in a logical sequence that begins with Fundamentals of Instructing and Technical Subject Areas, followed by Preflight Preparation, Preflight Lesson on a Maneuver to be Performed in Flight, and Fundamentals of Flight. The final Area of Operation in the Authorized Instructor ACS is Slow Flight, Stalls, and Spins. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation.

Each Task begins with an ***Objective*** stating what the applicant should know and/or do. The ACS then lists the aeronautical knowledge, skills, and risk management elements relevant to the specific Task, along with the conditions and standards for acceptable performance. The ACS uses ***Notes*** to emphasize special considerations. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The terms "should" and "may" denote items that are recommended but not required.

Each Task in the ACS is coded according to a scheme that includes up to five elements. For example:

**AI.I.E.K12a**:

| | | |
|---|---|---|
| **AI** | = | Applicable ACS (authorized instructor) |
| **I** | = | Area of Operation (fundamentals of instructing) |
| **E** | = | Task (assessment) |
| **K12** | = | Knowledge Task Element 12 (consequences of ineffective critiques) |

**NOTE:** A fifth element may be used to indicate the level of learning: a = rote; b = understanding; c = application; d = correlation.

Knowledge test questions are mapped to the ACS codes, which replace the previous system of “Learning Statement Codes.” Because the airman knowledge test report will list an ACS code that correlates to a specific Task Element for a given Area of Operation and Task, remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient skill(s).

The applicant must pass the knowledge test before taking the practical test. The practical test is conducted in accordance with the ACS that is current as of the date of the test. The applicant must pass the oral portion of the practical test before beginning the flight portion, because the oral portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test. The FAA encourages applicants and instructors to use the ACS to measure progress during training, and as a reference to ensure the applicant is adequately prepared for the knowledge and practical tests.

The purpose of the Authorized Instructor ACS is to define the acceptable performance standards for instructional knowledge and skill, including the Fundamentals of Instructing (FOI) concepts listed in 14 CFR part 61. It is important for the instructor-applicant to understand that the FOI portion of the Authorized Instructor ACS stresses practical application of effective instructional concepts and techniques. For example, the Authorized Instructor ACS uses the term ***plan of action*** to describe the expectation that for any given Task, a competent instructor can develop and execute a flexible instructional plan of action to teach the knowledge, skill, and risk management requirements for that Task. Where appropriate to the Task, the instructional plan of action should incorporate realistic scenarios that require the learner to correctly apply and/or correlate the target knowledge, skill, and risk management elements to specific circumstances.

The Authorized Instructor ACS includes sections that define the acceptable standards for knowledge, skills, and risk management in the aeronautical proficiency tasks unique to a particular instructor certificate or rating.

Instructor-Applicants, instructors, and evaluators should understand, however, that the Authorized Instructor ACS is not a stand-alone document. Rather, it is to be used in conjunction with the pilot certificate level or rating ACS for which the instructor-applicant seeks authorization to provide instruction. Therefore, in addition to mastery of the knowledge and skills defined in the Authorized Instructor ACS, the instructor-applicant must demonstrate instructional competence with the Tasks in the ACS for the appropriate certificate level or rating, to include analyzing and correcting common learner errors.

The FAA will revise the ACS as circumstances require.

### *Knowledge Tests for Instructor Certificates and Ratings*

| Code | Title | Questions | Time |
|---|---|---|---|
| **FOI** | **Fundamentals of Instructing** | 50 | 1.5 |
| **MCI** | **Military Competency Instructor** | 125 | 3.0 |
| | **Ground Instructor** | | |
| **BGI** | Basic Ground Instructor | 80 | 2.5 |
| **AGI** | Advanced Ground Instructor | 100 | 2.5 |
| **IGI** | Instrument Ground Instructor | 50 | 2.5 |
| | **Airplane** | | |
| **FIA** | Flight Instructor – Airplane | 100 | 2.5 |
| **AFA** | Flight Instructor – Airplane-Added Rating | 25 | 1.0 |
| **FII** | Flight Instructor – Instrument Airplane | 50 | 2.5 |
| **AIF** | Flight instructor – Instrument Airplane – Added Rating | 25 | 1.0 |
| | **Helicopter** | | |
| **FRH** | Flight Instructor – Rotorcraft Helicopter | 100 | 2.5 |
| **HFA** | Flight Instructor – Helicopter-Added Rating | 25 | 1.0 |
| **FIH** | Flight Instructor – Instrument Helicopter | 50 | 2.5 |
| **HIF** | Flight Instructor – Instrument Helicopter – Added Rating | 25 | 1.0 |
| | **Gyroplane** | | |
| **FRG** | Flight Instructor – Gyroplane | 100 | 2.5 |
| **GFA** | Flight Instructor – Gyroplane – Added Rating | 25 | 1.0 |
| | **Glider** | | |
| **FIG** | Flight Instructor – Glider | 100 | 2.5 |
| **AFG** | Flight Instructor – Glider – Added Rating | 25 | 1.0 |
| | **Sport Pilot** | | |
| **SIA** | Flight Instructor – Sport Airplane | 70 | 2.5 |
| **SIB** | Flight Instructor – Sport Balloon | 70 | 2.5 |
| **SIG** | Flight Instructor – Sport Glider | 70 | 2.5 |
| **SIL** | Flight Instructor – Sport Lighter-Than-Air (Airship) | 70 | 2.5 |
| **SIP** | Flight Instructor – Sport Powered Parachute | 70 | 2.5 |
| **SIW** | Flight Instructor – Sport Weight-Shift-Control | 70 | 2.5 |
| **SIY** | Flight Instructor – Sport Gyroplane | 70 | 2.5 |

**Instructor Ratings Held**

| Instructor Rating Sought | None | BGI | AGI | IGI | ASE | AME | IA | RH | IH | RG | G |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BGI | FOI* BGI | – | BGI | BGI | BGI | BGI | BGI | BGI | BGI | BGI | BGI |
| AGI | FOI* AGI | AGI | – | AGI | AGI | AGI | AGI | AGI | AGI | AGI | AGI |
| IGI | FOI* IGI | IGI | IGI | – | IGI | IGI | IGI | IGI | IGI | IGI | IGI |
| ASE | FOI* FIA | FIA | FIA | FIA | – | – | FIA | AFA | FIA | AFA | AFA |
| AME | FOI* FIA | FIA | FIA | FIA | – | – | FIA | AFA | FIA | AFA | AFA |
| IA | FOI* FII | FII | FII | FII | FII | FII | – | FII | AIF | FII | AIF |
| RH | FOI* FRH | FIH | FIH | FIH | HFA | HFA | FIH | – | FIH | HFA | HFA |
| IH | FOI* FIH | FIH | FIH | FIH | FIH | FIH | HIF | FIH | – | FIH | FIH |
| RG | FOI* FRG | FRG | FRG | FRG | GFA | GFA | FRG | GFA | FRG | – | GFA |
| G | FOI* FIG | FIG | FIG | FIG | AFG | AFG | FIG | AFG | AFG | FIG | – |
| **HELD** | **None** | **BGI** | **AGI** | **IGI** | **SIA** | **SIB** | **SIG** | **SIL** | **SIP** | **SIW** | **SIY** |
| SIA | FOI SIA | SIA | SIA | SIA | – | ** | ** | ** | ** | ** | ** |
| SIB | FOI SIB | SIB | SIB | SIB | ** | – | ** | ** | ** | ** | ** |
| SIG | FOI SIG | SIG | SIG | SIG | ** | ** | – | ** | ** | ** | ** |
| SIL | FOI SIL | SIL | SIL | SIL | ** | ** | ** | – | ** | ** | ** |
| SIP | FOI SIP | SIP | SIP | SIP | ** | ** | ** | ** | – | ** | ** |
| SIW | FOI SIW | SIW | SIW | SIW | ** | ** | ** | ** | ** | – | ** |
| SIY | FOI SIY | SIY | SIY | SIY | ** | ** | ** | ** | ** | ** | – |

* The instructor-applicant does not have to take the FOI test if he or she meets the requirements of 14 CFR 61.183, or 14 CFR 61.73.

** Flight Instructors with Sport Pilot Rating seeking additional category/class privileges comply with the requirements of 14 CFR 61.419(a).

**NOTE:** The Military Competency Instructor (MCI) Knowledge Test incorporates the FOI, CFI, and CFII knowledge areas in a single test. As long as the instructor-applicant meets the requirements of 14 CFR 61.73 and passes the MCI knowledge test, the evaluator may issue the appropriate instructor ratings.

Legend:

| | | | |
|---|---|---|---|
| AFA | Flight Instructor – Airplane-Added Rating | HFA | Flight Instructor – Helicopter-Added Rating |
| AFG | Flight Instructor – Glider – Added Rating | HIF | Flight Instructor – Instrument Helicopter – Added Rating |
| AGI | Advanced Ground Instructor | IA | Instrument Airplane |
| AIF | Flight instructor – Instrument Airplane – Added Rating | IGI | Instrument Ground Instructor |
| AME | Airplane Multiengine | IH | Instrument Helicopter |
| ASE | Airplane Single Engine | RG | Rotorcraft Gyroplane |
| BGI | Basic Ground Instructor | RH | Rotorcraft Helicopter |
| FIA | Flight Instructor – Airplane | SIA | Flight Instructor – Sport Airplane |
| FIG | Flight Instructor – Glider | SIB | Flight Instructor – Sport Balloon |
| FIH | Flight Instructor – Instrument Helicopter | SIG | Flight Instructor – Sport Glider |
| FII | Flight Instructor – Instrument Airplane | SIL | Flight Instructor – Sport Lighter-Than-Air (Airship) |
| FRG | Flight Instructor – Gyroplane | SIP | Flight Instructor – Sport Powered Parachute |
| G | Glider | SIW | Flight Instructor – Sport Weight-Shift-Control |
| GFA | Flight Instructor – Gyroplane – Added Rating | SIY | Flight Instructor – Sport Gyroplane |

### *Aircraft and Equipment Required for the Practical Test*

The aircraft the instructor-applicant uses for the practical test must:

- Be the appropriate Category and Class for the rating sought
- Be of U.S. Foreign, or military registry
- Have fully functioning dual controls, except as provided in 14 CFR 61.45
- Be capable of performing all appropriate Tasks for the instructor rating sought
- For airplanes:
    - A complex airplane must be used to demonstrate the takeoff, landing, and emergency procedures.
    - A complex landplane is one having retractable landing gear, flaps, and a controllable pitch propeller.
    - A complex seaplane is one having flaps, floats, and controllable pitch propeller.
    - Airplanes with a full authority digital engine control (FADEC) system are considered to have a controllable pitch propeller.
    - If an instructor-applicant holds an Airplane Multiengine Instructor Rating, they are not required to use a complex airplane for an added Airplane Single Engine instructor class rating.

### *Instructor Renewal or Reinstatement*

An instructor may renew an unexpired, or reinstate an expired, flight instructor certificate by passing the practical test for any of the valid or expired flight instructor ratings held by the instructor-applicant.

On the practical test, the evaluator will assess the instructor-applicant on at least two Tasks in each of the Areas of Operation of the appropriate ACS.

The instructor-applicant who seeks renewal or reinstatement does not have to take a knowledge test. However, he or she will be evaluated on the practical application of the FOI and the risk management elements in the appropriate ACS. The instructor-applicant is not required to test in a complex airplane if using an airplane to renew or reinstate the flight instructor certificate.

Renewing or reinstating any of the flight instructor ratings on a valid or expired flight instructor certificate will renew or reinstate all flight instructor ratings on that certificate.

# SECTION 1: GROUND INSTRUCTOR

## *Completion Standards*

A. Basic Ground Instructor

(1) Pass the Fundamentals of Instructing Knowledge Test (if required).

(2) Pass a knowledge test of the tasks contained in the Sport Pilot, Recreational Pilot, and Private Pilot ACS.

B. Advanced Ground Instructor

(1) Pass the Fundamentals of Instructing Knowledge Test (if required)

(2) Pass a knowledge test of the tasks contained in the Sport Pilot, Recreational Pilot, Private Pilot and Commercial Pilot ACS.

C. Instrument Ground Instructor

(1) Pass the Fundamentals of Instructing Knowledge Test (if required).

(2) Pass a knowledge test of the tasks contained in the Instrument Rating ACS.

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## SECTION 2: CFI AIRPLANE

### *Completion Standards*

A. Knowledge Test

(1) Pass the appropriate Knowledge Test.

B. Practical Test

(2) To determine the instructor-applicant can:

(a) Demonstrate instructional competence in the tasks;
(b) Facilitate the learning of subject material;
(c) Explain and demonstrate the maneuvers;
(d) Exemplify risk management skills;
(e) Promote professionalism; and
(f) Analyze and correct common learner errors.

**NOTE**: Except for the six Areas of Operation included in this ACS (listed below), the Authorized Instructor ACS uses the appropriate Commercial Pilot ACS (except for the Slow Flight and Stalls Area of Operation) and the appropriate Private Pilot ACS for the Inadvertent Instrument Meteorological Conditions (IMC) Task in the Emergency Operations Area of Operation.

I. Fundamentals of Instructing
II. Technical Subject Areas ACS System Reference
III. Preflight Preparation
IV. Preflight Lesson on a Maneuver to be Performed in Flight
V. Fundamentals of Flight
VI. Slow Flight, Stalls, and Spins

## I. Fundamentals of Instructing

| **Task** | ***A. Learning Process*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant exhibits instructional competence in the elements of the learning process and that the applicant can apply that knowledge when performing the duties of a certificated flight instructor. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Definitions of learning and practical examples that demonstrate when learning has taken place. (AI.I.A.K1)<br>2. Various learning theories and their individual applications in flight instruction. (AI.I.A.K2)<br>3. Higher order thinking skills and their importance to pilots. (AI.I.A.K3)<br>4. Scenario-based training as it relates to learning higher order thinking skills. (AI.I.A.K4)<br>5. How learners acquire skill knowledge and how to encourage the acquisition process. (AI.I.A.K5)<br>6. Types of practice and the practical uses of each during flight training. (AI.I.A.K6)<br>7. Helping learners develop applied skills during flight training to:<br>a. Incorporate multitasking. (AI.I.A.K7a)<br>b. Retain focus during distractions and interruptions. (AI.I.A.K7b)<br>c. Avoid fixation and inattention. (AI.I.A.K7c)<br>8. How to recognize and identify learner errors during flight training. (AI.I.A.K8)<br>9. Learner motivation in the learning process and instructor responsibilities regarding motivating learners to foster learning. (AI.I.A.K9)<br>10. Learner memory, associated learning challenges, and promoting retention of information. (AI.I.A.K10)<br>11. Transfer of learning in ground, simulation, and flight instruction activities. (AI.I.A.K11)<br>12. Consequences of:<br>a. Faulty instruction. (AI.I.A.K12a)<br>b. Unmotivated learners. (AI.I.A.K12b)<br>c. Instruction not delivered on learner's level of understanding. (AI.I.A.K12c)<br>d. Failing to recognize and correct learner errors. (AI.I.A.K12d) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Provide instruction to the evaluator in a manner that demonstrates an operational understanding of the learning process. (AI.I.A.S1)<br>2. Present material in such a way as to encourage the development of higher order thinking skills. (AI.I.A.S2)<br>3. Adapt lesson delivery and/or content to account for differences in learning styles and abilities. (AI.I.A.S3)<br>4. Recognize and identify types and causes of learner errors during training. (AI.I.A.S4)<br>5. Explain the process of moving a learner through the levels of learning during a course of training. (AI.I.A.S5)<br>6. Use positive motivation during instructional activities. (AI.I.A.S6)<br>7. Explain positive and negative transfers of learning. (AI.I.A.S7)<br>8. Explain the qualities of effective training scenarios. (AI.I.A.S8) |

| Task | ***B. Human Behavior and Effective Communication*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant exhibits instructional competence in the elements of human behavior and effective communication and how these impact effective teaching and learning. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The influence of personality types and their effect on the instructor-learner relationship. (AI.I.B.K1)<br>2. Human needs and their influence on motivation. (AI.I.B.K2)<br>3. Defense mechanisms and how they negatively affect learning. (AI.I.B.K3)<br>4. How to counter learner defense mechanisms. (AI.I.B.K4)<br>5. Human motivation and what affects it. (AI.I.B.K5)<br>6. Normal and abnormal emotional reactions that may be displayed by the learner. (AI.I.B.K6)<br>7. The basic elements of communication. (AI.I.B.K7)<br>8. The barriers of effective communication and how to avoid them. (AI.I.B.K8)<br>9. Effective instructional communication techniques and the consequences of poor instructional communication techniques.(AI.I.B.K9) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Give specific examples of how human needs could influence a learner's motivation. (AI.I.B.S1)<br>2. Give specific examples of how to counter defense mechanisms that a learner may use. (AI.I.B.S2)<br>3. Explain what an instructor can do to positively affect learner motivation. (AI.I.B.S3)<br>4. Explain what actions an instructor can do that will negatively affect learner motivation. (AI.I.B.S4)<br>5. Explain the normal emotional reactions that are a part of human behavior. (AI.I.B.S5)<br>6. Explain how to handle abnormal learner reactions. (AI.I.B.S6)<br>7. Explains the basic elements of communication.  (AI.I.B.S7)<br>8. Give specific examples of barriers to effective communication, the consequences of them and how to avoid them. (AI.I.B.S8)<br>9. Demonstrates effective instructional communication techniques during all activities. (AI.I.B.S9) |

| **Task** | ***C. Teaching Process*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant exhibits instructional competence in the elements of the teaching process. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Essential teaching skills as they apply to personal strengths and weaknesses. (AI.I.C.K1)<br>2. Preparation of a lesson for a ground or flight instructional period. (AI.I.C.K2)<br>3. Various presentation methods and the ability to implement the appropriate method given the topic, learner, and available teaching aids. (AI.I.C.K3)<br>4. Assessment techniques that ensure the learner can properly apply the material or procedure that was presented. (AI.I.C.K4)<br>5. How to review and evaluate learner performance. (AI.I.C.K5)<br>6. How to guide a learner through self-critique and assessment. (AI.I.C.K6)<br>7. Scenario-based delivery methods. (AI.I.C.K7)<br>8. The consequences of failing to:<br>a. Be aware of human behavior. (AI.I.C.K8a)<br>b. Comprehend the learning process. (AI.I.C.K8b)<br>c. Use methods of communication most effective and efficient for the learner. (AI.I.C.K8c)<br>d. Be flexible in the teaching process as it pertains to learner personality and learning differences. (AI.I.C.K8d)<br>e. Assess and teach the “why” behind the “what” of learner performance. (AI.I.C.K8e) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Use a well-rounded approach to teaching delivery methods by utilizing personal strengths while improving weaknesses. (AI.I.C.S1)<br>2. Organize a lesson flow to engage the learner and make them active participants in the learning process. (AI.I.C.S2)<br>3. Choose a delivery method that is best suited for the learner based on an understanding of known learning tendencies. (AI.I.C.S3)<br>4. Recognize if the learner has truly learned the presented material by a change in behavior or philosophy. (AI.I.C.S4)<br>5. Not only assess basic topic knowledge and skill, but also the underlying causal factors and related elements, and then address them in a way the learner understands.(AI.I.C.S5)<br>6. Construct a realistic scenario that is multi-faceted and integrates numerous subject areas to evaluate a learner’s understanding of all content. (AI.I.C.S6) |

| **Task** | ***D. Teaching Methods*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant exhibits instructional competence in the elements of the various methods of teaching information and skills and their appropriate application to instructional situations. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The different training delivery methods for ground and flight instruction by describing appropriate use of lecture, discussion, problem-based learning, electronic-based learning, cooperative or group learning, and demonstration-performance. (AI.I.D.K1)<br>2. Why it may be appropriate to incorporate more than one method in an instructional session. (AI.I.D.K2)<br>3. How the organization of teaching materials may affect learner learning. (AI.I.D.K3)<br>4. The use of proper and correct source materials and the positive/negative value of developing supplementary material when preparing lessons. (AI.I.D.K4)<br>5. The use of instructional aids and training technologies appropriate to each method. (AI.I.D.K5) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Prepare a plan of action to incorporate appropriate teaching methods and supporting materials for an assigned ACS task applicable to the instructor-applicant's certificate level, for the following situations:<br>a. Aeronautical knowledge ground lesson applicable for a classroom. (AI.I.D.S1a)<br>b. Maneuver ground lesson for an individual pilot in training. (AI.I.D.S1b)<br>c. Maneuver introduction for a flight lesson. (AI.I.D.S1c)<br>2. Utilize materials developed in lesson preparation to demonstrate and teach information and skills to the evaluator. (AI.I.D.S2) |

| Task | ***E. Assessment*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, and skills associated with instructional assessment. |
| **Knowledge** | The applicant demonstrates understanding of the elements of assessment by describing and explaining:<br>1. The purpose and characteristics of an effective critique. (AI.I.E.K1)<br>2. Different methods of conducting a critique. (AI.I.E.K2)<br>3. “Ground rules” for conducting a critique. (AI.I.E.K3)<br>4. Traditional assessment vs. authentic assessment. (AI.I.E.K4)<br>5. Characteristics of effective oral questions. (AI.I.E.K5)<br>6. Oral questions to be avoided. (AI.I.E.K6)<br>7. How to respond to learner questions. (AI.I.E.K7)<br>8. Characteristics of effective written tests. (AI.I.E.K8)<br>9. How to develop effective written tests. (AI.I.E.K9)<br>10. Characteristics and uses of performance tests. (AI.I.E.K10)<br>11. Principles of collaborative assessment (or learner-centered grading (LCG)). (AI.I.E.K11)<br>12. The consequences of:<br>a. Ineffective critiques. (AI.I.E.K12a)<br>b. Improper timing of critiques. (AI.I.E.K12b)<br>c. Improper venue for conducting critiques. (AI.I.E.K12c)<br>d. Use of improper types of questioning/tests. (AI.I.E.K12d)<br>e. Improper answers to learner questions. (AI.I.E.K12e) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Conduct an effective learner-centered critique. (AI.I.E.S1)<br>2. Apply different techniques for critiquing. (AI.I.E.S2)<br>3. Apply “ground rules” for conducting a critique. (AI.I.E.S3)<br>4. Conduct effective oral questioning. (AI.I.E.S4)<br>5. Respond to learner questioning. (AI.I.E.S5)<br>6. Create an effective written test. (AI.I.E.S6)<br>7. Select the appropriate method of assessment. (AI.I.E.S7)<br>8. Differentiate between different testing techniques to obtain a given result. (AI.I.E.S8)<br>9. Apply techniques of collaborative assessment. (AI.I.E.S9) |

| **Task** | ***F. Flight Instructor Characteristics and Responsibilities*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant fully comprehends the flight instructor's responsibilities and exhibits the professional characteristics associated with effective instruction. |
| **Knowledge** | The applicant demonstrates understanding of the instructor's responsibilities by describing and explaining how to:<br>1. Provide effective instruction and help learners gain knowledge and skill. (AI.I.F.K1)<br>2. Emphasize the positive. (AI.I.F.K2)<br>3. Be prepared for each instructional activity and make learners' best interests their top priority. (AI.I.F.K3)<br>4. Prepare pilots in training to exceed the published minimum standards of performance. (AI.I.F.K4)<br>5. Incorporate the highest standards of safe operations and risk management in all instructional and student pilot solo activity. (AI.I.F.K5)<br>6. Evaluate the learner's piloting ability. (AI.I.F.K6)<br>7. Supervise student pilot solo activity. (AI.I.F.K7)<br>8. Prepare pilots they are training to become responsible members of the aviation community and to exercise effective risk management when using their privileges as pilot in command. (AI.I.F.K8)<br>9. Minimize learner frustrations. (AI.I.F.K9)<br>10. Recommend applicants for knowledge and practical tests. (AI.I.F.K10)<br>11. Conduct specialized training, evaluate proficiency, and grant privileges through endorsements as authorized by regulations. (AI.I.F.K11)<br>12. Maintain and advance personal professional knowledge and skills. (AI.I.F.K12)<br>13. Identify and appropriately deal with seriously abnormal learners. (AI.I.F.K13)<br>14. Develop an adaptable plan of action with appropriate scenario(s). (AI.I.F.K14)<br>15. Exhibit the characteristics of a professional flight instructor. (AI.I.F.K15) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Recognize the differences between individual learners and adapt instruction that helps each to learn. (AI.I.F.S1)<br>2. Clearly define objectives, standards and assessment methods. (AI.I.F.S2)<br>3. Evaluate performance against standards. (AI.I.F.S3)<br>4. Effectively and constructively critique learners' performance. (AI.I.F.S4)<br>5. Instill risk management habits that progressive grow and transfer to the pilot in training. (AI.I.F.S5)<br>6. Instill a sense personal responsibility for the aviation community, their passengers and those whom they overfly. (AI.I.F.S6)<br>7. Exhibit the highest standards of safe operations and risk management in all instructional activities. (AI.I.F.S7)<br>8. Teach a lesson using the plan of action. (AI.I.F.S8) |

## II. Technical Subject Areas

| **Task** | ***A. Principles of Flight*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25 |
| **Objective** | To determine the applicant exhibits instructional competence in and has the ability to effectively teach the elements of aerodynamics appropriate for the level of instructor certificate sought. |
| **Knowledge** | The applicant demonstrates understanding by describing and explaining:<br>1. Airfoil design characteristics. (AI.II.A.K1)<br>2. Airplane stability and controllability. (AI.II.A.K2)<br>3. Turning tendency (torque effect). (AI.II.A.K3)<br>4. Forces acting on an airplane. (AI.II.A.K4)<br>5. Load factors in airplane design. (AI.II.A.K5)<br>6. Wingtip vortices and precautions to be taken. (AI.II.A.K6)<br>7. The risk to pilots not understanding the basic aerodynamic principles of flight. (AI.II.A.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Effectively deliver pilot-oriented instruction to a simulated pilot in training (evaluator) on one of the following topics:<br>a. Airfoil design characteristics. (AI.II.A.S1a)<br>b. Airplane stability and controllability. (AI.II.A.S1b)<br>c. Turning tendency (torque effect). (AI.II.A.S1c)<br>d. Forces acting on an airplane. (AI.II.A.S1d)<br>e. Load factor. (AI.II.A.S1e)<br>f. Wingtip vortices: source and impact. (AI.II.A.S1f) |

| | |
|---|---|
| **Task** | ***B. 14 CFR and Publications*** |
| **Reference** | 14 CFR parts 1, 61, 91; AC 00-2, AIM, FAA-H-8083-25, NTSB part 830, POH/AFM. |
| **Objective** | To determine the applicant exhibits instructional competence in and has the ability to effectively teach the appropriate elements of the Federal Aviation Regulations and essential publications. |
| **Knowledge** | The applicant demonstrates understanding by describing and explaining the purpose, how to access, how to determine currency, and general content category of:<br>1. 14 CFR parts 1, 61, and 91. (AI.II.B.K1)<br>2. NTSB part 830. (AI.II.B.K2)<br>3. Advisory Circulars. (AI.II.B.K3)<br>4. Airman Certification Standards. (AI.II.B.K4)<br>5. Pilot's Operating Handbooks or FAA-approved airplane flight manuals. (AI.II.B.K5)<br>6. Flight Information publications. (AI.II.B.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Deliver instruction to a simulated pilot in training (evaluator) on what a pilot needs to know about item a. and at least one other of the following:<br>a. 14 CFR parts 1, 61, and 91. (AI.II.B.S1a)<br>b. NTSB part 830. (AI.II.B.S1b)<br>c. Advisory Circulars. (AI.II.B.S1c)<br>d. Airman Certification Standards. (AI.II.B.S1d)<br>e. Pilot's Operating Handbooks or FAA-approved airplane flight manuals. (AI.II.B.S1e)<br>f. Flight information publications, i.e. AIM and AF/D. (AI.II.B.S1f) |

| Task | *C. Logbook Entries and Certificate Endorsements* |
|---|---|
| **Reference** | 14 CFR parts 61; AC 61-65. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements and has the ability to effectively teach the appropriate aspects of logbook entries and certificates endorsements. |
| **Knowledge** | The applicant demonstrates understanding the elements of logbook entries and certificate endorsements by describing:<br>1. Required logbook entries for instruction given. (AI.II.C.K1)<br>2. Required student pilot certificate endorsements, including appropriate logbook entries. (AI.II.C.K2)<br>3. Preparation of a recommendation for a pilot practical test, including appropriate logbook entry and electronic forms for:<br>a. Initial pilot certification. (AI.II.C.K3a)<br>b. Additional pilot certification. (AI.II.C.K3b)<br>c. Additional aircraft qualification. (AI.II.C.K3c)<br>4. Required endorsement of a pilot logbook for the satisfactory completion of the required FAA flight review. (AI.II.C.K4)<br>5. Required flight instructor records. (AI.II.C.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Prepare simulated logbook entries and/or certificate endorsements required for at least two of the following scenarios:<br>a. Student pilot first solo. (AI.II.C.S1a)<br>b. First lesson with student pilot introducing straight and level, level turns, descents and climbs. (AI.II.C.S1b)<br>c. Recommendation for knowledge test. (AI.II.C.S1c)<br>d. Recommendation for practical test. (AI.II.C.S1d)<br>e. Satisfactory flight review. (AI.II.C.S1e) |

## III. Preflight Preparation

| **Task** | ***A. Certificates and Documents*** |
|---|---|
| **Reference** | 14 CFR parts 23, 43, 61, 67, 91; FAA-H-8083-3, FAA-H-8083-25, Commercial Pilot – Airplane ACS, Private Pilot – Airplane ACS; POH/AFM. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements and has the ability to effectively teach a pilot-in-training the appropriate elements of certificates and documents. |
| **Knowledge** | The applicant demonstrates understanding of the elements of pilot and aircraft certificates and documents by describing:<br>1. The training requirements for the issuance of a recreational, private, and commercial pilot certificate. (AI.III.A.K1)<br>2. The privileges and limitations of pilot certificates and ratings at recreational, private, and commercial levels. (AI.III.A.K2)<br>3. Class and duration of medical certificates. (AI.III.A.K3)<br>4. Recent pilot flight experience requirements. (AI.III.A.K4)<br>5. Required entries in pilot logbook or flight record. (AI.III.A.K5) |
| **Skills** | The applicant demonstrates instructional ability to develop scenarios for teaching the required knowledge of certificates and documents involving the following:<br>1. Meeting minimum training requirements for a recreational, private, or commercial pilot certificate application. (AI.III.A.S1)<br>2. Acting as pilot-in-command without passengers. (AI.III.A.S2)<br>3. Acting as pilot-in-command with passengers. (AI.III.A.S3) |

## IV. Preflight Lesson on a Maneuver to be Performed in Flight

| Task | ***A. Maneuver Lesson*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-9, FAA-H-8083-23, FAA-H-8083-25, Commercial Pilot – Airplane ACS, Private Pilot – Airplane ACS; POH/AFM. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements and has the ability to effectively teach a pilot-in-training the appropriate elements of a maneuver task from this ACS selected by the evaluator. |
| **Knowledge** | The applicant demonstrates understanding of the elements of the selected maneuver task from this ACS by:<br>1. Stating the purpose of the maneuver. (AI.IV.A.K1)<br>2. Giving an accurate, comprehensive oral description including the elements of the maneuver and the common learner errors associated with it. (AI.IV.A.K2)<br>3. Describing the desired outcome(s). (AI.IV.A.K3)<br>4. Describing possible risks when performing this maneuver and recommended mitigation strategies. (AI.IV.A.K4) |
| **Skills** | The applicant demonstrates instructional ability to orally present, using instructional aids when appropriate, the elements of the selected maneuver task by:<br>1. Explaining why the maneuver is important to master. (AI.IV.A.S1)<br>2. Breaking down the maneuver into the basic, understandable elements. (AI.IV.A.S2)<br>3. Explaining how the pilot-in-training will know when the maneuver is performed correctly. (AI.IV.A.S3)<br>4. Describing possible flawed outcomes and how to analyze the errors and avoid them in future practice. (AI.IV.A.S4) |

## V. Fundamentals of Flight

| Task | ***A. Straight-and-Level Flight*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23, Private Pilot – Airplane ACS. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with straight-and-level flight. |
| **Knowledge** | The applicant demonstrates understanding of straight-and-level flight by describing:<br>1. Purpose of the maneuver. (AI.V.A.K1)<br>2. Basic elements of the maneuver. (AI.V.A.K2)<br>3. Desired outcome. (AI.V.A.K3)<br>4. Flight control and trim use. (AI.V.A.K4)<br>5. The pilot's visual reference when performing the maneuver. (AI.V.A.K5)<br>6. Common errors performing the maneuver. (AI.V.A.K6) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain straight and level flight. (AI.V.A.S1)<br>2. Analyze and correct simulated common errors related to straight and level flight. (AI.V.A.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles when performing straight and level flight in regard to:<br>1. Distractions impacting navigation and avoiding unintended airspace incursions and proximity to terrain. (AI.V.A.R1)<br>2. Collision avoidance. (AI.V.A.R2) |

| Task | ***B. Level Turns*** |
|---|---|
| **Reference** | FAA-H-8083-3, Private Pilot – Airplane ACS. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with level turns. |
| **Knowledge** | The applicant demonstrates understanding of level turns by describing:<br>1. Purpose of the maneuver. (AI.V.B.K1)<br>2. Basic elements of the maneuver. (AI.V.B.K2)<br>3. Desired outcome. (AI.V.B.K3)<br>4. Flight control and trim use. (AI.V.B.K4)<br>5. The pilot's visual reference when performing the maneuver. (AI.V.B.K5)<br>6. Common errors performing the maneuver. (AI.V.B.K6) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain level turns. (AI.V.B.S1)<br>2. Analyze and correct simulated common errors related to level turns. (AI.V.B.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles when performing level turns in regard to:<br>1. Distractions impacting navigation and avoiding unintended airspace incursions and proximity to terrain. (AI.V.B.R1)<br>2. Collision avoidance. (AI.V.B.R2) |

| Task | ***C. Straight Climbs and Climbing Turns*** |
|---|---|
| **Reference** | FAA-H-8083-3, Private Pilot – Airplane ACS. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with straight climbs and climbing turns. |
| **Knowledge** | The applicant demonstrates understanding straight climbs and climbing turns by describing:<br>1. Purpose of the maneuver. (AI.V.C.K1)<br>2. Basic elements of the maneuver. (AI.V.C.K2)<br>3. Desired outcome. (AI.V.C.K3)<br>4. Flight control and trim use. (AI.V.C.K4)<br>5. The pilot's visual reference when performing the maneuver. (AI.V.C.K5)<br>6. Common errors performing the maneuver. (AI.V.C.K6) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain straight climbs and climbing turns. (AI.V.C.S1)<br>2. Analyze and correct simulated common errors related to straight climbs and climbing turns. (AI.V.C.S2) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles when performing straight climbs and climbing turns in regard to:<br>1. Distractions impacting navigation and avoiding unintended airspace incursions and proximity to terrain. (AI.V.C.R1)<br>2. Collision avoidance. (AI.V.C.R2) |

| Task | ***D. Straight Descents and Descending Turns*** |
| --- | --- |
| **Reference** | FAA-H-8083-3, Private Pilot – Airplane ACS. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with straight descents and descending turns. |
| **Knowledge** | The applicant demonstrates understanding straight descents and descending turns by describing:<br>1. Purpose of the maneuver. (AI.V.D.K1)<br>2. Basic elements of the maneuver. (AI.V.D.K2)<br>3. Desired outcome. (AI.V.D.K3)<br>4. Flight control and trim use. (AI.V.D.K4)<br>5. The pilot's visual reference when performing the maneuver. (AI.V.D.K5)<br>6. Common errors performing the maneuver. (AI.V.D.K6) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain straight descents and descending turns. (AI.V.D.S1)<br>2. Analyze and correct simulated common errors related to straight descents and descending turns. (AI.V.D.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles when performing straight descents and descending turns in regard to:<br>1. Distractions impacting navigation and avoiding unintended airspace incursions and proximity to terrain. (AI.V.D.R1)<br>2. Collision avoidance. (AI.V.D.R2) |

## VI. Slow Flight, Stalls, and Spins

| **Task** | ***A. Maneuvering During Slow Flight*** |
|---|---|
| **Reference** | FAA-H-8083-3, Commercial Pilot – Airplane ACS, Private Pilot – Airplane ACS; POH/AM. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with maneuvering during slow flight. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. The slow flight maneuver relative to a critical real-life situation, i.e. go-arounds, short field approach and landing, etc. (AI.VI.A.K1)<br>2. Relationship between AOA, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.A.K2)<br>3. Relationship of configuration, weight, center of gravity, maneuvering loads, angle of bank, and power to flight characteristics and controllability. (AI.VI.A.K3)<br>4. Recognizing and responding appropriately to all indications of high angle of attack to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.A.K4)<br>5. The difference between AOA and aircraft attitude during all flight conditions and how it relates to aircraft performance. (AI.VI.A.K5)<br>6. How environmental elements affect aircraft performance. (AI.VI.A.K6)<br>7. Performance of the maneuver with selected landing gear and flap configurations in straight-and-level flight and level turns. (AI.VI.A.K7)<br>8. Importance of the 1,500 foot AGL minimum altitude. (AI.VI.A.K8)<br>9. Specified airspeed for the maneuver. (AI.VI.A.K9)<br>10. Coordination of flight controls. (AI.VI.A.K10)<br>11. Trim technique. (AI.VI.A.K11)<br>12. Reestablishment of cruise flight. (AI.VI.A.K12)<br>13. Common errors related to maneuvering during slow flight. (AI.VI.A.K13) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL. (AI.VI.A.S1)<br>2. Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in an immediate stall. (AI.VI.A.S2)<br>3. Accomplish coordinated straight-and-level flight, turns, climbs, and descents with landing gear and flap configurations specified by the evaluator. (AI.VI.A.S3)<br>4. Divide attention between airplane control, and orientation while pointing-out the control feel and other cockpit sensations. (AI.VI.A.S4)<br>5. Maintain the specified altitude, ±50 feet; specified heading, ±10°; airspeed, +5/-0 knots; and specified angle of bank, ±5°. (AI.VI.A.S5)<br>6. Analyze and correct simulated common errors. (AI.VI.A.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.A.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.A.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.A.R3)<br>4. Collision avoidance procedures. (AI.VI.A.R4) |

| Task | ***B. Power-On Stalls (Proficiency)*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with power-on stalls.<br><br>**NOTE:** In some high performance airplanes, the power setting may have to be reduced below the practical test standards guideline power setting to prevent excessively high pitch attitudes (greater than 30° nose up). |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Aerodynamics of power-on stalls. (AI.VI.B.K1)<br>2. Relationship of various factors such as landing gear and flap configuration, weight, center of gravity, load factor, and bank angle to stall speed. (AI.VI.B.K2)<br>3. Flight situations where unintentional power-on stalls may occur. (AI.VI.B.K3)<br>4. Entry technique and minimum entry altitude. (AI.VI.B.K4)<br>5. Performance of power-on stalls in climbing flight (straight or turning). (AI.VI.B.K5)<br>6. Coordination of flight controls. (AI.VI.B.K6)<br>7. Recognition of the first indications of power-on stalls. (AI.VI.B.K7)<br>8. Recovery technique and minimum recovery altitude. (AI.VI.B.K8)<br>9. Common errors related to power-on stalls. (AI.VI.B.K9) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain power-on stalls, in climbing flight (straight or turning), with selected landing gear and flap configurations, from an instructional standpoint. (AI.VI.B.S1)<br>2. Analyze and correct simulated common errors related to power-on stalls, in climbing flight (straight or turning), with selected landing gear and flap configurations. (AI.VI.B.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.B.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.B.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.B.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.B.R4)<br>5. Collision avoidance procedures. (AI.VI.B.R5) |

| **Task** | ***C. Power-Off Stalls (Proficiency)*** |
|---|---|
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with Power-Off Stalls. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Aerodynamics of power-off stalls. (AI.VI.C.K1)<br>2. Relationship of various factors such as landing gear and flap configuration, weight, center of gravity, load factor, and bank angle to stall speed. (AI.VI.C.K2)<br>3. Flight situations where unintentional power-off stalls may occur. (AI.VI.C.K3)<br>4. Entry technique and minimum entry altitude. (AI.VI.C.K4)<br>5. Performance of power-off stalls in descending flight (straight or turning). (AI.VI.C.K5)<br>6. Coordination of flight controls. (AI.VI.C.K6)<br>7. Recognition of the first indications of power-off stalls. (AI.VI.C.K7)<br>8. Recovery technique and minimum recovery altitude. (AI.VI.C.K8)<br>9. Common errors related to power-off stalls. (AI.VI.C.K9) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain power-off stalls, in descending flight (straight or turning), with selected landing gear and flap configurations, from an instructional standpoint. (AI.VI.C.S1)<br>2. Analyze and correct simulated common errors related to power-off stalls, in descending flight (straight or turning), with selected landing gear and flap configurations. (AI.VI.C.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.C.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.C.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.C.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.C.R4)<br>5. Collision avoidance procedures. (AI.VI.C.R5) |

| Task | ***D. Cross-Controlled Stalls*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with cross-controlled stalls. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Aerodynamics of cross-controlled stalls. (AI.VI.D.K1)<br>2. Effects of crossed controls in gliding or reduced airspeed descending turns. (AI.VI.D.K2)<br>3. Flight situations where unintentional cross-controlled stalls may occur. (AI.VI.D.K3)<br>4. Entry technique and minimum entry altitude. (AI.VI.D.K4)<br>5. Recognition of cross-controlled stalls. (AI.VI.D.K5)<br>6. Recovery technique and minimum recovery altitude. (AI.VI.D.K6)<br>7. Common errors related to cross-controlled stalls. (AI.VI.D.K7) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain a cross-controlled stall in a specified configuration. (AI.VI.D.S1)<br>2. Analyze and correct simulated common errors related to a cross-controlled stall in a specified configuration. (AI.VI.D.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, aircraft attitude, and uncoordinated control inputs. (AI.VI.D.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.D.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.D.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.D.R4) |

| **Task** | ***E. Elevator Trim Stalls (Demonstration)*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with Elevator Trim Stalls. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Aerodynamics of elevator trim stalls. (AI.VI.E.K1)<br>2. Hazards of inadequate control pressures to compensate for thrust, torque, and up-elevator trim during go-around and other related maneuvers. (AI.VI.E.K2)<br>3. Entry procedure and minimum entry altitude. (AI.VI.E.K3)<br>4. Recognition of elevator trims stalls. (AI.VI.E.K4)<br>5. Importance of recovering from an elevator trim stall immediately upon recognition. (AI.VI.E.K5)<br>6. Common errors related to elevator trim stalls. (AI.VI.E.K6) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain elevator trim stalls, in selected landing gear and flap configurations. (AI.VI.E.S1)<br>2. Analyze and correct simulated common errors related to elevator trim stalls in selected landing gear and flap configurations. (AI.VI.E.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.E.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.E.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.E.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.E.R4) |

| Task | ***F. Secondary Stalls (Demonstration)*** |
|---|---|
| **Reference** | FAA-H-8083-9 |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with Secondary Stalls. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Aerodynamics of secondary stalls. (AI.VI.F.K1)<br>2. Flight situations where secondary stalls may occur. (AI.VI.F.K2)<br>3. Hazards of secondary stalls during normal stall or spin recovery. (AI.VI.F.K3)<br>4. Entry procedure and minimum entry altitude. (AI.VI.F.K4)<br>5. Recognition of a secondary stall. (AI.VI.F.K5)<br>6. Recovery procedure and minimum recovery altitude. (AI.VI.F.K6) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain secondary stalls, in selected landing gear and flap configurations. (AI.VI.F.S1)<br>2. Analyze and correct simulated common errors related to secondary stalls in selected landing gear and flap configurations. (AI.VI.F.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.F.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.F.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.F.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.F.R4) |

| Task | ***G. Spins*** |
|---|---|
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills and risk management associated with spins.<br><br>**NOTE:** At the discretion of the examiner, a logbook record attesting applicant instructional competency in spin entries, spins, and spin recoveries may be accepted in lieu of this Task. The flight instructor who conducted the spin instruction must certify the logbook record. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Anxiety factors associated with spin instruction. (AI.VI.G.K1)<br>2. Aerodynamics of spins. (AI.VI.G.K2)<br>3. Airplanes approved for the spin maneuver based on airworthiness category and type certificate. (AI.VI.G.K3)<br>4. Relationship of various factors such as configuration, weight, center of gravity, and control coordination to spins. (AI.VI.G.K4)<br>5. Flight situations where unintentional spins may occur. (AI.VI.G.K5)<br>6. How to recognize and recover from imminent, unintentional spins. (AI.VI.G.K6)<br>7. Entry procedure and minimum entry altitude for intentional spins. (AI.VI.G.K7)<br>8. Control procedure to maintain a stabilized spin. (AI.VI.G.K8)<br>9. Orientation during a spin. (AI.VI.G.K9)<br>10. Which instrument(s) are reliable for determining the direction of spin to affect recovery and which are not. (AI.VI.G.K10)<br>11. Recovery procedure and minimum recovery altitude for intentional spins. (AI.VI.G.K11)<br>12. Effects of inappropriate recovery control inputs. (AI.VI.G.K12)<br>13. Common errors related to performing spins. (AI.VI.G.K13) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain a spin. (AI.VI.G.S1)<br>2. Analyze and correct simulated common errors related to spins. (AI.VI.G.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.G.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.G.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.G.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.G.R4)<br>5. Uncoordinated flight. (AI.VI.G.R5)<br>6. Understanding the hazards associated with the improper application of flight control inputs during the spin recovery. (AI.VI.G.R6) |

| Task | *H. Accelerated Maneuver Stalls (Demonstration)* |
|---|---|
| **Reference** | FAA-H-8083-3, Private Pilot – Airplane ACS; POH/AM. |
| **Objective** | To determine the applicant exhibits instructional competence in the elements, skills, and risk management associated with demonstrating accelerated maneuver stalls. |
| **Knowledge** | The applicant demonstrates understanding by describing:<br>1. Aerodynamics of accelerated maneuver stalls in various aircraft configurations and attitudes. (AI.VI.H.K1)<br>2. The maneuver in relation to realistic flight scenarios. (AI.VI.H.K2)<br>3. Circumstances that can lead to an inadvertent spin. (AI.VI.H.K3)<br>4. Approach to stall and full stall indications. (AI.VI.H.K4)<br>5. Aircraft inputs required to maintain heading or bank angle. (AI.VI.H.K5)<br>6. Efficient stall recovery procedure. (AI.VI.H.K6)<br>7. Importance of establishing the correct aircraft configuration during the recovery process and the consequences of failing to do so, as applicable. (AI.VI.H.K7)<br>8. Hazards of accelerated stalls during stall or spin recovery (AI.VI.H.K8)<br>9. Entry procedure and minimum entry altitude. (AI.VI.H.K9)<br>10. Recognition of the accelerated stall. (AI.VI.H.K10)<br>11. Recovery procedure and minimum recovery altitude. (AI.VI.H.K11) |
| **Skills** | The applicant demonstrates instructional ability to:<br>1. Demonstrate and simultaneously explain accelerated maneuver stall. (AI.VI.H.S1)<br>2. Analyze and correct simulated common errors related to accelerated stalls. (AI.VI.H.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (AI.VI.H.R1)<br>2. Recognizing and responding appropriately to all indications of high angle of attack, to include aircraft performance indications, airframe buffet, and stall warning systems. (AI.VI.H.R2)<br>3. Understanding how environmental elements affect aircraft performance. (AI.VI.H.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (AI.VI.H.R4)<br>5. Scenarios during which an accelerated stall can occur. (AI.VI.H.R5) |

## SECTION 3: CFI INSTRUMENT AIRPLANE AND HELICOPTER

### *Completion Standards*

A. Knowledge Test

   (1) Pass the appropriate Knowledge Test.

B. Practical Test

   (1) To determine the instructor-applicant can:

      (a) Demonstrate instructional competence in the tasks;

      (b) Facilitate the learning of subject material;

      (c) Explain and demonstrate the maneuvers;

      (d) Exemplify risk management skills;

      (e) Promote professionalism; and

      (f) Analyze and correct common student errors found in the Instrument Rating ACS.

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## SECTION 4: CFI ROTORCRAFT HELICOPTER

### *Completion Standards*

A. Knowledge Test

  (1) Pass the appropriate Knowledge Test.

B. Practical Test

  (1) To determine the instructor-applicant can:

    (a) Demonstrate instructional competence in the tasks;

    (b) Facilitate the learning of subject material;

    (c) Explain and demonstrate the maneuvers;

    (d) Exemplify risk management skills;

    (e) Promote professionalism; and

    (f) Analyze and correct common student errors found in the Commercial Pilot – Rotorcraft (Helicopter and Gyroplane).

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## SECTION 5: CFI GLIDER

### *Completion Standards*

A. Knowledge Test

(1) Pass the appropriate Knowledge Test.

B. Practical Test

(1) To determine the instructor-applicant can:

(a) Demonstrate instructional competence in the tasks;

(b) Facilitate the learning of subject material;

(c) Explain and demonstrate the maneuvers;

(d) Exemplify risk management skills;

(e) Promote professionalism; and

(f) Analyze and correct common student errors found in the Commercial Pilot – Glider ACS, and the Areas of Operation in this ACS:

I. Fundamentals of Instructing
II. Technical Subject Areas (ACS System Reference)
III. Preflight Preparation
IV. Preflight Lesson on a Maneuver to be Performed in Flight
V. Fundamentals of Flight
VI. Slow Flight, Stalls, and Spins

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## SECTION 6: CFI SPORT PILOT

### *Completion Standards*

A. Knowledge Test

(1) Pass the appropriate Knowledge Test.

B. Practical Test

(1) To determine the instructor-applicant can:

(a) Demonstrate instructional competence in the tasks;

(b) Facilitate the learning of subject material;

(c) Explain and demonstrate the maneuvers;

(d) Exemplify risk management skills;

(e) Promote professionalism; and

(f) Analyze and correct common student errors found in the Sport Pilot ACS (appropriate exceptions/additions for category & class), and the following Areas of Operation in this ACS:

I. Fundamentals of Instructing
II. Technical Subject Areas (ACS System Reference)
IV. Preflight Lesson on a Maneuver to be Performed in Flight

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## APPENDIX 1: REFERENCES

This ACS is based on the following 14 CFR parts, FAA guidance material, manufacturer's publications, and other documents.

| | |
|---|---|
| 14 CFR part 1 | Definition and Abbreviations |
| 14 CFR part 23 | Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes |
| 14 CFR part 39 | Airworthiness Directives |
| 14 CFR part 43 | Maintenance, Preventive Maintenance, Rebuilding, and Alteration |
| 14 CFR part 61 | Certification: Pilots, Flight Instructors, and Ground Instructors |
| 14 CFR part 67 | Medical Standards and Certification |
| 14 CFR part 91 | General Operating and Flight Rules |
| 49 CFR (NTSB) part 830 | Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records |
| AC 00-2 | Storage and Distribution of Aeronautical Supplies |
| AC 61-65 | Certification: Pilots and Flight and Ground Instructors |
| AIM | Aeronautical Information Manual |
| POH/AFM | Pilot's Operating Handbook/FAA-Approved Aircraft Flight Manual |
| FAA-H-8083-3 | Airplane Flying Handbook |
| FAA-H-8083-9 | Aviation Instructor's Handbook |
| FAA-H-8083-23 | Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook |
| FAA-H-8083-25 | Pilot's Handbook of Aeronautical Knowledge |
| TBD | Commercial Pilot – Airplane Airman Certification Standards |
| TBD | Private Pilot – Airplane Airman Certification Standards |

**NOTE:** Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.

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## APPENDIX 2: ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this ACS.

| | |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| AFA | Flight Instructor – Airplane-Added Rating |
| AFG | Flight Instructor – Glider – Added Rating |
| AFM | Airplane Flight Manual |
| AFS | Flight Standards Service |
| AGI | Advanced Ground Instructor |
| AGL | Above Ground Level |
| AIF | Flight instructor – Instrument Airplane – Added Rating |
| AME | Airplane Multiengine |
| AOA | Airport Operations Area |
| ASE | Airplane Single Engine |
| BGI | Basic Ground Instructor |
| FAA | Federal Aviation Administration |
| FADEC | Full Authority Digital Engine Control |
| FIA | Flight Instructor – Airplane |
| FIG | Flight Instructor – Glider |
| FIH | Flight Instructor – Instrument Helicopter |
| FII | Flight Instructor – Instrument Airplane |
| FOI | Fundamentals of Instructing |
| FRG | Flight Instructor – Gyroplane |
| FRH | Flight Instructor – Rotorcraft Helicopter |
| G | Glider |
| GFA | Flight Instructor – Gyroplane – Added Rating |
| HFA | Flight Instructor – Helicopter– Added Rating |
| HIF | Flight Instructor – Instrument Helicopter – Added Rating |
| IA | Instrument Airplane |
| IGI | Instrument Ground Instructor |
| IH | Instrument Helicopter |
| IMC | Instrument Meteorological Conditions |
| LCG | Learner-Centered Grading |
| MCI | Military Competency Instructor |
| NAS | National Airspace System |
| NTSB | National Transportation Safety Board |
| POH | Pilot's Operating Handbook |
| PTS | Practical Test Standards |
| RG | Rotorcraft Gyroplane |
| RH | Rotorcraft Helicopter |
| SIA | Flight Instructor – Sport Airplane |
| SIB | Flight Instructor – Sport Balloon |
| SIG | Flight Instructor – Sport Glider |
| SIL | Flight Instructor – Sport Lighter-Than-Air (Airship) |
| SIP | Flight Instructor – Sport Powered Parachute |
| SIW | Flight Instructor – Sport Weight-Shift-Control |
| SIY | Flight Instructor – Sport Gyroplane |
| SMS | Safety Management System |

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# APPENDIX E: FEDERAL REGISTER NOTICE + COMMENTS ON AUTHORIZED INSTRUCTOR, PRIVATE PILOT + INSTRUMENT RATING ACS DOCUMENTS

The ATST WG published the first draft of the Authorized Instructor Airman Certification Standards (ACS), as well as the second draft of the Private Pilot – Airplane ACS and Instrument Rating ACS for comment on July 24, 2013.[14] This appendix includes the Notice of Request for Comment published in the *Federal Register*, as well as a summary of the 34 comments received and reviewed by the ATST WG.

**NOTE:** The Summary of Comments appears first as an integrated component of this appendix, and the Notice of availability; request for comments published in the *Federal Register* on July 24, 2013 immediately follows as a stand-alone document.

## Summary of Comments in Response to *Federal Register* Notice of Availability (Docket No. FAA-2013-0649)

The ATST WG received 34 comments on the following documents, which were published in Docket No. FAA-2013-0649:

- Airman Certification Standards – Frequently Asked Questions
- Draft Private Pilot – Airplane Airman Certification Standards
- Draft Instrument Rating Airman Certification Standards
- Draft Authorized Instructor Airman Certification Standards

The ATST WG tracked all comments received. The comments were addressed in the following groups:

(1) General Comments on the ACS Concept: The ATST WG reviewed and considered the general comments on the ACS concept. In responding to these comments, the ATST WG refined Frequently Asked Questions (FAQ) document and addressed questions on implementation of the ACS concept in the ATST WG Report to the ARAC.

(2) Comments on Draft Private Pilot ACS: The Private Pilot Subgroup reviewed and addressed each specific comment on the draft Private Pilot ACS, and the majority of the specific comments resulted in revisions to the document. The Private Pilot Subgroup further noted that helicopter references will be included in Private-Helicopter ACS and changing the stall demonstration requirements falls outside the ATST WG tasking.

[14] 78 FR 44619 (Docket No. FAA-2013-0649).

(3) Comments on Draft Instrument Rating ACS: The Instrument Subgroup reviewed the comments applicable to the draft Instrument ACS, but did not make any significant revisions to the document. The Instrument Subgroup also noted that helicopter references will be included in Private-Helicopter ACS and changing the stall demonstration requirements falls outside the ATST WG tasking.

(4) Comments on Draft Authorized Instructor ACS: The Instructor Subgroup reviewed the comments applicable to the draft Authorized Instructor ACS, and the majority of the specific comments resulted in revisions to the document. The Instructor Subgroup also noted that changes to the equipment (aircraft) requirements for the practical test, as well as changes to the spin endorsement process, fall outside the scope of the ATST WG tasking.

(5) Comments on Terminology: The ATST WG noted that the term “airman” is used in 14 CFR to encompass the full range of aviation functions that require an FAA certificate or rating. The members further noted not all airman certificates and ratings are for pilots or aviators; some apply to aircraft maintenance technicians, dispatchers, and other specialties. In addition, changes to 14 CFR fall outside the scope of the ATST WG tasking.

## Strategy for Dispositioning Comments

The ATST WG tracked the 34 comments, including commenter and date of submission. Multiple ATST WG subgroups reviewed and dispositioned the comments by noting whether the comment was incorporated (in the case of specific substantive comments) in a subsequent draft of the applicable ACS document(s) and/or how the comment was addressed. The complete matrix will be submitted to the FAA for further review and consideration with the complete package of documents comprising the ATST WG work product developed as a part of this endeavor.

Authority 234, dated October 1, 1999, which remains in effect.

This delegation of authority shall be published in the **Federal Register**.

Dated: July 15, 2013.

**John F. Kerry,**

*Secretary of State.*

[FR Doc. 2013–17802 Filed 7–23–13; 8:45 am]

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

**[Docket No: FAA–2013–0649]**

### Aviation Rulemaking Advisory Committee (ARAC) Airman Testing Standards and Training Working Group (ATSTWG)

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of Request for Comment

**SUMMARY:** This notice announces the availability of additional draft Airman Certification Standards (ACS) documents developed by the ATSTWG for the authorized instructor certificate, the private pilot certificate and the instrument rating. These documents are available for public review, download, and comment.

**DATES:** Send comments on or before August 23, 2013.

**ADDRESSES:** Send comments identified by docket number FAA–2013–0649 using any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov* and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M–30; U.S. Department of Transportation (DOT), 1200 New Jersey Avenue SE., Room W12–140, West Building Ground Floor, Washington, DC 20590–0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at (202) 493–2251.

*Privacy:* The FAA will post all comments it receives, without change, to *http://www.regulations.gov,* including any personal information the commenter provides. Using the search function of the docket Web site, anyone can find and read the electronic form of all comments received into any FAA dockets, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the **Federal Register** published on April 11, 2000 (65 FR 19477–19478), as well as at *http://DocketsInfo.dot.gov.*

*Docket:* Background documents or comments received may be read at *http://www.regulations.gov* at any time. Follow the online instructions for accessing the docket or Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Van L. Kerns, Manager, Regulatory Support Division, FAA Flight Standards Service, AFS 600, FAA Mike Monroney Aeronautical Center, P.O. Box 25082, Oklahoma City, OK 73125; telephone (405) 954–4431, email *van.l.kerns@faa.gov.*

**SUPPLEMENTARY INFORMATION:**

### Background

On August 30, 2012, the ARAC Executive Committee accepted the FAA's assignment of a new task arising from recommendations of the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC). The ARC recommended ways to ensure that the FAA's airman testing and training materials better support reduction of fatal general aviation accidents. The new task instructed the ARAC to integrate aeronautical knowledge and flight proficiency requirements for the private pilot and flight instructor certificates and the instrument rating into a single ACS document for each type of certificate and rating; to develop a detailed proposal to realign FAA training handbooks with the ACS documents; and to propose knowledge test item bank questions consistent with the integrated ACS documents and the principles set forth in the ARC's recommendations.

The FAA announced the ARAC's acceptance of this task through a **Federal Register** Notice published on September 12, 2012 [77 FR 56251]. This Notice described the task elements and solicited participants for the ATSTWG, which subsequently formed and began its work in November 2012.

Consistent with the first part of this tasking, the ATSTWG developed draft ACS documents that align the aeronautical knowledge testing standards with the flight proficiency standards set out in the existing Practical Test Standards (PTS). In addition to supporting the FAA's effort to improve the relevance, reliability, validity, and effectiveness of aeronautical testing and training materials, the draft ACS documents support the FAA's goal of reducing fatal general aviation accidents by incorporating task-specific risk management considerations into each Area of Operation.

The ATSTWG completed its initial work on the ACS for the private pilot certificate and the instrument rating in April, 2013. At the request of the ATSTWG, the FAA made these documents available for public comment through docket number FAA–2013–0316. The comment period for the notice published on April 24, 2013 (78 FR 24289) closed May 24, 2013. Also at the request of the ATSTWG, the FAA reopened the comment period until July 8, 2013.

During these periods, the ATSTWG received more than 300 comments and questions on the draft ACS for the private pilot certificate and the instrument rating. The ATSTWG has used these comments to inform and refine its continuing work on this project, and has consequently asked the FAA to make the revised versions of these documents available for on additional period of public review and comment before it completes its work in September, 2013.

In addition, the ATSTWG has completed its initial draft of the authorized instructor ACS document. The purpose of the authorized instructor ACS is to define the acceptable performance standards for instructional knowledge and skill, including the Fundamentals of Instructing (FOI) concepts listed in 14 CFR part 61. Consistent with its desire for comments to help refine its work, the ATSTWG has asked the FAA to make this document available for public comment as well.

In making this document available, the ATSTWG wishes to note that while the draft authorized instructor ACS follows the overall conceptual framework developed for the private pilot ACS and the instrument rating ACS, its construction reflects fundamental differences between the family of pilot certificates/ratings and the instructor certificate. The core of the authorized instructor ACS addresses practical application of the instructional concepts and techniques presented in the traditional FOI. The authorized instructor ACS uses appendices to define the acceptable standards for knowledge, skill, and risk management in the aeronautical proficiency tasks unique to a particular instructor certificate or rating.

The ATSTWG also wishes to emphasize that the authorized instructor ACS is not intended to be a stand-alone document. Rather, it is intended to be used in conjunction with the pilot certificate level or rating ACS for which the instructor-applicant seeks authorization to provide instruction. Therefore, in addition to mastery of the knowledge and skills defined in the authorized instructor ACS, the instructor-applicant must demonstrate instructional competence for Tasks in the ACS for the appropriate certificate level or rating, to include analyzing and correcting common learner errors.

The ATSTWG continues work to complete its remaining assignments. These include developing a detailed proposal to realign and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., handbooks) with each integrated ACS document; and to propose methodologies to ensure that knowledge test item bank questions are consistent with both the ACS documents and the test question development principles set forth in the ARC's recommendations.

The ACS documents are designed as the foundation for transitioning to a more integrated and systematic approach to airman certification testing and training. To accomplish this objective and achieve its overall safety goals, the ACS documents support the safety management system (SMS) framework. SMS methodology provides a systematic approach to achieving acceptable levels of safety risk. The ATSTWG is constructing ACS, associated guidance, and test item bank question components of the airman certification system around the four functional components of SMS:

- *Safety Policy* that demonstrates FAA senior management commitment to continually improve safety through enhancements to the airman certification testing and training system; specifically, better integration of the aeronautical knowledge, flight proficiency, and risk management components of the airman certification system;
- *Safety Risk Management* processes that create a structured means of safety risk management decision making to identify, assess, and determine acceptable level of risk associated with regulatory changes, safety recommendations, or other factors requiring modification of airman testing and training materials;
- *Safety Assurance* processes which allow increased confidence on the part of industry and FAA stakeholders in risk controls through a continual review of FAA products and the systematic, prompt and appropriate incorporation of changes arising from new regulations, data analysis, and safety recommendations; and
- *Safety Promotion* framework to support a positive safety culture in the form of training and ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

Time permitting, and given the foundational nature of the ACS documents and their importance in the ongoing evolution of the FAA's airman certification testing and training system, the ATSTWG wishes to make subsequent revised draft ACS documents for the private pilot certificate and the instrument rating, and of its current initial draft of the authorized instructor ACS, available to the public for one additional period of review and comment before it completes its work in September 2013. The ATSTWG would use the comments it receives to complete its work on this project and to develop its final report and recommendations.

Issued in Washington, DC on July 19, 2013.

**Lirio Liu,**

*Designated Federal Officer, Aviation Rulemaking Advisory Committee.*

[FR Doc. 2013–17782 Filed 7–23–13; 8:45 am]

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## DEPARTMENT OF TRANSPORTATION

### National Highway Traffic Safety Administration

**[Docket No. NHTSA–2013–0045]**

### Reports, Forms and Record Keeping Requirements; Agency Information Collection Activity Under OMB Review

**AGENCY:** National Highway Traffic Safety Administration, DOT.

**ACTION:** Notice.

**SUMMARY:** In compliance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.), this notice announces that the Information Collection Request (ICR) abstracted below will be forwarded to the Office of Management and Budget (OMB) for review and comment. The ICR describes the nature of the information collection and its expected burden. The **Federal Register** Notice with a 60-day comment period was published on April 18, 2013 (78 FR 23330). No comments were received.

*Comments:* Comments should be directed to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street NW., Washington, DC 20503, Attention NHTSA Desk Officer.

*Type of Request:* Extension of a currently approved collection.

*Form Number:* This collection of information uses no standard forms.

**DATES:** Comments must be submitted on or before August 23, 2013.

**FOR FURTHER INFORMATION CONTACT:** John Piazza, National Highway Traffic Safety Administration, Office of the Chief Counsel (NCC–111), (202) 366–9511, 1200 New Jersey Avenue SE., Washington, DC 20590.

**SUPPLEMENTARY INFORMATION:**

**National Highway Traffic Safety Administration**

*Title:* Criminal Penalty Safe Harbor Provision.

*OMB Control Number:* 2127–0609.

*Frequency:* We believe that there will be very few criminal prosecutions under 49 U.S.C. 30170, given the lack of prosecutions under the statute to date. Accordingly, it is not likely to be a substantial motivating force for a submission of a corrected report in response to an agency request for information. See Summary of the Collection of Information below. Based on our experience to date, we estimate that no more than one (1) person per year would be subject to this collection of information, and we do not anticipate receiving more than one report a year from any particular person.

*Affected Public:* This collection of information would apply to any person who seeks a ''safe harbor'' from potential criminal liability under 49 U.S.C. 30170. Thus, the collection of information could apply to the manufacturers, any officers or employees thereof, and other persons who respond or have a duty to respond to an information provision requirement pursuant to 49 U.S.C. 30166 or a regulation, requirement, request or order issued thereunder.

*Abstract:* NHTSA has published a final rule related to ''reasonable time'' and sufficient manner of ''correction,'' as they apply to the safe harbor from criminal penalties, as required by Section 5 of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act (Pub. L. 106–414), which was enacted on November 1, 2000. 65 FR 38380 (July 24, 2001).

*Estimated Annual Burden:* Using the above estimate of one (1) affected person a year, with an estimated two (2) hours of preparation to collect and provide the information, at an assumed rate of $26.70 an hour, the annual, estimated cost of collecting and preparing the

# APPENDIX F: DRAFT COMMERCIAL PILOT ACS + TRACKING MATRIX

Appendix F includes the draft Commercial Pilot – Airplane Airman Certification Standards (ACS), as well as the Tracking Matrix documenting the transition from FAA-S-8081-12C, Commercial Pilot Practical Test Standards (PTS) for Airplane Single- and Multi-Engine Land and Sea to the Commercial Pilot – Airplane ACS.

**NOTE:** The Commercial Pilot Practical Test Standards Tracking Matrix appears first as an integrated component of this appendix, and the draft Commercial Pilot – Airplane ACS immediately follows as a stand-alone document.

**FAA-S-8081-4E, Commercial Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift**
**Section 1: Commercial Pilot – Airplane Single-Engine Land and Single-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.A. | Certificates and Documents | I.A. | Pilot Qualifications | Removed (ASEL and ASES) from name of task—Combined PTS Sections 1 and 2 (Single-Engine and Multi-Engine) so all 4 classes (ASEL, ASES, AMEL, AMES) are represented in the single ACS Section 1.<br><br>Airman Certificate Questions/Regulatory Currency/Medical Certificate Questions should be separated from determining whether the aircraft is airworthy.<br><br>Changed name of task to *Pilot Qualifications*.<br><br>Modified references to be specific to airman certificates. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.B. | Airworthiness Requirements (ASEL and ASES) | I.B. | Airworthiness Requirements | Removed (ASEL and ASES) from name of task.<br><br>Added tasks from Certificates and Documents (now Pilot Qualifications) as they apply to aircraft airworthiness.<br><br>Added reference applicable to aircraft certificates and documents (14 CFR Part 43).<br><br>Accounted for differences with light sport aircraft (how certified, how maintained). |
| I.C. | Weather Information (ASEL and ASES) | I.C. | Weather Information | Removed (ASEL and ASES) from name of task.<br><br>Removed obsolete reference (AC 61-84).<br><br>Need basic meteorology knowledge for risk assessment. |
| I.D. | Cross-Country Flight Planning (ASEL and ASES) | I.D. | Cross-Country Flight Planning | Removed (ASEL and ASES) from name of task.<br><br>Remove obsolete reference (AC61-84).<br><br>Task elements from current guidance relevant to planning and calculating flight plan have been moved to *Pilotage and Dead Reckoning* task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.E. | National Airspace System (ASEL and ASES) | I.E. | National Airspace System | Removed (ASEL and ASES) from name of task. |
| I.F. | Performance and Limitations (ASEL and ASES) | I.F. | Performance and Limitations | Removed (ASEL and ASES) from name of task.<br><br>Removed AC 61-84 (obsolete) from Reference. |
| I.G. | Operation of Systems (ASEL and ASES) | I.G. | Operation of Systems | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| I.H. | Water and Seaplane Characteristics (ASES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task |
| I.I. | Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task; combined Sections 1 and 2 (single-engine and multi-engine) |
| I.J | Aeromedical Factors (ASEL and ASES) | I.H. | Human Factors | Removed (ASEL and ASES) from name of task.<br><br>Added human factors and changed name of task to *Human Factors* . |
| II.A. | Preflight Inspection (ASEL and ASES) | II.A. | Preflight Assessment | Removed (ASEL and ASES) from name of task.<br><br>Change name of task to *Preflight Assessment* to capture risk management aspect of preflight planning. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| II.B. | Cockpit Management (ASEL and ASES) | II.B. | Cockpit Management | Removed (ASEL and ASES) from name of task.<br><br>Added AC 91-21.1, Use of Portable Electronic Devices, to References. |
| II.C. | Engine Starting (ASEL and ASES) | II.C. | Engine Starting | Removed (ASEL and ASES) from name of task. |
| II.D. | Taxiing (ASEL) | II.D. | Taxiing | Removed (ASEL) from name of task & absorbed Runway Markings, Signs and Lighting (Task III.C.) and Runway Incursion Avoidance (Task II.F.). Added A/FD, FAA-H-8083-25, AC 91-73, AC 150-5340-18 to References. |
| II.E. | Taxiing and Sailing (ASES) | II.E. | Taxiing and Sailing (ASES, AMES) | Combined PTS Sections 1 and 2. |
| II.F. | Runway Incursion Avoidance (ASEL and ASES) | - | COMBINED/ABSORBED | Absorbed in *Taxiing* task. |
| II.G. | Before Takeoff Check (ASEL and ASES) | II.E. | Before Takeoff Check | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| III.A. | Radio Communications and ATC Light Signals (ASEL and ASES) | III.A. | Radio Communications and ATC Light Signals | Removed (ASEL and ASES) from name of task & removed ASES reference (FAA-H-8083-23). Added SRM and CRM to RM elements. |
| III.B. | Traffic Patterns (ASEL and ASES) | III.B. | Traffic Patterns | Removed (ASEL and ASES) from name of task per standard throughout ACSs. |
| III.C. | Airport/Seaplane Base, Runway, and Taxiway Signs, Markings, and Lighting (ASEL and ASES) | - | COMBINED/ABSORBED | Absorbed in *Taxiing* ACS task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| IV.A. | Normal and Crosswind Takeoff and Climb (ASEL and ASES) | IV.A. | Normal Takeoff and Climb | Changed name of task to Normal Takeoff and Climb because there are three kinds of approaches and landings (normal, short-field, soft-field) & removed ASES reference (FAA-H-8083-23). |
| IV.B. | Normal and Crosswind Approach and Landing (ASEL and ASES) | IV.B. | Normal Approach and Landing | Changed name of task to Normal Approach and Landing because there are three kinds of approaches and landings (normal, short-field, soft-field) & removed ASES reference (FAA-H-8083-23). |
| IV.C. | Soft-Field Takeoff and Climb (ASEL) | IV.C. | Soft-Field Takeoff and Climb (ASEL) | Removed (ASEL) from name of task. |
| IV.D. | Soft-Field Approach and Landing (ASEL) | IV.D. | Soft-Field Approach and Landing (ASEL) | Removed (ASEL) from name of task. |
| IV.E. | Short-Field Takeoff (Confined Area—ASES) and Maximum Performance Climb (ASEL and ASES) | IV.E. | Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL) | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| IV.F. | Short-Field Approach (Confined Area—ASES) and Landing (ASEL and ASES) | IV.F. | Short-Field Approach and Landing (ASEL, AMEL) | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| | | IV.G. | Confined Area Takeoff and Maximum Performance Climb (ASES, AMES) | Split sea task out of Short-Field Takeoff Land task |
| | | IV.H. | Confined Area Approach and Landing (ASES, AMES) | Split sea task out of Short-Field Approach Land task |
| IV.G. | Glassy Water Takeoff and Climb (ASES) | IV.I. | Glassy Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.H. | Glassy Water Approach and Landing (ASES) | IV.J. | Glassy Water Approach and Landing (ASES, AMES) | Added AMES to name of task |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| IV.I. | Rough Water Takeoff and Climb (ASES) | IV.K. | Rough Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.J. | Rough Water Approach and Landing (ASES) | IV.L. | Rough Water Approach and Landing (ASES, AMES) | Added AMES to name of task |
| IV.K. | Power-Off 180° Accuracy Approach and Landing (ASEL and ASES) | - | COMBINED/ABSORBED | Absorbed into new Emergency Descent and Landing (Simulated) task in Emergency Operations Area of Operations, which combines Power-Off 180° Accuracy Approach and Landing task (IV.K.) and Steep Spiral task (V.B.). Applicant should conduct steep spiral to intended landing point and then perform power-off 180 approach to landing. This maneuver is designed to allow for banked descent without engine power. Practically, this maneuver should terminate with a landing. |
| IV.L. | Go-Around/Rejected Landing (ASEL and ASES) | IV.M. | Go-Around/Rejected Landing | Removed (ASEL and ASES) from name of task & removed ASES reference (FAA-H-8083-23). |
| V.A. | Steep Turns (ASEL and ASES) | V.A. | Steep Turns | Removed (ASEL and ASES) from name of task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| V.B. | Steep Spiral (ASEL and ASES) | - | COMBINED/ABSORBED | Absorbed into new Emergency Descent and Landing (Simulated) task in Emergency Operations Area of Operations, which combines Power-Off 180° Accuracy Approach and Landing task (IV.K.) and Steep Spiral task (V.B.). Applicant should conduct steep spiral to intended landing point and then perform power-off 180 approach to landing. This maneuver is designed to allow for banked descent without engine power. Practically, this maneuver should terminate with a landing. |
| V.C. | Chandelles (ASEL and ASES) | V.B. | Chandelles | Removed (ASEL and ASES) from name of task. Removed (ASEL and ASES) from name of task. Emphasize the practicality of this maneuver rather than the mere performance of it. Applicants must understand when a chandelle is a valuable and worthwhile maneuver to be used in flight, as well as operational parameters that will lead to either the success or failure of the maneuver. |
| V.D. | Lazy Eights (ASEL and ASES) | V.C. | Lazy Eights | Removed (ASEL and ASES) from name of task. |
| VI.A. | Eights on Pylons (ASEL and ASES) | V.D. | Eights on Pylons | Removed (ASEL and ASES) from name of task. |
| VII.A. | Pilotage and Dead Reckoning (ASEL and ASES) | VI.A. | Pilotage and Dead Reckoning | Removed (ASEL and ASES) from name of task. Absorbs flight planning elements from Cross-Country Flight Planning task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| VII.B. | Navigation Systems and Radar Services (ASEL and ASES) | VI.B. | Navigation Systems and Radar Services | Removed (ASEL and ASES) from name of task & eliminated ADF/NDB testing at the Commercial Pilot level. |
| VII.C. | Diversion (ASEL and ASES) | VI.C. | Diversion | Removed (ASEL and ASES) from name of task & suggested removing VHF Direction Finder from all knowledge exams. |
| VII.D. | Lost Procedures (ASEL and ASES) | VI.D. | Lost Procedures | Removed (ASEL and ASES) from name of task & removed references to DF steer. |
| VIII.A. | Maneuvering During Slow Flight (ASEL and ASES) | VII.A. | Maneuvering During Slow Flight | Removed (ASEL and ASES) from name of task. |
| VIII.B. | Power-Off Stalls (ASEL and ASES) | VII.B. | Power-Off Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.C. | Power-On Stalls (ASEL and ASES) | VII.C. | Power-On Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.D. | Accelerated Stalls (ASEL and ASES) | VII.D. | Accelerated Stalls | Removed (ASEL and ASES) from name of task. |
| VIII.E. | Spin Awareness (ASEL and ASES) | VII.E. | Spin Awareness | Removed (ASEL and ASES) from name of task. |
| IX.A. | Emergency Descent (ASEL and ASES) | - | COMBINED/ABSORBED | Absorbed into *Systems and Equipment Malfunctions* task. |
| IX.B. | Emergency Approach and Landing (Simulated) (ASEL and ASES) | VIII.A. | Power Failure at Altitude (Simulated) | Changed name of task to Power Failure at Altitude (Simulated). Removed (ASEL and ASES) from name of task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| | | VIII.B. | Emergency Descent and Landing (Simulated) | Combined Power-Off 180° Accuracy Approach and Landing task (IV.K.) and Steep Spiral task (V.B.) into new Emergency Descent and Landing (Simulated) task in Emergency Operations Area of Operation. Applicant should conduct steep spiral to intended landing point and then perform power-off 180 approach to landing. This maneuver is designed to allow for banked descent without engine power. Practically, this maneuver should terminate with a landing. |
| IX.C. | System and equipment Malfunctions (ASEL and ASES) | VIII.C. | System and equipment Malfunctions | Removed (ASEL and ASES) from name of task & absorbed Emergency Descent task. |
| IX.D. | Emergency Equipment and Survival Gear (ASEL and ASES) | VIII.D. | Emergency Equipment and Survival Gear | Removed (ASEL and ASES) from name of task. |
| X.A. | Supplemental Oxygen (ASEL and ASES) | X.A. | Supplemental Oxygen | Break down the task into Knowledge, Skills, and Risk Management. Removed (ASEL and ASES) from name of task. |
| X.B. | Pressurization (ASEL and ASES) | X.B. | Pressurization | Removed (ASEL and ASES) from name of task. |
| XI.A. | After Landing, Parking, and Securing (ASEL and ASES) | XI.A. | Parking, and Securing | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| XI.B. | Anchoring (ASEL and ASES) | XI.B. | Seaplane Post-Landing Procedures | Combined PTS XII.B., C. D. into a single task |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| XI.C. | Docking and Mooring (ASES) | – | COMBINED/ABSORBED | |
| XI.E. | Ramping/Beaching (ASES) | – | COMBINED/ABSORBED | |

**FAA-S-8081-4E, Commercial Rating Practical Test Standards for Airplane, Helicopter, and Powered Lift**
**Section 2: Commercial Pilot – Airplane Multi-Engine Land and Multi-Engine Sea Areas of Operation**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.A. | Certificates and Documents (AMEL and AMES) | I.A. | Pilot Qualifications | Removed (ASEL and ASES) from name of task—Combined PTS Sections 1 and 2 (Single-Engine and Multi-Engine) so all 4 classes (ASEL, ASES, AMEL, AMES) are represented in the single ACS Section 1.<br><br>Airman Certificate Questions/Regulatory Currency/Medical Certificate Questions should be separated from determining whether the aircraft is airworthy.<br><br>Changed name of task to *Pilot Qualifications* .<br><br>Modified references to be specific to airman certificates. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.B. | Airworthiness Requirements (AMEL and AMES) | I.B. | Airworthiness Requirements | Removed (ASEL and ASES) from name of task.<br><br>Added tasks from Certificates and Documents (now Pilot Qualifications) as they apply to aircraft airworthiness.<br><br>Added reference applicable to aircraft certificates and documents (14 CFR Part 43).<br><br>Accounted for differences with light sport aircraft (how certified, how maintained). |
| I.C. | Weather Information (AMEL and AMES) | I.C. | Weather Information | Removed (ASEL and ASES) from name of task.<br><br>Removed obsolete reference (AC 61-84).<br><br>Need basic meteorology knowledge for risk assessment. |
| I.D. | Cross-Country Flight Planning (AMEL and AMES) | I.D. | Cross-Country Flight Planning | Removed (ASEL and ASES) from name of task.<br><br>Remove obsolete reference (AC61-84).<br><br>Task elements from current guidance relevant to planning and calculating flight plan have been moved to *Pilotage and Dead Reckoning* task. |
| I.E. | National Airspace System (AMEL and AMES) | I.E. | National Airspace System | Removed (ASEL and ASES) from name of task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.F. | Performance and Limitations (AMEL and AMES) | I.F. | Performance and Limitations | Removed (ASEL and ASES) from name of task.<br><br>Removed AC 61-84 (obsolete) from Reference. |
| I.G. | Operation of Systems (AMEL and AMES) | I.G. | Operation of Systems | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| I.H. | Principles of Flight - Engine Inoperative (AMEL and AMES) | I.J. | Principles of Flight - Engine Inoperative (AMEL, AMES) | |
| I.I. | Water and Seaplane Characteristics (AMES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task |
| I.J. | Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (AMES) | I.I. | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, And Aids to Marine Navigation (ASES, AMES) | Combined PTS I.H. and I.I. into a single Task; combined Sections 1 and 2 (single-engine and multi-engine) |
| I.K. | Aeromedical Factors (AMEL and AMES) | I.H. | Human Factors | Removed (ASEL and ASES) from name of task.<br><br>Added human factors and changed name of task to *Human Factors* . |
| II.A. | Preflight Inspection (AMEL and AMES) | II.A. | Preflight Assessment | Removed (ASEL and ASES) from name of task.<br><br>Change name of task to *Preflight Assessment* to capture risk management aspect of preflight planning. |
| II.B. | Cockpit Management (AMEL and AMES) | II.B. | Cockpit Management | Removed (ASEL and ASES) from name of task.<br><br>Added AC 91-21.1, Use of Portable Electronic Devices, to References. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| II.C. | Engine Starting (AMEL and AMES) | II.C. | Engine Starting | Removed (ASEL and ASES) from name of task. |
| II.D. | Taxiing (AMEL) | II.D. | Taxiing | Removed (ASEL) from name of task & absorbed Runway Markings, Signs and Lighting (Task III.C.) and Runway Incursion Avoidance (Task II.F.). Added A/FD, FAA-H-8083-25, AC 91-73, AC 150-5340-18 to References. |
| II.E. | Taxiing and Sailing (AMES) | II.E. | Taxiing and Sailing (ASES, AMES) | Combined PTS Sections 1 and 2 |
| II.F. | Runway Incursion Avoidance (AMEL and AMES) | - | COMBINED/ABSORBED | Absorbed in *Taxiing* task. |
| II.G. | Before Takeoff Check (AMEL and AMES) | II.E. | Before Takeoff Check | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| III.A. | Radio Communications and ATC Light Signals (AMEL and AMES) | III.A. | Radio Communications and ATC Light Signals | Removed (ASEL and ASES) from name of task & removed ASES reference (FAA-H-8083-23). Added SRM and CRM to RM elements. |
| III.B. | Traffic Patterns (AMEL and AMES) | III.B. | Traffic Patterns | Removed (ASEL and ASES) from name of task per standard throughout ACSs. |
| III.C. | Airport/Seaplane Base, Runway, and Taxiway Signs, Markings, and Lighting (AMEL and AMES) | - | COMBINED/ABSORBED | Absorbed in *Taxiing* ACS task. |
| IV.A. | Normal and Crosswind Takeoff and Climb (AMEL and AMES) | IV.A. | Normal Takeoff and Climb | Changed name of task to Normal Takeoff and Climb because there are three kinds of approaches and landings (normal, short-field, soft-field) & removed ASES reference (FAA-H-8083-23). |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| IV.B. | Normal and Crosswind Approach and Landing (AMEL and AMES) | IV.B. | Normal Approach and Landing | Changed name of task to Normal Approach and Landing because there are three kinds of approaches and landings (normal, short-field, soft-field) & removed ASES reference (FAA-H-8083-23). |
| IV.C. | Short-Field Takeoff (Confined Area—AMES) and Maximum Performance Climb (AMEL and AMES) | IV.E. | Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL) | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| IV.D. | Short-Field Approach (Confined Area—AMES) and Landing (AMEL and AMES) | IV.F. | Short-Field Approach and Landing (ASEL, AMEL) | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| | | IV.G. | Confined Area Takeoff and Maximum Performance Climb (ASES, AMES) | Split sea task out of Short-Field Takeoff Land task |
| | | IV.H. | Confined Area Approach and Landing (ASES, AMES) | Split sea task out of Short-Field Approach Land task |
| IV.E. | Glassy Water Takeoff and Climb (AMES) | IV.I. | Glassy Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.F. | Glassy Water Approach and Landing (AMES) | IV.J. | Glassy Water Approach and Landing (ASES, AMES) | Added AMES to name of task |
| IV.G. | Rough Water Takeoff and Climb (AMES) | IV.K. | Rough Water Takeoff and Climb (ASES, AMES) | Added AMES to name of task |
| IV.H. | Rough Water Approach and Landing (AMES) | IV.L. | Rough Water Approach and Landing (ASES, AMES) | Added AMES to name of task |
| IV.I. | Go-Around/Rejected Landing (AMEL and AMES) | IV.M. | Go-Around/Rejected Landing | Removed (ASEL and ASES) from name of task & removed ASES reference (FAA-H-8083-23). |
| V.A. | Steep Turns (AMEL and AMES) | V.A. | Steep Turns | Removed (ASEL and ASES) from name of task. |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| VI.A. | Pilotage and Dead Reckoning (AMEL and AMES) | VI.A. | Pilotage and Dead Reckoning | Removed (ASEL and ASES) from name of task. Absorbs flight planning elements from Cross-Country Flight Planning task. |
| VI.B. | Navigation Systems and Radar Services (AMEL and AMES) | VI.B. | Navigation Systems and Radar Services | Removed (ASEL and ASES) from name of task & eliminated ADF/NDB testing at the Commercial Pilot level. |
| VI.C. | Diversion (AMEL and AMES) | VI.C. | Diversion | Removed (ASEL and ASES) from name of task & suggested removing VHF Direction Finder from all knowledge exams. |
| VI.D. | Lost Procedures (AMEL and AMES) | VI.D. | Lost Procedures | Removed (ASEL and ASES) from name of task & removed references to DF steer. |
| VII.A. | Maneuvering During Slow Flight (AMEL and AMES) | VII.A. | Maneuvering During Slow Flight | Removed (ASEL and ASES) from name of task. |
| VII.B. | Power-Off Stalls (AMEL and AMES) | VII.B. | Power-Off Stalls | Removed (ASEL and ASES) from name of task. |
| VII.C. | Power-On Stalls (AMEL and AMES) | VII.C. | Power-On Stalls | Removed (ASEL and ASES) from name of task. |
| VII.D. | Accelerated Stalls (AMEL and AMES) | VII.D. | Accelerated Stalls | Removed (ASEL and ASES) from name of task. |
| VII.E. | Spin Awareness (AMEL and AMES) | VII.E. | Spin Awareness | Removed (ASEL and ASES) from name of task. |
| VIII.A. | Emergency Descent (AMEL and AMES) | - | COMBINED/ABSORBED | Absorbed into *Systems and Equipment Malfunctions* task. |
| VIII.B. | Engine Failure During Takeoff Before $V_{MC}$ (Simulated) (AMEL and AMES) | VIII.E. | Engine Failure During Takeoff Before $V_{MC}$ (Simulated) (AMEL, AMES) | |
| VIII.C. | Engine Failure After Lift-Off (Simulated) (AMEL and AMES) | VIII.F. | Engine Failure After Lift-Off (Simulated) (AMEL, AMES) | |
| VIII.D. | Approach and Landing with an Inoperative Engine (Simulated) (AMEL and AMES) | VIII.G. | Approach and Landing with an Inoperative Engine (Simulated) (AMEL, AMES) | |
| VIII.E. | Systems and Equipment Malfunctions (AMEL and AMES) | VIII.C. | Systems and Equipment Malfunctions | |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| VIII.F. | Emergency Equipment and Survival Gear (AMEL and AMES) | VIII.D. | Emergency Equipment and Survival Gear | |
| IX.A. | Supplemental Oxygen (AMEL and AMES) | X.A. | Supplemental Oxygen | |
| IX.B. | Pressurization (AMEL and AMES) | X.B. | Pressurization | |
| X.A. | Maneuvering with One Engine Inoperative (AMEL and AMES) | IX.A. | Maneuvering with One Engine Inoperative (AMEL and AMES) | |
| X.B. | $V_{MC}$ Demonstration (AMEL and AMES) | IX.B. | $V_{MC}$ Demonstration (AMEL and AMES) | |
| X.C. | Engine Failure During Flight (by Reference to Instruments) (AMEL and AMES) | IX.C. | Engine Failure During Flight (by Reference to Instruments) (AMEL and AMES) | |
| X.D. | Instrument Approach One Engine Inoperative (by Reference to Instruments) (AMEL and AMES) | IX.D. | Instrument Approach One Engine Inoperative (by Reference to Instruments) (AMEL and AMES) | |
| XI.A. | After Landing, Parking, and Securing (AMEL and AMES) | XI.A. | Parking, and Securing | Removed (ASEL and ASES) from name of task.<br><br>Removed ASES reference (FAA-H-8083-23). |
| XI.B. | Anchoring (AMES) | XI.B. | Seaplane Post-Landing Procedures | Combined PTS XII.B., C. D. into a single task |
| XI.C. | Docking and Mooring (AMES) | – | COMBINED/ABSORBED | |
| XI.D. | Ramping/Beaching (AMES) | – | COMBINED/ABSORBED | |

FAA-S-8081-XX

U.S. Department
of Transportation

**Federal Aviation
Administration**

# COMMERCIAL PILOT – AIRPLANE

## Airman Certification Standards



Date TBD

**FLIGHT STANDARDS SERVICE**
**Washington, DC 20591**

**ACKNOWLEDGMENTS**

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, AFS-630, P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

**AVAILABILITY**

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

**FOREWORD**

The Federal Aviation Administration (FAA) has published the Commercial Pilot—Airplane Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, flight proficiency, and risk management standards for commercial pilot certification in the airplane category, single-engine land and sea; and multiengine land and sea classes. This ACS incorporates and supersedes the previous Practical Test Standards (PTS).

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing to an acceptable level. Specifically, the ACS, associated guidance, and test item bank question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which internal and external stakeholders identify and evaluate regulatory changes, safety recommendations, or other factors that require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

In this connection, the FAA gratefully acknowledges and deeply appreciates the many hours that aviation training experts throughout the industry have contributed to the development of this ACS, along with the associated guidance and a more systematic approach to knowledge test question development. This kind of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Acting Director, Flight Standards Service

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# INTRODUCTION

## *Airman Certification Standards Concept*

The goal of the airman certification process is to ensure the applicant possesses the knowledge and skill as well as the ability to manage the risks of flight in order to act as pilot in command consistent with the privileges of the certificate or rating being exercised. In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing.

Historically, these materials have included several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. The Practical Test Standards (PTS) define the acceptable parameters of flight proficiency in the Areas of Operation listed in14 CFR part 61. FAA H-series handbooks, test supplements, and other materials provide guidance to applicants, instructors, and evaluators on aeronautical knowledge, flight proficiency, and risk management.

The FAA recognizes that safe operations in today's complex National Airspace System (NAS) require a more systematic integration of aeronautical knowledge, flight proficiency standards, and risk management. The FAA further recognizes the need to more clearly standardize knowledge, skills, and risk management according to the level of the certificate or rating. To that end, the FAA drew upon the expertise of organizations and individuals across the aviation community to develop the Airman Certification Standards (ACS). The ACS incorporates and supersedes the PTS.

Based on aeronautical knowledge and flight proficiency standards specified in 14 CFR part 61, the ACS integrates the knowledge, skills, and risk management abilities necessary for the safe conduct of each Task. In keeping with this integrated and systematic approach, the knowledge, skills, and risk management sections of each Task stipulate that the applicant must demonstrate understanding of each specific item. The applicant demonstrates this understanding by passing the knowledge exam and practical test.

Throughout this process, the FAA expects evaluators to assess the applicant's mastery of the topic in accordance with the level of learning (i.e., rote, understanding, application, or correlation) most appropriate for the specified Task. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge, experience, and information to the circumstances of the given scenario. The flight portion of the practical test requires the applicant to demonstrate flight proficiency, operational skill, and risk management in accordance with the ACS.

**NOTE:** As used in this ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector, designated pilot examiner, or other individual authorized to conduct a practical test.

### *Using the ACS*

The ACS consists of ***Areas of Operation,*** arranged in a logical sequence that begins with Preflight Preparation and ends with Postflight Procedures. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know and/or do. The ACS then lists the aeronautical knowledge, skills, and risk management considerations relevant to the specific Task, along with the conditions and acceptable standards for performance. The ACS uses ***Notes*** to emphasize special considerations. The FAA will revise the ACS as circumstances require.

The abbreviation(s) within parenthesis immediately following a Task refer to the category and/or class aircraft appropriate to that Task. The meaning of each abbreviation is as follows.

ASEL: Airplane – Single Engine Land
ASES: Airplane – Single-Engine Sea
AMEL: Airplane – Multi Engine Land
AMES: Airplane – Multi Engine Sea

**NOTE:** When administering a test based on this ACS, the Tasks appropriate to the class airplane (ASEL, ASES, AMEL, or AMES) used for the test shall be included in the plan of action. The absence of a class indicates the Task is for all classes.

Each Task in the ACS is coded according to a scheme that includes up to five elements. For example:

**CA.I.C.K1.a:**
**CA** = Applicable ACS (commercial pilot airplane)
**I** = Area of Operation (preflight preparation)
**C** = Task (weather information);
**K1** = Knowledge Task element 1 (weather products required for preflight planning and enroute operations)

**NOTE:** The fifth element may be used to indicate the level of learning: a=rote; b=understanding; c= application; d= correlation.

Knowledge test questions are mapped to the ACS codes, which replace the previous system of “Learning Statement Codes.” Because the airman knowledge test report will list an ACS code that correlates to a specific Task Element for a given Area of Operation and Task, remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient skill(s).

Practical Tests will be based on the ACS in effect the day of the test. The FAA encourages applicants and instructors to use the ACS to measure progress during training, and as a reference to ensure the applicant is adequately prepared for the knowledge and practical tests.

The FAA expects evaluators to adhere to 14 CFR and this ACS. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The terms "should" and "may" denote items that are recommended, but not required.

The applicant must pass the knowledge test before taking the practical test. Further, the applicant must pass the oral portion of the practical test before beginning the flight portion because the oral portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test.

## AIRPLANE—SINGLE ENGINE, MULTI ENGINE LAND AND SEA AREAS OF OPERATION

### I. Preflight Preparation

| **Task** | ***A. Pilot Qualifications*** |
|---|---|
| **Reference** | 14 CFR parts 61, 91, 119; FAA-H-8083-25, FAA-H-8083-23 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with airman and medical certificates including privileges, limitations, currency, and operating as pilot-in-command as a commercial pilot. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Currency, regulatory compliance, privileges and limitations. (CA.I.A.K1)<br>2. Location of airman documents and identification required when exercising commercial pilot privileges. (CA.I.A.K2)<br>3. Inspection of certificate. (CA.I.A.K3)<br>4. Pilot logbook/record-keeping. (CA.I.A.K4)<br>5. Compensation. (CA.I.A.K5)<br>6. Towing. (CA.I.A.K6)<br>7. Category and Class. (CA.I.A.K7)<br>8. Endorsements. (CA.I.A.K8)<br>9. Medical Certificates: class, expiration, privileges, temporary disqualifications. (CA.I.A.K9)<br>10. Drugs, alcohol regulatory restrictions that affect the pilot's ability to operate safely. (CA.I.A.K10) |
| **Skills** | The applicant demonstrates the ability to apply requirements to act as PIC in a scenario given by the evaluator. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distinguishing proficiency vs. currency. (CA.I.A.R1)<br>2. Setting personal minimums. (CA.I.A.R2)<br>3. Maintaining fitness to fly. (CA.I.A.R3)<br>4. Flying unfamiliar aircraft. (CA.I.A.R4)<br>5. Flying with unfamiliar flight display systems or unfamiliar avionics. (CA.I.A.R5) |

<table>
<tr><td>Task</td><td>B. Airworthiness Requirements</td></tr>
<tr><td>Reference</td><td>14 CFR parts 39, 43, 91; FAA-H-8083-25</td></tr>
<tr><td>Objective</td><td>To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with airworthiness requirements, including aircraft certificates and checklist compliance.</td></tr>
<tr><td>Knowledge</td><td>The applicant demonstrates understanding of:<br><br>1. General airworthiness requirements and compliance for airplanes. (CA.I.B.K1)<br>a. Certificate location and expiration dates<br>b. Required inspections<br>c. Inspection requirements<br>2. Individuals who can perform maintenance on the aircraft, including A&P and IA roles in aircraft maintenance. (CA.I.B.K2)<br>3. Pilot-performed preventative maintenance. (CA.I.B.K3)<br>4. Equipment requirements for day and night flight including flying with inoperative equipment (approved Minimum Equipment List (MEL), Kinds of Operation Equipment List (KOEL), required equipment for VFR and IFR flight, required equipment, placards). (CA.I.B.K4)<br>5. Proving airworthiness (specifics of the aircraft–compliance with Airworthiness Directives or Safety Bulletins). (CA.I.B.K5)<br>6. Obtaining a special flight permit. (CA.I.B.K6)<br>7. Experimental aircraft airworthiness. (CA.I.B.K7)<br>8. Equipment malfunctions. (CA.I.B.K8)</td></tr>
<tr><td>Skills</td><td>The applicant demonstrates the ability to:<br>1. Locate aircraft airworthiness information. (CA.I.B.S1)<br>2. Determine the aircraft is airworthy in a scenario given by the evaluator. (CA.I.B.S2)<br>3. Explain conditions where flight can be made with inoperative equipment. (CA.I.B.S3)</td></tr>
<tr><td>Risk Management</td><td>The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Flying with inoperative equipment. (CA.I.B.R1)<br>2. Equipment failure during flight. (CA.I.B.R2)<br>3. Proper reporting discrepancies or placards. (CA.I.B.R3)</td></tr>
</table>

| **Task** | ***C. Weather Information*** |
|---|---|
| **Reference** | 14 CFR part 91; AC 00-6, AC 00-45, FAA-H-8083-25; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with weather information for a flight under visual flight rules (VFR). |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Weather products required for preflight planning and enroute operations. (CA.I.C.K1)<br>2. Current and forecast weather for departure, arrival, enroute phases of flight. (CA.I.C.K2)<br>3. Meteorology applicable to local, departure, enroute, alternate, and destination of VFR flight in VMC to include expected climate and hazardous conditions such as: (CA.I.C.K3)<br>a. Atmospheric composition and stability<br>b. Wind<br>c. Temperature<br>d. Moisture<br>e. Weather system formation, including air masses and fronts<br>f. Clouds<br>g. Turbulence<br>h. Thunderstorms<br>i. Wind shear<br>j. Icing<br>k. Fog<br>l. Frost<br>4. Enroute weather resources. (CA.I.C.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use available aviation weather resources to obtain an adequate weather briefing. (CA.I.C.S1)<br>2. Correlate weather information to determine alternate requirements. (CA.I.C.S2)<br>3. Correlate available weather information to make a competent go-no-go decision. (CA.I.C.S3)<br>4. Perform procedures to update/interpret weather in flight. (CA.I.C.S4)<br>5. Given scenario, divert. (CA.I.C.S5)<br>6. Evaluate environmental conditions using valid and reliable information sources to be able to make a competent go/no-go or diversion decision. (CA.I.C.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Making a valid go/no-go decision. (CA.I.C.R1)<br>2. Weather in flight. (CA.I.C.R2)<br>3. Dynamic weather affecting flight. (CA.I.C.R3)<br>4. Limitations of portable weather equipment. (CA.I.C.R4)<br>5. Limitations of aviation weather reports and forecasts. (CA.I.C.R5)<br>6. Limitations of inflight aviation weather resources. (CA.I.C.R6)<br>7. Identifying alternate airports along the intended route of flight and circumstances that would make diversion prudent. (CA.I.C.R7)<br>8. Identifying weather conditions that may affect the planned flight. (CA.I.C.R8) |

| Task | *D. Cross-Country Flight Planning* |
|---|---|
| Reference | 14 CFR part 91; FAA-H-8083-25; Navigation Charts; A/FD; AIM; NOTAMS |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with cross-country flights and VFR flight planning. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Route planning. (CA.I.D.K1)<br>2. Applying universal coordinated time to flight planning. (CA.I.D.K2)<br>3. Converting and calculating time relative to time zones and ETA. (CA.I.D.K3)<br>4. Calculating heading, speed, course. (CA.I.D.K4)<br>5. Calculating time, rate, distance. (CA.I.D.K5)<br>6. Fuel planning. (CA.I.D.K6)<br>7. Altitude selection accounting for terrain and obstacles, glide distance of aircraft, hemispherical rules, and effect of wind. (CA.I.D.K7)<br>8. Conditions conducive to icing. (CA.I.D.K8)<br>9. Symbology found on VFR charts. (CA.I.D.K9)<br>10. Elements of a VFR flight plan. (CA.I.D.K10)<br>11. Procedures for activating a VFR flight plan in controlled and non-controlled airspace. (CA.I.D.K11) |
| Skills | The applicant demonstrates the ability to:<br>1. Prepare a cross-country flight assigned by the evaluator. (CA.I.D.S1)<br>2. Transfer knowledge used for one region to another region (given local climate, terrain, etc.). (CA.I.D.S2)<br>3. Update fuel planning/manage fuel. (CA.I.D.S3)<br>4. Select appropriate routes, altitudes, and checkpoints. (CA.I.D.S4)<br>5. Recalculate fuel reserves based on a scenario provided by the evaluator. (CA.I.D.S5)<br>6. Create and file a VFR flight plan. (CA.I.D.S6)<br>7. Interpret departure, enroute, arrival, route with reference to proper charts. (CA.I.D.S7)<br>8. Demonstrate diversion to alternate. (CA.I.D.S8) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Pilot. (CA.I.D.R1)<br>2. Aircraft. (CA.I.D.R2)<br>3. Environment. (CA.I.D.R3)<br>4. External pressures. (CA.I.D.R4)<br>5. Lack of appropriate training when flight is planned in an area different from local area such as mountains, high density airspace, or Alaska. (CA.I.D.R5)<br>6. Tendency to complete the flight in spite of changing conditions. (CA.I.D.R6)<br>7. Not maintaining appropriate VFR altitudes for the direction of flight. (CA.I.D.R7)<br>8. Limitations of ATC services. (CA.I.D.R8)<br>9. Establishing conservative fuel reserves. (CA.I.D.R9)<br>10. Planning a route overflying significant environmental influences, such mountains, and large bodies of water. (CA.I.D.R10)<br>11. Overflying areas unsuitable for landing or below personal minimums. (CA.I.D.R11) |

| **Task** | ***E. National Airspace System*** |
|---|---|
| **Reference** | 14 CFR parts 71, 91, 93; Navigation Charts; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the National Airspace System operating under VFR as a commercial pilot. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Kinds of airspace/airspace classes. (CA.I.E.K1)<br>2. Charting symbology. (CA.I.E.K2)<br>3. Requirements for flying in that airspace. (CA.I.E.K3)<br>4. Special use airspace. (CA.I.E.K4)<br>5. Temporary flight restrictions. (CA.I.E.K5)<br>6. Aircraft speed requirements in various classes of airspace. (CA.I.E.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Determine the requirements for flying in particular classes of airspace. (CA.I.E.S1)<br>2. Determine the requirements for flying in special use airspace, and special flight rule airspace. (CA.I.E.S2)<br>3. Properly identify airspace and operate accordingly with regards to communication and equipment requirements. (CA.I.E.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Various classes of airspace. (CA.I.E.R1)<br>2. Maintaining VFR at night underneath airspace. (CA.I.E.R2)<br>3. Special use airspace. (CA.I.E.R3)<br>4. Effectively planning for compliance with or avoidance of specific enroute airspace. (CA.I.E.R4) |

| Task | ***F. Performance and Limitations*** |
|---|---|
| **Reference** | FAA-H-8083-1, FAA-H-8083-25; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with operating an aircraft safely within the parameters of the aircraft performance capabilities and limitations. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Elements related to performance and limitations (takeoff and landing, crosswind and headwind, density altitude, glide performance, weight and balance, climb, cruise, descent) by explaining the use of charts, tables, and data to determine performance. (CA.I.F.K1)<br>2. Factors affecting performance to include atmospheric conditions, pilot technique and aircraft condition, airport environment. (CA.I.F.K2)<br>3. Effects of loading on performance. (CA.I.F.K3)<br>4. Effects of exceeding weight and balance limits. (CA.I.F.K4)<br>5. Effects of weight and balance changes over the course of the flight. (CA.I.F.K5)<br>6. Aerodynamics. (CA.I.F.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Given scenario, compute weight and balance, including practical techniques to resolve out-of-limits calculations. (CA.I.F.S1)<br>2. Use aircraft manufacturer's approved performance charts, tables, and data. (CA.I.F.S2)<br>3. Evaluate takeoff and landing performance based on the values calculated. (CA.I.F.S3)<br>4. Evaluate environmental conditions. (CA.I.F.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performance charts. (CA.I.F.R1)<br>2. Exceeding limitations. (CA.I.F.R2)<br>3. Variations in flight performance resulting in weight and balance changes during flight. (CA.I.F.R3)<br>4. Applying published aircraft performance data to expected performance. (CA.I.F.R4) |

| **Task** | ***G. Operation of Systems*** |
|---|---|
| **Reference** | FAA-H-8083-25, POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the safe operation of systems on the airplane provided for the flight test. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Major components of the systems: (CA.I.G.K2)<br>a. Primary flight controls and trim<br>b. Flaps, leading edge devices, and spoilers<br>c. Powerplant and propeller (basic engine knowledge)<br>d. Landing gear<br>e. Fuel, oil, and hydraulic<br>f. Electrical<br>g. Avionics<br>h. Pitot-static, vacuum/pressure, ADC/AHARS and associated flight instruments<br>i. Environmental<br>j. Deicing and anti-icing<br>2. Normal operation of systems. (CA.I.G.K2)<br>3. Common mistakes made by pilots (operator error). (CA.I.G.K3)<br>4. Abnormal operation of systems (recognition of system failures/malfunctions). (CA.I.G.K4)<br>5. Systems interaction. (CA.I.G.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Explain operation of systems/operate systems. (CA.I.G.S1)<br>2. Use checklist procedures. (CA.I.G.S2)<br>3. Use checklist memory items during emergency operations, as applicable. (CA.I.G.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Handling a failure properly. (CA.I.G.R1)<br>2. Effective troubleshooting of system failures/malfunctions. (CA.I.G.R2)<br>3. Pilot error, including improperly operating the system that creates failure or problem. (CA.I.G.R3)<br>4. Determining and/or declaring an emergency. (CA.I.G.R4)<br>5. Ways to identify system failure, recognizing problems as they develop. (CA.I.G.R5)<br>6. Outside/environmental factors affecting the systems, including improper fueling, carburetor ice, extremely cold temperatures, vapor lock. (CA.I.G.R6) |

| **Task** | ***H. Human Factors*** |
|---|---|
| **Reference** | FAA-H-8083-25; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with personal health, flight physiology and human factors, as it relates to safety of flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The symptoms, recognition, causes, effects, and corrective actions associated with:(Require all) (CA.I.H.K1)<br>a. hypoxia<br>b. hyperventilation<br>c. middle ear and sinus problems<br>d. spatial disorientation<br>e. motion sickness<br>f. carbon monoxide poisoning<br>g. stress and fatigue<br>h. dehydration and improper/insufficient nutrition<br>i. medication (OTC and Prescription)<br>2. The effects of alcohol, drugs, and over-the-counter medications, and associated regulations. (CA.I.H.K2)<br>3. The effects of excess nitrogen during scuba dives upon a pilot or passenger in flight. (CA.I.H.K3)<br>4. Aeronautical decision making as affected by hazardous attitudes. (CA.I.H.K4)<br>5. Vision (including optical illusion, environmental impacts, day/night, haze, sloping runways). (CA.I.H.K5)<br>6. Collision Avoidance (CFIT, scanning, obstacle and wire strike avoidance). (CA.I.H.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform self-assessment including whether he or she is fit for flight. (CA.I.H.S1)<br>2. Show sound decision-making and judgment (based on reality of circumstances). (CA.I.H.S2)<br>3. Perform Safety Risk Management (SRM) tasks: Aeronautical Decision Making (ADM), risk management, automation management, task management, situational awareness, and avoidance of CFIT. (CA.I.H.S3)<br>4. Using examples, account for environmental impacts/visual cues at the airport, as well as at one airport vs. a different airport. (CA.I.H.S4)<br>5. Establish personal limitations. (CA.I.H.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Environmental impacts on medication. (CA.I.H.R1)<br>2. Personal risk factors and the conflict between being goal oriented and personal limitations. (CA.I.H.R2)<br>3. Optical illusions, including awareness, being able to anticipate, and limiting the effects. (CA.I.H.R3<br>4. Circumstances of the flight (day/night, hot/cold) that affect the pilot's physiology. (CA.I.H.R4)<br>5. Inadvertent continued VFR into Instrument Meteorological Conditions (IMC) (check Weather) (CA.I.H.R5)<br>6. Hazardous attitudes. (CA.I.H.R6) |

| | |
|---|---|
| **Task** | ***I. Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES)*** |
| **Reference** | FAA-H-8083-23; AIM; USCG Navigation Rules, International-Inland; POH/AFM; A/FD |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with water and seaplane characteristics, seaplane bases, maritime rules, and aids to marine navigation. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The characteristics of a water surface as affected by features, such as: (CA.I.I.K1)<br>a. size and location<br>b. protected and unprotected areas<br>c. surface wind<br>d. direction and strength of water current<br>e. floating and partially submerged debris<br>f. sandbars, islands, and shoals<br>g. vessel traffic and wakes<br>h. other features peculiar to the area<br>2. Float and hull construction, and their effect on seaplane performance. (CA.I.I.K2)<br>3. Causes of porpoising and skipping, and the pilot action required to prevent or correct these occurrences. (CA.I.I.K3)<br>4. How to locate and identify seaplane bases on charts or in directories. (CA.I.I.K4)<br>5. Operating restrictions at various bases. (CA.I.I.K5)<br>6. Right-of-way, steering, and sailing rules pertinent to seaplane operation. (CA.I.I.K6)<br>7. Marine navigation aids, such as buoys, beacons, lights, and sound signals. (CA.I.I.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Assess the water surface characteristics for today's flight. (CA.I.I.S1)<br>2. Locate and identify seaplane bases for the region. (CA.I.I.S2)<br>3. Identify restrictions at local bases. (CA.I.I.S3)<br>4. Perform correct right-of-way, steering, and sailing operations. (CA.I.I.S4)<br>5. Identify marine navigation aids in the local region. (CA.I.I.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Assessing the local conditions. (CA.I.I.R1)<br>2. The impact of marine traffic. (CA.I.I.R2) |

| **Task** | ***J. Principles of Flight – Engine Inoperative (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25; FAA-P-8740-19, POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the elements related to engine inoperative principles of flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. The “critical engine.” (CA.I.J.K1)<br>2. The effects of density altitude on the Vmc demonstration. (CA.I.J.K2)<br>3. The effects of airplane weight and center of gravity on control. (CA.I.J.K3)<br>4. Relationship of Vmc to stall speed. (CA.I.J.K4)<br>5. Reasons for loss of directional control. (CA.I.J.K5)<br>6. Indications of loss of directional control. (CA.I.J.K6)<br>7. Importance of maintaining the proper pitch and bank attitude, and the proper coordination of controls. (CA.I.J.K7)<br>8. Loss of directional control recovery procedure. (CA.I.J.K8)<br>9. Engine failure during takeoff including planning, decisions, and single-engine operations. (CA.I.J.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Properly plan for engine failure during takeoff. (CA.I.J.S1) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Single-engine operations. (CA.I.J.R1) |

## II. Preflight Procedures

| **Task** | ***A. Preflight Assessment*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with preparing for safe flight accounting for pilot, aircraft, environment, and external factors. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Pilot self-assessment. (CA.II.A.K1)<br>2. Determine if the aircraft is appropriate for the mission by considering load, range, equipment and aircraft ability. (CA.II.A.K2)<br>3. Aircraft preflight inspection including which items must be inspected, the reasons for checking each item, and how to detect possible defects, and the associated regulations. (CA.II.A.K3)<br>4. Environmental factors including weather and flight plan (terrain, route selection, obstructions). (CA.II.A.K4)<br>5. External pressures. (CA.II.A.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use checklist to systematically identify and manage pilot-related risks and personal minimums associated with the flight. (CA.II.A.S1)<br>2. Inspect the airplane with reference to an appropriate checklist. (CA.II.A.S2)<br>3. Verify the airplane is airworthy and in condition for safe flight. (CA.II.A.S3)<br>4. Assess the factors related to the environment (weather, airports, terrain, airspace). (CA.II.A.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Environmental factors. (CA.II.A.R1)<br>2. External pressures. (CA.II.A.R2)<br>3. Aviation security concerns. (CA.II.A.R3) |

| **Task** | ***B. Cockpit Management*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM; AC 91-21.1 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe cockpit management practices. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Pilot and passenger restraint and safety system rules and operational considerations. (CA.II.B.K1)<br>2. Oxygen use regulations, system operational guidelines, and system checks, if applicable. (CA.II.B.K2)<br>3. Passenger briefing requirements and appropriate information. (CA.II.B.K3)<br>4. PIC responsibility to have available material for the flight as planned. (CA.II.B.K4)<br>5. Purpose of a checklist. (CA.II.B.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure all loose items in the cockpit and cabin are secured. (CA.II.B.S1)<br>2. Organize, access, and determine suitability of material, equipment, and technology in an efficient manner. (CA.II.B.S2)<br>3. Brief occupants on the use of safety belts, shoulder harnesses, doors, sterile cockpit, flight control freedom of movement, and emergency procedures. (CA.II.B.S3)<br>4. Properly program the navigational equipment available to the pilot on that particular aircraft. (CA.II.B.S4)<br>5. Brief and execute positive exchange of flight controls and PIC responsibility. (CA.II.B.S5)<br>6. Define who is PIC. (CA.II.B.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Positive exchange of the flight controls. (CA.II.B.R1)<br>2. Suitability of using portable electronic devices. (CA.II.B.R2)<br>3. Ensuring technology is an asset and not a distraction. (CA.II.B.R3)<br>4. Abandoning technology when it is not appropriate. (CA.II.B.R4)<br>5. Recognizing impact of reported discrepancies. (CA.II.B.R5)<br>6. Recognizing passenger behavior that could negatively affect safety. (CA.II.B.R6) |

| Task | *C. Engine Starting* |
|---|---|
| Reference | FAA-H-8083-3, FAA-H-8083-25; AC 91-13, AC 91-55; POH/AFM |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with recommended engine starting procedures including proper airplane positioning. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Options for starting with a weak or depleted battery. (CA.II.C.K1)<br>2. Starting under various atmospheric conditions. (CA.II.C.K2)<br>3. Starting procedures for carbureted and fuel injected engines. (CA.II.C.K3)<br>4. Equipment limitations (starter cycles). (CA.II.C.K4)<br>5. Proper positioning of the aircraft. (CA.II.C.K5) |
| Skills | The applicant demonstrates the ability to:<br>1. Position the airplane properly considering structures, other aircraft, and the safety of nearby persons and property. (CA.II.C.S1)<br>2. Utilize the appropriate checklist for starting procedure. (CA.II.C.S2) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Propeller safety and awareness to include passenger briefing. (CA.II.C.R1)<br>2. Hand propping. (CA.II.C.R2)<br>3. Abnormal start. (CA.II.C.R3)<br>4. Cold weather operation. (CA.II.C.R4)<br>5. Electrical system failure following aircraft engine starts. (CA.II.C.R5)<br>6. Engine fires related to over-priming/cold weather starting. (CA.II.C.R6) |

| Task | *D. Taxiing (ASEL, AMEL)* |
|---|---|
| **Reference** | A/FD; FAA-H-8083-3, FAA-H-8083-25 (Appendix 1); POH/AFM; AC 91-73, AC 150-5340-18 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe taxi operations, including runway incursion avoidance. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind. (CA.II.D.K1)<br>2. Airport markings (including hold short lines), signs, and lights. (CA.II.D.K2)<br>3. Aircraft lighting. (CA.II.D.K3)<br>4. Towered and non-towered airport operations. (CA.II.D.K4)<br>5. Visual indicators for wind. (CA.II.D.K5)<br>6. Airport information resources (A/FD, airport diagram). (CA.II.D.K6)<br>7. Good cockpit discipline during taxi, including maintaining a sterile cockpit, proper speed, separation between other aircraft and vehicles, communication procedures. (CA.II.D.K7)<br>8. Procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC. (CA.II.D.K8)<br>9. Rules for entering or crossing runways. (CA.II.D.K9)<br>10. Procedures unique to night operations. (CA.II.D.K10)<br>11. Hazards of low visibility operations. (CA.II.D.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform a brake check immediately after the airplane begins moving. (CA.II.D.S1)<br>2. Position the flight controls properly for the existing wind conditions. (CA.II.D.S2)<br>3. Control direction and speed without excessive use of brakes. (CA.II.D.S3)<br>4. Exhibit procedures for steering, maneuvering, maintaining taxiway, runway position, and situational awareness to avoid runway incursions. (CA.II.D.S4)<br>5. Exhibit proper positioning of the aircraft relative to hold lines. (CA.II.D.S5)<br>6. Exhibit procedures to ensure clearances/instructions are received, recorded, and read back correctly. (CA.II.D.S6)<br>7. Exhibit situational awareness and taxi procedures in the event the aircraft is on a taxiway that is between parallel runways. (CA.II.D.S7)<br>8. Uses a taxi chart during taxi.(CA.II.D.S8)<br>9. Comply with airport/taxiway markings, signals, ATC clearances and instructions. (CA.II.D.S9)<br>10. Utilize procedures for eliminating pilot distractions to avoid other aircraft or vehicles and hazards. (CA.II.D.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi. (CA.II.D.R1)<br>2. Proper workload management. (CA.II.D.R2)<br>3. Confirmation or expectation bias as related to taxi instructions. (CA.II.D.R3)<br>4. Recording taxi instructions/clearances. (CA.II.D.R4)<br>5. Resource management. (CA.II.D.R5) |

| Task | ***E. Taxiing and Sailing (ASES, AMES)*** |
|---|---|
| **Reference** | A/FD; FAA-H-8083-23, FAA-H-8083-25; POH/AFM; AC 91-73, AC 150-5340-18 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe taxiing and sailing operations, including runway incursion avoidance. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind, water and sailing procedures, including the use of flaps, doors, water rudder, and power so as to follow the desired course while sailing. (CA.II.E.K1)<br>2. Airport markings (including hold short lines), signs, and lights. (CA.II.E.K2)<br>3. Aircraft lighting. (CA.II.E.K3)<br>4. Towered and non-towered airport operations. (CA.II.E.K4)<br>5. Visual indicators for wind. (CA.II.E.K5)<br>6. Airport information resources (A/FD, airport diagram). (CA.II.E.K6)<br>7. Good cockpit discipline during taxi and sailing, including maintaining a sterile cockpit, proper speed, separation between other aircraft and vehicles, communication procedures. (CA.II.E.K7)<br>8. Procedures for appropriate cockpit activities during taxiing and sailing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC. (CA.II.E.K8)<br>9. Rules for entering or crossing runways. (CA.II.E.K9)<br>10. Procedures unique to night operations. (CA.II.E.K10)<br>11. Hazards of low visibility operations, other aircraft and vessels. (CA.II.E.K11)<br>12. Proper engine management including leaning, per manufacturer recommendations (CA.II.E.K12)<br>13. Requesting progressive taxi instructions if there is any doubt on understanding or ability to comply with a taxi clearance. (CA.II.E.K13)<br>14. Proper technique for the conditions, including idle, plow or step taxi, preventing and correcting for porpoising and skipping. (CA.II.E.K14) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform a brake check immediately after the airplane begins moving. (CA.II.E.S1)<br>2. Position the flight controls, flaps, doors, water rudder, and power correctly for the existing wind, water and sailing conditions and to prevent and correct for porpoising and skipping. (CA.II.E.S2)<br>3. Uses the appropriate idle, plow, or step taxi technique. (CA.II.E.S3)<br>4. Exhibit procedures for steering, maneuvering, maintaining taxiway, runway position, and situational awareness to avoid runway incursions. (CA.II.E.S4)<br>5. Plans and follows the most favorable course while taxiing or sailing. Considers wind, water current, water conditions, and maritime regulations, as appropriate. (CA.II.E.S5)<br>6. Exhibit procedures to ensure clearances/instructions are received, recorded, and read back correctly. (CA.II.E.S6)<br>7. Exhibit situational awareness and taxi procedures in the event the aircraft is on a taxiway that is between parallel runways. (CA.II.E.S7)<br>8. Uses an Airport Diagram during taxi.(CA.II.E.S8)<br>9. Comply with airport/taxiway markings, signals, ATC clearances and instructions. (CA.II.E.S9)<br>10. Utilize procedures for eliminating pilot distractions to avoid other aircraft or vehicles and hazards. (CA.II.E.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi. (CA.II.E.R1)<br>2. Proper workload management. (CA.II.E.R2)<br>3. Confirmation or expectation bias as related to taxi instructions. (CA.II.E.R3)<br>4. Recording taxi instructions/clearances. (CA.II.E.R4)<br>5. Resource management. (CA.II.E.R5)<br>6. Porpoising and skipping. (CA.II.E.R6)<br>7. Avoid other aircraft, vessels, and hazards while on the water. (CA.II.E.R7) |

| Task | *F. Before Takeoff Check* |
| --- | --- |
| **Reference** | FAA-H-8083-3, POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with the before takeoff check, including the reasons for checking each item, detecting malfunctions, and ensuring the airplane is in safe operating condition as recommended by the manufacturer. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Purpose of the runup. (CA.II.F.K1)<br>2. Aircraft performance given expected conditions. (CA.II.F.K2)<br>3. Purpose of a checklist. (CA.II.F.K3)<br>3. Wake turbulence avoidance. (CA.II.F.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the airplane properly considering other aircraft, vessels, and wind. (CA.II.F.S1)<br>2. Divide attention inside and outside the cockpit. (CA.II.F.S2)<br>3. Ensure that powerplant and instrumentation are suitable for runup and takeoff. (CA.II.F.S3)<br>4. Accomplish the before takeoff checklist and departure briefing. (CA.II.F.S4)<br>5. Review takeoff performance, such as airspeeds, takeoff distance, departure, and emergency procedures. (CA.II.F.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Division of attention and scanning. (CA.II.F.R1)<br>2. Different runway than expected. (CA.II.F.R2)<br>3. Positive exchange of flight controls. (CA.II.F.R3)<br>4. Wake turbulence and vessel avoidance. (CA.II.F.R4)<br>5. Automation management. (CA.II.F.R5) |

## III. Airport and Seaplane Base Operations

| **Task** | ***A. Communications and Light Gun Signals*** |
|---|---|
| **Reference** | 14 CFR part 91; FAA-H-8083-25; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with normal and emergency radio communications and ATC light signals to conduct radio communications safely while operating the aircraft. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. How to obtain frequency. (CA.III.A.K1)<br>2. Standard communication procedures and ATC standard phraseology. (CA.III.A.K2)<br>3. ATC light signal recognition. (CA.III.A.K3)<br>4. Communication procedures. (CA.III.A.K4)<br>5. Transponders. (CA.III.A.K5)<br>6. Emergency Locator Transmitter. (CA.III.A.K6)<br>7. Radar assistance. (CA.III.A.K7)<br>8. Lost communication procedures. (CA.III.A.K8)<br>9. Use of automated weather and airport information. (CA.III.A.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select appropriate frequencies. (CA.III.A.S1)<br>2. Transmit using standard phraseology and procedures. (CA.III.A.S2)<br>3. Acknowledge radio communications and comply with instructions. (CA.III.A.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Overcoming human factors associated with communication (CA.III.A.R1)<br>2. Overcoming human factors associated with declaring an emergency (CA.III.A.R2)<br>3. Equipment issues that could cause loss of communication. (CA.III.A.R3)<br>4. Automation management. (CA.III.A.R4)<br>5. Single pilot and/or crew resource management. (CA.III.A.R5) |

| Task | ***B. Traffic Patterns*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25, FAA-H-8083-23; AC 90-66; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe operations in and around the airport traffic patterns. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Towered and non-towered airport operations and runway selection. (CA.III.B.K1)<br>2. Airport markings, lighting, wind indicators. (CA.III.B.K2)<br>3. Collision avoidance. (CA.III.B.K3)<br>4. Right-of-way rules. (CA.III.B.K4)<br>5. Wake turbulence recognition and resolution. (CA.III.B.K5)<br>6. Wind shear avoidance. (CA.III.B.K6)<br>7. Runway incursion avoidance. (CA.III.B.K7)<br>8. Use of automated weather and airport information. (CA.III.B.K8)<br>9. Use of radio for proper communications. (CA.III.B.K9)<br>10.Parachuting operations. (CA.III.B.K10)<br>11. Approach and landing considerations for different types of aircraft (CA.III.B.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Properly identify and interpret airport/seaplane base runways, taxiways, markings, and lighting. (CA.III.B.S1)<br>2. Comply with proper traffic pattern procedures. (CA.III.B.S2)<br>3. Maintain proper spacing from other aircraft. (CA.III.B.S3)<br>4. Correct for wind drift to maintain the proper ground track. (CA.III.B.S4)<br>5. Maintain orientation with the runway/landing area in use. (CA.III.B.S5)<br>6. Maintain traffic pattern altitude, ±100 feet, and the appropriate airspeed, ±10 knots. (CA.III.B.S6)<br>7. Maintain an awareness of the position of other aircraft in the pattern. (CA.III.B.S7) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (CA.III.B.R1)<br>2. Scanning. (CA.III.B.R2)<br>3. Wake turbulence. (CA.III.B.R3)<br>4. Lack of situational awareness. (CA.III.B.R4)<br>5. Aircraft separation. (CA.III.B.R5)<br>6. Operating considerations of various aircraft types. (CA.III.B.R6) |

## IV. Takeoffs, Landings, and Go-Arounds

| **Task** | ***A. Normal Takeoff and Climb*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a normal takeoff, climb operations, and rejected takeoff procedures.<br><br>**NOTE:** If a crosswind condition does not exist, the applicant's knowledge of crosswind elements shall be evaluated through oral testing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Takeoff distance. (CA.IV.A.K1)<br>2. Takeoff power. (CA.IV.A.K2)<br>3. Atmospheric conditions. (CA.IV.A.K3)<br>4. Minimum safe altitude. (CA.IV.A.K4)<br>5. Headwind, tailwind, crosswind component. (CA.IV.A.K5)<br>6. Application of $V_X$ or $V_Y$ and variations with altitude. (CA.IV.A.K6)<br>7. Emergency procedures during takeoff and climb. (CA.IV.A.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (CA.IV.A.S1)<br>2. Verify aircraft is on the assigned/correct runway. (CA.IVA.A.S2)<br>3. Ascertain wind direction with or without visible wind direction indicators. (CA.IV.A.S3)<br>4. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations (CA.IV.A.S4)<br>5. Position the flight controls for the existing wind conditions. (CA.IV.A.S5)<br>6. Clear the area; taxi into the takeoff position and align the airplane on the runway center/takeoff path. (CA.IV.A.S6)<br>7. Confirm takeoff power, and proper engine and flight instrument indications prior to rotation. (ASEL, AMEL); Retracts the water rudders, as appropriate, confirm takeoff power, and proper engine instrument indications prior to rotation, establishes and maintains the most efficient planning/lift-off attitude, and corrects for porpoising and skipping (ASES, AMES). (CA.IV.A.S7)<br>8. Rotate and lift off at the recommended airspeed and accelerates to $V_Y$. (CA.IV.A.S8)<br>9. Establish a pitch attitude that will maintain $V_Y \pm 5$ knots. (CA.IV.A.S9)<br>10. Retract the landing gear and flaps in accordance with manufacturer guidance. (CA.IV.A.S10)<br>11. Maintain takeoff power and $V_Y \pm 5$ knots to a safe maneuvering altitude. (CA.IV.A.S11)<br>12. Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (CA.IV.A.S12)<br>13. Comply with noise abatement and published departure procedures. (CA.IV.A.S13)<br>14. Complete the appropriate checklist. (CA.IV.A.S14)<br>15. Comply with manufacturer recommended emergency procedures relating to the takeoff sequence. (CA.IV.A.S15) |

| Task | *A. Normal Takeoff and Climb* |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability, and aircraft limitations (CA.IV.A.R1)<br>2. Determining if crosswind component exceeds pilot ability or aircraft capability. (CA.IV.A.R2)<br>3. Windshear. (CA.IV.A.R3)<br>4. Tailwinds. (CA.IV.A.R4)<br>5. Wake turbulence. (CA.IV.A.R5)<br>6. Go/no go decision making. (CA.IV.A.R6)<br>7. Task management. (CA.IV.A.R7)<br>8. Low altitude maneuvering. (CA.IV.A.R8)<br>9. Wire strikes. (CA.IV.A.R9)<br>10. Situational awareness of obstacles on departure path. (CA.IV.A.R10)<br>11. Recognition of need for rejected takeoff and predetermines takeoff abort point. (CA.IV.A.R11)<br>12. Handling engine failure during takeoff and climb. (CA.IV.A.R12)<br>13. Criticality of takeoff distance available. (CA.IV.A.R13)<br>14. Plans for engine-failure after takeoff. (CA.IV.A.R14)<br>15. Sterile cockpit. (CA.IV.A.R15) |

| **Task** | ***B. Normal Approach and Landing*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a normal approach and landing with emphasis on proper use and coordination of flight controls.<br><br>**NOTE:** If a crosswind condition does not exist, the applicant's knowledge of crosswind elements shall be evaluated through oral testing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Available landing distance (ALD). (CA.IV.B.K1)<br>2. Stabilized approach. (CA.IV.B.K2)<br>3. Energy management. (CA.IV.B.K3)<br>4. Atmospheric conditions. (CA.IV.B.K4)<br>5. Headwind, tailwind, crosswind component. (CA.IV.B.K5)<br>6. Emergency procedures during approach and landing. (CA.IV.B.K6)<br>7. Land and hold short operations. (CA.IV.B.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway. (CA.IV.B.S1)<br>2. Scan the landing runway/areas and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (CA.IV.B.S2)<br>3. Complete the appropriate checklist. (CA.IV.B.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and selects a suitable touchdown point prior to the 1000 foot distance markers (if available), or within the first 1/3 of the runway length. (CA.IV.B.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjusts pitch attitude and power as required. (CA.IV.B.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied $\pm$5 knots. (CA.IV.B.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown (ASEL, AMEL); Make smooth, timely, and correct control application during the round out and touchdown to contact the water at the proper pitch attitude (ASES, AMES). (CA.IV.B.S7)<br>8. Touch down smoothly at a speed that provides little or no aerodynamic lift. (CA.IV.B.S8)<br>9. Touch down within the available runway, within 200 feet beyond a specified point with no drift, and with the airplane's longitudinal axis aligned with and over the runway centerline. (CA.IV.B.S9)<br>10. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.IV.B.S10)<br>11. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (CA.IV.B.S11)<br>12. Utilize after landing runway incursion avoidance procedures. (CA.IV.B.S12) |

| **Task** | ***B. Normal Approach and Landing*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability and aircraft limitations – considering possibility of selecting a runway at a different airport. (CA.IV.B.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations(CA.IV.B.R2)<br>3. Windshear. (CA.IV.B.R3)<br>4. Tailwinds. (CA.IV.B.R4)<br>5. Wake turbulence. (CA.IV.B.R5)<br>6. Task management. (CA.IV.B.R6)<br>7. Low altitude maneuvering. (CA.IV.B.R7)<br>8. Wire strikes. (CA.IV.B.R8)<br>9. Collision Avoidance. (CA.IV.B.R9)<br>10. Right-of-way. (CA.IV.B.R10)<br>11. Situational awareness of obstacles on approach and departure paths. (CA.IV.B.R11)<br>12. Recognition of need for go-around/rejected landing. (CA.IV.B.R12)<br>13. Stall/spin awareness. (CA.IV.B.R13)<br>14. Land and hold short operations. (CA.IV.B.R14)<br>15. Maintain a sterile cockpit. (CA.IV.B.R15) |

| **Task** | ***C. Soft-Field Takeoff and Climb (ASEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a soft-field takeoff, climb operations, and rejected takeoff procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Importance of weight transfer from wheels to wings. (CA.IV.C.K1)<br>2. Awareness of additional left turning tendencies. (CA.IV.C.K2)<br>3. Effects of aircraft configuration. (CA.IV.C.K3)<br>4. Effects of runway surface. (CA.IV.C.K4)<br>5. Takeoff distance. (CA.IV.C.K5)<br>6. Takeoff power. (CA.IV.C.K6)<br>7. Wind conditions and effects. (CA.IV.C.K7)<br>8. Density altitude. (CA.IV.C.K8)<br>9. Headwind, tailwind, crosswind component. (CA.IV.C.K9)<br>10. Application of $V_X$ or $V_Y$. (CA.IV.C.K10)<br>11. Emergency procedures during takeoff and climb. (CA.IV.C.K11)<br>12. Hazards of other than hard surfaced runway. (CA.IV.C.K12) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (CA.IV.S.S1)<br>2. Ensure the aircraft is properly configured. (CA.IV.C.S2)<br>3. Ensure the aircraft is on the correct takeoff runway. (CA.IV.C.S3)<br>4. Ascertain wind direction with or without visible wind direction indicators. (CA.IV.C.S4)<br>5. Calculate the crosswind component and determine if it is above his or her ability or that of the aircraft's capability. (CA.IV.C.S5)<br>6. Position the flight controls for the existing wind conditions. (CA.IV.C.S6)<br>7. Clear the area; taxi into the takeoff position and align the airplane on the runway center without stopping while advancing the throttle smoothly to takeoff power. (CA.IV.C.S7)<br>8. Confirm takeoff power, and proper engine and flight instrument indications prior to rotation. (CA.IV.C.S8)<br>9. Establish and maintain a pitch attitude that will transfer the weight of the airplane from the wheels to the wings as rapidly as possible. (CA.IV.C.S9)<br>10. Rotate and lift off at the lowest possible airspeed consistent with safety and remains in ground effect while accelerating to $V_X$ or $V_Y$, as appropriate. (CA.IV.C.S10)<br>11. Establish a pitch attitude for $V_X$ or $V_Y$, as appropriate, and maintains selected airspeed ±5 knots during the climb. (CA.IV.C.S11)<br>12. Retract landing gear and flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (CA.IV.C.S12)<br>13. Maintain takeoff power and $V_X$ or $V_Y$ ±5 knots to a safe maneuvering altitude. (CA.IV.C.S13)<br>14. Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (CA.IV.C.S14)<br>15. Comply with noise abatement and published departure procedures. (CA.IV.C.S15)<br>16. Complete the appropriate checklist. (CA.IV.C.S16)<br>17. Comply with manufacturer recommended emergency procedures relating to the takeoff sequence. (CA.IV.C.S17) |

*Task continued on next page.*

| **Task** | ***C. Soft-Field Takeoff and Climb (ASEL)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability, and aircraft limitations. (CA.IV.C.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations(CA.IV.C.R2)<br>3. Other than hard surfaced runway. (CA.IV.C.R3)<br>4. Windshear. (CA.IV.C.R4)<br>5. Tailwinds. (CA.IV.C.R5)<br>6. Wake turbulence. (CA.IV.C.R6)<br>7. Go/no go decision making. (CA.IV.C.R7)<br>8. Task management. (CA.IV.C.R8)<br>9. Low altitude maneuvering. (CA.IV.C.R9)<br>10. Wire strikes. (CA.IV.C.R10)<br>11. Minimum safe altitude for climb. (CA.IV.C.R11)<br>12. Situational awareness of obstacles on departure path. (CA.IV.C.R12)<br>13. Recognition of need for rejected takeoff and predetermines takeoff abort point. (CA.IV.C.R13)<br>14. Strategies for handling engine failure during takeoff and climb. (CA.IV.C.R14)<br>15. Make a determination of when a soft field takeoff technique is required. (CA.IV.C.R15)<br>16. Criticality of takeoff distance available. (CA.IV.C.R16)<br>17. Plans for engine-failure after takeoff. (CA.IV.C.R17)<br>18. Sterile cockpit. (CA.IV.C.R18) |

| **Task** | ***D. Soft-Field Approach and Landing (ASEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a soft-field approach and landing with emphasis on proper use and coordination of flight controls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (CA.IV.D.K1)<br>2. Hazards of other than hard surfaced runway. (CA.IV.D.K2)<br>3. Stabilized approach. (CA.IV.D.K3)<br>4. Energy management. (CA.IV.D.K4)<br>5. Wind conditions and effects. (CA.IV.D.K5)<br>6. Density altitude. (CA.IV.D.K6)<br>7. Headwind, tailwind, crosswind component. (CA.IV.D.K7)<br>8. Emergency procedures during approach and landing. (CA.IV.D.K8) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway. (CA.IV.D.S1)<br>2. Scan the landing runway and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (CA.IV.D.S2)<br>3. Complete the appropriate checklist. (CA.IV.D.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and selects a suitable touchdown point. (CA.IV.D.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjusts pitch attitude and power as required. (CA.IV.D.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, ±5 knots. (CA.IV.D.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown and, for tricycle gear airplanes, keep the nose wheel off the surface until loss of elevator effectiveness. (CA.IV.D.S7)<br>8. Touch down softly with no drift, and with the airplane's longitudinal axis aligned in the runway center. (CA.IV.D.S8)<br>9. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.IV.D.S9)<br>10. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (CA.IV.D.S10)<br>11. Maintain proper position of the flight controls and sufficient speed to taxi on the soft surface. (CA.IV.D.S11) |

*Task continued on next page.*

| **Task** | ***D. Soft-Field Approach and Landing (ASEL)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability and aircraft limitations – considering possibility of selecting a runway at a different airport.. (CA.IV.D.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (CA.IV.D.R2)<br>3. Other than hard-surfaced runway. (CA.IV.D.R3)<br>4. Windshear avoidance. (CA.IV.D.R4)<br>5. Tailwinds. (CA.IV.D.R5)<br>6. Wake turbulence. (CA.IV.D.R6)<br>7. Task management. (CA.IV.D.R7)<br>8. Low altitude maneuvering. (CA.IV.D.R8)<br>9. Wire strikes. (CA.IV.D.R9)<br>10. Collision avoidance. (CA.IV.D.R10)<br>11. Right-of-way. (CA.IV.D.R11)<br>12. Situational awareness of obstacles on approach and departure paths. (CA.IV.D.R12)<br>13. Recognition of need for go-around/rejected landing. (CA.IV.D.R13)<br>14. Stall/spin awareness. (CA.IV.D.R14)<br>15. How to accomplish soft field landing without the use of power in power failure situation. (CA.IV.D.R15)<br>16. Maintaining a sterile cockpit environment. (CA.IV.D.R16) |

| Task | ***E. Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a short-field takeoff, maximum performance climb operations, and rejected takeoff procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Effects of aircraft configuration. (CA.IV.E.K1)<br>2. Effects of runway surface. (CA.IV.E.K2)<br>3. Takeoff distance. (CA.IV.E.K3)<br>4. Takeoff power. (CA.IV.E.K4)<br>5. Obstruction clearance. (CA.IV.E.K5)<br>6. Wind conditions and effects. (CA.IV.E.K6)<br>7. Minimum safe altitude. (CA.IV.E.K7)<br>8. Density altitude. (CA.IV.E.K8)<br>9. Headwind, tailwind, crosswind component. (CA.IV.E.K9)<br>10. Application of $V_X$ or $V_Y$. (CA.IV.E.K10)<br>11. Emergency procedures during takeoff and climb. (CA.IV.E.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify proper aircraft configuration. (CA.IV.E.S1)<br>2. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (CA.IV.E.S2)<br>3. Ensure the aircraft is on the correct takeoff runway. (CA.IV.E.S3)<br>4. Ascertain wind direction with or without visible wind direction indicators. (CA.IV.E.S4)<br>5. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations. (CA.IV.E.S5)<br>6. Position the flight controls for the existing wind conditions. (CA.IV.E.S6)<br>7. Clear the area; taxi into takeoff position utilizing maximum available takeoff area and align the airplane on the runway center line. (CA.IV.E.S7)<br>8. Apply brakes (if appropriate), while configuring aircraft power setting to achieve maximum performance.(CA.IV.E.S8)<br>9. Confirm takeoff power prior to brake release and proper engine and flight instrument indications prior to rotation. (CA.IV.E.S9)<br>10. Rotate and lift off at the recommended airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$. (CA.IV.E.S10)<br>11. Establish a pitch attitude that will maintain the recommended obstacle clearance airspeed, or $V_X$, +5/-0 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface. (CA.IV.E.S11)<br>12. After clearing the obstacle, establish the pitch attitude for $V_Y$, accelerate to $V_Y$, and maintain $V_Y$, ±5 knots, during the climb. (CA.IV.E.S12)<br>13. Retract landing gear and flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance.. (CA.IV.E.S13)<br>14. Maintain takeoff power and $V_X$ or $V_Y$ ±5 knots to a safe maneuvering altitude. (CA.IV.E.S14)<br>15. Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (CA.IV.E.S15)<br>16. Comply with noise abatement and published departure procedures. (CA.IV.E.S16)<br>17. Complete the appropriate checklist. (CA.IV.E.S17)<br>18. Comply with manufacturer recommended emergency procedures relating to the takeoff sequence.(CA.IV.E.S18) |

*Task continued on next page.*

| Task | *E. Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL)* |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind and pilot capability and aircraft limitations. (CA.IV.E.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (CA.IV.E.R2)<br>3. Other than hard-surfaced runway. (CA.IV.E.R3)<br>4. Obstruction clearance. (CA.IV.E.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (CA.IV.E.R5)<br>6. Windshear. (CA.IV.E.R6)<br>7. Tailwinds. (CA.IV.E.R7)<br>8. Wake turbulence. (CA.IV.E.R8)<br>9. Go/no go decision making. (CA.IV.E.R9)<br>10. Task management. (CA.IV.E.R10)<br>11. Low altitude maneuvering. (CA.IV.E.R11)<br>12. Wire strikes. (CA.IV.E.R12)<br>13. Minimum safe altitude for climb. (CA.IV.E.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (CA.IV.E.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (CA.IV.E.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (CA.IV.E.R16)<br>17. Criticality of takeoff distance available. (CA.IV.E.R17)<br>18. Plans for engine-failure after takeoff. (CA.IV.E.R18)<br>19. Sterile cockpit. (CA.IV.E.R19) |

| **Task** | ***F. Short-Field Approach and Landing (ASEL, AMEL)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a short-field approach and landing with emphasis on proper use and coordination of flight controls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Landing distance. (CA.IV.F.K1)<br>2. Hazards of other than hard-surfaced runways. (CA.IV.F.K2)<br>3. Obstruction clearance. (CA.IV.F.K3)<br>4. Stabilized approach. (CA.IV.F.K4)<br>5. Energy management. (CA.IV.F.K5)<br>6. Wind conditions and effects. (CA.IV.F.K6)<br>7. Density altitude. (CA.IV.F.K6)<br>8. Headwind, tailwind, crosswind component. (CA.IV.F.K7)<br>9. Emergency procedures during approach and landing.<br>10. Land and hold short operations. |
| **Skills** | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway. (CA.IV.F.S1)<br>2. Scan the landing runway and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (CA.IV.F.S2)<br>3. Complete the appropriate checklist. (CA.IV.F.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point. (CA.IV.F.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (CA.IV.F.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, ±5 knots. (CA.IV.F.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown. (CA.IV.F.S7)<br>8. Touch down smoothly at manufacturer's recommended airspeed. (CA.IV.F.S8)<br>9. Touch down within the available runway, at or within 100 feet beyond a the approach end of the runway, threshold markings or runway numbers, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over the runway center line. (CA.IV.F.S9)<br>10. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.IV.F.S10)<br>11. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing.. (CA.IV.F.S11)<br>12. Apply brakes as necessary, to stop in the shortest distance consistent with safety. (CA.IV.F.S12) |

*Task continued on next page.*

| Task | ***F. Short-Field Approach and Landing (ASEL, AMEL)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability and aircraft limitations – considering possibility of selecting a runway at a different airport. (CA.IV.F.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations (CA.IV.F.R2)<br>3. Other than hard surfaced runway. (CA.IV.F.R3)<br>4. Obstruction clearance. (CA.IV.F.R4)<br>5. Windshear. (CA.IV.F.R5)<br>6. Hazards of tailwinds. (CA.IV.F.R6)<br>7. Wake turbulence. (CA.IV.F.R7)<br>8. Task management. (CA.IV.F.R8)<br>9. Low altitude maneuvering. (CA.IV.F.R9)<br>10. Wire strikes. (CA.IV.F.R10)<br>11. Collision Avoidance. (CA.IV.F.R11)<br>12. Right-of-way. (CA.IV.F.R12)<br>13. Situational awareness of obstacles on approach and departure paths. (CA.IV.F.R13)<br>14. Recognition of need for go-around/rejected landing. (CA.IV.F.R14)<br>15. Stall/spin awareness. (CA.IV.F.R15)<br>16. Land and Hold Short Operations. (CA.IV.F.R16)<br>17. Maintaining a sterile cockpit environment. (CA.IV.F.R17) |

| Task | ***G. Confined Area Takeoff and Maximum Performance Climb (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a confined area takeoff, maximum performance climb operations, and rejected takeoff procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Effects of aircraft configuration. (CA.IV.G.K1)<br>2. Effects of water surface. (CA.IV.G.K2)<br>3. Takeoff distance. (CA.IV.G.K3)<br>4. Takeoff power. (CA.IV.G.K4)<br>5. Obstruction clearance. (CA.IV.G.K5)<br>6. Wind conditions and effects. (CA.IV.G.K6)<br>7. Minimum safe altitude. (CA.IV.G.K7)<br>8. Density altitude. (CA.IV.G.K8)<br>9. Headwind, tailwind, crosswind component. (CA.IV.G.K9)<br>10. Application of $V_X$ or $V_Y$. (CA.IV.G.K10)<br>11. Emergency procedures during takeoff and climb. (CA.IV.G.K11) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify proper aircraft configuration. (CA.IV.G.S1)<br>2. Verify ATC clearance and no aircraft is on final before crossing the Hold Line. (CA.IV.G.S2)<br>3. Ensure the aircraft is on the correct takeoff center path. (CA.IV.G.S3)<br>4. Ascertain wind direction with or without visible wind direction indicators. (CA.IV.G.S4)<br>5. Determine if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (CA.IV.G.S5)<br>6. Position the flight controls for the existing wind conditions. (CA.IV.G.S6)<br>7. Clear the area and select an appropriate takeoff path for the existing conditions; taxi into takeoff position utilizing maximum available takeoff area and align the airplane on the takeoff path. (CA.IV.G.S7)<br>8. Configure aircraft power to achieve maximum performance and confirm takeoff power and proper engine and flight instrument indications prior to rotation.(CA.IV.G.S8)<br>9. Establish and maintain the most efficient planning/lift-off attitude and correct for porpoising and skipping. (CA.IV.G.S9)<br>10. Rotate and lift off at the recommended airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$. (CA.IV.G.S10)<br>11. Establish a pitch attitude that will maintain the recommended obstacle clearance airspeed, or $V_X$, +5/-0 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface. (CA.IV.G.S11)<br>12. After clearing the obstacle, establish the pitch attitude for $V_Y$, accelerate to $V_Y$, and maintain $V_Y$, +5/-0 knots, during the climb. (CA.IV.G.S12)<br>13. Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (CA.IV.G.S13)<br>14. Maintain takeoff power and $V_X$ or $V_Y$ ±5 knots to a safe maneuvering altitude. (CA.IV.G.S14)<br>15. Maintain directional control and proper wind-drift correction throughout the takeoff and climb. (CA.IV.G.S15)<br>16. Comply with noise abatement and published departure procedures. (CA.IV.G.S16)<br>17. Complete the appropriate checklist. (CA.IV.G.S17)<br>18. Comply with manufacturer recommended emergency procedures relating to the takeoff sequence.(CA.IV.G.S18) |

*Task continued on next page.*

| **Task** | ***G. Confined Area Takeoff and Maximum Performance Climb (ASES, AMES)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate takeoff path based on wind and pilot capability and aircraft limitations. (CA.IV.G.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (CA.IV.G.R2)<br>3. Water conditions. (CA.IV.G.R3)<br>4. Obstruction clearance. (CA.IV.G.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (CA.IV.G.R5)<br>6. Windshear. (CA.IV.G.R6)<br>7. Tailwinds. (CA.IV.G.R7)<br>8. Wake turbulence. (CA.IV.G.R8)<br>9. Go/no go decision making. (CA.IV.G.R9)<br>10. Task management. (CA.IV.G.R10)<br>11. Low altitude maneuvering. (CA.IV.G.R11)<br>12. Wire strikes. (CA.IV.G.R12)<br>13. Minimum safe altitude for climb. (CA.IV.G.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (CA.IV.G.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (CA.IV.G.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (CA.IV.G.R16)<br>17. Criticality of takeoff distance available. (CA.IV.G.R17)<br>18. Plans for engine-failure after takeoff. (CA.IV.G.R18)<br>19. Sterile cockpit. (CA.IV.G.R19)<br>20. Confirms gear retracted in amphibious aircraft. (CA.IV.G.R20) |

| Task | *H. Confined Area Approach and Landing (ASES, AMES)* |
|---|---|
| Reference | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a confined area approach and landing with emphasis on proper use and coordination of flight controls. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Landing distance. (CA.IV.H.K1)<br>2. Hazards of a confined area. (CA.IV.H.K2)<br>3. Obstruction clearance. (CA.IV.H.K3)<br>4. Stabilized approach. (CA.IV.H.K4)<br>5. Energy management. (CA.IV.H.K5)<br>6. Wind conditions and effects. (CA.IV.H.K6)<br>7. Density altitude. (CA.IV.H.K7)<br>8. Headwind, tailwind, crosswind component. (CA.IV.H.K8)<br>9. Emergency procedures during approach and landing. (CA.IV.H.K9)<br>10. Land and hold short operations. (CA.IV.H.K10) |
| Skills | The applicant demonstrates the ability to:<br>1. Ensure the aircraft is on the correct/assigned runway and adequately survey the intended landing area. (CA.IV.H.S1)<br>2. Scan the landing area and adjoining areas for possible wildlife, vehicular or other aircraft to avoid collision. (CA.IV.H.S2)<br>3. Complete the appropriate checklist. (CA.IV.H.S3)<br>4. Consider the wind conditions, landing surface, obstructions, and select the proper landing path. (CA.IV.H.S4)<br>5. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (CA.IV.H.S5)<br>6. Maintain a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, with wind gust factor applied, ± 5 knots. (CA.IV.H.S6)<br>7. Make smooth, timely, and correct control application during the round out and touchdown. (CA.IV.H.S7)<br>8. Contact the water at the minimum safe airspeed with the proper pitch attitude for the surface conditions. (CA.IV.H.S8)<br>9. Touch down within the available water landing area, at or within 100 feet beyond a specified point, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over the landing center area. (CA.IV.H.S9)<br>10. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.IV.H.S10)<br>11. Execute a timely go around decision when the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. (CA.IV.H.S11)<br>12. Apply elevator control as necessary, to stop in the shortest distance consistent with safety. (CA.IV.H.S12) |

*Task continued on next page.*

| Task | *H. Confined Area Approach and Landing (ASES, AMES)* |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of landing area based on wind, pilot capability and aircraft limitations – considering possibility of selecting an area at a different location. (CA.IV.H.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacture limitations (CA.IV.H.R2)<br>3. Water conditions. (CA.IV.H.R3)<br>4. Obstruction clearance. (CA.IV.H.R4)<br>5. Windshear. (CA.IV.H.R5)<br>6. Hazards of tailwinds. (CA.IV.H.R6)<br>7. Wake turbulence. (CA.IV.H.R7)<br>8. Task management. (CA.IV.H.R8)<br>9. Low altitude maneuvering. (CA.IV.H.R9)<br>10. Wire strikes. (CA.IV.H.R10)<br>11. Collision Avoidance. (CA.IV.H.R11)<br>12. Right-of-way. (CA.IV.H.R12)<br>13. Situational awareness of obstacles on approach and departure paths. (CA.IV.H.R13)<br>14. Recognition of need for go-around/rejected landing. (CA.IV.D.R14)<br>15. Stall/spin awareness. (CA.IV.H.R15)<br>16. Land and Hold Short Operations. (CA.IV.H.R16)<br>17. Maintaining a sterile cockpit environment. (CA.IV.H.R17) |

| Task | ***I. Glassy Water Takeoff and Climb (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a glassy water takeoff and climb.<br>**NOTE:** If a glassy water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Water effects on operations. (CA.IV.I.K1)<br>2. Effects of glassy water on acceleration and lift-off. (CA.IV.I.K2)<br>3. When and why to use the glassy water takeoff and climb technique. (CA.IV.I.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the flight controls and flaps for the existing conditions. (CA.IV.I.S1)<br>2. Clear the area; select an appropriate takeoff path considering surface hazards and/or vessels and surface conditions. (CA.IV.I.S2)<br>3. Retract the water rudders as appropriate; advance the throttle smoothly to takeoff power. (CA.IV.I.S3)<br>4. Establish and maintain an appropriate planning attitude, directional control, and correct for porpoising, skipping, and increase in water drag. (CA.IV.I.S4)<br>5. Utilize appropriate techniques to lift seaplane from the water considering surface conditions. (CA.IV.I.S5)<br>6. Establish proper attitude/airspeed, and accelerate to Vy ±5 knots during the climb. (CA.IV.I.S6)<br>7. Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (CA.IV.I.S7)<br>8. Maintain takeoff power Vy ±5 to a safe maneuvering altitude. (CA.IV.I.S8)<br>9. Maintain directional control and proper wind-drift correction throughout takeoff and climb. (CA.IV.I.S9)<br>10. Complete the appropriate checklist (CA.IV.I.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate takeoff path based on wind and pilot capability and aircraft limitations. (CA.IV.I.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (CA.IV.I.R2)<br>3. Water conditions. (CA.IV.I.R3)<br>4. Obstruction clearance. (CA.IV.I.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (CA.IV.I.R5)<br>6. Windshear. (CA.IV.I.R6)<br>7. Tailwinds. (CA.IV.I.R7)<br>8. Wake turbulence. (CA.IV.I.R8)<br>9. Go/no go decision making. (CA.IV.I.R9)<br>10. Task management. (CA.IV.I.R10)<br>11. Low altitude maneuvering. (CA.IV.I.R11)<br>12. Wire strikes. (CA.IV.I.R12)<br>13. Minimum safe altitude for climb. (CA.IV.I.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (CA.IV.I.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (CA.IV.I.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (CA.IV.I.R16)<br>17. Criticality of takeoff distance available. (CA.IV.I.R17)<br>18. Plans for engine-failure after takeoff. (CA.IV.I.R18)<br>19. Sterile cockpit. (CA.IV.I.R19)<br>20. Confirms gear retracted in amphibious aircraft. (CA.IV.I.R20) |

| **Task** | ***J. Glassy Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a glassy water approach and landing.<br>**NOTE:** If a glassy water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. When and why glassy water techniques are used. (CA.IV.J.K1)<br>2. How a glassy water approach and landing is executed. (CA.IV.J.K2)<br>3. Landing distance. (CA.IV.J.K3)<br>4. Stabilized approach. (CA.IV.J.K4)<br>5. Energy management. (CA.IV.J.K5)<br>6. Wind conditions and effects. (CA.IV.J.K7)<br>7. Density altitude. (CA.IV.J.K8)<br>8. Headwind, tailwind, crosswind component. (CA.IV.J.K9)<br>9. Emergency procedures during approach and landing. (CA.IV.J.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Adequately survey the intended landing area. (CA.IV.J.S1)<br>2. Consider the wind conditions, water depth, hazards, surrounding terrain, and other watercraft. (CA.IV.J.S2)<br>3. Select the most suitable approach path and touchdown area. (CA.IV.J.S3)<br>4. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (CA.IV.J.S4)<br>5. Maintain a stabilized approach and the recommended approach airspeed, ±5 knots and maintain a touchdown pitch attitude and descent rate from the last altitude reference until touchdown. (CA.IV.J.S5)<br>6. Make smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown. (CA.IV.J.S6)<br>7. Contact the water in the proper pitch attitude, and slow to idle taxi speed. (CA.IV.J.S7)<br>8. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.IV.J.S8)<br>9. Complete the appropriate checklist. (CA.IV.J.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performing a go-around/rejected landing. (CA.IV.J.R1)<br>2. Importance of landing in direction of momentum, with wheels pointed forward on touchdown. (CA.IV.J.R2)<br>3. Stall/spin awareness. (CA.IV.J.R3)<br>4. Windshear. (CA.IV.J.R4)<br>5. Tailwinds. (CA.IV.J.R5)<br>6. Wake turbulence. (CA.IV.J.R6)<br>7. Task management. (CA.IV.J.R7)<br>8. Low altitude maneuvering. (CA.IV.J.R8)<br>9. Wire strikes. (CA.IV.J.R9)<br>10. Collision avoidance. (CA.IV.J.R10)<br>11. Right-of-way. (CA.IV.J.R11)<br>12. Situational awareness of obstacles on approach and departure paths. (CA.IV.J.R12)<br>13. Sterile cockpit. (CA.IV.J.R13) |

| Task | ***K. Rough Water Takeoff and Climb (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a rough water takeoff and climb.<br><br>**NOTE:** If a rough water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Water effects on operations. (CA.IV.K.K1)<br>2. Effects of rough water on acceleration and lift-off. (CA.IV.K.K2)<br>3. When and why to use the rough water takeoff and climb technique. (CA.IV.K.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Position the flight controls and flaps for the existing conditions. (CA.IV.K.S1)<br>2. Clear the area; select an appropriate takeoff path considering surface hazards and/or vessels and surface conditions. (CA.IV.K.S2)<br>3. Retract the water rudders as appropriate; advance the throttle smoothly to takeoff power. (CA.IV.K.S3)<br>4. Establish and maintain an appropriate planning attitude, directional control, and correct for porpoising, skipping, and increase in water drag. (CA.IV.K.S4)<br>5. Lift off at minimum airspeed and accelerate to Vy, ±5 knots before leaving ground effect. (CA.IV.K.S5)<br>6. Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer guidance. (CA.IV.K.S6)<br>7. Maintain takeoff power Vy ±5 to a safe maneuvering altitude. (CA.IV.K.S7)<br>8. Maintain directional control and proper wind-drift correction throughout takeoff and climb. (CA.IV.K.S8)<br>9. Complete the appropriate checklist (CA.IV.K.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate takeoff path based on wind and pilot capability and aircraft limitations. (CA.IV.K.R1)<br>2. Determines if crosswind component exceeds pilot ability or is beyond aircraft manufacturer limitations. (CA.IV.K.R2)<br>3. Water conditions. (CA.IV.K.R3)<br>4. Obstruction clearance. (CA.IV.K.R4)<br>5. Obstruction clearance climb attitude and stall awareness. (CA.IV.K.R5)<br>6. Windshear. (CA.IV.K.R6)<br>7. Tailwinds. (CA.IV.K.R7)<br>8. Wake turbulence. (CA.IV.K.R8)<br>9. Go/no go decision making. (CA.IV.K.R9)<br>10. Task management. (CA.IV.K.R10)<br>11. Low altitude maneuvering. (CA.IV.K.R11)<br>12. Wire strikes. (CA.IV.K.R12)<br>13. Minimum safe altitude for climb. (CA.IV.K.R13)<br>14. Situational awareness of obstacles on departure and arrival paths. (CA.IV.K.R14)<br>15. Recognition of need for rejected takeoff and predetermines takeoff abort point. (CA.IV.K.R15)<br>16. Strategies for handling engine failure during takeoff and climb. (CA.IV.K.R16)<br>17. Criticality of takeoff distance available. (CA.IV.K.R17)<br>18. Plans for engine-failure after takeoff. (CA.IV.K.R18)<br>19. Sterile cockpit. (CA.IV.K.R19)<br>20. Confirms gear retracted in amphibious aircraft. (CA.IV.K.R20) |

| **Task** | ***L. Rough Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a rough water approach and landing.<br><br>**NOTE:** If a rough water condition does not exist, the applicant shall be evaluated by simulating the Task. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. When and why rough water techniques are used. (CA.IV.L.K1)<br>2. How a rough water approach and landing is executed. (CA.IV.L.K2)<br>3. Landing distance. (CA.IV.L.K3)<br>4. Stabilized approach. (CA.IV.L.K4)<br>5. Energy management. (CA.IV.L.K5)<br>6. Wind conditions and effects. (CA.IV.L.K7)<br>7. Density altitude. (CA.IV.L.K8)<br>8. Headwind, tailwind, crosswind component. (CA.IV.L.K9)<br>9. Emergency procedures during approach and landing. (CA.IV.L.K10) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Adequately survey the intended landing area. (CA.IV.L.S1)<br>2. Consider the wind conditions, water depth, hazards, surrounding terrain, and other watercraft. (CA.IV.L.S2)<br>3. Select the most suitable approach path and touchdown area. (CA.IV.L.S3)<br>4. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required. (CA.IV.L.S4)<br>5. Maintain a stabilized approach and the recommended approach airspeed, or in its absence not more than 1.3 Vso ±5 knots with wind gust factor applied. (CA.IV.L.S5)<br>6. Make smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown. (CA.IV.L.S6)<br>7. Contact the water in the proper pitch attitude, considering the type of rough water. (CA.IV.L.S7)<br>8. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.IV.L.S8)<br>9. Complete the appropriate checklist. (CA.IV.L.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performing a go-around/rejected landing. (CA.IV.L.R1)<br>2. Importance of landing in direction of momentum, with wheels pointed forward on touchdown. (CA.IV.L.R2)<br>3. Stall/spin awareness. (CA.IV.L.R3)<br>4. Windshear. (CA.IV.L.R4)<br>5. Tailwinds. (CA.IV.L.R5)<br>6. Wake turbulence. (CA.IV.L.R6)<br>7. Task management. (CA.IV.L.R7)<br>8. Low altitude maneuvering. (CA.IV.L.R8)<br>9. Wire strikes. (CA.IV.L.R9)<br>10. Collision avoidance. (CA.IV.L.R10)<br>11. Right-of-way. (CA.IV.L.R11)<br>12. Situational awareness of obstacles on approach and departure paths. (CA.IV.L.R12)<br>13. Sterile cockpit. (CA.IV.L.R13) |

| Task | *M. Go-Around/Rejected Landing* |
|---|---|
| Reference | FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a go around/rejected landing with emphasis on factors that contribute to landing conditions that may require a go around. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Available Landing distance (ALD). (CA.IV.M.K1)<br>2. Stabilized approach. (CA.IVM.K2)<br>3. Energy management. (CA.IV.M.K3)<br>4. Wind conditions and effects. (CA.IV.M.K4)<br>5. Headwind, tailwind, crosswind component. (CA.IV.M.KI5)<br>6. Emergency procedures during approach and landing. (CA.IV.M.K6)<br>7. Communication procedures. (CA.IV.M.K7) |
| Skills | The applicant demonstrates the ability to:<br>1. Make a timely decision to discontinue the approach to landing. (CA.IV.M.S1)<br>2. Apply takeoff power immediately and transition to climb pitch attitude for $V_X$ or $V_Y$ as appropriate ±5 knots and/or appropriate pitch attitude. (CA.IV.M.S2)<br>3. Configure aircraft power settings to achieve maximum performance. (CA.IV.M.S3)<br>4. Retract the landing gear in accordance with manufacturer guidance. (CA.IV.M.S4)<br>5. Maneuver to the side of the runway/landing area when necessary to clear and avoid conflicting traffic.(CA.IV.M.S5)<br>6. Maintain takeoff power $V_Y$ ±5 knots to a safe maneuvering altitude. (CA.IV.M.S6)<br>7. Maintain directional control and proper wind-drift correction throughout the climb. (CA.IV.M.S67)<br>8. Complete the appropriate checklist. (CA.IV.M.S8) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Timeliness for making and executing decision. (CA.IV.M.R1)<br>2. Task management. (CA.IV.M.R2)<br>3. Low altitude maneuvering. (CA.IV.M.R3)<br>4. Slow flight. (CA.IV.M.R4)<br>5. Wire strikes. (CA.IV.M.R5)<br>6. Collision avoidance. (CA.IV.M.R6)<br>7. Right-of-way. (CA.IV.M.R7)<br>8. Situational awareness of obstacles on approach and departure paths. (CA.IV.M.R8)<br>9. Spin awareness. (CA.IV.M.R9)<br>10. Elevator trim stalls. (CA.IV.M.R10)<br>11. Pilot changing mind regarding the go-around decision (CA.IV.M.R11)<br>12. Sterile cockpit. (CA.IV.M.R12) |

## V. Performance Maneuvers

| Task | *A. Steep Turns (ASEL, ASES)* |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with steep turns. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Coordinated flight. (CA.V.A.K1)<br>2. Attitude control at various airspeeds. (CA.V.A.K2)<br>3. Maneuvering speed, including changes in weight. (CA.V.A.K3)<br>4. Controlling rate and radius of turn. (CA.V.A.K4)<br>5. Accelerated stalls. (CA.V.A.K5)<br>6. Overbanking tendencies. (CA.V.A.K6)<br>7. Use of trim in a turn. (CA.V.A.K7)<br>8. Aerodynamics associated with steep turns. (CA.V.A.K8)<br>9. Aerobatic requirements and limitations(CA.V.A.K9) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Establish the manufacturer's recommended airspeed or if one is not stated, a safe airspeed not to exceed $V_A$. (CA.V.A.S1)<br>2. Rolls into a coordinated 360° steep turn with at least a 50° bank, followed immediately by a 360° steep turn in the opposite direction. (CA.V.A.S2)<br>3. Perform the task in the opposite direction, as specified by the evaluator. (CA.V.A.S3)<br>4. Maintain the entry altitude, ±100 feet, airspeed, ±10 knots, bank, ±5°; and roll out on the entry heading, ±10°. (CA.V.A.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dividing attention between airplane control and orientation. (CA.V.A.R1)<br>2. Task management. (CA.V.A.R2)<br>3. Energy management. (CA.V.A.R3)<br>4. Stall/spin awareness. (CA.V.A.R4)<br>5. Situational awareness. (CA.V.A.R5)<br>6. Rate and radius of turn with confined area operations. (CA.V.A.R6) |

| **Task** | ***B. Chandelles (ASEL, ASES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with chandelles. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Purpose and practical applications of chandelle maneuver. (CA.V.B.K1)<br>2. Positioning of flaps and gear for maximum performance climb. (CA.V.B.K2)<br>3. Importance of aircraft coordination. (CA.V.B.K3)<br>4. Phases of chandelle maneuver from entry to recovery. (CA.V.B.K4)<br>5. Aircraft maneuvering speed, wing loading, and changes in weight. (CA.V.B.K5)<br>6. Accelerated stalls. (CA.V.B.K6)<br>7. Overbanking tendencies. (CA.V.B.K7)<br>8. Proper pitch control required for continually decreasing airspeed. (CA.V.B.K8)<br>9. Use of trim. (CA.V.B.K9)<br>10. Aerodynamics associated with chandelles. (CA.V.B.K10)<br>11. Effects of non-standard conditions on aircraft performance. (CA.V.B.K11)<br>12. Considerations of performing chandelles to both the left and the right. (CA.V.B.K12) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an altitude that will allow the maneuver to be performed no lower than 1,500 feet AGL. (C.V.B.S1)<br>2. Establish the appropriate entry configuration, power, and airspeed. (CA.V.B.S2)<br>3. Establish the angle of bank at approximately 30°. (CA.V.B.S3)<br>4. Simultaneously apply power and pitch to maintain a smooth, coordinated climbing turn, in either direction, to the 90° point, with a constant bank and continually decreasing airspeed. (CA.V.B.S4)<br>5. Begins a coordinated constant rate rollout from the 90° point to the 180° point maintaining power and a constant pitch attitude. (CA.V.B.S5)<br>6. Completes rollout at the 180° point, ±10° just above a stall airspeed, and maintaining that airspeed momentarily avoiding a stall. (CA.V.B.S6)<br>7. Resumes straight-and-level flight with minimum loss of altitude. (CA.V.B.S7) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dividing attention between airplane control and orientation. (CA.V.B.R1)<br>2. Task management. (CA.V.B.R2)<br>3. Energy management. (CA.V.B.R3)<br>4. Stall/spin awareness. (CA.V.B.R4)<br>5. Situational awareness. (CA.V.B.R5)<br>6. Rate and radius of turn with confined area operations. (CA.V.B.R6)<br>7. CFIT avoidance. (CA.V.B.R7)<br>8. Visual scanning and collision avoidance. (CA.V.B.R8) |

| Task | *C. Lazy Eights (ASEL, ASES)* |
|---|---|
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with lazy eights. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Aircraft coordination. (CA.V.C.K1)<br>2. Performance and limitation airspeeds. (CA.V.C.K2)<br>3. Smooth, deliberate control applications. (CA.V.C.K3)<br>4. Accelerated stalls. (CA.V.C.K4)<br>5. Effects of pitch and roll control on airspeed. (CA.V.C.K5)<br>6. Aerodynamics associated with lazy eights. (CA.V.C.K6)<br>7. Phases of the lazy eight maneuver from entry to recovery. (CA.V.C.K7) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an altitude that will allow the task to be performed no lower than 1,500 feet AGL. (CA.V.C.S1)<br>2. Establish the recommended entry configuration, power, and airspeed. (CA.V.C.S2)<br>3. Maintain coordinated flight throughout the maneuver. (CA.V.C.S3)<br>4. Achieve the following throughout the maneuver— (CA.V.C.S4)<br>a. approximately 30° bank at the steepest point.<br>b. constant change of pitch and roll rate and airspeed.<br>c. altitude tolerance at 180° point, ±100 feet from entry altitude.<br>d. airspeed tolerance at the 180° point, plus ±10 knots from entry airspeed.<br>e. heading tolerance at the 180° point, ±10°.<br>5. Continue the maneuver through the number of symmetrical loops specified and resumes straight-and-level flight. (CA.V.C.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dividing attention between airplane control and orientation. (CA.V.C.R1)<br>2. Task management. (CA.V.C.R2)<br>3. Energy management. (CA.V.C.R3)<br>4. Stall/spin awareness. (CA.V.C.R4)<br>5. Situational awareness. (CA.V.C.R5)<br>6. CFIT avoidance. (CA.V.C.R6)<br>7. Visual scanning and collision avoidance. (CA.V.C.R7) |

| **Task** | ***D. Eights on Pylons (ASEL, ASES)*** |
|---|---|
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with eights on pylons. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Function of pivotal altitude and factors that affect it. (CA.V.D.K1)<br>2. Aircraft coordination. (CA.V.D.K2)<br>3. Effect of wind on ground track. (CA.V.D.K3)<br>4. Proper control inputs for conducting the maneuver. (CA.V.D.K4)<br>5. Phases of eights on pylons from entry to recovery. (CA.V.D.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Determine the approximate pivotal altitude. (CA.V.D.S1<br>2. Select suitable pylons that will permit straight-and-level flight between the pylons. (CA.V.D.S2)<br>3. Enter the maneuver at the appropriate altitude and airspeed and at a bank angle of approximately 30° to 40° at the steepest point. (CA.V.D.S3)<br>4. Apply the necessary corrections so that the line-of-sight reference line remains on the pylon. (CA.V.D.S4)<br>5. Divide attention between accurate coordinated airplane control and outside visual references. (CA.V.D.S5)<br>6. Hold pylon using appropriate pivotal altitude avoiding slips and skids. (CA.V.D.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dividing attention between airplane control and orientation. (CA.V.D.R1)<br>2. Task management. (CA.V.D.R2)<br>3. Situational awareness. (CA.V.D.R3)<br>4. CFIT avoidance. (CA.V.D.R4)<br>5. Visual scanning and collision avoidance. (CA.V.D.R5)<br>6. Emergency landing considerations. (CA.V.D.R6)<br>7. Low-altitude maneuvering. (CA.V.D.R7) |

## VI. Navigation

| Task | *A. Pilotage and Dead Reckoning* |
|---|---|
| **Reference** | FAA-H-8083-25; 14 CFR part 61; Navigation Chart |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with pilotage and dead reckoning. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Navigation process selection. (CA.VI.A.K1)<br>2. Determining heading, speed, course. (CA.VI.A.K2)<br>3. Estimating time, speed, and distance.(CA.VI.A.K3)<br>4. True airspeed and density altitude. (CA.VI.A.K4)<br>5. Wind correction angle. (CA.VI.A.K5)<br>6. Checkpoint selection. (CA.VI.A.K6)<br>7. Planned vs. actual flight plan calculations and required corrections. (CA.VI.A.K7)<br>8. Topography. (CA.VI.A.K8)<br>9. Plotting a course. (CA.VI.A.K9)<br>10. Magnetic compass errors. (CA.VI.A.K10)<br>11. Route selection. (CA.VI.A.K11)<br>12. Altitude selection. (CA.VI.A.K12)<br>13. Power setting selection. (CA.VI.A.K13) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Prepare a document or electronic equivalent to be used in flight for comparisons with planned fuel usages and times over waypoints while dead reckoning. (CA.VI.A.S1)<br>2. Follow the preplanned course by reference to landmarks. (CA.VI.A.S2)<br>3. Identify landmarks by relating surface features to chart symbols. (CA.VI.A.S3)<br>4. Navigate by means of pre-computed headings, groundspeeds, and elapsed time. (CA.VI.A.S4)<br>5. Demonstrate use of magnetic direction indicator in navigation, to include turns to headings(CA.VI.A.S5)<br>6. Correct for and record the differences between preflight groundspeed, fuel consumption, and heading calculations and those determined en route. (CA.VI.A.S6)<br>7. Verify the airplane's position within 2 nautical miles of the flight-planned route. (CA.VI.A.S7)<br>8. Arrive at the en route checkpoints within 3 minutes of the initial or revised ETA and provide a destination estimate. (CA.VI.A.S8)<br>9. Maintain the selected altitude, ±100 feet and headings, ±10°. (CA.VI.A.S9)<br>10. Determine compass heading based on wind, magnetic variation, and deviation. (CA.VI.A.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. CFIT risk avoidance plan. (CA.VI.A.R1)<br>2. Avoiding/recovering from misidentification of landmarks. (CA.VI.A.R2)<br>3. Bracketing strategy. (CA.VI.A.R3)<br>4. Selecting an alternate. (CA.VI.A.R4)<br>5. Situational awareness. (CA.VI.A.R5)<br>6. Task management. (CA.VI.A.R6)<br>7. Actual vs. planned fuel consumption. (CA.VI.A.R7)<br>8 Exit strategies. (CA.VI.A.R8)<br>9. Preflight pilot/operation risk assessment and planning. (CA.VI.A.R9)<br>10. Determine the impact of corrected groundspeed, time enroute and fuel consumption on the overall safety of flight to destination. (CA.IV.A.R10) |

| Task | ***B. Navigation Systems and Radar Services*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-6, FAA-H-8083-25; Navigation Equipment Operation Manuals; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with navigation systems and radar services. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Ground-based navigation (orientation, course determination, equipment, tests and regulations). (CA.VI.B.K1)<br>2. Global Positioning System (GPS) (equipment, regulations, databases authorized use, Receiver Autonomous Integrity Monitoring (RAIM)). (CA.VI.B.K2)<br>3. Radar assistance to VFR aircraft (operations, equipment, available services, traffic advisories). (CA.VI.B.K3)<br>4. Transponder (Mode A, C, and S). (CA.VI.B.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Demonstrate the ability to use installed electronic navigation system. (CA.VI.B.S1)<br>2. Locate the airplane's position using the navigation system. (CA.VI.B.S2)<br>3. Intercept and track a given course, radial, or bearing, as appropriate. (CA.VI.B.S3)<br>4. Recognize and describe the indication of station passage, if appropriate. (CA.VI.B.S4)<br>5. Recognize signal loss and take appropriate action. (CA.VI.B.S5)<br>6. Use proper communication procedures when utilizing radar services. (CA.VI.B.S6)<br>7. Maintain the appropriate altitude, ±200 feet and headings ±15°. (CA.VI.B.S7) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Automation management. (CA.VI.B.R1)<br>2. Task management. (CA.VI.B.R2)<br>3. Situational awareness. (CA.VI.B.R3)<br>4. Limitations of the navigation system in use. (CA.VI.B.R4)<br>5. Planning to avoid automation distractions. (CA.VI.B.R5) |

| Task | ***C. Diversion*** |
|---|---|
| **Reference** | FAA-H-8083-25; AIM; Navigation Chart |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with diversion. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Selecting divert destination. (CA.VI.C.K1)<br>2. Deviating from ATC instructions and/or the flight plan. (CA.VI.C.K2) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an appropriate diversion airport and route. (CA.VI.C.S1)<br>2. Make an accurate estimate of heading, groundspeed, arrival time, and fuel consumption to the divert airport. (CA.VI.C.S2)<br>3. Maintain the appropriate altitude, ±100 feet and heading, ±10°. (CA.VI.C.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of appropriate airport. (CA.VI.C.R1)<br>2. Timely decision to divert. (CA.VI.C.R2)<br>3. Improving situation by diversion. (CA.VI.C.R3)<br>4. Maintaining airmanship during diversion. (CA.VI.C.R4)<br>5. Collision avoidance. (CA.VI.C.R5)<br>6. CFIT. (CA.VI.C.R6)<br>7. Task management. (CA.VI.C.R7)<br>8. Situational awareness. (CA.VI.C.R8)<br>9. Utilizing all available resources (automation, ATC, cockpit planning aids). (CA.VI.C.R9) |

| **Task** | ***D. Lost Procedures*** |
|---|---|
| **Reference** | FAA-H-8083-25; AIM; Navigation Chart |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with lost procedures and taking appropriate steps to achieve a satisfactory outcome if lost. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Understands value of recording time at waypoints. (CA.VI.D.K1)<br>2. Assistance available if lost (radar services, communication procedures). (CA.VI.D.K2)<br>3. Responsibility and authority of PIC. (CA.VI.D.K3)<br>4. Deviation from ATC instructions. (CA.VII.D.K4)<br>5. Declaring an emergency. (CA.VI.D.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an appropriate course of action. (CA.VI.D.S1)<br>2. Maintain an appropriate heading and climbs, if necessary. (CA.VI.D.S2)<br>3. Identify prominent landmarks. (CA.VI.D.S3)<br>4. Use navigation systems/facilities and/or contacts an ATC facility for assistance, as appropriate. (CA.VI.D.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Following a procedure of recording times over waypoints. (CA.VI.D.R1)<br>2. Task management. (CA.VI.D.R2)<br>3. Situational awareness. (CA.VI.D.R3)<br>4. CFIT. (CA.VI.D.R4)<br>5. Collision avoidance. (CA.VI.D.R5)<br>6. Recognition of a deteriorating situation and seeking assistance. (CA.VI.D.R6)<br>7. Knowing when to declare an emergency. (CA.VI.D.R7) |

## VII. Slow Flight and Stalls

**NOTE:** In accordance with FAA policy, all stalls for the Commercial rating will be taken to the "onset" (buffeting) stall condition.

| **Task** | ***A. Maneuvering During Slow Flight*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with maneuvering during slow flight. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Maneuver relative to a real-life portion of a flight. (CA.VII.A.K1)<br>2. Relationship between Airport Operations Area (AOA), airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (CA.VI.A.K2)<br>3. Importance of reliance on aircraft performance indications (aircraft buffet) instead of artificial warning systems (stall horn). (CA.VII.A.K3)<br>4. The difference between AOA and aircraft attitude during all flight conditions and how it relates to aircraft performance. (CA.VII.A.K4)<br>5. How environmental elements affect aircraft performance. (CA.VII.A.K5)<br>6. Importance of the 1,500 foot AGL minimum altitude. (CA.VII.A.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) ***OR*** 3,000 feet AGL (AMEL, AMES). (CA.VII.A.S1)<br>2. Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in an immediate stall. (CA.VII.A.S2)<br>3. Accomplish coordinated straight-and-level flight, turns, climbs, and descents with landing gear and flap configurations specified by the evaluator. (CA.VII.A.S3)<br>4. Divide attention between airplane control, traffic avoidance and orientation. (CA.VII.A.S4)<br>5. Maintain the specified altitude, ±50 feet; specified heading, ±10°; airspeed, +5/-0 knots; and specified angle of bank, ±5°. (CA.VII.A.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (CA.VII.A.R1)<br>2. Reliance on aircraft performance indications, such as aircraft buffet instead of artificial warning systems such as a stall horn. (CA.VII.A.R2)<br>3. Understanding how environmental elements affect aircraft performance. (CA.VII.A.R3) |

| **Task** | ***B. Power-Off Stalls*** |
|---|---|
| **Reference** | FAA-H-8083-3; AC 61-67; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with power-off stalls. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Importance of the 1,500 foot AGL minimum altitude. (CA.VII.B.K1)<br>2. Relating the maneuver to a real-life portion of a flight. (CA.VII.B.K2)<br>3. Components of a stabilized descent. (CA.VII.B.K3)<br>4. Approach to stall indications. (CA.VII.B.K4)<br>5. Full stall indications. (CA.VII.B.K5)<br>6. Determining which aircraft inputs are required to meet heading or bank angle requirements. (CA.VII.B.K6)<br>7. Determining the most efficient stall recovery procedure. (CA.VII.B.K7)<br>8. Importance of establishing the correct aircraft configuration during the recovery process and the consequences of failing to do so. (CA.VII.B.K8)<br>9. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (CA.VII.B.K9)<br>10. Circumstances that can lead to an inadvertent stall or spin. (CA.VII.B.K10) |
| **Skills** | **NOTE:** When published, the aircraft manufacturer's procedures for the specific make/mode/series aircraft take precedent over the identification and recovery procedures described in paragraphs 5 and 6 below.<br><br>The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) ***OR*** 3,000 feet AGL (AMEL, AMES). (CA.VII.B.S1)<br>2. Establish a stabilized descent in the approach or landing configuration, as specified by the evaluator. (CA.VII.B.S2)<br>3. Transition smoothly from the approach or landing attitude to a pitch attitude that will induce a stall. (CA.VII.B.S3)<br>4. Maintain a specified heading, ±10°, if in straight flight; maintain a specified angle of bank not to exceed 20°, ±5°; if in turning flight, while inducing the stall. (CA.VII.B.S4)<br>5. Recognize and recover promptly at the "onset" (buffeting) stall condition. (CA.VII.B.S5)<br><br>**NOTE:** Evaluation criteria for a recovery from an approach to stall should not mandate a predetermined value for altitude loss and should not mandate maintaining altitude during recovery. Proper evaluation criteria should consider the multitude of external and internal variables which affect the recovery altitude.<br><br>6. Retract the flaps to the recommended setting; retract the landing gear, if retractable, after a positive rate of climb is established. (CA.VII.B.S6)<br>7. Execute stall recovery in accordance with procedures set forth in the POH. (CA.VII.B.S7)<br>8. Accelerates to $V_X$ or $V_Y$ speed before the final flap retraction; returns to the altitude, heading and airspeed specified by the examiner. (CA.VII.B.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (CA.VII.B.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as a stall horn. (CA.VII.B.R2)<br>3. Understanding how environmental elements affect aircraft performance. (CA.VII.B.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (CA.VII.B.R4) |

| Task | *C. Power-On Stalls* |
|---|---|
| Reference | FAA-H-8083-3; AC 61-67; POH/AFM |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with power-on stalls.<br><br>**NOTE:** In some high performance airplanes, the power setting may have to be reduced below the practical test standards guideline power setting to prevent excessively high pitch attitudes (greater than 30° nose up). |
| Knowledge | The applicant demonstrates understanding of:<br>1. Importance of the 1,500 foot AGL minimum altitude. (CA.VII.C.K1)<br>2. Relating the maneuver to a real-life portion of a flight. (CA.VII.C.K2)<br>3. Rationale for power setting variances. (CA.VII.C.K3)<br>4. Approach to stall indications. (CA.VII.C.K4)<br>5. Full stall indications. (CA.VII.C.K5)<br>6. Determining which aircraft inputs are required to meet heading or bank angle requirements. (CA.VII.C.K6)<br>7. Determining the most efficient stall recovery procedure. (CA.VII.C.K7)<br>8. Importance of establishing the correct aircraft configuration during the recovery process and the consequences of failing to do so. (CA.VII.C.K8)<br>9. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (CA.VII.C.K9)<br>10. Circumstances that can lead to an inadvertent stall or spin. (CA.VII.C.K10) |
| Skills | The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) ***OR*** 3,000 feet AGL (AMEL, AMES). (CA.VII.C.S1)<br>2. Establish the takeoff, departure, or cruise configuration as specified by the evaluator. (CA.VII.C.S2)<br>3. Set power (as assigned by evaluator) to no less than 65 percent available power. (CA.VII.C.S3)<br>4. Transition smoothly from the takeoff or departure attitude to the pitch attitude that will induce a stall. (CA.VII.C.S4)<br>5. Maintain a specified heading, ±10°,if in straight flight; maintain a specified angle of bank not to exceed 20°, ±10°, if in turning flight, while inducing the stall. (CA.VII.C.S5)<br><br>**NOTE:** Evaluation criteria for a recovery from an approach to stall should not mandate a predetermined value for altitude loss and should not mandate maintaining altitude during recovery. Proper evaluation criteria should consider the multitude of external and internal variables which affect the recovery altitude.<br><br>6. Recognize and recover promptly at the “onset” (buffeting) stall condition. (CA.VII.C.S6)<br>7. Retract the flaps to the recommended setting; retract the landing gear if retractable, after a positive rate of climb is established. (CA.VII.C.S7)<br>8. Accelerate to $V_X$ or $V_Y$ speed before the final flap retraction; return to the altitude, heading, and airspeed specified by the evaluator. (CA.VII.C.S8) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (CA.VII.C.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as stall horn. (CA.VII.C.R2)<br>3. Understanding how environmental elements affect aircraft performance. (CA.VII.C.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (CA.VII.C.R4) |

| Task | *D. Accelerated Stalls* |
|---|---|
| Reference | FAA-H-8083-3; AC 61-67; POH/AFM |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management related to accelerated (power on or power off) stalls. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Relating the maneuver to a realistic flight scenario. (CA.VII.D.K1).<br>2. Approach to stall indications. (CA.VII.D.K2)<br>3. Full stall indications. (CA.VII.D.K3)<br>4. Aircraft inputs required to maintain heading or bank angle. (CA.VII.D.K4)<br>5. Efficient stall recovery procedure so that a minimum loss of altitude occurs. (CA.VII.D.K5)<br>6. Importance of establishing the correct aircraft configuration during the recovery process and the consequences of failing to do so, as applicable. (CA.VII.D.K6)<br>7. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (CA.VII.D.K7)<br>8. Circumstances that can lead to an inadvertent stall or spin. (CA.VII.D.K8) |
| Skills | The applicant demonstrates the ability to:<br>1. Select an entry altitude that will allow the task to be completed no lower than 1,500 feet AGL (ASEL, ASES) **OR** 3,000 feet AGL (AMEL, AMES). (CA.VII.D.S1)<br>2. Establish the power setting, airspeed and configuration to replicate a realistic flight scenario specific to an accelerated stall. (CA.VII.D.S2)<br>3. Maintains coordinated flight, increasing elevator back pressure steadily and firmly to induce the stall. (CA.VII.D.S3)<br>4. Recognize and recover promptly at the onset of the accelerated stall. (CA.VII.D.S4)<br>5. Returns to the altitude, heading, and airspeed specified by the evaluator. (CA.VII.D.S5) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (CA.VII.D.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as stall horn. (CA.VII.D.R2)<br>3. Understanding how environmental elements affect aircraft performance. (CA.VII.D.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (CA.VII.D.R4)<br>5. Scenarios during which an accelerated stall can occur. (CA.VII.D.R5) |

| **Task** | ***E. Spin Awareness*** |
|---|---|
| **Reference** | FAA-H-8083-3; AC 61-67; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with spins, flight situations where unintentional spins may occur and procedures for recovery from unintentional spins. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Aerodynamics associated with stalls and spins in various aircraft configurations and attitudes. (CA.VII.E.K1)<br>2. Circumstances that can lead to an inadvertent stall or spin. (CA.VII.E.K2)<br>3. Different spin types, causes, recovery strategies. (CA.VII.E.K3)<br>4. Effects of inappropriate recovery control inputs. (CA.VII.E.K4)<br>5. Which instrument(s) are reliable for determining the direction of spin to effect recovery. (CA.VII.E.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Assess and avoid situations where unintentional spins may occur. (CA.VII.E.S1)<br>2. Explain procedures for recovery from unintentional spins. (CA.VII.E.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Dynamic aerodynamic relationship between angle of attack, airspeed, load factor, aircraft configuration, aircraft weight, and aircraft attitude. (CA.VII.E.R1)<br>2. Reliance on aircraft performance indications such as aircraft buffet instead of artificial warning systems such as stall horn. (CA.VII.E.R2)<br>3. Understanding how environmental elements affect aircraft performance. (CA.VII.E.R3)<br>4. Understanding the required actions for aircraft maximum performance and the consequences of failing to do so. (CA.VII.E.R4)<br>5. Uncoordinated flight. (CA.VII.E.R5)<br>6. Understanding the hazards associated with the improper application of flight control inputs during the spin recovery. (CA.VII.E.R6) |

## VIII. Emergency Operations

**NOTE (AMEL, AMES):** Examiners shall select an entry altitude that will allow the single engine demonstrations task to be completed no lower than 3,000 feet AGL or the manufacturer's recommended altitude, whichever is higher. At altitudes lower than 3,000 feet AGL, engine failure shall be simulated by reducing throttle to idle and then establishing zero thrust.

| **Task** | ***A. Power Failure at Altitude (Simulated)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a power failure at altitude and associated emergency approach and landing procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Glide speed, distance. (CA.VIII.A.K1)<br>2. Available landing distance (ALD). (CA.VIII.A.K2)<br>3. Hazards of other than hard surfaced runway. (CA.VIII.A.K3)<br>4. Stabilized approach. (CA.VIII.A.K4)<br>5. Energy management. (CA.VIII.A.K5)<br>6. Wind conditions and effects. (CA.VIII.A.K6)<br>7. Density altitude. (CA.VIII.A.K7)<br>8. Headwind, tailwind, crosswind component. (CA.VIII.A.K8)<br>9. Emergency procedures. (CA.VIII.A.K9)<br>10. Communications. (CA.VIII.A.K10)<br>11. Regulations pertaining to emergencies safe altitudes. (CA.VIII.A.K11)<br>12. ATC clearance deviations. (CA.VIII.A.K12)<br>13. Minimum fuel. (CA.VIII.A.K13)<br>14. Selecting a landing location. (CA.VIII.A.K14)<br>15. ELTs and/or other emergency locating devices. (CA.VIII.A.K15)<br>16. Radar assistance to VFR aircraft. (CA.VIII.A.K16)<br>17. Transponder. (CA.VIII.A.K17) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Analyze the situation and select an appropriate course of action. (CA.VIII.A.S1)<br>2. Establish and maintain the recommended best-glide airspeed, ±10 knots. (CA.VIII.A.S2)<br>3. Plan and follow a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions. (CA.VIII.A.S3)<br>4. Prepare for landing, or go-around, as specified by the evaluator. (CA.VIII.A.S4)<br>5. Follow the appropriate checklist. (CA.VIII.A.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Accounting for wind. (CA.VIII.A.R1)<br>2. Selecting a suitable landing area. (CA.VIII.A.R2)<br>3. Planning and following a flight pattern to the selected landing area considering. altitude, wind, terrain, and obstructions. (CA.VIII.A.R3)<br>4. Task management. (CA.VIII.A.R4)<br>5. Low altitude maneuvering. (CA.VIII.A.R5)<br>6. Obstacle and wire strike avoidance. (CA.VIII.A.R6)<br>7. Collision avoidance. (CA.VIII.A.R7)<br>8. Right-of-way. (CA.VIII.A.R8)<br>9. Situational awareness. (CA.VIII.A.R9)<br>10. Stall/spin awareness. (CA.VIII.A.R10)<br>11. Understanding the difference between best glide speed (L/D) and minimum sink speed and when each one is appropriate. (CA.VIII.A.R11) |

| Task | ***B. Emergency Descent and Landing (Simulated)*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM<br><br>**NOTE:** If this maneuver cannot be completed to touch down due to safety concerns, then the landing portion of this maneuver may be evaluated separately. The evaluator's plan of action must allow for this maneuver to be completed in whole, but it must also allow for the possibility that the landing cannot be completed due to traffic considerations. |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an emergency descent to a precision landing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Fire in flight. (CA.VIII.B.K1)<br>2. Smoke in cockpit. (CA.VIII.B.K2)<br>3. Power-off approach. (CA.VIII.B.K3)<br>4. Energy management. (CA.VIII.B.K4)<br>5. Maintaining a constant radius about a point. (CA.VIII.B.K5)<br>6. Available landing distance (ALD). (CA.VIII.B.K6)<br>7. Hazards of other than hard surfaced runway. (CA.VIII.B.K7)<br>8. Wind conditions and effects. (CA.VIII.B.K8)<br>9. Density altitude. (CA.VIII.B.K9)<br>10. Headwind, tailwind, crosswind component. (CA.VIII.B.K10)<br>11. Emergency procedures. (CA.VIII.B.K11)<br>12. Communications. (CA.VIII.B.K12)<br>13. ATC clearance deviations. (CA.VIII.B.K13)<br>14. Selecting a landing location and an appropriate touchdown point. (CA.VIII.B.K14)<br>15. ELTs and/or other emergency locating devices. (CA.VIII.B.K15)<br>16. Transponder. (CA.VIII.B.K16) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Analyze the situation and select an appropriate course of action. (CA.VIII.B.S1)<br>2. Establish and maintain a steep spiral, not to exceed 60° angle of bank, to maintain a constant radius about a suitable ground reference point. (CA.VIII.B.S2)<br>3. Selects an altitude sufficient to continue through a series of at least three 360° turns. (CA.VIII.B.S3)<br>4. Applies wind-drift correction to track a constant radius circle around selected reference point with bank not to exceed 60° at steepest point in turn. (CA.VIII.B.S4)<br>5. Divides attention between airplane control and ground track, while maintaining coordinated flight. (CA.VIII.B.S5)<br>6. Maintains the specified airspeed, ±10 knots, rolls out toward object or specified heading, ±10°. (CA.VIII.B.S6)<br>7. Plan and follow a flight pattern to the selected landing area considering aircraft performance capabilities, altitude, wind, terrain, and obstructions. (CA.VIII.B.S7)<br>8. Completes final airplane configuration accounting for glide speed and distance to the intended touchdown point. (CA.VIII.B.S8)<br>9. Touch down in a normal landing attitude, -0/+200 feet from the specified touchdown point. (CA.VIII.B.S9)<br>10. Follow the appropriate checklist. (CA.VIII.B.S10) |

| **Task** | ***B. Emergency Descent and Landing (Simulated)*** |
|---|---|
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Wind effects. (CA.VIII.B.R1)<br>2. Exceeding airframe and/or airspeed limitations. (CA.VIII.B.R2)<br>3. Inadvertent stall/spin. (CA.VIII.B.R3)<br>4. Visual scanning and collision avoidance. (CA.VIII.B.R4)<br>5. Selecting a landing area. (CA.VIII.B.R5)<br>6. Task management. (CA.VIII.B.R6)<br>7. Low altitude maneuvering. (CA.VIII.B.R7)<br>8. Obstacle and wire strike avoidance. (CA.VIII.B.R8)<br>9. Situational awareness. (CA.VIII.B.R9) |

| **Task** | ***C. Systems and Equipment Malfunction*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with system and equipment malfunctions appropriate to the airplane provided for the practical test and analyzing the situation and take appropriate action for simulated emergencies. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Elements related to system and equipment malfunctions appropriate to the airplane, including the following— (CA.VIII.C.K1)<br>a. partial or complete power loss.<br>b. engine roughness or overheat.<br>c. carburetor or induction icing.<br>d. loss of oil pressure.<br>e. fuel starvation.<br>f. electrical malfunction.<br>g. vacuum/pressure, and associated flight instruments malfunction.<br>h. pitot/static system malfunction.<br>i. landing gear or flap malfunction.<br>j. inoperative trim.<br>k. inadvertent door or window opening.<br>l. structural icing.<br>m. smoke/fire/engine compartment fire.<br>n. any other emergency appropriate to the airplane.<br>2. Supplemental oxygen. (CA.VIII.C.K2)<br>3. Load factors. (CA.VIII.C.K3)<br>4. High drag versus low drag. (CA.VIII.C.K4) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Analyze the situation and take appropriate action for simulated emergencies appropriate to the airplane provided for at least three of the system and equipment malfunctions in the knowledge element. (CA.VIII.C.S1)<br>2. Completes appropriate checklist or procedure. (CA.VIII.C.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Hazardous attitudes. (CA.VIII.C.R1)<br>2. Preflight inspections. (CA.VIII.C.R2)<br>3. Maintenance. (CA.VIII.C.R3)<br>4. Checklist usage. (CA.VIII.C.R4)<br>5. Recognizing situations, such as depressurization (if applicable), cockpit smoke, and/or fire that require an emergency descent. (CA.VIII.C.R5)<br>6. Orientation, division of attention, and proper planning. (CA.VIII.C.R6)<br>7. Energy management. (CA.VIII.C.R7) |

| **Task** | ***D. Emergency Equipment and Survival Gear*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with emergency equipment, personal, and survival gear appropriate to the airplane and environment encountered during flight and identifying appropriate equipment that should be onboard the airplane. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Emergency equipment. (CA.VIII.D.K1)<br>2. Climate extremes (hot/cold). (CA.VIII.D.K2)<br>3. Mountainous terrain. (CA.VIII.D.K3)<br>4. Overwater operations. (CA.VIII.D.K4)<br>5. Gear to meet basic physical needs until rescue.. (CA.VIII.D.K5)<br>6. ELT operation, limitations and testing requirements. (CA.VIII.D.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Identify appropriate equipment that should be onboard the airplane. (CA.VIII.D.S1)<br>2. Identify appropriate personal gear to meet physical needs until rescue. (CA.VIII.D.S2)<br>3. Brief the proper use of the fire extinguisher, if installed. (CA.VII.D.S3) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Meeting basic needs (water, clothing, shelter) for 48 to 72 hours until search and rescue is made. (CA.VIII.D.R1)<br>2. Survival techniques, to include being located by search and rescue. (CA.VIII.D.R2) |

| Task | ***E. Engine Failure During Takeoff Before Vmc (Simulated) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an engine failure during takeoff before Vmc.<br>**NOTE:** Engine failure (simulated) shall be accomplished before reaching 50 percent of the calculated Vmc. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (CA.VIII.E.K1)<br>2. Runway distances. (CA.VIII.E.K2) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Close the throttles smoothly and promptly when simulated engine failure occurs. (CA.VIII.E.S1)<br>2. Maintain directional control and apply brakes, as necessary. (CA.VIII.E.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Emergency planning and communications. (CA.VIII.E.R1)<br>2. Task management. (CA.VIII.E.R2)<br>3. Low altitude maneuvering. (CA.VIII.E.R3)<br>4. Wire strike avoidance. (CA.VIII.E.R4)<br>5. Collision Avoidance. (CA.VIII.E.R5)<br>6. Right-of-way. (CA.VIII.E.R6)<br>7. Situational awareness of obstacles on approach and departure paths. (CA.VIII.E.R7)<br>8. Stall/Spin Awareness. (CA.VIII.E.R8) |

| **Task** | ***F. Engine Failure After Lift-Off (Simulated) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an engine failure after lift-off.<br>**NOTE:** Simulated engine failure of the most critical engine shall be demonstrated after lift-off. However, the failure of an engine shall not be simulated until attaining at least Vsse/Vxse/Vyse and at an altitude not lower than 400 feet AGL. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (CA.VIII.F.K1)<br>2. Runway distances. (CA.VIII.F.K2)<br>3. Drag reduction. (CA.VIII.F.K3)<br>4. How to identify the inoperative engine. (CA.VIII.F.K4)<br>5. Aircraft configuration for best performance during single-engine operations. (CA.VIII.F.K5)<br>6. Feathering and zero-thrust procedures. (CA.VIII.F.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize a simulated engine failure promptly, maintain control and utilize appropriate emergency procedures. (CA.VIII.F.S1)<br>2. Reduce drag, identify and verify the inoperative engine after simulated engine failure. (CA.VIII.F.S2)<br>3. Simulate feathering the propeller on the inoperative engine. Evaluator shall then establish a zero-thrust on the inoperative engine. (CA.VIII.F.S3)<br>4. Establish Vyse; if obstructions are present, establish Vxse or Vmc +5 knots, whichever is greater, until obstructions are cleared. Then transition to Vyse. (CA.VIII.F.S4)<br>5. Bank toward the operating engine as required for best performance. (CA.VIII.F.S5)<br>6. Monitor operating engine and make adjustments as necessary. (CA.VIII.F.S6)<br>7. Recognize the airplane's performance capabilities. If a climb is not possible at Vyse, maintain Vyse and return to the departure airport for landing, or initiate an approach to the most suitable landing area available. (CA.VIII.F.S7)<br>8. Simulate securing the inoperative engine. (CA.VIII.F.S8)<br>9. Maintain heading +10 degrees, and airspeed ±5 knots. (CA.VIII.F.S9)<br>10. Complete appropriate emergency checklist. (CA.VIII.F.S10) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Emergency planning and communications. (CA.VIII.F.R1)<br>2. Task management. (CA.VIII.F.R2)<br>3. Low altitude maneuvering. (CA.VIII.F.R3)<br>4. Wire strike avoidance. (CA.VIII.F.R4)<br>5. Collision Avoidance. (CA.VIII.F.R5)<br>6. Right-of-way. (CA.VIII.F.R6)<br>7. Situational awareness of obstacles on approach and departure paths. (CA.VIII.F.R7)<br>8. Stall/Spin Awareness. (CA.VIII.F.R8) |

| Task | *G. Approach and Landing with an Inoperative Engine (Simulated) (AMEL, AMES)* |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with an approach and landing with an engine inoperative, including engine failure on final approach. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (CA.VIII.G.K1)<br>2. Runway distances. (CA.VIII.G.K2)<br>3. Drag reduction. (CA.VIII.G.K3)<br>4. How to identify the inoperative engine. (CA.VIII.G.K4)<br>5. Aircraft configuration for best performance during single-engine operations. (CA.VIII.G.K5)<br>6. Feathering and zero-thrust procedures. (CA.VIII.G.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure and take appropriate action, maintain control, and utilize manufacturer's recommended emergency procedures. (CA.VIII.G.S1)<br>2. Bank toward the operating engine, as required, for best performance. (CA.VIII.G.S2)<br>3. Monitor the operating engine and make adjustments as necessary. (CA.VIII.G.S3)<br>4. Maintain the manufacturer's recommended approach airspeed +10/-5, and landing configuration with a stabilized approach, until landing is assured. (CA.VIII.G.S4)<br>5. Make smooth, timely, and correct control applications, during round out and touchdown. (CA.VIII.G.S5)<br>6. Touch down on the first one-third of available runway, with no drift and the airplane's longitudinal axis aligned with and over the runway center path. (CA.VIII.G.S6)<br>7. Maintain crosswind correction and directional control throughout the approach and landing sequence. (CA.VIII.G.S7)<br>8. Complete appropriate checklists. (CA.VIII.G.S8) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Accounting for wind. (CA.VIII.G.R1)<br>2. Selecting a suitable landing area. (CA.VIII.G.R2)<br>3. Planning and following a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions. (CA.VIII.G.R3)<br>4. Task management. (CA.VIII.G.R4)<br>5. Low altitude maneuvering. (CA.VIII.G.R5)<br>6. Wire strike avoidance. (CA.VIII.G.R6)<br>7. Collision Avoidance. (CA.VIII.G.R7)<br>8. Right-of-way. (CA.VIII.G.R8)<br>9. Situational awareness of obstacles on approach and departure paths. (CA.VIII.G.R9)<br>10. Stall/Spin Awareness. (CA.VIII.G.R10) |

## IX. Multiengine Operations

**NOTE:** If the applicant does not hold an instrument rating airplane, Tasks C and D need not be accomplished. All other Tasks must to be completed.

| **Task** | ***A. Maneuvering with One Engine Inoperative (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with one engine inoperative.<br><br>**NOTE:** The feathering of one propeller shall be demonstrated in flight, unless the manufacturer prohibits the intentional feathering of the propellers during flight. The maneuvers shall be performed at altitudes above 3,000 feet AGL or the manufacturer's recommended altitude, whichever is higher, and positions where safe landings on established airports can be readily accomplished. In the event a propeller cannot be unfeathered during the practical test, it shall be treated as an emergency. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Vmc. (CA.IX.A.K1)<br>2. Drag reduction. (CA.IX.A.K3)<br>3. How to identify the inoperative engine. (CA.IX.A.K4)<br>4. Aircraft configuration for best performance during single-engine operations. (CA.IX.A.K5)<br>5. Feathering and zero-thrust procedures. (CA.IX.A.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure and maintain control. (CA.IX.A.S1)<br>2. Set the engine controls, reduce drag, identify and verify the inoperative engine, and feather appropriate propeller. (CA.IX.A.S2)<br>3. Establish and maintain a bank toward the operating engine as required for best performance in straight and level flight. (CA.IX.A.S3)<br>4. Follow the manufacturer's prescribed checklists to verify procedures for securing the inoperative engine. (CA.IX.A.S4)<br>5. Monitor the operating engine and make necessary adjustments. (CA.IX.A.S5)<br>6. Demonstrate coordinated flight with one engine inoperative (propeller feathered). (CA.IX.A.S6)<br>7. Restart the inoperative engine using appropriate manufacturer's restart procedures. (CA.IX.A.S7)<br>8. Maintain altitude ±100 feet or minimum sink as appropriate and heading ±10 degrees. (CA.IX.A.S8)<br>9. Complete the appropriate checklist. (CA.IX.A.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (CA.IX.A.R1)<br>2. CFIT avoidance. (CA.IX.A.R2)<br>3. Task management. (CA.IX.A.R3)<br>4. Wire strike avoidance. (CA.IX.A.R4)<br>5. Situational awareness. (CA.IX.A.R5) |

| Task | *B. Vmc Demonstration (AMEL, AMES)* |
|---|---|
| Reference | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| Objective | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a Vmc demonstration.<br>**NOTE:** An applicant seeking an airplane-multiengine land rating, “Limited to Center Thrust,” is not required to be evaluated on this Task.<br>**NOTE:** Airplane with normally aspirated engines will lose power as altitude increases because of the reduced density of the air entering the induction system of the engine. This loss of power will result in a Vmc lower than the stall speed at higher altitudes. Therefore, recovery should be made at the first indication of loss of directional control, stall warning, or buffet. Do not perform this maneuver by increasing the pitch attitude to a high angle with both engines operating and then reducing power on the critical engine. This technique is hazardous and may result in loss of airplane control. |
| Knowledge | The applicant demonstrates understanding of:<br>1. Vmc and factors affecting Vmc. (CA.IX.B.K1)<br>2. Cause of loss of directional controls at airspeeds less than Vmc. (CA.IX.B.K2)<br>3. Safe recovery procedures. (CA.IX.B.K3) |
| Skills | The applicant demonstrates the ability to:<br>1. Configure the airplane in accordance with the manufacturer’s recommendation, in the absence of the manufacturer’s recommendations, then at Vsse/Vyse, as appropriate-(CA.IX.B.S1)<br>a. Landing gear retracted.<br>b. Flaps set for takeoff.<br>c. Cowl flaps set for takeoff.<br>d. Trim set for takeoff.<br>e. Propellers set for high RPM.<br>f. Power on critical engine reduce to idle.<br>g. Power on operating engine set to takeoff or maximum available power.<br>2. Establish a single-engine climb attitude with the airspeed at approximately 10 knots above Vsse. (CA.IX.B.S2)<br>3. Establish a bank toward the operating engine, as required for best performance and controllability. (CA.IX.B.S3)<br>4. Increase the pitch attitude slowly to reduce the airspeed at approximately 1 knot per second while applying rudder pressure to maintain directional control until full rudder is applied. (CA.IX.B.S4)<br>5. Recognize indications of loss of directional control, stall warning, or buffet. (CA.IX.B.S5)<br>6. Recover promptly by simultaneously reducing power sufficiently on the operating engine while decreasing the angle of attack as necessary to regain airspeed and directional control. Recovery SHOULD NOT be attempted by increasing the power on the simulated failed engine. (CA.IX.B.S6)<br>7. Recover within 20 degrees of the entry heading. (CA.IX.B.S7)<br>8. Advance power smoothly on operating engine and accelerate to Vxse/Vyse, as appropriate, +10/-5 knots, during the recovery. (CA.IX.B.S8) |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (CA.IX.B.R1)<br>2. CFIT avoidance. (CA.IX.B.R2)<br>3. Task management. (CA.IX.B.R3)<br>4. Wire strike avoidance. (CA.IX.B.R4)<br>5. Situational awareness. (CA.IX.B.R5) |

| **Task** | ***C. Engine Failure During Flight (by reference to instruments) (AMEL, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with instrument flight with one engine inoperative. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Instrument procedures used with one engine inoperative. (CA.IX.C.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure, set the engine controls, reduce drag, identify and verify the inoperative engine, and feather appropriate engine propeller. (CA.IX.C.S1)<br>2. Establish and maintain a bank toward the operating engine as required for best performance in straight-and-level. (CA.IX.C.S2)<br>3. Follow the prescribed checklists to verify procedures for securing the inoperative engine. (CA.IX.C.S3)<br>4. Monitor the operating engine and make necessary adjustments. (CA.IX.C.S4)<br>5. Demonstrate coordinated flight with one engine inoperative. (CA.IX.C.S5)<br>6. Maintain altitude ±100 feet, or minimum sink as appropriate and heading ±10 degrees bank, bank ±5 degrees, and levels off from climbs and descents within ±100 feet. (CA.IX.C.S6) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (CA.IX.C.R1)<br>2. CFIT avoidance. (CA.IX.C.R2)<br>3. Task management. (CA.IX.C.R3)<br>4. Wire strike avoidance. (CA.IX.C.R4)<br>5. Situational awareness. (CA.IX.C.R5) |

| | |
|---|---|
| **Task** | ***D. Instrument Approach and Landing with an Inoperative Engine (Simulated) by Reference to Instruments (AMEL, AMES)*** |
| **Reference** | FAA-H-8083-3, FAA-P-8740-19; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with executing a published instrument approach with one engine inoperative. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Instrument approach procedures used with one engine inoperative. (CA.IX.D.K1) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Recognize engine failure, set the engine controls, reduce drag, identify and verify the inoperative engine, and feather appropriate engine propeller. (CA.IX.D.S1)<br>2. Establish and maintain a bank toward the operating engine, as required for best performance in straight-and-level flight. (CA.IX.D.S2)<br>3. Follow the manufacturer's prescribed checklists to verify procedures for securing the inoperative engine. (CA.IX.D.S3)<br>4. Monitor the operating engine and make necessary adjustments. (CA.IX.D.S4)<br>5. Request and receive an actual or a simulated ATC clearance for an instrument approach. (CA.IX.D.S5)<br>6. Follow the actual or a simulated ATC clearance for an instrument approach. (CA.IX.D.S6)<br>7. Maintain altitude within 100 feet, the airspeed within ±10 knots if within the aircraft's capability, and heading +-10 degrees. (CA.IX.D.S7)<br>8. Establish a rate of descent that will ensure arrival at the MDA or DH/DA, with the airplane in a position from which a descent to a landing, on the intended runway can be made, either straight in or circling as appropriate. (CA.IX.D.S8)<br>9. On final approach segment, no more than three-quarter-scale deflection of the CDI/glide slope indicator. For RMI or ADF indicators, within 10 degrees of the course. (CA.IX.D.S9)<br>10. Avoid loss of aircraft control, or attempted flight contrary to the engine-inoperative operating limitations of the aircraft. (CA.IX.D.S10)<br>11. Comply with the published criteria for the aircraft approach category when circling. (CA.IX.D.S11)<br>12. Complete landing and appropriate manufacturer's checklists. (CA.IX.D.S12) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Collision avoidance. (CA.IX.D.R1)<br>2. CFIT avoidance. (CA.IX.D.R2)<br>3. Task management. (CA.IX.D.R3)<br>4. Wire strike avoidance. (CA.IX.D.R4)<br>5. Situational awareness. (CA.IX.D.R5) |

## X. High Altitude Operations

| Task | *A. Supplemental Oxygen* |
|---|---|
| **Reference** | 14 CFR part 91; FAA-H-8083-25; AC 61-107; AIM; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management for flight at higher altitudes where supplemental oxygen is required or recommended. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Regulatory requirements for supplemental oxygen for flight crew and passengers. (CA.X.A.K1)<br>2. Physiological impairment and symptoms of hypoxia. (CA.X.A.K2)<br>3. Useful conscientious times without supplemental oxygen. (CA.X.A.K3)<br>4. Operational characteristics, limitations, and applicability of continuous flow, demand, and pressure-demand oxygen systems. (CA.X.A.K4)<br>5. Differences between and identification of “aviator’s breathing oxygen” and other types. (CA.X.A.K5)<br>6. The necessary precautions when using supplemental oxygen systems. (CA.X.A.K6) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Operate the installed or portable oxygen equipment in the aircraft, if equipment is installed. (CA.X.A.S1)<br>2. Determine the quantity of supplemental oxygen required. (CA.X.A.S2)<br>3. Accurately assess the adequacy of the oxygen supply for a planned flight. (CA.X.A.S3)<br>4. Brief passengers on the use of the supplemental oxygen equipment. (CA.X.A.S4) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Flight planning to assess the potential need for supplemental oxygen. (CA.X.A.R1)<br>2. Compressed gas container hazards with portable systems. (CA.X.A.R2)<br>3. Combustion hazards of an oxygen rich environment. (CA.X.A.R3) |

| **Task** | ***B. Pressurization*** |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-25A; AC 61-107; AIM; POH/AFM. |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management for flight in pressurized aircraft at high altitudes. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Fundamental concepts of aircraft pressurization system. (CA.X.B.K1)<br>2. Supplemental oxygen requirements when operating airplanes with pressurized cabins. (CA.X.B.K2)<br>3. Physiological hazards associated with high altitude flight and decompression. (CA.X.B.K3) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Operate the installed pressurization system, if equipment is installed. (CA.X.B.S1)<br>2. React appropriately to simulated pressurization malfunctions. (CA.X.B.S2) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Planning a high altitude flight. (CA.X.B.R1)<br>2. Checking supplemental oxygen quantities and systems before flight. (CA.X.B.R2)<br>3. Briefing passengers on use of supplemental oxygen systems in the case of pressurization malfunction. (CA.X.B.R3)<br>4. Human factors. (CA.X.B.R4) |

## XI. Postflight Procedures

| **Task** | ***A. Parking and Securing*** |
|---|---|
| **Reference** | FAA-H-8083-3; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with after landing, parking, and securing procedures. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind. (CA.XI.A.K1)<br>2. Familiarity with airport markings (including hold short lines), signs, and lights. (CA.XI.A.K2)<br>3. Aircraft lighting. (CA.XI.A.K3)<br>4. Towered and non-towered airport operations. (CA.XI.A.K4)<br>5. Visual indicators for wind. (CA.XI.A.K5)<br>6. Airport information resources (A/FD, airport diagram). (CA.XI.A.K6)<br>7. Good cockpit discipline during taxi. (CA.XI.A.K7)<br>8. Appropriate taxi speeds. (CA.XI.A.K8)<br>9. Exhibiting procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC. (CA.XI.A.K9)<br>10. Procedures unique to night operations. (CA.XI.A.K10)<br>11. Hazards of low visibility operations. (CA.XI.A.K11)<br>12. Importance of documenting any in-flight/post-flight discrepancies. (CA.XI.A.K12)<br>13. National Transport Safety Board (NTSB) accident/incident reporting. (CA.XI.A.K13) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Utilize after landing runway incursion avoidance procedures. (CA.XI.A.S1)<br>2. Park in an appropriate area, considering the safety of nearby persons and property. (CA.XI.A.S2)<br>3. Follow the appropriate procedure for engine shutdown. (CA.XI.A.S3)<br>4. Completes the After Landing checklist after the airplane is stopped. (CA.XI.A.S4)<br>5. Plan the taxi route to the ramp up. (CA.XI.A.S5)<br>6. Complete the Engine Shutdown Checklist. (CA.XI.A.S6)<br>7. Disembark passengers safely and remain aware of passenger movement while on the ramp area. (CA.XI.A.S7)<br>8. Record aircraft discrepancies and notes for possible service needs before next flight. (CA.XI.A.S8)<br>9. Conduct an appropriate post flight inspection, secure the aircraft. (CA.XI.A.S9) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi and parking. (CA.X.A.R1)<br>2. Proximity of other aircraft/vehicles/people when operating on airport surfaces. (CA.XI.A.R2)<br>3. Propeller safety. (CA.XI.A.R3)<br>4. Proper workload management. (CA.XI.A.R4)<br>5. Confirmation or expectation bias. (CA.XI.A.R5)<br>6. Automation Management. (CA.XI.A.R6)<br>7. Airport security. (CA.XI.A.R7) |

| Task | ***B. Seaplane Post-Landing Procedures (ASES, AMES)*** |
|---|---|
| **Reference** | FAA-H-8083-23; POH/AFM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with anchoring, docking, mooring, and ramping/beaching.<br>**NOTE:** The examiner shall select at least one after-landing procedure (anchoring, docking and mooring, or ramping/beaching). |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Mooring. (CA.XI.B.K1)<br>2. Docking. (CA.XI.B.K2)<br>3. Anchoring. (CA.XI.B.K3)<br>4. Ramping/beaching. (CA.XI.B.K4)<br>5. Post-landing procedures. (CA.XI.B.K5) |
| **Skills** | The applicant demonstrates the ability to:<br>1. Selects a suitable area for anchoring, considering seaplane movement, water depth, tide, wind, and weather changes. (CA.XI.B.S1)<br>2. Uses an adequate number of anchors and lines of sufficient strength and length to ensure the seaplane's security. (CA.XI.B.S2)<br>3. Approaches the dock or mooring buoy in the proper direction considering speed, hazards, wind, and water current. (CA.XI.B.S3)<br>4. Approaches the ramp/beach considering persons and property, in the proper attitude and direction, at a safe speed, considering water depth, tide, current, and wind. (CA.XI.B.S4)<br>5. Ensures seaplane security in a manner that will protect it from the harmful effect of wind, waves, and changes in water level. (CA.XI.B.S5) |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi and parking. (CA.XI.B.R1)<br>2. Proximity of other aircraft/vehicles/people when operating on airport surfaces. (CA.XI.B.R2)<br>3. Propeller safety. (CA.XI.B.R3)<br>4. Proper workload management. (CA.XI.B.R4)<br>5. Confirmation or expectation bias. (CA.XI.B.R5)<br>6. Automation Management. (CA.XI.B.R6)<br>7. Airport security. (CA.XI.B.R7)<br>8. Water and environmental impacts on securing a seaplane. (CA.XI.B.R8) |

# APPENDIX 1:  THE KNOWLEDGE TEST

The knowledge test is an important part of the airman certification process. Applicants must pass the knowledge test before taking the practical test.

### *Knowledge Test Description*

The knowledge test consists of objective, multiple-choice questions. There is a single best response for each test question. Each test question is independent of other questions. A correct response to one does not depend upon, or influence, the correct response to another.

| Test Code | Test Name | Number of Questions | Allotted Time | Passing Score |
|---|---|---|---|---|
| CAX | Commercial Pilot Airplane | 100 | 3.0 | 70% |
| CCP | Commercial Pilot Canadian Conversion | 40 | 2.0 | 70% |

### *Knowledge Test Eligibility Requirements*

For information concerning eligibility for Commercial Pilot certification, please refer to:

- Medical Certificates: Requirement and Duration: 14 CFR 61.23
- Knowledge Test: Prerequisites and Passing Grades: 14 CFR 61.35
- Eligibility: 14 CFR 61.123, 61.125, 61.127, 61.129

### *Knowledge Test Centers*

The FAA authorizes hundreds of knowledge testing center locations. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

### *Test Authorization*

In order to take the Commercial Pilot knowledge test, you must provide one of the following:

- Graduation certificate issued by a Federal Aviation Administration (FAA) certificated pilot school (14 CFR 61.71), or a
- Written statement or logbook endorsement from an authorized instructor certifying that the applicant completed an applicable ground training or home study course and is prepared for the knowledge test (14 CFR 61.35, 61.96(b)(3) or 61.103(d)(2)).

Acceptable forms of authorization for PCP only:

- Confirmation of Verification Letter issued by the Airmen Certification Branch (AFS-760).

Acceptable forms of retest authorization for ALL Commercial Pilot tests:

- Original failed, passing, or expired Airman Knowledge Test Report, provided the applicant still has the test report in his or her possession.

  **NOTE:** If the applicant no longer possesses the original test report, he or she may present an ‘expired test/credit’ letter issued by AFS-760.

- An applicant retesting AFTER FAILURE is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training. The endorsement must certify that the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.

***Knowledge Test Procedures***

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software).

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
|---|---|---|
| *Supplement book provided by proctor* | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators |
| *All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions* | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| *Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages* | Magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature. |
| *Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test* | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| *Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures* | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

### *FAA Knowledge Test Question Coding*

Each task in the Airman Certification Standard includes an Airman Certification Standards (ACS) code. This ACS code is displayed on the airman test report to indicate what task element was proven deficient on the Knowledge Exam. Instructors can then provide remedial training in the deficient areas and evaluators can re-test this element during the practical exam.

The ACS coding consists of 5 elements. For example: this code is deciphered accordingly:

**CA.I.C.K1.a:**

**CA** = Applicable ACS (commercial pilot airplane)
**I** = Area of Operation (preflight preparation)
**C** = Task (weather information);
**K1** = Knowledge Task element 1 (weather products required for preflight planning and enroute operations)
**a** = rote – represents the level of learning and guides question development (e.g., rote would require the applicant to define, recall, list, name, match, label)

Every question is correlated to a specific ACS task/element. This coding methodology will be useful to all involved with airman certification—the applicant, the evaluator, and the flight instructor. It indicates what test subjects (tasks) were satisfactorily passed and what tasks need to be reviewed prior to the practical test.

### *Testing Procedures for Applicants Requesting Special Accommodations*

An applicant with a learning or reading disability may request approval from AFS-630 through the local Flight Standards District Offices (FSDO) or International Field Offices (IFO) to take an airman knowledge test using one of the three options listed below, in preferential order:

**Option 1**: Use current testing facilities and procedures whenever possible.

**Option 2**: Use a self-contained, electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

(***NOTE:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.)*

**Option 3**: Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO inspector must contact the Airman Testing Standards Branch (AFS-630) for assistance in selecting the test site and assisting the proctor. Before approving any option, the FSDO or IFO inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

### *Cheating or Other Unauthorized Conduct*

Computer testing centers must follow strict security procedures to avoid test compromise in accordance with FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. Testing centers will terminate a test any time the test proctor suspects an occurrence of cheating.

The FAA will conduct an investigation of the incident. If the investigation determines that cheating or unauthorized conduct occurred, any airman certificate or rating the applicant holds may be revoked. In addition, the applicant may be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of one year.

### *Airman Knowledge Test Report*

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report documenting the score with the testing center's raised, embossed seal. The applicant must retain the original Airman Knowledge Test Report and present it to the evaluator conducting the practical test.

An Airman Knowledge Test Report expires 24-calendar months from the month the applicant completes the knowledge test. If the Airman Knowledge Test Report expires before completion of the practical test, the applicant must retake the knowledge test.

To obtain a duplicate Airman Knowledge Test Report due to loss or destruction of the original, the applicant can send a signed request accompanied by a check or money order for $1.00, payable to the FAA to:

> Federal Aviation Administration
> Airmen Certification Branch, AFS-760
> P.O. Box 25082
> Oklahoma City, OK 73125

## APPENDIX 2: THE PRACTICAL TEST

The evaluator must conduct the practical test in accordance with this ACS. The evaluator must assess the applicant on all tasks included in each Area of Operation of the ACS unless otherwise noted.

**NOTE:** The applicant must pass the knowledge test before taking the practical test, and the applicant must pass the oral portion of the practical test before beginning the flight portion.

For an applicant who holds at least a commercial pilot certificate and seeks an additional airplane category and/or class rating at the private pilot level, the examiner shall evaluate that applicant in the Areas of Operation and Tasks listed in the Additional Rating Task Table. Please note, however, that the evaluator has the discretion to evaluate the applicant's competence in the remaining Areas of Operation and Tasks.

If the applicant holds two or more category or class ratings at least at the commercial level, and the ratings table indicates differing required Tasks, the "least restrictive" entry applies. For example, if "ALL" and "NONE" are indicated for one Area of Operation, the "NONE" entry applies. If "B" and "B, C" are indicated, the "B" entry applies.

### *Conduct of the Practical Test*

The evaluator must develop a written Plan of Action to conduct the test, which includes all required Areas of Operation and Tasks. The Plan of Action will include a scenario that evaluates as many of the required Areas of Operation and Tasks as possible. As the scenario unfolds during the test, the examiner will interject problems and emergencies the applicant must manage.

The evaluator has the discretion and flexibility to change the Plan of Action in order to accommodate unexpected situations as they arise. The evaluator will evaluate any selected Task in its entirety. The evaluator may elect to suspend a scenari006F and then resume the scenario in order to assess certain tasks.

If performing aspects of a given maneuver, such as emergency procedures, would jeopardize safety, the evaluator will ask the applicant to simulate that portion of the maneuver.

### *Use of Checklists*

Throughout the practical test, the applicant is evaluated on the use of an approved manufacturer's checklist or equivalent.

**NOTE:** If there is no published manufacturer's checklist, the applicant may use the appropriate FAA handbook or equivalent checklist.

Assessing proper checklist use depends upon the specific Task. In all cases, the evaluator should determine the applicant appropriately divides attention and uses proper visual scanning. In some situations, reading the actual checklist may be impractical or unsafe. In such cases, the evaluator should assess the applicant's performance of published or recommended immediate action "memory" items along with his or her review of the appropriate checklist once conditions permit.

### *Use of Distractions*

Research and accident analysis indicate that pilot distraction during critical phases of flight is a factor in many accidents. The evaluator will cause realistic distractions during the flight portion of the practical test in order to evaluate the applicant's ability to use and maintain proper control technique while dividing attention both inside and/or outside the cockpit.

### *Positive Exchange of Flight Controls*

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls."

Pilots should follow this procedure during any exchange of flight controls, including any occurrence during the practical test. The FAA also recommends that both pilots use a visual check to verify that the exchange has occurred. There must never be any doubt as to who is flying the aircraft.

### *Stall and Spin Awareness*

During flight training and testing, the applicant and the instructor or evaluator must always recognizeandavoidoperationthatcouldleadtoaninadvertentstallorspin

### *Possible Outcomes of the Practical Test*

There are three possible outcomes of the practical test:(1) pass, (2) fail, or (3) discontinuance.

<u>Pass</u>

Satisfactory performance requires the applicant to:

- Perform the Tasks specified in the Areas of Operation for the certificate or rating sought within the approved standards;
- Demonstrate mastery of the aircraft by performing each Task successfully;
- Demonstrate proficiency and competency in accordance with the approved standards;
- Demonstrate sound judgment and exercise aeronautical decision-making/risk management;
- Demonstrate single-pilot competence if the aircraft is type certificated for single-pilot operations.

Satisfactory performance will result in the issuance of a temporary certificate.

**NOTE:** The tolerances listed in the ACS represent the performance expected in good flying conditions.

<u>Fail</u>

If, in the judgment of the evaluator, the applicant does not meet the standards for any Task, the applicant fails the Task and associated Area of Operation, the test is unsatisfactory, and the examiner issues a Notice of Disapproval. When the examiner issues a Notice of Disapproval, he or she shall list the Area of Operation in which the applicant did not meet the standard. The Notice of Disapproval must also list the Area(s) of Operation not tested, and the number of practical test failures.

The examiner or the applicant may end the test if the applicant fails a Task. The examiner may continue the test only with the consent of the applicant and examiner, and the applicant is entitled to credit for only those Areas of Operation and the associated Tasks performed satisfactorily. Though not required, the examiner has discretion to reevaluate any Task, including those previously passed, during the retest.

Typical areas of unsatisfactory performance and grounds for disqualification include:

- Any action or lack of action by the applicant that requires corrective intervention by the examiner to maintain safe flight.
- Failure to use proper and effective visual scanning techniques to clear the area before and while performing maneuvers.
- Consistently exceeding tolerances stated in the Objectives.
- Failure to take prompt corrective action when tolerances are exceeded.
- Failure to exercise Risk Management

Discontinuance

When it is necessary to discontinue a practical test for reasons other than unsatisfactory performance (e.g., equipment failure, weather, illness), the evaluator returns all the test paperwork to the applicant. The evaluator must prepare, sign, and issue a Letter of Discontinuance that lists those Areas of Operation the applicant successfully completed and the time remaining to complete the test. The evaluator should advise the applicant to present the Letter of Discontinuance to the evaluator when the practical test resumes in order to receive credit for the items successfully completed. The Letter of Discontinuance becomes part of the applicant's certification file.

***Prerequisites for the Test***

According to 14 CFR part 61, an applicant for the Commercial Pilot Practical Test must:

- Be at least 18 years of age;
- Be able to read, speak, write, and understand the English language as detailed in AC 60-28;
- Possess a private pilot certificate with an airplane rating, if a commercial pilot certificate with an airplane rating is sought, or meet the flight experience required for a private pilot certificate (airplane rating) and pass the private airplane knowledge and practical test;
- Possess an instrument rating (airplane) or the following limitation shall be placed on the commercial pilot certificate: "Carrying passengers in airplanes for hire is prohibited at night or on cross-country flights of more than 50 nautical miles;"
- Have passed the appropriate commercial pilot knowledge test since the beginning of the 24th month before the month in which he or she takes the practical test;
- Have satisfactorily accomplished the required training and obtained the prescribed aeronautical experience;
- Possess at least a current third class medical certification or, when a military pilot of the U.S. Armed Forces, show and present evidence of an up-to-date medical examination by the U.S. Armed Forces authorizing pilot status;
- Have an endorsement from an authorized instructor certifying that the applicant has received and logged training time within two (2) calendar months preceding the date of application in preparation for the practical test, and is prepared for the practical test;
- Receive and log ground training from an authorized instructor or complete a home-study course on the aeronautical knowledge areas of 14 CFR part 61.105 paragraph (b) that apply to the aircraft category and class rating sought; and
- Have an endorsement certifying that the applicant has demonstrated satisfactory knowledge of the subject areas in which the applicant was deficient on the airman knowledge test (not required for power aircraft to non-power aircraft or power aircraft to power aircraft for additional category or class rating).

***Aircraft and Equipment Required for the Practical Test***

The Commercial Pilot—Airplane applicant is required by 14 CFR 61.45 to provide an airworthy, certificated aircraft for use during the practical test.  This section states that the aircraft must:

- Be of U.S., foreign, or military registry of the same category, class, and type, if applicable, for the certificate and/or rating for which the applicant is applying;
- Have fully functioning dual controls, except as provided for in 14 CFR 61.45(c) and (e); and
- Be capable of performing all Areas of Operation appropriate to the rating sought and have no operating limitations which prohibit its use in any of the Areas of Operation required for the practical test.
- Be a complex airplane furnished by the applicant, unless the applicant currently holds a commercial pilot certificate with a single-engine or multiengine class rating as appropriate, for the performance of takeoffs, landings, and appropriate emergency procedures. A complex landplane is one having retractable landing gear, flaps, and controllable propeller or turbine-powered. A complex seaplane is one having flaps and controllable propeller.

***Instructor Responsibilities***

Instructors are responsible for training the applicant to acceptable standards in knowledge, skills, and risk management procedures in all the Tasks, even if the applicant is simply adding an additional Commercial pilot certificate.

***Evaluator Responsibilities***

The evaluator who conducts the practical test is responsible for determining the applicant meets the acceptable standards of aeronautical knowledge, skills, and risk management for each Task in the appropriate ACS.

The evaluator must test at least one item in each of the Knowledge and Risk Management elements for every Task, emphasizing the topics (if any) the applicant missed on the Knowledge Test. The evaluator must test each item in the Skills elements unless otherwise noted in the Task.

Applicants must complete the oral portion of the practical test before the flight portion; however, oral questioning will continue throughout the flight. To the greatest extent practicable, evaluators shall test the applicant's ability to apply and correlate information, and only use rote questions when appropriate for the material being tested.

If the evaluator determines that a Task is incomplete, or the outcome is uncertain, the evaluator may require the applicant to repeat that Task, or portions of that Task. The FAA made this provision in the interest of fairness, but it does not mean that instruction, practice, or the repetition of an unsatisfactory task is permitted during the practical test.

On multiengine practical tests, where the failure of the most critical engine after liftoff is required, the examiner must give consideration to local atmospheric conditions, terrain, and type of aircraft used. However, the failure of an engine shall not be simulated until attaining at least $V_{SSE}$/$V_{XSE}$/$V_{YSE}$ and at an altitude not lower than 400 feet AGL.

During simulated engine failures on multiengine practical tests, the examiner shall set zero thrust after the applicant has simulated feathering the propeller. The examiner shall require the applicant to demonstrate at least one landing with a simulated-feathered propeller with the engine set to zero thrust. The feathering of one propeller shall be demonstrated in flight, unless the manufacturer prohibits the intentional feathering of the propellers during flight.

The evaluator will assess the applicant's use of visual scanning and collision avoidance procedures throughout the entire test.

## APPENDIX 3: ADDITIONAL RATING TASK TABLES

### Addition of an Airplane Single-Engine Land Rating to an existing Commercial Pilot Certificate

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| COMMERCIAL PILOT RATING(S) HELD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASES** | **AMEL** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G | F,G | F,G | F,G | F,G | F,G | F,G | F,G |
| **II** | D | D | D | A,C,D, F | A,D,F | A,B,C,D,F | A,B,C,D,F | A,B,C,D,F |
| **III** | B | NONE | B | B | NONE | B | B | B |
| **IV** | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F, M | A,B,C, D,E,F, M | A,B,C, D,E,F,M | A,B,C, D,E,F, M | A,B,C, D,E,F,M |
| **V** | NONE | B,C,D | B,C,D | ALL | ALL | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B | B | B | ALL | ALL | ALL | ALL | ALL |
| **IX** | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE |
| **X** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **XI** | A | NONE | A | A | A | A | A | A |

**Addition of an Airplane Single-Engine Sea Rating to an existing Commercial Pilot Certificate**

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| COMMERCIAL PILOT RATING(S) HELD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASEL** | **AMEL** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G,I | F,G,I | F,G | F,G,I | F,G,I | F,G,I | F,G,I | F,G,I |
| **II** | E | E | E | A,B,C,E | A,B,E, F | A,B,C,E,F | A,B,C,E,F | A,B,C,E,F |
| **III** | B | B | NONE | B | B | B | B | B |
| **IV** | A,B,G, H,J,K,L | A,B,G, H,I,J,K,L | A,B,G, H,I,J,K,L | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N | A,B,G, H,I,J,K,L, M,N |
| **V** | NONE | B,C,D | B,C,D | ALL | ALL | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B | B | B | ALL | ALL | ALL | ALL | ALL |
| **IX** | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE |
| **X** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **XI** | B | B | NONE | B | B | B | B | B |

**Addition of an Airplane Multi-Engine Land Rating to an existing Commercial Pilot Certificate**

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| **COMMERCIAL PILOT RATING(S) HELD** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASEL** | **ASES** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G,J | F,G,J | F,G | F,G,J | F,G,J | F,G,J | F,G,J | F,G,J |
| **II** | ALL | ALL | D | ALL | ALL | ALL | ALL | ALL |
| **III** | NONE | B | B | B | NONE | B | B | B |
| **IV** | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D,N | A,B,C,D,N | A,B,C,D,N | A,B,C,D,N | A,B,C,D,N |
| **V** | ALL | ALL | NONE | ALL | ALL | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | ALL | ALL | NONE | ALL | ALL | ALL | ALL | ALL |
| **VIII** | ALL | ALL | E,F,G | ALL | ALL | ALL | ALL | ALL |
| **IX** | ALL | ALL | NONE | ALL | ALL | ALL | ALL | ALL |
| **X** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **XI** | NONE | A | A | A | A | A | A | A |

**Addition of an Airplane Multi-Engine Sea Rating to an existing Commercial Pilot Certificate**

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

| | COMMERCIAL PILOT RATING(S) HELD | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AREAS OF OPERATION** | **ASEL** | **ASEL** | **AMES** | **RH** | **RG** | **Glider** | **Balloon** | **Airship** |
| **I** | F,G,I | F,G,I,J | F,G,J | F,G,I,J | F,G,I,J | F,G,I,J | F,G,I,J | F,G,I,J |
| **II** | E | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **III** | B | B | NONE | B | B | B | B | B |
| **IV** | A,B,G, H,J,K,L | A,B,G, H,I,J,K,L | A,B,G, H,I,J,K,L | ALL | ALL | ALL | ALL | ALL |
| **V** | NONE | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **VI** | NONE | NONE | NONE | NONE | NONE | ALL | ALL | NONE |
| **VII** | NONE | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **VIII** | B,C,D, E,F,G | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **IX** | NONE | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| **X** | NONE | NONE | NONE | ALL | ALL | ALL | ALL | ALL |
| **XI** | B | B | NONE | ALL | B | ALL | ALL | ALL |

## APPENDIX 4: PRACTICAL TEST CHECKLIST

***Applicant's Practical Test Checklist***

### Appointment with Evaluator

**Evaluator's Name:** ______________________________

**Location:** ______________________________

**Date/Time:** ______________________________

**ACCEPTABLE AIRCRAFT**

- ☐ Aircraft Documents:
  - ☐ Airworthiness Certificate
  - ☐ Registration Certificate
  - ☐ Operating Limitations
- ☐ Aircraft Maintenance Records:
  - ☐ Logbook Record of Airworthiness Inspections and AD Compliance
- ☐ Pilot's Operating Handbook, FAA-Approved Aircraft Flight Manual

**PERSONAL EQUIPMENT**

- ☐ View-Limiting Device
- ☐ Current Aeronautical Charts (Printed or Electronic)
- ☐ Computer and Plotter
- ☐ Flight Plan Form
- ☐ Flight Plan Form and Flight Logs (printed or electronic)
- ☐ Airport Facility Directory, Airport Diagrams and Appropriate Publications
- ☐ Current AIM

**PERSONAL RECORDS**

- ☐ Identification—Photo/Signature ID
- ☐ Pilot Certificate
- ☐ Current Medical Certificate
- ☐ Completed FAA Form 8710-1, Airman Certificate and/or Rating Application with Instructor's Signature
- ☐ Original Knowledge Test Report
- ☐ Pilot Logbook with appropriate Instructor Endorsements
- ☐ FAA Form 8060-5, Notice of Disapproval (if applicable)
- ☐ Letter of Discontinuance (if applicable)
- ☐ Approved School Graduation Certificate (if applicable)
- ☐ Evaluator's Fee (if applicable)

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## APPENDIX 5: REFERENCES

| | |
|---|---|
| **14 CFR part 39** | Airworthiness Directives |
| **14 CFR part 43** | Maintenance, Preventive Maintenance, Rebuilding, and Alteration |
| **14 CFR part 61** | Certification: Pilots, Flight Instructors, and Ground Instructors |
| **14 CFR part 71** | Designation of Class A, B, C, D and E Airspace Areas; Air Traffic Service Rotes; and Reporting Points |
| **14 CFR part 91** | General Operating and Flight Rules |
| **14 CFR part 93** | Special Air Traffic Rules |
| **AC 00-6** | Aviation Weather |
| **AC 00-45** | Aviation Weather Services |
| **AC 60-28** | English Language Skill Standards Required by 14 CFR Parts 61, 63 and 65 |
| **AC 61-67** | Stall and Spin Awareness Training |
| **AC 90-66** | Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports Without Operating Control Towers |
| **AC 91-13** | Cold Weather Operation of Aircraft |
| **AC 91-21.1** | Use of Portable Electronic Devices Aboard Aircraft |
| **AC 91-55** | Reduction of Electrical System Failures Following Aircraft Engine Starting |
| **AC 91-73** | Part 91 and 135 Single-Pilot Procedures During Taxi Operations |
| **AC 150-5340-18** | Standards for Airport Sign Systems |
| **AIM** | Aeronautical Information Manual |
| **A/FD** | Airport Facility Directory |
| **FAA-H-8083-1** | Aircraft Weight and Balance Handbook |
| **FAA-H-8083-3** | Airplane Flying Handbook |
| **FAA-H-8083-6** | Advanced Avionics Handbook |
| **FAA-H-8083-23** | Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook |
| **FAA-H-8083-25** | Pilot's Handbook of Aeronautical Knowledge |
| **NOTAM** | Notices to Airmen |
| **POH/AFM** | Pilot's Operating Handbook/FAA-Approved Aircraft Flight Manual |
| | |
| **Other** | Navigation Charts |
| | Navigation Equipment Manual |

**NOTE:** Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.

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## APPENDIX 6: ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this ACS.

| | |
|---|---|
| **14 CFR** | Title 14 of the Code of Federal Regulations |
| **AC** | Advisory Circular |
| **ACS** | Airman Certification Standards |
| **ADM** | Aeronautical Decision-Making |
| **AFS** | Flight Standards Service |
| **AGL** | Above Ground Level |
| **AMEL** | Airplane Multiengine Land |
| **AMES** | Airplane Multiengine Sea |
| **AOA** | Airport Operations Area |
| **ASEL** | Airplane Single Engine Land |
| **ASES** | Airplane Single Engine Sea |
| **ATC** | Air Traffic Control |
| **CAX** | Commercial Pilot Airplane |
| **CCP** | Commercial Pilot Canadian Conversion |
| **CFIT** | Controlled Flight Into Terrain |
| **ELT** | Emergency Locator Transmitter |
| **FAA** | Federal Aviation Administration |
| **FSDO** | Flight Standards District Office |
| **GPS** | Global Positioning System |
| **IFO** | International Field Office |
| **IMC** | Instrument Meteorological Conditions |
| **NAS** | National Airspace System |
| **NTSB** | National Transport Safety Board |
| **POH** | Pilot's Operating Handbook |
| **PTS** | Practical Test Standards |
| **RAIM** | Receiver Autonomous Integrity Monitoring |
| **SRM** | Safety Risk Management |
| **SMS** | Safety Management System |
| **VFR** | Visual Flight Rules |
| **VOR** | Very High Frequency Omni-Directional Range |
| $V_X$ | Best Angle of Climb Speed |
| $V_Y$ | Best Rate of Climb Speed |
| $V_{S0}$ | Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration |

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# APPENDIX G: HANDBOOKS/COMPUTER TESTING SUPPLEMENTS + RECOMMENDED CHANGES

Appendix G includes a matrix documenting the ATST WG's recommended changes to FAA Handbooks (FAA-H-8083-XX series) and Computer Testing Supplements (FAA-CT-8080-XX series) in order to align the documents with the Airman Certification Standards (ACS) system. The matrix was developed by compiling the "Recommended Handbook Changes" from each ACS worksheet and the general recommendations regarding streamlined content proposed to the ATST WG by the Guidance Material Subgroup.

**ACS – HANDBOOK/COMPUTER TESTING SUPPLEMENT RECOMMENDED CHANGES TRACKING MATRIX**
**(PHASE II, TASK A – CHANGES REQUIRED TO ALIGN HANDBOOKS WITH ACS)**

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| FAA-H-8083-6 | ***Advanced Avionics Handbook*** | Provide general aviation users with comprehensive information on advanced avionics equipment available in technically advanced aircraft. | 2009 | | | Include Chapters 1, 2, and 5 in the FAA-H-8083-25 or FAA-H-8083-3. More pilots are flying TAA aircraft and may never train to be an instrument pilot. This information may help with the newer technology that is becoming standard equipment in newer aircraft. This is a similar concept as IFR, but for the VFR pilot.<br><br>Recommendation: Incorporate material in this handbook into the FAA-H-8083-31 for AMTs.<br><br>Recommendation: Remove the basic info about glass cockpits already covered in FAA-H-8083-25 and FAA-H-8083-15; it does not need to be repeated. | GPO<br>GPO (eBook)<br>FAA website |
| FAA-H-8083-1A | ***Aircraft Weight and Balance Handbook*** | The objective of this handbook is twofold: to provide the Airframe and Powerplant Mechanic (A&P) with the method of determining the empty weight and empty weight center of gravity (EWCG) of an aircraft, and to furnish the flightcrew with information on loading and operating the aircraft to ensure its weight is within the allowable limit and the center of gravity (CG) is within the allowable range. | 2007 | | | Any pertinent information not already covered in FAA-H-8083-30 and FAA-H-8083-25 should be added to these handbooks and the handbook eliminated. | GPO *<br>FAA website |
| FAA-H-8083-3A | ***Airplane Flying Handbook*** | This handbook is developed to assist student pilots learning to fly airplanes. It is also beneficial to pilots who wish to improve their flying proficiency and aeronautical knowledge, those pilots preparing for additional certificates or ratings, and flight instructors engaged in the instruction of both student and certificated pilots. It introduces the future pilot to the realm of flight and provides information and guidance in the performance of procedures and maneuvers required for pilot certification. Topics such as navigation and communication, meteorology, use of flight information publications, regulations, and aeronautical decision making are available in other Federal Aviation Administration (FAA) publications. | 2004 | | AFS-630: Started 3/2012 (A: 18-24 mos.) | Add information as follows:<br>(1) Ch 2 Ground Operations: Prove Airworthiness (what documents need to be reviewed; where do you find the information?) (PVT: Airworthiness Requirements);<br><br>(2) Consider new chapter "Transition to TAA" and include information such as: variations in glass cockpit/advanced avionics (PVT: Airworthiness Requirements), What is a PFD? What is an MFD? (PVT: Airworthiness Requirements), Address how to detect a failure. (PVT: Airworthiness Requirements), Transition/Differences Training. (PVT: Airworthiness Requirements);<br><br>(3) Ch 4 Slow Flight, Stalls and Spins: Include information about detailed aerodynamic influences for maneuvering and stall/spin susceptibility to correlate with information in FAA-H-8083-25. (PVT: Spin Awareness);<br><br>(4) Ch 9, Chandelles, add scenarios for altitude gain within a confined area -- reference FAA-H-8083-2 for an example that could be adapted here as well;<br><br>(5) Ch 9, merge steep spiral with Power-Off 180 content in Ch 8.<br><br>Incorporate the new IFH-style presentation where instrument interpretation is divided into two parts, one for analog, and one for digital displays. | FAA website |
| NAVAIR 00-80T-80 | ***Aerodynamics for Naval Aviators*** | The purpose of this textbook is to present the elements of applied aerodynamics and aeronautical engineering which relate directly to the problems of flying operations. | 1/2/1965 | | | Move high priority, critical safety areas to FAA-H-8083-3 and FAA-H-8083-25 and remove as as reference. | GPO ($3.50) * |

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| FAA-H-8083-9A | ***Aviation Instructor's Handbook*** | Designed for ground instructors, flight instructors, and aviation maintenance instructors to help beginning instructors understand and apply the fundamentals of instruction. | 2008 | | | (1) Place the "summary of instructor's actions" blurbs in shaded boxes or further separate them out of the other content. These summary sections are good references for applicants and existing CFIs. (FOI: Learning Process).<br><br>(2) Move Motivation covered in Chapter 2 to Chapter 1 where motivation is first discussed. (The Theory X Theory Y Motivation theory by MacGregor is fairly outdated. Newer concepts of motivation could be used.)<br><br>(3) Review information to ensure all is appropriate to both a classroom instructor and the individual flight instructor who is working one on one.<br><br>(4) Add teaching techniques that can be used in the aircraft to address common student errors as identified in the Authorized Instructor ACS -- comparable to the information that is now found in FAA-H-8083-4. Including information in this 8083-9 will increase value and reduce workload for maintaining separate publications.<br><br>(5) Provide additional information on the use of (all levels of) simulation training aids; Instructors need to know what devices/software are available (in general terms), what you can do with what, and how to effectively teach with these aids.<br><br>(6) Add Plan of Action discussion.<br><br>(7) Add SMS and application. | GPO<br>GPO (eBook)<br>FAA website |
| FAA-H-8083-30 | ***Aviation Maintenance Technician Handbook-General*** | The handbook is designed to aid students enrolled in a formal course of instruction preparing for FAA certification as a maintenance technician, as well as for current technicians who wish to improve their knowledge. | 2008 | | | | GPO *<br>FAA website |
| FAA-H-8083-Addendum | ***AMT Handbook-Human Factors Addendum*** | | 2011 | | | Incorporate into the book along with similar information in Chapter 13 and include in Table of Contents and Index. | FAA website |
| H8083-31 V1<br>H8083-31 V2 | ***Aviation Maintenance Technician Handbook-Airframe Vol. 1 & 2*** | It is intended that this handbook provide the basic information on principles, fundamentals, and technical procedures in the subject matter areas relating to the airframe rating. It is designed to aid students enrolled in a formal course of instruction, as well as the individual who is studying on his or her own.<br>Note: Since the knowledge requirements for the airframe and powerplant ratings closely parallel each other in some subject areas, the chapters which discuss fire protection systems and electrical systems contain some material which is also duplicated in the Aviation Maintenance Technician Handbook—Powerplant (FAA-H-8083-32). | 2012 | | | | FAA website |

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| H8083-32 V1<br>H8083-32 V2 | ***Aviation Maintenance Technician Handbook-Powerplant Vol. 1 & 2*** | It is intended that this handbook provide the basic information on principles, fundamentals, and technical procedures in the subject matter areas relating to the powerplant rating. It is designed to aid students enrolled in a formal course of instruction, as well as the individual who is studying on his or her own.<br>Note: Since the knowledge requirements for the airframe and powerplant ratings closely parallel each other in some subject areas, the chapters which discuss fire protection systems and electrical systems contain some material which is also duplicated in the Aviation Maintenance Technician Handbook–Airframe (FAA-H-8083-31). | 2012 | | | | FAA website |
| H-8083-11A | ***Balloon Flying Handbook*** | Student pilots learning to fly balloons, certificated pilots preparing for additional balloon ratings or who desire to improve their flying proficiency and aeronautical knowledge, and commercial balloon pilots teaching balloon students how to fly should find this handbook helpful. This book introduces the prospective pilot to the realm of balloon flight and provides information and guidance to all balloon pilots in the performance of various balloon maneuvers and procedures. | 2008 | | | | GPO<br>GPO (eBook)<br>FAA website |
| FAA/FS-I-8700-1 | ***Information for Banner Tow Operations*** | This publication is presented as an information guide for banner tow operations, to promote safe operations through careful preparation and planning. | 3/27/2003 | | | Note: Reference to Commercial PTS on page 4-2. | FAA website |
| FAA-H-8083-22 | ***Flight Dispatcher Handbook*** | | | | AFS-630:<br>Started 11/2011<br>(A: 18-24 mos.) | New Publication (?) | |
| FAA-H-8083-18 | ***Flight Navigator Handbook*** | This handbook is a source of reference for navigators and navigator students. This handbook explains how to measure, chart the earth, and use flight instruments to solve basic navigation problems. | 2011 | | | Review whether this handbook is necessary. Only 1-3 navigator certificates are issued annually. Perhaps pertinent information from this document could be placed in the FAA-H-8083-25. | FAA website |
| FAA-H-8083-13A | ***Glider Flying Handbook*** | The Glider Flying Handbook is a technical manual for applicants who are preparing for glider category rating, and for currently certificated glider pilots who wish to improve their knowledge. | 2013 | | | | FAA website |

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| FAA-H-8083-21A | ***Helicopter Flying Handbook*** | The Helicopter Flying Handbook is designed as a technical manual for applicants who are preparing for their private, commercial, or flight instructor pilot certificates with a helicopter class rating.<br>Note: FAA-8083-21, Rotorcraft Flying Handbook, is to be used for GYROPLANE information ONLY. | 2012 | | | | FAA website |
| FAA-H-8083-4 | ***Helicopter Instructor's Handbook*** | This handbook is designed as a technical manual for applicants who are preparing for their flight instructor pilot certificate with a helicopter class rating. This handbook contains detailed coverage of aerodynamics, flight controls, systems, performance, flight maneuvers, emergencies, and aeronautical decision-making. | 2012 | | | Move pertinent information from this document to FAA-H-8083-9. | FAA website |
| FAA-H-8083-15B | ***Instrument Flying Handbook*** | This Instrument Flying Handbook is designed for use by instrument flight instructors and pilots preparing for instrument rating tests. | 2012 | | | Review to ensure FAA-H-8083-15 and FAA-H-8261-1 are working as companion documents and eliminate redundancies.<br><br>Add clarification on touchdown zone elevation, threshold elevation, height above threshold/touchdown, etc. Some company OpSpecs require specific altitudes above TDZE and this designation has been omitted from some recent IAPs complicating things. Training docs need to reflect current, correct terms, use and definitions. Reference for further information: http://www.pilotsofamerica.com/forum/showthread.php?t=53814&referrerid=3196 | GPO<br>FAA website |
| FAA-H-8261-1A | ***Instrument Procedures Handbook*** | This handbook is designed as a technical reference for professional pilots who operate under instrument flight rules (IFR) in the National Airspace System (NAS). | 2007 | | | Review to ensure FAA-H-8083-15 and FAA-H-8261-1 are working as companion documents and eliminate redundancies.<br><br>Add clarification on touchdown zone elevation, threshold elevation, height above threshold/touchdown, etc. Some company OpSpecs require specific altitudes above TDZE and this designation has been omitted from some recent IAPs complicating things. Training docs need to reflect current, correct terms, use and definitions. Reference for further information: http://www.pilotsofamerica.com/forum/showthread.php?t=53814&referrerid=3196 | FAA website |
| FAA-H-8083-17 | ***Parachute Rigger Handbook*** | This handbook is primarily intended to assist individuals who are preparing for the parachute rigger airman knowledge test, and the oral and practical test. The material presented in this handbook is appropriate for senior and master parachute riggers. | 2005 | | AFS-630: Started 9/2011 (A: 18-24 mos.) | Can pertinent information be moved to the AMT Handbook series; is a separate publication necessary? | FAA website |

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| FAA-H-8083-25A | ***Pilot's Handbook of Aeronautical Knowledge*** | This handbook provides basic knowledge that is essential for pilots. This handbook introduces pilots to the broad spectrum of knowledge that will be needed as they progress in their pilot training.<br>Note: Appendix A: Runway Incursion Avoidance (4/1/2012) will be used as a reference for airmen knowledge test questions beginning November 1, 2012. | 2008 | | AFS-630: Started 7/2011 (B: 30-60 days) | (1) Ch 8 Prove Airworthiness (what documents need to be reviewed; where do you find the information?) (PVT & COM: Airworthiness Requirements). (2) Ch 7 Add information and presentation of analog/digital side-by-side comparable to FAA-H-8083-15; expand information for PFD, MFD, detecting failures, transition/differences training. Comparable information from Ch 1, 2, and 5 from FAA-H-8083-6 for ther VFR pilot. (3) Ch 11, incorporate any info currently missing from AC 00-6A so this very old AC can be cancelled; (4) Ch 16, rename to "Human Factors" to be consistent with ACS; add discussion of how OTC meds and legally prescribed drugs affect pilot performance. (PVT & COM: Human Factors), tools for pilot decision-making and self-assessment (IMSAFE as an example – not the standard/no testing to pneumonics). (PVT & COM: Human Factors), Pilot/Aircraft Team (PVT & COM: Preflight Assessment). (5) Ch 15, expand discussion of what to do in case of lost (PVT: Lost Procedures). (6) Ch 4, expand information to include more advanced aerodynamic relationships and maneuvering flight (PVT & COM: Maneuvering during Slow Flight, Power-On Stalls, Power-Off Stalls). (7) Ch 17, incorporate information from FAA-H-8083-2.<br><br>Note: Use technology in inadvertent IMC. | GPO<br>FAA website |
| FAA-H-8083-19A | ***Plane Sense: General Aviation Information*** | This handbook introduces aircraft owners and operators, or prospective aircraft owners and operators, to basic information about the requirements involved in acquiring, owning, operating, and maintaining a private aircraft. | 2008 | | | No references to ACS. Does not require revision as part of this project. | GPO<br>FAA website |
| FAA-H-8083-2 | ***Risk Management Handbook*** | This handbook is a tool designed to help recognize and manage risk. It provides a higher level of training to the pilot in command (PIC) who wishes to aspire to a greater understanding of the aviation environment and become a better pilot. This handbook is for pilots of all aircraft from Weight-Shift Control (WSC) to a Piper Cub, a Twin Beechcraft, or a Boeing 747. | 2009 | | | Move pertinent information to Chapter 17 of the FAA-H-8083-25 and FAA-H-8083-15 and consider removing reference. If kept and maintained, it should NOT be a repeat of the other handbooks but a more practical guidebook to continue use of good use of case studies. | GPO *<br>FAA website |
| FAA-H-8083-23 | ***Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook*** | This handbook is primarily intended to assist pilots who already hold private or commercial certificates and who are learning to fly seaplanes, skiplanes, or helicopters equipped for water or ski operations. It is also beneficial to rated seaplane pilots who wish to improve their proficiency, pilots preparing for flights using ski equipped aircraft, and flight instructors engaged in the instruction of both student and transitioning pilots. | 2004 | | | | FAA website |
| FAA-H-8083-27A | ***Student Pilot Guide*** | This publication is intended to serve as a guide for prospective student pilots and for those already engaged in flight training. This guide presents in "how to" fashion, general procedures for obtaining FAA student pilot, sport pilot, recreational pilot, and private pilot certificates. | 2006 | | | | GPO *<br>FAA website |

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| FAA-H-8083-5 | ***Weight-Shift Control Aircraft Flying Handbook*** | Student pilots learning to fl y WSC aircraft, certifi cated pilots preparing for additional WSC ratings or who desire to improve their fl ying profi ciency and aeronautical knowledge, and commercial WSC pilots teaching WSC students how to fl y should find this handbook helpful. This book introduces the prospective pilot to the realm of WSC flight and provide information and guidance to all WSC pilots in the performance of various maneuvers and procedures. | 2008 | | | | FAA website |
| | | | | | | | |
| FAA-CT-8080-4E | ***Computer Testing Supplement for Aviation Mechanic General, Powerplant, and Airframe; and Parachute Rigger*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: AMG, AMP, AMA, RMP. | 2005 | | No revisions planned. | Update to include figures currently displaying on-screen for consistent accessibility to figures being used on the figures; i.e. some of the figures are in this booklet and others are available as "Additional Figures" file posted separate from the booklet on the FAA website. | FAA website, Industry prints and distributes to CTDs |
| FAA-CT-8080-8D | ***Computer Testing Supplement for Inspection Authorization*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted IA airman knowledge test. | 2008 | | No revisions planned. | Update to include "pencil corrections" being submitted to the CTDs; confusing to issue updates in this manner (pencil corrections). | Industry prints and distributes to CTDs |
| FAA-CT-8080-10A | ***Computer Testing Supplement for Sport Pilot, Sport Pilot Instructor, Sport Pilot Examiner*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: Sport Pilot and Sport Pilot Instructor. | 2005 | | Planning to cancel with next revision ETA 10/13 | High priority. All figures with exception to 4 (which are in Commercial booklet) are already in Private and CFI CT-8080 books. No need for this separate Sport Pilot supplement; it is expensive and unnecessary due to redundancy with existing FAA materials. Recommend cancelling asap and referring Sport Pilot knowledge exam questions to Private and CFI supplement (figure numbers). | Industry prints and distributes to CTDs |
| FAA-CT-8080-2E | ***Computer Testing Supplement for Recreational Pilot and Private Pilot*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: Recreational Pilot and Private Pilot. | 2004 | | Revision to -2F ETA 10/13 | High priority. Update to account for Sport Pilot test (so this book would work for Sport, Recreational, and Private Pilots) for cost savings and alleviate redundancy. Sectional, A/FD, and Winds Aloft forecasts outdated reflecting obsolete procedures. | Industry prints and distributes to CTDs |
| FAA-CT-8080-3E | ***Computer Testing Supplement for Instrument Rating*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: Instrument Rating, Instrument Flight Instructor (CFII), Instrument Ground Instructor (IGI), and Instrument Foreign Pilot (IFP). | 2005 | | No revisions planned. | High priority. Instrument Approach Procedures (IAPs), chart excerpts, and Winds Aloft forecasts outdated reflecting obsolete procedures. Additional figures available onscreen and in separate file; should consolidate for a single-source document for these applicants. | Industry prints and distributes to CTDs |

| Publication Number | Title | Objective | Edition/ Last Revised | OPR | Revision Schedule** | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| FAA-CT-8080-1C | ***Computer Testing Supplement for Commercial Pilot*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: Commercial Pilot and Military Competence. | 2005 | | No revisions planned. | High priority. Sectional, A/FD, and Winds Aloft forecasts outdated reflecting obsolete procedures. Known errors in existing figures. Additional figures available in separate file; should consolidate for a single-source document for Commercial applicants | Industry prints and distributes to CTDs |
| FAA-CT-8080-5E | ***Computer Testing Supplement for Flight and Ground Instructor*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: Fundamentals of Instructing (FOI), Ground Instructor (BGI and AGI), Flight Instructor (CFI). | 2001 | | Revision to -5G ETA 10/13 | High priority. Update to account for Sport Instructor Pilot test to alleviate redundancy. Sectional, A/FD, and Winds Aloft forecasts outdated reflecting obsolete procedures. Known errors in some figures. | Industry prints and distributes to CTDs |
| FAA-CT-8080-6A | ***Computer Testing Supplement for Flight Engineer*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: Flight Engineer. | 1999 | | No revisions planned. | Low priority. Low test volume. | Industry prints and distributes to CTDs |
| FAA-CT-8080-7C | ***Computer Testing Supplement for Airline Transport Pilot and Aircraft Dispatcher*** | This computer testing supplement ("figures booklet") is designed by the Flight Standards Service of the FAA for use by computer testing designees (CTDs) in the administration of computer-assisted airman knowledge tests: ATP, Dispatcher. | 2005 (Addendum A July 2011, Addendum B May 2012) | | Revision to -7D ETA 06/14 | High priority. Instrument Approach Procedures (IAPs), chart excerpts, and Winds Aloft forecasts outdated reflecting obsolete procedures. Known errors in existing figures. Two (2) additional Addendums used with CT-8080-7C for a total of 3, adding cost to each test. Additional figures available onscreen and in separate file; should consolidate for a single-source document for ATP and Dispatcher applicants. | |

* Preface indicates Handbook is published by GPO, but it is not available in GPO online bookstore.

** Under Revision Schedule:
A—Handbook is currently in development/revision. Content of handbook is being revised and/or developed. (Estimated18 to 24 month process.)
B—Handbook is currently in a final draft/editorial review. Content of handbook is complete. (Estimated 30 to 60 day process.)
C—Handbook is currently in final formal coordination (review) with Agency Divisions. This is the final stage before the handbook is posted to www.faa.gov. (Estimated 30 to 120 day process.)

# APPENDIX H: REFERENCE DOCUMENTS + RECOMMENDED CHANGES

Appendix H includes a matrix of the reference documents (other than FAA-H-8083-XX handbooks) cited in the current Practical Test Standards (PTS), as well as recommended changes to align the Airman Certification Standards (ACS) documents with current guidance material. The matrix was developed by compiling the reference documents cited in the current PTS documents (as listed on each ACS worksheet) and integrating the general recommendations regarding aligning the ACS with current guidance material proposed to the ATST WG by the Guidance Material Subgroup.

**ACS – REFERENCE DOCUMENTS TRACKING MATRIX**
**(PHASE II, TASK A – CHANGES REQUIRED TO ALIGN HANDBOOKS WITH ACS)**

| Publication Number | Title | Description | Date | OPR | Revision Schedule | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| 14 CFR Part 1 | Definitions and Abbreviations | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 23 | Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 25 | Airworthiness Standards: Transport Category Airplanes | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 43 | Maintenance, Preventive Maintenance, Rebuilding, and Alteration | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 61 | Certification: Pilots, Ground Instructors, and Flight Instructors | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 67 | Medical Standards and Certification | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 71 | Designation of Class A, B, C, D, and E Airspace Areas; Air Traffic Service Routes; and Reporting Points | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 91 | General Operating and Flight Rules | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 119 | Certification: Air Carriers and Commerical Operators | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 121 | Operating Requirements: Domestic, Flag and Supplemental Operations | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 14 CFR Part 135 | Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons on board such Aircraft | | | | | Appropriate Reference. | eCFR<br>FAA website |
| 49 CFR Part 830 | Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records | | | | | Appropriate Reference. | eCFR<br>FAA website |
| AIM | Aeronautical Information Manual (AIM) | This manual is designed to provide the aviation community with basic flight information and ATC procedures for use in the National Airspace System (NAS) of the United States. An international version called the "Aeronautical Information Publication" contains parallel information, as well as specific information on the international airports for use by the international community. | 2/9/2012 (CHG 3: 3/7/13) | | | Appropriate Reference. | GPO<br>FAA website |
| AC 00-6A | Aviation Weather For Pilots and Flight Operations Personnel | Provides an up-to-date and expanded text for pilots and other flight operations personnel whose interest in meteorology is primarily in its application to flying. | 1/1/75 | AFS-400 | | Not updated since 1975. Replace with FAA-H-8083-25 for weather theory and eliminate this reference. | FAA website |
| AC 00-45G | Aviation Weather Services | Aviation Weather Services, Advisory Circular 00-45F, is published jointly by the National Weather Service (NWS) and the Federal Aviation Administration (FAA). This publication supplements its companion manual Aviation Weather, Advisory Circular 00-6A, which documents weather theory and its application to the aviation community. This AC explains U.S. aviation weather products and services. It details the interpretation and application of advisories, coded weather reports, forecasts, observed and prognostic weather charts, and radar and satellite imagery. Product examples and explanations are taken primarily from the Aviation Weather Center's Aviation Digital Data Service. | 3/11/10 | AFS-330 | | Appropriate Reference. | FAA website |

| Publication Number | Title | Description | Date | OPR | Revision Schedule | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| AC 120-51E | Crew Resource Management | Provides FAA guidance for approval of an Advanced Qualification Program (AQP) under SFAR 58. | 1/22/04 | AFS-210 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 120-58 | Pilot Guide for Large Aircraft Ground Deicing | Contains recommendations for ensuring safe operations of large airplanes during icing conditions and guidelines for the development of adequate procedures for the deicing of large airplanes. | 9/30/92 | AFS-400 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 135-17 | Pilot Guide for Small Aircraft Ground Deicing | Contains information and recommendations to assist pilots in conducting ground operations during weather conditions conducive to aircraft icing. Also contains information and guidance regarding deicing and anti-icing fluids and procedures for use and identifies the aircraft critical surfaces which must be free of contamination prior to takeoff. | 12/14/94 | AFS-250 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 00-30B | Atmospheric Turbulence Avoidance | This document's content is not currently available. | 9/9/97 | AFS-400 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 91-74A | Pilot Guide: Flight in Icing Conditions | Provides pilots with a convenient reference on the principal factors related to flight in icing conditions and the location of additional information in related publications. | 12/31/07 | AFS-800 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 00-54 | Pilot Wind Shear Guide | Communicates key windshear information relevant to flight crews. Appendix 1 of this advisory circular is the Pilot Windshear Guide, which is only one section of the two-volume Windshear Training Aid. | 11/25/88 | AFS-200 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 91-43 | Unreliable Airspeed Indication | Alerts pilots to the possibility of erroneous airspeed/Mach indications that may be caused by blocking or freezing of the pilot system and advises of corrective action that can be taken. | 6/26/75 | AFS-223 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 20-117 | Hazard Following Ground Deicing and Ground Operations in Conditions Conductive to Aircraft | Provides information on the identified hazards associated with ground deicing and ground operations in conditions conducive to aircraft icing. | 12/3/82 | AFS-200 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 00-24C | Thunderstorms | This advisory circular (AC) describes the hazards of thunderstorms to aviation and offers guidance to help prevent accidents caused by thunderstorms. | 2/19/13 | AFS-430 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 60-22 | Aeornautical Decision Making | Provides introductory material, background information, and reference material on aeronautical decision making. Provides a systematic approach to risk assessment and stress management in aviation, illustrates how personal attitudes can influence decision. | 12/13/91 | AFS-800 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 91-13C | Cold Weather Operation of Aircraft | Provides background and guidelines relating to operation of aircraft in the colder climates where wide temperature changes may occur. | 7/24/79 | AFS-820 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 90-48C | Pilots' Role in Collision Avoidance | Alerts all pilots to the potential hazards of midair collision and near midair collision, and to emphasize those basic problem areas related to the human causal factors where improvements in pilot education, operating practices, procedures, and improved scanning techniques are needed to reduce midair conflicts. | 3/18/83 | AFS-820 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 20-103 | Aircraft Engine Crankshaft Failure | Provides information and suggests procedures to increase crankshaft service life and to minimize failures. | 3/7/78 | AFS-340 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |

| Publication Number | Title | Description | Date | OPR | Revision Schedule | Recommendations | Distribution |
|---|---|---|---|---|---|---|---|
| AC 20-43C | Aircraft Fuel Control | Alerts the aviation community to the potential hazards of inadvertent mixing or contamination of turbine and piston fuels, and provides recommended fuel control and servicing procedures. | 10/20/76 | AFS-340 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 25-7 | Flight Test Guide for Certification of Transport Category Airplanes | Includes flight test methods and procedures to show compliance with the regulations contained in subpart B of Title 14, Code of Federal Regulations (14 CFR) part 25, which address airplane performance and handling characteristics. | 10/16/12 | ANM-110 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| AC 91-51A | Effect of Icing on Aircraft Control and Airplane Deice and Anti-Ice Systems | Provides information for pilots regarding the hazards of aircraft icing and the use of airplane deice and anti-ice systems. | 7/17/96 | AFS-820 | | Any pertinent information not already covered should be moved to one of the handbooks and the reference could be eliminated. | FAA website |
| | U.S. Terminal Procedures/Instrument Approach Procedure Charts | U.S. Terminal Procedures Publications are published in 24 loose-leaf or perfect bound volumes covering the conterminous U.S., Puerto Rico, and the Virgin Islands. | Revised every 56 days. | | | Appropriate Reference. | FAA website |
| | Sectional Aeronautical Chart | Sectional Aeronautical Charts are the primary navigational reference medium used by the VFR pilot community. The aeronautical information on Sectional Charts includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data. | Updated every 6 months (most Alaska charts annually). | | | Appropriate Reference. | FAA website |
| | IFR/VFR Low Altitude Planning Chart | U.S. IFR/VFR Low Altitude Planning Charts is designed for preflight and enroute flight planning for IFR/VFR flights. Information includes the depiction of low altitude LF/MF and VHF airways and mileages, navigational facilities, airports, special use airspace areas, cities, time zones, major drainage, a directory of airports with their airspace classification and a mileage table showing great circle distances between major airports, 40 x 36 inches. | Revised annually. | | | Appropriate Reference. | FAA website |
| | STARs Standard Terminal Arrivals and Profile Descent Procedures | The Digital En-Route Supplement is specifically designed to provide digital airspace data not otherwise readily available. | Revised every 56 days. | | | Appropriate Reference. | FAA website |
| d-A/FD | Airport/Facility Directory | The A/FD is a seven volume set plus Alaska and Pacific Territories of printed paper books containing data on public and joint use airports, seaplane bases heliports, VFR airport sketches, NAVAIDs, communications data, weather data sources, airspace, special notices, and operational procedures. The seven volumes cover the conterminous United States, Puerto Rico, and the Virgin Islands. The Airport/Facility Directory includes data that cannot be readily depicted in graphic form: e.g., airport hours of operation, types of fuel available, runway data, lighting codes, etc. General Information, Directory Legend and Supplemental information pages printed in each of the A/FD volumes are provided as multi-page PDF files. | 3/7/2013 (end 5/2/13) | | | Appropriate Reference. | FAA website |

## APPENDIX I: SAMPLE TEST MAPS

Appendix I includes the Sample Test Maps for the Private Pilot – Airplane Airman Certification Standards (ACS) and Instrument Rating Airman Certification Standards (ACS), as proposed to the ATST WG by the Question Development Subgroup.

## Proposed Private Pilot ACS Test Map

(60 Questions—2 hours available time)

| **PVT ACS Area of Operation** PVT ACS Task | **Rote** Define, Recall, List, Name, Match, Label | **Understanding** Describe, Identify, Select, Recognize, Explain, Locate, Translate | **Application** Apply, Choose, Interpret, Use, Solve, Operate | **Correlation** Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| **I. Preflight** | 12 | 10 | 9 | 1 | 32 | 53.33% | |
| Pilot Qualifications | | | | | | | 61.105(b)(1); 61.105(b)(2); 61.105(b)(12) |
| Airworthiness Requirements | | | | | | | 61.105(b)(1); 61.105(b)(12) |
| Weather Information | | | | | | | 61.105(b)(1); 61.105(b)(6); 61.105(b)(8); 61.105(b)(12) |
| Cross-Country Flight Planning | | | | | | | 61.105(b)(1); 61.105(b)(3); 61.105(b)(4); 61.105(b)(12); 61.105(b)(13)(i),(ii) |
| National Airspace System | | | | | | | 61.105(b)(1); 61.105(b)(5) |
| Performance & Limitations | | | | | | | 61.105(b)(1); 61.105(b)(8); 61.105(b)(9);61.105(b)(12) |
| Operation of Systems | | | | | | | 61.105(b)(10); 61.105(b)(12) |
| Human Factors | | | | | | | 61.105(b)(12) |
| Preflight Assessment | | | | | | | 61.105(b)(1); 61.105(b)(12); 61.105(b)(13)(i),(ii) |
| Cockpit Management | | | | | | | 61.105(b)(12) |
| Engine Starting | | | | | | | 61.105(b)(12) |
| Taxiing | | | | | | | 61.105(b)(3); 61.105(b)(5); 61.105(b)(12) |
| Before Takeoff Check | | | | | | | 61.105(b)(12); 61.105(b(13)(i),(ii) |
| | | | | | | | |

| **PVT ACS Area of Operation** PVT ACS Task | **Rote** Define, Recall, List, Name, Match, Label | **Understanding** Describe, Identify, Select, Recognize, Explain, Locate, Translate | **Application** Apply, Choose, Interpret, Use, Solve, Operate | **Correlation** Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| **II. Airport Operations** | 2 | 1 | 1 | 1 | 5 | 8.33% | |
| Communications & Light Gun Signals | | | | | | | 61.105(b)(5) |
| Traffic Patterns | | | | | | | 61.105(b)(1); 61.105(b)(3); 61.105(b)(4); 61.105(b)(7) |
| | | | | | | | |
| **III. Takeoffs, Landings & Go-Arounds** | 1 | 1 | 1 | 1 | 4 | 6.67% | |
| Normal Takeoff & Climb | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Normal Approach & Landing | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Soft-Field Takeoff & Climb | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Soft-Field Approach & Landing | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Short-Field Takeoff & Maximum Performance Climb | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Short-Field Approach & Landing | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Forward Slip to a Landing | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| Go-Around/Rejected Landing | | | | | | | 61.105(b)(7); 61.105(b)(8); 61.105(b)(12); |
| | | | | | | | |

| **PVT ACS Area of Operation** PVT ACS Task | **Rote** Define, Recall, List, Name, Match, Label | **Understanding** Describe, Identify, Select, Recognize, Explain, Locate, Translate | **Application** Apply, Choose, Interpret, Use, Solve, Operate | **Correlation** Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| **IV. Performance Maneuvers** | | 1 | 1 | | 2 | 3.33% | |
| Ground Reference Maneuvers | | | | | | | 61.105(b)(1); 61.105(b)(10); 61.105(b)(11); 61.105(b)(12) |
| Steep Turns | | | | | | | 61.105(b)(10); 61.105(b)(11); 61.105(b)(12) |
| | | | | | | | |
| **V. Navigation** | 1 | 1 | 2 | 1 | 5 | 8.33% | |
| Pilotage & Dead Reckoning | | | | | | | 61.105(b)(4);61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(12) |
| Navigation Systems & Radar Services | | | | | | | 61.105(b)(4);61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(12) |
| Diversion | | | | | | | 61.105(b)(4);61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(12); 61.105(b(13)(i),(ii) |
| Lost Procedures | | | | | | | 61.105(b)(4);61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(12) |
| | | | | | | | |
| **VI. Slow Flight & Stalls** | 1 | 1 | 1 | 1 | 4 | 6.67% | |
| Maneuvering During Slow Flight | | | | | | | 61.105(b)(10); 61.105(b)(11); 61.105(b)(12) |
| Power-Off Stalls | | | | | | | 61.105(b)(10); 61.105(b)(11); 61.105(b)(12) |
| Power-On Stalls | | | | | | | 61.105(b)(10); 61.105(b)(11); 61.105(b)(12) |
| Spin Awareness | | | | | | | 61.105(b)(10); 61.105(b)(11); 61.105(b)(12) |

| **PVT ACS Area of Operation**<br>PVT ACS Task | **Rote**<br>Define, Recall, List, Name, Match, Label | **Understanding**<br>Describe, Identify, Select, Recognize, Explain, Locate, Translate | **Application**<br>Apply, Choose, Interpret, Use, Solve, Operate | **Correlation**<br>Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| **VII. Emergency Operations** | 1 | 1 | 2 | 1 | 5 | 8.33% | |
| Inadvertent IMC | | | | | | | 61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(10); 61.105(b)(12) |
| Emergency Approach Landing (Simulated) | | | | | | | 61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(10); 61.105(b)(12) |
| Systems & Equipment Malfunctions | | | | | | | 61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(10); 61.105(b)(12) |
| Emergency Equipment & Survival Gear | | | | | | | 61.105(b)(5); 61.105(b)(6); 61.105(b)(7); 61.105(b)(10); 61.105(b)(12) |
| | | | | | | | |
| **VIII. Night Operation** | | 1 | 1 | | 2 | 3.33% | |
| Night Preparation | | | | | | | 61.105(b)(1); 61.105(b)(3); 61.105(b)(6); 61.105(b)(7); 61.105(b)(12) |
| | | | | | | | |
| **IX. Postflight Procedures** | | 1 | | | 1 | 1.67% | |
| After Landing, Parking, & Securing | | | | | | | 61.105(b)(1); 61.105(b)(3); 61.105(b)(7); 61.105(b)(12); |
| Total | 18 | 18 | 18 | 6 | 60 | 100% | |

# Proposed Instrument Rating ACS Test Map

(60 Questions—2.5 hours available time)

| **IFR ACS Area of Operation**<br>IFR ACS Task | **Rote**<br>Define, Recall, List, Name, Match, Label | **Understanding**<br>Describe, identify, Select, Recognize, Explain, locate, Translate | **Application**<br>Apply, Choose, Interpret, Use, Solve, Operate | **Correlation**<br>Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| **I. Preflight Preparation** | 10 | 4 | 5 | 1 | 20 | 33.33% | |
| Pilot Qualifications | | | | | | | 61.65(b)(1)/(7)/(9) |
| Weather Information | | | | | | | 61.65(b)(6)/(7)/(8)/(9) |
| Cross-Country Flight Planning | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(6)/(7)/(9) |
| | | | | | | | |
| **II. Preflight Procedures** | 2 | 2 | 1 | 1 | 6 | 10.00% | |
| Aircraft Systems Related to IFR Operations | | | | | | | 61.65(b)(1)/(2)/(7)/(9) |
| Aircraft Flight Instruments & Navigation Equip. | | | | | | | 61.65(b)(1)/(2)/(7)/(9) |
| Instrument Cockpit Check | | | | | | | 61.65(b)(1)/(2)/(7)/(9) |
| | | | | | | | |
| **III. Air Traffic Control Clearances & Procedures** | 2 | 3 | 3 | 1 | 9 | 15.00% | |
| Compliance with Departures, En Route, & | | | | | | | 61.65(b)(2)/(3)/(4)/(5)/(7)/(9) |
| Arrival Procedures & Clearances | | | | | | | 61.65(b)(2)/(3)/(4)/(5)/(7)/(9) |
| Holding Procedures | | | | | | | 61.65(b)(2)/(3)/(4)/(5)/(7)/(9) |
| | | | | | | | |

| **IFR ACS Area of Operation** IFR ACS Task | **Rote** Define, Recall, List, Name, Match, Label | **Understanding** Describe, identify, Select, Recognize, Explain, locate, Translate | **Application** Apply, Choose, Interpret, Use, Solve, Operate | **Correlation** Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| **IV. Flight by Reference to Instruments** | | 2 | 1 | | 3 | 5.00% | |
| Basic Instrument Flight Maneuvers | | | | | | | 61.65(b)(7)/(9) |
| Recovery from Unusual Flight Attitudes | | | | | | | 61.65(b)(7)/(8)/(9) |
| | | | | | | | |
| **V. Navigation Systems** | | 3 | 2 | 1 | 6 | 10.00% | |
| Intercepting & Tracking Navigational Systems | | | | | | | 61.65(b)(4) |
| | | | | | | | |
| **VI. Instrument Approach Procedures** | 2 | 3 | 3 | 1 | 9 | 15.00% | |
| Nonprecision Approach | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9)/(10) |
| Precision Approach | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9)/(10) |
| Missed Approach | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9)/(10) |
| Circling Approach | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9)/(10) |
| Landing from an Instrument Approach | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9)/(10) |
| | | | | | | | |
| **VII. Emergency Operations** | 1 | 1 | 2 | 1 | 5 | 8.33% | |
| Loss of Communications | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9) |

| **IFR ACS Area of Operation**<br>IFR ACS Task | **Rote**<br>Define, Recall, List, Name, Match, Label | **Understanding**<br>Describe, identify, Select, Recognize, Explain, locate, Translate | **Application**<br>Apply, Choose, Interpret, Use, Solve, Operate | **Correlation**<br>Calculate, Differentiate, Organize, Formulate, assess, Compare, Evaluate | **Total** | **Percentage** | **Proposed Test Map Correlation With Aeronautical Knowledge FARs** |
|---|---|---|---|---|---|---|---|
| One Engine Inoperative--Instrument Approach | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9) |
| (Multi-Engine Airplane) | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9) |
| Approach with Loss of Primary Flight | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9) |
| Instrument Indicators | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9) |
| | | | | | | | |
| **VIII. Postflight Procedures** | 1 | | 1 | | 2 | 3.33% | |
| Checking Instruments & Equipment | | | | | | | 61.65(b)(1)/(2)/(3)/(4)/(5)/(7)/(9)/(10) |
| Total | 18 | 18 | 18 | 6 | 60 | 100% | |

## APPENDIX J: TEST QUESTION DEVELOPMENT GUIDELINES

The ATST WG used the Test Question Development Guidelines included in this appendix to review test questions and develop the recommendations included in this report. The Test Question Development Guidelines were initially formulated by the Question Development Subgroup and finalized by the members during multiple knowledge test question review ("boarding") sessions.

### Test Question Review Guidelines

**Basic questions to start:**

1. Is the question content relevant for the pilot certificate or rating being sought? (Is this question pertinent and relevant to operations as a certificated, rated pilot?)
2. Is this question testing knowledge required to be a safe, competent aviator?
3. Is it more effective to introduce this new question or revise an existing question?
4. Does this new question apply to other certificates and ratings?
5. Is the subject matter relevant to the pilot (every day)?
6. Would this question be better covered during the oral? Where should this question adequately be covered? (as part of the oral – or as part of the practical test?)
7. Is the key correct?
8. Is the reference valid?

**Content-related Rules:**

Each item should be based on an educational or instructional objective of the certificate/rating, not trivial information.

- Test for important or significant information.
- Focus on a single problem or idea for each test item.
- Keep the vocabulary consistent with the examinees' level of understanding.
- Avoid cueing one item with another; keep items independent of one another.
- Avoid overly specific knowledge when developing items.
- Avoid textbook, verbatim phrasing when developing the items.
- Avoid items based on opinions.
- Be sensitive to cultural and gender issues.

**Stem Construction Rules:**

State the stem in either question form or completion form.

- When using a completion form, don't leave a blank for completion in the beginning or middle of the stem.
- Ensure that the directions in the stem are clear, and that wording lets the examinee know exactly what is being asked.
- Avoid excessive verbiage in the stem.
- Word the stem positively; avoid negative phrasing such as "not" or "except."
- Include the central idea and most of the phrasing in the stem.
- Avoid giving clues such as linking the stem to the answer.

**General Option Development Rules:**

- Place options in logical or numerical order.
- Keep options independent; options should not be overlapping.
- Keep all options homogeneous in content.
- Keep the length of options fairly consistent.
- Avoid the phrases "*all of the above*" or "*none of the above*."
- Phrase options positively, not negatively.
- Avoid distractors that can clue test-wise examinees; for example, absurd options, formal prompts, or overly specific or overly general clues.
- Avoid specific determinates, such as *never* and *always*.
- Position the correct option so that it appears about the same number of times in each possible position for a set of items.
- Make sure that there is one and only one correct option.

**Distractor (incorrect options) Development Rules:**

- Use plausible distractors.
- Incorporate common errors of students in distractors.
- Use familiar yet incorrect phrases as distractors.
- Use true statements that do not correctly answer the item.
- Avoid the use of humor when developing options.

Source:
Writing Good Multiple-Choice Exams
Dawn M. Zimmaro, Ph.D.
Center for Teaching and Learning
Telephone: (512) 232-2662
Web: www.utexas.edu/academic/ctl
Location: Bridgeway Building, 2616 Wichita Street
Address: P.O. Box 7246, Austin, TX 78713-7246

# APPENDIX K: SAMPLE TEST QUESTIONS

Appendix K includes Sample Test Questions for the Private Pilot Knowledge Test, which are based on (and coded to) the draft Private Pilot – Airplane Airman Certification Standards (ACS). These sample questions were reviewed and revised by the ATST WG using the test question development guidelines included in Appendix J.

# SAMPLE TEST QUESTIONS

The following sample test questions apply to the Private Pilot ACS: Preflight Preparation Area of Operation: Pilot Qualifications Task. Each chart depicts the original question, a mark-up of the question that resulted from review of ("boarding") the question, the final question, and notes on the boarding/review process to illustrate the rationale behind the changes.

## Question #1

| Original Question | Mark-up/Review/Boarding | Final Question |
|---|---|---|
| You were born 38 years before this year. If you had your medical exam on March 18th this year and received a first class medical certificate, when can you no longer exercise the privileges as a private pilot on that medical certificate?<br>(Reference: 14 CFR 61.23)<br><br>A) March 18th, 2 years from this year.<br>B) March 18th, 5 years from this year.<br>**C) April 1st, 5 years from this year.** | You ~~were born~~ are 38 years ~~before this year~~ old. ~~If you~~ You had your medical exam on March 18th this year and received a first class medical certificate~~,~~. ~~when~~ When can you no longer exercise the privileges as a private pilot ~~on~~ with that medical certificate?<br>(Reference: 14 CFR 61.23)<br>(P.I.A.K9.a)<br><br>A) March 18th, 2 years from this year.<br>B) March ~~18th~~19th, 5 years from this year.<br>**C) April 1st, 5 years from this year.** | You are 38 years old. You had your medical exam on March 18th this year and received a first class medical certificate. When can you no longer exercise the privileges as a private pilot with that medical certificate?<br>(Reference: 14 CFR 61.23)<br>(P.I.A.K9.a)<br><br>A) March 18th, 2 years from this year.<br>B) March 19th, 5 years from this year.<br>**C) April 1st, 5 years from this year.** |

**Notes on Boarding/Review Process:**

- The question was coded to the Private Pilot – Airplane ACS.
- The reference was checked, and it was correct.
- The question stem was shortened to make it more concise and to the point.
- The distractor in Answer Option B was changed to add more variations within the distractors to reduce the likelihood of the test taker guessing the answer to the question.
- The question does apply to other certificates and ratings and can be managed collectively.

## Question #2

| Original Question | Mark-up/Review/Boarding | Final Question |
|---|---|---|
| You invited two friends to join you for a two hour flight to a city for an afternoon presentation. You expect to return to your home airport by 7:45 PM. Sunset is 6:30. For night recent experience, you must have completed within the last 90 days…<br>(Reference: 14 CFR 61.57)<br><br>A) 3 touch-and-go landings at least an hour after sunset.<br>B) 3 takeoffs and full stop landings after sunset.<br>**C) 3 takeoffs and full stop landings at least an hour after sunset.** | ~~You invited two friends to join you for a two hour flight to a city for an afternoon presentation~~You are PIC carrying passengers on a flight and ~~expect~~plan to return to your home airport by 7:45 PM. Sunset is 6:30 PM. ~~For night recent experience, you must have completed w~~ Within the last 90 days, you must have completed…<br>(Reference: 14 CFR 61.57)<br>(P.I.A.K1.a)<br><br>A) 3 touch-and-go landings at least an hour after sunset.<br>B) 3 takeoffs and full stop landings after sunset.<br>**C) 3 takeoffs and full stop landings at least an hour after sunset.** | You are PIC carrying passengers on a flight and plan to return to your home airport by 7:45 PM. Sunset is 6:30 PM. Within the last 90 days, you must have completed…<br>(Reference: 14 CFR 61.57)<br>(P.I.A.K1.a)<br><br>A) 3 touch-and-go landings at least an hour after sunset.<br>B) 3 takeoffs and full stop landings after sunset.<br>**C) 3 takeoffs and full stop landings at least an hour after sunset.** |

**Notes on Boarding/Review Process:**

- The question was coded to the Private Pilot – Airplane ACS.
- The reference was checked, and it was correct.
- By taking out most of the first sentence, the stem was shortened to make it more concise and focused on the intent of the question.
- Cueing was taken out of the stem: “For night recent experience, you must have completed” is a teaching or cueing statement and should not be a part of the stem of the question.
- The question does apply to other certificates and ratings and can be managed collectively.

## Question #3

| Original Question | Mark-up/Review/Boarding | Final Question |
|---|---|---|
| You invited two friends to join you in your plane for a two hour flight to a city for an afternoon presentation. You may accept their offer to…<br>(Reference: 14 CFR 61.113)<br><br>**A) Pay their pro-rata share of the flight expenses.**<br>B) Pay for your lunch, dinner and the fuel expenses.<br>C) Pay 70% of the expenses of the flight. | You ~~invited~~ asked two friends to join you ~~in your plane~~ for a leisurely two hour flight ~~to a city for an afternoon presentation~~. As a private pilot, ~~Y~~you may accept their offer to…<br>(Reference: 14 CFR 61.113)<br>(P.I.A.K1.a)<br>**A) Pay their pro-rata share of the flight expenses.**<br>B) Pay ~~for your lunch, dinner and the fuel expenses~~ for all of the associated flight expenses.<br>C) Pay ~~70% of the expenses of the flight~~ their pro-rata share of the flight expenses plus maintenance costs. | You asked two friends to join you for a leisurely two hour flight. As a private pilot, you may accept their offer to…<br>(Reference: 14 CFR 61.113)<br>(P.I.A.K1.a)<br><br>**A) Pay their pro-rata share of the flight expenses.**<br>B) Pay for all of the associated flight expenses.<br>C) Pay their pro-rata share of the flight expenses plus maintenance costs. |

**Notes on Boarding/Review Process:**

- The question was coded to the Private Pilot – Airplane ACS.
- The reference was checked, and it was correct.
- The stem was shortened to remove excess verbiage (the words “leisurely two hour” have nothing to do with the question).
- The distractors were altered to make them more plausible answers (without the changes, answer B can be easily eliminated and answer C can be eliminated because “70%” does not appear in 14 CFR part 61). All distracters should be plausible to some degree so make sure the test taker knows the correct answer.
- “As a private pilot” was added to better define the question.

## General Notes on Questions #1 – #3:

In keeping with test question writing best practices, the ATST WG made the following general observations during the boarding/review process:

- For all three questions above, the stem was shortened to remove excess verbiage.
- The question stem should be focused to a single point, and the use of adverbs and adjectives should be used sparingly.
- The question stem should be free of teaching or cueing statements.
- The distractors should all be plausible answers to reduce the “guess factor” and better measure what the test taker knows (and does not know).

# APPENDIX L: OBSOLETE QUESTIONS

Appendix L includes the ATST WG Recommendation to Remove Obsolete Questions from FAA Knowledge Exams submitted to AFS-600 on May 13, 2013. The ATST WG identified terms/technologies as obsolete and recommended the FAA no longer reference the terms/technologies on FAA Knowledge Exams.

**NOTE:** The ATST WG Recommendation to Remove Obsolete Questions from FAA Knowledge Exams original submission is included in this appendix as a stand-alone document.

## AFS-630 Disposition of Recommendation

The FAA Airman Testing Standards Branch (AFS-630) received and responded to the ATST WG submission. After analysis of the recommendation, AFS-630 removed several of the obsolete questions from the applicable knowledge test item bank(s), including:

- VHF/DF Steer (Direction Finding)
- MLS (Microwave Landing System) (Only used as distractor.)
- TWEB (In the next revision of the ATP supplement this figure will be updated.)
- On-Airport FSS
- Composite Moisture Stability Chart
- Winds Aloft Forecasts (In the next question cycle roll scheduled for 6-2013 the questions that refer to "FD" will be revised to read "FB" in the IRA.)
- LORAN (Only used as a distractor.)

## Recommendation to Remove Obsolete Questions from FAA Knowledge Exams

The ARAC ATST WG identified the following terms/technologies as obsolete and recommends the FAA no longer reference the terms/technologies on FAA Knowledge Exams.

The terms are followed by questions historically used on knowledge exams and/or the public data (sample tests and databases posted on AFS-630 website). Questions are identified where the obsolete information is part of an answer choice (not the question stem). The ARAC ATST WG recommends that obsolete technologies be removed as distracters, as they are then required to be part of a training curriculum.

The ARAC ATST WG further recommends that once these terms and associated questions are no longer issued on the FAA Knowledge Exams, the FAA issue a formal notice so training providers can remove the terms/technologies from the training process.

**VHF/DF Steer (Direction Finding)**
Service now only available in very limited capacity and in Alaska only

- Commercial: To use VHF/DF facilities for assistance in locating your position, you must have an operative VHF
- Private: To use VHF/DF facilities for assistance in locating an aircraft's position, the aircraft must have a
- Private: The letters VHF/DF appearing in the Airport/Facility Directory for a certain airport indicate that

**MLS (Microwave Landing System)**
Used in answer choices for the following questions:

- ATP: 'Unreliable', as indicated in the following GPS NOTAMS: SFO 12/051 SFO WAAS LNAV/VNAV AND LPV MNM UNRELBL WEF0512182025-0512182049 means
- ATP: What does "UNREL" indicate in the following GPS and WAAS NOTAM: BOS WAAS LPV AND LNAV/VNAV MNM UNREL WEF 0305231700 -0305231815?
- Taxiway Centerline Lead-Off Lights are color coded to warn pilots that

**INS (Inertial Navigation System)**

- ATP: Which equipment requirement must be met by an air carrier that elects to use a dual Inertial Navigation System (INS) on a proposed flight?
- ATP: An air carrier that elects to use an Inertial Navigational System (INS) must meet which equipment requirement prior to takeoff on a proposed flight?
- What type navigation system is Inertial Navigation System (INS)? A navigation computer which provides position

**TWEB**
Used in answer choices for the following questions:
- ATP: (Refer to Figure 186.) The NAVAID box at Mormon Mesa (MMM) has a black square in the upper left corner. What does this indicate?
- CFI: (Refer to Figure 44.) Select the correct statement concerning the Maverick VOR (area 6).

**On-Airport FSS**
- Private: If a control tower and an FSS are located on the same airport, which function is provided by the FAA during those periods when the tower is closed?

**Composite Moisture Stability Chart**
Replaced by Lifted Index chart
- Commercial: A freezing level panel of the composite moisture stability chart is an analysis of

**Winds Aloft Forecasts**
CT-8080s depict these as “FD” which has been replaced with “FB”; questions could be salvaged if the FB forecast is embedded into the question stem rather than referring applicants to an obsolete figure:
- Sport: questions referring to Figure 7 and Figure 43
- Private: questions referring to Figure 17
- CFI: questions referring to Figure 7

**LORAN**
Most questions dealing with LORAN have been removed; however, LORAN still referenced in incorrect answers:
- Instrument: (Refer to Figure 40.) For planning purposes, what is the highest useable altitude for an IFR flight on V16 from BGS VORTAC to ABI VORTAC? (one of the answer choices details the MRA at LORAN intersections)

**AIM Change 2 (03/07/2013) makes this question obsolete:**
- Instrument: Your onboard GPS-based FMS/RNAV unit is IFR certified under TSO-C129. Your destination is below minimums and you proceed to your filed alternate. You know that

**Instrument Approach Procedures:** Instrument and ATP Questions are referencing CT-8080 Figures with dated approach plate procedures – using the old layout and obsolete components (such as inner and middle markers where they no longer apply). Ideally all questions should be removed until approach plates can be updated; however, an interim solution could be to embed the necessary information into the question stem.

## APPENDIX M: FREQUENTLY ASKED QUESTIONS

Appendix M includes the Frequently Asked Questions (FAQ) prepared by the ATST WG in response to several comments/questions submitted when the Private Pilot – Airplane Airman Certification Standards (ACS) and Instrument Rating ACS documents were published for comment.[15] The FAQs were published for additional clarification with the first draft of the Authorized Instructor ACS (and second draft of Private Pilot – Airplane and Instrument Rating ACS documents).[16]

**NOTE:** The contents of the FAQs has been modified since publication in order to be consistent with the ATST WG work product at the time of submission of this report.

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### FREQUENTLY ASKED QUESTIONS

#### What is the ACS project all about?

The goal of this project is to improve airman training and testing with an integrated, holistic system that clearly aligns testing with certification standards and guidance.

#### What is the ATST WG? How does it relate to the ARC?

ARC refers to the Airman Testing Standards and Training Aviation Rulemaking Committee, which the FAA chartered in September 2011 to make recommendations for more effective training and testing. The ARC submitted its report and nine recommendations to the FAA on April 13, 2012.

To benefit from industry expertise in implementing the ARC recommendations, in August 2012 the FAA turned to the Aviation Rulemaking Advisory Committee (ARAC). ARAC, a formal standing committee of aviation associations and industry, assigned this work to a newly-formed Airman Testing Standards and Training Working Group (ATST WG) consisting of aviation education and training professionals from all major segments of this community.

[15] 78 FR 24289 (Docket No. FAA-2013-0316) (April 24, 2013).
[16] 78 FR 44619 (Docket No. FAA-2013-0649) (July 24, 2013).

## Who are these people? What expertise do they have?

When the FAA asked the industry-comprised Aviation Rulemaking Advisory Committee (ARAC) to accept this project, the agency stipulated that the Airman Testing Standards and Training Working Group should be:

> [C]omprised of aviation professionals with experience and expertise in airman training and testing, and technical experts having an interest in the assigned task. The FAA would like a wide range of members to ensure that all aspects of airman testing and training, including best practices, are considered in the development of its recommendations.

In response to the Federal Register notice published on September 12, 2012 (77 FR 56251), a number of individuals and organizations contacted the FAA to request participation on the ATST WG. The FAA selected its membership to include aviation professionals who could collectively represent all major sectors of the industry. These include flight instructors, designated pilot examiners, the aviation academic community, industry advocacy associations, and training and test preparation providers involved with aviation training and testing in 14 CFR Part 61, 141, 147, and 121 environments. To help ensure that the FAA has a full understanding of the ATST WG's work and the rationale for its recommendations, the FAA also assigned subject matter experts from a number of its policy divisions to attend ATST WG meetings.

## What is the problem you're trying to solve? What's wrong with the tests we have now?

To many stakeholders, FAA knowledge testing is the most deeply flawed part of the airman certification system. It matters because the knowledge test is an important component of the airman certification process. It measures an applicant's understanding of the rules, regulations, and knowledge areas required to receive an FAA airman certificate.

For the flight proficiency (skills) part of the airman certification process, the FAA developed the Practical Test Standards (PTS) to define acceptable performance of the required skills. There is currently no such guidance for the knowledge test, which creates problems familiar to anyone who has ever taken an FAA knowledge test. These include questions that are overly broad, trivial, outdated, and sometimes irrelevant. Test questions that require multiple interpolations to calculate takeoff, landing, and density altitude to the foot imply a level of precision that, ironically, is grossly inaccurate in terms of safety and reality.

Moreover, the knowledge exam is not a reflection of a typical ground training program. Consequently, applicants who have demonstrated knowledge and mastery in an approved flight and ground school curriculum must still conduct a comprehensive "test prep" to pass the knowledge test. It is difficult for instructors to provide the required remedial training for missed knowledge, and difficult for examiners to accurately re-test the missed knowledge. As a result, the knowledge exam is disconnected from both training and the practical test. For these reasons, many regard the knowledge test as a rote memorization exercise that has no real value for aviation safety education and training.

## If there are problems with the knowledge test, why can't you just fix those and leave the rest alone?

In September 2011, the FAA convened a group of industry experts to recommend ways to "fix testing." This group – the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) – quickly determined that there is no way to fix the knowledge test in a meaningful and sustainable way without having a knowledge test standard akin to the PTS.

The ARC briefly considered proposing a "Knowledge Test Standards" (KTS) document that would be the knowledge test companion to the skill-focused PTS. After much discussion, the ARC discarded this approach as unworkable. ARC members feared that creation of separate KTS documents could result in divergence between the KTS and the PTS. It would burden stakeholders with an additional set of documents, and require a greater expenditure of shrinking FAA resources to develop, deploy, and maintain a full range of KTS documents.

The ARC ultimately concluded that aviation safety and stakeholder needs, including the core desire for a more relevant FAA knowledge test, would be best served by integrating task-specific aeronautical knowledge into the appropriate Area of Operation in the existing PTS, and by adding task-appropriate risk management elements for each Area of Operation. The ACS would thus define not only the performance metrics for knowledge and skill, but also the required content for guidance materials such as the FAA-H-series handbooks and for relevant knowledge test questions.

## What's wrong with the PTS?

The PTS provides metrics to define acceptable performance of the "flight proficiency" skills listed in 14 CFR part 61 for a given certificate or rating. Most people believe that the PTS generally serves its intended purpose but, like all such documents, it has become bloated over the years with an ever-expanding list of "special emphasis" items, repetitive or overlapping Areas of Operation/tasks, and poorly-defined additional requirements (e.g., evaluation of the applicant's risk management and aeronautical decision-making skills).

## How does the ACS approach improve the PTS?

The ACS approach does **not** increase or expand any of the skill evaluation requirements in the existing PTS, but it significantly improves the PTS in several ways. The ACS:

- Provides integrated guidance that defines performance metrics for aeronautical knowledge as well as flight proficiency (skill).
- Strengthens the PTS by explicitly defining the aeronautical knowledge needed to support each Area of Operation/task. This linkage enhances the relevance of the testing/training process for adult learners by clearly answering the "why do I need to know **that**?!" question.
- Enhances safety by using the risk management section in each ACS Area of Operation to translate abstract terms like "aeronautical decision-making" into specific safety behaviors relevant to each task.
- Eliminates "bloat" by consolidating duplicative or overlapping tasks in the existing PTS.

## Why does the ACS have a separate section for risk management? Isn't that just the latest buzz word?

The PTS already requires evaluation of the applicant's risk management abilities, but the existing document doesn't offer the kind of concrete "what do I have to do?" guidance that users need and deserve.

The rationale for including a risk management section in the ACS is to enhance safety by translating abstract terms into specific safety behaviors relevant to each task. The ACS is also intended to communicate and demonstrate that risk management is a continuous process that includes identification, assessment, and mitigation of task-specific hazards that create risk. The risk management element identifies the circumstantial issues that aviators must consider in association with a particular task.

## So how does the ACS approach improve the test?

Accepted industry practices for any certification process stipulate that training and testing be based on a job/task analysis. The ACS documents function as the required job/task analysis, as they define the knowledge and skills needed to perform at the level of the target certificate or rating. By so doing, the ACS approach better serves the applicant, the instructor, and the evaluator. And because the process of developing the ACS requires a thorough review and update of knowledge and skills for airman certification, it aligns with certification industry standards for periodic review and revision of the job/task analysis. In addition, the ACS approach will enable the FAA to create and maintain a clear link between the regulations, knowledge/skill performance standards, guidance, and test materials.

## How do you propose to provide the "clear link" connecting knowledge/skill performance standards, guidance, and test materials?

One of the overarching goals of this project is to create an integrated, coherent airman certification system in which standards, guidance, and testing can be aligned and maintained in alignment. Such symmetry is key to fully realizing the benefits the ACS system promises to both the FAA and its many stakeholders. It is also key to conformance with accepted industry standards for certification programs, which require that items to be trained and tested be directly linked to the job/task analysis – in this case, the ACS.

You may have noticed that the revised versions of the private pilot and instrument rating ACS documents and the new Authorized Instructor ACS include a series of letters and numbers after each task. These codes provide the means to correlate the tasks in the ACS with guidance and testing, and to keep them aligned going forward. The proposed ACS codes would supersede the current system of "Learning Statement Codes" (LSC), which is too limited to serve as the mechanism for alignment and too complex to effectively serve the needs of the FAA and the stakeholder community.

The proposed coding system has five elements that are anchored in the ACS (not in reference documents, like the current LSCs).

**PA.X.A.K1.a:**

**PA** = Applicable ACS (private pilot airplane)*
**X** = Area of Operation (night operation)
**A** = Task (night preparation)
**K1** = Knowledge Task element 1 (physiological aspects of night flying as it relates to vision) **
**a** = rote*** – represents the level of learning and guides question development (e.g., rote would require the applicant to define, recall, list, name, match, label).

* IR = instrument rating, CA = commercial airplane, etc.
** S = skills elements, R = risk management elements
*** b = understanding, c = application, d = correlation (representing the level of learning which also informs the manner of the question (e.g., rote = define, recall, list, name, match, label))

The proposed ACS-based coding scheme will:

- Clearly align guidance and test questions to the ACS;
- Make the airman test report meaningful to stakeholders (applicant, instructor, evaluator);
- Provide a means for automated generation of tests, whether using the existing test forms or future randomized selections; and
- Eliminate subjectivity and vastly simplify system management requirements for the FAA.

## Isn't the real problem related to deficient skills? If so, what is the point of this change?

Aviators love to debate, and we can argue endlessly about what **really** causes accidents. Perhaps we can agree, though, that most accidents have multiple causes.

According to the AOPA Air Safety Institute, the three leading general aviation (GA) fatal accident factors are maneuvering flight, continued VFR into IMC, and loss of control on takeoff. These factors all imply some degree of deficiency in the pilot's knowledge, skill, and risk management abilities. Even the world's best stick-and-rudder pilot is at risk for loss of control if he or she has an inadvertent flight into IMC because of deficiencies in weather knowledge or risk management ability. Safety is not served by emphasizing just one of these three abilities. On the contrary, each supports the others.

The ACS is therefore an improvement over the current system, because it offers a holistic approach to aviation training and testing – it integrates knowledge, skills, and risk management, and it provides a way to ensure that the elements of the certification process – standards, guidance, and testing – are correlated to these abilities and aligned with each other.

## How can you map knowledge to skills?

The ATST WG invested considerable time developing a standardized approach to integrating knowledge and risk management with the skills in the existing PTS Areas of Operation/tasks. To assist the FAA in this process, the ATST WG's final report will describe its PTS-to-ACS transition methodology in detail. In summary, though, the ATST WG sought to:

- Ensure that all aeronautical knowledge topics listed in 14 CFR part 61 are addressed in the appropriate Area(s) of Operation in the ACS
- Define the knowledge topics required to support the skill area for the level of airman certificate covered by the target ACS.
- Calibrate the required knowledge to the level of the airman certificate or rating level.

The ATST WG strongly recommends that the FAA seek expert stakeholder participation in this process. And, while calibration is unavoidably somewhat subjective, the use of standardized rubrics and a comprehensive task chart (i.e., a document that displays the required level of performance for each Area or Operation and/or task) would be helpful.

The group took a similar approach to risk management. Drawing from the special emphasis topics in the existing PTS and sources such as the FAA Risk Management Handbook (FAA-H-8083-2), the group listed specific, practical, risk management tasks, skills, or behaviors appropriate to each Area of Operation.

## What benefits come from mapping knowledge to skills?

Most accidents have multiple causes, and many involve at least some degree of deficiency in the pilot's knowledge, skill, and risk management abilities. Each of these abilities supports the others. The ACS reflects this reality because it offers a holistic approach to aviation training and testing – it integrates knowledge, skills, and risk management, and it provides a way to ensure that the elements of the certification process – standards, guidance, and testing – are correlated to these abilities and aligned with each other.

Another benefit is that the holistic ACS approach is consistent with principles for effective adult education and meaningful testing. According to Malcolm Knowles, effective instruction and education of adults occurs when they perceive a need for certain knowledge or skills, understand how the area of learning relates to what they want to achieve, and recognize how the area of learning applies to the life or work context.

By mapping specific items of aeronautical knowledge and actionable risk management practices with the flying skill performance metrics in the existing PTS, the ACS meets these needs and significantly enhances the educational value of the FAA knowledge test.

Finally, the holistic ACS approach is consistent with accepted industry practices for any certification process. The ACS documents function as the required job/task analysis, because they define the knowledge and skills needed to perform at the level of the target certificate or rating. By so doing, the ACS approach better serves the applicant, the instructor, and the evaluator.

## Why is the Authorized Instructor ACS different?

Because the ACS is intended to be a foundation for the entire airman certification testing and training system, the ATST WG invested considerable effort developing an ACS framework that can be consistently applied to the majority of airman certificates and ratings.

The draft Authorized Instructor ACS follows the overall conceptual framework developed for the private pilot ACS and the instrument rating ACS, but its construction reflects fundamental differences between the family of pilot certificates/ratings and the instructor certificate. The core of the Authorized Instructor ACS addresses practical application of the instructional concepts and techniques presented in the traditional Fundamentals of Instructing (FOI). The Authorized Instructor ACS uses appendices to define the acceptable standards for knowledge, skill, and risk management in the aeronautical proficiency tasks unique to a particular instructor certificate or rating.

It is also important to understand that the Authorized Instructor ACS is not intended to be a stand-alone document. Just as a flight instructor certificate must be accompanied by a commercial pilot certificate, the Authorized Instructor ACS is to be used in conjunction with the ACS for the pilot certificate level or rating for which the instructor-applicant seeks to provide instruction. In addition to mastery of the knowledge and skills defined in the Authorized Instructor ACS, the instructor-applicant must demonstrate instructional competence for Tasks in the ACS for the appropriate certificate level or rating, to include analyzing and correcting common learner errors.

### What's the point of changing terms to words like "evaluator" or "plan of action?"

One of the goals of this project is greater consistency. Instead of trying to list every category of person authorized to conduct a practical test (e.g., examiner, designee, designated pilot examiner, aviation safety inspector), the ACS uses the term "evaluator" to cover the entire range. The term "plan of action" is used in the Authorized Instructor ACS because a plan of action for instruction better conveys the intended concept, and also because it corresponds with the requirement for an evaluator to have a plan of action for conducting the test.

### Why does the ACS mix the terms "learner" and "student pilot?"

The education and training industry has generally adopted the term "learner," because it conveys recognition and respect for adults' experience and motivation. We followed this convention in most instances. However, the ACS retains the term "student pilot" when it refers to certification activities involving an individual who is a student pilot within the meaning of 14 CFR part 61.

### Why use the term "airman" instead of "pilot" or "aviator?"

The regulations use the term "airman" to encompass the full range of aviation functions that require an FAA certificate or rating. Not all airman certificates and ratings are for pilots or aviators; some apply to aircraft maintenance technicians, dispatchers, and other specialties. We continued to use this term because it includes all aviation functions that require an FAA certificate or rating, and because it is used in the regulations. We did not recommend a change because changes that require rulemaking are beyond the scope of this group's charter.

### Doesn't this kind of change require a formal rulemaking process?

No. Like the PTS, the ACS simply defines the metrics – the standards -- for meeting the regulatory requirements that 14 CFR part 61 enumerates for aeronautical knowledge and flight proficiency. The ACS does not change any of the requirements in 14 CFR.

### Doesn't this approach increase the standards?

No. The ACS approach does not increase the standards. Except for those areas where the ACS consolidates overlapping or duplicative Areas of Operation/tasks in the existing PTS, none of the PTS material has changed. The knowledge and risk management sections simply define the standards for meeting the requirements in 14 CFR part 61.

### Doesn't the ACS approach increase the cost of flight training?

No. In fact, a more integrated and efficient presentation of the material to be tested could make training far more effective and efficient for all stakeholders – and thus less costly. Instructors will be able to effectively and efficiently remediate any deficient knowledge identified on the airman knowledge test report in preparation for the practical test.

## Won't the ACS approach dramatically increase the length (and expense) of the practical test?

No. In fact, a more integrated and efficient presentation of the material to be tested could even shorten the test, especially if the evaluator has more confidence in the quality and meaning of the applicant's knowledge test score. Evaluators will be able to effectively and efficiently re-test any deficient knowledge identified on the airman knowledge test report to ensure the applicant has trained to proficiency in all areas.

## How much will the ACS cost in terms of money and manpower?

Today's airman certification system is far more costly than it should be for both the FAA and stakeholders, because the absence of a knowledge standard and the lack of standardized and solid integration of standards, guidance, and testing leads to disconnects and errors that have to be corrected on a piecemeal basis. For the FAA, the shortcomings of the present system also make it difficult to coherently accommodate and integrate requests for new or enhanced material on special emphasis topics.

For stakeholders, the current system is costly because it creates uncertainty and leads to expensive last-minute or off-cycle changes and corrections to training and test preparation materials. It is certainly costly for applicants, instructors, and evaluators, if only because of the time wasted in teaching or learning topics that have no value for safe operation in today's National Airspace System (NAS).

While there will be an initial investment needed to implement the ACS approach, the ATST WG's proposal for a phased transition – designed to match the existing schedule for updates – will minimize the cost. And, if properly implemented, the ACS approach to airman certification testing and training will be much less costly than today's highly inefficient system.

## What do you mean when you say that the ACS concept is consistent with SMS principles?

The safety management system (SMS) framework provides a systematic approach to achieving acceptable levels of safety risk. The holistic ACS concept for the overall airman certification system is consistent with SMS, because it addresses each of the four "pillars" of SMS:

- Safety Policy that demonstrates FAA senior management commitment to continually improve safety through enhancements to the airman certification testing and training system; specifically, better integration of the aeronautical knowledge, flight proficiency, and risk management components of the airman certification system;
- Safety Risk Management processes that create a structured means of safety risk management decision making to identify, assess, and determine acceptable level of risk associated with regulatory changes, safety recommendations, or other factors requiring modification of airman testing and training materials;
- Safety Assurance processes which allow increased confidence on the part of industry and FAA stakeholders in risk controls through a continual review of FAA products and the systematic, prompt and appropriate incorporation of changes arising from new regulations, data analysis, and safety recommendations; and
- Safety Promotion framework to support a positive safety culture in the form of training and ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

### What did you do with the comments submitted to the docket on the initial private pilot and instrument rating ACS documents?

We appreciate the many comments and questions we received in response to the first set of documents. As planned, we used this feedback to refine the draft ACS documents. You will see some of that feedback reflected in the revised ACS for the private pilot certificate and the instrument rating. Other comments and questions were very valuable in showing us the areas we need to clarify or better explain, as we have tried to do with these “frequently asked questions.” The ATST WG’s final report (submitted in September 2013) includes a more detailed discussion of how we addressed the comments received through this process.

### What’s the difference between this ACS and a training syllabus?

The ACS defines **what** the applicant must know, do, and consider in order to earn an airman certificate or rating. A training syllabus defines **how** (where, when and why) these standards are met. Accepted industry practices for any certification process stipulate that it be based on a job/task analysis. The certification process must analyze, define, and publish the domains and tasks that are a part of the certification process. It must further identify the knowledge and skills associated with performance of those tasks. The required knowledge and skills become the basis for development of assessment activities.

The ACS documents function as the required job/task analysis, as they define the knowledge and skills needed to perform at the level of the target certificate or rating. By so doing, the ACS approach better serves the applicant, the instructor, and the evaluator. Because the process of developing the ACS required a thorough review and update of knowledge and skills for airman certification, it also aligns with certification industry standards requiring periodic review and revision of the job/task analysis.

### How can risk management be tested on a knowledge test?

Risk management can be effectively tested on a knowledge test through the use of scenarios, common student errors, misconceptions, or frequent accident causes. Risk management questions will remain objective because they will be specific to an area of operation/task.

### How do you expect to evaluate soft skills?

So called “soft skills” are already evaluated through the use of scenarios and circumstances that require decision-making and judgment. By providing more specific guidance on the knowledge and risk management abilities needed to support a particular skill, the ACS will give applicants, instructors, and evaluators much better guidance than they have in today’s system.

### How will use of the ACS approach change airman training?

With clearly defined standards for knowledge, skill and risk management, airman training can be conducted more effectively to ensure applicants who complete flight and ground training are safe, competent aviators as well as successful in passing the FAA knowledge test. Training and testing will be aligned, which means that “test prep” will be a review of the ground school curriculum rather than a separate, unrelated step to learn questions for the sole purpose of passing a test.

# APPENDIX N: PROPOSED PRIORITIES FOR ACS CONVERSION + DEPLOYMENT

Appendix N includes the ATST WG's proposed Practical Test Standards (PTS)-to-Airman Certification Standards (ACS) Recommended Conversion Priorities. The matrix describing the proposed schedule is based on a three-phase deployment plan designed to complete the conversion process as efficiently as possible, while leveraging existing resources and recognizing the overlapping nature of some of the underlying documents.

| PTS to ACS RECOMMENDED CONVERSION SCHEDULE<br>(PHASE I, FOLLOW-ON TO COMPLETED ACS DOCUMENTS) | | | |
|---|---|---|---|
| **Proposed ACS Title** | **Current PTS Document Number(s)** | **ACS Conversion Priority** | **Notes** |
| Private Pilot – Airplane Airman Certification Standards | FAA-S-8081-14B | Phase 1 | ACS will have 1 section ( with tasks/elements specific to SEL, SES, MEL, MES noted); Will need new edition of Test Guide (FAA-G-8082-17M) to remove PAT, PAR tests. |
| Private Pilot – Rotorcraft (Helicopter and Gyroplane) Airman Certification Standards | FAA-S-8081-15A | Phase 1 | ACS will have 2 sections (HELI, GYRO); will need new edition of Test Guide (FAA-G-8082-17M) to remove PHT, PGT, PRH, PRG tests. |
| Instrument Rating Airman Certification Standards | FAA-S-8081-4E | Phase 1 | ACS will have 3 sections (AIR, RTC, PL); will need new edition of Test Guide (FAA-G-8082-13M) to remove IRA, IRH, IFP tests |
| Commercial Pilot – Airplane Airman Certification Standards | FAA-S-8081-12C | Phase 1 | ACS will have 1 section ( with tasks/elements specific to SEL, SES, MEL, MES noted); Will need new edition of Test Guide (FAA-G-8082-5I) to remove CAX, MCA tests. |
| Commercial Pilot – Rotorcraft (Helicopter and Gyroplane) Airman Certification Standards | FAA-S-8081-16B | Phase 1 | ACS will have 2 sections (HELI, GYRO); will need new edition of Test Guide (FAA-G-8082-5I) to remove CRH, CRG, MCH tests. |
| Authorized Instructor Airman Certification Standards | FAA-S-8081-6D<br>FAA-S-8081-9D<br>FAA-S-8081-7B<br>FAA-S-8081-8B<br>Add: Sport Pilot Instructor | Phase 1 | This ACS represents a combination of 4 PTS and Sport Pilot Instructor (FAA-S-8081-29, FAA-S-8081-30, FAA-S-8081-31); the ACS will have 6 Sections (Ground Instructor, CFI-A, CFII, CFI-H, CFI-G, CFI-Sport Pilot. Cancel FAA-G-8082-7L and FAA-G-8082-13M once ACS is effective. |
| Airline Transport Pilot and Type Rating – Airplane Airman Certification Standards | FAA-S-8081-5F | Phase 1 | Will need new edition of Test Guide (FAA-G-8082-1K) to remove ATP, ATA, ARA tests. |
| Airline Transport Pilot and Type Rating – Helicopter Airman Certification Standards | FAA-S-8081-20 | Phase 1 | Will need new edition of Test Guide (FAA-G-8082-1K) to remove ATH, ARH tests |
| Sport Pilot Airman Certification Standards | FAA-S-8081-29<br>FAA-S-8081-30<br>FAA-S-8081-31 | Phase 2 | ACS will be a combination of 3 PTS which could mean up to 14 sections depending on how aircraft categories are covered. Test Guide (FAA-G-8082-4D). Cancel Test Guide (FAA-G-8082-4D) once this ACS is effective.<br><br>Sport Pilot Instructor to be integrated into Authorized Instructor ACS. |
| Private Pilot – Lighter-Than-Air (Balloon, Airship) Airman Certification Standards | FAA-S-8081-17 | Phase 2 | Will need new edition of Test Guide (FAA-G-8082-17N) to remove LTA tests. |
| Private Pilot – Glider Airman Certification Standards | FAA-S-8081-22 | Phase 2 | Will need new edition of Test Guide (FAA-G-8082-17N) to remove GLI tests. |
| Private Pilot – Powered Parachute and Weight-Shift Control Airman Certification Standards | FAA-S-8081-32 | Phase 2 | Will need new edition of Test Guide (FAA-G-8082-17N) to remove PPC and WSC tests. |
| Recreational Pilot Airman Certification Standards | FAA-S-8081-3A | Phase 3 | Cancel Test Guide (FAA-G-8082-17N) once this ACS is effective. |
| Commercial Pilot – Lighter-Than-Air (Balloon, Airship) Airman Certification Standards | FAA-S-8081-18 | Phase 3 | Will need new edition of Test Guide (FAA-G-8082-5I) to remove LTA tests. |
| Commercial Pilot – Glider | FAA-S-8081-23A | Phase 3 | Cancel Test Guide (FAA-G-8082-5) once ACS is effective. |
| Aircraft Dispatcher Airman Certification Standards | FAA-S-8081-10D | Phase 3 | Will need new edition of Test Guide (FAA-G-8082-1L) to remove Dispatcher tests. |
| Flight Navigator Airman Certification Standards | None | Phase 3 | Cancel Test Guide (FAA-G-8082-1) once ACS is effective. |
| Flight Engineer Airman Certification Standards | FAA-S-8081-21 | Phase 3 | Cancel Test Guide (FAA-G-8082-9H) once ACS is effective. |
| Aviation Mechanic – General Airman Certification Standards | FAA-S-8081-26 | Phase 3 | Note: FAA-S-8081-26A was released 09/2012 with an effective date of 11/01/12 and then cancelled pending guidance documents. Will FAA be releasing this new edition or will they instead release the ACS replacement? |
| Aviation Mechanic – Airframe Airman Certification Standards | FAA-S-8081-27 | Phase 3 | Note: FAA-S-8081-27A was released 09/2012 with an effective date of 11/01/12 and then cancelled pending guidance documents. Will FAA be releasing this new edition or will they instead release the ACS replacement? |
| Aviation Mechanic – Powerplant Airman Certification Standards | FAA-S-8081-28 | Phase 3 | Note: FAA-S-8081-28A was released 09/2012 with an effective date of 11/01/12 and then cancelled pending guidance documents. Will FAA be releasing this new edition or will they instead release the ACS replacement? Cancel Test guide (FAA-G-8082-3) once this ACS is effective. |
| Inspection Authorization Airman Certification Standards | None | Phase 1 | Cancel Test Guides (8082-19 and 11) once this ACS is effective. |
| Parachute Rigger Airman Certification Standards | FAA-S-8081-25B | Phase 3 | Cancel Test Guide (8082-15) once this ACS is effective. |

**Notes:**
Test Guides and Test Matrix will need to be updated and/or cancelled in correspondence with the ACS effective dates.
Learning Statement Reference Memo should be cancelled; Test Guides and ACS will be source for LSCs.

# APPENDIX O: AIRMAN CERTIFICATION SYSTEM QMS

The ATST WG recommends the following elements be addressed and integrated into an Airman Certification System Quality Management System (QMS).

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## 1. Standards (ACS)

The ACSWG should:

(A) Determine the nature of the airman certificate or rating to be converted from PTS to ACS:

(i) *Pilot certificate or rating*: Use the Private Pilot ACS as the baseline model for conversion to the ACS structure.

(a) *The specific knowledge, skills, and risk management tasks in each Area of Operation should be calibrated "up" or "down" in accordance with the level of pilot certificate or rating*.

(ii) *Instructor certificate or rating*: Use the Instructor ACS as the baseline model for conversion to the ACS structure.

(iii) *Other certificate or rating* (e.g., dispatcher, AMT): To the greatest possible extent, use the pilot certificate ACS as the structural model.

(B) Set up the appropriate worksheet template. (See Appendix P.)

(C) In consultation with appropriate internal stakeholders (e.g., FAA policy divisions) and external stakeholders, develop the ACS document:

(i) *Introduction:*

(a) Use template language to the greatest practicable extent for the actual introduction.

(b) List special emphasis topics to be moved into the Areas of Operation.

(c) Following the appropriate model ACS, list the necessary appendices.

(ii) *Areas of Operation:* Use Areas of Operation in existing PTS as the point of departure to develop each section of the new ACS, bearing in mind that it may be appropriate to split or, in other cases, combine certain Areas of Operation and/or tasks:

(a) *Knowledge*: Ensuring that all aeronautical knowledge topics listed in 14 CFR part 61 are addressed in the appropriate Area(s) of Operation in the ACS, define the knowledge required to support the skill area for the level of airman certificate covered by the target ACS. The ATST WG notes that the calibration of knowledge to a particular airman certificate or rating level is among those activities most likely to benefit from expert stakeholder input. While calibration is unavoidably somewhat subjective, the ATST WG further notes that the use of standardized rubrics and a comprehensive task chart (i.e., a document that displays the required level of performance for each Area or Operation and/or task) would be helpful in this regard.

(b) *Skills*: Except in cases where it is appropriate to separate or combine current (PTS) Area(s) of Operation and/or tasks, integrate the existing skills material into the ACS framework (i.e., modify stems and structure in accordance with standardized ACS formulations).

(c) *Risk Management*: Drawing from the special emphasis topics and sources such as the FAA Risk Management Handbook (FAA-H-8083-2), develop specific, practical, risk management tasks, skills, or behaviors appropriate to each Area of Operation. The goal is to translate concepts into practical actions that enhance safety.

(iii) *Appendices:* Revise PTS introductory material to align with ACS framework for appendices.

(D) Document the transition, to include:

(i) ACS disposition of PTS Areas of Operation and tasks through the tracking matrix template. (See Appendix P.)

(ii) Calibration of standard(s) to level of airman certificate or rating. (See Appendix P.)

(E) Ensure that there is adequate guidance material to support the knowledge, skills, and risk management tasks in each ACS Area of Operation, and list the appropriate references in the space provided on the ACS worksheet template.

(F) Code the tasks in each ACS Areas of Operation in accordance with the scheme described in Section 4.1.3 of this report.

(G) Review: Because comprehensive review of the ACS is critical to achieving the goal of a relevant, safety-oriented, and educationally-sound airman certification system, the QMS process for the ACS element of the airman certification system should include submission of the completed draft for review by:

(i) Internal stakeholders (e.g., FAA policy divisions and/or Offices of Primary Responsibility)

(ii) Expert stakeholders (outside SMEs)

(iii) Public via *Federal Register* with invitation for comment.

## 2. Guidance

Upon completion of the draft ACS document(s), the ACSWG should:

(A) Review FAA-H-8083-XX series handbooks to ensure that:

(i) Appropriate guidance exists, and that it correlates to the ACS Area(s) of Operation/Task(s)/Element(s).

(a) If guidance does not exist, make a written proposal to add as necessary.

(b) If guidance does not correctly align with the ACS, make a written proposal to amend as appropriate.

(ii) Documents listed in the reference section of the ACS are correct and current.

(B) Review any other document(s) referenced in the ACS (e.g., Advisory Circulars) to ensure that the content is complete, correct, and in alignment with the ACS.

(C) If changes to the ACS require additional references (e.g., changes to the ACS arise from material in a new AC not yet incorporated into the FAA-H-8083-XX series handbooks), list these documents in the appropriate ACS Area(s) of Operation/Task(s)/Element(s).

(D) If changes to the ACS require amendments to FAA internal guidance (e.g., Order 8900.1, Order 8900.2, or ASI/DPE training), list the areas requiring change and propose language to address the issue(s).

### 3. Test Question Development

Upon completion of the draft ACS document(s), and review of the guidance, the ACSWG should take the following steps with respect to the airman certification system's testing component:

(A) Review test questions for:

- (i) Validity
- (ii) Code (determines whether K, S, or R and type of question required)
- (iii) Public counterpart (i.e., "sample questions")
- (iv) Test map (distribution)

(B) Review the "test map" of suggested test question subject allocation for the relevant certificate or rating to determine the number and nature of questions to be allocated to each topic. *(NOTE: This step provides a system management tool that, used in combination with a review of the ACS, guidance, and statistical analysis of accident data, can help ensure that special emphasis items are adequately represented at the appropriate point(s) in the certification process without displacing other important subjects that should be sampled via the knowledge test.)*

(C) As necessary, draft new test questions, using test question development guidelines (see Appendix J) that align with the relevant ACS and associated guidance.

**Examples:**

1. What aircraft inspections are required for rental aircraft supplied by a flight school for flight instruction? (P.I.B.K1c.r)
(Reference: 91.409)
A) Annual condition inspection and 50-hour inspection.
**B) Annual condition inspection and 100-hour inspection.**
C) Biannual condition inspection and 100-hour inspection.

2. Upon encountering severe turbulence, which flight condition should the pilot attempt to maintain?
(Reference: AC 00-6A) (P.I.C.K3g.u) – *Handbook Recommendation*
A) Constant attitude and airspeed.
B) Constant angle of attack.
**C) Level flight attitude.**

(D) Review the FAA-CT-8080-XX series supplementary testing material to ensure that it is comprehensive and correct, and that it correlates to the relevant ACS and its associated guidance material.

(E) Submit the draft test question to the appropriate ACSWG test question subgroup for "boarding" (review) of content, construction, correctness, correlation to ACS/guidance, and coding.

(F) Add board-approved questions to the test question validation process.

# APPENDIX P: JOB AIDS FOR ACS TRANSITION

Appendix P includes sample Job Aids for use in the transition from each Practical Test Standards (PTS) to the applicable Airman Certification Standards (ACS). These tools were used by the ATST WG to construct each ACS document and track changes in the existing PTS and/or applicable guidance document(s).

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## ACS Transition Job Aids

The following job aids are included in this appendix:

- PVT-COM-ATP IFR ACS Task Comparison Matrix: The Task Comparison Matrix was developed as a tool for the ATST WG to track overlapping tasks across PTS (and subsequently ACS) documents. This tool allowed the members to build the original worksheet and populate overlapping ACS tasks, as well as ensure that overlapping task elements are harmonized and appropriate to the certificate/rating.
- Sample Tracking Matrix Template: The Airline Transport Pilot (ATP) Tracking Matrix is designed to track the tasks in the corresponding PTS (FAA-S-8081-4E, ATP for Airplane, Helicopter, and Powered Lift) during the transition to the ACS. Each complete ACS document will have a related tracking matrix to address any questions that arise during the coordination process and ensure that all relevant and current content is incorporated in the ACS worksheet.
- Sample ACS Worksheet: The ATP ACS Worksheet was built using the content from the original PTS and content from overlapping ACS documents (if applicable) to precede the ATP ACS task template where the new task (including knowledge, skills, and risk management elements) is developed. The template also allows the drafter to add applicable references and recommend Handbook changes. The worksheet data is preserved, and as the document evolves, the current guidance and overlapping guidance is eventually deleted to allow the drafter to finalize the new ACS task in the context of the new ACS document.

**NOTE:** The PVT-COM-ATP-IFR ACS Task Comparison Matrix, Sample Tracking Matrix Template (ATP), and Sample ACS Worksheet (ATP) are each included as a stand-alone document in the original format used by the ATST WG when the members started converting the ATP PTS to an ACS document.

**Private Pilot, Commercial Pilot, Airline Transport Pilot, Instrument Rating**
**ACS Task Comparison Matrix**

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| I.A. | Pilot Qualifications | I.A | Pilot Qualifications | | | I.A. | Pilot Qualifications |
| I.B. | Airworthiness Requirements | I.B. | Airworthiness Requirements | | | | |
| I.C. | Weather Information | I.C. | Weather Information | | | I.B. | Weather Information |
| I.D. | Cross-Country Flight Planning | I.D. | Cross-Country Flight Planning | | | I.C. | Cross-Country Flight Planning |
| I.E. | National Airspace System | I.E. | National Airspace System | | | | |
| | | | | I.A. | Equipment Examination | | |
| I.F. | Performance and Limitations | I.F. | Performance and Limitations | I.B. | Performance and Limitations | | |
| I.G. | Operation of Systems | I.G. | Operation of Systems | | | | |
| – | Water and Seaplane Characteristics (ASES) [SEPARATE ACS SECTION] | – | Water and Seaplane Characteristics (ASES) [SEPARATE ACS SECTION] | I.C. | Water and Seaplane Characteristics (ASES) | | |
| – | Seaplane BASES, Maritime Rules, and Aids to Maritime Navigation (ASES) [SEPARATE ACS SECTION] | – | Seaplane BASES, Maritime Rules, and Aids to Maritime Navigation (ASES) [SEPARATE ACS SECTION] | I.D. | Seaplane BASES, Maritime Rules, and Aids to Maritime Navigation (ASES) | | |
| I.H. | Human Factors | I.H. | Human Factors | | | | |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| | | | | | | II.A. | Aircraft Systems Related to IFR Operations |
| II.A. | Preflight Assessment | II.A. | Preflight Assessment | II.A. | Preflight Inspection (ASEL and ASES) | | |
| | | | | | | II.B. | Aircraft Flight Instruments and Navigation Equipment |
| | | | | II.B. | Powerplant Start | | |
| II.B. | Cockpit Management | II.B. | Cockpit Management | | | | |
| II.C. | Engine Starting | II.C. | Engine Starting | | | | |
| | | | | | | II.C. | Instrument Cockpit Check |
| II.D. | Taxiing | II.D. | Taxiing | II.C. | Taxiing | | |
| – | Taxiing and Sailing (ASES) [SEPARATE ACS SECTION] | – | Taxiing and Sailing (ASES) [SEPARATE ACS SECTION] | II.D. | Sailing (AMES/ASES) | | |
| – | Runway Incursion Avoidance (ASEL and ASES) [COMBINED/ABSORBED] | – | Runway Incursion Avoidance (ASEL and ASES) [COMBINED/ABSORBED] | | | | |
| II.E. | Before Takeoff Check | II.E. | Before Takeoff Check | | | | |
| III.A. | Radio Communications and ATC Light Signals | III.A. | Radio Communications and ATC Light Signals | | | | |
| III.B. | Traffic Patterns | III.B. | Traffic Patterns | | | | |
| – | Airport/Seaplane Base, Runway, and Taxiway Signs, Markings, and Lighting (ASEL and ASES) [COMBINED/ABSORBED] | – | Airport/Seaplane Base, Runway, and Taxiway Signs, Markings, and Lighting (ASEL and ASES) [COMBINED/ABSORBED] | II.E. | Seaplane Base/Water Landing Site Markings, and Lighting (ASEL and ASES) | | |
| | | | | II.F. | Pre-Takeoff Checks | | |
| | | | | | | III.A. | Air Traffic Control Clearances |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| | | | | | | III.B. | Compliance with Departure, En Route, and Arrival Procedures and Clearances |
| IV.A. | Normal Takeoff and Climb | IV.A. | Normal Takeoff and Climb | III.A. | Normal and Crosswind Takeoff (ASEL and ASES) | | |
| IV.B. | Normal Approach and Landing | IV.B. | Normal Approach and Landing | VI.A.* | Normal and Crosswind Approaches and Landings | | |
| IV.C. | Soft-Field Takeoff and Climb | IV.C. | Soft-Field Takeoff and Climb | | | | |
| IV.D. | Soft-Field Approach and Landing | IV.D. | Soft-Field Approach and Landing | | | | |
| IV.E. | Short-Field Takeoff and Maximum Performance Climb | IV.E. | Short-Field Takeoff and Maximum Performance Climb | | | | |
| IV.F. | Short-Field Approach and Landing | IV.F. | Short-Field Approach and Landing | | | | |
| – | Glassy Water Takeoff and Climb (ASES) [SEPARATE ACS SECTION] | – | Glassy Water Takeoff and Climb (ASES) [SEPARATE ACS SECTION] | III.B. | Glassy Water Takeoff and Climb (AMES/ASES) | | |
| – | Glassy Water Approach and Landing (ASES) [SEPARATE ACS SECTION] | – | Glassy Water Approach and Landing (ASES) [SEPARATE ACS SECTION] | VI.F.* | Glassy Water Approach and Landing (AMES/ASES) | | |
| – | Rough Water Takeoff and Climb (ASES) [SEPARATE ACS SECTION] | – | Rough Water Takeoff and Climb (ASES) [SEPARATE ACS SECTION] | III.C. | Rough Water Takeoff and Climb (AMES/ASES) | | |
| | | | | III.D. | Confined-Area Takeoff and Climb (AMES/ASES) | | |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| | | | | III.E. | Instrument Takeoff | | |
| | | | | III.F. | Powerplant Failure during Takeoff | | |
| | | | | III.G. | Rejected Takeoff | | |
| | | | | III.H. | Departure Procedures | | |
| – | Rough Water Approach and Landing (ASES) [SEPARATE ACS SECTION] | – | Rough Water Approach and Landing (ASES) [SEPARATE ACS SECTION] | VI.E.* | Rough Water Approach and Landing (AMES/ASES) | | |
| IV.G. | Forward Slip to Landing | | | | | | |
| | | – | Power-Off 180° Accuracy Approach and Landing (ASEL and ASES) [COMBINED/ABSORBED] | | | | |
| IV.H. | Go-Around/Rejected Landing | IV.G. | Go-Around/Rejected Landing | | | | |
| V.A. | Steep Turns | V.A. | Steep Turns | IV.A. | Steep Turns | | |
| | | | | IV.B. | Approaches to Stalls and Stall Recovery | | |
| | | | | IV.C. | Powerplant Failure - Multiengine Airplane | | |
| | | | | IV.D. | Powerplant Failure - Single-Engine Airplane | | |
| | | | | IV.E. | Specific Flight Characteristics | | |
| | | | | | | IV.A. | Basic Instrument Flight Maneuvers (IA, IH, PL, AA, HA, PLA, PC) |
| | | | | IV.F. | Recovery from Unusual Attitudes | IV.B.* | Recovery from Unusual Attitudes |
| | | | | V.A. | Standard Terminal Arrival/Flight Management System Procedures | | |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| | | | | V.B. | Holding | III.C.* | Holding Procedures |
| | | | | | | V.A. | Intercepting and Tracking Navigational Systems and DME Arcs |
| | | | | V.C. | Precision Approaches (PA) | VI.B.* | Precision Approaches (PA) |
| | | | | V.D. | Nonprecision Approaches (NPA) | VI.A. | Nonprecision Approaches (NPA) |
| | | | | V.E. | Circling Approach | VI.D.* | Circling Approach |
| | | | | V.F. | Missed Approach | VI.C. | Missed Approach |
| | | | | VI.B. | Landing from a Precision Approach | | |
| | | | | VI.C. | Approach and Landing with (Simulated) Powerplant Failure - Multiengine Airplane | | |
| | | | | VI.D. | Landing from a Circling Approach | VI.E. | Landing From a Straight-In or Circling Approach |
| | | | | VI.G. | Confined-Area Approach and Landing (AMES/ASES) | | |
| | | | | VI.H. | Rejected Landing | | |
| | | | | VI.I. | Landing from a No Flap or a Nonstandard Flap Approach | | |
| | | | | VII.A. | Normal and Abnormal Procedures | | |
| | | | | | | VII.A. | Loss of Communications |
| | | | | | | VII.B. | One Engine Inoperative During Straight-and-Level Flight and Turns (Multiengine Airplane) |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| | | | | | | VII.C. | One Engine Inoperative -- Instrument Approach (Multiengine Airplane) |
| | | | | | | VII.D. | Approach with Loss of Primary Flight Instrument Indicators |
| | | | | | | VIII.A. | Checking Instruments and Equipment |
| | | – | Steep Spirals (ASEL and ASES) [COMBINED/ABSORBED] | | | | |
| | | V.B. | Chandelles | | | | |
| | | V.C. | Lazy Eights | | | | |
| | | VI.A. | Eights on Pylons | | | | |
| V.B. | Ground Reference Maneuvers [NEW TASK] | | | | | | |
| – | Rectangular Course [COMBINED/ABSORBED] | | | | | | |
| – | S-Turns [COMBINED/ABSORBED] | | | | | | |
| – | Turns Around a Point [COMBINED/ABSORBED] | | | | | | |
| VI.A. | Pilotage and Dead Reckoning | VII.A. | Pilotage and Dead Reckoning | | | | |
| VI.B. | Navigation Systems and Radar Services | VII.B. | Navigation Systems and Radar Services | | | | |
| VI.C. | Diversion | VII.C. | Diversion | | | | |
| VI.D. | Lost Procedures | VII.D. | Lost Procedures | | | | |
| VII.A. | Maneuvering During Slow Flight | VIII.A. | Maneuvering During Slow Flight | | | | |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| VII.B. | Power-Off Stalls | VIII.B. | Power-Off Stalls | | | | |
| VII.C. | Power-On Stalls | VIII.C. | Power-On Stalls | | | | |
| | | VIII. D. | Accelerated Stalls | | | | |
| VII.D. | Spin Awareness | VIII.E. | Spin Awareness | | | | |
| – | Straight-and-Level Flight [COMBINED/ABSORBED] | | | | | | |
| – | Constant Airspeed Climbs [COMBINED/ABSORBED] | | | | | | |
| – | Constant Airspeed Descents [COMBINED/ABSORBED] | | | | | | |
| – | Turns to Headings [COMBINED/ABSORBED] | | | | | | |
| – | Recovery from Unusual Flight Attitudes [COMBINED/ABSORBED] | | | | | | |
| – | Radio Communications, Navigation Systems/Facilities, and Radar Services [COMBINED/ABSORBED] | | | | | | |
| VIII.A. | Inadvertent IMC [NEW TASK] | | | | | | |
| – | Emergency Descent (ASEL and ASES) [COMBINED/ABSORBED] | – | Emergency Descent (ASEL and ASES) [COMBINED/ABSORBED] | VIII.A.** | Emergency Procedures | | |
| VIII.B. | Emergency Approach and Lading (Simulated) | IX.A. | Emergency Approach and Landing (Simulated) | VIII.A.** | Emergency Procedures | | |
| VIII.C. | Systems and Equipment Malfunctions | IX.B. | Systems and Equipment Malfunctions | VIII.A.** | Emergency Procedures | | |

| PVT Task Ref. | Name of PVT ACS Task | COMM Task Ref. | Name of COMM PTS Task | ATP PTS Task Ref. | Name of ATP PTS Task | IFR Task Ref. | Name of IFR ACS Task |
|---|---|---|---|---|---|---|---|
| VIII.D. | Emergency Equipment and Survival Gear | IX.C. | Emergency Equipment and Survival Gear | VIII.A.** | Emergency Procedures | | |
| | | X.A. | Supplemental Oxygen | | | | |
| | | X.B. | Pressurization | | | | |
| IX.A. | Night Preparation | | | | | | |
| X.A. | After Landing, Parking, and Securing | XI.A. | After Landing, Parking, and Securing | IX.A. and IX.F.*** | After-landing Procedures and Parking and Securing | | |
| – | Anchoring (ASES) [SEPARATE ACS SECTION] | – | Anchoring (ASES) [SEPARATE ACS SECTION] | IX.B. | Anchoring (AMES/ASES) | | |
| – | Docking and Mooring (ASES) [SEPARATE ACS SECTION] | – | Docking and Mooring (ASES) [SEPARATE ACS SECTION] | IX.C. | Docking and Mooring (AMES/ASES) | | |
| – | Ramping/Beaching (ASES) [SEPARATE ACS SECTION] | – | Ramping/Beaching (ASES) [SEPARATE ACS SECTION] | IX.D and IX.E.*** | Beaching (AMES/ASES) and Ramping (AMES/ASES) | | |

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| **PVT -COMM-IFR Overlap** |
| **PVT-COMM-ATP Overlap** |
| **PVT-COMM Overlap** |
| **IFR-ATP Overlap** |

* NOTE: Tasks within ATP PTS Areas of Operation & IFR ACS Areas of Operation may be slightly out of numerical order in order to align tasks with other ACS documents.
** NOTE: Single Emergency Procedures Task in ATP PTS - task repeated in Tracking Matrix to align with other ACS documents.
*** NOTE: Tasks are separated in ATP PTS - Combined in Tracking Matrix to align tasks with other ACS documents.

**FAA-S-8081-4E, ATP for Airplane, Helicopter, and Powered Lift**
**Change Tracking Matrix**

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| I.A. | Equipment Examination | | | |
| I.B. | Performance and Limitations | | | |
| I.C. | Water and Seaplane Characteristics (AMES/ASES) | | | |
| I.D. | Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (AMES/ASES) | | | |
| II.A. | Preflight Inspection | | | |
| II.B. | Powerplant Start | | | |
| II.C. | Taxiing | | | |
| II.D. | Sailing (AMES/ASES) | | | |
| II.E. | Seaplane Base/Water Landing Site Markings and Lighting (AMES/ASES) | | | |
| II.F. | Pre-Takeoff Checks | | | |
| III.A. | Normal and Crosswind Takeoff | | | |
| III.B. | Glassy Water Takeoff and Climb (AMES/ASES) | | | |
| III.C. | Rough Water Takeoff and Climb (AMES/ASES) | | | |
| III.D. | Confined Area Takeoff and Climb (AMES/ASES) | | | |
| III.E | Instrument Takeoff | | | |
| III.F. | Powerplant Failure during Takeoff | | | |
| III.G. | Rejected Takeoff | | | |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| III.H | Departure Procedures | | | |
| IV.A. | Steep Turns | | | |
| IV.B. | Approaches to Stalls and Stall Recovery | | | |
| IV.C. | Powerplant Failure – Multiengine Airplane | | | |
| IV.D. | Powerplant Failure – Single-Engine Airplane | | | |
| IV.E. | Specific Flight Characteristics | | | |
| IV.F. | Recovery from Unusual Attitudes | | | |
| V.A. | Standard Terminal Arrival/Flight Management System Procedures | | | |
| V.B. | Holding | | | |
| V.C. | Precision Approaches (PA) | | | |
| V.D. | Nonprecision Approaches (NPA) | | | |
| V.E. | Circling Approach | | | |
| V.F. | Missed Approach | | | |
| VI.A. | Normal and Crosswind Approaches and Landings | | | |
| VI.B. | Landings from a Precision Approach | | | |
| VI.C. | Approach and Landing with (Simulated) Powerplant Failure—Multiengine Airplane | | | |
| VI.D. | Landing From a Circling Approach | | | |
| VI.E. | Rough Water Approach and Landing (AMES/ASES) | | | |
| VI.F. | Glassy Water Approach And Landing (AMES/ASES) | | | |

| PTS Task Reference | Name of PTS Task | ACS Task Reference | Name of ACS Task | Notes |
|---|---|---|---|---|
| VI.G. | Confined-Area Approach and Landing (AMES/ASES) | | | |
| VI.H. | Rejected Landing | | | |
| VI.I. | Landing from a No Flap or a Nonstandard Flap Approach | | | |
| VII.A. | Normal and Abnormal Procedures | | | |
| VIII.A. | Emergency Procedures | | | |
| IX.A. | After-Landing Procedures | | | |
| IX.B. | Anchoring | | | |
| IX.C. | Docking and Mooring (AMES/ASES) | | | |
| IX.D. | Beaching (AMES/ASES) | | | |
| IX.E. | Ramping (AMES/ASES) | | | |
| IX.F. | Parking and Securing | | | |

Current ATP PTS

TASK: I. A. Equipment Examination

REFERENCES: AC 20-29, AC 20-117, AC 91-43, AC 91-51, AC 91-74, AC 120-60, AC 135-17, 14 CFR part 61; POH; AFM.

Objective: To determine that the applicant:

1. Exhibits satisfactory knowledge appropriate to the airplane; its systems and components; its normal, abnormal, and emergency procedures; and uses the correct terminology with regard to the following items—
   a. landing gear—extension/retraction system(s); indicators, float devices, brakes, antiskid, tires, nose-wheel steering, and shock absorbers.
   b. powerplant—controls and indications, induction system, carburetor and fuel injection, turbocharging, cooling, fire detection/protection, mounting points, turbine wheels, compressors, deicing, anti-icing, and other related components.
   c. propellers—type, controls, feathering/unfeathering, auto- feather, negative torque sensing, synchronizing, and synchrophasing.
   d. fuel system—capacity; drains; pumps; controls; indicators; cross-feeding; transferring; jettison; fuel grade, color and additives; fueling and defueling procedures; and fuel substitutions, if applicable.
   e. oil system—capacity, grade, quantities, and indicators.
   f. hydraulic system—capacity, pumps, pressure, reservoirs, grade, and regulators.
   g. electrical system—alternators, generators, battery, circuit breakers and protection devices, controls, indicators, and external and auxiliary power sources and ratings.
   h. environmental systems—heating, cooling, ventilation, oxygen and pressurization, controls, indicators, and regulating devices.
   i. avionics and communications—autopilot; flight director; Electronic Flight Instrument Systems (EFIS); Flight Management System(s) (FMS); Doppler Radar; Inertial Navigation Systems (INS); Global Positioning System/ Wide Area Augmentation System/Local Area Augmentation System (GPS/WAAS/LAAS); VOR, NDB, ILS, GLS, RNAV systems and components; traffic (MLS deleted) awareness/warning/avoidance systems, terrain awareness/warning/alert systems; other avionics or communications equipment, as appropriate; indicating devices; transponder; and emergency locator transmitter.
   j. ice protection—anti-ice, deice, pitot-static system protection, propeller, windshield, wing and tail surfaces.
   k. crewmember and passenger equipment—oxygen system, survival gear, emergency exits, evacuation procedures and crew duties, and quick donning oxygen mask for crewmembers and passengers.
   l. flight controls—ailerons, elevator(s), rudder(s), control tabs, balance tabs, stabilizer, flaps, spoilers, leading edge flaps/slats and trim systems.
   m. pitot-static system with associated instruments and the power source for the flight instruments.
2. Exhibits satisfactory knowledge of the contents of the POH or AFM with regard to the systems and components listed in paragraph 1 (above); the Minimum Equipment List (MEL) and/or configuration deviation list (CDL), if appropriate; and the operations specifications, if applicable.

Recommended ATP ACS Guidance

| **Area of Operation** | **Preflight Preparation** |
|---|---|
| **Task** | ***Equipment Examination*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |

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| **Area of Operation** | **Preflight Preparation** |
| **Task** | ***Equipment Examination*** |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: I. B. Performance and Limitations

REFERENCE: 14 CFR parts 1, 61, 91; AFD; POH; AFM; AIM; AC 20-117, AC 91-51, AC 91-74, AC 91-79, AC 120-27; AC 120-60, AC 135-17 FAA-H-8083-1, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25.

Objective. To determine that the applicant:

1. Exhibits satisfactory knowledge of performance and limitations, including a thorough knowledge of the adverse effects of exceeding any limitation.
2. Demonstrates proficient use of (as appropriate to the airplane) performance charts, tables, graphs, or other data relating to items, such as—
   a. Departure airport, taxiway, and runway NOTAMs, runway usable lengths, HOT Spots, taxi restrictions, specific taxi procedures, as applicable, and signage/markings
   b. accelerate-stop distance.
   c. accelerate-go distance.
   d. takeoff performance—all engines and with engine(s) inoperative.
   e. climb performance including segmented climb performance with all engines operating—with one or more engine(s) inoperative, and with other engine malfunctions as may be appropriate.
   f. service ceiling—all engines, with engines(s) inoperative, including drift down, if appropriate.
   g. cruise performance.
   h. fuel consumption, range, and endurance.
   i. descent performance.
   j. Arrival airport, taxiway, and runway NOTAMs, runway usable lengths, HOT Spots, tax restrictions, specific tax procedures as applicable, and signage/markings.
   k. landing distance.
   l. land and hold short operations (LAHSO).
   m. go-around from rejected landings (landing climb).
   n. other performance data (appropriate to the airplane).
3. Describes (as appropriate to the airplane) the airspeeds used during specific phases of flight.
4. Describes the effects of meteorological conditions upon performance characteristics and correctly applies these factors to a specific chart, table, graph, or other performance data.
5. Computes the center-of-gravity location for a specific load condition (as specified by the examiner), including adding, removing, or shifting weight.
6. Determines if the computed center-of-gravity is within the forward and aft center-of-gravity limits, and that lateral fuel balance is within limits for takeoff and landing.
7. Demonstrates adequate knowledge of the adverse effects of airframe icing during pre-takeoff, takeoff, cruise and landing phases of flight and corrective actions.
8. Demonstrates adequate knowledge of procedures for wing contamination recognition and adverse effects of airframe icing during pre-takeoff, takeoff, cruise, and landing phases of flight. (Pilots applying for an aircraft type rating should have adequate knowledge of icing procedures and/or available information published by the manufacturer that is specific to that type of aircraft.)
9. Demonstrates good planning and knowledge of procedures in applying operational factors affecting airplane performance.
10. Demonstrates knowledge of the stabilized approach procedures and the decision criteria for go-around or rejected landings.

## COMM Recommended ACS Guidance

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| **Area of Operation** | **I. Preflight Preparation** |
| **Task** | **F. *Performance and Limitations*** |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with operating an aircraft safely within the parameters of the aircraft performance capabilities and limitations. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Elements related to performance and limitations (takeoff and landing, crosswind and headwind, density altitude, glide performance, weight and balance, climb, cruise, descent) by explaining the use of charts, tables, and data to determine performance.<br>2. Factors affecting performance to include atmospheric conditions, pilot technique and aircraft condition, airport environment.<br>3. Effects of loading on performance<br>4. Effects of exceeding weight and balance limits.<br>5. Effects of weight and balance changes over the course of the flight.<br>6. Aerodynamics. |

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| **Area of Operation** | **I. Preflight Preparation** |
| **Task** | **F. *Performance and Limitations*** |
| **Skills** | The applicant demonstrates the ability to:<br>1. Given scenario, compute weight and balance, including practical techniques to resolve out-of-limits calculations.<br>2. Use aircraft manufacturer's approved performance charts, tables, and data to determine takeoff, climb, cruise, fuel consumption, descent and landing performance.<br>3. Evaluate takeoff and landing performance based on the values calculated.<br>4. Evaluate environmental conditions. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Performance charts.<br>2. Exceeding limitations.<br>3. Variations in flight performance resulting in weight and balance changes during flight.<br>4. Applying published aircraft performance data to expected performance. |
| **Rationale for Changes** | Removed (ASEL and ASES) from name of task & removed AC 61-84 (obsolete) from Reference. |

Recommended ATP ACS Guidance

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|---|---|
| **Area of Operation** | **Preflight Preparation** |
| **Task** | ***Performance and Limitations*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: I. C. Water and Seaplane Characteristics (AMES/ASES)

REFERENCE: 14 CFR part 61; FAA-H-8083-3, FAA-H-8083-23.

Objective. To determine that the applicant exhibits knowledge of the elements related to water and seaplane characteristics by explaining:

1. The characteristics of a water surface as affected by features, such as—
   a. size and location
   b. direction and strength of the water current
   c. presence of floating and partially submerged debris.
   d. protected and unprotected areas
   e. effect of surface wind and method of determining its force
   f. operating near sandbars, islands, and shoals
   g. other pertinent characteristics deemed important by the examiner
2. Float and hull construction and their effect on seaplane/flying boat performance.
3. Causes of porpoising and skipping, and pilot action to prevent or correct these occurrences.

Recommended ATP ACS Guidance

| **Area of Operation** | **Preflight Preparation** |
|---|---|
| **Task** | ***Water and Seaplane Characteristics*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

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| TASK: I. D. Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (AMES/ASES)<br>REFERENCE: AIM; FAA-H-8083-3, FAA-H-8083-23.<br>Objective. To determine that the applicant exhibits satisfactory knowledge of the elements related to seaplane bases, maritime rules, and aids to marine navigation by explaining:<br>1. How to identify and locate seaplane bases on charts or in directories.<br>2. Operating restrictions at seaplane bases.<br>3. Right-of-way, steering, and sailing rules pertinent to seaplane operation.<br>4. Purpose and identification of marine navigation aids, such as buoys, beacons, lights, and range markers.<br>5. Naval Vessel Protection Zones.<br>6. No Wake Zones. |

Recommended ATP ACS Guidance

| **Area of Operation** | **Preflight Preparation** |
|---|---|
| **Task** | ***Seaplane Bases, Maritime Rules, and Aids to Marine Navigation*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: II. A. Preflight Inspection

REFERENCE: 14 CFR parts 61, 91; POH/AFM; AC 20-29, AC 20-117, AC 61-84, AC 91-43, AC-51, AC 91-74, AC 120-27, AC 120-60, AC 135-17.

NOTE: If a flight engineer (FE) is a required crewmember for a particular type airplane, the actual visual inspection may be waived. The actual visual inspection may be replaced by using an approved pictorial means that realistically portrays the location and detail of inspection items. On airplanes requiring an FE, an applicant must demonstrate satisfactory knowledge of the FE functions for the safe completion of the flight if the FE becomes ill or incapacitated during a flight.

Objective. To determine that the applicant:

1. Exhibits satisfactory knowledge of the preflight inspection procedures, while explaining briefly—
    a. the purpose of inspecting the items which must be checked.
    b. how to detect possible defects.
    c. the corrective action to take.
2. Exhibits satisfactory knowledge of the operational status of the airplane by locating and explaining the significance and importance of related documents, such as—
    a. airworthiness and registration certificates.
    b. operating limitations, handbooks, and manuals.
    c. minimum equipment list (MEL), if appropriate.
    d. weight and balance data.
    e. maintenance requirements, tests, and appropriate records applicable to the proposed flight or operation; and maintenance that may be performed by the pilot or other designated crewmember.
3. Uses the appropriate checklist or coordinates with crew to ensure completion of checklist items in a timely manner and as recommended by the manufacturer or approved method to inspect the airplane externally and internally.
4. Verifies the airplane is safe for flight by emphasizing (as appropriate) the need to look at and explain the purpose of inspecting items, such as—
    a. powerplant, including controls and indicators.
    b. fuel quantity, grade, type, contamination safeguards, and servicing procedures.
    c. oil quantity, grade, and type. d. hydraulic fluid quantity, grade, type, and servicing procedures.
    e. oxygen quantity, pressures, servicing procedures, and associated systems and equipment for crew and passengers.
    f. hull, landing gear, float devices, brakes, steering system, winglets, and canards.
    g. tires for condition, inflation, and correct mounting, where applicable.
    h. fire protection/detection systems for proper operation, servicing, pressures, and discharge indications.
    i. pneumatic system pressures and servicing.
    j. ground environmental systems for proper servicing and operation.
    k. auxiliary power unit (APU) for servicing and operation.
    l. flight control systems including trim, spoilers, and leading/trailing edge.
    m. anti-ice, deice systems, servicing, and operation.
    n. installed and auxiliary aircraft security equipment, as appropriate.
5. Coordinates with ground crew and ensures adequate clearance prior to moving any devices, such as door, hatches, and flight control surfaces.
6. Complies with the provisions of the appropriate operations specifications, if applicable, as they pertain to the particular airplane and operation.
7. Demonstrates proper operation of all applicable airplane systems.
8. Notes any discrepancies, determines if the airplane is airworthy and safe for flight, or takes the proper corrective action, and acknowledges limitations imposed by MEL/CDL items.
9. Checks the general area around the airplane for hazards to the safety of the airplane and personnel.
10. Ensures that the airplane and surfaces are free of ice, snow, and has satisfactory knowledge of deicing procedures, if icing conditions were present or ice was found.

COMM Recommended ACS Guidance

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| **Area of Operation** | **II. Preflight Procedures** |
| **Task** | **A. *Preflight Assessment*** |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with preparing for safe flight accounting for pilot, aircraft, environment, and external factors. |

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| **Area of Operation** | **II. Preflight Procedures** |
| **Task** | **A. *Preflight Assessment*** |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Pilot self-assessment.<br>2. Determining an appropriate aircraft for the mission by considering sufficient load, range, equipment, and altitude capability.<br>3. Aircraft preflight inspection including which items must be inspected, the reasons for checking each item, and how to detect possible defects, and the associated regulations.<br>4. Environmental factors including weather and flight plan (terrain, route selection, obstructions).<br>5. External pressures. |
| **Skills** | The applicant demonstrates the ability to:<br>1. Use checklist to systematically identify and manage pilot-related risks and personal minimums associated with the flight.<br>2. Inspect the airplane with reference to an appropriate checklist.<br>3. Verify the airplane is airworthy and in condition for safe flight.<br>4. Assess the factors related to the environment (weather, airports, terrain, airspace). |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Environmental factors.<br>2. External pressures.<br>3. Aviation security concerns. |
| **Rationale for Changes** | Remove (ASEL and ASES) from name of task & change name of task to *Preflight Assessment* to capture risk management aspect of preflight planning. |

Recommended ATP ACS Guidance

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|---|---|
| **Area of Operation** | **Preflight Preparation** |
| **Task** | ***Preflight Assessment*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |

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|---|---|
| **Area of Operation** | **Preflight Preparation** |
| **Task** | ***Preflight Assessment*** |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: II. B. Powerplant Start

REFERENCE: 14 CFR part 61; POH/AFM

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the correct powerplant start procedures including the use of an auxiliary power unit (APU) or external power source, starting under various atmospheric conditions, normal and abnormal starting limitations, and the proper action required in the event of a malfunction.
2. Ensures the ground safety procedures are followed during the before-start, start, and after-start phases.
3. Ensures the use of appropriate ground crew personnel during the start procedures.
4. Performs all items of the start procedures by systematically following the approved checklist procedure in a timely manner and as recommended by the manufacturer for the before-start, start, and after-start phases.
5. Demonstrates sound judgment and operating practices in those instances where specific instructions or checklist items are not published.

Recommended ATP ACS Guidance

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|---|---|
| **Area of Operation** | **Preflight Procedures** |
| **Task** | ***Powerplant Start*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: II. C. Taxiing

REFERENCE: 14 CFR part 61; POH/AFM; AC 91-73, AC 120-57, AC 120-74

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of safe taxi procedures (as appropriate to the airplane including push-back or powerback, as may be applicable).
2. Demonstrating and explaining procedures for holding the pilot's workload to a minimum during taxi operations .
3. Exhibiting taxi operation planning procedures, such as recording taxi instructions, reading back taxi clearances, and reviewing taxi routes on the airport diagram.
4. Demonstrating procedures to insure that clearance or instructions that are actually received are adhered to rather than the ones expected to be received.
5. Know, explain and discuss the hazards of low visibility operations.
6. Demonstrates proficiency by maintaining correct and positive airplane control. In airplanes equipped with float devices, this includes water taxiing, sailing, step taxiing, approaching a buoy, and docking.
7. Maintains proper spacing on other aircraft, obstructions, and persons.
8. Accomplishes the applicable checklist items or ensures all required checks as required by the appropriate checklist items are accomplished in a timely manner and as recommended by the manufacturer, and performs recommended procedures.
9. Maintains desired track and speed.
10. Complies with instructions issued by ATC (or the examiner simulating ATC).
11. Observes runway hold lines, localizer and glide slope critical areas, buoys, beacons, and other surface control and lighting.
12. Maintains constant vigilance and airplane control during taxi operation to prevent runway/waterway incursion.
13. Demonstrating and/or explaining procedural differences for night operations.
14. Demonstrating and explaining the use(s) of aircraft exterior lighting and differences for day and night operations.

COMM Recommended ACS Guidance

| **Area of Operation** | **II. Preflight Procedures** |
|---|---|
| **Task** | **D. *Taxiing*** |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with safe taxi operations, including runway incursion avoidance. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Positioning aircraft controls for wind.<br>2. Airport markings (including hold short lines), signs, and lights.<br>3. Aircraft lighting.<br>4. Towered and non-towered airport operations.<br>5. Visual indicators for wind.<br>6. Airport information resources (A/FD, airport diagram).<br>7. Good cockpit discipline during taxi, including maintaining a sterile cockpit, proper speed, separation between other aircraft and vehicles, communication procedures.<br>8. Procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of HOT SPOTS, communicating and coordinating with ATC.<br>9. Rules for entering or crossing runways.<br>10. Procedures unique to night operations.<br>11. Hazards of low visibility operations. |
| **Skills** | The applicant demonstrates the ability to:<br>1. Perform a brake check immediately after the airplane begins moving.<br>2. Position the flight controls properly for the existing wind conditions.<br>3. Control direction and speed without excessive use of brakes.<br>4. Exhibit procedures for steering, maneuvering, maintaining taxiway, runway position, and situational awareness to avoid runway incursions.<br>5. Exhibit proper positioning of the aircraft relative to hold lines.<br>6. Exhibit procedures to ensure clearances/instructions are received, recorded, and read back correctly.<br>7. Exhibit situational awareness and taxi procedures in the event the aircraft is on a taxiway that is between parallel runways.<br>8. Use a taxi chart during taxi.<br>9. Comply with airport/taxiway markings, signals, ATC clearances and instructions.<br>10. Utilize procedures for eliminating pilot distractions to avoid other aircraft or vehicles and hazards. |

| Area of Operation | II. Preflight Procedures |
|---|---|
| Task | D. *Taxiing* |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Distractions during aircraft taxi.<br>2. Proper workload management.<br>3. Confirmation or expectation bias.<br>4. Recording taxi instructions/clearances<br>5. Resource management. |
| Rationale for Changes | Removed (ASEL) from name of task & absorbed Runway Markings, Signs and Lighting (Task III.C.) and Runway Incursion Avoidance (Task II.F.). Added A/FD, FAA-H-8083-25, AC 91-73, AC 150-5340-18 to References. |

Recommended ATP ACS Guidance

| Area of Operation | Preflight Procedures |
|---|---|
| Task | *Taxiing* |
| Reference | |
| Airman Test Report | Pending |
| Objective | |
| Knowledge | The applicant demonstrates understanding of:<br>1. |
| Skills | The applicant demonstrates the ability to:<br>1. |
| Risk Management | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| Rationale for Changes | |
| Sample Questions | |
| Recommendation for Handbook Revisions | |

Current ATP PTS

TASK: II. D. Sailing (AMES/ASES)

REFERENCE: POH/AFM; AIM; FAA-H-8083-3, FAA-H-8083-23.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to sailing by explaining the techniques used in this procedure.
2. Recognizes the circumstance when sailing should be used.
3. Plans and follows the most favorable course considering wind, water current, obstructions, debris, and other vessels.
4. Uses flight controls, flaps, doors, and water rudders, as appropriate, to follow the desired course.

Recommended ATP ACS Guidance

| **Area of Operation** | **Preflight Procedures** |
|---|---|
| **Task** | ***Sailing*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

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| TASK: II. E. Seaplane Base/Water Landing Site Markings and Lighting (AMES/ASES)<br>REFERENCE: AIM; FAA-H-8083-3, FAA-H-8083-23<br>Objective. To determine that the applicant:<br>1. Exhibits knowledge of the elements related to seaplane base/water landing site markings and lighting.<br>2. Identifies and interprets seaplane base/water landing site markings and lighting. |

Recommended ATP ACS Guidance

| **Area of Operation** | **Preflight Procedures** |
|---|---|
| **Task** | ***Seaplane Base/Water Landing Site Markings and Lighting (AMES, ASES)*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: II. F. Pre-Takeoff Checks

REFERENCE: 14 CFR part 61; POH/AFM; AC 91-74, AC 120-60, AC 120-117.

Objective. To determine that the applicant:

1. Exhibits satisfactory knowledge of the pre-takeoff checks by stating the reason for checking the items outlined on the approved checklist and explaining how to detect possible malfunctions.
2. Divides attention properly inside and outside cockpit.
3. Ensures that all systems are within their normal operating range prior to beginning, during the performance of, and at the completion of those checks required by the approved checklist.
4. Explains, as may be requested by the examiner, any normal or abnormal system-operating characteristic or limitation; and the corrective action for a specific malfunction.
5. Determines if the airplane is safe for the proposed flight or requires maintenance.
6. Determines the airplane's takeoff performance, considering such factors as wind, density altitude, weight, temperature, pressure altitude, and runway/waterway condition and length.
7. Determines airspeeds/V-speeds and properly sets all instrument references, configures flight director and autopilot controls, and navigation and communications equipment to properly fly the aircraft in accordance with the ATC clearance.
8. Reviews procedures for emergency and abnormal situations, which may be encountered during takeoff, and states the corrective action required of the pilot in command and other concerned crewmembers.
9. Obtains and correctly interprets the takeoff and departure clearance as issued by ATC.

Recommended ATP ACS Guidance

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|---|---|
| **Area of Operation** | **Preflight Procedures** |
| **Task** | ***Pre-Takeoff Checks*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. A. Normal and Crosswind Takeoff

REFERENCE: 14 CFR part 61; POH/AFM; FAA-H-8083-3; AC 20-117, AC 91-54, AC 91-74.

NOTE: VMC maneuver

Objective. To determine that the applicant:

1. Exhibits knowledge of normal and crosswind takeoffs and climbs including (as appropriate to the airplane) airspeeds, configurations, and emergency/abnormal procedures.
2. Notes any surface conditions, obstructions, aircraft cleared for LAHSO, or other hazards that might hinder a safe takeoff.
3. Verifies and correctly applies correction for the existing wind component to the takeoff performance.
4. Coordinates with crew (if crew served airplane) to ensure completion or completes required checks prior to starting takeoff to verify the expected powerplant performance. Performs or ensures all required pre-takeoff checks as required by the appropriate checklist items are accomplished in a timely manner and as recommended by the manufacturer.
5. Aligns the airplane on the runway centerline or clear of obstacles and vessels on waterways as appropriate.
6. Applies the controls correctly to maintain longitudinal alignment on the centerline of the runway, if appropriate, prior to initiating and during the takeoff.
7. Adjusts the powerplant controls as recommended by the FAA-approved guidance for the existing conditions.
8. Monitors powerplant controls, settings, and instruments during takeoff to ensure all predetermined parameters are maintained.
9. Adjusts the controls to attain the desired pitch attitude at the predetermined airspeed/V-speed to attain the desired performance for the particular takeoff segment.
10. Performs the required pitch changes and, as appropriate, performs or calls for and verifies the accomplishment of, gear and flap retractions, power adjustments, and other required pilot-related activities at the required airspeed/V speeds within the tolerances established in the POH or AFM.
11. Uses the applicable noise abatement and wake turbulence avoidance procedures, as required.
12. Accomplishes, or calls for and verifies the accomplishment of, the appropriate checklist items in a timely manner and as recommended by the manufacturer.
13. Maintains the appropriate climb segment airspeed/V speeds.
14. Maintains the desired heading, ±5°, and the desired airspeed (V-speed), ±5 knots (of the appropriate V-speed range).

COMM Recommended ACS Guidance

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|---|---|
| **Area of Operation** | **IV. Takeoffs, Landings, and Go-Arounds** |
| **Task** | **A. *Normal Takeoff and Climb*** |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, skills and risk management associated with a normal takeoff, climb operations, and rejected takeoff procedures.<br><br>NOTE: If a crosswind condition does not exist, the applicant's knowledge of crosswind elements shall be evaluated through oral testing. |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. Takeoff distance.<br>2. Takeoff power.<br>3. Wind conditions and effects.<br>4. Minimum safe altitude.<br>5. Density altitude.<br>6. Headwind, tailwind, crosswind component.<br>7. Application of $V_X$ or $V_Y$.<br>8. Emergency procedures during takeoff and climb. |

| | |
|---|---|
| **Area of Operation** | **IV. Takeoffs, Landings, and Go-Arounds** |
| **Task** | **A. *Normal Takeoff and Climb*** |
| **Skills** | The applicant demonstrates the ability to:<br>1. Verify ATC clearance and no aircraft is on final before entering the runway.<br>2. Ensure the aircraft is on the correct takeoff runway.<br>3. Ascertain wind direction with or without visible wind direction indicators.<br>4. Calculate if crosswind component is above his or her ability or that of the aircraft's capability.<br>5. Position the flight controls for the existing wind conditions.<br>6. Clear the area; taxi into the takeoff position and align the airplane on the runway center.<br>7. Confirm takeoff power, and proper engine instrument indications prior to rotation.<br>8. Rotate and lift off at the recommended airspeed and accelerates to $V_Y$.<br>9. Establish a pitch attitude and trim condition that will maintain $V_Y$ $\pm$5 knots.<br>10. Retract the landing gear and flaps in accordance with manufacturer guidance.<br>11. Maintain takeoff power and $V_Y$ $\pm$5 knots to a safe maneuvering altitude.<br>12. Maintain directional control and proper wind-drift correction throughout the takeoff and climb.<br>13. Comply with noise abatement and published departure procedures.<br>14. Complete the appropriate checklist.<br>15. Use proper emergency procedures during takeoff and climb, according to the manufacturer. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. Selection of runway based on wind, pilot capability, and aircraft limitations.<br>2. Determining if crosswind component exceeds pilot ability or aircraft capability.<br>3. Windshear.<br>4. Tailwinds.<br>5. Wake turbulence.<br>6. Go/no go decision making.<br>7. Task management.<br>8. Low altitude maneuvering.<br>9. Obstacle and wire strike avoidance.<br>10. Minimum safe altitude for climb.<br>11. Situational awareness of obstacles on departure path.<br>12. Recognition of need for rejected takeoff.<br>13. Handling engine failure during takeoff and climb. |
| **Rationale for Changes** | Changed name of task to *Normal Takeoff and Climb* because there are three kinds of approaches and landings (normal, short-field, soft-field) & removed ASES reference (FAA-H-8083-23). |

Recommended ATP ACS Guidance

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|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Normal and Crosswind Takeoff*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Normal and Crosswind Takeoff*** |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. B. Glassy Water Takeoff and Climb (AMES/ASES)

REFERENCE: POH/AFM; FAA-H-8083-3, FAA-H-8083-23.

NOTE If a glassy water condition does not exist, the applicant's satisfactory knowledge of glassy water elements must be evaluated through oral testing. The applicant's skill must be evaluated by simulating the Task.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to a glassy water takeoff and climb.
2. Positions the flight controls and flaps for the existing conditions.
3. Clears the area, notes any surface hazards and/or vessels prior to selecting a takeoff path.
4. Retracts the water rudders, if applicable.
5. Advances the throttles to takeoff power.
6. Avoids excessive water spray on the propellers.
7. Establishes and maintains an appropriate planing attitude, directional control, and corrects for porpoising, skipping, and increases in water drag.
8. Utilizes appropriate techniques to lift seaplane from the water surface.
9. Establishes proper attitude/airspeed, lifts off and accelerates to best single-engine climb speed or VY, whichever is greater, ±5 knots during the climb.
10. Reduces the flaps after a positive rate of climb is established and at a safe altitude.
11. Maintains takeoff power to a safe maneuvering altitude, then sets climb power.
12. Maintains directional control and proper wind-drift correction throughout takeoff and climb.
13. Uses noise abatement procedures, as required.
14. Completes appropriate checklists or ensures all required checks as required by the appropriate checklist items are accomplished in a timely manner and as recommended by the manufacturer.

Recommended ATP ACS Guidance

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|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Glassy Water Takeoff and Climb*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Glassy Water Takeoff and Climb*** |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. C. Rough Water Takeoff and Climb (AMES/ASES)

REFERENCE: POH/AFM; FAA-H-8083-3, FAA-H-8083-23.

NOTE: If a rough water condition does not exist, the applicant's satisfactory knowledge of rough water elements must be evaluated through oral testing. The applicant's skill must be evaluated by simulating the Task.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to rough water takeoff and climb.
2. Positions the flight controls and flaps for the existing conditions.
3. Clears the area, selects the proper takeoff path, considering wind, swells, surface hazards and/or vessels.
4. Retracts the water rudders, if applicable.
5. Advances the throttles to takeoff power.
6. Avoids excessive water spray on the propellers.
7. Establishes and maintains an appropriate planing/lift-off attitude, directional control, and corrects for porpoising, skipping, or excessive bouncing.
8. Establishes and maintains proper attitude to lift-off at minimum airspeed and accelerates to best single-engine climb speed or VY, whichever is greater, ±5 knots before leaving ground effect.
9. Retracts the flaps after a positive rate of climb is established and at a safe altitude.
10. Maintains takeoff power to a safe maneuvering altitude, then sets climb power.
11. Maintains directional control and proper wind-drift correction throughout takeoff and climb.
12. Uses noise abatement procedures, as required.
13. Completes appropriate checklists or coordinates with crew to ensure completion of checklist items in a timely manner and as recommended by the manufacturer.

Recommended ATP ACS Guidance

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Rough Water Takeoff and Climb*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Rough Water Takeoff and Climb*** |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. D. Confined Area Takeoff and Climb (AMES/ASES)

REFERENCE: POH/AFM; FAA-H-8083-3, FAA-H-8083-23.

NOTE: This Task simulates a takeoff from a small pond, which would require a takeoff and spiral climb; or a straight-ahead takeoff and climb from a narrow waterway with obstructions at either end. The examiner must evaluate both takeoff situations for this Task. In multiengine seaplanes with VX values within 5 knots of VMC, the use of VY or the manufacturer's recommendation may be more appropriate for this demonstration.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to a confined area takeoff and climb.
2. Positions the flight controls and flaps for the existing conditions.
3. Clears the area, notes any surface hazards, vessels, and/or obstructions prior to selecting a takeoff path.
4. Selects a takeoff path that will allow maximum safe utilization of wind, water, and low terrain.
5. Advances the throttles to takeoff power.
6. Ensures that the water rudders are retracted when no longer needed.
7. Maintains the most efficient alignment and planing angle, without skidding, porpoising, and skipping.
8. Lifts off at recommended airspeed and accelerates to manufacturer's recommended climb airspeed.
9. Climbs at manufacturer's recommended configuration and airspeed, or in their absence at VX, +5/-0 knots until the obstacle is cleared.
10. After clearing all obstacles, accelerates to and maintains VY, ±5 knots, retracts flaps and maintains safe bank angles while turning and/or providing best terrain clearance.
11. Maintains takeoff power to a safe altitude, and then sets climb power.
12. Uses noise abatement procedures, as required.
13. Completes appropriate checklists or coordinates with crew to ensure completion of checklist items in a timely manner and as recommended by the manufacturer.

Recommended ATP ACS Guidance

| **Area of Operation** | **Takeoff and Departure Phase** |
|---|---|
| **Task** | ***Confined-Area Takeoff and Climb*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Confined-Area Takeoff and Climb*** |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. E. Instrument Takeoff

REFERENCE: 14 CFR part 61; POH/AFM; AIM; FAA-H-8083-15, FAA-H-8261-1; AC 20-117, AC 91-74, AC 135-17.

Objective. To determine that the applicant:

1. Exhibits knowledge of an instrument takeoff with instrument meteorological conditions (IMC) simulated at or before reaching an altitude of 100 feet AGL. If accomplished in a flight simulator, visibility should be no greater than one quarter (1/4) mile, or as specified by operator specifications, whichever is lower.
2. Takes into account, prior to beginning the takeoff, operational factors which could affect the maneuver, such as Takeoff Warning Inhibit Systems or other airplane characteristics, runway length, surface conditions, wind, wake turbulence, icing conditions, obstructions, and other related factors that could adversely affect safety.
3. Coordinates with crew, if a crew served airplane, or completes the appropriate checklist items in a timely manner and as recommended by the manufacturer in a single pilot airplane, to ensure that the airplane systems applicable to the instrument takeoff are operating properly.
4. Sets the applicable avionics and flight instruments to the desired setting prior to initiating the takeoff.
5. Applies the controls correctly to maintain longitudinal alignment on the centerline of the runway, if appropriate, prior to initiating and during the takeoff.
6. Transitions smoothly and accurately from visual meteorological conditions (VMC) to actual or simulated instrument meteorological conditions (IMC).
7. Maintains the appropriate climb attitude.
8. Complies with the appropriate airspeeds/V-speeds and climb segment airspeeds.
9. Maintains desired heading within ±5° and desired airspeeds within ±5 knots.
10. Complies with ATC clearances and instructions issued by ATC (or the examiner simulating ATC).
11. Acknowledges and makes appropriate callouts to coordinate with the crew, if in a crew served airplane.

Recommended ATP ACS Guidance

| **Area of Operation** | **Takeoff and Departure Phase** |
|---|---|
| **Task** | ***Instrument Takeoff*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Instrument Takeoff*** |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. F. Powerplant Failure during Takeoff

REFERENCE 14 CFR part 61; POH/AFM; FAA-H-8083-3, FSB Report.

Objective. To determine that the applicant:

1. Exhibits satisfactory knowledge of the procedures used during powerplant failure on takeoff, the appropriate reference airspeeds, and the specific pilot actions required.
2. Takes into account, prior to beginning the takeoff, operational factors which could affect the maneuver, such as Takeoff Warning Inhibit Systems or other airplane characteristics, runway length, surface conditions, wind, wake turbulence, visibility, precipitation, obstructions, and other related factors that could adversely affect safety.
3. Completes required checks prior to starting takeoff to verify the expected powerplant performance. Performs all required pre-takeoff checks as required by the appropriate checklist items or coordinates with crew to ensure completion of checklist items in a timely manner and as recommended by the manufacturer.
4. Aligns the airplane on the runway/waterway.
5. Applies the controls correctly to maintain longitudinal alignment on the centerline of the runway, if appropriate, prior to initiating and during the takeoff.
6. Adjusts the powerplant controls as recommended by the FAA-approved guidance for the existing conditions.
7. Single-engine airplanes—establishes a power-off descent approximately straight-ahead, if the powerplant failure occurs after becoming airborne and before reaching an altitude where a safe turn can be made.
8. Continues the takeoff (in a 14 CFR part 25 or 14 CFR section 23.3(d) commuter multiengine airplane) if the (simulated) powerplant failure occurs at a point where the airplane can continue to a specified airspeed and altitude at the end of the runway commensurate with the airplane's performance capabilities and operating limitations.
9. Maintains (in a multiengine airplane), after a simulated powerplant failure and after a climb has been established, the desired heading within ±5°, desired airspeed within ±5 knots, and, if appropriate for the airplane, establishes a bank of approximately 5°, or as recommended by the manufacturer, toward the operating powerplant.
10. Maintains the airplane alignment with the heading appropriate for climb performance and terrain clearance when powerplant failure occurs.
11. Acknowledges and makes appropriate callouts to crew, if in crew served aircraft.

Recommended ATP ACS Guidance

| **Area of Operation** | **Takeoff and Departure Phase** |
|---|---|
| **Task** | ***Powerplant Failure during Takeoff*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Powerplant Failure during Takeoff*** |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. G. Rejected Takeoff

REFERENCE 14 CFR part 61; FAA-H-8083-3; AC 120-62; POH/AFM.

Objective. To determine that the applicant understands when to reject or continue the takeoff and:

1. Exhibits satisfactory knowledge of the technique and procedure for accomplishing a rejected takeoff after powerplant/system(s) failure/warnings, including related safety factors.
2. Takes into account, prior to beginning the takeoff, operational actors, which could affect the maneuver, such as Takeoff Warning Inhibit Systems or other airplane characteristics, runway length, surface conditions, wind, visibility, precipitation, obstructions, and aircraft cleared for LAHSO that could affect takeoff performance and could adversely affect safety.
3. Aligns the airplane on the runway centerline or clear of obstacles and vessels on waterways.
4. Performs all required pre-takeoff checks as required by the appropriate checklist items or coordinates with crew to ensure completion of checklist items in a timely manner and as recommended by the manufacturer.
5. Adjusts the powerplant controls as recommended by the FAA-approved guidance for the existing conditions.
6. Applies the controls correctly to maintain longitudinal alignment on the centerline of the runway.
7. Aborts the takeoff if, in a single-engine airplane the powerplant failure occurs prior to becoming airborne, or in a multiengine airplane, the powerplant failure occurs at a point during the takeoff where the abort procedure can be initiated and the airplane can be safely stopped on the remaining runway/stopway. If a flight simulator is not used, the powerplant failure must be simulated before reaching 50 percent of VMC.
8. Reduces the power smoothly and promptly, if appropriate to the airplane, when powerplant failure is recognized.
9. Uses spoilers, prop reverse, thrust reverse, wheel brakes, and other drag/braking devices, as appropriate, maintaining positive control in such a manner as to bring the airplane to a safe stop.
10. Accomplishes the appropriate powerplant failure or other procedures and/or checklists or coordinates with crew to ensure completion of checklist items in a timely manner and as recommended by the manufacturer, as set forth in the POH or AFM.

Recommended ATP ACS Guidance

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Rejected Takeoff*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Rejected Takeoff*** |
| **Recommendation for Handbook Revisions** | |

Current ATP PTS

TASK: III. H. Departure Procedures

REFERENCE 14 CFR part 61; AC 90-100; POH/AFM; AIM; FAA-H-8261-1, FAA-H-8083-15.

Objective. To determine that the applicant:

1. In actual or simulated instrument conditions, exhibits satisfactory knowledge of DPs, En Route Low and High Altitude Charts, FMSP, and related pilot/controller responsibilities.
2. Uses the current and appropriate navigation publications for the proposed flight.
3. Selects, configures, and uses the appropriate communications frequencies, navigation and systems displays; selects and identifies the navigation aids and routes necessary to properly fly the assigned ATC clearance.
4. Coordinates with crew in crew served aircraft to ensure performance of, or performs the appropriate checklist items in a timely manner and as recommended by the manufacturer.
5. Establishes communications with ATC, using proper phraseology and advises ATC when unable to comply with a clearance or restriction.
6. Complies, in a timely manner, with all instructions and airspace restrictions.
7. Exhibits adequate knowledge of two-way radio communications failure procedures.
8. Intercepts, in a timely manner, all courses, radials, and bearings appropriate to the procedure, route, clearance, or as directed by the examiner.
9. Maintains the appropriate airspeed within ±10 knots, headings within ±10°, altitude within ±100 feet; and accurately tracks a course, radial, or bearing.
10. Conducts the departure phase to a point where, in the opinion of the examiner, the transition to the en route environment is complete.

Recommended ATP ACS Guidance

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Departure Procedures*** |
| **Reference** | |
| **Airman Test Report** | Pending |
| **Objective** | |
| **Knowledge** | The applicant demonstrates understanding of:<br>1. |
| **Skills** | The applicant demonstrates the ability to:<br>1. |
| **Risk Management** | The applicant applies risk identification, assessment, and mitigation principles to:<br>1. |
| **Rationale for Changes** | |
| **Sample Questions** | |

| | |
|---|---|
| **Area of Operation** | **Takeoff and Departure Phase** |
| **Task** | ***Departure Procedures*** |
| **Recommendation for Handbook Revisions** | |

# APPENDIX Q: PTS-TO-ACS REFERENCES MATRIX

Appendix Q includes a matrix documenting references to the Practical Test Standards (PTS) in current FAA guidance documents including Order 8900.1, Flight Standards Information Management System, Order 8900.2, General Aviation Airman Designee Handbook, and other associated guidance documents.

The FAA will need to coordinate revisions to existing guidance documents to facilitate the transition to the Airman Certification Standards (ACS) concept. The attached matrix was developed to track the changes required to align current FAA guidance material (other than the FAA-H-8083-XX series handbooks and FAA-CT-8080-XX series computer testing supplements) with the ACS.

**PTS-to-ACS REFERENCES MATRIX**
**(CHANGES REQUIRED TO ALIGN CURRENT FAA GUIDANCE (OTHER THAN HANDBOOKS) WITH ACS)**

| Document Number | Date | Title | Notes |
|---|---|---|---|
| 8900.1, V1 C1 S3 | 12/19/2011 | Handbook Organization, Use, and Revision: Acronyms and Abbreviations | Terminology Change (PTS to ACS) |
| 8900.1, V11 C10 S1 | 8/2/2010 | Approval and Authorized Use under 14 CFR Parts 61 and 141 | Terminology Change (PTS to ACS) |
| 8900.1, V13 C3 S1 | 9/30/2008 | Duties and Responsibilities of the FAA Specialist | Further Review Suggested |
| 8900.1, V13 C3 S4 | 9/30/2008 | Aircraft Dispatcher Practical Test | Further Review Suggested |
| 8900.1, V13 C5 S1 | 6/7/2010 | Appoint/Renew a General Aviation Designee | Further Review Suggested |
| 8900.1, V15 C13 S1 | 12/3/2010 | General | Terminology Change (PTS to ACS) |
| 8900.1, V15 C15 S2 | 12/3/2010 | WINGS–Pilot Proficiency Program | Terminology Change (PTS to ACS) |
| 8900.1, V3 C21 S1 | 9/13/2007 | Advanced Qualification Program: Scope, Concepts and Definitions | Further Review Suggested |
| 8900.1, V3 C21 S4 | 8/31/2009 | Advanced Qualification Program: The Advanced Qualification Program Approval Process | Terminology Change (PTS to ACS) |
| 8900.1, V3 C32 S5 | 9/13/2007 | Flight Manuals for 14 CFR Parts 121/135 | Terminology Change (PTS to ACS) |
| 8900.1, V3 C53 S2 | 9/13/2007 | Approve Training Course Outlines for a Part 141 Pilot School | Terminology Change (PTS to ACS) |
| 8900.1, V3 C54 S1 | 8/19/2011 | Part 142 Training Centers: Training Center and Training Center Program Manager Overview | Terminology Change (PTS to ACS) |
| 8900.1, V5 C1 S3 | 9/13/2007 | Phases of Certification | Terminology Change (PTS to ACS) |
| 8900.1, V5 C12 S4 | 9/13/2007 | Background | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S10 | 9/13/2007 | Conduct a Part 125 Pilot Competency or Instrument Proficiency Check | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S18 | 9/13/2007 | Conduct an Airline Transport Pilot Certification, Including Additional Category/Class Ratings | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S19 | 10/19/2012 | Conduct a Pilot Type Rating Certification | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S3 | 8/31/2012 | Flight Reviews and Competency Checks | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S4 | 5/11/2009 | Integrated Airman Certification and/or Rating Application Process | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S5 | 7/3/2012 | Miscellaneous Part 61 Certification Information | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S6 | 4/20/2011 | Issue a Student Pilot Certificate | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S8 | 9/13/2007 | Conduct a Commercial Pilot Certification, Including Additional Category/Class Ratings | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S9 | 9/13/2007 | Conduct an Instrument Rating Certification | Further Review Suggested |
| 8900.1, V5 C9 S5 | 9/13/2007 | Issue an FAA Industry Training Standards (FITS) Acceptance When Requested by a Flight School, Training Center, or Other Training Provider | Terminology Change (PTS to ACS) |
| 8900.1, V6 C1 S5 | 9/13/2007 | Surveillance of a Certificated Flight Instructor | Terminology Change (PTS to ACS) |
| AT JTA 4.1.202 (OP) | 6/26/2008 | Conduct a Flight Standardization Board (FSB) Evaluation | Terminology Change (PTS to ACS) |
| GA JTA 2.1.6 (OP) | | Inspect a Designated Pilot Examiner (DPE) | Terminology Change (PTS to ACS) |
| N 8900.190 | 6/11/2012 | Review of TCAS II Guidance & Training for 14 CFR Parts 91 Subpart K, and 135 | Notice – does not require revision. |
| N 8900.194 | 7/13/2012 | Reexamination of Airmen Tested by Designated Pilot Examiner Edward Lane | Notice – does not require revision. |
| 8900.1, V13 C1 S1 | 7/13/2010 | General | Terminology Change (PTS to ACS) |
| 8900.1, V13 C2 S2 | 9/30/2008 | FAA's Management of an ADE Program | Terminology Change (PTS to ACS) |
| 8900.1, V13 C3 S2 | 9/30/2008 | Duties and Responsibilities of the Designee | Terminology Change (PTS to ACS) |
| 8900.1, V13 C3 S3 | 9/30/2008 | Designated Aircraft Dispatcher Examiner (DADE) Training | Terminology Change (PTS to ACS) |

**PTS-to-ACS REFERENCES MATRIX**
**(CHANGES REQUIRED TO ALIGN CURRENT FAA GUIDANCE (OTHER THAN HANDBOOKS) WITH ACS)**

| Document Number | Date | Title | Notes |
|---|---|---|---|
| 8900.1, V13 C5 S2 | 6/7/2010 | Oversight of General Aviation Designee | Terminology Change (PTS to ACS) |
| 8900.1, V13 C5 S4 | 6/22/2011 | Designee Focal Points | Terminology Change (PTS to ACS) |
| 8900.1, V13 C6 S1 | 4/15/2012 | Inspect a Designated Pilot Examiner | Terminology Change (PTS to ACS) |
| 8900.1, V13 C8 S1 | 4/15/2012 | Inspect a Technical Personnel Examiner | Terminology Change (PTS to ACS) |
| 8900.1, V15 C13 S2 | 12/3/2010 | Scheduling and Conducting Workshops | Terminology Change (PTS to ACS) |
| 8900.1, V3 C12 S2 | 9/13/2007 | Balloons | Terminology Change (PTS to ACS) |
| 8900.1, V3 C20 S3 | 1/8/2009 | Approve a Check Airman for Title 14 CFR Part 125 Operations (Pilot, Flight Engineer, or Navigator) | Terminology Change (PTS to ACS) |
| 8900.1, V3 C54 S2 | 8/19/2011 | Part 142 Training Centers: Training, Qualification, and Designation of Training Center Instructors and Evaluators | Terminology Change (PTS to ACS) |
| 8900.1, V3 C54 S6 | 8/19/2011 | Part 142 Training Centers: Evaluate Training Programs, Curriculums, Flight Training Equipment, and Recordkeeping Requirements | Further Review Suggested |
| 8900.1, V5 C1 S2 | 10/30/2008 | Aviation Safety Inspector (Operations) Qualifications and Status | Terminology Change (PTS to ACS) |
| 8900.1, V5 C1 S4 | 9/13/2007 | Considerations for the Practical Test | Further Review Suggested |
| 8900.1, V5 C1 S5 | 9/13/2007 | Issuance of Temporary Certificates | Terminology Change (PTS to ACS) |
| 8900.1, V5 C10 S1 | 1/10/2013 | Qualify an Applicant as Chief Pilot for Rotorcraft External-Load Operations | Terminology Change (PTS to ACS) |
| 8900.1, V5 C12 S1 | 2/15/2013 | Conduct a Chief/Assistant Chief Instructor Practical Test for Title 14 CFR Part 141 Pilot School | Terminology Change (PTS to ACS) |
| 8900.1, V5 C12 S2 | 9/13/2007 | Conduct a Stage Test for a Title 14 CFR Part 141 Pilot School | Terminology Change (PTS to ACS) |
| 8900.1, V5 C13 S1 | 9/30/2011 | Approval or Renewal of Manufacturer’s Required Training Programs | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S11 | 9/13/2007 | Conduct a Title 14 CFR Part 61 Flight Instructor Initial/Reinstatement/Renewal Certification and Additional Category/Class Ratings | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S12 | 9/13/2007 | Administer a Practical Test for a Title 14 CFR Part 61 Initial, Renewal, or Reinstatement for a Flight Instructor with a Sport Pilot Rating | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S20 | 9/13/2007 | Conduct of Pilot-in-Command Proficiency Checks for Aircraft Requiring More Than One Pilot as Required by Title 14 CFR Section 61.58 | Terminology Change (PTS to ACS) |
| 8900.1, V5 C2 S7 | 9/13/2007 | Conduct a Private Pilot Certification, Including Additional Category/Class Ratings | Terminology Change (PTS to ACS) |
| 8900.1, V5 C3 S5 | 9/13/2007 | Oral and Flight Test Events in Helicopters for ATP Applicants Engaged in Operations under Title 14 CFR Part 121, 135, or 91 Subpart K | Terminology Change (PTS to ACS) |
| 8900.1, V5 C7,S1 | 12/12/2011 | Conduct a Reexamination Test of an Airman Under Title 49 of the United States Code | Terminology Change (PTS to ACS) |
| 8900.1, V5 C9,S2 | 5/16/2011 | Issue a Letter of Authorization for Pilot in Command of Surplus Military Turbine- or Piston-Powered Airplanes | Terminology Change (PTS to ACS) |
| 8900.1, V6 C7 S1 | 9/13/2007 | Conduct Facility Inspection of a Part 141 Pilot School | Terminology Change (PTS to ACS) |
| 8900.2 w/CHG 1 | 8/16/2010 | General Aviation Airman Designee Handbook | In-depth review. |
| AC 65-30A | 11/9/2001 | Overview of the Aviation Maintenance Profession | Confirm if still active. |
| AC 65-5B | 7/25/1988 | Parachute Rigger Senior/Master Certification Guide | Confirm if still active. |

| PTS-to-ACS REFERENCES MATRIX<br>(CHANGES REQUIRED TO ALIGN CURRENT FAA GUIDANCE (OTHER THAN HANDBOOKS) WITH ACS) | | | |
|---|---|---|---|
| **Document Number** | **Date** | **Title** | **Notes** |
| AT JTA 2.4.23 (OP) | | Surveillance of a 14 CFR Part 142 Evaluator | Terminology Change (PTS to ACS) |
| AT JTA 2.4.5 (OP) | | Conduct a Knowledge Test, Practical Test, Stage Check or End-of-Course Test to Students of a Pilot School or Provisional Pilot School under 14 CFR § 141.83 | Terminology Change (PTS to ACS) |
| AT JTA 2.5.15 (OP | | Re-examine or Re-inspect an Airman, Air Agency or Operator under 49 USC Section 44709 | Terminology Change (PTS to ACS) |
| AT JTA 3.1.18 (OP) | 7/25/2005 | Issue a Certificate or Rating for a Flight Engineer under 14 CFR Part 63 | Terminology Change (PTS to ACS) |
| AT JTA 3.1.65 (OP) | 7/25/2005 | Conduct Inspector Flight Check in Accordance with Order 4040.9 | Terminology Change (PTS to ACS) |
| AT JTA 4.8.16 (OP) | 7/25/2005 | Inspector Currency Flying in Accordance with Order 4040.9 | Terminology Change (PTS to ACS) |
| GA JTA 2.4.23 (OP) | No date | Surveillance of a 14 CFR Part 142 Evaluator | Terminology Change (PTS to ACS) |
| GA JTA 2.4.5 (OP) | | Conduct a Knowledge Test, Practical Test, Stage Check or End-of-Course Test to Students of a Pilot School or Provisional Pilot School Under 14 CFR § 141.83 | Terminology Change (PTS to ACS) |
| GA JTA 2.5.15 (OP) | | Reexamine or Reinspect an Airman, Air Agency, or Operator Under 49 USC Section 44709 | Terminology Change (PTS to ACS) |
| GA JTA 3.1.13 (OP) | | Issue Additional Aircraft Ratings Under 14 CFR § 61.63 | Terminology Change (PTS to ACS) |
| GA JTA 3.1.65 (OP) | | Conduct Inspector Flight Check in Accordance With Order 4040.9 | Terminology Change (PTS to ACS) |
| GA JTA 3.4.1 (OP) | | Approve a Training Program or Training Course Outline (TCO) for a 14 CFR Part 141 Air Agency/Applicant | Terminology Change (PTS to ACS) |
| GA JTA 3.4.21 (OP) | | Evaluate a Special Curricula for a Pilot School or Provisional Pilot School under 14 CFR § 141.57 | Terminology Change (PTS to ACS) |
| GA JTA 3.4.38 (OP) | | Evaluate a Contractor Training Program for a 14 CFR Part 141 Air Agency/Applicant | Terminology Change (PTS to ACS) |
| GA JTA 4.8.16 (OP) | | Inspector Currency Flying in Accordance with Order 4040.9 | Terminology Change (PTS to ACS) |
| N 8900.204 | 1/11/2013 | English Proficiency (Date – 01/11/2013) | Notice – does not require revision. |
| N 8900.205 | 1/11/2013 | Enhanced Stall and Stick Pusher Training (Date – 01/11/2013) | Notice – does not require revision. |
| SAI 4.3.3 (OP) | 9/30/2012 | Advanced Qualification Program (AQP) – OP 09/30/2012 | Terminology Change (PTS to ACS) |

# APPENDIX R: ACS CODE SYSTEM

This appendix describes the Airman Certification Standards (ACS) Code System proposed by the ATST WG. To achieve the intended and desired results, the ATST WG views a coding methodology that aligns standards, guidance material, and test questions as an essential component of the ACS concept.

The recommended ACS code system consists of up to five-elements. For example:

**PA.X.A.K1.a:**

| PA | XI | A | K1 | a |
|---|---|---|---|---|
| Applicable ACS | Area of Operation | Task | Task Element | Level of Learning* |
| *In this PA ACS example*:<br><br>PA = private pilot airplane | *In this PA ACS example*:<br><br>X = night operation | *In this PA ACS example*:<br><br>A = night preparation | *In this PA ACS example:*<br><br>K1 = Knowledge task element 1 (physiological aspects of night flying as it relates to vision) | *In this PA ACS example:*<br><br>a = rote |
| | | | | |
| *Additional ACS identifiers*:<br><br>IR = instrument rating<br>AI = authorized instructor<br>CA = commercial pilot airplane<br><br>(*others to be determined*) | *Select as appropriate.* | *Select as appropriate.* | *Select as appropriate.*<br><br>*Task element codes:*<br><br>K = Knowledge<br>S = Skill<br>R = Risk management | *Select as appropriate.*<br><br>*Level of learning codes:*<br><br>a = rote<br>b = understanding<br>c = application<br>d = correlation |

* *Level of Learning* codes help guide question development. For example, an "a" (rote) code would suggest a question that requires the applicant to define, recall, list, name, match, label

A transparent, intuitive coding scheme anchored in the ACS will contribute to:

- ***Better safety education and training.*** ACS-based codes provide a means to ensure that test questions are relevant to safe operations, and that the associated guidance clearly reflects the material to be trained and tested.
- ***Better feedback to stakeholders.*** By linking airman test report results to a specific Area of Operation/Task/Task Element, ACS-based codes would accomplish the FAA's goal of focusing on the deficient knowledge, and not the specific missed test question. Remedial instruction and re-testing would be specific, targeted, and based on specified learning criteria.

- ***Better testing and test management*.** In addition to providing much better guidance to test writers (because each question will correlate to a specific ACS task/element), the ACS-based coding system will facilitate test construction and management using the proposed test maps discussed in Section 6.1.3 of this report. (See Appendix I: Sample Test Maps.)
- ***Better use of resources*.** Management of the entire airman certification system (standards, guidance, testing) becomes a much less work- and resource-intensive process for the FAA. Updates can be made objectively and consistently, and the process will also be transparent to all parties with (i.e., no guesswork required on how to re-code when there are changes to the ACS.

## APPENDIX S: AIRMAN CERTIFICATION SYSTEM WORKING GROUP GUIDELINES

This appendix includes the proposed Airman Certification System Working Group (ACSWG) Guidelines (Procedures Guide), based on documentation pertaining to the FAA's existing Operations Specifications Working Group (OSWG), which also involves an agency-industry partnership. The OSWG was established to address timely promulgation of operational authorizations and associated guidance.

### I. INTRODUCTION AND BACKGROUND

In September 2011, the FAA chartered the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) to make recommendations for more effective certification training and testing. The ARC submitted its report and nine recommendations to the FAA on April 13, 2012.

To benefit from industry expertise in implementing the ARC recommendations, the FAA turned to the Aviation Rulemaking Advisory Committee (ARAC) in August 2012. ARAC, a formal standing committee of aviation associations and industry, assigned this work to a newly-formed Airman Testing Standards and Training Working Group (ATST WG) consisting of aviation education and training professionals representing all major segments of this community.

In September 2013, the ARAC submitted the ATST WG's report on implementing the ARC's recommendations. This report recommended that the FAA adopt its proposals for an integrated, holistic certification system that clearly aligns testing with certification standards and guidance.

Among these proposals is a recommendation for the FAA to establish a joint FAA/Aviation Industry ACSWG that will allow the FAA to capitalize on the expertise of the aviation industry and improve the quality of communication between the FAA and Aviation Industry on the safety-critical airman certification system.

This document describes the purpose, membership, and procedures of the ACSWG, to include guidelines for developing, reviewing, and submitting proposed updates, corrections, or other changes to elements of the airman certification system (i.e., standards, guidance, and testing).

The ACSWG will review and update as necessary the contents of this document annually.

### II. PURPOSE

The FAA and the Aviation Industry jointly seek to improve airman training and testing by establishing an integrated, holistic airman certification system that clearly aligns testing with certification standards, guidance, and reference materials, and maintains that alignment.

A. The purpose of the ACSWG is to provide a proactive and cooperative process that achieves this goal by improving the quality of FAA/Aviation Industry communication and allowing the FAA to benefit from the Aviation Industry's expertise on the knowledge and skills needed for safe operation in today's National Airspace System (NAS).

B. Specifically, the ACSWG is intended to provide a means for the Aviation Industry to provide expert assistance and industry views to the FAA's Flight Standards Service (AFS) on the development, modification, and continued alignment of the major components of the airman certification system:

- The Airman Certification Standards (ACS) for airman certificates and ratings (i.e. converted/transitions FAA-S-8081-XX series documents);
- Associated training guidance material (e.g., FAA-H-8083-XX series handbooks);
- Test management (e.g., test question development, test question boarding, test composition/test "mapping," and FAA-CT-8080-XX series figures); and
- Reference materials, to include AFS directives and ASI guidance; FAA Orders, Advisory Circulars (AC), and other documents pertaining to the airman certification system.

## III. MEMBERSHIP

The FAA Flight Standard Service (AFS) will appoint all members of the ACSWG. All ACSWG members will have the right to vote on all ACSWG matters.

A. <u>Qualifications for ACSWG Members</u>:

(1) Individual ACSWG members must have education, work experience, aviation credentials, and industry involvement in order to be recognized as experts by the FAA.

(2) From the group of qualified Aviation Industry individuals, the FAA will select members who will collectively represent all major sectors of the industry. These sectors include flight instructors, designated pilot examiners, the aviation academic community, industry advocacy associations, and training and test preparation providers involved with aviation training and testing in 14 CFR Part 61, 65, 141, 142, 147, 121, and 135 environments.

(3) From the group of qualified FAA individuals, the agency will select members from headquarters policy divisions with functions relevant to the content of airman certification system components.

B. <u>Leadership</u>: The ACSWG leadership will consist of the following positions:

(1) FAA Chair. He or she will serve a term as decided by the FAA.

(2) Industry Co-Chair: He or she will serve a term of one year, after which the industry Vice-Chair will normally succeed as Co-Chair. If the Vice-Chair cannot fulfill this responsibility, the ACSWG will elect a new Chair by majority vote. This vote will occur at the last quarterly meeting each year. The term of the new Industry Chair begins after the first quarterly meeting each year. The Industry Vice-Chair will act as Chair in his/her absence. In the event that the Industry Chair cannot fulfill his/her position for a complete term, the Industry Vice-Chair will act as chair for the remainder of the term and a new Vice-Chair will be elected.

(3) Industry Vice-Chair: He or she will serve a term of one year and will succeed as the Industry Co-Chair. The ACSWG will elect a new industry Vice-Chair by majority vote. This vote will occur at the last quarterly meeting each year. The term of the new Industry Vice-Chair begins after the first quarterly meeting each year.

C. Membership: The ACSWG membership will consist of up to 18 members as follows:

(1) Twelve (12) members from the Aviation Industry who meet the membership criteria and qualifications listed above.

(2) Six (6) members who are assigned to FAA Headquarters policy divisions (e.g., AFS-200, AFS-300, AFS-400, AFS-600, AFS-800, other).

D. Term of Office and Mid-Term Appointments:

(1) One-third of the initial members will serve a one-year term, one-third of the initial members will serve a two-year term, and one-third of the initial members will serve a three-year term for the purpose of establishing the ACSWG and its processes. If reappointed, a member may serve thereafter in accordance with the provisions listed below.

(2) Each member may serve a maximum of two (2) consecutive three (3)-year terms on the ACSWG. After two consecutive three-year terms, a member is eligible for reappointment only after being off the ACSWG for a minimum of one two-year term.

(3) A mid-term vacancy of an appointed ACSWG member will be filled for the balance of the un-expired term. The FAA will be the designated appointing authority. The completion of an un-expired portion of a term will not be considered a full term.

E. Member Confidentiality and Conflicts of Interest:

(1) At the time of appointment, and at least once each year, each ACSWG Member must sign a “Commitment to Serve” agreement stating that, if selected, the member will not disclose any confidential information discussed by the ACSWG.

(2) Each ACSWG member must further agree that during service as a member, he or she will disclose fully and promptly to the ACSWG, in writing, any existing or potential conflict of interest of a personal, professional, business or financial nature that the member may have.

(3) After full disclosure, the ACSWG will determine whether the affected member may continue with ACSWG activities relating to involving the disclosed conflict. Breach of either the Commitment to Serve or obligation to disclose a conflict of interest may constitute sufficient cause for a Member’s removal from the ACSWG.

F. Removal of Members: An ACSWG member or officer may be removed for any of the following reasons:

(1) Failure to perform the duties of a Member, including participation in conference calls and other ACSWG activities between regularly scheduled meetings.

(2) Violation of ACSWG policies or rules.

(3) Failure to attend two (2) out of three (3) consecutive regularly scheduled ACSWG meetings without good cause, as determined by the ACSWG.

(4) Actions not in the best interest of ACSWG.

(5) Other cause or whenever required by the best interests of the ACSWG.

Removal will occur upon an affirmative vote of seven (7) ACSWG members at any meeting for which notice has been given and the question of such removal is an item of business.

## IV. GENERAL PROCEDURES FOR ACSWG ACTIVITIES

This section describes general procedures and guidelines for the ACSWG's participation in developing, reviewing, and submitting proposed updates, corrections, or other changes to any elements of the airman certification system (e.g., standards, guidance, and testing).

A. General Procedures: To propose changes to any component of the airman certification system, the Aviation Industry or FAA proponent develops a draft document that includes:

(1) Description of the issue

(2) Reason for the concern

(3) Recommendation for ACSWG action

(4) Justification for the recommendation (to include data from appropriate users and FAA AFS divisions.

B. ACSWG Subgroups: The ACSWG will accomplish its work through subgroups consisting of an industry lead, appropriate ACSWG members, and the appropriate FAA (AFS) personnel.

ACSWG subgroups will be formed for two purposes.

(1) The first is to address the full set of airman certification system components (standards, guidance, testing) for a specific certificate or rating or, as appropriate, for "families" of airman certificates/ratings (e.g., pilot; instructor, aviation maintenance technician, dispatcher). The purpose of this holistic approach is to ensure that standards, guidance, and testing are aligned and maintained in alignment.

For each certificate or rating, the assigned subgroup will:

- Develop new ACS as required and periodically review existing ACS(s)
- Review and, as necessary, realign FAA-H-8083-XX series handbooks and guidance documents with the ACS
- Develop proposed knowledge test questions aligned with the ACS and guidance.
- Note any conforming changes needed to FAA internal guidance documents (e.g., Order 8900.1, Order 8900.2, advisory circulars, ASI/DE training)
- Review existing form tests, realign and/or correlate test maps to ACS
- Review test items (questions) currently in use and assign ACS codes
- Review the public data to ensure it accurately reflects the current tests.

In addition, the subgroup responsible for a given certificate or rating will review both internal (FAA) and external requests to add, delete, or modify content in any component of the airman certification system. The responsible subgroup will make recommendations to the appropriate FAA policy division(s) on whether, how, and to what extent the content should be modified, taking care to ensure that changes to any component of the airman certification system are appropriately incorporated in other components.

Once approved by the full ACSWG, the FAA will make ACSWG subgroup airman certification system proposals and work products except proposed test questions available for public review and comment via the FAA website and, as appropriate, announce such availability via *Federal Register* notice. In general, such documents should be available for public review and comment for at least two weeks. The FAA will also circulate the draft documents for internal coordination.

The assigned ACSWG subgroup will have responsibility to disposition both internal and external comments and develop a consensus position before making a final recommendation to the FAA.

(2) The second type of ACSWG subgroup is established to meet the requirement for security of knowledge test questions. The ACSWG will form multiple subgroups to review ("board") discrete sets of test questions to include assigning the ACS codes. This procedure will ensure that no single individual or organization represented on the ACSWG has direct knowledge of more than a third of the total test question data bank.

Additional security procedures, adapted from standard industry protocols, include the following:

- Each ACSWG member or subject matter expert (SME) must sign a Statement of Non-Disclosure agreeing to abide by all security procedures established to protect the test from compromise.
- Disclosure of any information about test items to anyone outside the ACSWG constitutes a breach of security and grounds for immediate removal from the ACSWG.
- Security procedures include the following:
  - During test question development meetings, individual use of personal communication devices is strictly prohibited.
  - Any written drafts or copies of items or notes relating to test question development will be destroyed (shredded or burned) by AFS personnel.
  - Copies of written items cannot be kept after any meeting. During ACSWG meetings, answer key(s) or any test portion(s) will be removed from the test review room at the completion of each day's meeting and retained in a secure area.
  - For test question development work performed via internet, technological security must be maintained at all times. This requirement includes keeping password information in a secure location, and never leaving computers unattended if performing test question development work.

C. Types of Meetings: ACSWG subgroups may use formal (face-to-face) meetings, telephone conferences, web meetings, or other means to seek coordination and consensus. Early coordination and interface involving the ACSWG subgroup lead, the ACSWG leadership, and the relevant AFS headquarters policy division representatives are essential to making the process successful.

D. Reports: By December 31 of each year, the ACSWG Industry Chair will provide a letter summarizing the preceding year's successes and challenges of the ACSWG to the FAA Flight Standards Service Director.

## V. ACSWG QUARTERLY MEETINGS

The ACSWG will hold quarterly face-to-face meetings. Such meetings will typically be held the second Tuesday and Wednesday of the month in which the meeting takes place, although meetings may be extended as necessary to accomplish the necessary work. During the initial meeting, the ACSWG will establish its quarterly meeting schedule as necessary to align with the established schedule for introduction of new knowledge test questions and refreshed form tests in February, June, and October of each year,

Meetings will generally occur in Washington, DC or Oklahoma City. The proposed agenda for each meeting will be sent to the ACSWG members two weeks prior to the meeting with a request for any additional agenda items. The agenda should allow for time to modify the "final" agenda.

At each quarterly ACSWG meeting, participants should complete a sign-in sheet listing the name, company represented, address, telephone and fax numbers, and electronic mail address. Suggested format for preprinted "sign-in" sheet:

**FAA/Industry Airman Certification System Working Group ACSWG 200X-X Attendees**

| Company and Address: | Company/FAA Representative: | Telephone and FAX Numbers: | E-mail address And Other information: |
|---|---|---|---|

The ACSWG leadership shall ensure that the minutes for each quarterly meeting are distributed within 30 days of adjournment.

## VI. ACSWG PROCEDURES GUIDE APPENDICES:

[Appendix A] to this document lists the names and contact information for current industry participants on the ACSWG.

[Appendix B] lists the names and addresses of current FAA AFS headquarters participants on the ACSWG.

# APPENDIX T: ESTABLISHMENT OF ARAC ATST WG

Appendix T includes the *Federal Register* Notice establishing and tasking the Aviation Rulemaking Advisory Committee Airman Testing Standards and Training Working Group (ATST WG).[17]

**Notice—Aviation Rulemaking Advisory Committee (ARAC); New Task Assignment for the ARAC: Establishment of Airman Testing Standards and Training Working Group**

**Summary**: The FAA assigned the ARAC a new task arising from recommendations of the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC). The ARC recommended ways to ensure that the FAA's airman testing and training materials better support reduction of fatal general aviation accidents. The new task is to integrate 14 CFR part 61 aeronautical knowledge and flight proficiency requirements for the private pilot and flight instructor certificates and the instrument rating into a single Airman Certification Standards document for each type of certificate and rating; to develop a detailed proposal to realign FAA training handbooks with the Airman Certification Standards documents; and to propose knowledge test item bank questions consistent with the integrated Airman Certification Standards documents and the principles set forth in the ARC's recommendations. This action item informs the public of the new ARAC's task and solicits membership for the new Airman Testing Standards and Training Working Group.

[17] 77 FR 56251 (September 12, 2012).

**ADDRESSES:** Submit completed loan applications to: U.S. Small Business Administration, Processing and Disbursement Center, 14925 Kingsport Road, Fort Worth, TX 76155.

**FOR FURTHER INFORMATION CONTACT:** A. Escobar, Office of Disaster Assistance, U.S. Small Business Administration, 409 3rd Street SW., Suite 6050, Washington, DC 20416.

**SUPPLEMENTARY INFORMATION:** The notice of the Presidential disaster declaration for the State of Louisiana, dated 08/31/2012 is hereby amended to include the following areas as adversely affected by the disaster:

*Primary Parishes: (Physical Damage and Economic Injury Loans):* Saint Charles.

All Contiguous Parishes have previously been declared.

All other information in the original declaration remains unchanged.

(Catalog of Federal Domestic Assistance Numbers 59002 and 59008)

**James E. Rivera,**

*Associate Administrator for Disaster Assistance.*

[FR Doc. 2012–22374 Filed 9–11–12; 8:45 am]

**BILLING CODE 8025–01–P**

## DEPARTMENT OF STATE

**[PUBLIC NOTICE 8020]**

### Culturally Significant Objects Imported for Exhibition Determinations: ''The Body Beautiful in Ancient Greece''

**SUMMARY:** Notice is hereby given of the following determinations: Pursuant to the authority vested in me by the Act of October 19, 1965 (79 Stat. 985; 22 U.S.C. 2459), Executive Order 12047 of March 27, 1978, the Foreign Affairs Reform and Restructuring Act of 1998 (112 Stat. 2681, *et seq.;* 22 U.S.C. 6501 note, *et seq.*), Delegation of Authority No. 234 of October 1, 1999, and Delegation of Authority No. 236–3 of August 28, 2000 (and, as appropriate, Delegation of Authority No. 257 of April 15, 2003), I hereby determine that the objects to be included in the exhibition ''The Body Beautiful in Ancient Greece,'' imported from abroad for temporary exhibition within the United States, are of cultural significance. The objects are imported pursuant to a loan agreement with the foreign owner or custodian. I also determine that the exhibition or display of the exhibit objects at the Portland Art Museum, Portland, Oregon, from on or about October 6, 2012, until on or about January 6, 2013, the Dallas Museum of Art, Dallas, Texas, from on or about May 5, 2013, until on or about October 6, 2013, and at possible additional exhibitions or venues yet to be determined, is in the national interest. I have ordered that Public Notice of these Determinations be published in the **Federal Register**.

**FOR FURTHER INFORMATION CONTACT:** For further information, including a list of the exhibit objects, contact Paul W. Manning, Attorney-Adviser, Office of the Legal Adviser, U.S. Department of State (telephone: 202–632–6469). The mailing address is U.S. Department of State, SA–5, L/PD, Fifth Floor (Suite 5H03), Washington, DC 20522–0505.

Dated: September 6, 2012.

**J. Adam Ereli,**

*Principal Deputy Assistant Secretary, Bureau of Educational and Cultural Affairs, Department of State.*

[FR Doc. 2012–22445 Filed 9–11–12; 8:45 am]

**BILLING CODE 4710–05–P**

## DEPARTMENT OF STATE

**[Public Notice 8019]**

### Culturally Significant Objects Imported for Exhibition Determinations: ''Picasso Black and White''

**SUMMARY:** Notice is hereby given of the following determinations: Pursuant to the authority vested in me by the Act of October 19, 1965 (79 Stat. 985; 22 U.S.C. 2459), Executive Order 12047 of March 27, 1978, the Foreign Affairs Reform and Restructuring Act of 1998 (112 Stat. 2681, *et seq.;* 22 U.S.C. 6501 note, *et seq.*), Delegation of Authority No. 234 of October 1, 1999, and Delegation of Authority No. 236–3 of August 28, 2000 (and, as appropriate, Delegation of Authority No. 257 of April 15, 2003), I hereby determine that the objects to be included in the exhibition ''Picasso Black and White,'' imported from abroad for temporary exhibition within the United States, are of cultural significance. The objects are imported pursuant to loan agreements with the foreign owners or custodians. I also determine that the exhibition or display of the exhibit objects at the Solomon R. Guggenheim Museum, New York, New York, from on or about October 5, 2012, until on or about January 23, 2013, and at possible additional exhibitions or venues yet to be determined, is in the national interest. I have ordered that Public Notice of these Determinations be published in the **Federal Register**.

**FOR FURTHER INFORMATION CONTACT:** For further information, including a list of the exhibit objects, contact Paul W. Manning, Attorney-Adviser, Office of the Legal Adviser, U.S. Department of State (telephone: 202–632–6469). The mailing address is U.S. Department of State, SA–5, L/PD, Fifth Floor (Suite 5H03), Washington, DC 20522–0505.

Dated: September 5, 2012.

**J. Adam Ereli,**

*Principal Deputy Assistant Secretary, Bureau of Educational and Cultural Affairs, Department of State.*

[FR Doc. 2012–22447 Filed 9–11–12; 8:45 am]

**BILLING CODE 4710–05–P**

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

### Aviation Rulemaking Advisory Committee (ARAC); New Task Assignment for the ARAC: Establishment of Airman Testing Standards and Training Working Group

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice

**SUMMARY:** The FAA assigned the ARAC a new task arising from recommendations of the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC). The ARC recommended ways to ensure that the FAA's airman testing and training materials better support reduction of fatal general aviation accidents. The new task is to integrate 14 CFR part 61 aeronautical knowledge and flight proficiency requirements for the private pilot and flight instructor certificates and the instrument rating into a single Airman Certification Standards document for each type of certificate and rating; to develop a detailed proposal to realign FAA training handbooks with the Airman Certification Standards documents; and to propose knowledge test item bank questions consistent with the integrated Airman Certification Standards documents and the principles set forth in the ARC's recommendations.

This action item informs the public of the new ARAC's task and solicits membership for the new Airman Testing Standards and Training Working Group (Working Group).

**FOR FURTHER INFORMATION CONTACT:** Van L. Kerns, Manager, Regulatory Support Division, FAA Flight Standards Service, AFS 600, FAA Mike Monroney Aeronautical Center P.O. Box 25082 Oklahoma City, OK 73125; telephone (405) 954–4431, email *van.l.kerns@faa.gov.*

**SUPPLEMENTARY INFORMATION:**

## Background

The FAA established ARAC to provide advice and recommendations to the FAA Administrator on the FAA's rulemaking activities. ARAC's objectives are to improve the development of the FAA's regulations by providing information, advice, and recommendations related to aviation issues.

On September 21, 2011, the FAA chartered the ARC for the U.S. aviation community to develop recommendations for more effective training and testing in the areas of aeronautical knowledge and flight proficiency required for safer operation in today's National Airspace System (NAS).

The FAA's charge to the ARC was to help ensure that FAA's technical information related to existing standards for airman knowledge and skill tests, computer testing supplements, knowledge test guides, practical test standards and training handbooks incorporates the most current, relevant, and effective approaches to training and testing. The FAA specifically tasked the ARC with providing recommendations on a process for ongoing stakeholder participation in developing the content of these materials, and methodologies for developing better test item bank questions. The FAA also asked the ARC to develop a prioritized list of certificates and ratings to update.

This new task is the FAA's response to several of the ARC's recommendations. Establishment of the ARAC's Working Group creates a process by which the stakeholders' real world aviation education and training expertise can contribute to the development of materials and methodologies. In accordance with the ARC's recommended certificate and rating priorities, the Working Group will address the private pilot, flight instructor, and instrument rating training and testing materials by developing an integrated Airman Certification Standards document for each one.

By aligning the aeronautical knowledge testing standards required by 14 CFR part 61 with the flight proficiency standards set out in the existing Practical Test Standards (PTS), the integrated Airman Certification Standard will enhance the relevance, reliability, validity, and effectiveness of aeronautical knowledge testing and training materials and thus support the FAA's goal of reducing fatal general aviation accidents. The FAA is also tasking the ARAC's Working Group to develop a detailed proposal to realign and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., handbooks) with each integrated Airman Certification Standards documents; and to propose methodologies to ensure that knowledge test item bank questions are consistent with both the Airman Certification Standards documents and the test question development principles set forth in the ARC's recommendations.

In August 2012, the ARAC's Executive Committee discussed the proposed actions for this tasking. This notice advises the public that the FAA has assigned, and the Executive Committee has accepted, a new task to develop the items listed below. The FAA has specifically tasked the ARAC's Working Group to support the FAA's goal to enhance general aviation safety and reduce the fatal general aviation accident rate by providing:

(1) An integrated Airman Certification Standards document that aligns the aeronautical knowledge testing standards required by 14 CFR part 61 with the flight proficiency standards (''Areas of Operation'') set out in 14 CFR part 61 and the existing Practical Test Standards (PTS) for (a) the private pilot and (b) flight instructor certificates and (c) the instrument rating. To accomplish this task, the Working Group should follow the ARC's recommendations to integrate appropriate elements of aeronautical knowledge and risk management into each Area of Operation in the current Practical Test Standards documents.

(2) A recommendation on priorities for revision of additional certificates and ratings, along with ways to ensure expert review of any revisions to these documents.

(3) A detailed proposal to realign and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., the handbooks listed below) with the integrated Airman Certification Standards documents developed in accordance with item (1). The Working Group will also develop and recommend a process for review and revision of these materials.

(4) Proposed knowledge test item bank questions that are consistent with both the newly developed Airman Certification Standards documents and the test question development principles set forth in the ARC's recommendations. The Working Group will also recommend options that provide for expert outside review (''boarding'') of proposed questions while safeguarding the integrity of the testing process.

The Working Group is expected to develop a report containing each of the listed elements. Any disagreements should be documented, including the rationale for each position and the reasons for the disagreement.

In developing this report, the Working Group shall familiarize itself with:

1. A Report to the FAA from the Airman Testing Standards and Training Aviation Rulemaking Committee: Recommendations to Enhance Airman Knowledge Test Content and Its Processes and Methodologies for Training and Testing (*www.faa.gov/aircraft/draft_docs/arc*).

2. Aeronautical knowledge standards set forth in 14 CFR part 61, Certification: Pilots, Flight Instructors, and Ground Instructors.

3. Flight proficiency standards set forth in 14 CFR part 61, Certification: Pilots, Flight Instructors, and Ground Instructors.

4. FAA Airman Knowledge Test Guide (FAA–G–8082–17E).

5. Current Practical Test Standards documents for Private Pilot Airplane (FAA–S–8081–14B); Flight Instructor Airplane (FAA–S–8081–6C); and Instrument Rating for Airplane, Helicopter, and Powered Lift (FAA–S–8081–4E).

6. Current FAA guidance materials, to include the Pilot's Handbook of Aeronautical Knowledge (FAA–H–8083–25A); the Airplane Flying Handbook (FAA–H–8083–3A); the Aviation Instructor's Handbook (FAA–H–8083–9A); the Instrument Flying Handbook (FAA–H–8083–15A); and the Instrument Procedures Handbook (FAA–H–8083–1A).

## Schedule

The recommendations must be forwarded to the ARAC Executive Committee for review and approval no later than September 30, 2013.

## ARAC Acceptance of New Task

The ARAC's Executive Committee has accepted the task and assigned it to the newly-established ARAC Working Group. The Working Group serves as staff to ARAC and assists in the analysis of the assigned new task. ARAC must review and approve the Working Group's recommendations. If ARAC accepts the Working Group's recommendations, it will send them to the FAA in the form of a written report.

## Working Group Activity

The Working Group must comply with the procedures adopted by ARAC. As part of the procedures, the Working Group must:

1. Recommend a work plan for completion of the task, including the rationale supporting such a plan, for

consideration at the next ARAC Executive Committee meeting held following publication of this notice.

2. Provide a status report at each meeting of the ARAC Executive Committee.

3. Draft the recommendations report and required analyses and/or any other related materials or documents.

4. Present the final recommendations to the ARAC Executive Committee for review and approval.

**Participation in the ARAC Working Group**

The Working Group will be comprised of aviation professionals with experience and expertise in airman training and testing, and technical experts having an interest in the assigned new task. The FAA would like a wide range of members to ensure that all aspects of airman testing and training, including best practices, are considered in the development of its recommendations.

If you wish to become a member of the Working Group, please write the person listed under the caption **FOR FURTHER INFORMATION CONTACT** expressing such desire. Describe your interest in the new task and state the expertise you would bring to the Working Group. We must receive all requests by October 2, 2012.

The ARAC Executive Committee and the FAA will review the requests and advise you whether your request is approved.

If you are chosen for membership on the Working Group, you must actively participate by attending all meetings and providing written comments when requested to do so. You must devote the resources necessary to support the Working Group in meeting any assigned deadlines. You must keep your management chain, and those you may represent, advised of the Working Group's activities and decisions to ensure the proposed technical solutions do not conflict with your sponsoring organization's position, when the subject is presented to ARAC for approval. Once the Working Group has begun deliberations, members will not be added or substituted without the approval of the FAA and the Working Group chair.

The Secretary of Transportation determined the formation and use of ARAC is necessary and in the public interest in connection with the performance of duties imposed on the FAA by law. ARAC meetings are open to the public. However, ARAC Working Group's meetings are not open to the public, except to the extent individuals with an interest and expertise are selected to attend. The FAA will make no public announcement of the Working Group's meetings.

Issued in Washington, DC, on September 5, 2012.

**Lirio Liu,**

*Acting Director, Office of Rulemaking.*

[FR Doc. 2012–22451 Filed 9–11–12; 8:45 am]

BILLING CODE 4910–13–P

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

### 60th Meeting: RTCA Special Committee 135, Environmental Conditions and Test Procedures for Airborne Equipment

**AGENCY:** Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT)

**ACTION:** Meeting Notice of RTCA Special Committee 135, Environmental Conditions and Test Procedures for Airborne Equipment

**SUMMARY:** The FAA is issuing this notice to advise the public of the sixtieth meeting of the RTCA Special Committee 135, Environmental Conditions and Test Procedures for Airborne Equipment

**DATES:** The meeting will be held November 8, 2012 from 9 a.m.—5 p.m.

**ADDRESSES:** The meeting will be held at FAA Aircraft Certification Office, 2601 Meacham Blvd., Ft. Worth, TX 76137. Foreign Nationals will need to complete a Foreign National Authorization Form. Send a completed form to host/point of contact: Daniele Jordan at the following email address: *Danielle.Jordan@faa.gov.*

**FOR FURTHER INFORMATION CONTACT:** The RTCA Secretariat, 1150 18th Street, NW., Suite 910, Washington, DC, 20036, or by telephone at (202) 330–0652/(202) 833–9339, fax at (202) 833–9434, or Web site at *http://www.rtca.org.*

**SUPPLEMENTARY INFORMATION:** Pursuant to section 10(a) (2) of the Federal Advisory Committee Act (Pub. L. No. 92–463, 5 U.S.C., App.), notice is hereby given for a meeting of Special Committee 135. The agenda will include the following:

**November 8, 2012**

- Chairmen's Opening Remarks, Introductions.
- Introduce FAA Representative
- Approval of Summary from the Fifty-Ninth Meeting
- Presentation on the rotorcraft DO–160 environmental qualification of equipment
- Review open proposal's for User's Guide's
- Review Working Group activities
  - Section 4
  - Section 5
  - Section 8
  - Section 16
  - Section 20
  - Section 21
- RTCA Workspace Discussion
- New/Unfinished Business
  - Errata Sheet
  - Schedule for Users Guide
- Establish Date for Next SC–135 Meeting
- Closing/Adjourn

Attendance is open to the interested public but limited to space availability. With the approval of the chairman, members of the public may present oral statements at the meeting. Persons wishing to present statements or obtain information should contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section. Members of the public may present a written statement to the committee at any time.

Issued in Washington, DC, on September 7, 2012.

**David Sicard,**

*Manager, Business Operations Group, Federal Aviation Administration.*

[FR Doc. 2012–22466 Filed 9–11–12; 8:45 am]

BILLING CODE 4910–13–P

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

### Ninth Meeting: RTCA Special Committee 225, Rechargeable Lithium Battery and Battery Systems—Small and Medium Size

**AGENCY:** Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT).

**ACTION:** Meeting Notice of RTCA Special Committee 225, Rechargeable Lithium Battery and Battery Systems—Small and Medium Size.

**SUMMARY:** The FAA is issuing this notice to advise the public of the ninth meeting of the RTCA Special Committee 225, Rechargeable Lithium Battery and Battery Systems—Small and Medium Size.

**DATES:** The meeting will be held October 9–11, 2012, from 9 a.m.–5 p.m.

**ADDRESSES:** The meeting will be held at RTCA, Inc., 1150 18th Street NW., Suite 910, Washington, DC 20036.

**FOR FURTHER INFORMATION CONTACT:** The RTCA Secretariat, 1150 18th Street NW., Suite 910, Washington, DC 20036, or by telephone at (202) 330–0652/(202) 833–9339, fax at (202) 833–9434, or Web site at *http://www.rtca.org.*

## APPENDIX U: ARAC ATST WG MEMBERS + FAA PARTICIPANTS

| Name | Organization |
|---|---|
| **Industry Members** | |
| David Oord, Co-Chair | Aircraft Owners and Pilots Association |
| Jason Blair, Co-Chair | National Association of Flight Instructors |
| Eric Crump | Polk State College |
| Jeremy Desruisseaux | Jeppesen |
| Kate Fraser | General Aviation Manufacturers Association |
| John King | King Schools, Inc. |
| Dr. Janeen Kochan | Aviation Research, Training, and Services, Inc. |
| Kent Lovelace | University of North Dakota |
| John “Mac” McWhinney | King Schools, Inc. |
| Kurt Reesman | Liberty University & Aircraft Owners and Pilots Association Air Safety Institute |
| Hans Reigle | University Aviation Association |
| Roger Sharp | Redbird Skyport & ProFlight Academy |
| Jackie Spanitz | Aviation Supplies & Academics, Inc. |
| Doug Stewart | Society of Aviation and Flight Educators |
| Batson Michael Wilson | AnywhereEducation Inc. |
| **FAA Participants** | |
| Susan Parson, FAA Representative | FAA – AFS-003 |
| Robyn LaPorte | FAA – AFS-210 |
| Leisha Bell | FAA – AFS-270 |
| Kevin Kelly | FAA – AFS-470 |
| Van Kerns | FAA – AFS-600 |
| Eric Baird | FAA – AFS-630 |
| Jim Viola | FAA – AFS-800 |
| Jeff Smith | FAA – AFS-810 |
| Sabrina Jawed | FAA – AGC |
| Barbara Adams | FAA – AIR-280 |

## Co-Chair Biographies

**David J. Oord**
*Manager, Regulatory Affairs*
Aircraft Owners and Pilots Association

Co-chair of the ARAC ATSTWG, David Oord is the Manager of Regulatory Affairs for the Aircraft Owners and Pilots Association (AOPA). Mr. Oord oversees policy and regulations affecting airman certification, aircraft certification, aeromedical certification, and environmental issues. An active pilot, he holds a commercial pilot certificate - both single and multi-engine airplane land and instrument ratings. Mr. Oord obtained a Bachelor of Business Administration in Aviation Management from the University of North Dakota and a Master of Business Administration from Boise State University. Prior to his work for AOPA, he worked in airport management, operations, security and firefighting at Westchester County airport (HPN) and government affairs for the Experimental Aircraft Association (EAA). Mr. Oord serves on ASTM F37 Light-Sport Aircraft Executive subcommittee, chairs ASTM F37.1 Terminology subcommittee, co-chaired the loss of control working groups of the General Aviation Joint Steering Committee (GAJSC), and co-chaired the FAA/Industry Light-Sport Joint Safety Committee (LS-JSC).

With a membership base of nearly 400,000 pilots and aviation enthusiasts in the United States, AOPA is the largest, most influential aviation association in the world. AOPA has achieved its prominent position through effective advocacy, enlightened leadership, technical competence, and hard work. Providing member services that range from representation at the federal, state, and local levels to legal services, advice, and other assistance, AOPA has built a service organization that far exceeds any other in the aviation community.

**Jason Blair**
*Designated Pilot Examiner*

Co-Chair of the ARAC ATST WG, Jason Blair is an active FAA Designated Pilot Examiner and CFI who consults on aviation training and regulatory efforts for general aviation companies. He has and continues to serve on a number of FAA/Industry aviation committees, has previously served as the Executive Director of the National Association of Flight Instructors, and has owned an FBO that provided maintenance and flight training. Mr. Blair is an active CFI with over 2,500 hours of instruction given.

## Industry Member Biographies

**Eric Crump**
*Aerospace Program Director*
Polk State College

Eric Crump administers and actively instructs in a collegiate aviation program in central Florida. Polk State College is widely known for its innovative approach to pilot training through flight simulation and its thorough incorporation of human factors principles in both its academic and flight curricula. Mr. Crump has extensive aviation experience in the Part 61/141 aviation training industry as well as in Part 135 air charter operations. He was Chief Ground Instructor at Middle Tennessee State University, his alma mater, before beginning a professional piloting career in Atlanta, Georgia. Mr. Crump most recently served as Aviation Content Manager and Part 141 Chief Instructor of Gleim Publications, an international pilot training materials provider. He holds current pilot and flight instructor privileges from the FAA and actively serves on various industry boards and in various aviation-related associations.

**Jeremy R. Desruisseaux**
*Portfolio Manager Flight Education*
Jeppesen

Jeremy Desruisseaux is the business development manager for flight training for Jeppesen. Mr. Desruisseaux currently oversees the development of online pilot certification programs and advanced pilot training products and services. He has more than 16 years of experience as a Certificated Flight Instructor, and he has provided more than 4,800-hours of dual instruction in multiple single- and multi-engine aircraft. He has been instrumental in the global development and administration of some of the world’s largest flight training organizations and OEM affiliated flight training programs, including Diamond Aircraft (Diamond Flight Centers) and Pan Am International Flight Academy.

**Kathryn Fraser**
*Manager, Operations*
General Aviation Manufacturers Association

Kathryn Fraser is the Manager of Operations at the General Aviation Manufacturers Association (GAMA), where she provides regulatory staff support for the Association’s work in operations, safety, security and certification. Ms. Fraser also acts as a staff liaison to GAMA committees related to operations and safety and continually works with both member companies and government agencies on these issues. She is also in charge of the GA Air Safety Investigators Workshop (GA-ASI), annually held in Wichita, KS. Ms. Fraser graduated from Kansas State University at Salina with a Bachelor's degree in Aeronautical Technology. She is a commercial rated pilot in both single engine and multi-engine land airplanes and was a flight instructor in the University's flight department prior to joining GAMA.

GAMA represents over 80 of the world’s leading manufacturers, general aviation airplanes and rotorcraft, engines, avionics, components, and related services. In addition to building nearly all of the general aviation airplanes flying worldwide today, GAMA member companies also operate fleets of airplanes, fixed-based operations, pilot/technician training centers, and maintenance facilities worldwide.

**John King**
*Co-Chairman*
King Schools, Inc.

John King, along with his wife and business partner, Martha, owns King Schools. He has been learning about and teaching flying full time since 1975. He considers aviation one of humankind's greatest achievements and those who fly to be very special people. Having through the magic of video and the Internet taught hundreds of thousands of pilots through the decades, he feels his greatest privilege has been to have played a role in the lives of so many pilots. Mr. King considers himself fortunate to have also accumulated some 12,000 flight hours. He holds an Airline Transport Pilot certificate with Single & Multiengine Land and Sea Airplane and Rotorcraft Helicopter ratings, and the following type ratings: Falcon 10, Citation 500, Citation 510S, Eclipse 500S, and LR-JET. Mr. King has Commercial Privileges for Rotorcraft Gyroplane, Glider, and Lighter-than-Air Airship and Free Balloon. He has Sport Pilot endorsements for Powered Parachute Land and Weight-Shift Control Land. He also holds a Flight Instructor certificate with ratings for Airplane Single & Multi-Engine, Rotorcraft Helicopter & Gyroplane, Instrument Airplane and Helicopter, Glider, and Lighter-than-Air and with Sport endorsements for Powered Parachute and Weight-Shift Control. He is also an Advanced and Instrument Ground Instructor.

**Dr. Janeen A. Kochan**
*President/Human Factors Researcher/Instructor/Pilot*
Aviation Research, Training, and Services, Inc.

Dr. Janeen Kochan, a former Boeing 767 captain and Crew Resource Management instructor for a major U.S. airline, presently flies as a corporate pilot. She provides pilot training and conducts FAA pilot certification tests throughout the world. She has over 18,000 hours of flying time in a variety of aircraft and has type ratings in the B-767/757, DC-8, DC-9, YS-11, CV-LB-30, and numerous corporate jets. In addition, she holds current and active Airframe and Powerplant, Inspector Authorization, Flight Instructor, and FAA Designated Pilot Examiner privileges. In addition to providing training and evaluation services to the aviation industry, Dr. Kochan serves as a Courtesy Instructor of Medical Education at the University of Central Florida College of Medicine and is a Visiting Research Professor and an Aviation Expert in Residence for the Drexel University School of Biomedical Engineering, Science and Health Systems. She is an Adjunct Assistant Professor for Embry-Riddle Aeronautical University – Worldwide and Polk State College. Dr. Kochan holds a PhD in Applied Experimental and Human Factors Psychology from the University of Central Florida in Orlando and an M.S. in Industrial and Systems Engineering from the Ohio State University. Her BA degree was also earned from the Ohio State University in pre-medicine and psychology.

**Kent Lovelace**
*Professor and Chair, Department of Aviation*
University of North Dakota

Kent Lovelace holds the rank of Full Professor and is Chairman of the Aviation Department at the University of North Dakota (UND) in Grand Forks, overseeing the academic program of 1,500 students enrolled as aviation majors in various undergraduate and graduate degree programs. Prof. Lovelace holds an Airline Transport Pilot Certificate with a Cessna Citation Type Rating and a CFI Certificate with all of the fixed wing ratings. He has accumulated over 4,000 hours of flying experience, with 3,400+ hours of dual given. Prof. Lovelace has developed or co-developed and taught many of UND's aviation flight courses and has co-authored several publications for pilot certification courses as well as other aviation-related flight courses. He has given numerous presentations at local, regional and national aviation conferences. He has a Bachelor's Degree in Business Administration along with a Master's degree in Education from University of North Dakota. In addition to his academic responsibilities, Prof. Lovelace is in his tenth year as a Director on the National Business Aviation Association's Certified Aviation Managers Governing Board and recently stepped down as a Director of the National Intercollegiate Flying Association's Board of Directors after serving for 27 years. He is active with the University Aviation Association and Aviation Accreditation Board International though various committees.

**John "Mac" McWhinney**
*Senior Course Developer*
King Schools, Inc.

John "Mac" McWhinney, a retired U.S. Navy Captain, served as a pilot and officer fulfilling numerous leadership, management, and administrative positions in U.S. Navy aircraft squadrons, air wings, and command staffs. Captain McWhinney commanded a Navy Light Attack squadron, Carrier Air Wing, and a Combat Stores ship. He has logged over 8,000 total flight hours and 1,000 arrested landings on U.S. Navy aircraft carriers. In civil aviation, he holds a CE-500 type rating on an ATP certificate. He also holds a Flight Instructor certificate with Airplane Single Engine and Instrument ratings as well as a Ground Instructor certificate with an Advanced Instrument rating. Under a Part 135 certificate, Mr. McWhinney flew single-pilot air ambulance operations on Cessna 400 series aircraft and as SIC in Lear 20 series aircraft and was designated as the training pilot for the Cessna 400 series aircraft.

Mr. McWhinney has over 20 years of experience at his current employment developing and maintaining pilot and aviation mechanic training courses and supervising development teams working on them. He held positions as department manager, vice president, and senior vice president. His current situation is part-time allowing involvement in many activities including flight instruction. Mr. McWhinney has participated with the committee that developed the FAA/Industry Training Standards (FITS), the General Aviation Joint Steering Committee (GAJSC) Subgroup on Personal/Sport Aviation, and the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC). Mr. McWhinney holds a BS in Math/Physics Education from Purdue University.

**Kurt Reesman**
*Associate Professor/Lecturer/Instructor/Pilot*
Liberty University and Aircraft Owners and Pilots Association Air Safety Institute

Kurt Reesman, a retired U.S. Air Force Instructor and Evaluator pilot, is currently an Associate Professor and Flight Instructor in the Liberty University School of Aeronautics. In addition, he travels with the Aircraft Owners and Pilots Association Air Safety Institute as a Flight Instructor Refresher Course Instructor and Safety Seminar Presenter. Mr. Reesman is also a FAASTeam Representative with the Richmond Flight Service District Office. He provides academic and flight training instruction at Liberty University, and nationwide with AOPA. He has over 4,000 hours of flying time in the U.S. Air Force's T-37, T-38, RF-4C and F-15E, as well as the Royal Saudi Air Force F-15S. He served as an instructor and evaluator pilot in the T-37, F-15E and the F-15S. His civilian flight, and instructor time includes experience in various Cessna and Piper single-engine and multi-engine aircraft. Currently he holds current and active Flight Instructor privileges. Mr. Reesman holds a Master of Aeronautical Science, Operations concentration, from Embry-Riddle Aeronautical University and a BA in Psychology and Religious Studies from Western Kentucky University.

**Hans Reigle**
*Assistant Professor/Assistant Director of Aviation Program at Delaware State University*
University Aviation Association

Professor Hans Reigle currently represents the University Aviation Association (UAA) on the ATST WG. With over 11,000 flight hours, his flight experience includes: Captain on the Airbus 320 at United Airlines, United States Air Force Instructor Pilot on the Lockheed C-5 Galaxy, U.S. Army Instructor Pilot in the UH-1 Huey helicopter, Flight Engineer on the Boeing 727 and First Officer on the Boeing 777. He has extensive CRM, Part 121 and glass cockpit experience in addition to over 1,000 hours of general aviation aircraft experience. He currently holds CFI and CFII ratings for Single and Multiengine Airplanes and Helicopters. Additionally, he holds Airline Transport Pilot type ratings in the Boeing 777 and Airbus 319/320 aircraft with a Flight Engineer Turbojet Powered certificate. Prof. Reigle is currently an Assistant Professor and is the Assistant Director of the aviation program at Delaware State University in Dover, Delaware where he specializes in Crew Resource Management and International Air Transportation studies.

The UAA is the voice of collegiate aviation to the industry, government and the general public. Through the collective expertise of its members, this nonprofit organization plays a pivotal role in the advancement of degree-granting aviation programs that represent all segments of aviation. The UAA has more than 525 members, including 105 accredited colleges and universities.

**Roger Sharp**
*General Manager, Operations*
Redbird Skyport and ProFlight Academy

Roger Sharp is currently the General Manager for Flight Operations at Redbird Skyport and ProFlight Academy. He holds five ATP category and class ratings and has been actively instructing for over 30 years. He is a Designated Pilot Examiner for Airplanes (Land & Sea) and Helicopters. Prior to joining Redbird he was Program Manager and Regional Manager for Cessna's Pilot Center Program. Prior to Cessna he spent 20 years in the USAF, and was a Command Pilot, Stan-Eval Examiner, and Master Instructor. He holds undergraduate degrees in Biology and Chemistry, and graduate degree in Education.

**Jackie Spanitz**
*Director of Curriculum Development*
Aviation Supplies & Academics, Inc.

Jackie Spanitz is Director of Curriculum Development for Aviation Supplies & Academics, Inc. (ASA). She oversees new and existing product development, ranging from textbooks and flight computers to software products, and digital and mobile solutions, and integration of these products into new and existing curricula. She has worked directly with the training and testing associated with airman certification for 20 years, including the FAA Knowledge and Practical Exams. Ms. Spanitz holds a Bachelor of Science in aviation technology from Western Michigan University, a Masters in Aeronautics Science from Embry Riddle Aeronautical University, and Instructor and Commercial Pilot certificates. She is the author of *Guide to the Flight Review, Private Pilot Syllabus, Instrument Rating Syllabus,* and *Commercial Pilot Syllabus*, is the technical editor for ASA's Test Prep and FAR/AIM series, and has written for numerous aviation publications.

ASA has been providing trusted aviation training products for more than 65 years to flight instructors, aviation maintenance technicians, air traffic controllers, career aviators, and students. ASA's pilot supplies, software, and publications are supported with integrity, consistency, superior quality, and the best customer service in the industry from the corporate headquarters in Newcastle, Washington. ASA's nearly 100 authors consist of subject matter experts from around the globe and represent a wide-range of disciplines and organizations including pilot and maintenance colleges and universities, air traffic controllers, manufacturers, engineers, government agencies, airlines, and corporate flight departments.

**Doug Stewart**
*Executive Director/Co-founder*
Society of Aviation and Flight Educators (SAFE)

Doug Stewart is the Executive Director and co-founder of the Society of Aviation and Flight Educators (SAFE) as well as a full time flight instructor and designated pilot examiner. He is the 2004 National CFI of the Year. Doug has provided more than 10,500 hours of dual instruction, specializing in IFR training, complex and technically advanced aircraft, as well as tailwheel training. He authored "*The Vintage Instructor*" column for *Vintage Airplane* magazine for many years, and is a frequent contributor to the "*FAA Safety Brief.*"

SAFE is a member-centric, professional organization for aviation educators. SAFE facilitates the professional development of aviation educators; it seeks improved learning materials for all aviation students, and a safer aviation environment. SAFE seeks to create a safer aviation environment through enhanced education. SAFE provides aviation educators with mentoring, support, and professional accreditation. By providing quality educational materials and other resources, we seek a reduction in aviation accidents, increased professionalism among aviation educators, and lifelong learning by everyone involved in aviation.

**Batson Michael Wilson**
*President/CEO*
AnywhereEducation Inc.

Baton Wilson is the President/CEO of AnyhereEducation Inc., the world's largest provider of online and mobile aviation training with over 500,000 unique users in 100 countries since 1999. He holds an ATP (multi-engine land), Commercial (single engine land and sea & rotorcraft-helicopter). Mr. Wilson has over 5,600 hours of flight time (including 1,200 hours of helicopter time), and he has been actively instructing for 14 years. He also holds a CFI, CFII, MEI, AGI and IGI. Mr. Wilson previously served as a Part 141 Chief Flight Instructor.

## FAA Participant Biographies

**Susan Parson**
*Editor,* FAA Safety Briefing *Magazine*
*Special Technical Assistant*
Flight Standards Service

Susan Parson is the FAA Representative for the ATST WG. She holds an ATP certificate, as well as ground and flight instructor certificates with instrument, single engine, and multi-engine land ratings. She has repeatedly earned Master Flight Instructor and Master Ground Instructor designations from NAFI and Master Instructors LLC. An active general aviation pilot, Ms. Parson continues to instruct on weekends for her Leesburg-based C182 flying club and the Civil Air Patrol, in which she has held safety and stan/eval positions at the Wing and Region levels. As editor of *FAA Safety Briefing* magazine and in her Flight Standards role, which included work on the General Aviation Joint Steering Committee, Ms. Parson has authored over 80 GA safety articles and several online training documents and courses. These include *Conducting an Effective Flight Review*, *Instrument Proficiency Check Guidance*, the *General Aviation Pilot's Guide to Preflight Weather Planning, Weather Self-Briefings, and Weather Decision Making*, and *Best Practices for Mentoring in Flight Instruction*. In her various CAP roles, she has created a number of advanced avionics training courses and modules, and she is the primary author of the Civil Air Patrol's online National Check Pilot Standardization Course.

Ms. Parson has been with the Federal Aviation Administration since May 2004, serving in the General Aviation and Commercial Division of the FAA Flight Standards Service from May 2004 until June 2009, when she took a position as special technical assistant to the director of the FAA Flight Standards Service.

**Robyn LaPorte**
*Aviation Safety Inspector, Air Carrier and Part 142 Training Center Branch (AFS-210)*
Flight Standards Service

Robyn LaPorte is assigned to the Air Carrier and Part 142 Training Center Branch in the Air Transportation Division. Ms. LaPorte currently supports stall and upset prevention and recovery training guidance development, the A350 Flight Standardization Board, the Commercial Aviation Safety Team, and follow-on work to the Pilot Certification and Qualification Requirements for Air Carrier Operations final rule.

Ms. LaPorte holds an airline transport pilot certificate with multiengine airplane land rating and type ratings on the A320 and SF-340. She also holds a single engine commercial certificate and flight instructor certificate with instrument and multiengine land ratings. Prior to becoming an aviation safety inspector, Ms. LaPorte was a pilot in part 121 operations for over ten years flying the Avro RJ 85, SF-340, and A319/321. Ms. LaPorte also instructed systems integration and procedures training for the A320 series aircraft. After graduating from college, Ms. LaPorte built her flight time by flight instructing and flying part 135, traffic patrol, sightseeing flights, and aerial surveys.

**Leisha Bell**
*Management and Program Analyst, Policy Integration Branch (AFS-270)*
Federal Aviation Administration

Leisha Bell is a Management and Program Analyst for the Policy Integration Branch of the Air Transportation Division of the Federal Aviation Administration. She is a member of multiple FAA rulemaking teams, including the Pilot Certification and Qualification Requirements for Air Carrier Operations. Ms. Bell was an integral part of drafting this rule and the associated FAA policy. In addition to this work, Ms. Bell is responsible for reviewing Air Transportation Division responses to NTSB safety recommendations, drafting reports to Congress, and responses to Congressional inquiries.

Before joining the FAA, Ms. Bell was the Director of Regulatory Affairs for the Aircraft Owners and Pilots Association. Ms. Bell holds a BS from the University of Connecticut and an MBA from Loyola University Maryland. She holds an airline transport pilot certificate and flight instructor certificate with multiengine and instrument instructor ratings.

**Eric Baird**
*Manager, Airman Testing Standards Branch (AFS-630)*
Flight Standards Service

Eric Baird holds a Commercial Pilot certificate with single and multi-engine land as well as rotorcraft, helicopter ratings. He also holds a flight instructor certificate. In addition, he holds an Aircraft Mechanic Certificate with Inspection Authorization and a Master Parachute Rigger certificate.

Since 1991, Mr. Baird’s work focus has been on FAA designees. He has been an instructor and manager of the Designee Standardization Branch, AFS-640; he started the Designee Quality Assurance Branch, AFS-650. He served as the FAA Designee Steering Group chairman and program manager for the development of the Designee Management System that is scheduled to go live in early FY 2014. He accepted the position of Manager of the Airman Testing Standards Branch, AFS-630, in June, 2013. Mr. Baird has a BS in Aviation Administration and an MS in Aerospace Administration from Southeastern Oklahoma State University. He also provides leadership in community; having served in various positions on the board of directors of Deaconess Hospital, Butterfield Memorial Foundation, both located in Oklahoma City as well as Central Christian College, located in McPherson, Kansas.

**James Viola**
*Manager, General Aviation and Commercial Division (AFS-800)*
Flight Standards Service

James Viola is the FAA Division Manager of the General Aviation and Commercial Division, Flight Standards, AFS-800. In part, this division is responsible for regulations and policy general aviation (GA) airmen, flight instructors, GA air agencies (pilot schools), commercial operations, and public aircraft operations. The division is the focal point for the aviation community at the national level on matters pertaining to GA affairs and certain aspects of sport aviation. The division is also the FAA focal point for GA safety outreach and education through the FAA Safety Team (FAASTeam), the International Helicopter Safety Team (IHST) and the *FAA Safety Briefing* magazine.

In his personal time, Mr. Viola is also the Program Director for the International Helicopter Safety Team and the Director of the Pilot Familiarization Program for The International Grumman American Pilots Association, as well as the working group Chairman for General Aviation of the International Society of Air safety Investigators. He holds Airline Transport and Flight Instructor Certificates for airplanes and helicopters; and is qualified in a variety of helicopters including the Robinson R-22, R-44: the Hughes 269/300, the Sikorsky UH-60 Black Hawk; the Bell UH-1 Huey, OH-58 Jet Ranger, and AH-1 Cobra; the McDonald Douglas 500 series; and the Boeing MH-47 Chinook. Mr. Viola has also flown more than 30 single and multi-engine airplanes. He holds a Master of Science in International Relations from Auburn University, Montgomery, AL. Prior to his current position, Mr. Viola was a General Aviation Safety Inspector at the DC FSDO for both airplanes and helicopters. He was responsible for Title 14 of the Code of Federal Regulations Parts 61, 91, 133, 135, and 137. He administered CFI practical flight tests to both airplane and helicopter flight instructor candidates, was a National Resource Inspector for Robinson Helicopters, and attended the FAA Night Vision Course adding the FAA qualification to his 1000+ hours of Military Night Vision Goggle experience.

**Jeffrey Smith**
*Manager, Airman Training and Certification Branch (AFS-810)*
Flight Standards Service

Jeffrey Smith has worked for the past six years as an Aviation Safety Inspector, General Aviation Operations, with the Federal Aviation Administration. He is the manager for the Airman Training and Certification Branch (AFS-810), having served in this branch for over three years. AFS-810 is primarily responsible for the certification standards of pilot schools, pilots, flight instructors, and ground instructors under 14 CFR parts 61 and 141. Prior to his positions in AFS-810, Mr. Smith served as an Assistant Principal Operations Inspector in the South Florida Flight Standards District Office (FSDO), with primary oversight and surveillance of persons operating under 14 CFR parts 61 and 141. Additional oversight duties involved entities operating under 14 CFR parts 91, 133, 135, 137 and 142.

Mr. Smith currently serves in the Fredericksburg, VA Civil Air Patrol squadron. He is a pilot, instructor and check pilot for the CAP, as well as the aerospace-education officer for the squadron.

**Barbara Adams**
*Analyst, Air Carrier Training Programs and Voluntary Safety Programs Branch (AFS-280)*
Flight Standards Service

Barbara Adams has worked in various areas of the Federal Aviation Administration over the past 7 years. Some of the areas she has been involved with include the FAA Aviation Safety Hotline, FAA and National Transportation Safety Board safety recommendation programs, air carrier national policy, experimental aircraft airworthiness national policy, and most recently served as the Team Lead for the Pilot Certification and Qualification Requirements for Air Carrier Operations rulemaking project, which revised the requirements for obtaining an ATP certificate in the airplane category.

Prior to coming to the FAA, Barbara served as an aviation technical specialist for AOPA. She also served as a pilot for Independence Air/Atlantic Coast Airlines, and was a flight instructor for several years. She has a BBA in Aviation Management and a MS in Aviation from the University of North Dakota.

# APPENDIX V: ABBREVIATIONS + ACRONYMS

| Abbreviation/ Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| ACSWG | ACS Working Group |
| ADF | Automatic Direction Finder |
| AFS | FAA Flight Standards Service |
| AFS-200 | FAA Air Transportation Division |
| AFS-400 | FAA Flight Technologies and Procedures Division |
| AFS-600 | FAA Regulatory Support Division |
| AFS-630 | FAA AFS Regulatory Support Division Airman Testing Standards Branch |
| AFS-800 | General Aviation and Commercial Division |
| AGC | Office of the Chief Counsel |
| AKT | Airman Knowledge Testing |
| AMT | Aviation Maintenance Technician |
| AOPA | Aircraft Owners and Pilots Association |
| ARAC | Aviation Rulemaking Advisory Committee |
| ARC | Aviation Rulemaking Committee |
| ASI | Aviation Safety Inspector |
| ATP | Airline Transport Pilot |
| ATST WG | Airman Testing Standards and Training Working Group |
| CAM | Certified Aviation Manager |
| CFI | Certified Flight Instructors |
| COM | Commercial Pilot |
| DPE | Designated Pilot Examiner |
| FAA | Federal Aviation Administration |
| FAAST | FAA Safety Team |
| FOI | Fundamentals of Instructing |
| GA | General Aviation |
| GAMA | General Aviation Manufacturers Association |
| InFO | Information for Operators |
| KTS | Knowledge Test Standards |
| LSC | Learning Statement Codes |
| NAFI | National Association of Flight Instructors |
| NAS | National Airspace System |
| NDB | Non-Directional Beacon |
| ODA | Organization Designation Authorization |
| OPR | FAA Office of Primary Responsibility |
| PTS | Practical Test Standards |
| QMS | Quality Management System |
| RNAV | Area Navigation |
| SAFE | Society of Aviation and Flight Educators |
| SAFO | Safety Alert for Operators |
| SBT | Scenario-Based Training |

| Abbreviation/ Acronym | Definition |
|---|---|
| SME | Subject Matter Expert |
| SMKC | Subject Matter Knowledge Codes |
| SMS | Safety Management System |
| SPANS | Safety Program Airmen Notification System |
| UAA | University Aviation Association |

# Aviation Rulemaking Advisory Committee

## Airman Certification System Working Group

### Interim Recommendation Report

May 21, 2018

May 21, 2018

Yvette A. Rose
Chair, Aviation Rulemaking Advisory Committee
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Ms. Rose,

On behalf of the Airman Certification System Working Group (ACSWG), we submit the following interim recommendation report to the Aviation Rulemaking Advisory Committee (ARAC) for consideration and implementation.

The FAA and the Aviation Industry have continued its collaborative effort to improve airman training and testing by establishing an integrated, holistic airman certification system that clearly aligns testing with the certification standards, guidance, and reference materials, and maintains that alignment.

As part of its ongoing effort, the ACSWG has provided feedback on draft standards for the Airline Transport Pilot (ATP) and Type Rating for Airplane, Commercial Pilot – Military Competence, the Aviation Maintenance Technician (AMT), and Instructor. Additionally, we have included recommendations on Instructor ACS development, prototype, and guidance as well as a recommendation to align AMT training regulations and guidance with the ACS.

Collectively, we recommend and endorse the committee's transmittal of the working group recommendations to the FAA for further review, incorporation, and execution. We are confident that, by doing so, the safety of aviation will continue to markedly improve.

Sincerely,

David Oord
ACSWG Chair
ARAC Vice-Chair
Senior Director, Regulatory Affairs
Aircraft Owners and Pilots Association

Susan Parson
FAA Representative
Flight Standards Service
Federal Aviation Administration

Eric Crump
ACSWG Subgroup Lead
Aerospace Program Director
Polk State College

Janeen Kochan, PhD, FRAeS,
AMT ACS Subgroup Co-chair
Human Factors Scientist/Designated Pilot Examiner/Instructor Pilot
Aviation Research, Training, and Services, Inc.

John "Mac" McWhinney
ACSWG Subgroup Lead
Senior Course Developer
King Schools, Inc.

Jackie Spanitz
ACSWG Subgroup Lead
General Manager
Aviation Supplies & Academics, Inc.

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## Airman Certification Standards

FAA-S-ACS-11

U.S. Department
of Transportation

**Federal Aviation
Administration**

**FAA-S-ACS-11**

# Airline Transport Pilot and Type Rating for Airplane

## Airman Certification Standards

**Date TBD**

**Flight Standards Service
Washington, DC 20591**

## Acknowledgments

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Office of Safety Standards, Regulatory Support Division, Airman Testing Branch, P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

## Availability

This ACS is available for download from www.faa.gov. Please send comments regarding this document using the following link to the Airman Testing Branch Mailbox: afs630comments@faa.gov .

Material in FAA-S-ACS-11 will be effective XXXX 2019. All previous editions of the Airline Transport Pilot and Aircraft Type Rating -Practical Test Standards for Airplane will be obsolete as of this date for Airplane applicants.

# Foreword

The Federal Aviation Administration (FAA) has published the Airline Transport Pilot—Airplane Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, risk management, and flight proficiency standards for airline transport pilot certification (ATP) and type rating in the airplane category, single-engine land and sea; and multiengine land and sea classes. This ACS incorporates and supersedes the previous Airline Transport Pilot and Aircraft Type Rating Practical Test Standards (PTS) for Airplane, FAA-S-8081-5.

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing. Specifically, the ACS, associated guidance, and test question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which internal and external stakeholders identify and evaluate regulatory changes, safety recommendations, or other factors that require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

The FAA has developed this ACS and its associated guidance in collaboration with a diverse group of aviation training experts. The goal is to drive a systematic approach to all components of the airman certification system, including knowledge test question development and conduct of the practical test. The FAA acknowledges and appreciates the many hours that these aviation experts have contributed toward this goal. This level of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Executive Director, Flight Standards Service

Revision History

| Document # | Description | Revision Date |
|---|---|---|
| FAA-S-8081-5F | Airline Transport Pilot and Aircraft Type Rating Practical Test Standards for Airplane | July 2008 |
| FAA-S-ACS-11 | Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards | XXXX, XXXX |

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# Introduction

## Airman Certification Standards Concept

The goal of the airman certification process is to ensure the applicant possesses the knowledge and skill consistent with the privileges of the certificate or rating being exercised, as well as the ability to manage the risks of flight in order to act as Pilot-in-Command (PIC).

In fulfilling its responsibilities for the airman certification process, the FAA flight standards service (AFS) plans, develops, and maintains materials related to airman certification training and testing. These materials have included several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. Other materials, such as handbooks in the FAA-H-8083 series, provide guidance to applicants on aeronautical knowledge, risk management, and flight proficiency.

The FAA recognizes that safe operations in today's complex National Airspace System (NAS) require a more systematic integration of aeronautical knowledge, risk management, and flight proficiency standards than those prescribed in the PTS. The FAA further recognizes the need to more clearly calibrate knowledge, risk management, and skills to the level of the certificate or rating, and to align standards with guidance and test questions.

To accomplish these goals, the FAA drew upon the expertise of organizations and individuals across the aviation and training community to develop the ACS. The ACS integrates the elements of knowledge, risk management, and skill listed in 14 CFR part 61 for each airman certificate or rating. It thus forms a more comprehensive standard for what an applicant must know, consider, and do for the safe conduct and successful completion of each Task to be tested on either the knowledge exam or the practical test.

The ACS significantly improves the knowledge test part of the certification process by enabling the development of test questions, from FAA reference documents, that are meaningful and relevant to safe operation in the NAS. It is important for applicants, instructors, and evaluators to understand that the addition of knowledge and risk management elements is not intended to lengthen or expand the scope of the practical test. Rather, the integration of knowledge and risk management elements associated with each Task is intended to enable a more holistic approach to learning, training, and testing. During the ground portion of the practical test, for example, the ACS provides greater context and structure both for retesting items missed on the knowledge test, if applicable, and for sampling the applicant's mastery of knowledge and risk management elements associated with a given skill Task.

Through the ground and flight portion of the practical test, the FAA expects evaluators to assess the applicant's mastery of the topic in accordance with the level of learning most appropriate for the specified Task. The oral questioning will continue throughout the entire practical test. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge, experience, and information to the circumstances of the given scenario. The flight portion of the practical test requires the applicant to demonstrate knowledge, risk management, flight proficiency, and operational skill in accordance with the ACS. Knowledge elements not evident in the demonstrated skills may be tested by questioning, at any time, during the flight portion of the test. Questioning in-flight should be used judiciously so that safety is not jeopardized. Questions may be deferred until after the flight portion of the test is completed.

***Note:*** *As used in the ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector (ASI)), designated pilot examiner (DPE), or other individual authorized to conduct test for a certificate or rating).*

## Using the ACS

The ACS consists of ***Areas of Operation*** arranged in a logical sequence, beginning with Preflight Preparation and ending with Postflight Procedures. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know, consider, and/or do. The ACS then lists the aeronautical knowledge, risk management, and skill elements relevant to the specific Task, along with the conditions and standards for acceptable performance. The ACS uses ***Notes*** to emphasize special considerations. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The term “may” denotes items that are recommended but not required. The ***References*** for each Task indicate the source material for Task elements. For example, in Tasks such as “Airport markings, signs, and lights.” (AA.II.C.K3), the applicant must be prepared for questions on any airport markings, signs, and lights presented in the references for that Task.

The abbreviation(s) within parentheses immediately following a Task refer to the category and/or class aircraft appropriate to that Task. The meaning of each abbreviation is as follows.

ATP: Initial issuance of an ATP Certificate only (not applicable to Type rating applicants)
ASEL: Airplane – Single-Engine Land
ASES: Airplane – Single-Engine Sea
AMEL: Airplane – Multiengine Land
AMES: Airplane – Multiengine Sea

***Note:*** *When administering a test based on this ACS, the Tasks appropriate to the class airplane (ASEL, ASES, AMEL, or AMES) used for the test must be included in the plan of action. The absence of a class indicates the Task is for all classes.*

Each Task in the ACS is coded according to a scheme that includes four elements. For example:

**AA.I.B.K4:**
**AA** = Applicable ACS (Airline Transport Pilot – Airplane)
**I** = Area of Operation I (Preflight Preparation)
**B** = Task B (Performance & Limitations)
**K4** = Knowledge Task element 4 (Aerodynamics and how it relates to performance.)

Knowledge test questions are mapped to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC). After this transition occurs, the Airman Knowledge Test Report (AKTR) will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. Remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task elements.

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., “PLT058”) code will continue to be displayed on the AKTR. The LSC codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC codes and ACS codes.

Because all active knowledge test questions for the Airline Transport Pilot Airplane Knowledge Tests (ATM and ATS) have been aligned with the corresponding ACS, evaluators can use LSC codes in conjunction with the ACS for the time being. The evaluator should look up the LSC code(s) on the applicant’s AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the evaluator can use the corresponding Area(s) of Operation/Task(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant’s understanding of that material in the context of the appropriate ACS Area(s) of Operation and Task(s).

The applicant must pass the knowledge test before taking the practical test, if applicable to the certificate or rating sought. The practical test is conducted in accordance with the ACS and FAA regulations that are current as of the date of the test. Further, the applicant must pass the ground portion of the practical test before beginning the flight portion.

The ground portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test. The oral questioning will continue throughout the entire practical test.

The FAA encourages applicants and instructors to use the ACS when preparing for the knowledge tests and practical tests. The FAA will revise the ACS as circumstances require.

I. Preflight Preparation

| Task | *A. Operation of Systems* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; AC 90-117, AC 91.21-1, AC 91-78, AC 120-76; POH/AFM; FSB report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with airplane systems and their components; and their normal, abnormal, and emergency procedures. |
| **Knowledge** | The applicant demonstrates an understanding of: |
| *AA.I.A.K1* | **Landing gear**—extension/retraction system(s); indicators, float devices, brakes, antiskid, tires, nose-wheel steering, and shock absorbers. |
| *AA.I.A.K2* | **Powerplant**—controls and indications, induction system, carburetor and fuel injection, turbocharging, cooling, mounting points, turbine wheels, compressors, deicing, anti-icing, and other related components. |
| *AA.I.A.K3* | **Propellers**—type, controls, feathering/unfeathering, auto-feather, negative torque sensing, synchronizing, synchrophasing, and thrust reverse including uncommanded reverse procedures. |
| *AA.I.A.K4* | **Fuel system**—capacity; drains; pumps; controls; indicators; cross-feeding; transferring; jettison; fuel grade, color and additives; fueling and defueling procedures; and fuel substitutions, if applicable. |
| *AA.I.A.K5* | **Oil system**—capacity, allowable types of oil, quantities, and indicators. |
| *AA.I.A.K6* | **Hydraulic system**—capacity, pumps, pressure, reservoirs, allowable types of fluid, and regulators. |
| *AA.I.A.K7* | **Electrical system**—alternators, generators, batteries, circuit breakers and protection devices, controls, indicators, and external and auxiliary power sources and ratings. |
| *AA.I.A.K8* | **Pneumatic and environmental systems**—heating, cooling, ventilation, oxygen, pressurization, supply for ice protection systems, controls, indicators, and regulating devices. |
| *AA.I.A.K9* | **Avionics and communications**—autopilot; flight director; Electronic Flight Instrument Systems (EFIS); Flight Management System (FMS); Electronic Flight Bag (EFB); Radar; Inertial Navigation Systems (INS); Global Navigation Satellite System (GNSS), Space-Based Augmentation System (SBAS), Ground-Based Augmentation System (GBAS); ground-based navigation systems and components; ADS-B In and Out, traffic awareness/warning/avoidance systems, terrain awareness/warning/alert systems; communication systems (e.g., data link, UHF/VHF/HF, satellite); other avionics, as appropriate; indicating devices; transponder; and emergency locator transmitter. |
| *AA.I.A.K10* | **Ice protection**—anti-ice, de-ice, pitot-static system protection, turbine inlet, propeller, windshield, airfoil surfaces. |
| *AA.I.A.K11* | **Crewmember and passenger equipment**—oxygen system, survival gear, emergency exits, evacuation procedures and crew duties, quick donning oxygen mask for crewmembers, passenger oxygen system. |
| *AA.I.A.K12* | **Flight controls**—ailerons, elevator(s), rudder(s), control tabs, control boost/augmentation systems, flaps, spoilers, leading edge devices, stability augmentation system (e.g., yaw damper), and trim systems. |
| *AA.I.A.K13* | **Pitot-static system** with associated instruments and the power source for those flight instruments if applicable. Operation and power sources for other flight instruments. |
| *AA.I.A.K14* | **Fire & smoke detection/protection/suppression**—powerplant, cargo and passenger compartments, lavatory, pneumatic and environmental, electrical/avionics, and batteries (on-aircraft and personal electronic devices). |
| *AA.I.A.K15* | **Envelope protection**—angle of attack warning and protection and speed protection. |
| *AA.I.A.K16* | The contents of the POH or AFM with regard to the systems and components in the airplane. |

| **Task** | ***A. Operation of Systems*** |
|---|---|
| *AA.I.A.K17* | How to use a Minimum Equipment List (MEL) and a Configuration Deviation List (CDL). |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.A.R1* | Failure to detect system malfunctions or failures. |
| *AA.I.A.R2* | Improper management of a system failure. |
| *AA.I.A.R3* | Failure to monitor and manage automated systems. |
| *AA.I.A.R4* | Failure to follow appropriate checklists or procedures. |
| **Skills** | For the airplane provided for the practical test, the applicant demonstrates the ability to: |
| *AA.I.A.S1* | Explain and describe the operation of each airplane system and its components using correct terminology. |
| *AA.I.A.S2* | Recall immediate action items or memory items, if appropriate. |
| *AA.I.A.S3* | Identify any system or component limitations listed in the POH/AFM. |
| *AA.I.A.S4* | Demonstrate or describe, as appropriate, the process for deferring inoperative equipment (e.g., MEL) and using a CDL. |
| *AA.I.A.S5* | Comply with operations specifications, if applicable. |
| *AA.I.A.S6* | Through the use of the appropriate checklists and normal and abnormal procedures, demonstrate the proper use of the airplane systems, subsystems, and devices, as determined by the evaluator. |

| Task | *B. Performance and Limitations* |
|---|---|
| **References** | 14 CFR parts 1, 61, 91; FAA-H-8083-1, FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; AC 120-58; Chart Supplements; POH/AFM; AIM; AC 20-117, AC 61-138, AC 91-74, AC 91-79, AC 120-27, AC 120-60, AC 135-17 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with operating an aircraft safely within the parameters of its performance, capabilities, and limitations. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.I.B.K1* | Elements related to performance and limitations by explaining the use of charts, tables, and data to determine performance. |
| *AA.I.B.K2* | How to determine the following (as applicable to the category and class sought): |
| *AA.I.B.K2a* | a. Accelerate-stop / accelerate-go distance |
| *AA.I.B.K2b* | b. Takeoff performance (include balance field length, $V_{MCG}$) |
| *AA.I.B.K2c* | c. Climb performance |
| *AA.I.B.K2d* | d. Cruise performance |
| *AA.I.B.K2e* | e. Descent performance |
| *AA.I.B.K2f* | f. Landing distance |
| *AA.I.B.K2g* | g. Performance with an engine inoperative for all phases of flight |
| *AA.I.B.K2h* | h. Weight and balance and how to shift weight |
| *AA.I.B.K3* | Factors affecting performance, to include: |
| *AA.I.B.K3a* | a. Atmospheric conditions |
| *AA.I.B.K3b* | b. Pilot technique |
| *AA.I.B.K3c* | c. Aircraft configuration (e.g., flap setting) |
| *AA.I.B.K3d* | d. Airport environment (e.g., runway condition, land and hold short operations (LAHSO)) |
| *AA.I.B.K3e* | e. Loading (e.g., center of gravity) |
| *AA.I.B.K3f* | f. Weight and balance |
| *AA.I.B.K4* | Aerodynamics and how it relates to performance. |
| *AA.I.B.K5* | Adverse effects of exceeding an airplane limitation or the airplane operating envelope. |
| *AA.I.B.K6* | Effects of icing on performance. |
| *AA.I.B.K7* | Clean wing concept; deicing and anti-icing procedures to include use of appropriate de-ice fluid, hold-over tables, calculating hold-over times, and pre-takeoff contamination checks. |
| *AA.I.B.K8* | Stabilized approach procedures and the decision criteria for go-around or rejected landings. |
| *AA.I.B.K9* | Air carrier weight and balance systems (e.g., average weight program). (ATP AMEL, AMES) |
| *AA.I.B.K10* | Runway assessment and condition reporting and use of the Runway Condition Assessment Matrix (RCAM). (ATP AMEL, AMES) |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.B.R1* | Inaccurate use of performance charts, tables, and data. |
| *AA.I.B.R2* | Exceeding airplane limitations. |
| *AA.I.B.R3* | Possible differences between calculated performance and actual performance. |
| *AA.I.B.R4* | Airplane icing and its effect on performance and stall warning. |
| *AA.I.B.R5* | Runway excursions. |
| **Skills** | For the airplane provided for the practical test, the applicant demonstrates the ability to: |
| *AA.I.B.S1* | Describe the airspeeds used during specific phases of flight. |

| Task | *B. Performance and Limitations* |
|---|---|
| *AA.I.B.S2* | Describe the effects of meteorological conditions upon performance characteristics for any phase of flight and correctly apply these factors to a specific chart, table, graph, or other performance data. |
| *AA.I.B.S3* | Explain the adverse effects of airframe icing during all phases of flight and describe the procedures for wing contamination recognition and any airplane limitations for icing conditions. If equipped, describe the procedures for de-icing and anti-icing system use and any affects it may have on performance. |
| *AA.I.B.S4* | Compute weight and balance, including practical techniques to resolve out-of-limits calculations for a representative scenario, as specified by the evaluator. |
| *AA.I.B.S5* | For the flight or a given scenario, determine if the computed center-of-gravity is within the acceptable range and the lateral fuel balance is within limits for takeoff and landing. |
| *AA.I.B.S6* | Demonstrate proficient use of appropriate performance charts, tables, graphs, or other data to determine airplane performance and limitations for all phases of flight. |

| Task | C. Weather Information (ATP) |
|---|---|
| References | 14 CFR parts 61 and 91; FAA-H-8083-25, AC 00-6; AC 00-45; AC 00-54, AC 61-138; AIM |
| Objective | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with obtaining, understanding, and applying weather information for a flight under IFR.<br>**Note:** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| Knowledge | The applicant demonstrates understanding of: |
| *AA.I.C.K1* | Sources of weather data (e.g., National Weather Service, Flight Service) for flight planning purposes. |
| *AA.I.C.K2* | Acceptable weather products and resources utilized for preflight planning, current and forecast weather for departure and en route operations and arrival phases of flight. |
| *AA.I.C.K3* | Meteorology applicable to the departure, en route, alternate, and destination for flights conducted under Instrument Flight Rules (IFR) in Instrument Meteorological Conditions (IMC) to include expected climate and hazardous conditions such as:<br>**Note:** *If K3 is selected, the evaluator must assess the applicant's knowledge of at least three of the following sub-elements.* |
| *AA.I.C.K3a* | a. Atmospheric composition and stability |
| *AA.I.C.K3b* | b. Wind (e.g., crosswind, tailwind, windshear, mountain wave, etc.) |
| *AA.I.C.K3c* | c. Temperature |
| *AA.I.C.K3d* | d. Moisture/precipitation |
| *AA.I.C.K3e* | e. Weather system formation, including air masses and fronts |
| *AA.I.C.K3f* | f. Clouds |
| *AA.I.C.K3g* | g. Turbulence |
| *AA.I.C.K3h* | h. Thunderstorms and microbursts |
| *AA.I.C.K3i* | i. Icing and freezing level information |
| *AA.I.C.K3j* | j. Fog |
| *AA.I.C.K3k* | k. Frost |
| *AA.I.C.K4* | Flight deck displays of digital weather and aeronautical information, their use to navigate around weather, and equipment limitations. |
| *AA.I.C.K5* | Low-visibility operations (e.g., surface movement, category II and III approaches). (ATP AMEL, AMES) |
| *AA.I.C.K6* | Flight Risk Assessment Tools. |
| Risk Management | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.C.R1* | Weather conditions involved in departure and in-flight decision making, to include: |
| *AA.I.C.R1a* | a. Circumstances that would make diversion prudent |
| *AA.I.C.R1b* | b. Known or forecast icing, winds or turbulence aloft, volcanic ash, destination weather, etc. |
| *AA.I.C.R1c* | c. Personal minimums |
| *AA.I.C.R1d* | d. Employer or operational limitations, if applicable |
| *AA.I.C.R2* | Limitations of: |
| *AA.I.C.R2a* | a. Onboard weather equipment |
| *AA.I.C.R2b* | b. Aviation weather reports and forecasts |
| *AA.I.C.R2c* | c. Inflight weather resources |
| Skills | The applicant demonstrates the ability to: |

| Task | ***C. Weather Information (ATP)*** |
|---|---|
| *AA.I.C.S1* | Use a Flight Risk Assessment Tool, if available, and interpret and use weather information in aeronautical decision-making. |

| Task | ***D. High Altitude Aerodynamics (ATP AMEL, AMES)*** |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-3; AC 61-138, AC 120-111 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with high altitude airplane aerodynamics. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.I.D.K1* | Aerodynamics of large transport category airplanes to include flight characteristics of swept wing airplanes (e.g., Mach buffet). |
| *AA.I.D.K2* | Energy management. |
| *AA.I.D.K3* | Relationship between Mach number, indicated airspeed, true airspeed, and change over altitudes. |
| *AA.I.D.K4* | Bank angles at high altitude and its effect on high and low speed operating margins. |
| *AA.I.D.K5* | Relationship between altitude capability, weight, and temperature. |
| *AA.I.D.K6* | $V_{MO}/M_{MO}$ convergence and stall angle of attack. |
| *AA.I.D.K7* | Maximum Lift over Drag Ratio (L/D Max). |
| *AA.I.D.K8* | Best range and best endurance. |
| *AA.I.D.K9* | Factors which contribute to airplane upsets at high altitude and upset prevention and recovery techniques. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.D.R1* | Failure to manage the airplane's energy state. |
| *AA.I.D.R2* | High operating altitudes at high operational weights. |
| *AA.I.D.R3* | High altitude slow-downs and excursions behind the power curve. |
| *AA.I.D.R4* | Turbulence at high altitude. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.I.D.S1* | If a cruise altitude is reached, manage the airplane's systems and energy state. |

| Task | *E. Air Carrier Operations (ATP AMEL, AMES)* |
|---|---|
| **References** | 14 CFR part 121; AC 61-138, AC 00-46, AC 91.21-1, AC 120-66, AC 120-82, AC 120-90, AC 120-101; AFM, AC 91-78, AC 120-76 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with air carrier operations. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.I.E.K1* | Turbine engines, thrust reversing systems, and system malfunctions. |
| *AA.I.E.K2* | Airplane automation components (i.e., flight director, autopilot), their relationship to each other, and how to manage the automation for flight. |
| *AA.I.E.K3* | Advanced navigation equipment (e.g., FMS, RNP, ADS-B, EFB, etc.) and how it is used inflight. |
| *AA.I.E.K4* | Flightpath warning systems (e.g., TCAS, TAWS) and how to respond to a warning. |
| *AA.I.E.K5* | Altitudes and conditions that require the use of oxygen masks. |
| *AA.I.E.K6* | Causes and recognition of cabin pressure loss. |
| *AA.I.E.K7* | Rudder use in transport aircraft/part 25 certification standards. |
| *AA.I.E.K8* | Crew communications (e.g., sterile flight deck rules, briefings). |
| *AA.I.E.K9* | Air carrier operational control. |
| *AA.I.E.K10* | Elements associated with operating at complex and high traffic airports with emphasis on runway incursion prevention techniques. |
| *AA.I.E.K11* | Professional responsibilities associated with being an ATP certificate holder and how to apply leadership skills as pilot in command. |
| *AA.I.E.K12* | Crew resource management (CRM) principles and application in a multicrew environment. |
| *AA.I.E.K13* | Use of voluntary safety programs to manage risk across an organization (e.g., Threat and error management (TEM)). |
| *AA.I.E.K14* | Operations specifications. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.E.R1* | Turbine engine and thrust reversing system malfunctions. |
| *AA.I.E.R2* | Failure to manage automation and navigation equipment. |
| *AA.I.E.R3* | Failure to respond to a flightpath warning system alert. |
| *AA.I.E.R4* | Loss of cabin pressure. |
| *AA.I.E.R5* | Poor crew communication. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.I.E.S1* | Apply CRM principles and use in a crew environment, as appropriate. |

| Task | *F. Human Factors (ATP)* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-25; AIM; AC 61-138, AC 120-100 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with personal health, flight physiology, aeromedical and human factors, as it relates to safety of flight.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.I.F.K1* | Causes, effects, recognition, and corrective actions associated with aeromedical and physiological issues including:<br>***Note:*** *If K1 is selected, the evaluator must assess the applicant's knowledge of at least three of the following sub-elements.* |
| *AA.I.F.K1a* | a. Hypoxic hypoxia due to altitude increase or oxygen displacement |
| *AA.I.F.K1b* | b. Hyperventilation |
| *AA.I.F.K1c* | c. Middle ear and sinus problems |
| *AA.I.F.K1d* | d. Spatial disorientation |
| *AA.I.F.K1e* | e. Motion sickness |
| *AA.I.F.K1f* | f. Carbon monoxide poisoning and other forms of hypemic hypoxia |
| *AA.I.F.K1g* | g. Stress |
| *AA.I.F.K1h* | h. Fatigue |
| *AA.I.F.K1i* | i. Dehydration and nutrition |
| *AA.I.F.K1j* | j. Hypothermia |
| *AA.I.F.K1k* | k. Optical illusions |
| *AA.I.F.K1l* | l. Dissolved nitrogen in the bloodstream after scuba dives |
| *AA.I.F.K2* | Effects of alcohol, drugs, and over-the-counter medications. |
| *AA.I.F.K3* | Aeronautical Decision-Making (ADM) using Crew Resource Management (CRM) or Single Pilot Resource Management (SRM), as appropriate. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.F.R1* | Aeromedical and physiological issues. |
| *AA.I.F.R2* | Hazardous attitudes. |
| *AA.I.F.R3* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.I.F.S1* | Perform a self-assessment and determine fitness for flight. |

| Task | *G. Federal Aviation Regulations (ATP)* |
|---|---|
| **References** | 14 CFR parts 61, 91, 117, 121, 135; 49 CFR part 830 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge of Federal Aviation Regulations as they apply to the privileges and limitations of the ATP certificate and to flight operations that require an ATP certificate.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.I.G.K1* | 14 CFR part 61, subparts A, B, and G. |
| *AA.I.G.K2* | 14 CFR part 91, subparts A, B, C, F, G, and H. |
| *AA.I.G.K3* | 14 CFR part 117 (AMEL, AMES). |
| *AA.I.G.K4* | 14 CFR part 121, subparts A, G, K, M, O, T, U, and V (AMEL, AMES). |
| *AA.I.G.K5* | 14 CFR part 135, subparts A, B, C, D, E, F, and G (ASEL, ASES). |
| *AA.I.G.K6* | 49 CFR part 830 |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.G.R1* | Failure to comply with the applicable CFRs. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.I.G.S1* | Apply the CFRs to the flight/operation. |

| Task | ***H. Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES)*** |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; USCG Navigation Rules, International-Inland; POH/AFM; Chart Supplements; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with water and seaplane characteristics, seaplane bases, maritime rules, and aids to marine navigation. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.I.H.K1* | The characteristics of a water surface as affected by features, such as: |
| *AA.I.H.K1a* | a. Size and location |
| *AA.I.H.K1b* | b. Protected and unprotected areas |
| *AA.I.H.K1c* | c. Surface wind |
| *AA.I.H.K1d* | d. Direction and strength of water current |
| *AA.I.H.K1e* | e. Floating and partially submerged debris |
| *AA.I.H.K1f* | f. Sandbars, islands, and shoals |
| *AA.I.H.K1g* | g. Vessel traffic and wakes |
| *AA.I.H.K1h* | h. Other characteristics specific to the area |
| *AA.I.H.K2* | Float and hull construction and its effect on seaplane performance. |
| *AA.I.H.K3* | Causes of porpoising and skipping, and the pilot action needed to prevent or correct these occurrences. |
| *AA.I.H.K4* | How to locate and identify seaplane bases on charts or in directories. |
| *AA.I.H.K5* | Operating restrictions at various bases. |
| *AA.I.H.K6* | Right-of-way, steering, and sailing rules pertinent to seaplane operation. |
| *AA.I.H.K7* | Marine navigation aids, such as buoys, beacons, lights, sound signals, and range markers. |
| *AA.I.H.K8* | Naval vessel protection zones. |
| *AA.I.H.K9* | No wake zones. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.I.H.R1* | Local conditions. |
| *AA.I.H.R2* | Impact of marine traffic. |
| *AA.I.H.R3* | Failure to follow right-of-way and sailing rules pertinent to seaplane operations. |
| *AA.I.H.R4* | Limited services and assistance available at seaplane bases. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.I.H.S1* | Explain how float and hull construction can affect seaplane performance. |
| *AA.I.H.S2* | Describe how to correct for porpoising and skipping. |
| *AA.I.H.S3* | Locate seaplane bases on charts or in directories and identify any restrictions. |
| *AA.I.H.S4* | Identify marine navigation aids. |
| *AA.I.H.S5* | Describe what Naval vessel protection zones and no wake zones are. |
| *AA.I.H.S6* | Assess the water surface characteristics for the proposed flight. |
| *AA.I.H.S7* | Perform correct right-of-way, steering, and sailing operations. |

## II. Preflight Procedures

| Task | A. Preflight Assessment |
|---|---|
| **References** | 14 CFR parts 43, 61, 63, 71, 91, 97, 117, 119, 121, 135; POH/AFM; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; AC 00-6, AC 120-27, AC 120-60, AC 135-17 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with preparing for safe flight.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.II.A.K1* | Pilot self-assessment. |
| *AA.II.A.K2* | Determining that the aircraft to be used is appropriate, airworthy, and in a condition for safe flight by locating and explaining related documents such as: |
| *AA.II.A.K2a* | a. Airworthiness and registration certificates |
| *AA.II.A.K2b* | b. Operating limitations, handbooks, and manuals |
| *AA.II.A.K2c* | c. Minimum Equipment List (MEL) and Configuration Deviation List (CDL) |
| *AA.II.A.K2d* | d. Weight and balance data |
| *AA.II.A.K2e* | e. Required inspections or tests and appropriate records applicable to the proposed flight or operation. |
| *AA.II.A.K3* | Preventive maintenance that can be performed by the pilot or other designated crewmember. |
| *AA.II.A.K4* | Aircraft preflight inspection including: |
| *AA.II.A.K4a* | a. Which items must be inspected |
| *AA.II.A.K4b* | b. The reasons for checking each item |
| *AA.II.A.K4c* | c. How to detect possible defects |
| *AA.II.A.K4d* | d. The associated regulations |
| *AA.II.A.K5* | Environmental factors including weather, terrain, route selection, and obstructions. |
| *AA.II.A.K6* | Requirements for current and appropriate navigation data. |
| *AA.II.A.K7* | Operations specifications applying to a particular airplane and operation, if applicable. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.II.A.R1* | Human performance factors. |
| *AA.II.A.R2* | Inoperative equipment discovered prior to flight. |
| *AA.II.A.R3* | Environment (e.g., weather, airports, airspace, terrain, obstacles). |
| *AA.II.A.R4* | External pressures. |
| *AA.II.A.R5* | Aviation security concerns. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.II.A.S1* | Inspect the airplane in accordance with an appropriate checklist demonstrating proper operation of applicable airplane systems. Coordinate checklist with crew, if appropriate. |
| *AA.II.A.S2* | Coordinates with ground crew and ensures adequate clearance prior to moving doors, hatches, flight control surfaces, etc. |
| *AA.II.A.S3* | Document any discrepancies found; take corrective action and acknowledge limitations imposed by MEL/CDL items, if applicable. |
| *AA.II.A.S4* | Determine if the airplane is airworthy and in condition for safe flight. |
| *AA.II.A.S5* | Identify and comply with operations specifications as required. |
| *AA.II.A.S6* | Assess factors related to the environment (weather, airports, terrain, airspace). |

| Task | *A. Preflight Assessment* |
|---|---|
| *AA.II.A.S7* | Ensure the airplane and surfaces are free of ice, snow, and frost. If icing conditions are present, demonstrates satisfactory knowledge of deicing procedures. |

| | |
|---|---|
| **Task** | ***B. Powerplant Start*** |
| **References** | FAA-H-8083-2, 14 CFR part 61; POH/AFM; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with powerplant start procedures.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.II.B.K1* | Normal and abnormal powerplant start procedures and limitations, including the use of an auxiliary power unit (APU) or external power source (if applicable). |
| *AA.II.B.K2* | Starting under various atmospheric conditions. |
| *AA.II.B.K3* | Malfunctions during powerplant start, procedures to address the malfunction, and any associated limitations. |
| *AA.I.B.K4* | Ground crew personnel necessary and appropriate communication procedures for powerplant start, if applicable. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.II.B.R1* | Malfunctions during powerplant start. |
| *AA.II.B.R2* | Propeller and turbine powerplant safety. |
| *AA.II.B.R3* | Managing situations where specific instructions or checklist items are not published. |
| *AA.II.B.R4* | Personnel, vehicles, vessels, and other aircraft in the vicinity during powerplant start. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.II.B.S1* | Ensure the ground safety procedures are followed during the before-start, start, and after-start phases. |
| *AA.II.B.S2* | Use appropriate ground crew personnel during the start procedures (if applicable). |
| *AA.II.B.S3* | Coordinate with the crew, if applicable, and complete the checklist(s) prior to and after powerplant start. |
| *AA.II.B.S4* | Respond appropriately to an abnormal start or malfunction. |

| Task | *C. Taxiing (ASEL, AMEL)* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25; AC 120-57; AC 120-74; POH/AFM; AIM; Chart Supplements |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with safe taxi operations. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.II.C.K1* | Current airport aeronautical references and information resources including Chart Supplements, airport diagram, and appropriate references. |
| *AA.II.C.K2* | Taxi instructions/clearances including published taxi routes. |
| *AA.II.C.K3* | Airport markings, signs, and lights. |
| *AA.II.C.K4* | Appropriate aircraft lighting for day and night operations. |
| *AA.II.C.K5* | Push-back procedures, if applicable. |
| *AA.II.C.K6* | Procedures for: |
| *AA.II.C.K6a* | a. Appropriate flight deck activities prior to taxi, including route planning, identifying the location of Hot Spots, and coordinating with crew if, applicable |
| *AA.II.C.K6b* | b. Communications at towered and nontowered airports |
| *AA.II.C.K6c* | c. Entering or crossing runways |
| *AA.II.C.K6d* | d. Night taxi operations |
| *AA.II.C.K6e* | e. Low visibility taxi operations and techniques used to avoid disorientation |
| *AA.II.C.K6f* | f. Single-engine taxi procedures (AMEL) |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.II.C.R1* | Inappropriate activities and distractions. |
| *AA.II.C.R2* | Confirmation or expectation bias as related to taxi instructions. |
| *AA.II.C.R3* | A taxi route or departure runway change. |
| *AA.II.C.R3* | Failure to complete checklist(s). |
| *AA.II.C.R4* | Low visibility taxi operations. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.II.C.S1* | Record/receive taxi instructions, read back/acknowledge taxi clearances, and review taxi routes on the airport diagram. |
| *AA.II.C.S2* | Use an airport diagram or taxi chart during taxi. |
| *AA.II.C.S3* | Comply with ATC clearances and instructions and observe all runway hold lines, localizer and glide slope critical areas, beacons, and other airport/taxiway markings and lighting. |
| *AA.II.C.S4* | Coordinate with the crew, if applicable, and complete the checklist(s) prior to and during taxi, as appropriate. |
| *AA.II.C.S5* | Maintain sterile flight deck and situational awareness. |
| *AA.II.C.S6* | Maintain correct and positive airplane control, proper speed, appropriate use of wheel brakes and reverse thrust, and separation between other aircraft, vehicles, and persons to avoid an incursion. |
| *AA.II.C.S7* | Demonstrate taxi during day and night operations. If either condition is not available, the applicant must explain the differences between day and night taxi. |
| *AA.II.C.S8* | Demonstrate proper use of aircraft exterior lighting for day and night operations. If either condition is not available, the applicant must explain the differences between exterior aircraft lighting used for day and night operations. |
| *AA.II.C.S9* | Explain the hazards of low visibility taxi operations. |

| Task | *D. Taxiing and Sailing (ASES, AMES)* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; AC 120-57; AC 120-74; POH/AFM; AIM; Chart Supplements |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with safe taxi and sailing operations. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.II.D.K1* | Current airport/seabase aeronautical references and information resources including Chart Supplements, airport diagram, and appropriate references. |
| *AA.II.D.K2* | Taxi instructions/clearances, if applicable. |
| *AA.II.D.K3* | Airport/seabase markings, signs, and lights. |
| *AA.II.D.K4* | Appropriate aircraft lighting for day and night operations. |
| *AA.II.D.K5* | Sailing elements and techniques and when sailing should be used. |
| *AA.II.D.K6* | Considerations for determining the most favorable sailing course. |
| *AA.II.D.K7* | Airport/seabase procedures including: |
| *AA.II.D.K7a* | a. Appropriate flight deck activities prior to taxi or sailing, including route planning, and coordinating with crew, if applicable |
| *AA.II.D.K7b* | b. Communications at towered and nontowered seabases |
| *AA.II.D.K7c* | c. Entering or crossing runways (land operation) |
| *AA.II.D.K7d* | d. Night taxi and sailing operations |
| *AA.II.D.K7e* | e. Low visibility taxi and sailing operations |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.II.D.R1* | Inappropriate activities and distractions. |
| *AA.II.D.R2* | Porpoising and skipping. |
| *AA.II.D.R3* | Failure to complete checklist(s). |
| *AA.II.D.R4* | Low visibility taxi and sailing operations. |
| *AA.II.D.R5* | Other aircraft, vessels, and hazards. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.II.D.S1* | Record/receive taxi instructions, read back/acknowledge taxi clearances, and review taxi routes on the airport diagram. |
| *AA.II.D.S2* | Use an appropriate chart during taxi, if published. |
| *AA.II.D.S3* | Comply with ATC clearances, as appropriate, and seabase/airport/taxiway markings, signals and signs. |
| *AA.II.D.S4* | Departs the dock/mooring buoy or ramp/beach in a safe manner, considering wind, current, traffic, and hazards. |
| *AA.II.D.S5* | Coordinate with the crew, if applicable, and complete the checklist(s) prior to and during taxi or sailing, as appropriate. |
| *AA.II.D.S6* | Maintain sterile flight deck and situational awareness. |
| *AA.II.D.S7* | Maintain correct and positive airplane control, proper speed, appropriate use of reverse thrust, and separation between other aircraft, vehicles, vessels, and persons to avoid an incursion. |
| *AA.II.D.S8* | Position the flight controls, flaps, doors, water rudders, and power correctly for the existing conditions to follow the desired course while sailing and to prevent or correct for porpoising and skipping during step taxi. |
| *AA.II.D.S9* | Use the appropriate idle, plow, or step taxi technique. |
| *AA.II.D.S10* | Exhibit procedures for steering, maneuvering, maintaining proper position and situational awareness. |

| Task | ***D. Taxiing and Sailing (ASES, AMES)*** |
|---|---|
| *AA.II.D.S11* | Plan and follow the most favorable taxi or sailing course for current conditions. |
| *AA.II.D.S12* | Demonstrate taxi or sailing during day and night operations. If either condition is not available, the applicant must explain the differences between day and night taxi or sailing. |
| *AA.II.D.S13* | Demonstrate proper use of aircraft exterior lighting for day and night operations. If either condition is not available, the applicant must explain the differences between exterior aircraft lighting used for day and night operations. |
| *AA.II.D.S14* | Explain the hazards of low visibility taxi and sailing operations. |
| *AA.II.D.S15* | Comply with the applicable taxi elements in Task C if the practical test is in an amphibious airplane. |

| Task | *E. Before Takeoff Checks* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with before takeoff checks.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.II.E.K1* | Purpose of pre-takeoff checklist items including: |
| *AA.II.E.K1a* | a. Reasons for checking each item |
| *AA.II.E.K1b* | b. Detecting malfunctions |
| *AA.II.E.K1c* | c. Ensuring the airplane is in safe operating condition |
| *AA.II.E.K2* | Deicing and anti-icing procedures and holdover times. |
| *AA.II.E.K3* | Adverse weather considerations for performance on takeoff (e.g., snow, ice, gusting crosswinds, low-visibility). |
| *AA.II.E.K4* | Items to be included in a before takeoff briefing. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.II.E.R1* | Division of attention while conducting before takeoff checks. |
| *AA.II.E.R2* | Unexpected runway changes by ATC. |
| *AA.II.E.R3* | Failure to verify performance data is correct and airspeeds and flight instruments are set for actual conditions and the departure runway. |
| *AA.II.E.R4* | Failure to set navigation and communication equipment for departure. |
| *AA.II.E.R5* | Failure to configure autopilot and flight director controls for departure. |
| *AA.II.E.R6* | Failure to account for adverse weather conditions prior to takeoff (e.g., snow, ice, gusting crosswinds, low-visibility). |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.II.E.S1* | Determine the airplane's takeoff performance for actual conditions and planned departure runway or waterway. |
| *AA.II.E.S2* | Coordinate with the crew, if applicable, and complete the checklist(s) prior to takeoff in a timely manner. |
| *AA.II.E.S3* | Determine all systems checked are within their normal operating range and are safe for the proposed flight. During the checks, explain at the request of the evaluator, any system operating characteristic or limitation. |
| *AA.II.E.S4* | Determine airspeeds/V-speeds and set flight instruments appropriately, configure flight director, autopilot controls, and navigation and communication equipment for the current flight conditions and takeoff and departure clearances. |
| *AA.II.E.S5* | Conduct a briefing that includes procedures for emergency and abnormal situations (e.g., powerplant failure, windshear), which may be encountered during takeoff, and state the planned action if they were to occur. |
| *AA.II.E.S6* | Obtain and correctly interpret the takeoff and departure clearance. |

III. Takeoffs and Landings

| Task | *A. Normal Takeoff and Climb* |
|---|---|
| References | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| Objective | To determine that the applicant exhibits satisfactory knowledge, risk management and skills associated with a normal takeoff and climb.<br>***Note:*** *If a crosswind condition does not exist, the applicant's knowledge of crosswind elements must be evaluated through oral testing. See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.A.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. |
| *AA.III.A.K2* | Appropriate V-speeds for takeoff and climb. |
| *AA.III.A.K3* | Appropriate aircraft configuration and power setting for takeoff and climb. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.A.R1* | Selection of runway, or runway intersection, based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.A.R2* | Effects of: |
| *AA.III.A.R2a* | a. Crosswind |
| *AA.III.A.R2b* | b. Windshear |
| *AA.III.A.R2c* | c. Tailwind |
| *AA.III.A.R2d* | d. Wake turbulence |
| *AA.III.A.R2e* | e. Runway surface/condition |
| *AA.III.A.R3* | Abnormal operations, to include planning for: |
| *AA.III.A.R3a* | a. Rejected takeoff |
| *AA.III.A.R3b* | b. Engine failure in takeoff/climb phase of flight |
| *AA.III.A.R4* | Improper aircraft configuration or settings (e.g., trim, autobrakes). |
| *AA.III.A.R5* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.A.R6* | Low altitude maneuvering including stall, spin, or Controlled Flight Into Terrain (CFIT). |
| *AA.III.A.R7* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.A.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) prior to takeoff in a timely manner. |
| *AA.III.A.S2* | Make radio calls as appropriate. |
| *AA.III.A.S3* | Verify assigned/correct runway (ASEL, AMEL) or takeoff path (ASES, AMES). |
| *AA.III.A.S4* | Verify the airplane is configured for takeoff. |
| *AA.III.A.S5* | Position the flight controls for the existing wind conditions. |
| *AA.III.A.S6* | Clear the area; taxi into takeoff position and align the airplane on the runway centerline (ASEL, AMEL) or takeoff path (ASES, AMES). |
| *AA.III.A.S7* | Retract the water rudders, as appropriate (ASES, AMES). |
| *AA.III.A.S8* | Establish and maintain the most efficient planing/liftoff attitude, and correct for porpoising or skipping (ASES, AMES). |
| *AA.III.A.S9* | Maintain centerline (ASEL, AMEL) and proper flight control inputs during the takeoff roll. |
| *AA.III.A.S10* | Confirm takeoff power and proper engine and flight instrument indications prior to rotation making callouts, as appropriate, for the airplane or per the operator's procedures. |

| Task | ***A. Normal Takeoff and Climb*** |
|---|---|
| *AA.III.A.S11* | Avoid excessive water spray on the propellers (ASES, AMES). |
| *AA.III.A.S12* | Rotate and lift off at the recommended airspeed. |
| *AA.III.A.S13* | Establish a power setting and a pitch attitude to maintain the desired climb airspeed/V-speed, ±5 knots for each climb segment. |
| *AA.III.A.S14* | Maintain desired heading ±5°. |
| *AA.III.A.S15* | Retract the landing gear and flaps in accordance with manufacturer or operator procedures and limitations, as appropriate. |
| *AA.III.A.S16* | Avoid wake turbulence, if applicable. |
| *AA.III.A.S17* | Follow noise abatement procedures, as practicable. |
| *AA.III.A.S18* | Complete appropriate after takeoff checklist(s) in a timely manner. |

| Task | *B. Normal Approach and Landing* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a normal approach and landing.<br>***Note:*** *If a crosswind condition does not exist, the applicant's knowledge of crosswind elements must be evaluated through oral testing. See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.B.K1* | A stabilized approach, to include energy management concepts. |
| *AA.III.B.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. |
| *AA.III.B.K3* | Wind correction techniques on approach and landing. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.B.R1* | Selection of runway based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.B.R2* | Effects of: |
| *AA.III.B.R2a* | a. Crosswind |
| *AA.III.B.R2b* | b. Windshear |
| *AA.III.B.R2c* | c. Tailwind |
| *AA.III.B.R2d* | d. Wake turbulence |
| *AA.III.B.R2e* | e. Runway surface/condition |
| *AA.III.B.R3* | Go-Around/Rejected Landing |
| *AA.III.B.R4* | Land and Hold Short Operations (LAHSO) |
| *AA.III.B.R5* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.B.R6* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.B.R7* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.B.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s). |
| *AA.III.B.S2* | Make radio calls, as appropriate. |
| *AA.III.B.S3* | Maintain a ground track that ensures the desired traffic pattern will be flown taking into consideration obstructions and ATC or evaluator instructions. |
| *AA.III.B.S4* | Ensure the aircraft is aligned with the correct/assigned runway or landing surface. |
| *AA.III.B.S5* | Scan the runway or landing surface and adjoining area for traffic and obstructions. |
| *AA.III.B.S6* | Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point. |
| *AA.III.B.S7* | Establish the recommended approach and landing configuration and airspeed, ±5 knots, and adjust pitch attitude and power as required to maintain a stabilized approach. |
| *AA.III.B.S8* | Maintain crosswind correction and directional control throughout the approach and landing. |
| *AA.III.B.S9* | Make smooth, timely, and correct control application during the round out and touchdown. |
| *AA.III.B.S10* | Touch down at the appropriate speed and pitch attitude at the runway aiming point markings -250/+500 feet, or where there are no runway markings 750 to 1,500 feet from the approach threshold of the runway. (ASEL, AMEL) |
| *AA.III.B.S11* | During round out and touchdown contact the water at the proper pitch attitude within 200 feet beyond a specified point (ASES, AMES). In addition, for AMES, the touchdown will be within the first one-third of the water landing area. |

| Task | *B. Normal Approach and Landing* |
|---|---|
| *AA.III.B.S12* | Decelerate to taxi speed (20 knots or less on dry pavement, 10 knots or less on contaminated pavement) to within the calculated landing distance plus 25% for the actual conditions with the runway centerline between the main landing gear. (At least one landing) (ASEL, AMEL) |
| *AA.III.B.S13* | Use spoilers, prop reverse, thrust reverse, wheel brakes, and other drag/braking devices, as appropriate to safely slow the airplane. (At least one landing slow to a full stop) |
| *AA.III.B.S14* | Execute a timely go-around if the approach cannot be made within the tolerances specified above or for any other condition that may result in an unsafe approach or landing. |
| *AA.III.B.S15* | Utilize runway incursion avoidance procedures. |

| Task | *C. Glassy Water Takeoff and Climb (ASES, AMES)* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with glassy water takeoff and climb.<br>***Note:*** *If a glassy water condition does not exist, the applicant must be evaluated by simulating the Task.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.C.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. |
| *AA.III.C.K2* | Appropriate V-speeds for takeoff and climb. |
| *AA.III.C.K3* | Appropriate aircraft configuration. |
| *AA.III.C.K4* | Appropriate use of glassy water takeoff and climb technique. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.C.R1* | Selection of takeoff path based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.C.R2* | Water surface/condition. |
| *AA.III.C.R3* | Abnormal operations, to include planning for: |
| *AA.III.C.R3a* | a. Rejected takeoff |
| *AA.III.C.R3b* | b. Engine failure in takeoff/climb phase of flight |
| *AA.III.C.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.C.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.C.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.C.R7* | Failure to confirm gear position in an amphibious aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.C.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) prior to takeoff in a timely manner. |
| *AA.III.C.S2* | Make radio calls as appropriate. |
| *AA.III.C.S3* | Position the flight controls for the existing conditions. |
| *AA.III.C.S4* | Verify the airplane is configured for takeoff. |
| *AA.III.C.S5* | Clear the area; select appropriate takeoff path considering surface conditions and collision hazards. |
| *AA.III.C.S6* | Retract the water rudders, as appropriate. |
| *AA.III.C.S7* | Set and confirm takeoff power. |
| *AA.III.C.S8* | Avoid excessive water spray on the propellers. |
| *AA.III.C.S9* | Maintain directional control throughout takeoff and climb. |
| *AA.III.C.S10* | Establish and maintain an appropriate planing attitude, directional control, and correct for porpoising, skipping, and increase in water drag. |
| *AA.III.C.S11* | Utilize appropriate techniques to lift seaplane from the water considering the glassy water surface conditions. |
| *AA.III.C.S12* | Adjust power, as appropriate, and establish a pitch attitude to maintain the appropriate climb airspeed/V-speed, ±5 knots for each climb segment. |
| *AA.III.C.S13* | Retract flaps after a positive rate of climb has been verified or in accordance with manufacturer or operator procedures and limitations, as appropriate. |
| *AA.III.C.S14* | Follow noise abatement procedures, as practicable. |

| Task | *D. Glassy Water Approach and Landing (ASES, AMES)* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a glassy water approach and landing.<br>***Note:*** *If a glassy water condition does not exist, the applicant must be evaluated by simulating the Task.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.D.K1* | A stabilized approach, to include energy management concepts. |
| *AA.III.D.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. |
| *AA.III.D.K3* | Wind correction techniques on approach and landing. |
| *AA.III.D.K4* | When and why glassy water techniques are used. |
| *AA.III.D.K5* | How a glassy water approach and landing is executed. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.D.R1* | Selection of approach path and touchdown area based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.D.R2* | Effects of: |
| *AA.III.D.R2a* | a. Crosswind |
| *AA.III.D.R2b* | b. Windshear |
| *AA.III.D.R2c* | c. Tailwind |
| *AA.III.D.R2d* | d. Water surface/condition |
| *AA.III.D.R3* | Go-around/rejected landing. |
| *AA.III.D.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.D.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.D.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.D.R7* | Failure to confirm gear position in an amphibious aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.D.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s). |
| *AA.III.D.S2* | Make radio calls as appropriate. |
| *AA.III.D.S3* | Ensure that the landing gear and water rudders are retracted, if applicable. |
| *AA.III.D.S4* | Consider the landing surface, visual attitude references, water depth, and collision hazards and select the proper approach and landing path. |
| *AA.III.D.S5* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. |
| *AA.III.D.S6* | Maintain a stabilized approach and recommended airspeed, ±5 knots. |
| *AA.III.D.S7* | Make smooth, timely, and correct power and control adjustments to maintain proper attitude and rate of descent to touchdown. |
| *AA.III.D.S8* | Maintain crosswind correction and directional control throughout the approach. |
| *AA.III.D.S9* | Contact the water at the correct pitch attitude and slow to idle taxi speed. |

| Task | *E. Rough Water Takeoff and Climb (ASES, AMES)* |
|---|---|
| References | FAA-H-8083-2, FAA-H-8083-23; POH/AFM |
| Objective | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a rough water takeoff and climb.<br>***Note:*** *If a rough water condition does not exist, the applicant must be evaluated by simulating the Task.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.E.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. |
| *AA.III.E.K2* | Appropriate V-speeds for takeoff and climb. |
| *AA.III.E.K3* | Appropriate aircraft configuration. |
| *AA.III.E.K4* | Appropriate use of rough water takeoff and climb technique. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.E.R1* | Selection of takeoff path based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.E.R2* | Effects of: |
| *AA.III.E.R2a* | a. Crosswind |
| *AA.III.E.R2b* | b. Windshear |
| *AA.III.E.R2c* | c. Tailwind |
| *AA.III.E.R2d* | d. Wake turbulence |
| *AA.III.E.R2e* | e. Water surface/condition |
| *AA.III.E.R3* | Abnormal operations, to include planning for: |
| *AA.III.E.R3a* | a. Rejected takeoff |
| *AA.III.E.R3b* | b. Engine failure in takeoff/climb phase of flight |
| *AA.III.E.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.E.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.E.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.E.R7* | Failure to confirm gear position in an amphibious aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.E.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) prior to takeoff in a timely manner. |
| *AA.III.E.S2* | Make radio calls as appropriate. |
| *AA.III.E.S3* | Position the flight controls for the existing conditions. |
| *AA.III.E.S4* | Verify the airplane is configured for takeoff. |
| *AA.III.E.S5* | Clear the area; select appropriate takeoff path considering surface conditions and collision hazards. |
| *AA.III.E.S6* | Retract the water rudders, as appropriate. |
| *AA.III.E.S7* | Set and confirm takeoff power. |
| *AA.III.E.S8* | Avoid excessive water spray on the propellers. |
| *AA.III.E.S9* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. |
| *AA.III.E.S10* | Establish and maintain an appropriate planing attitude, directional control, and correct for porpoising, skipping, and increase in water drag. |
| *AA.III.E.S11* | Establish proper attitude and airspeed, lift off at minimum airspeed and accelerate to appropriate climb airspeed/V-speed, ±5 knots before leaving ground effect. |

| Task | ***E. Rough Water Takeoff and Climb (ASES, AMES)*** |
|---|---|
| *AA.III.E.S12* | Retract the flaps after a positive rate of climb is established and a safe altitude has been achieved. |
| *AA.III.E.S13* | Maintain takeoff power to a safe maneuvering altitude then sets climb power. |
| *AA.III.E.S14* | Follow noise abatement procedures, as practicable. |

| Task | ***F. Rough Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a rough water approach and landing.<br>***Note:*** *If a rough water condition does not exist, the applicant must be evaluated by simulating the Task.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.F.K1* | A stabilized approach, to include energy management concepts. |
| *AA.III.F.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. |
| *AA.III.F.K3* | Wind correction techniques on approach and landing. |
| *AA.III.F.K4* | When and why rough water techniques are used. |
| *AA.III.F.K5* | How a rough water approach and landing is executed. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.F.R1* | Selection of approach path and touchdown area based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.F.R2* | Effects of: |
| *AA.III.F.R2a* | a. Crosswind |
| *AA.III.F.R2b* | b. Windshear |
| *AA.III.F.R2c* | c. Tailwind |
| *AA.III.F.R2d* | d. Water surface/condition |
| *AA.III.F.R3* | Go-around/rejected landing. |
| *AA.III.F.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.F.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.F.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.F.R7* | Failure to confirm gear position in an amphibious aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.F.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s). |
| *AA.III.F.S2* | Make radio calls as appropriate. |
| *AA.III.F.S3* | Ensure that the landing gear and water rudders are retracted, if applicable. |
| *AA.III.F.S4* | Consider the landing surface, visual attitude references, water depth, and collision hazards and select the proper approach and landing path. |
| *AA.III.F.S5* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. |
| *AA.III.F.S6* | Maintain a stabilized approach and recommended airspeed with gust factor applied, ±5 knots. |
| *AA.III.F.S7* | Make smooth, timely, and correct power and control adjustments to maintain proper attitude and rate of descent to touchdown. |
| *AA.III.F.S8* | Contact the water at the correct pitch attitude and touchdown speed. |
| *AA.III.F.S9* | Make smooth, timely, and correct power and control application during the landing while remaining alert for a go-around should conditions be too rough. |
| *AA.III.F.S10* | Maintain positive after-landing control. |

| Task | *G. Confined-Area Takeoff and Maximum Performance Climb (ASES, AMES)* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3, FAA-8083-23; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a confined area takeoff and maximum performance climb.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.G.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. |
| *AA.III.G.K2* | Appropriate V-speeds for takeoff and climb. |
| *AA.III.G.K3* | Appropriate aircraft configuration. |
| *AA.III.G.K4* | Effects of water surface. |
| *AA.III.G.K5* | Available techniques for confined-area takeoff and climb. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.G.R1* | Selection of takeoff path based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.G.R2* | Effects of: |
| *AA.III.G.R2a* | a. Crosswind |
| *AA.III.G.R2b* | b. Windshear |
| *AA.III.G.R2c* | c. Tailwind |
| *AA.III.G.R2d* | d. Water surface/condition |
| *AA.III.G.R3* | Abnormal operations, to include planning for: |
| *AA.III.G.R3a* | a. Rejected takeoff |
| *AA.III.G.R3b* | b. Engine failure in takeoff/climb phase of flight |
| *AA.III.G.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.G.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.G.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.G.R7* | Failure to confirm gear position in an amphibious aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.G.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) prior to takeoff in a timely manner. |
| *AA.III.G.S2* | Make radio calls as appropriate. |
| *AA.III.G.S3* | Position the flight controls for the existing conditions. |
| *AA.III.G.S4* | Verify the airplane is configured for takeoff. |
| *AA.III.G.S5* | Clear the area; select appropriate takeoff path considering surface conditions and collision hazards. |
| *AA.III.G.S6* | Retract the water rudders, as appropriate. |
| *AA.III.G.S7* | Set and confirm takeoff power. |
| *AA.III.G.S8* | Avoid excessive water spray on the propellers. |
| *AA.III.G.S9* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. |
| *AA.III.G.S10* | Establish and maintain an appropriate planing attitude, directional control, and correct for porpoising, skipping, and increase in water drag. |
| *AA.III.G.S11* | Rotate and liftoff at the appropriate airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$ using appropriate bank angles to maintain terrain clearance, as needed. |

| Task | *G. Confined-Area Takeoff and Maximum Performance Climb (ASES, AMES)* |
|---|---|
| *AA.III.G.S12* | Climb at the recommended airspeed or in its absence at $V_X$, +5/-0 knots until the obstacle is cleared, or until the airplane is 50 feet above the surface. In multiengine seaplanes with $V_X$ values within 5 knots of $V_{MC}$, the use of $V_Y$ or the manufacturer's recommendation is acceptable. |
| *AA.III.G.S13* | After clearing all obstacles, accelerate to $V_Y$ ±5 knots. |
| *AA.III.G.S14* | Retract flaps and adjust power as needed to maintain $V_Y$ or appropriate climb airspeed, ±5 knots to a safe maneuvering altitude. |
| *AA.III.G.S15* | Follow noise abatement procedures, as practicable. |

| Task | *H. Confined-Area Approach and Landing (ASES, AMES)* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a confined area approach and landing.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.H.K1* | A stabilized approach, to include energy management concepts. |
| *AA.III.H.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. |
| *AA.III.H.K3* | Available techniques for confined-area approach and landing. |
| *AA.III.H.K4* | Wind correction techniques on approach and landing. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.H.R1* | Selection of approach path and touchdown area based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.H.R2* | Effects of: |
| *AA.III.H.R2a* | a. Crosswind |
| *AA.III.H.R2b* | b. Windshear |
| *AA.III.H.R2c* | c. Tailwind |
| *AA.III.H.R2d* | d. Water surface/condition |
| *AA.III.H.R3* | Go-around/rejected landing. |
| *AA.III.H.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.H.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.H.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.H.R7* | Failure to confirm gear position in an amphibious aircraft. |
| *AA.III.H.R8* | Landing in an area or in conditions where a takeoff/climb may not be possible. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.H.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s). |
| *AA.III.H.S2* | Make radio calls as appropriate. |
| *AA.III.H.S3* | Ensure that the landing gear and water rudders are retracted, if applicable. |
| *AA.III.H.S4* | Consider the landing surface, visual attitude references, water depth, and collision hazards and select the proper approach and landing path. |
| *AA.III.H.S5* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. |
| *AA.III.H.S6* | Maintain a stabilized approach and recommended airspeed with gust factor applied, ±5 knots. |
| *AA.III.H.S7* | Make smooth, timely, and correct power and control adjustments to maintain proper attitude and rate of descent to touchdown. |
| *AA.III.H.S8* | Touch down smoothly at the recommended airspeed and pitch attitude, beyond and within 100 feet of a specified point/area. |
| *AA.III.H.S9* | Maintain crosswind correction and directional control throughout the approach and landing. |

| Task | *I. Rejected Takeoff* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a rejected takeoff.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.I.K1* | Conditions and situations that could warrant a rejected takeoff (e.g., takeoff warning systems, powerplant failure, other systems warning/failure). |
| *AA.III.I.K2* | Safety considerations following a rejected takeoff. |
| *AA.III.I.K3* | The procedure for accomplishing a rejected takeoff. |
| *AA.III.I.K4* | Accelerate/stop distance. |
| *AA.III.I.K5* | $V_1$, $V_2$, and $V_R$, as applicable to the class of airplane. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.I.R1* | Selection of takeoff path based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.III.I.R2* | Failure to plan for a powerplant failure during takeoff considering operational factors such as airplane characteristics, runway/takeoff path length, surface conditions, environmental conditions, and obstructions. |
| *AA.III.I.R3* | Failure to maintain directional control following a rejected takeoff. |
| *AA.III.I.R4* | A rejected takeoff with inadequate stopping distance. |
| *AA.III.I.R5* | A high-speed abort. |
| *AA.III.I.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.I.S1* | Abort the takeoff if the powerplant failure occurs prior to becoming airborne (ASEL, ASES). |
| *AA.III.I.S2* | Abort the takeoff if the powerplant failure occurs at a point during the takeoff where the abort procedure can be initiated and the airplane can be safely stopped on the remaining runway/waterway (AMEL, AMES). |
| *AA.III.I.S3* | Promptly reduce the power and maintain positive aircraft control using drag and braking devices, as appropriate, to come to a stop. |
| *AA.III.I.S4* | Coordinate with the crew, if applicable, and complete the appropriate procedures, checklist(s), and radio calls following a rejected takeoff in a timely manner. |

| Task | *J. Go-Around/Rejected Landing* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM; AIM; FSB Report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a go-around/rejected landing.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.III.J.K1* | A stabilized approach, to include energy management concepts. |
| *AA.III.J.K2* | Effects of atmospheric conditions, including wind and density altitude on a go-around or rejected landing. |
| *AA.III.J.K3* | Wind correction techniques on takeoff/departure and approach/landing. |
| *AA.III.J.K4* | Situations and considerations on approach that could require a go-around/rejected landing, to include the inability to comply with a LAHSO clearance. |
| *AA.III.J.K5* | Go-around/rejected landing procedures, the importance of a timely decision, and appropriate airspeed/V-speeds for the maneuver. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.III.J.R1* | Delayed recognition of the need for a go-around/rejected landing. |
| *AA.III.J.R2* | Delayed performance of a go-around at low altitude. |
| *AA.III.J.R3* | Improper application of power. |
| *AA.III.J.R4* | Improper aircraft configuration. |
| *AA.III.J.R5* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.III.J.R6* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.III.J.R7* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.III.J.R8* | Managing a go-around/rejected landing after accepting a LAHSO clearance. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.III.J.S1* | Make a timely decision to go-around/reject the landing. |
| *AA.III.J.S2* | Apply the appropriate power setting for the flight condition and establish a pitch attitude necessary to obtain the desired performance. |
| *AA.III.J.S3* | Establish a positive rate of climb and the appropriate airspeed/V-speed, ±5 knots. |
| *AA.III.J.S4* | Configure and trim the airplane, when appropriate. |
| *AA.III.J.S5* | Make radio calls as appropriate. |
| *AA.III.J.S6* | Maintain the ground track, heading, or course appropriate for the conditions, or as specified by ATC or the evaluator. |
| *AA.III.J.S7* | Complete the appropriate procedures and checklist(s) in a timely manner. |

## IV. Inflight Maneuvers

| Task | ***A. Steep Turns*** |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-3, FAA-H-8083-25; POH/AFM, FSB report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with steep turns.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.IV.A.K1* | Energy management concepts and the purpose of steep turns. |
| *AA.IV.A.K2* | Aerodynamics associated with steep turns, to include: |
| *AA.IV.A.K2a* | a. Coordinated and uncoordinated flight |
| *AA.IV.A.K2b* | b. Overbanking tendencies |
| *AA.IV.A.K2c* | c. Maneuvering speed, including the impact of weight changes |
| *AA.IV.A.K2d* | d. Load factor and accelerated stalls |
| *AA.IV.A.K2e* | e. Rate and radius of turn |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.IV.A.R1* | Spatial disorientation when conducting a steep turn while flying by reference to instruments. |
| *AA.IV.A.R2* | Collision hazards, to include aircraft, terrain, obstacles, and wires. |
| *AA.IV.A.R3* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.IV.A.R4* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.IV.A.R5* | Failure to maintain coordinated flight. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.IV.A.S1* | Select an entry altitude that will allow the Task to be completed no lower than 3,000 feet above ground level. |
| *AA.IV.A.S2* | Establish the manufacturer's recommended airspeed; or if one is not available, an airspeed not to exceed $V_A$. |
| *AA.IV.A.S3* | Roll into a coordinated 180°or 360° turn, as specified by the evaluator, and establish at least a 45° bank solely by reference to instruments. |
| *AA.IV.A.S4* | Perform the task in the opposite direction, as specified by the evaluator. |
| *AA.IV.A.S5* | Make smooth pitch, bank, and power adjustments as needed. |
| *AA.IV.A.S6* | Maintain the entry altitude ±100 feet, airspeed ±10 knots, bank ±5°, and roll out on the entry heading or specified heading, ±10°. |
| *AA.IV.A.S7* | Avoid any indication of an impending stall, abnormal flight attitude, or exceeding any structural or operating limitation during any part of the Task. |

| Task | *B. Recovery from Unusual Flight Attitudes* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-15; FAA-H-8083-2; AC 120-111; AFM, POH; FSB Report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with recovering from unusual flight attitudes. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.IV.B.K1* | Procedures for recovery from unusual flight attitudes. |
| *AA.IV.B.K2* | Unusual flight attitude causal factors, including physiological factors, system and equipment failures, and environmental factors. |
| *AA.IV.B.K3* | The normal operating envelope and structural limitations for the airplane. |
| *AA.IV.B.K4* | Effects of engine location, wing design, and other specific design characteristics that could affect aircraft control during the recovery. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.IV.B.R1* | Situations that could lead to loss of control or unusual flight attitudes (e.g., stress, task saturation, and distractions). |
| *AA.IV.B.R2* | Failure to recognize an unusual flight attitude and follow the proper recover procedure. |
| *AA.IV.B.R3* | Exceeding the normal flight envelope during the recovery. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.IV.B.S1* | Use proper instrument cross-check and interpretation to identify an unusual attitude (including both nose-high and nose-low), and apply the appropriate pitch, bank, and power corrections, in the correct sequence, to return to a stabilized level flight attitude. |

| Task | *C. Specific Flight Characteristics* |
|---|---|
| **References** | 14 CFR part 61; FAA-H-8083-2; POH/AFM; FSB Report (type specific). |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with flight and performance characteristics unique to a specific aircraft type.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.IV.C.K1* | All specific flight and/or performance characteristics associated with the aircraft. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.IV.C.R1* | Specific flight and performance characteristics, their effects, and failure to follow procedures. |
| *AA.IV.C.R2* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.IV.C.S1* | Use proper techniques and procedures, as applicable, to enter into, operate within, and recover from specific flight situations. |

V. Stall Prevention

| Task | *A. Partial Flap Configuration Stall Prevention* |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-3; AC 61-67, AC 120-109; POH/AFM; FSB Report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with stalls in a partial flap configuration.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.V.A.K1* | Aerodynamics associated with stalls in a partial flap configuration, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and balance, aircraft attitude, and sideslip effects. |
| *AA.V.A.K2* | Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). |
| *AA.V.A.K3* | Factors and situations that can lead to a stall during takeoff or while on approach and actions that can be taken to prevent it. |
| *AA.V.A.K4* | Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. |
| *AA.V.A.K5* | Fundamentals of stall recovery. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.V.A.R1* | Factors and situations that could lead to an inadvertent stall, spin, and loss of control during takeoff or while on approach. |
| *AA.V.A.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, stick shaker, etc.). |
| *AA.V.A.R3* | Failure to recognize and recover at the stall warning. |
| *AA.V.A.R4* | Improper stall recovery procedure. |
| *AA.V.A.R5* | Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. |
| *AA.V.A.R6* | Effect of environmental elements on aircraft performance while in a partial flap configuration as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). |
| *AA.V.A.R7* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.V.A.R8* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.V.A.S1* | Clear the area. |
| *AA.V.A.S2* | Select an entry altitude that will allow the recovery to be completed no lower than 3,000 feet AGL (non-transport category airplanes) or 5,000 feet AGL (transport category airplanes). When accomplished in an FSTD, the entry should be consistent with the expected operational environment for a stall on takeoff or while on approach in a partial flap configuration with no minimum entry altitude defined. |
| *AA.V.A.S3* | Establish the takeoff or approach configuration (partial flap), as specified by the evaluator, and maintain coordinated flight in simulated or actual instrument conditions throughout the maneuver. |
| *AA.V.A.S4* | Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. |

| Task | ***A. Partial Flap Configuration Stall Prevention*** |
|---|---|
| *AA.V.A.S5* | Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). |
| *AA.V.A.S6* | Execute a stall recovery in accordance with procedures set forth in the POH/AFM. |
| *AA.V.A.S7* | Retract the flaps or other lift/drag devices to the recommended setting, if applicable; retract the landing gear after a positive rate of climb is established, if applicable; and return to the desired flight path as specified by the evaluator. |

| Task | *B. Clean Configuration Stall Prevention* |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-3; AC 61-67, AC 120-109, POH/AFM; FSB Report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with stalls in a clean configuration.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.V.B.K1* | Aerodynamics associated with stalls in a clean configuration, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and balance, and aircraft attitude. |
| *AA.V.B.K2* | Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). |
| *AA.V.B.K3* | Factors and situations that can lead to a stall during cruise flight and actions that can be taken to prevent it. |
| *AA.V.B.K4* | Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. |
| *AA.V.B.K5* | Fundamentals of stall recovery. |
| *AA.V.B.K6* | Effects of altitude on performance (e.g., thrust available) and flight control effectiveness during a recovery. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.V.B.R1* | Factors and situations that could lead to an inadvertent stall, spin, and loss of control during cruise flight. |
| *AA.V.B.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, stick shaker, etc.). |
| *AA.V.B.R3* | Failure to recognize and recover at the stall warning. |
| *AA.V.B.R4* | Improper stall recovery procedure. |
| *AA.V.B.R5* | Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. |
| *AA.V.B.R6* | Effect of environmental elements on aircraft performance while in cruise flight as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). |
| *AA.V.B.R7* | Collision hazards, to include aircraft, terrain, and obstacles. |
| *AA.V.B.R8* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.V.B.S1* | Clear the area. |
| *AA.V.B.S2* | Select an entry altitude that will allow the recovery to be completed no lower than 3,000 feet AGL (non-transport category airplanes) or 5,000 feet AGL (transport category airplanes). When accomplished in an FSTD, the entry should be consistent with the expected operational environment for a stall in cruise flight with no minimum entry altitude defined. |
| *AA.V.B.S3* | While in cruise flight, maintain coordinated flight in simulated or actual instrument conditions throughout the maneuver. |
| *AA.V.B.S4* | Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. |
| *AA.V.B.S5* | Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). |
| *AA.V.B.S6* | Execute a stall recovery in accordance with procedures set forth in the POH/AFM. |
| *AA.V.B.S7* | Return to the desired flight path as specified by the evaluator. |

| Task | *C. Landing Configuration Stall Prevention* |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-3; AC 61-67, AC 120-109; POH/AFM; FSB Report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with stalls in the landing configuration.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.V.C.K1* | Aerodynamics associated with stalls in the landing configuration, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and balance, aircraft attitude, and sideslip effects. |
| *AA.V.C.K2* | Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). |
| *AA.V.C.K3* | Factors and situations that can lead to a stall when configured for landing and actions that can be taken to prevent it. |
| *AA.V.C.K4* | Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. |
| *AA.V.C.K5* | Fundamentals of stall recovery. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.V.C.R1* | Factors and situations that could lead to an inadvertent stall, spin, and loss of control during landing. |
| *AA.V.C.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, stick shaker, etc.). |
| *AA.V.C.R3* | Failure to recognize and recover at the stall warning. |
| *AA.V.C.R4* | Improper stall recovery procedure. |
| *AA.V.C.R5* | Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. |
| *AA.V.C.R6* | Effect of environmental elements on aircraft performance while landing as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). |
| *AA.V.C.R7* | Stalls at a low altitude. |
| *AA.V.C.R8* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.V.C.R9* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.V.C.S1* | Clear the area. |
| *AA.V.C.S2* | Select an entry altitude that will allow the recovery to be completed no lower than 3,000 feet AGL (non-transport category airplanes) or 5,000 feet AGL (transport category airplanes). When accomplished in an FSTD, the entry should be consistent with the expected operational environment for a stall when fully configured for landing with no minimum entry altitude defined. |
| *AA.V.C.S3* | Establish the landing configuration (i.e., lift/drag devices set and landing gear extended) and maintain coordinated flight in simulated or actual instrument conditions throughout the maneuver. |
| *AA.V.C.S4* | Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. |
| *AA.V.C.S5* | Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). |
| *AA.V.C.S6* | Execute a stall recovery in accordance with procedures set forth in the POH/AFM. |
| *AA.V.C.S7* | Retract the flaps or other lift/drag devices to the recommended setting, if applicable; retract the landing gear after a positive rate of climb is established, if applicable; and return to the desired flight path as specified by the evaluator. |

VI. Instrument Procedures

| Task | *A. Instrument Takeoff* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-6; FAA-H-8083-15, FAA-H-8083-16, FAA-H-8083-23, FAA-H-8083-25; POH/AFM; AIM; IFP |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an instrument takeoff. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.A.K1* | Operational factors that could affect an instrument takeoff (e.g., runway length, surface conditions, wind, wake turbulence, icing conditions, obstructions, available instrument approaches or alternate airports available in the event of an emergency after takeoff). |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.A.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. |
| *AA.VI.A.R2* | Effects of: |
| *AA.VI.A.R2a* | a. Crosswind |
| *AA.VI.A.R2b* | b. Windshear |
| *AA.VI.A.R2c* | c. Tailwind |
| *AA.VI.A.R2d* | d. Wake turbulence |
| *AA.VI.A.R2e* | e. Runway surface/condition |
| *AA.VI.A.R3* | Abnormal operations, to include planning for: |
| *AA.VI.A.R3a* | a. Rejected takeoff |
| *AA.VI.A.R3b* | b. Engine failure in takeoff/climb phase of flight with the ceiling or visibility below the minimums for an instrument approach at departure airport |
| *AA.VI.A.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VI.A.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VI.A.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.A.S1* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) prior to takeoff in a timely manner. |
| *AA.VI.A.S2* | Properly set the applicable avionics and flight instruments prior to initiating the takeoff. |
| *AA.VI.A.S3* | Make radio calls as appropriate. |
| *AA.VI.A.S4* | Verify assigned/correct runway. |
| *AA.VI.A.S5* | Position the flight controls for the existing wind conditions. |
| *AA.VI.A.S6* | Clear the area; taxi into takeoff position and align the airplane on the runway centerline (ASEL, AMEL) or takeoff path (ASES, AMES). |
| *AA.VI.A.S7* | Perform an instrument takeoff with instrument meteorological conditions (IMC) simulated at or before reaching an altitude of 100 feet AGL. If accomplished in a full flight simulator, visibility should be no greater than 1/4 mile, or as specified by applicable operations specifications, whichever is lower. |
| *AA.VI.A.S8* | Maintain centerline (ASEL, AMEL) and proper flight control inputs during the takeoff roll. |
| *AA.VI.A.S9* | Confirm takeoff power and proper engine and flight instrument indications prior to rotation making callouts, as appropriate, for the airplane or per the operator’s procedures. |
| *AA.VI.A.S10* | Rotate and lift off at the recommended airspeed, establish the desired pitch attitude, and accelerate to the desired airspeed/ V-speed. |

| Task | *A. Instrument Takeoff* |
|---|---|
| *AA.VI.A.S11* | Transition smoothly from visual meteorological conditions (VMC) to actual or simulated instrument meteorological conditions (IMC). |
| *AA.VI.A.S12* | Maintain desired heading ±5° and desired airspeeds ±5 knots. |
| *AA.VI.A.S13* | Comply with ATC clearances and instructions issued by ATC or the evaluator, as appropriate. |
| *AA.VI.A.S14* | Complete appropriate after takeoff checklist(s) in a timely manner. |

| Task | ***B. Departure Procedures*** |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-2, FAA-H-8083-15, FAA-H-8083-16; AC 90-100; POH/AFM; AIM; IFP |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with IFR departure procedures (DPs). |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.B.K1* | DPs and associated climb gradients, U.S. Terminal Procedures Publications, and IFR Enroute Low Altitude Charts. |
| *AA.VI.B.K2* | Use of a Flight Management System (FMS) or Global Positioning System (GPS) to follow a DP. |
| *AA.VI.B.K3* | Pilot/controller responsibilities, communication procedures, and ATC services available to pilots. |
| *AA.VI.B.K4* | Two-way radio communication failure procedures after takeoff. |
| *AA.VI.B.K5* | Requirements for current and appropriate navigation data. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.B.R1* | Failure to communicate with ATC or follow published procedures. |
| *AA.VI.B.R2* | Failure to recognize limitations of traffic avoidance equipment. |
| *AA.VI.B.R3* | Failure to use see and avoid techniques when possible. |
| *AA.VI.B.R4* | Improper automation management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.B.S1* | In actual or simulated instrument conditions, select, identify (as necessary) and use the appropriate communication and navigation facilities associated with the proposed flight. |
| *AA.VI.B.S2* | Program the FMS prior to departure and set avionics to include flight director and autopilot controls, as appropriate, for the departure, if applicable. |
| *AA.VI.B.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.B.S4* | Use current and appropriate navigation publications or databases for the proposed flight. |
| *AA.VI.B.S5* | Establish two-way communications with the proper controlling agency, use proper phraseology, and comply, in a timely manner, with all ATC instructions and airspace restrictions as well as exhibit adequate knowledge of communication failure procedures. |
| *AA.VI.B.S6* | Intercept all courses, radials, and bearings appropriate to the procedure, route, clearance, or as directed by the evaluator in a timely manner. |
| *AA.VI.B.S7* | Comply with all applicable charted procedures. |
| *AA.VI.B.S8* | Maintain the appropriate airspeed ±10 knots, headings ±10°, and altitude ±100 feet, and accurately track a course, radial, or bearing. |
| *AA.VI.B.S9* | Conduct the departure phase to a point where, in the opinion of the evaluator, the transition to the en route environment is complete. |

| Task | *C. Arrival Procedures* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-2, FAA-H-8083-15, FAA-H-8083-16; AC 90-100; Enroute Low and High Altitude Charts; Profile Descent Charts; STARs/FMSPs; IFP; POH/AFM; AIM |
| **Objective** | To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with IFR arrival procedures and the use of a Flight Management System, where applicable. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.C.K1* | Standard Terminal Arrival (STAR) charts, U.S. Terminal Procedures Publications, and IFR Enroute High and Low Altitude Charts. |
| *AA.VI.C.K2* | Use of a Flight Management System (FMS) or GPS to follow a STAR. |
| *AA.VI.C.K3* | Pilot/controller responsibilities, communication procedures, and ATC services available to pilots. |
| *AA.VI.C.K4* | Two-way radio communication failure procedures during an arrival. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.C.R1* | Failure to communicate with ATC or follow published procedures. |
| *AA.VI.C.R2* | Failure to recognize limitations of traffic avoidance equipment. |
| *AA.VI.C.R3* | Failure to use see and avoid techniques when possible. |
| *AA.VI.C.R4* | Improper automation management. |
| *AA.VI.C.R5* | ATC instructions that modify an arrival or take you off and back on an arrival. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.C.S1* | In actual or simulated instrument conditions, select, identify (as necessary) and use the appropriate communication and navigation facilities associated with the arrival. |
| *AA.VI.C.S2* | Set FMS and avionics to include flight director and autopilot controls for the arrival, if applicable. |
| *AA.VI.C.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.C.S4* | Use current and appropriate navigation publications or databases for the proposed flight. |
| *AA.VI.C.S5* | Establish two-way communications with the proper controlling agency, use proper phraseology and comply, in a timely manner, with all ATC instructions and airspace restrictions as well as exhibit adequate knowledge of communication failure procedures. |
| *AA.VI.C.S6* | Intercept all courses, radials, and bearings appropriate to the procedure, route, clearance, or as directed by the evaluator in a timely manner. |
| *AA.VI.C.S7* | Comply with all applicable charted procedures. |
| *AA.VI.C.S8* | Adhere to airspeed restrictions required by regulation, ATC, aircraft limitations, or the evaluator. |
| *AA.VI.C.S9* | Establish rates of descent consistent with the route segment, airplane operating characteristics and safety. |
| *AA.VI.C.S10* | Maintain the appropriate airspeed/V-speed ±10 knots, but not less than $V_{Ref}$ if applicable, heading ±10°, altitude ±100 feet, and accurately track radials, courses, and bearings. |

| Task | *D. Nonprecision Approaches* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-15, FAA-H-8083-16; IFP, AIM; AC 120-108 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with performing nonprecision approach procedures.<br>***Note***: *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.D.K1* | Procedures and limitations associated with a nonprecision approach, including the differences between Localizer Performance (LP) and Lateral Navigation (LNAV) approach guidance. |
| *AA.VI.D.K2* | Navigation system annunciations expected during an RNAV approach. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.D.R1* | Failure to follow prescribed procedures (e.g., to prevent descending below the minimum descent altitude (MDA) without proper visual references). |
| *AA.VI.D.R2* | Deteriorating weather conditions on approach. |
| *AA.VI.D.R3* | An unstable approach, including excessive descent rates. |
| *AA.VI.D.R4* | Failure to ensure proper aircraft configuration during an approach and missed approach. |
| *AA.VI.D.R5* | Failure to manage automated navigation and autoflight systems. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.D.S1* | Accomplish the nonprecision instrument approaches selected by the evaluator. |
| *AA.VI.D.S2* | Establish two-way communications with ATC appropriate for the phase of flight or approach segment, and use proper communication phraseology. |
| *AA.VI.D.S3* | Select, tune, identify, and confirm the operational status of navigation equipment to be used for the approach. |
| *AA.VI.D.S4* | Comply with all clearances issued by ATC or the evaluator. |
| *AA.VI.D.S5* | Recognize if any flight instrumentation is inaccurate or inoperative, and take appropriate action. |
| *AA.VI.D.S6* | Advise ATC or the evaluator if unable to comply with a clearance. |
| *AA.VI.D.S7* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.D.S8* | Establish the appropriate airplane configuration and airspeed considering meteorological and operating conditions. |
| *AA.VI.D.S9* | Maintain altitude ±100 feet, heading ±5°, airspeed ±10 knots, and accurately track radials, courses, and bearings, prior to beginning the final approach segment. |
| *AA.VI.D.S10* | Apply adjustments to the published MDA and visibility criteria for the aircraft approach category, as appropriate, for factors that include NOTAMs, inoperative aircraft or navigation equipment, or inoperative visual aids associated with the landing environment, etc. |
| *AA.VI.D.S11* | Establish a stabilized descent to the appropriate altitude. |
| *AA.VI.D.S12* | For the final approach segment, maintain no more than ¼ scale CDI deflection, airspeed ±5 knots of selected value, and altitude above MDA +50/-0 feet (to the VDP or MAP). |
| *AA.VI.D.S13* | Execute the missed approach procedure if the required visual references are not distinctly visible and identifiable at the appropriate point or altitude for the approach profile; or execute a normal landing from a straight-in or circling approach. |
| *AA.VI.D.S14* | Use a Multi-Function Display (MFD) and other graphical navigation displays, if installed, to monitor position, track wind drift and other parameters to maintain desired flightpath. |

| Task | *E. Precision Approaches* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-15, FAA-H-8083-16; IFP; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with performing precision approach procedures.<br>***Note**: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.E.K1* | Procedures and limitations associated with a precision approach, including determining required descent rates and adjusting minimums in the case of inoperative equipment. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.E.R1* | Failure to initiate the missed approach immediately at Decision Altitude (DA)/Decision Height (DH) if the required visual references are not visible. |
| *AA.VI.E.R2* | Deteriorating weather conditions on approach. |
| *AA.VI.E.R3* | An unstable approach, including excessive descent rates. |
| *AA.VI.E.R4* | Failure to ensure proper aircraft configuration during an approach and missed approach. |
| *AA.VI.E.R5* | Failure to manage automated navigation and autoflight systems. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.E.S1* | Accomplish the precision instrument approaches selected by the evaluator. |
| *AA.VI.E.S2* | Establish two-way communications with ATC appropriate for the phase of flight or approach segment, and use proper communication phraseology. |
| *AA.VI.E.S3* | Select, tune, identify, and confirm the operational status of navigation equipment to be used for the approach. |
| *AA.VI.E.S4* | Comply in a timely manner with all clearances, instructions, and procedures. |
| *AA.VI.E.S5* | Recognize if any flight instrumentation is inaccurate or inoperative, and take appropriate action. |
| *AA.VI.E.S6* | Advise ATC or the evaluator if unable to comply with a clearance. |
| *AA.VI.E.S7* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.E.S8* | Establish the appropriate airplane configuration and airspeed considering meteorological and operating conditions. |
| *AA.VI.E.S9* | Maintain altitude ±100 feet, heading ±5°, airspeed ±10 knots, and accurately track radials, courses, and bearings, prior to beginning the final approach segment. |
| *AA.VI.E.S10* | Apply adjustments to the published DA/DH and visibility criteria for the aircraft approach category, as appropriate, for factors that include NOTAMs, inoperative aircraft or navigation equipment, or inoperative visual aids associated with the landing environment, etc. |
| *AA.VI.E.S11* | Establish a predetermined rate of descent at the point where vertical guidance begins, which approximates that required for the aircraft to follow the vertical guidance. |
| *AA.VI.E.S12* | Maintain a stabilized final approach from the Final Approach Fix (FAF) to DA/DH allowing no more than ¼-scale deflection of either the vertical or lateral guidance indications and maintain the desired airspeed ±5 knots. |
| *AA.VI.E.S13* | Upon reaching the DA/DH, immediately initiate the missed approach procedures if the required visual references for the runway are not distinctly visible and identifiable (or if in a seaplane); or transition to a normal landing approach only when the aircraft is in a position from which a descent to a landing on the runway can be made at a normal rate of descent using normal maneuvering. |
| *AA.VI.E.S14* | Use an MFD and other graphical navigation displays, if installed, to monitor position, track wind drift and other parameters to maintain desired flightpath. |

| Task | *F. Landing from a Precision Approach* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-15; FAA-H-8083-16; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with performing the procedures for a landing from a precision approach.<br>***Note***: *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.F.K1* | Elements related to the pilot's responsibilities, and the environmental, operational, and meteorological factors that affect landing from a precision approach. |
| *AA.VI.F.K2* | Airport signs, markings and lighting, to include approach lighting systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.F.R1* | Selection of approach procedure and runway based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.VI.F.R2* | Effects of: |
| *AA.VI.F.R2a* | a. Crosswind |
| *AA.VI.F.R2b* | b. Windshear |
| *AA.VI.F.R2c* | c. Tailwind |
| *AA.VI.F.R2d* | d. Wake turbulence |
| *AA.VI.F.R2e* | e. Runway surface/condition |
| *AA.VI.F.R3* | Planning for: |
| *AA.VI.F.R3a* | a. Missed approach |
| *AA.VI.F.R3b* | b. LAHSO |
| *AA.VI.F.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VI.F.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VI.F.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.VI.F.R7* | Attempting to land from an unstable approach. |
| *AA.VI.F.R8* | Flying below the glidepath. |
| *AA.VI.F.R9* | Transitioning from flying by instruments to visual references for landing. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.F.S1* | Transition at the DA/DH, or a point specified by the evaluator, to a visual flight condition allowing for safe visual maneuvering and a normal landing. |
| *AA.VI.F.S2* | Adhere to all ATC or evaluator advisories, such as NOTAMs, windshear, wake turbulence, runway surface, braking conditions, and other operational considerations. |
| *AA.VI.F.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.F.S4* | Maintain the desired airspeed, ±5 knots, and vertical and lateral guidance within ¼-scale deflection of the indicators during the visual descent from DA/DH to a point over the runway where vertical or lateral guidance must be abandoned to accomplish a normal landing. |
| *AA.VI.F.S5* | Touch down at the aiming point markings, -250/+500 feet, or where there are no runway aiming point markings, 750 to 1,500 feet, from the approach threshold of the runway. |
| *AA.VI.F.S6* | Maintain positive airplane control throughout the landing using drag and braking devices, as appropriate, to come to a stop. |
| *AA.VI.F.S7* | Demonstrate SRM or CRM, as appropriate. |
| *AA.VI.F.S8* | Utilize runway incursion avoidance procedures. |

| Task | G. Circling Approach |
|---|---|
| **References** | 14 CFR parts 61, 91 and 97; FAA-H-8083-15; FAA-H-8083-16; AIM; IFP |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with performing a circling approach procedure.<br>***Note**: See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.G.K1* | Elements related to circling approach procedures and limitations including approach categories and related airspeed restrictions. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.G.R1* | Failure to follow prescribed circling approach procedures. |
| *AA.VI.G.R2* | Executing a circling approach at night or with marginal visibility. |
| *AA.VI.G.R3* | Losing visual contact with an identifiable part of the airport. |
| *AA.VI.G.R4* | Failure to manage automated navigation and autoflight systems. |
| *AA.VI.G.R5* | Failure to maintain an appropriate airspeed while circling. |
| *AA.VI.G.R6* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VI.G.R7* | Executing an improper missed approach after the MAP while circling. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.G.S1* | Perform a circling approach to a runway that includes maneuvering of 90° or more from the final approach course. Comply with the circling approach procedure considering turbulence, windshear, and the maneuvering capabilities of the aircraft. |
| *AA.VI.G.S2* | Confirm the direction of traffic and adhere to all restrictions and instructions issued by ATC or the evaluator. |
| *AA.VI.G.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.G.S4* | Establish the approach and landing configuration for the situation and maintain airspeed, ±5 knots, desired heading/track, ±5°, and altitude, +100/-0 feet, as appropriate; and adjust pitch attitude and power as required to maintain a stabilized approach and a descent rate that ensures arrival at the MDA, prior to or at a point from which a circle-to-land maneuver can be accomplished. |
| *AA.VI.G.S5* | If a missed approach occurs, turns in the appropriate direction using the correct procedure and appropriately configures the airplane. |

| | |
|---|---|
| **Task** | ***H. Landing from a Circling Approach*** |
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-15; FAA-H-8083-16; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with performing the procedures for a landing from a circling approach.<br>***Note***: *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.H.K1* | Elements related to the pilot's responsibilities, and the environmental, operational, and meteorological factors that affect landing from a circling approach. |
| *AA.VI.H.K2* | Airport signs, markings and lighting, to include approach lighting systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.H.R1* | Selection of approach procedure and runway based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.VI.H.R2* | Effects of: |
| *AA.VI.H.R2a* | a. Crosswind |
| *AA.VI.H.R2b* | b. Windshear |
| *AA.VI.H.R2c* | c. Tailwind |
| *AA.VI.H.R2d* | d. Wake turbulence |
| *AA.VI.H.R2e* | e. Runway surface/condition |
| *AA.VI.H.R3* | Planning for: |
| *AA.VI.H.R3a* | a. Missed approach |
| *AA.VI.H.R3b* | b. LAHSO |
| *AA.VI.H.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VI.H.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VI.H.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.VI.H.R7* | Attempting to land from an unstable approach. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.H.S1* | Keep the airport environment in sight and remain within the circling approach radius applicable to the approach category to a position from which a stabilized descent to landing can be made. |
| *AA.VI.H.S2* | Adhere to all ATC or evaluator advisories, such as NOTAMs, windshear, wake turbulence, runway surface, braking conditions, and other operational considerations. |
| *AA.VI.H.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VI.H.S4* | Aligns the airplane for a normal landing on the selected runway without excessive maneuvering and without exceeding the normal operating limits of the airplane. The angle of bank should not exceed 30°. |
| *AA.VI.H.S5* | Make smooth, timely, and correct control application throughout the circling maneuver and maintain appropriate airspeed, ±5 knots. If applicable, maintain altitude +100/−0 feet, and desired heading/track, ±5°. |
| *AA.VI.H.S7* | Ensure the airplane is configured for landing. |
| *AA.VI.H.S8* | Scan the landing runway and adjoining area for traffic and obstructions. (ASEL, AMEL). |
| *AA.VI.H.S9* | Touch down at the aiming point markings - 250/+500 feet, or where there are no runway aiming point markings 750 to 1,500 feet from the approach threshold of the runway. |

| Task | ***H. Landing from a Circling Approach*** |
|---|---|
| *AA.VI.H.S10* | Maintain positive aircraft control throughout the landing using drag and braking devices, as appropriate, to come to a stop. |
| *AA.VI.H.S11* | Demonstrate SRM or CRM, as appropriate. |
| *AA.VI.H.S12* | Utilize runway incursion avoidance procedures. |

| Task | I. *Missed Approaches* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-15, FAA-H-8083-16; IFP; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with performing a missed approach procedure.<br>***Note**: See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.I.K1* | Elements related to missed approach procedures and limitations associated with standard instrument approaches, including while using a FMS and/or autopilot, if equipped. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.I.R1* | Failure to follow prescribed procedures. |
| *AA.VI.I.R2* | Holding, diverting, or electing to fly the approach again. |
| *AA.VI.I.R3* | Failure to ensure proper aircraft configuration during an approach and missed approach. |
| *AA.VI.I.R4* | Factors that might lead to executing a missed approach procedure before the MAP or to a go-around below DA/MDA. |
| *AA.VI.I.R5* | Failure to manage automated navigation and autoflight systems. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.I.S1* | Promptly initiate the missed approach procedure and report it to ATC. |
| *AA.VI.I.S2* | Apply the appropriate power setting for the flight condition and establish a pitch attitude necessary to obtain the desired performance. |
| *AA.VI.I.S3* | Retract the wing flaps/drag devices and landing gear, if appropriate, in the correct sequence and at a safe altitude, and establish a positive rate of climb and the appropriate airspeed/V-speed, ±5 knots. |
| *AA.VI.I.S4* | Coordinate with the crew, if applicable, and complete the appropriate procedures and checklist(s) in a timely manner. |
| *AA.VI.I.S5* | Comply with the published or alternate missed approach procedure. |
| *AA.VI.I.S6* | Advise ATC or the evaluator if unable to comply with a clearance, restriction, or climb gradient. |
| *AA.VI.I.S7* | Request, if appropriate, ATC clearance to the alternate airport, clearance limit, or as directed by the evaluator. |
| *AA.VI.I.S8* | Maintain the heading, course, or bearing ±5°, and altitude(s) ±100 feet during the missed approach procedure. |
| *AA.VI.I.S9* | Use an MFD and other graphical navigation displays, if installed, to monitor position and track to help navigate the missed approach. |
| *AA.VI.I.S10* | Demonstrate SRM or CRM, as appropriate. |
| *AA.VI.I.S11* | Re-engage autopilot (if installed) at appropriate times during the missed approach procedure. |

| Task | *J. Holding Procedures* |
|---|---|
| **References** | 14 CFR parts 61 and 91; FAA-H-8083-15, FAA-H-8083-16; AC 91-74; POH/AFM; AIM; IFP |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with holding procedures.<br>***Note:*** *See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VI.J.K1* | Elements related to holding procedures, including reporting criteria, appropriate speeds, and recommended entry procedures for standard, nonstandard, published, and non-published holding patterns. |
| *AA.VI.J.K2* | Determining holding endurance based upon factors to include an expect further clearance (EFC) time, fuel on board, fuel flow while holding, fuel required to destination and alternate, etc., as appropriate. |
| *AA.VI.J.K3* | When to declare minimum fuel or a fuel-related emergency. |
| *AA.VI.J.K4* | Use of automation for holding to include autopilot and flight management systems, if equipped. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VI.J.R1* | Recalculating fuel reserves if assigned an unanticipated EFC time. |
| *AA.VI.J.R2* | Scenarios and circumstances that could result in minimum fuel or the need to declare an emergency. |
| *AA.VI.J.R3* | Scenarios that could lead to holding, including deteriorating weather at the planned destination. |
| *AA.VI.J.R4* | Improper holding entry and improper wind correction while holding. |
| *AA.VI.J.R5* | Holding while in icing conditions. |
| *AA.VI.J.R6* | Improper automation management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VI.J.S1* | Correctly identifies instrument navigation aids associated with the assigned hold. |
| *AA.VI.J.S2* | Uses an entry procedure appropriate for a standard, nonstandard, published, or non-published holding pattern. |
| *AA.VI.J.S3* | Changes to the appropriate holding airspeed for the airplane and holding altitude to cross the holding fix at or below maximum holding airspeed. |
| *AA.VI.J.S4* | Comply with the holding pattern leg length and other restrictions, if applicable, associated with the holding pattern. |
| *AA.VI.J.S5* | Comply with ATC reporting requirements. |
| *AA.VI.J.S6* | Use proper wind correction procedures to maintain the desired pattern and to arrive over the fix as close as possible to a specified time. |
| *AA.VI.J.S7* | Maintain the airspeed ±10 knots, altitude ±100 feet, headings ±10°, and accurately track a selected course, radial, or bearing. |
| *AA.VI.J.S8* | If available, uses automation to include autopilot, flight director controls, and navigation displays associated with the assigned hold. |
| *AA.VI.J.S9* | Updates fuel reserve calculations based on EFC times. |

## VII. Emergency Operations

| Task | *A. Emergency Procedures* |
|---|---|
| **References** | 14 CFR part 91; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; AC 91-74; POH/AFM; AIM; FSB report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with emergency procedures. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.A.K1* | Declaring an emergency. |
| *AA.VII.A.K2* | Situations that would require an emergency descent. |
| *AA.VII.A.K3* | Causes of inflight fire or smoke. |
| *AA.VII.A.K4* | Airplane decompression. |
| *AA.VII.A.K5* | When an emergency evacuation may be necessary. |
| *AA.VII.A.K6* | Actions required if icing conditions exceed the capabilities of the airplane. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.A.R1* | Failure to follow proper procedures or checklists in an emergency. |
| *AA.VII.A.R2* | Multiple failures or system abnormalities. |
| *AA.VII.A.R3* | Failure to consider altitude, wind, terrain, and obstructions in an emergency. |
| *AA.VII.A.R4* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | For the airplane provided for the practical test, the applicant demonstrates the ability to: |
| *AA.VII.A.S1* | Explain or describe an emergency procedure for a situation(s) presented by the evaluator. |
| *AA.VII.A.S2* | Use proper procedures for an emergency situation(s) presented by the evaluator, such as: |
| *AA.VII.A.S2a* | a. Emergency descent |
| *AA.VII.A.S2b* | b. Inflight fire and smoke |
| *AA.VII.A.S2c* | c. Decompression |
| *AA.VII.A.S2d* | d. Emergency evacuation |
| *AA.VII.A.S2e* | e. Airframe icing |
| *AA.VII.A.S2f* | f. Others as specified in the AFM/POH |
| *AA.VII.A.S3* | Fly by reference to standby flight instruments. |
| *AA.VII.A.S4* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s) in a timely manner. |
| *AA.VII.A.S5* | Communicate with ATC and the evaluator, as appropriate for the situation. |

| Task | *B. Powerplant Failure During Takeoff* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3, POH/AFM; FSB report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a powerplant failure during takeoff.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.B.K1* | The procedures used during a powerplant failure on takeoff, the appropriate reference airspeeds, and the specific pilot actions required. |
| *AA.VII.B.K2* | Operational considerations to include: airplane performance (e.g., sideslip, bank angle, rudder input), takeoff warning systems, runway length, surface conditions, density altitude, wake turbulence, environmental conditions, obstructions, and other related factors that could adversely affect safety. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.B.R1* | Failure to plan for a powerplant failure during takeoff considering operational factors such as takeoff warning inhibit systems, other airplane characteristics, runway/takeoff path length, surface conditions, environmental conditions, obstructions, and LAHSO operations. |
| *AA.VII.B.R2* | Failure to brief the plan for a powerplant failure during takeoff, in a crew environment. |
| *AA.VII.B.R3* | Failure to follow proper procedures or checklists in an emergency. |
| *AA.VII.B.R4* | Failure to correctly identify the inoperative engine (AMEL, AMES). |
| *AA.VII.B.R5* | Inability to climb or maintain altitude with an inoperative powerplant (AMEL, AMES). |
| *AA.VII.B.R6* | Failure to consider altitude, wind, terrain, and obstructions in an emergency. |
| *AA.VII.B.R7* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VII.B.R8* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VII.B.S1* | Following the powerplant failure, adjust the powerplant controls as recommended by the manufacturer for the existing conditions. |
| *AA.VII.B.S2* | Establish a power-off descent approximately straight-ahead, if the powerplant failure occurs after becoming airborne and before reaching an altitude where a safe turn can be made (ASEL, ASES) or the performance capabilities and operating limitations of the airplane will not allow the climb to continue (AMEL, AMES). |
| *AA.VII.B.S3* | Continue the takeoff if the (simulated) powerplant failure occurs at a point where the airplane can continue to a specified airspeed and altitude at the end of the runway commensurate with the airplane's performance capabilities and operating limitations(AMEL, AMES). |
| *AA.VII.B.S4* | After establishing a climb, maintain the desired airspeed, ±5 knots. Use flight controls in the proper combination as recommended by the manufacturer, or as required, to maintain best performance and trim as required (AMEL, AMES). |
| *AA.VII.B.S5* | Maintain the appropriate heading, ±5°, when powerplant failure occurs (AMEL, AMES). |
| *AA.VII.B.S6* | Coordinate with the crew, if applicable, and complete the checklist(s) following the powerplant failure. |

| Task | *C. Powerplant Failure (Simulated) (ASEL, ASES)* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a powerplant failure and associated emergency approach and landing procedures.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.C.K1* | Immediate action items and emergency procedures for a forced landing. |
| *AA.VII.C.K2* | Airspeed, to include: |
| *AA.VII.C.K2a* | a. Importance of best glide speed and its relationship to distance |
| *AA.VII.C.K2b* | b. Difference between best glide speed and minimum sink speed |
| *AA.VIII.C.K2c* | c. Effects of wind on glide distance |
| *AA.VII.C.K3* | Effects of atmospheric conditions on emergency approach and landing. |
| *AA.VII.C.K4* | A stabilized approach, to include energy management concepts. |
| *AA.VII.C.K5* | Emergency Locator Transmitter (ELTs) and other emergency locating devices. |
| *AA.VII.C.K6* | ATC services to aircraft in distress. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.C.R1* | Failure to consider altitude, wind, terrain, obstructions, gliding distance, and available landing distance. |
| *AA.VII.C.R2* | Failure to plan and follow a flightpath to the selected landing area. |
| *AA.VII.C.R3* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VII.C.R4* | Improper aircraft configuration. |
| *AA.VII.C.R5* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VII.C.R6* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.VII.C.R7* | A powerplant failure in IMC conditions. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VII.C.S1* | Recognize the powerplant failure. |
| *AA.VII.C.S2* | Determine the cause for the simulated powerplant failure (if altitude permits) and if a restart is a viable option. |
| *AA.VII.C.S3* | Maintain positive control throughout the maneuver. |
| *AA.VII.C.S4* | Establish and maintain the recommended best glide airspeed, ±5 knots. |
| *AA.VII.C.S5* | Configure the airplane in accordance with the POH/AFM and existing conditions. |
| *AA.VII.C.S6* | Select a suitable landing area considering altitude, wind, terrain, obstructions, and available glide distance. |
| *AA.VII.C.S7* | Establish a proper flight path to the selected landing area. |
| *AA.VII.C.S8* | Complete emergency checklist items appropriate to the airplane in a timely manner and as recommended by the manufacturer or operator. |

| Task | *D. Inflight Powerplant Failure and Restart (AMEL, AMES)* |
|---|---|
| **References** | FAA-H-8083-2, FAA-8083-3, POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an inflight powerplant failure in a multiengine airplane and restart procedures.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.D.K1* | Flight characteristics and controllability associated with maneuvering the airplane with powerplant(s) inoperative to include the importance of drag reduction. |
| *AA.VII.D.K2* | Powerplant restart procedures and conditions where a restart attempt is appropriate. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.D.R1* | Failure to plan for a powerplant failure during flight. |
| *AA.VII.D.R2* | Failure to follow checklist procedures for a powerplant failure or a powerplant restart. |
| *AA.VII.D.R3* | Incorrect diagnosis of the cause of the powerplant failure. |
| *AA.VII.D.R4* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VII.D.R5* | Improper aircraft configuration. |
| *AA.VII.D.R6* | Factors and situations that could lead to an inadvertent stall, spin, and loss of control with an inflight powerplant failure. |
| *AA.VII.D.R7* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VII.D.S1* | Recognize and correctly identify powerplant failure(s), complete memory items (if applicable), and maintain positive airplane control. |
| *AA.VII.D.S2* | Coordinate with crew, as appropriate, and complete the appropriate emergency procedures and checklist(s) for propeller feathering or powerplant shutdown. |
| *AA.VII.D.S3* | Use flight controls in the proper combination as recommended by the manufacturer, or as required, to maintain best performance, and trim as required. |
| *AA.VII.D.S4* | Determine the cause for the powerplant(s) failure and if a restart is a viable option. |
| *AA.VII.D.S5* | Maintain the operating powerplant(s) within acceptable operating limits. |
| *AA.VII.D.S6* | Maintain the airspeed ±10 knots, the specified heading ±10°, and altitude ±100 feet as specified by the evaluator and within the airplane's capability. |
| *AA.VII.D.S7* | Demonstrate powerplant restart procedures in accordance with manufacturer or operator specified procedures and checklists, if applicable. |

| Task | ***E. Approach and Landing with a Powerplant Failure (Simulated) (AMEL, AMES)*** |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3; POH/AFM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an approach and landing with a powerplant failure in a multiengine airplane.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.E.K1* | Flight characteristics and controllability associated with maneuvering to a landing with inoperative powerplant(s). |
| *AA.VII.E.K2* | Go-around/rejected landing considerations with a powerplant failure. |
| *AA.VII.E.K3* | How to determine a suitable airport. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.E.R1* | Failure to plan for a powerplant failure inflight or during an approach. |
| *AA.VII.E.R2* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VII.E.R3* | Improper aircraft configuration. |
| *AA.VII.E.R4* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VII.E.R5* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.VII.E.R6* | Go-around/rejected landing with a powerplant failure. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VII.E.S1* | Recognize and correctly identify powerplant failure(s), complete memory items (if applicable), and maintain positive airplane control. |
| *AA.VII.E.S2* | Coordinate with crew, if applicable, and complete the appropriate emergency procedures and checklist(s) for simulated propeller feathering or simulated powerplant shutdown. |
| *AA.VII.E.S3* | Use flight controls in the proper combination as recommended by the manufacturer, or as required, to maintain best performance, and trim as required. |
| *AA.VII.E.S4* | Maintain the operating powerplant(s) within acceptable operating limits. |
| *AA.VII.E.S5* | Make radio calls, as appropriate. |
| *AA.VII.E.S6* | Proceed toward the nearest suitable airport. |
| *AA.VII.E.S7* | Prior to beginning the final approach segment, maintain the desired altitude ±100 feet, the desired airspeed ±10 knots, the desired heading ±5°, and accurately track courses, radials, and bearings. |
| *AA.VII.E.S8* | Establish the recommended approach and landing configuration and airspeed, ±5 knots, and adjust pitch attitude and power as required to maintain a stabilized approach. |
| *AA.VII.E.S9* | Maintain crosswind correction and directional control throughout the approach and landing. |
| *AA.VII.E.S10* | Make smooth, timely, and correct control application during the round out and touchdown. |
| *AA.VII.E.S11* | Touch down at the appropriate speed and pitch attitude at the runway aiming point markings -250/+500 feet, or where there are no runway markings 750 to 1,500 feet from the approach threshold of the runway. (AMEL) |
| *AA.VII.E.S12* | During round out and touchdown contact the water at the proper pitch attitude within 200 feet beyond a specified point. In addition, the touchdown will be within the first one-third of the water landing area. (AMES) |
| *AA.VII.E.S13* | Maintain positive aircraft control throughout the landing using drag and braking devices, as appropriate, to come to a stop. |
| *AA.VII.E.S14* | Coordinate with crew, if applicable, to complete after landing checklists. |

| | |
|---|---|
| **Task** | ***F. Precision Approach (Manually Flown) with a Powerplant Failure (Simulated) (AMEL, AMES)*** |
| **References** | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15, FAA-H-8083-16; POH/AFM; IFP |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a precision approach (manually flown) with a powerplant failure in a multiengine airplane.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.F.K1* | Flight characteristics and controllability associated with maneuvering to a landing with inoperative powerplant(s). |
| *AA.VII.F.K2* | Missed approach considerations with a powerplant failure. |
| *AA.VII.F.K3* | How to determine a suitable airport. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.F.R1* | Failure to plan for a powerplant failure inflight or during an approach. |
| *AA.VII.F.R2* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VII.F.R3* | Improper aircraft configuration. |
| *AA.VII.F.R4* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VII.F.R5* | Distractions, loss of situational awareness, and/or improper task management. |
| *AA.VII.F.R6* | Landing with a powerplant failure. |
| *AA.VII.F.R7* | Missed approach with a powerplant failure. |
| *AA.VII.F.R8* | Maneuvering in IMC with a powerplant failure. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VII.F.S1* | Recognize and correctly identify powerplant failure(s), complete memory items (if applicable), and maintain positive airplane control. |
| *AA.VII.F.S2* | Coordinate with crew, if applicable, and complete the appropriate emergency procedures and checklist(s) for simulated propeller feathering or simulated powerplant shutdown. |
| *AA.VII.F.S3* | Use flight controls in the proper combination as recommended by the manufacturer, or as required, to maintain best performance, and trim as required. |
| *AA.VII.F.S4* | Maintain the operating powerplant(s) within acceptable operating limits. |
| *AA.VII.F.S5* | Make radio calls, as appropriate. |
| *AA.VII.F.S6* | Proceed toward the nearest suitable airport. |
| *AA.VII.F.S7* | Coordinate with crew, if applicable, and complete the approach and landing checklists. |
| *AA.VII.F.S8* | Establish the appropriate airplane configuration and airspeed considering meteorological and operating conditions. |
| *AA.VII.F.S9* | Prior to beginning the final approach segment, maintain the desired altitude ±100 feet, the desired airspeed ±10 knots, the desired heading ±5°, and accurately track courses, radials, and bearings. |
| *AA.VII.F.S10* | Apply adjustments to the published DA/DH and visibility criteria for the aircraft approach category, as appropriate, for factors that include NOTAMs, Inoperative aircraft or navigation equipment, inoperative visual aids associated with the landing environment, etc. |
| *AA.VII.F.S11* | Establish a predetermined rate of descent at the point where vertical guidance begins, which approximates that required for the aircraft to follow the vertical guidance. |

| Task | F. *Precision Approach (Manually Flown) with a Powerplant Failure (Simulated) (AMEL, AMES)* |
|---|---|
| *AA.VII.F.S12* | Fly and maintain a stabilized approach, adjusting pitch and power as required, allowing no more than ¼-scale deflection of either the vertical or lateral guidance indications. |
| *AA.VII.F.S13* | Maintain a stabilized final approach from the FAF to the DA/DH allowing no more than ¼-scale deflection of either the vertical or lateral guidance indications and maintain the desired airspeed ±5 knots. |
| *AA.VII.F.S14* | Maintain crosswind correction and directional control throughout the approach and landing or missed approach. |
| *AA.VII.F.S15* | Immediately initiate the missed approach procedures when at the DA/DH, and the required visual references for the runway are not unmistakably visible and identifiable. |
| *AA.VII.F.S16* | Transition to a normal landing approach (missed approach for seaplanes) only when the aircraft is in a position from which a descent to a landing on the runway can be made at a normal rate of descent using normal maneuvering. |
| *AA.VII.F.S17* | Make smooth, timely, and correct control application during the round out and touchdown or during the missed approach. |

| Task | *G. Landing from a No Flap or a Nonstandard Flap Approach* |
|---|---|
| **References** | FAA-H-8083-2, FAA-H-8083-3; POH/AFM; FSB Report (type specific) |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a no flap or a nonstandard flap approach and landing.<br>***Note:*** *See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations for related considerations.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VII.G.K1* | Airplane flight characteristics when flaps, leading edge devices, and other similar devices malfunction or become inoperative. |
| *AA.VII.G.K2* | Other airplane system limitations when landing at a high speed. |
| *AA.VII.G.K3* | How to determine required landing distance and a suitable runway for landing. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VII.G.R1* | Hazards associated with a no flap or nonstandard flap approach and landing to include an asymmetrical flap situation. |
| *AA.VII.G.R2* | Selection of runway based on pilot capability, aircraft limitations, available distance, and wind. |
| *AA.VII.G.R3* | Effects of: |
| *AA.VII.G.R3a* | a. Crosswind |
| *AA.VII.G.R3b* | b. Windshear |
| *AA.VII.G.R3c* | c. Tailwind |
| *AA.VII.G.R3d* | d. Wake turbulence |
| *AA.VII.G.R3e* | e. Runway surface/condition |
| *AA.VII.G.R4* | Go-around/rejected landing. |
| *AA.VII.G.R5* | Collision hazards, to include aircraft, terrain, obstacles, vessels, vehicles, persons, wildlife, and wires. |
| *AA.VII.G.R6* | Low altitude maneuvering including stall, spin, or CFIT. |
| *AA.VII.G.R7* | Distractions, loss of situational awareness, and/or improper task management. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VII.G.S1* | Identify the malfunction. |
| *AA.VII.G.S2* | Coordinate with crew, if applicable, to complete applicable checklist(s) for the malfunction, approach, and landing. |
| *AA.VII.G.S3* | Communicate with ATC as needed and select an airport/runway with sufficient length for landing. |
| *AA.VII.G.S4* | Calculate the correct airspeeds/V-speeds for approach and landing. |
| *AA.VII.G.S5* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. |
| *AA.VII.G.S6* | Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point. |
| *AA.VII.G.S7* | Make smooth, timely, and correct control application during the round out and touchdown. |
| *AA.VII.G.S8* | Touchdown at an acceptable point on the runway. |
| *AA.VII.G.S9* | Maintain positive aircraft control throughout the landing using drag and braking devices, as appropriate, to come to a stop. |

VIII. Postflight Procedures

| Task | *A. After Landing, Parking and Securing (ASEL, AMEL)* |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-3; POH/AFM; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with normal after landing, parking, and securing procedures. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VIII.A.K1* | Aircraft shutdown, securing, and postflight inspection. |
| *AA.VIII.A.K2* | Documenting in-flight/postflight discrepancies. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VIII.A.R1* | Inappropriate activities and distractions. |
| *AA.VIII.A.R2* | Confirmation or expectation bias as related to taxi instructions. |
| *AA.VIII.A.R3* | Propeller, turbofan inlet, and exhaust safety. |
| *AA.VIII.A.R4* | Airport specific security procedures. |
| *AA.VIII.A.R5* | Disembarking passengers. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VIII.A.S1* | Demonstrate runway incursion avoidance procedures. |
| *AA.VIII.A.S2* | Park at the gate or in an appropriate area, considering the safety of nearby persons and property. |
| *AA.VIII.A.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s). |
| *AA.VIII.A.S4* | Conduct a postflight inspection and document discrepancies and servicing requirements, if any. |
| *AA.VIII.A.S5* | Secure the aircraft. |

| Task | *B. Seaplane Post-Landing Procedures (ASES, AMES)* |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-23; POH/AFM; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with anchoring, docking, mooring, and ramping/beaching. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AA.VIII.B.K1* | Mooring. |
| *AA.VIII.B.K2* | Docking. |
| *AA.VIII.B.K3* | Anchoring. |
| *AA.VIII.B.K4* | Ramping/beaching. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *AA.VIII.B.R1* | Inappropriate activities and distractions. |
| *AA.VIII.B.R2* | Confirmation or expectation bias as related to taxi instructions. |
| *AA.VIII.B.R3* | Propeller, turbofan inlet, and exhaust safety. |
| *AA.VIII.B.R4* | Airport/seabase security procedures. |
| *AA.VIII.B.R5* | Disembarking passengers. |
| **Skills** | The applicant demonstrates the ability to: |
| *AA.VIII.B.S1* | If anchoring, select a suitable area considering seaplane movement, water depth, tide, wind, and weather changes. Use an adequate number of anchors and lines of sufficient strength and length to ensure the seaplane's security. |
| *AA.VIII.B.S2* | If not anchoring, approach the dock/mooring buoy or beach/ramp in the proper direction and at a safe speed, considering water depth, tide, current, and wind. |
| *AA.VIII.B.S3* | Coordinate with the crew, if applicable, and complete the appropriate checklist(s). |
| *AA.VIII.B.S4* | If anchoring/mooring/beaching, secure the seaplane considering the effects of wind, waves, and changes in water level; if ramping, comply with appropriate ground movement procedures. |
| *AA.VIII.B.S5* | Conduct a postflight inspection and document discrepancies and servicing requirements, if any. |

Appendix Table of Contents

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# Appendix 1: The Knowledge Test Eligibility, Prerequisites and Testing Centers

## Knowledge Test Description

The knowledge test is an important part of the airman certification process. Applicants must pass the knowledge test before taking the practical test, when applicable.

The knowledge test consists of objective, multiple-choice questions. There is a single correct response for each test question. Each test question is independent of other questions. A correct response to one question does not depend upon, or influence, the correct response to another.

## Knowledge Test Table

| Test Code | Test Name | Number of Questions | Age | Allotted Time | Passing Score |
|---|---|---|---|---|---|
| ATM | Airline Transport Pilot Multiengine Airplane | 125 | 18 | 4.0 | 70 |
| ATS | Airline Transport Pilot Single-Engine Airplane | 90 | 21 | 3.0 | 70 |
| ACM | Airline Transport Pilot Multiengine Airplane Canadian Conversion | 60 | 23 | 2.5 | 70 |
| ASC | Airline Transport Pilot Single-Engine Airplane Canadian Conversion | 40 | 23 | 2.5 | 70 |

## Knowledge Test Blueprint

### *Airline Transport Pilot Single-Engine Airplane*

| ATS Knowledge Areas Required by 14 CFR part 61, section 61.155 to be on the Knowledge Test | Percentage of Test Questions |
|---|---|
| Aerodynamics | 5 – 10% |
| Aeronautical Decision Making | 5 – 10% |
| Air Traffic Control Procedures | 5 – 10% |
| Aircraft Performance | 5 – 10% |
| Crew Resource Management (CRM) | 5 – 10% |
| Human Factors | 5 – 10% |
| Meteorology | 10 – 15% |
| National Weather Service | 3 – 8% |
| Navigation | 10 – 15% |
| Regulations | 5 – 10% |
| Weather / Weather Charts | 10 – 15% |
| Weight and Balance | 5 – 10% |
| Windshear / Turbulence | 5 – 10% |
| Total Number of Questions | 90 |

***Airline Transport Pilot Multiengine Airplane***

| ATM Knowledge Areas Required by 14 CFR part 61, section 61.155 to be on the Knowledge Test | Percentage of Test Questions |
|---|---|
| Aeronautical Decision Making | 3 – 10% |
| Regulations | 10 – 15% |
| Windshear / Turbulence | 5 – 10% |
| Aerodynamics | 8 – 15% |
| Air Traffic Control Procedures | 8 – 15% |
| Aircraft Performance | 10 – 15% |
| Crew Resource Management (CRM) | 5 – 10% |
| Meteorology | 10 – 15% |
| Weather / Weather Charts | 5 – 10% |
| National Weather Service | 5 – 10% |
| Navigation | 10 – 15% |
| Human Factors | 3 – 10% |
| Weight and Balance | 3 – 10% |
| Air Carrier Operations | 5 – 10% |
| Leadership / Professional Development / Safety Culture | 3 – 10% |
| Total Number of Questions | 125 |

**Aviation English Language Standard**

In accordance with the requirements of 14 CFR section 61.153(b), the applicant must demonstrate the ability to read, write, speak, and understand the English language throughout the application and testing process. English language proficiency is required to communicate effectively with Air Traffic Control (ATC), to comply with ATC instructions, and to ensure clear and effective crew communication and coordination. Normal restatement of questions as would be done for a native English speaker is permitted, and does not constitute grounds for disqualification. The FAA English Language Standard (AELS) is the FAA evaluator's benchmark. It requires the applicant to demonstrate at least the ICAO level 4 standard.

**Knowledge Test Requirements-Airplane Category, Single and Multiengine Class**

To be eligible to take an ATP Knowledge Test, you must provide proper identification and meet the minimum age requirements in accordance with 14 CFR part 61, section 61.35. To verify your eligibility to take the test, you must provide identification that includes the applicant's:

- Photograph;
- Signature;
- Date of birth;
- If the permanent mailing address is a post office box number, then the applicant must provide a government-issued residential address

If applying for the ATP - Airplane Multiengine (ATM) test or ATP - Airplane Multiengine Canadian Conversion (ACM) test, the applicant must provide a graduation certificate from an approved provider of the ATP Certification Training Program (ATP CTP) in accordance with part 61, section 61.35.

An applicant retesting **after failure** of any ATP knowledge test is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training in accordance with 14 CFR part 61, section 61.49. For the ATP - Airplane Multiengine (ATM) test or ATP - Airplane Multiengine Canadian Conversion (ACM) test, the authorized instructor must meet the ATP

CTP instructor requirements. The endorsement must certify that the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.

***Note:*** *For a replacement knowledge test report, see* *Appendix 3: Airman Knowledge Test Report*.

If an applicant seeks to add an additional category or class to an existing ATP certificate, reference part 61, section 61.165 for any additional knowledge test requirements.

An applicant seeking only to add an airplane type rating to an existing airman certificate in the same category and class (i.e., not adding a new category, class, or upgrading the certificate) is not required to pass a knowledge test in accordance with part 61, sections 61.63(d) and 61.165(e) prior to taking the practical test.

Acceptable forms of authorization for ATP Airplane Canadian Conversion (ACM and ASC) only:

- Confirmation of Verification Letter issued by FAA Airmen Certification Branch (Knowledge Testing Authorization Requirements Matrix).
- Requires **no** instructor endorsement or other form of written authorization, **except** those applicants seeking a multiengine airplane ATP certificate. Those applicants are required to provide a graduation certificate from an approved provider of the ATP CTP.

**Knowledge Test Centers**

The FAA authorizes hundreds of knowledge testing center locations that offer a full range of airman knowledge tests. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

**Knowledge Test Registration**

When you contact a knowledge testing center to register for a test, please be prepared to select a test date, choose a testing center, and make financial arrangements for test payment when you call. You may register for test(s) several weeks in advance, and you may cancel in accordance with the testing center's cancellation policy.

# Appendix 2: Knowledge Test Procedures and Tips

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.)

### Acceptable Materials

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
|---|---|---|
| Supplement book provided by proctor | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators. |
| All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability. | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages | Magnetic Cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature. |
| Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

### Test Tips

When taking a knowledge test, please keep the following points in mind:

- Carefully read the instructions provided with the test.
- Answer each question in accordance with the latest regulations and guidance publications.

- Read each question carefully before looking at the answer options. You should clearly understand the problem before trying to solve it.
- After formulating a response, determine which answer option corresponds with your answer. The answer you choose should completely solve the problem.
- Remember that only one answer is complete and correct. The other possible answers are either incomplete or erroneous.
- If a certain question is difficult for you, mark it for review and return to it after you have answered the less difficult questions. This procedure will enable you to use the available time to maximum advantage.
- When solving a calculation problem, be sure to read all the associated notes.
- For questions involving use of a graph, you may request a printed copy that you can mark in computing your answer. This copy and all other notes and paperwork must be given to the testing center upon completion of the test.

**Cheating or Other Unauthorized Conduct**

To avoid test compromise, computer testing centers must follow strict security procedures established by the FAA and described in FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test at any time a test unit member suspects that a cheating incident has occurred.

The FAA will investigate and, if the agency determines that cheating or unauthorized conduct has occurred, any airman certificate or rating you hold may be revoked. You will also be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of one year.

**Testing Procedures for Applicants Requesting Special Accommodations**

An applicant with learning or reading disability may request approval from the FAA Airman Testing Branch through the responsible Flight Standards Office or International Field Office/International Field Unit (IFO/IFU) to take an airman knowledge test using one of the three options listed below, in preferential order:

**Option 1:** Use current testing facilities and procedures whenever possible.

**Option 2:** Use a self-contained, electronic device, which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

> ***Note:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.*

**Option 3:** Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the Flight Standards Office or IFO/IFU inspector must contact the FAA Airman Testing Branch for assistance in selecting the test site and assisting the proctor. Before approving any option, the Flight Standards Office or IFO/IFU inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

# Appendix 3: Airman Knowledge Test Report

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report (AKTR) documenting the score with the testing center's raised, embossed seal. The applicant must retain the original AKTR. When taking the practical test, the applicant must present the original AKTR to the evaluator, who is required to assess the noted areas of deficiency during the oral portion of the practical test.

An AKTR expires 24 calendar months from the month the applicant completes the knowledge test unless it is a multiengine airplane ATP AKTR, That AKTR is valid for 60 calendar months from the month the applicant completes the knowledge test. If the AKTR expires before completion of the practical test, the applicant must retake the knowledge test unless otherwise permitted to use an expired AKTR in accordance with part 61, section 61.39.

To obtain a duplicate AKTR due to loss or destruction of the original, the applicant must mail a signed request accompanied by a check or money order made payable to the FAA in the amount of $12.00 to the following address:

Federal Aviation Administration
Airmen Certification Branch
P.O. Box 25082
Oklahoma City, OK 73125-0082

To obtain a copy of the application form or a list of the information required, please see the Airmen Certification Branch webpage.

**FAA Knowledge Test Question Coding**

Each task in the ACS includes an ACS code. This ACS code will ultimately be displayed on the AKTR to indicate what Task element was proven deficient on the knowledge test. An authorized instructor can then provide remedial training in the deficient areas and evaluators can re-test this element during the practical exam.

The ACS coding consists of four elements. For example, this code is interpreted as follows:

**AA.I.B.K6:**
**AA** = Applicable ACS (Airline Transport Pilot – Airplane)
**I** = Area of Operation (Preflight Preparation)
**B** = Task (Performance and Limitations)
**K6** = Knowledge Task element 6 (Effects of icing on performance.)

Knowledge test questions are linked to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC) codes. After this transition occurs, the AKTR will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. Remedial instruction, if applicable, and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task elements.

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., “PLT058”) code will continue to be displayed on the AKTR. The LSC codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC codes and ACS codes.

Because all active knowledge test questions for the Commercial Pilot Airplane Knowledge Test (CAX) have been aligned with the corresponding ACS, evaluators can continue to use LSC codes in conjunction with the ACS for the time being. The evaluator should look up the LSC code(s) on the applicant’s AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the evaluator can use the corresponding Area(s) of Operation/Task(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant’s understanding of that material in the context of the appropriate ACS Area(s) of Operation and Task(s).

# Appendix 4: The Practical Test – Eligibility and Prerequisites

The prerequisite requirements and general eligibility for a practical test and the specific requirements for the original issuance of an ATP Certificate in the airplane category can be found in 14 CFR part 61, sections 61.39 and 61.153.

There are a number of additional regulations in 14 CFR part 61 that outline requirements for an ATP certificate or the addition of an airplane type rating. Some of the key sections are highlighted below. Careful review of these sections is necessary to ensure that all of the requirements are met.

- Section 61.63 provides the endorsement and training record requirements for an applicant seeking an airplane type rating to be added to an airman certificate (other than an ATP certificate).
- Section 61.157 provides the endorsement and training record requirements for an applicant seeking an airplane type rating to be added to an ATP certificate or for an airplane type rating to be concurrently completed with the original issuance of an ATP certificate.
- Section 61.159 details the aeronautical experience needed to be eligible for an ATP certificate in the airplane category.
- Section 61.160 outlines the eligibility requirements for a multiengine ATP certificate with restricted privileges with reduced aeronautical experience. It also specifies the limitations that must be placed on the ATP certificate if the applicant uses this section to qualify for the certificate.
- Section 61.165 defines the requirements for the addition of an aircraft category or class rating to an ATP certificate.

# Appendix 5: Practical Test Roles, Responsibilities, and Outcomes

## Applicant Responsibilities

The applicant is responsible for mastering the established standards for knowledge, risk management, and skill elements in all Tasks appropriate to the certificate and rating sought. The applicant should use this ACS, its references, and the Applicant's Checklist in this Appendix in preparation to take the practical test.

## Instructor Responsibilities

The instructor, if used, is responsible for training the applicant to meet the established standards for knowledge, risk management, and skill elements in all Tasks appropriate to the certificate and rating sought. The instructor should use this ACS and its references as part of preparing the applicant to take the practical test and, if necessary, in retraining the applicant to proficiency in all subject(s) areas which were shown to be deficient by the FAA Airman Knowledge Test Report.

## Evaluator Responsibilities

An evaluator is:

- Aviation Safety Inspector (ASI)
- Pilot examiner (other than administrative pilot examiners);
- Training center evaluator (TCE);
- Aircrew Program Designee (APD);
- Chief instructor, assistant chief instructor or check instructor of pilot school holding examining authority; or
- Instrument Flight Instructor (CFII) conducting instrument proficiency check (IPC).

The evaluator who conducts the practical test is responsible for determining that the applicant meets the established standards of aeronautical knowledge, risk management, and skills (flight proficiency), and for each Task in the appropriate ACS. This responsibility also includes verifying the experience requirements specified for a certificate or rating and training requirements for an aircraft type rating.

Prior to beginning the practical test, the evaluator must also determine that the applicant meets FAA Aviation English Language Proficiency Standards by verifying that he or she can understand ATC instructions and communicate in English at a level that is understandable to ATC and other pilots. The evaluator should use procedures outlined in the AC 60-28, FAA English Language Standard for an FAA Certificate Issued Under 14 CFR Parts 61, 63, 65, and 107, as amended, when evaluating the applicant's ability to meet the standard.

The evaluator must develop a Plan of Action (POA), written in English, to conduct the practical test, and it must include all of the required Areas of Operation and Tasks. For initial issuance or to add a category or class to an ATP certificate, the POA must include a scenario that evaluates as many of the required Areas of Operation and Tasks as possible. As the scenario unfolds during the test, the evaluator will introduce problems and emergencies that the applicant must manage. The evaluator has the discretion to modify the POA in order to accommodate unexpected situations as they arise. For example, the evaluator may elect to suspend and later resume a scenario in order to assess certain tasks.

In the integrated ACS framework, the Areas of Operation contain Tasks that include "knowledge" elements (such as K1), "risk management" elements (such as R1), and "skill" elements (such as S1). Knowledge and risk management elements are primarily evaluated during the knowledge testing phase of the airman certification process. The evaluator must assess the applicant on all skill elements for each Task included in each Area of Operation of the ACS, unless otherwise noted. The evaluator administering the practical test has the discretion to combine Tasks/elements as appropriate to testing scenarios.

The required minimum elements to include in the POA, unless otherwise noted, from each applicable Task are as follows:

At least one knowledge element;

At least one risk management element;

All skill elements unless otherwise noted; and

Any Task elements in which the applicant was shown to be deficient on the knowledge test, if a knowledge test is required.

***Note:*** *Task elements added to the POA on the basis of being listed on the AKTR may satisfy the other minimum Task element requirements. The missed items on the AKTR are not required to be added in addition to the minimum Task element requirements.*

There is no expectation for testing every knowledge and risk management element in a Task, but the evaluator has discretion to sample as needed to ensure the applicant's mastery of that Task.

Unless otherwise noted in the Task, the evaluator must test each item in the skills section by asking the applicant to perform each one. As safety of flight conditions permit, the evaluator may use questions during flight to test knowledge and risk management elements not evident in the demonstrated skills. To the greatest extent practicable, evaluators shall test the applicant's ability to apply and correlate information, and use rote questions only when they are appropriate for the material being tested. If the Task includes sub-elements, the evaluator may select an appropriate sub-element (e.g., AA.I.B.K3f – Weight and balance). Tasks requiring evaluation of more than one sub-element are annotated accordingly. If the broader primary element is selected, the evaluator must develop questions only from material covered in the references listed for the Task.

## Possible Outcomes of the Test

There are three possible outcomes of the practical test: (1) Temporary Airman Certificate (satisfactory), (2) Notice of Disapproval (unsatisfactory), or (3) Letter of Discontinuance.

If the evaluator determines that a Task is incomplete, or the outcome is uncertain, the evaluator may require the applicant to repeat that Task, or portions of that Task. This provision does not mean that instruction, practice, or the repetition of an unsatisfactory Task is permitted during the practical test.

If the evaluator determines the applicant's skill and abilities are in doubt, the outcome is unsatisfactory and the evaluator must issue a Notice of Disapproval.

### *Satisfactory Performance*

Satisfactory performance requires that the applicant:

Demonstrate the Tasks specified in the Areas of Operation for the certificate or rating sought within the established standards;

Demonstrate mastery of the aircraft by performing each Task successfully;

Demonstrate proficiency and competency in accordance with the approved standards;

Demonstrate sound judgment and exercise aeronautical decision-making/risk management; and

Demonstrate competence in crew resource management in operations of aircraft certificated for more than one required pilot crewmember, or single-pilot competence in an operation or airplane that is certificated for single-pilot operations.

Satisfactory performance will result in the issuance of a temporary certificate or the continuation or reinstatement of an operating privilege, as appropriate to the checking event being completed.

### *Unsatisfactory Performance*

If, in the judgment of the evaluator, the applicant does not meet the standards for any Task, the applicant fails the Task and associated Area of Operation. The test is unsatisfactory, and the evaluator issues a Notice of Disapproval.

When the evaluator issues a Notice of Disapproval, he or she must list the Area of Operation in which the applicant did not meet the standard. The Notice of Disapproval must also list the Area(s) of Operation not tested, and the number of practical test failures. If the applicant's inability to meet the English language requirements contributed to the failure of a Task, the evaluator should note "English Proficiency" on the Notice of Disapproval.

The evaluator or the applicant may end the test if the applicant fails a Task. The evaluator may continue the test only with the consent of the applicant, and the applicant is entitled to credit only those Areas of Operation and the associated Tasks satisfactorily performed. Though not required, the evaluator has discretion to reevaluate any Task, including those previously passed, during the retest.

Typical areas of unsatisfactory performance and grounds for disqualification include:

Any action or lack of action by the applicant that requires corrective intervention by the evaluator to maintain safe flight.

Failure to use proper and effective visual scanning techniques to clear the area before and while performing maneuvers.

Consistently exceeding tolerances stated in the skill elements of the Task.

Failure to take prompt corrective action when tolerances are exceeded.

Failure to exercise risk management.

### ***Discontinuance***

When it is necessary to discontinue a practical test for reasons other than unsatisfactory performance (e.g., equipment failure, weather, illness), the evaluator must return all test paperwork to the applicant. The evaluator must prepare, sign, and issue a Letter of Discontinuance that lists those Areas of Operation the applicant successfully completed and the time period remaining to complete the test. The evaluator should advise the applicant to present the Letter of Discontinuance to the evaluator when the practical test resumes in order to receive credit for the items successfully completed. The Letter of Discontinuance becomes part of the applicant's certification file.

# Practical Test Checklist (Applicant)
## Appointment with Evaluator

**Evaluator's Name:** ______________________________________________

**Location:** ______________________________________________

**Date/Time:** ______________________________________________

***Note: Applicability of each item is contingent on the aircraft or Flight Simulation Training Device used.***

**Acceptable Aircraft**

- ☐ Aircraft Documents:
  - ☐ Airworthiness Certificate
  - ☐ Registration Certificate
  - ☐ Operating Limitations
- ☐ Aircraft Maintenance Records:
  - ☐ Logbook Record of Airworthiness Inspections and AD Compliance
- ☐ Pilot's Operating Handbook, FAA-Approved Aircraft Flight Manual

**Personal Equipment**

- ☐ View-Limiting Device
- ☐ Current Aeronautical Charts (Printed or Electronic)
- ☐ Computer and Plotter
- ☐ Flight Plan Form
- ☐ Flight Logs (printed or electronic)
- ☐ Chart Supplements, Airport Diagrams, and Appropriate Publications
- ☐ Current AIM

**Personal Records**

- ☐ Identification—Photo/Signature ID
- ☐ Pilot Certificate
- ☐ Current Medical Certificate
- ☐ Completed FAA Form 8710-1, Airman Certificate and/or Rating Application with Instructor's Signature
- ☐ Original Knowledge Test Report
- ☐ Pilot Logbook with appropriate Instructor Endorsements
- ☐ FAA Form 8060-5, Notice of Disapproval
- ☐ Letter of Discontinuance
- ☐ Approved School Graduation Certificate
- ☐ Original ATP CTP Graduation Certificate
- ☐ Evaluator's Fee

### Additional Rating Task Table

For an applicant who holds an ATP certificate and seeks an additional airplane category and/or class rating at the ATP level, the evaluator must evaluate that applicant in the Areas of Operation and Tasks listed in the Additional Rating Task Table. Please note, however that the evaluator has discretion to evaluate the applicant's competence in the remaining Areas of Operation and Tasks.

If the applicant holds two or more category or class ratings at least at the private level, and the ratings table indicates differing required Tasks, the "least restrictive" entry applies. For example, if "All" and "None" are indicated for one Area of Operation, the "None" entry applies. If "B" and "B, C" are indicated, the "B entry applies.

#### *Addition of an Airplane Single-Engine Land Rating to an existing ATP Certificate*

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**ATP Pilot Ratings Held**

| Areas of Operation | ASES | AMEL | AMES | RH |
|---|---|---|---|---|
| I | A,B | A,B | A,B | A,B |
| II | A,C,E | A,E | A,C,E | A,B,C,E |
| III | A,B,I | A,B | A,B,I | A,B,I,J |
| IV | C | C | C | All |
| V | None | None | None | All |
| VI | None | None | None | All |
| VII | A,B,C,G, | A,B,C,G | A,B,C,G | A,B,C,G |
| VIII | A | None | A | A |

#### *Addition of an Airplane Single-Engine Sea Rating to an existing ATP Certificate*

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**ATP Pilot Ratings Held**

| Areas of Operation | ASEL | AMEL | AMES | RH |
|---|---|---|---|---|
| I | A,B | A,B,H | A,B | A,B,H |
| II | A,B,D,E | A,B,D,E | A,E | A,B,D,E |
| III | A,B,C,D,E, F,G,H,I | A,B,C,D,E, F,G,H,I | A,B,I | All |
| IV | C | C | C | All |
| V | None | None | None | All |
| VI | None | None | None | All |
| VII | A,B,C,G | A,B,C,G | A,B,C,G | A,B,C,G |
| VIII | B | B | None | B |

***Addition of an Airplane Multiengine Land Rating to an existing ATP Certificate***

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**ATP Pilot Ratings Held**

| Areas of Operation | ASEL | ASES | AMES | RH |
|---|---|---|---|---|
| **I** | A,B,D,E | A,B,D,E | A,B | A,B,C, D,E,F,G |
| **II** | A,B,E | A,B,C,E | A,B,C,E | A,B,C,E |
| **III** | A,B,I | A,B,I | A,B,I | A,B,I,J |
| **IV** | All | All | C | All |
| **V** | All | All | None | All |
| **VI** | None | None | None | All |
| **VII** | A,B,D, E,F,G | A,B,D, E,F,G | A,B,E,G | A,B,D, E,F,G |
| **VIII** | A | A | A | A |

***Addition of an Airplane Multiengine Sea Rating to an existing ATP Certificate***

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**ATP Pilot Ratings Held**

| Areas of Operation | AMEL | ASEL | ASES | RH |
|---|---|---|---|---|
| **I** | A,B,H | A,B,C,D, E,F,G,H | A,B,C,D, E,F,G,H | A,B,C,D, E,F,G,H |
| **II** | A,B,D,E | A,B,D,E | A,B,D,E | A,B,D,E |
| **III** | A,B,C,D, E,F,G,H,I | A,B,C,D, E,F,G,H,I | A,B,I | All |
| **IV** | C | All | C | All |
| **V** | None | All | All | All |
| **VI** | None | A,G,H | None | All |
| **VII** | A,B,E,G | A,B,D, E,F,G | A,B,D, E,F,G | A,B,D, E,F,G |
| **VIII** | B | B | B | B |

### *Addition of a VFR Only Type Rating to an Existing Pilot Certificate*

In accordance with section 61.63(e) or section 61.157(g), as applicable, an applicant may add a type rating to a pilot certificate with an airplane that is not capable of instrument flight and therefore completion of the applicable Tasks by reference to instruments is not possible. This results in a “VFR only” limitation to be added to the type rating on the pilot certificate. The following table identifies the Tasks required for the category and class of type rating sought.

**Category and Class of Type Rating**

| Areas of Operation | AMEL | ASEL | AMES | ASES |
|---|---|---|---|---|
| **I** | A,B | A,B | A,B,H | A,B,H |
| **II** | A,B,C,E | A,B,C,E | A,B,D,E | A,B,D,E |
| **III** | A,B,I,J | A,B,I,J | All | All |
| **IV** | All | All | All | All |
| **V** | All | All | All | All |
| **VI** | None | None | None | None |
| **VII** | A,B,D,E,G | A,B,C,G | A,B,D,E,G | A,B,C,G |
| **VIII** | A | A | B | B |

***Note:*** *Any task that is normally required to be performed by reference to instruments would be conducted using visual references for the purposes of a VFR type rating.*

### Removal of the “Second-In-Command Required” Limitation from a Type Rating

A pilot, who holds an airplane type rating with a “Second-In-Command Required” Limitation, may be tested to remove the limitation and be issued an unrestricted type rating. The practical test to remove the restriction does not require evaluation of all Areas of Operation and Tasks as a single-pilot. The practical test is conducted in accordance with the Airline Transport Pilot and Type Rating for Airplane ACS (FAA-S-ACS-11 as amended), and the pilot must demonstrate single-pilot competency in the following Areas of Operation and Tasks listed below.

| Areas of Operation | AMEL Tasks | AMES Tasks |
|---|---|---|
| **I** | None | None |
| **II** | A,B,C,E | A,B,D,E |
| **III** | A,B,I,J | All |
| **IV** | B,C | B,C |
| **V** | None | None |
| **VI** | All | All |
| **VII** | A,B,D,E,F,G | A,B,D,E,F,G |
| **VIII** | A | B |

### Airplane Multiengine Land Limited to Center Thrust

A center thrust limitation for the AMEL rating is issued to applicants who complete the practical test for the AMEL rating in an aircraft that does not have a manufacturer’s published $V_{MC}$. It can also be issued to a military pilot seeking a commercial certificate under 14 CFR part 61, section 61.73 who can only show qualification in a multiengine airplane that is limited to center thrust.

When conducting a practical test for a pilot that has not previously demonstrated competence in a multiengine airplane with a published $V_{MC}$, or when removing the center thrust limitation from the AMEL rating, the applicant must be tested on the following Areas of Operation and Tasks from the Airline Transport Pilot and Type Rating for

Airplane ACS (FAA-S-ACS-11 as amended) and Commercial Pilot – Airplane ACS (FAA-S-ACS-7 as amended) in a multiengine airplane that has a manufacturer's published $V_{MC}$ speed. This speed can be found on the type certificate data sheet (TCDS) or in the AFM. If the limitation will be removed under part 121, 135, or 142, it must be done in accordance with an approved curriculum or training program.

***Airline Transport Pilot/Type Rating for Airplane ACS (FAA-S-ACS-11 as amended)***

| Areas of Operation | Tasks |
|---|---|
| **III** | I |
| **VII** | B,D,E |

***Commercial Pilot – Airplane ACS (FAA-S-ACS-7 as amended)***

| Areas of Operation | Tasks |
|---|---|
| **X** | A,B |

# Appendix 6: Safety of Flight

### General

Safety of flight must be the prime consideration at all times. The evaluator, applicant, and crew must be constantly alert for other traffic. If performing aspects of a given maneuver, such as emergency procedures, would jeopardize safety, the evaluator will ask the applicant to simulate that portion of the maneuver. The evaluator will assess the applicant’s use of visual scanning and collision avoidance procedures throughout the entire test.

### Stall and Spin Awareness

During flight training and testing, the applicant and the instructor or evaluator must always recognize and avoid operations that could lead to an inadvertent stall or spin and inadvertent loss of control.

### Use of Checklists

Throughout the practical test, the applicant is evaluated on the use of an appropriate checklist.

Assessing proper checklist use depends upon the specific Task. In all cases, the evaluator should determine whether the applicant appropriately divides attention and uses proper visual scanning. In some situations, reading the actual checklist may be impractical or unsafe. In such cases, the evaluator should assess the applicant's performance of published or recommended immediate action "memory" items along with his or her review of the appropriate checklist once conditions permit.

In a single-pilot airplane, the applicant should demonstrate the Crew Resource Management (CRM) principles described as Single Pilot Resource Management (SRM). Proper use is dependent on the specific Task being evaluated. The situation may be such that the use of the checklist while accomplishing elements of an Objective would be either unsafe or impractical in a single-pilot operation. In this case, a review of the checklist after the elements have been accomplished is appropriate.

### Use of Distractions

Numerous studies indicate that many accidents have occurred when the pilot has been distracted during critical phases of flight. The evaluator should incorporate realistic distractions during the flight portion of the practical test to evaluate the pilot’s situational awareness and ability to utilize proper control technique while dividing attention both inside and outside the cockpit.

### Positive Exchange of Flight Controls

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

> When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
>
> The second pilot acknowledges immediately by saying, "I have the flight controls."
>
> The first pilot again says, "You have the flight controls," and visually confirms the exchange.

Pilots should follow this procedure during any exchange of flight controls, including any occurrence during the practical test. The FAA also recommends that both pilots use a visual check to verify that the exchange has occurred. There must never be any doubt as to who is flying the aircraft.

### Aeronautical Decision Making, Risk Management, Crew Resource Management, and Single-Pilot Resource Management

Throughout the practical test, the evaluator must assess the applicant’s ability to use sound aeronautical decision-making procedures in order to identify hazards and mitigate risk. The evaluator must accomplish this requirement by reference to the risk management elements of the given Task(s), and by developing scenarios that incorporate and combine Tasks appropriate to assessing the applicant's risk management in making safe aeronautical decisions. For example, the evaluator may develop a scenario that incorporates weather decisions and performance planning.

In assessing the applicant's performance in all Tasks in this practical test standard, the evaluator should take note of the applicant's use of CRM or SRM, as applicable. CRM/SRM is the set of competencies that includes situational awareness, communication skills, teamwork, task allocation, and decision making within a comprehensive framework of standard operating procedures (SOPs). SRM specifically refers to the management of all resources onboard the aircraft as well as outside resources available to the single pilot. Resources a pilot may involve in decisions as part of CRM/SRM include dispatchers, flight attendants, maintenance personnel, flight operations managers, and air traffic control.

Deficiencies in CRM/SRM often contribute to the unsatisfactory performance of a Task. While evaluation of CRM/SRM may appear to be somewhat subjective, the evaluator should use the risk management elements of the given Task(s) to determine whether the applicant's performance of the Task(s) demonstrates both understanding and application of the associated risk management elements.

For aircraft requiring only one pilot, the evaluator may not assist the applicant in the management of the aircraft, radio communications, tuning and identifying navigational equipment, or using navigation charts. If the evaluator, other than an FAA Inspector, is qualified and current in the specific make and model aircraft that is certified for two or more crewmembers, he or she may occupy a duty position.

If the evaluator occupies a duty position on an aircraft that requires two or more crewmembers, the evaluator must fulfill the duties of that position. Moreover, when occupying a required duty position, the evaluator must perform CRM functions as briefed and requested by the applicant except during the accomplishment of steep turns and approach to stalls. During these two Tasks the applicant must demonstrate their ability to control the aircraft without the intervention from the pilot monitoring.

**Multiengine Considerations**

When a practical test is conducted in an airplane certificated under 14 CFR part 23 (except commuter category), for which no $V_1$, $V_R$, or $V_2$ speeds are published, the failure of the most critical powerplant should be simulated at a point after reaching a minimum of $V_{SSE}$, and at an altitude not lower than 400 feet above ground level (not applicable if in an FSTD). The evaluator must also consider atmospheric conditions, terrain, and type of aircraft used.

The applicant must supply an airplane that does not prohibit the demonstration of feathering the propeller inflight unless the conditions described in the next paragraph for a type rating are met. For multiengine practical tests conducted in the airplane, the evaluator will set zero thrust after the applicant has simulated feathering the propeller following a simulated engine failure. The applicant must demonstrate feathering one propeller in flight unless the manufacturer prohibits this action. The applicant must also demonstrate at least one landing with a simulated feathered propeller with the engine set to zero thrust.

In a multiengine airplane or FSTD equipped with propellers (including turboprop), the applicant must demonstrate feathering one propeller and engine shutdown unless:

• the practical test is for a type rating, and

• the airplane used for the practical test was not certificated with inflight unfeathering capability.

In this situation, the applicant may perform a simulated powerplant failure. In all other cases, the applicant must demonstrate the ability to safely feather and unfeather the propeller while airborne.

For safety reasons, when the practical test is conducted in an airplane, the applicant must perform Tasks that require feathering or shutdown only under conditions and at a position and altitude where it is possible to make a safe landing on an established airport if there is difficulty in unfeathering the propeller or restarting the engine. The evaluator must select an entry altitude that will allow the single-engine demonstration Tasks to be completed no lower than 3,000 feet AGL or the manufacturer's recommended altitude, whichever is higher). If it is not possible to unfeather the propeller or restart the engine while airborne, the applicant and the evaluator should treat the situation as an emergency. At altitudes lower than 3,000 feet AGL, engine failure should be simulated by reducing throttle to idle and then establishing zero thrust.

Practical tests conducted in an FSTD can only be accomplished as part of an approved curriculum or training program. Any limitations on powerplant failure will be noted in that program.

Engine failure (simulated) during takeoff should be accomplished prior to reaching 50 percent of the calculated VMC.

**Single-Engine Considerations**

For safety reasons, the evaluator will not simulate a powerplant failure in a single-engine airplane unless it is possible to safely complete a landing.

**High Performance Aircraft Considerations**

In some high performance airplanes, the power setting may have to be reduced below the ACS guidelines power setting to prevent excessively high pitch attitudes greater than 30° nose up.

# Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations

## Aircraft Requirements & Limitations

14 CFR part 61, section 61.45 prescribes the required aircraft and equipment for a practical test. The regulation states the minimum aircraft registration and airworthiness requirements as well as the minimum equipment requirements, to include the minimum required controls.

Multiengine practical tests require normal engine shutdowns and restarts in the air, to include propeller feathering and unfeathering. The Airplane Flight Manual (AFM) must not prohibit these procedures, but low power settings for cooling periods prior to the actual shutdown in accordance with the AFM are acceptable and encouraged. For a type rating in an airplane not certificated with inflight unfeathering capability, a simulated powerplant failure is acceptable.

If the multiengine airplane used for the practical test does not publish a $V_{MC}$, then the center thrust limitation will be added to the certificate issued from this check, unless the applicant has previously demonstrated competence in a multiengine airplane with a published $V_{MC}$.

If the aircraft presented for the practical test has inoperative instruments or equipment, it must be addressed in accordance with 14 CFR part 91, section 91.213. If the aircraft can be operated in accordance with 14 CFR part 91, section 91.213, then it must be determined if the inoperative instruments or equipment are required to complete the practical test.

For a type rating in an aircraft covered under the FAA's Specialty Aircraft Examiner (SAE) program, the evaluator has discretion to omit any skill element(s) deemed unsuitable or unsafe for the operational and/or performance characteristics of the aircraft, provided that such determinations are coordinated with the Specialty Aircraft Examiner Branch.

## Equipment Requirements & Limitations

The equipment examination should be administered before the flight portion of the practical test, but it must be closely coordinated and related to the flight portion. In a training core curriculum that has been approved under 14 CFR part 142, the evaluator may accept written evidence of the equipment exam, provided that the Administrator has approved the exam and authorized the individual who administers it.

The aircraft must:

be of U.S., foreign, or military registry of the same category, class and type, if applicable, for the certificate and/or rating for which the applicant is applying;

have fully functional dual controls, except as provided for in 14 CFR part 61, section 61.45 (c) and (e); and

be capable of performing all Areas of Operation appropriate to the rating sought and have no operating limitations, which prohibit its use in any Area of Operation~~,~~ required for the practical test.

Consistent with 14 CFR part 61, section 61.45(b) and (d), the aircraft must have:

The flight instruments necessary for controlling the aircraft without outside references;

The radio equipment required for ATC communications; and

The navigation equipment to perform precision and non-precision instrument approach procedures.

To assist in management of the aircraft during the practical test, the applicant is expected to demonstrate automation management skills by utilizing installed, available, or airborne equipment such as autopilot, avionics and systems displays, and/or a flight management system (FMS). The evaluator is expected to test the applicant's knowledge of the systems that are installed and operative during both the oral and flight portions of the practical test. If the applicant has trained using a class 1 or class 2 EFB to display charts and data, and wishes to use the EFB during the practical test, the applicant is expected to demonstrate appropriate knowledge, risk management, and skill.

If the practical test is conducted in an aircraft, the applicant is required by 14 CFR part 61, section 61.45(d)(2) to provide an appropriate view limiting device acceptable to the evaluator. The applicant and the evaluator should establish a procedure as to when and how this device should be donned and removed, and brief this procedure before the flight. The device must be used during all testing that requires flight “solely by reference to instruments.” This device must prevent the applicant from having visual reference outside the aircraft, but it must not restrict the evaluator’s ability to see and avoid other traffic. The use of a view-limiting device does not apply to specific elements within a Task when there is a requirement for visual references.

If a type rating practical test is given in an amphibian airplane, the type rating must bear the limitation “Limited to Land” or “Limited to Sea,” as appropriate, unless the applicant demonstrates proficiency in both land and sea operations.

**Operational Requirements, Limitations, & Task Information**

Except for water operations, the applicant must perform the tasks in actual or simulated instrument conditions unless the aircraft’s type certificate makes the aircraft incapable of operating under instrument flight rules (IFR). See Appendix 5 for required Tasks to be completed for a VFR Only type rating.

Successful checks conducted under the applicable sections of parts 91, subpart K, 121, and 135 are considered to have met the flight proficiency requirements of section 61.157 for the issuance of an ATP certificate and an appropriate rating. Section 61.157 also defines an appropriate evaluator for those checks. As a result, an operator’s approved training and checking program is controlling.

In an airplane with a single powerplant, unless the applicant holds a commercial pilot certificate of the same category and class, he or she must accomplish three Power-Off 180° Accuracy Approach and Landings, with one of them from a forward slip. The three landing must be accomplished to the standards specified in the Commercial Pilot – Airplane ACS, Area of Operations IV, Task M.

***I. Preflight Preparation***

*Task C. Weather Information*

Any risk assessment tool is acceptable provided the applicant is able to assess and mitigate risks.

*Task F. Human Factors*

The ability to perform a self-assessment and determine fitness for flight is also applicable to practical tests given in an FSTD.

*Task G. Federal Aviation Regulations*

Evaluator has the discretion to choose a representative sampling of one or more rule parts.

***II. Preflight Procedures***

*Task A. Preflight Assessment*

If a flight engineer is a required crewmember for a particular type airplane, the actual visual inspection may be waived. The actual visual inspection may be replaced by using an approved pictorial means that realistically portrays the location and detail of inspection items. On airplanes requiring a flight engineer, an applicant must demonstrate satisfactory knowledge of the flight engineer functions for the safe completion of the flight if the flight engineer becomes ill or incapacitated during a flight.

*Task B. Powerplant Start*

For practical tests in an airplane, an applicant’s ability to respond to a powerplant start failure or malfunction can be assessed through scenario-based oral questioning.

*Task E. Before Takeoff Checks*

Each applicant must give a briefing before each takeoff. If the operator or aircraft manufacturer has not specified a briefing, the briefing must cover the items appropriate for the conditions, such as: departure runway, departure procedure, power settings, speeds, abnormal or emergency procedures prior to or after reaching decision speed (i.e., $V_1$ or $V_{MC}$), emergency return intentions, and what is expected of the other crewmembers during the takeoff/departure. If the first takeoff briefing is satisfactory, the evaluator may allow the applicant to brief only the changes, during the remainder of the flight.

***III. Takeoffs and Landings***

*Briefings*

Each applicant must give a briefing before each takeoff and landing. If the operator, aircraft manufacturer, or training provider has not specified a briefing, the briefing must cover the items appropriate for the conditions, such as: departure runway, departure procedure, power settings, speeds, abnormal or emergency procedures prior to or after reaching decision speed (i.e., $V_1$ or $V_{MC}$), emergency return intentions, go-around/rejected landing procedures, initial rate of descent, and what is expected of the other crewmembers during the takeoff and landing. For single-pilot operations, the evaluator should request that the applicant verbalize the briefings. If the first takeoff and landing briefings are satisfactory, the evaluator may allow the applicant to brief only the changes, during the remainder of the flight.

*Landings*

The applicant must make at least three actual landings with at least one to a full stop.

*Task G. Confined-Area Takeoff and Maximum Performance Climb (ASES, AMES)*

This Task simulates a takeoff from an area that would require a takeoff and spiral climb; or a straight-ahead takeoff and climb from a narrow waterway with obstructions at either end. The evaluator must assess both takeoff situations for this Task.

In multiengine seaplanes with $V_X$ values within 5 knots of $V_{MC}$, the use of $V_Y$ or the manufacturer's recommendation may be more appropriate for this demonstration.

*Task H. Confined-Area Approach and Landing (ASES, AMES)*

This Task simulates an approach and landing to a small pond, which would require a spiral approach, wings level landing, and step turn upon landing; and a straight ahead approach and landing to a narrow waterway with obstructions at either end. The evaluator must evaluate both landing situations for this Task.

*Task I. Rejected Takeoff*

If completed in a multiengine airplane, the powerplant failure must be simulated before reaching 50 percent of $V_{MC}$.

*Task J. Go-Around/Rejected Landing*

The instrument conditions need not be simulated below 100 feet above the runway. This maneuver should be initiated approximately 50 feet above the runway or landing area and approximately over the runway threshold.

For those applicants seeking a VFR-only type rating and where this maneuver is accomplished with a simulated engine failure, it should not be initiated at speeds or altitudes below that recommended in the AFM/POH.

***IV. Inflight Maneuvers***

*Task A. Steep Turns*

The applicant must demonstrate his or her ability to control the aircraft without the intervention from the pilot monitoring, if applicable.

This task is to be conducted by reference to instruments. If IFR, the pilots should be situationally aware of location and any potential traffic.

For a VFR-only type rating, however, this Task will still be performed in visual conditions and the pilot should clear the area of traffic prior to beginning the maneuver; AA.IV.A.S3 would not be required to be by reference to instruments.

*Task C. Specific Flight Characteristics*

If the airplane does not have any specific flight characteristics identified in the FSB Report, this Task is not required.

### *V. Stall Prevention*

The applicant must demonstrate his or her ability to control the aircraft without the intervention from the pilot monitoring, if applicable.

For Tasks A, B, and C, one must be with the autopilot engaged, if installed; and one must be accomplished while in a turn with a bank angle of 15-30 degrees. In addition, these Tasks should be accomplished by reference to flight instruments. For a VFR only type rating, however, the tasks should be accomplished in visual conditions.

When conducted in the airplane, if a limitation of power application is prudent for operational considerations, the power should be set in accordance with the evaluator's instructions.

Evaluation criteria for a recovery from an approach to stall should not mandate a predetermined value for altitude loss and should not mandate maintaining altitude during recovery. Valid evaluation criteria must take into account the multitude of external (such as density altitude) and internal variables (i.e., airplane mass, drag configuration and powerplant response time) which affect the recovery altitude.

### *VI. Instrument Procedures*

*Briefings*

Each applicant must give a briefing before each takeoff/departure and approach/landing. If the operator, aircraft manufacturer, or training provider has not specified a briefing, the briefing must cover the items appropriate for the conditions, such as: departing/landing runway, departure/arrival procedure, instrument approach procedure, power settings, speeds, missed approach procedures, final approach fix, altitude at final approach fix, initial rate of descent, DA/DH/MDA, time to missed approach, and what is expected of the other crewmembers during the approach/landing. For single-pilot operations, the evaluator should request that the applicant verbalize the briefings. If the first takeoff/departure and approach/landing briefings are satisfactory, the evaluator may allow the applicant to brief only the changes, during the remainder of the flight.

*Stabilized approach criteria*

A stabilized approach is characterized by a constant angle, constant rate of descent approach profile ending near the touchdown point, where the landing maneuver begins.

*Use of RNAV or GPS system*

If the practical test is conducted in an airplane equipped with an approach-approved RNAV or GPS system or FSTD that is equipped to replicate an approved RNAV or GPS system, the applicant must demonstrate approach proficiency using that system. If the applicant has contracted for training in an approved course that includes GPS training, and the airplane/FSTD has a properly installed and operable GPS, the applicant must demonstrate GPS approach proficiency.

*Localizer performance with vertical guidance (LPV) minimums*

Localizer performance with vertical guidance (LPV) minimums with a decision altitude (DA) greater than 300 feet height above touchdown (HAT) may be used as a nonprecision approach; however, due to the precision of its glidepath and localizer-like lateral navigation characteristics, an LPV minimums approach can be used to demonstrate precision approach proficiency if the DA is equal to or less than 300 feet HAT.

*Vertical or lateral deviation standard*

The standard is to allow no more than a ¼-scale deflection of either the vertical or lateral deviation indications during the final approach. As markings on flight instruments vary, a ¼-scale deflection of either vertical or lateral guidance is deemed to occur when it is displaced ¼ of the distance that it may be deflected from the indication representing that the aircraft is on the correct flight path.

*Task D. Nonprecision Approaches*

The evaluator will select nonprecision approaches representative of the type the applicant is likely to use. The choices must use at least two different types of navigational aids.

Examples of acceptable nonprecision approaches include: VOR, VOR/DME, LOC procedures on an ILS, LDA, RNAV (RNP) or RNAV (GPS) to LNAV, LNAV/VNAV or LPV line of minima as long as the LPV DA is greater than 300 feet HAT. The equipment must be installed and the database must be current and qualified to fly GPS-based approaches.

The applicant must accomplish at least two nonprecision approaches in simulated or actual weather conditions.

> One must include a procedure turn or, in the case of a GPS-based approach, a Terminal Arrival Area (TAA) procedure.
>
> At least one must be flown without the use of an autopilot and without the assistance of radar vectors. The yaw damper and flight director are not considered parts of the autopilot for purposes of this Task.
>
> One is expected to be flown with reference to backup or partial panel instrumentation or navigation display, depending on the aircraft's instrument avionics configuration, representing the failure mode(s) most realistic for the equipment used.

The evaluator has the discretion to have the applicant perform a landing or missed approach at the completion of each nonprecision approach.

*Task E. Precision Approaches*

The applicant must accomplish at least two precision approaches in simulated or actual weather conditions to the decision altitude (DA) using aircraft navigational equipment for centerline and vertical guidance.

Acceptable instrument approaches for this part of the practical test are the ILS and GLS. In addition, if the installed equipment and database is current and qualified for IFR flight and approaches to LPV minima, an LPV minima approach can be flown to demonstrate precision approach proficiency if the LPV DA is equal to or less than 300 feet HAT.

> At least one must be flown without the use of an autopilot. Manually flown precision approaches may use raw data displays or may be flight director assisted, at the discretion of the evaluator.
>
> One is expected to be flown with reference to backup or partial panel instrumentation or navigation display, depending on the aircraft's instrument avionics configuration, representing the failure mode(s) most realistic for the equipment used.
>
> At least one approach may be flown via the autopilot, if equipped, and if the DA/DH does not violate the authorized minimum altitude for autopilot operation.

The evaluator has the discretion to have the applicant perform a landing or missed approach at the completion of each precision approach.

*Task F. Landing from a Precision Approach*

If circumstances beyond the control of the applicant prevent an actual landing, the evaluator may accept an approach to a point where, in his or her judgment, a safe landing and a full stop could have been made, and credit given for a missed approach.

*Task G. Circling Approach*

The evaluator will select a runway that requires at least a 90-degree turn from the final approach course.

If an applicant is employed by a certificate holder whose manual prohibits a circling approach when the weather is below 1,000 feet and 3 miles' visibility, the applicant is not required to be checked on the circling maneuver (Tasks G and H). That applicant's pilot certificate must include a limitation restricting a circling approach to visual meteorological conditions (VMC) only. For example, the certificate notation would be: "CL-65 CIRC APCH VMC ONLY." This restriction may be removed when the applicant receives training in the circling maneuver (Tasks G and H) in the same airplane for which he or she has the limitation and satisfactorily demonstrates a circling approach and landing in that same airplane as part of an approved curriculum or training program with an appropriately qualified evaluator.

If the initial ATP certificate is issued concurrently with an airplane type rating and the circling maneuver (Tasks G and H) is not performed, the ATP certificate would also have a circling limitation. For example, the certificate notation would state:

"ATP CIRC APCH VMC ONLY, CL-65 CIRC APCH VMC ONLY." This restriction may be removed from the ATP certificate upon completion of an approved curriculum or training program to remove the limitation as previously stated.

*Task H. Landing from a Circling Approach*

See previous task information for applicants that are not required to be checked on the circling maneuver (Tasks G and H).

*Task I. Missed Approaches*

The applicant must perform two missed approaches with one being from a precision approach.

One complete published missed approach must be accomplished. Additionally, in multiengine airplanes, a missed approach must be accomplished with one engine inoperative (or simulated inoperative). The engine failure may be experienced any time prior to the initiation of the approach, during the approach, or during the transition to the missed approach attitude and configuration.

Descending below the MDA or continuing a precision approach below DH/DA as appropriate, unless the runway environment is in sight is considered unsatisfactory performance. However, even if the missed approach is properly initiated at DA/DH, most airplanes descend below DA/DH because of the momentum of the airplane transitioning from a stabilized approach to a missed approach. This descent below DA/DH is not considered unsatisfactory, as long as the precision approach was not continued below DA/DH.

***VII. Emergency Operations***

*Task B. Powerplant Failure During Takeoff*

In a multiengine airplane certificated under 14 CFR parts 23 Commuter category, SFAR 41C 4(b), and part 25, with published $V_1$, $V_R$, or $V_2$ speeds, the failure of the most critical powerplant should be simulated at a point:

> after $V_1$ and prior to $V_2$, if in the opinion of the evaluator, it is appropriate under the prevailing conditions; or
>
> as close as possible after $V_1$ when $V_1$ and $V_2$ or $V_1$ and $V_R$ are identical.

In a multiengine airplane certificated under 14 CFR part 23 (except commuter category), (for which no $V_1$, $V_R$, or $V_2$ speeds are published) the failure of the most critical powerplant should be simulated at a point after reaching a minimum of $V_{SSE}$ and, if accomplished in the aircraft, at an altitude not lower than 400 feet AGL, giving consideration to local atmospheric conditions, terrain, and aircraft performance available.

In a simulator, there are no limitations on powerplant failures in either airplane by certification basis.

If the powerplant failure occurs after becoming airborne and before reaching an altitude where a safe turn can be made (ASEL, ASES) or the performance capabilities and operating limitations of the airplane will not allow the climb to continue (AMEL, AMES) the applicant should establish a power-off descent approximately straight-ahead.

For a 14 CFR part 25 or 14 CFR part 23, section 23.3(d) commuter multiengine airplane, if the (simulated) powerplant failure occurs at a point where the airplane can continue to a specified airspeed and altitude at the end of the runway commensurate with the airplane's performance capabilities and operating limitations, the takeoff should be continued. (AMEL, AMES)

*Task C. Powerplant Failure (Simulated) (ASEL, ASES)*

No simulated powerplant failure will be given by the evaluator in an airplane when an actual touchdown cannot be safely completed, should it become necessary.

*Task D. Powerplant Failure and Restart Procedures (AMEL, AMES)*

The feathering of one propeller and engine shutdown must be demonstrated in any multiengine airplane (or FSTD) equipped with propellers (includes turboprop), unless the airplane is an exception by the type rating and airplane certification. The propeller must be feathered and unfeathered while airborne. In a multiengine jet airplane or FSTD representing a multiengine airplane, one engine must be shut down and a restart must be demonstrated while airborne, if applicable.

When conducted in an FSTD, feathering or shutdown may be performed in conjunction with any Task and at locations and altitudes at the discretion of the evaluator.

*Task E. Approach and Landing with a Powerplant Failure (Simulated) (AMEL, AMES)*

In airplanes with three powerplants, the applicant must follow a procedure (if approved) that approximates the loss of two powerplants, the center and one outboard powerplant. In other multiengine airplanes, the applicant must follow a procedure, which simulates the loss of 50 percent of available powerplants, the loss being simulated on one side of the airplane.

*Task F. Precision Approach (Manually Flown) with a Powerplant Failure (Simulated) (AMEL, AMES)*

At least one must be flown without the use of an autopilot. The applicant should begin manually flying prior to the final approach segment. Manually flown precision approaches may use raw data displays or may be flight director assisted, at the discretion of the evaluator. The simulated powerplant failure should occur before initiating the final approach segment and continue to a landing or a missed approach procedure, at the evaluator’s discretion.

*Task G. Landing from a No Flap or a Nonstandard Flap Approach*

This Task need not be accomplished for a particular airplane type if the Administrator has determined that the probability of flap extension failure on that type airplane is extremely remote due to system design. The evaluator must determine whether checking on slats only and partial-flap approaches are necessary for the practical test. However, probability of asymmetrical flap failures should be considered in this making this determination.

# Appendix 8: Use of Flight Simulation Training Devices (FSTD) and Aviation Training Devices (ATD): Airplane Single-Engine, Multiengine Land and Sea

### Use of FSTDs

Title 14 of the Code of Federal Regulations (14 CFR) part 61, section 61.4, *Qualification and approval of flight simulators and flight training devices*, states in paragraph (a) that each full flight simulator (FFS) and flight training device (FTD) used for training, and for which an airman is to receive credit to satisfy any training, testing, or checking requirement under this chapter, must be qualified and approved by the Administrator for—

*(1) The training, testing, and checking for which it is used;*

*(2) Each particular maneuver, procedure, or crewmember function performed; and*

*(3) The representation of the specific category and class of aircraft, type of aircraft, particular variation within the type of aircraft, or set of aircraft for certain flight training devices.*

14 CFR part 60 prescribes the rules governing the initial and continuing qualification and use of all FSTDs used for meeting training, evaluation, or flight experience requirements for flight crewmember certification or qualification.

An FSTD is defined in 14 CFR part 60 as an FFS or FTD:

> ***Full Flight Simulator (FFS)****—a replica of a specific type, make, model, or series aircraft. It includes the equipment and computer programs necessary to represent aircraft operations in ground and flight conditions, a visual system providing an out-of-the-flight deck view, a system that provides cues at least equivalent to those of a three-degree-of-freedom motion system, and has the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the QPS for a specific FFS qualification level. (part 1)*
>
> ***Flight Training Device (FTD)****—a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft flight deck replica. It includes the equipment and computer programs necessary to represent aircraft (or set of aircraft) operations in ground and flight conditions having the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the qualification performance standard (QPS) for a specific FTD qualification level. (part 1)*

The FAA National Simulator Program (NSP) qualifies Level A-D FFSs and Level 4 – 7[1] FTDs. In addition, each operational rule part identifies additional requirements for the approval and use of FSTDs in a training program[2]. Use of an FSTD for the completion of the ATP – airplane practical test is permitted only when accomplished in accordance with an FAA approved curriculum or training program.

### Use of ATDs

14 CFR part 61, section 61.4(c) states the Administrator may approve a device other than an FFS or FTD for specific purposes. Under this authority, the FAA's General Aviation and Commercial Division provide approval for aviation training devices (ATD).

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[1] The FSTD qualification standards in effect prior to part 60 defined a Level 7 FTD for airplanes (see Advisory Circular 120-45A, Airplane Flight Training Device Qualification, 1992). This device required high fidelity, airplane specific aerodynamic and flight control models similar to a Level D FFS, but did not require a motion cueing system or visual display system. In accordance with the "grandfather rights" of part 60, section 60.17, these previously qualified devices will retain their qualification basis as long as they continue to meet the standards under which they were originally qualified. There is only one Level 7 FTD with grandfather rights that remains in the U.S. As a result of changes to part 60 that were published in the Federal Register in March 2016, the airplane Level 7 FTD was reinstated with updated evaluation standards. The new Level 7 FTD will require a visual display system for qualification. The minimum qualified Tasks for the Level 7 FTD are described in Table B1B of Appendix B of part 60.

[2] 14 CFR part 121, section 121.407; part 135, section 135.335; part 141, section 141.41; and part 142, section 142.59.

Advisory Circular (AC) 61-136A, FAA Approval of Aviation Training Devices and Their Use for Training and Experience, provides information and guidance for the required function, performance, and effective use of ATDs for pilot training and aeronautical experience (including currency). FAA issues a letter of authorization (LOA) to an ATD manufacturer approving an ATD as a basic aviation training device (BATD) or an advanced aviation training device (AATD). The LOA will be valid for a 5-year period with a specific expiration date and include the amount of credit a pilot may take for training and experience.

> ***Aviation Training Device (ATD)***—*a training device, other than an FFS or FTD, that has been evaluated, qualified, and approved by the Administrator. In general, this includes a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit. It includes the hardware and software necessary to represent a category and class of aircraft (or set of aircraft) operations in ground and flight conditions having the appropriate range of capabilities and systems installed in the device as described within the AC for the specific basic or advanced qualification level.*
>
> ***Basic Aviation Training Device (BATD)***—*provides an adequate training platform for both procedural and operational performance tasks specific to instrument experience and the ground and flight training requirements for the private pilot certificate and instrument rating per 14 CFR parts 61 and 141.*
>
> ***Advanced Aviation Training Device (AATD)***—*provides an adequate training platform for both procedural and operational performance tasks specific to the ground and flight training requirements for the private pilot certificate, instrument rating, commercial pilot certificate, airline transport pilot (ATP) certificate, and flight instructor certificate per 14 CFR parts 61 and 141. It also provides an adequate platform for tasks required for instrument experience and the instrument proficiency check.*

***Note:*** *ATDs cannot be used for practical tests, aircraft type specific training, or for an aircraft type rating; therefore the use of an ATD for the ATP – Airplane practical test is not permitted.*

### Credit for Time in an FSTD

14 CFR part 61, section 61.159 and 61.160 specify the minimum aeronautical experience requirements for a person applying for an ATP certificate. Paragraph (a)(6) of this section specifies the amount of credit a pilot can take towards the total time in an FFS or FTD as part of an approved training course in parts 121, 135, 141[3], or 142. Section 61.159 also provides allowances for crediting time in an FSTD towards time in class and instrument time. Credit may only be taken for time in a FFS towards time in class for multiengine airplanes; time in a FTD may not be used.

### Credit for Time in an ATD

14 CFR part 61, section 61.159 and 61.160 specify the minimum aeronautical experience requirements for a person applying for an ATP certificate. In order to credit the time, the ATD must be FAA-approved and the time must be provided by an authorized instructor. AC 61-136A, states the LOA for each approved ATD will indicate the credit allowances for pilot training and experience, as provided under parts 61 and 141. Time with an instructor in an AATD may be credited towards the aeronautical experience requirements for the ATP certificate as specified in the LOA for the device used. Time in a BATD cannot be used for the ATP certificate. Time in an ATD cannot be used for credit towards the required time in class either. It is recommended that applicants who intend to take credit for time in an AATD towards the aeronautical experience requirements for the ATP certificate obtain a copy of the LOA for each device used so they have a record for how much credit may be taken. For additional information on the logging of ATD time reference AC 61-136A.

### Use of an FSTD on a Practical Test

14 CFR part 61, section 61.45 specifies the required aircraft and equipment that must be provided for a practical test unless permitted to use an FFS or FTD for the flight portion. 14 CFR part 61, section 61.64 provides the criteria for using an FSTD for a practical test. Specifically, paragraph (a) states:

[3] As part of program approval, part 141 training providers must also adhere to the requirements for permitted time in an FFS or FTD per Appendices E or K to Part 141, as appropriate to the course of training.

*If an applicant for a certificate or rating uses a flight simulator or flight training device for training or any portion of the practical test, the flight simulator and flight training device—*

*(1) Must represent the category, class, and type (if a type rating is applicable) for the rating sought; and*

*(2) Must be qualified and approved by the Administrator and used in accordance with an approved course of training under part 141 or part 142 of this chapter; or under part 121 or part 135 of this chapter, provided the applicant is a pilot employee of that air carrier operator.*

Therefore, practical tests or portions thereof, when accomplished in an FSTD, may only be conducted by FAA aviation safety inspectors (ASI), aircrew program designees (APD) authorized to conduct such tests in FSTDs in 14 CFR parts 121 or 135, qualified personnel or designees authorized to conduct such tests in FSTDs for 14 CFR part 141 pilot school graduates, or appropriately authorized 14 CFR part 142 Training Center Evaluators (TCE).

In addition, 14 CFR, section 61.64(b) states if an airplane is not used during the practical test for a type rating for a turbojet airplane (except for preflight inspection), an applicant must accomplish the entire practical test in a Level C or higher FFS and the applicant must meet the specific experience criteria listed. If the experience criteria cannot be met, the applicant can either—

*(f)(1) […] complete the following tasks on the practical test in an aircraft appropriate to category, class, and type for the rating sought: Preflight inspection, normal takeoff, normal instrument landing system approach, missed approach, and normal landing; or*

*(f)(2) The applicant's pilot certificate will be issued with a limitation that states: "The [name of the additional type rating] is subject to pilot in command limitations," and the applicant is restricted from serving as pilot in command in an aircraft of that type.*

When flight Tasks are accomplished in an airplane, certain Task elements may be accomplished through "simulated" actions in the interest of safety and practicality. However, when accomplished in an FFS or FTD, these same actions would not be "simulated." For example, when in an airplane, a simulated engine fire may be addressed by retarding the throttle to idle, simulating the shutdown of the engine, simulating the discharge of the fire suppression agent, if applicable, and simulating the disconnection of associated electrical, hydraulic, and pneumatics systems. However, when the same emergency condition is addressed in a FSTD, all Task elements must be accomplished as would be expected under actual circumstances.

Similarly, safety of flight precautions taken in the airplane for the accomplishment of a specific maneuver or procedure (such as limiting altitude in an approach to stall or setting maximum airspeed for an engine failure expected to result in a rejected takeoff) need not be taken when a FSTD is used. It is important to understand that, whether accomplished in an airplane or FSTD, all Tasks and elements for each maneuver or procedure shall have the same performance standards applied equally for determination of overall satisfactory performance.

# Appendix 9: References

This ACS is based on the following 14 CFR parts, FAA guidance documents, manufacturer's publications, and other documents.

| Reference | Title |
|---|---|
| 14 CFR part 61 | Certification: Pilots, Flight Instructors, and Ground Instructors |
| 14 CFR part 91 | General Operating and Flight Rules |
| 14 CFR part 93 | Special Air Traffic Rules |
| 14 CFR part 97 | Standard Instrument Procedures |
| 14 CFR part 117 | Flight and Duty Limitations and Rest Requirements: Flightcrew Members |
| 14 CFR part 119 | Certification: Air Carriers and Commercial Operators |
| 14 CFR part 121 | Domestic, Flag, and Supplemental Operations |
| 14 CFR part 135 | Requirements for Commuter and On Demand Operations |
| 49 CFR part 830 | Notification and Reporting of Aircraft Accidents, or Incidents and |
| AC 00-45 | Aviation Weather Services |
| AC 00-46 | Aviation Safety Reporting (Program) System (ASRP/ASRS) |
| AC 20-117 | Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing |
| AC 90-100 | U.S Terminal and En Route Area Navigation (RNAV) Operations |
| AC 90-117 | Data Link Communications |
| AC 120-108 | Continuous Descent Final Approach |
| AC 91.21-1 | Use of Portable Electronic Devices Aboard Aircraft |
| AC 91-74 | Pilot Guide: Flight in Icing Conditions |
| AC 91-78 | Use of Class 1 or Class 2 Electronic Flight Bag (EFB) |
| AC 120-66 | Aviation Safety Action Program (ASAP) |
| AC 120-76 | Authorization for Use of Electronic Flight Bags |
| AC 120-82 | Flight Operational Quality Assurance (FOQA) |
| AC 120-90 | Line Operations Safety Audit (LOSA) |
| AC 120-101 | Part 121 Air Carrier Operational Control |
| AC 120-109 | Stall Prevention and Recovery Training |
| AC 120-111 | Upset Prevention and Recovery Training |
| AIM | Aeronautical Information Manual |
| FAA-H-8083-1 | Aircraft Weight and Balance Handbook |
| FAA-H-8083-2 | Risk Management Handbook |
| FAA-H-8083-3 | Airplane Flying Handbook |
| FAA-H-8083-6 | Advanced Avionics Handbook |
| FAA-H-8083-15 | Instrument Flying Handbook |
| FAA-H-8083-16 | Instrument Procedures Handbook |
| FAA-H-8083-23 | Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations |
| FAA-H-8083-25 | Pilot's Handbook of Aeronautical Knowledge |
| FMSPs | Flight Management System Procedures |
| FSB Report | Flight Standardization Board Report (if available) |
| IFP | Instrument Flight Procedures |
| POH/AFM | Pilot's Operating Handbook/FAA-Approved Airplane Flight Manual |
| NOTAMs | Notice to Airman |
| Other | Chart Supplements |
| | USCG Navigation Rules, International-Inland |

• ***Note:*** *Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at [www.faa.gov](http://www.faa.gov).*

## Appendix 10: Abbreviations and Acronyms

The following abbreviations and acronyms are used in the ACS.

| Abb./Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AATD | Advanced Aviation Training Device |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| ADM | Aeronautical Decision-Making |
| AFS | Flight Standards Service |
| AELS | Aviation English Language Standard |
| AFM | Aircraft Flight Manual |
| AGL | Above Ground Level |
| AIM | Aeronautical Information Manual |
| AMEL | Airplane Multiengine Land |
| AMES | Airplane Multiengine Sea |
| ASEL | Airplane Single-engine Land |
| ASES | Airplane Single-engine Sea |
| ASI | Aviation Safety Inspector |
| ATC | Air Traffic Control |
| ATD | Aviation Training Device |
| ATP | Airline Transport Pilot |
| BATD | Basic Aviation Training Device |
| CDI | Course Deviation Indicator |
| CRM | Crew Resource Management |
| CTP | Certification Training Program |
| DA | Decision Altitude |
| DH | Decision Height |
| DPE | Designated Pilot Examiner |
| ELT | Emergency Locator Transmitter |
| FAA | Federal Aviation Administration |
| FFS | Full Flight Simulator |
| FMS | Flight Management System |
| FSB | Flight Standardization Board |
| FSTD | Flight Simulation Training Device |
| FTD | Flight Training Device |
| GBAS | Ground Based Augmentation System |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning System |

| Abb./Acronym | Definition |
|---|---|
| HAT | Height Above Threshold (Touchdown) |
| IFP | Instrument Flight Procedures |
| IFR | Instrument Flight Rules |
| ILS | Instrument Landing System |
| IMC | Instrument Meteorological Conditions |
| LAHSO | Land and Hold Short Operations |
| LDA | Localizer-Type Directional Aid |
| LOA | Letter of Authorization |
| LOC | ILS Localizer |
| LPV | Localizer Performance with Vertical Guidance |
| MAP | Missed Approach Point |
| MFD | Multi-Function Display |
| NAS | National Airspace System |
| NOTAMs | Notices to Airmen |
| NSP | National Simulator Program |
| PIC | Pilot-in-Command |
| POA | Plan of Action |
| POH | Pilot's Operating Handbook |
| PTS | Practical Test Standards |
| QPS | Qualification Performance Standard |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| SAE | Specialty Aircraft Examiner |
| SMS | Safety Management System |
| SOP | Standard Operating Procedures |
| SRM | Single Pilot Resource Management |
| USCG | United States Coast Guard |
| VFR | Visual Flight Rules |
| VMC | Visual Meteorological Conditions |
| VOR | Very High Frequency Omnidirectional Range |
| $V_1$ | The maximum speed in the takeoff at which the pilot must take the first action (e.g., apply brakes, reduce thrust, deploy speed brakes) to stop the airplane within the accelerate-stop distance. $V_1$ also means the minimum speed in the takeoff, following a failure of the critical engine at $V_{EF}$, at which the pilot can continue the takeoff and achieve the required height above the takeoff surface within the takeoff distance. |
| $V_2$ | Takeoff safety speed |
| $V_{MC}$ | Minimum control speed with critical engine inoperative |
| $V_{MCG}$ | Minimum control speed on the ground with the critical engine inoperative |
| $V_R$ | Rotation speed |

| Abb./Acronym | Definition |
|---|---|
| $V_{SSE}$ | Safe, intentional one-engine-inoperative speed.<br>Originally known as safe single-engine speed |
| $V_X$ | Best Angle of Climb Speed |
| $V_{XSE}$ | Best angle of climb speed with one engine inoperative |
| $V_Y$ | Best Rate of Climb Speed |

# Compiled working group comments & requested changes to ATP ACS

## Comments and Requested Changes to ATP ACS, FAA-S-ACS-11

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| 1 | Introduction | Request for additional guidance | Request additional guidance on how part 121 air carriers, including those who conduct training and checking under AQP, are to use the ACS. |
| 1-2 | Using the ACS | Missing Content | This section is silent on the significant importance of information to be found in Appendix 7 Operational Requirements, Limitations, & Task Information. Furthermore, where specific tasks contain a link to Appendix 7, the phraseology is weak and misleading when it states "for related considerations." Those aren't mere considerations, they are actual requirements which must be accounted for within the POA. Such an important aspect on the use of the ACS should be covered in this section. |
| 3 | AA.I.A.S3 | Request for additional guidance | The list of aircraft limitations can be quite long. Suggest some language be added to allow for relevant/appropriate memory vs reference items. |
| 7 | I.C.K5 | Question | How does it work to have a test type defined at the Task Element level? i.e. the full task is designated "ATP" (type rating) – does the "(ATP AMES, AMES)" mean this specific task is only applicable to type ratings in multi-engine airplanes? |
| 9 | AA.I.E.K7 | Edit | Suggest revising to "Rudder use in 14 CFR part 25 transport aircraft certification standards." |
| 11 | I.G. | Reference and Task element | Part 119 is part of FAA Knowledge Exam; add as Reference and separate task element (between 117 and 121)? Parts 25, 125, 63, 71, 97 have also been tested on, to a lesser extent. Include if still part of expected knowledge. |
| 11 | I.G.K2 | Missing subpart | Part 91, Subpart K (fractional ownership) has been expected knowledge for ATPs in the past; if still part of FAA Knowledge Exam include in list. |
| 19 | Objective | Missing Content | Any task (takeoff or landing) which requires a crosswind, does not go on to describe a minimum magnitude of crosswind. Nor can it be found in Appendix 7, even though it refers to it. |
| 21 and/or A-21 | III.B. Appendix 7 | III. Landings | Current ACS note states must make at least 3 landings, 1 to a full stop. Do we need to add the note for single engine operations per 8081-5F VI. A. (yellow highlight indicates what isn't currently accounted for in ACS): In an airplane with a single powerplant, unless the applicant holds a commercial pilot certificate, he or she must accomplish 3 accuracy approaches and spot landings from an altitude of 1,000 feet or less, with the engine power lever in idle and 180 degrees of change in direction. The airplane must touch the ground in a normal landing attitude beyond and within 200 feet of a designated line or point on the runway. At least 1 landing must be from a forward slip. |
| 35 | IV.C.K1 | Missing element? | PTS specifically mentioned "dutch rolls" – was this intentionally removed from ACS or do we need to add back into the element? |

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| 52 | AA.VII.A.S2e | Request for additional guidance | Does this assume the new simulator extended envelope data package which better replicates actual ice characteristics vs. merely adding artificial weight? |
| A-2 | Knowledge Test Requirements-Airplane Category, Single and Multiengine Class | Clarification | In the paragraph describing retesting **after failure** of any ATP knowledge test:<br>This requirement appears to come from AC 61-138 and is overly restrictive. Many applicants for the ATP may take the examination at a site other than the provider of the ATP CTP course. As such, access to someone who meets the ATP CTP instructor qualification may be difficult or cost prohibitive. Additional training should be allowed by any CFI holding an ATP certificate. AC 61-38 should be revised to address an equivalent experience in military flight crew operations or instructor qualification under 14 CFR Part 142. The ability to teach air carrier operations in that Part should suffice to meet the requirements of 61-38 instructor qualification. |
| A-5 | Testing Procedures for Applicants Requesting Special Accommodations | Clarification | This is perplexing and appears to conflict with the basic requirements for certification - language skills and medical fitness. |
| A-6 | Appendix 3 | Request for additional guidance | Under AQP there might be several events where this could be done. Must it be accomplished by the evaluator (APD issuing the LOE), or could it also be accomplished at an earlier point during the Qual Program? |
| A-8 | Evaluator Responsibilities (3rd paragraph below the bullet points) | | As written, this statement implies that the evaluator does not have to meet all the Areas of Operation and Tasks, just as many of the required elements as possible. Later, the statement is made that all Tasks must be evaluated, in line with the past PTS guidance. What is meant by this statement?<br>More clarification required. What is meant by the phrase "elect to suspend and later resume" in this section? This results in the evaluator being injected into the profile, and detracting from the applicant's exercise of command. More detail is needed to train our evaluators and establish standardization. |
| A-8 | Evaluator Responsibilities | Additional guidance | Request additional guidance on how part 121 air carriers, including those who conduct training and checking under AQP, are to use the ACS. |
| A-9 | Possible Outcomes of the Test (1st and 2nd paragraphs) | Additional guidance | Request additional guidance on how the ACS will be used for a 61.58 check. |
| A-10 | Unsatisfactory Performance (2nd paragraph) | | This paragraph conflicts with the guidance that the evaluator is tasked to determine the ability of the applicant to read, speak, and understand English *prior* to the practical test. |
| A-12 | Additional Rating Task Table (1st paragraph) | | Request additional guidance on how to remove an SIC only type rating that was issued in accordance with section 61.55. |

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| A-12 | Additional Rating Task Table (1st paragraph) | | The statement: *"Please note, however, that the evaluator has discretion to evaluate the applicant's competence in the remaining Areas of Operation and Tasks."* Appears in much of the FAA guidance, but fails to provide any direction on when such discretion should be exercised. The applicant should know what needs to be accomplished, and not be subjected to additional Tasks at the whim of an examiner. How does an evaluator rationalize declaring an applicant unsuccessful for a Task that isn't called for and for which most other evaluators would not require the applicant to demostrate? |
| A-16 | **Use of Checklists** (2nd paragraph) | | This paragraph fails to address the environment where the aircraft TCDS stipulates a crew compliment of two or more. In those instances, the evaluator is assessing that the applicant directs the completion of any memory items, calls for the proper non-normal checklist when conditions permit, and ensures the other member of the crew executes the checklist properly. |
| A-17 | Multiengine Considerations | | As this section is written, none of it appears to apply to Part 25 turbojet or turbofan aircraft as the discussion never redirects from propeller-driven aircraft. if that isn't the case, it is not obvious. |
| A-19 | Equipment Requirements and Limitations | Request for additional guidance | There is provided an alternative means under Part 142 for the equipment exam to be conducted prior to the Practical Test. Might there be some equivalent/similar process allowed under Part 121? |
| A-21 | III. Takeoffs and Landings (Briefings paragraph) | | The briefing requirement transitions to the landing phase. As such, it should be a separate paragraph. Further, Boeing calls for the approach and landing briefing earlier in the flight profile than the landing phase. Hence, it would be attributed to a Task in AoO VI. |
| A-21 | III. Takeoffs and Landings (Briefings paragraph) | | This section is a duplicate of what is provided in the paragraph above. If you look at Task IIE, it mentions "Conduct a briefing that includes procedures for emergency and abnormal situations (e.g., powerplant failure, windshear), which may be encountered during takeoff, and state the planned action if they were to occur." However, the briefing should be more than that, and the statement should reference the manufacturer as a source for the breifing items. Tasks in AoO III don't call for a briefing as a skill, and thus this statement should be relegated to the preflight phase. Boeing procedures call for the briefing to be accomplished prior to starting engines for safety reasons, and update as necessary during taxi out. Thus, placement prior to movement is inappropriate. |
| A-21 | III. Takeoffs and Landings (Landings paragraph) | | Recommend adding the following sentences: "*Rejected landings in which the airplane wheels make contact with the runway surface suffice as a landing. One of the landings may be accomplished using installed autoland capabilities."* |

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| | | | Rational: The ability to count a rejected landing (below 50 feet) that doesn't result in touchdown greatly benefits the ability to vary the profile and results in greater efficiency in training delivery, especially with the landing from a circling approach. Once the placement of the airplane is ascertained and the airplane is stabilizied on a path to that point, the landing should be counted.<br><br>Autoland events are accomplished with the pilot positioned ready to take control of the aircraft. As such, they must accomplish the same energy state and placement accuracy assessments as in a manual landing. As more aircraft obtain the ability to conduct automated low visibility landings, the ability to ensure proper management of that task becomes critical. Allowing one autoland landing to count would support greater safety and training efficiency in meeting operator CAT II/III approach needs. |
| A-21 | IV. Inflisht Maneuvers Task A. Steep Turns (First paragraph) | | Recommend adding the following sentence: *"Applicants are allowed to make use of all aircraft instrumentation, to include flight path vectors and heading markers, and may obtain callouts from the pilot monitoring provided specific items are briefed prior to the Task."* |
| A-23 | Task D. Nonprecision Approaches (3rd bullet point) | | There should be a stipulation that this task need not be accomplished when system redundancies make the condition highly improbable. |
| A-23 | Task E. Precision Approaches (Paragraph 2; 1st bullet point) | | Recommend adding a clarifying sentence - revised bullet would read: "At least one must be flown without the use of an autopilot. *The applicant should begin manually flying prior to the final approach segment.* Manually flown precision approaches may use raw data displays or may be flight director assisted, at the discretion of the evaluator." |
| A-23 | Task F. Landing from a Precision Approach | | Recommend revising section as follows: If circumstances beyond the control of the applicant prevent an actual landing, the evaluator may accept an approach to a point where, in his or her judgment, a safe landing and a full stop could have been made, and credit given for *the landing and* a missed approach.<br><br>Does this allow for the landing to be credited even though it was not accomplished?It implies that it does, by stipulating "a safe landing and a full stop" as a criteria. As read, a landing and a missed approach could be received. This allowance should be extended to the use of FSTD training to provide for profile variation and training efficiency. Part 142 training program profiles provide considerable landing practice and, as such, the evaluation should give credit in a similar fashion. |

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| A-23 | Task H. Landing from a Circling Approach | | Recommend the following revision:<br>See previous task information for applicants that are not required to be checked on the circling maneuver (Tasks G and H). *The evaluator may accept an approach to a point where, in his or her judgment, a safe landing and a full stop could have been made, and credit given for the landing and a missed approach.* |
| A-24 | VII. Emergency Operations<br><br>Task B. Powerplant Failure During Takeoff (Paragraph 3) | Clarification | Does this means that the powerplant failure in an FSTD can occur after V2? |
| A-24 | Appendix 7, VII. | Part 23 reference | VII. Emergency Operations, Task B Powerplant Failure During Takeoff – references Part 23 Commuter category; current Part 23 is now called "Normal category airplanes" – need to adjust sentences accordingly. |
| A-24 | Appendix 7, VII. | SFAR 41C 4(b) | VII. Emergency Operations references "In a multiengine airplane certificated under 14 CFR parts 23 Commuter category, SFAR 41C 4(b), and part 25, with published $V_1$, $V_R$, or $V_2$ speeds, the failure of the most critical powerplant should be simulated at a point:…"<br><br>Not sure what SFAR 41C 4(b) is in reference too – is this still a valid SFAR or is it now a Part 91 or 25 Appendix? |
| A-25 | Task D. Powerplant Failure and Restart Procedures (AMEL, AMES) | | Recommend changing last sentence to read: "In a multiengine jet airplane or FSTD representing a multiengine airplane, one engine must be shut down and a restart *considered* while airborne, if applicable."<br><br>Rational: The requirement to shutdown a powerplant in an FSTD can be met following an engine fire or failure on takeoff, as authorized. However, the requirement to restart that powerplant should be restated as "consideration" for the restart. Many applicants may not deem a restart necessary; further, as some airplane types have no "elective" shutdown checklist, the event must be initiated from the basis of a non-normal that would mandate a shutdown. Many of them do not lend themselves to restart. At the air carrier level, this is unnecessary on a practical test given the volume of activity to be accomplished. |
| A-25 | Task G. Landing from a No Flap or | | Recommend adding a reference to the FSB as follows:<br>This Task need not be accomplished for a particular airplane type if the Administrator has determined that the probability of flap extension failure on that type airplane is extremely remote |

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| | a Nonstandard Flap Approach | | due to system design *or a particular configuration is required by the airplane FSB report.* The evaluator must determine whether checking on slats only and partial-flap approaches are necessary for the practical test. However, probability of asymmetrical flap failures should be considered in this making this determination. |

# Commercial Pilot – Military Competence

## Airman Certification Standards

FAA-S-ACS-12

U.S. Department
of Transportation

**Federal Aviation
Administration**

**FAA-S-ACS-12**

# Commercial Pilot – Military Competence

## Airman Certification Standards

**February 2018**

**Flight Standards Service
Washington, DC 20591**

Acknowledgments

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, (AFS-630), P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

## Availability

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

Material in FAA-S-ACS-12 will be effective in June 2018.

## Foreword

The Federal Aviation Administration (FAA) has published the Commercial Pilot – Military Competence Airman Certification Standards (ACS) document to communicate the aeronautical knowledge standards for military or former military pilots seeking a commercial pilot certificate with the appropriate aircraft category and class rating per 14 CFR part 61, section 61.73.

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the Safety Management System (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing. Specifically, the ACS, associated guidance, and test question components of the airman certification system are constructed around the four functional components of an SMS:

Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
Safety Risk Management processes through which both internal and external stakeholders identify changes in regulations, safety recommendations, or other factors. These changes are then evaluated to determine whether they require modification of airman testing and training materials;
Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

The FAA has developed this ACS and its associated guidance in collaboration with a diverse group of aviation training experts. The goal is to drive a systematic approach to all components of the airman certification system, including knowledge test question development and conduct of the practical test. The FAA acknowledges and appreciates the many hours that these aviation experts have contributed toward this goal. This level of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Director, Flight Standards Service

## Revision History

| Document # | Description | Revision Date |
|---|---|---|
| FAA-S-ACS-12 | Commercial Pilot – Military Competence Airman Certification Standards | June 2018 |

## Table of Contents

# Introduction

## Airman Certification Standards Concept

The goal of the airman certification process is to ensure the applicant possesses the knowledge and ability to manage risk and demonstrate the skills consistent with the privileges of a Commercial Pilot Certificate and any associated ratings being exercised, in order to act as pilot-in-command (PIC).

The Commercial Pilot – Military Competence Airman Certification Standards identifies the areas of knowledge that the FAA has determined as necessary for a military pilot to receive a Commercial Pilot Certificate. The FAA has determined that only knowledge areas that are outlined in 14 CFR part 61, section 61.73 will be tested.

In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification testing. These materials include several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR). Other materials, such as airman knowledge testing supplements in the FAA-CT-8080 series and an FAA online training course, provide guidance to applicants on aeronautical knowledge and risk management.

The FAA recognizes that safe operations in today's complex National Airspace System (NAS) require a systematic integration of aeronautical knowledge that an airman must possess. This ACS integrates the elements of knowledge in 14 CFR to Commercial Pilot standards, and any associated ratings that an applicant is entitled.

In keeping with this integrated and systematic approach, the knowledge Task elements of each Task identify what the applicant must know and understand for the issuance of a Commercial Pilot Certificate under 14 CFR part 61. The applicant demonstrates this understanding by passing the knowledge test.

## Using the ACS

The ACS consists of ***Areas of Operation*** arranged in a logical sequence, beginning with Commercial Pilot Privileges and Limitations and ending with Accident Reporting. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know. The ACS then lists the aeronautical knowledge elements relevant to the specific Task. The ACS uses ***Notes*** to emphasize special considerations. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The terms “may” and “should” denote items that are recommended but not required. The ***References*** for each Task indicate the source material for Task elements. For example, in Tasks such as “Qualifications and Responsibilities to Act as a Commercial Pilot” (MC.I.A.K1), the applicant should be prepared for questions on any currency and recordkeeping presented in the References for that Task.

Each Task in the ACS is coded according to a scheme that includes four elements. For example, in the Task, “Pilot Qualifications and Responsibilities” (MC.I.A.K1) the applicant should use the References for that Task and be prepared for questions on currency and recordkeeping.

**MC.I.A.K1**

**MC** = Applicable ACS (Military Competency)
**I** = Area of Operation (Commercial Pilot Privileges and Limitations)
**A** = Task (Qualifications and Responsibilities to Act as a Commercial Pilot)
**K1** = Task element Knowledge 1 (Currency and recordkeeping)

Knowledge test questions are linked to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC). After this transition occurs, the Airman Knowledge Test Report (AKTR) will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. The LSCs translations may be found at www.faa.gov. Each LSC provides the applicant with information that will assist in future test taking.

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., “PLT058”) code will continue to be displayed on the AKTR. The LSC codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC codes and ACS codes.

For those applicants who do not pass the knowledge test, remedial instruction and an endorsement from an instructor is required for retesting. See Appendix 1 for details on passing the Military Competency Non-Category Specific (MCN) knowledge test.

The FAA encourages applicants to use this ACS when preparing for the knowledge test. In the case where an applicant has failed the knowledge test, the FAA encourages the applicant and his/her instructor to use this ACS when preparing to retest.

## I. Commercial Pilot Privileges and Limitations

| Task | *A. Pilot Qualifications and Responsibilities* |
|---|---|
| **References** | 14 CFR parts 61, 91, FAA-H-8083-3, FAA-H-8083-25 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge associated with operating as pilot-in-command (PIC) as a commercial pilot. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MC.I.A.K1* | Currency and recordkeeping. |
| *MC.I.A.K2* | Documents required to exercise commercial pilot privileges, as per 14 CFR part 61. |
| *MC.I.A.K3* | Passenger briefing requirements, to include operation and required use of safety restraint systems. |
| *MC.I.A.K4* | Responsibility of the PIC, as per 14 CFR part 91, subparts A-E. |
| *MC.I.A.K5* | Regulatory requirements for supplemental oxygen use by flight crew and passengers. |

| Task | *B. Airworthiness Requirements* |
|---|---|
| **References** | 14 CFR parts 39, 43, 91; FAA-H-8083-3, FAA-H-8083-25 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge associated with airworthiness requirements, including aircraft certificates. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MC.I.B.K1* | General airworthiness requirements and compliance for aircraft, including: |
| *MC.I.B.K1a* | • Certificate location and expiration dates |
| *MC.I.B.K1b* | • Required inspections and aircraft logbook documentation |
| *MC.I.B.K1c* | • Airworthiness Directives and Special Airworthiness Information Bulletins |
| *MC.I.B.K1d* | • Aircraft Flight Manual/POH, markings, and placards |
| *MC.I.B.K2* | Pilot-performed preventive maintenance. |
| *MC.I.B.K3* | Equipment requirements for day and night flight, to include: |
| *MC.I.B.K3a* | a. Flying with inoperative equipment |
| *MC.I.B.K3b* | • Using an approved Minimum Equipment List (MEL) |
| *MC.I.B.K3c* | • Required discrepancy records or placards |
| *MC.I.B.K4* | Emergency Locator Transmitter (ELT) operations, limitations, and testing requirements. |

| Task | *C. Medical Certification and Qualification* |
|---|---|
| **References** | 14 CFR parts 61, 67, 68, 91; FAA-H-8083-3, FAA-H-8083-25; AC 68-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge associated with aeromedical certificate requirements. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MC.I.C.K1* | Medical certificates, classes, and validity time period. |
| *MC.I.C.K2* | Inspection of medical certificates. |
| *MC.I.C.K3* | Medical certificates and exercising pilot certificate privileges. |
| *MC.I.C.K4* | Use of U.S. Armed Forces Medical Examination. |
| *MC.I.C.K5* | BasicMed and exercising Commercial Pilot privileges. |

## II. Air Traffic

| Task | *A. National Airspace System* |
| --- | --- |
| **References** | 14 CFR parts 71, 91, 93; FAA-H-8083-3; Chart Supplements, Navigation Charts; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge associated with the National Airspace System (NAS) operating under VFR as a commercial pilot. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MC.II.A.K1* | Types of airspace/airspace classes and associated requirements and limitations. |
| *MC.II.A.K2* | Charting symbology. |
| *MC.II.A.K3* | Special use airspace (SUA), special flight rules areas (SFRA), temporary flight restrictions (TFR), and other airspace areas. |
| *MC.II.A.K4* | Altitude selection accounting for terrain and obstacles, VFR cruising altitudes. |
| *MC.II.A.K5* | Compliance with ATC clearances and instructions. |
| *MC.II.A.K6* | Airport operations. |
| *MC.II.A.K7* | Right-of-way rules. |

## III. Accident Reporting

| | |
|---|---|
| **Task** | ***A. Accident Reporting*** |
| **References** | 49 CFR part 830; AIM |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge associated with the reporting of aircraft accidents. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MC.III.A.K1* | National Transportation Safety Board (NTSB) accident/incident reporting. |

# Appendix Table of Contents



A

# Appendix 1: The Knowledge Test, Eligibility, and Testing Centers

## Knowledge Test Description

The knowledge test is an important part of the airman certification process. Applicants who meet the requirements in 14 CFR part 61, section 61.73 must pass the knowledge test before applying for a Commercial Pilot Certificate and any associated ratings that the airman may qualify to hold.

The knowledge test consists of objective, multiple-choice questions. There is a single correct response for each test question. Each test question is independent of other questions. A correct response to one question does not depend upon, or influence, the correct response to another. The knowledge test applicant has up to two hours to complete the test.

## Knowledge Test Blueprint

| MCN Knowledge Areas Required by 14 CFR part 61, section 61.73 to be on the Knowledge Test | Percent of Questions Per Test |
|---|---|
| Commercial Pilot Privileges and Limitations | 30%–35% |
| Air Traffic | 30%–35% |
| General Operating Rules | 30%–35% |
| Accident Reporting | 10%–20% |
| **Total Number of Questions** | **50** |

## English Language Standard

In accordance with the requirements of 14 CFR part 61, section 61.123(b) and the FAA English Language Standard, throughout the application and testing process, the applicant must demonstrate the ability to read, write, speak, and understand the English language. However, the FAA may make an exception if the person is unable to meet one of these requirements due to medical reasons, such as a hearing impairment.

## Knowledge Test Requirements

There are no eligibility requirements for taking the MCN knowledge test outlined in 14 CFR part 61. If you do not meet the eligibility requirements to be issued a Commercial Pilot Certificate under 14 CFR part 61, section 61.73, your application for certification will be denied even if you have successfully passed the MCN Knowledge Test.

To be eligible to take the knowledge test, you must meet the following in accordance with the requirements of 14 CFR part 61, section 61.123(a):

- Be at least 18 years of age.
- Provide proper identification at the time of application that contains the applicant's—
  - (i) Photograph;
  - (ii) Signature;
  - (iii) Date of birth;
  - (iv) If the permanent mailing address is a post office box number, then the applicant must provide a government-issued residential address

A list of acceptable documents used to provide proper identification can be found in Advisory Circular (AC) 61-65, Certification: Pilots and Flight and Ground Instructors (as amended).

Achieving a score of 70% or better is required to be considered as satisfactorily passing the knowledge test for a Commercial Pilot Certificate, and its associated ratings, when the applicant is applying under 14 CFR part 61, section 61.73.

14 CFR part 61, section 61.49 lists the acceptable forms of retest authorization for all Commercial Pilot tests, including the MCN:

> An applicant retesting after failure is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training. The endorsement must certify that the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.
>
> ***Note:*** *If the applicant no longer possesses the original test report, he or she may request a duplicate replacement issued by the Airman Certification Branch (AFB-720).*

A current or former military pilot who is applying for a Commercial Pilot Certificate under 14 CFR part 61, section 61.73 is not required to pass a practical test to become certificated. Because of this, there is not a requirement for a certificated instructor to review the questions that incorrectly answered on the knowledge test. The FAA encourages Military Competence applicants to review the topics that were incorrectly answered on the knowledge test by use of the PLT Codes that are printed on the knowledge test report. By doing this, the applicant can be aware of areas he/she should review before exercising the privileges of his/her pilot certificate.

**Knowledge Test Centers**

The FAA authorizes hundreds of knowledge testing center locations that offer a full range of airman knowledge tests. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

**Knowledge Test Registration**

When you contact a knowledge testing center to register for a test, please be prepared to select a test date, choose a testing center, and make financial arrangements for test payment when you call. You may register for test(s) several weeks in advance, and you may cancel in accordance with the testing center's cancellation policy.

# Appendix 2: Knowledge Test Procedures and Tips

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.)

### Acceptable Materials

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
|---|---|---|
| Supplement book provided by proctor | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators |
| All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages | Magnetic Cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature |
| Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

### Test Tips

When taking a knowledge test, please keep the following points in mind:

- Carefully read the instructions provided with the test.
- Answer each question in accordance with the latest regulations and guidance publications.

- Read each question carefully before looking at the answer options. You should clearly understand the problem before trying to solve it.
- After formulating a response, determine which answer option corresponds with your answer. The answer you choose should completely solve the problem.
- Remember that only one answer is complete and correct. The other possible answers are either incomplete or erroneous.
- If a certain question is difficult for you, mark it for review and return to it after you have answered the less difficult questions. This procedure will enable you to use the available time to maximum advantage.
- When solving a calculation problem, be sure to read all the associated notes.
- For questions involving use of a graph, you may request a printed copy that you can mark in computing your answer. This copy and all other notes and paperwork must be given to the testing center upon completion of the test.

**Cheating or Other Unauthorized Conduct**

To avoid test compromise, computer testing centers must follow strict security procedures established by the FAA and described in FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test at any time a test unit member suspects that a cheating incident has occurred.

The FAA will investigate and, if the agency determines that cheating or unauthorized conduct has occurred, any airman certificate or rating you hold may be revoked. You will also be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of 1 year.

**Testing Procedures for Applicants Requesting Special Accommodations**

An applicant with learning or reading disability may request approval from the Airman Testing Standards Branch (AFS-630) through the local Flight Standards District Office (FSDO) or International Field Office/International Field Unit (IFO/IFU) to take airman knowledge test using one of the three options listed below, in preferential order:

**Option 1:** Use current testing facilities and procedures whenever possible.

**Option 2:** Use a self-contained, electronic device, which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

***Note:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.*

**Option 3:** Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO/IFU inspector must contact AFS-630 for assistance in selecting the test site and assisting the proctor. Before approving any option, the FSDO or IFO/IFU inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

# Appendix 3: Airman Knowledge Test Report

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report (AKTR) documenting the score with the testing center's raised, embossed seal. The applicant must retain the original AKTR.

An AKTR expires 24 calendar months from the month the applicant completes the knowledge test. If the AKTR expires before the completion of the application process, the applicant must retake the knowledge test.

To obtain a duplicate AKTR due to loss or destruction of the original, the applicant must mail a signed request accompanied by a check or money order made payable to the FAA in the amount of $12.00 the following address:

Federal Aviation Administration
Airmen Certification Branch, AFB-720
P.O. Box 25082
Oklahoma City, OK 73125

To obtain a copy of the application form or a list of the information required, please see the Airman Certification Branch (AFB-720) web page.

## FAA Knowledge Test Question Coding

Each Task in the ACS includes an ACS code. This ACS code will soon be displayed on the AKTR to indicate what Task element was proven deficient on the knowledge test. Instructors can then provide remedial training in the deficient areas, and evaluators can re-test this element during the practical test.

The ACS coding consists of four elements. For example, this code is interpreted as follows:

**MC.I.A.K1:**
**MC** = Applicable ACS (Military Competency for Commercial Pilot Certification)
**I** = Area of Operation (Commercial Pilot Privileges and Limitations)
**A** = Task (Qualifications and Responsibilities to Act as a Commercial Pilot)
**K1** = Task element Knowledge 1 (Currency and recordkeeping.)

Knowledge test questions are linked to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC). After this transition occurs, the Airman Knowledge Test Report (AKTR) will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. Remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task elements.

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., “PLT058”) code will continue to be displayed on the AKTR. The LSC codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC codes and ACS codes.

Because all active knowledge test questions for the Military Competency Non-Category Specific (MCN) have been aligned with the corresponding ACS, applicants can continue to use LSC codes in conjunction with the ACS for the time being. The applicant and his/her instructor should look up the LSC code(s) on the applicant’s AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the applicant and his/her instructor can use the corresponding Area(s) of Operation/Task(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant’s understanding of that material in the context of the appropriate ACS Area(s) of Operation and Task(s).

# Appendix 4: Certificate Eligibility and Prerequisites

Current and former pilots of the U.S. Armed Forces may apply and receive a Commercial Pilot Certificate issued by the Federal Aviation Administration (FAA) as per the eligibility and requirements outlined in 14 CFR part 61, section 61.73. To be eligible, a current or former pilot in the U.S. Armed Forces must present the following documents:

- Official U.S. Armed Forces record that shows the person is or was a U.S. military pilot
- An official record that shows the pilot graduated from a U.S. Armed Forces undergraduate pilot training school in an aircraft as a military pilot.
- Has passed the military competence aeronautical knowledge test.
- Before the date of application, an official U.S. military pilot and instrument check in the aircraft category, class, and type, if a class or type rating is applicable.
- Logged 10 hours as a military pilot in a U.S. military aircraft category, class, and type, if a type rating is applicable.

To add an instrument rating to that pilot certificate, the current or former U.S. Armed Forces pilot will:

- Have passed an instrument proficiency check in the U.S. Armed Forces in the aircraft category
- Have an official U.S. Armed Forces record that shows the person is instrument qualified to conduct instrument flying on Federal airways in that aircraft category and class

An aircraft type rating may only be issued if that aircraft has a comparable civilian type designated by the Administrator.

The information published above should only be used as a general guide. Please refer to 14 CFR part 61, section 61.73, and review all pertinent information that may apply to your individual circumstance.

# Appendix 5: References

This ACS is based on the following 14 CFR parts, FAA guidance documents, manufacturer's publications, and other documents.

| Reference | Title |
|---|---|
| 14 CFR part 39 | Airworthiness Directives |
| 14 CFR part 43 | Maintenance, Preventive Maintenance, Rebuilding, and Alteration |
| 14 CFR part 61 | Certification: Pilots, Flight Instructors, and Ground Instructors |
| 14 CFR part 67 | Medical Standards and Certification |
| 14 CFR part 68 | Requirements for Operating Certain Small Aircraft Without a Medical Certificate |
| 14 CFR part 71 | Designation of Class A, B, C, D and E Airspace Areas; Air Traffic Service Routes; and Reporting Points |
| 14 CFR part 91 | General Operating and Flight Rules |
| 14 CFR part 93 | Special Air Traffic Rules |
| 49 CFR part 830 | Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records |
| AC 60-28 | FAA English Language Standard for an FAA Certificate Issued Under 14 CFR Parts 61, 63, 65, and 107 |
| AC 61-65 | Certification: Pilots and Flight and Ground Instructors |
| AC 68-1 | BasicMed |
| AIM | Aeronautical Information Manual |
| FAA-H-8083-3 | Airplane Flying Handbook |
| FAA-H-8083-25 | Pilot's Handbook of Aeronautical Knowledge |
| Other | Chart Supplement |
| | Navigation Charts |

***Note:*** *Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.*

# Appendix 6: Abbreviations and Acronyms

The following abbreviations and acronyms may be used in the ACS.

| Abb./Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| AELS | Aviation English Language Standard |
| AFB | Office of Foundational Business (FAA) |
| AFS | Flight Standards Service |
| AIM | Aeronautical Information Manual |
| AKTC | Airman Knowledge Testing Center |
| AKTR | Airman Knowledge Test Report |
| ATC | Air Traffic Control |
| ATIS | Automatic Terminal Information Service |
| AWOS | Automated Weather Observation System |
| CFI | Certificated Flight Instructor |
| CFR | Code of Federal Regulations |
| CTAF | Common Traffic Advisory Frequency |
| DOT | Department of Transportation |
| ELT | Emergency Locator Transmitter |
| FAA | Federal Aviation Administration |
| FSDO | Flight Standards District Office |
| FTN | FAA Tracking Number |
| GPS | Global Positioning System |
| IACRA | Integrated Airman Certification and Rating Application |
| LSC | Learning Statement Code |
| MCN | Military Competency Non-Category Specific Knowledge Test |
| MEL | Minimum Equipment List |
| MTR | Military Training Routes |
| NAS | National Airspace System |
| NOTAM | Notices to Airmen |
| NSA | National Security Areas |
| ODA | Organization Designation Authorization |
| PIC | Pilot-in-Command |
| PLT | Pilot Learning Statement Code |
| SAFO | Safety Alert for Operators |
| SFRA | Special Flight Rules Area |
| SMS | Safety Management System |
| SUA | Special Use Airspace |
| TFR | Temporary Flight Restrictions |
| TRSA | Terminal Radar Service Areas |
| UNICOM | Aeronautical Advisory Communications Stations |
| VFR | Visual Flight Rules |

# Compiled working group comments & requested changes to Commercial Pilot – Military Competence ACS

## Comments and Requested Changes to COM MIL COMP ACS, FAA-S-ACS-12

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| **Cover** | Date | Date on cover | Change from February 2018 to June 2018 |
| **3** | Task A | New task element | Add (CA.I.A.K2) Privileges and Limitations as a new task element MC.I.A.K6 |
| **3** | MC.I. | Layout | AOO. I- Task A, B & C Left column (Task-References-Objectives-Knowledge) do not line up on all three tasks. |
| **3** | MC.I.B.K3 | Content | Should this state 'VFR' day and night flight? |
| **3** | MC.I.C.K3 | Content | Element better covered in Task A with the addition of Privileges and Limitations. Recommend removing MC.I.C.K3 and have it covered in Task A. |
| **5** | Task A | Content | Objective – add incidents. '…aircraft accidents and incidents'. |
| **S-1** | Knowledge Test Description | Add table | Suggest adding a table consistent with ACS-6 (see pg A-1) and ACS-8, above the Test Blueprint with the Knowledge Test Table showing Test Code, Test Name, Number of Questions, Age, Allotted Time and Passing Score |
| **A-2** | 1 | Recommended phraseology change | **Change:** Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.)<br>**To:** Before starting the actual test, the testing center will provide an opportunity to practice using the testing center's computer testing software. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.)<br>**Rationale:** Do not recommend using the term "navigation" as that is a specific aviation/maritime skill. Remove period between software and (e.g., |

# Aviation Maintenance Technician – General, Airframe, and Powerplant

## Airman Certification Standards

FAA-S-ACS-1

U.S. Department
of Transportation

**Federal Aviation
Administration**

**FAA-S-ACS-1**

# Aviation Maintenance Technician –
# General, Airframe, Powerplant
## Airman Certification Standards

## Effective Date: TBD

**Flight Standards Service
Washington, DC 20591**

## Acknowledgments

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, P.O. Box 25082, Oklahoma City, OK 73125, developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

## Availability

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

Material in FAA-S-ACS-1 will be effective **TBD**. All previous editions of the Aviation Mechanic General, Airframe, and Powerplant Practical Test Standards (FAA-S-8081-26, -27, and -28) will be obsolete as of this date for Aviation Maintenance Technician applicants.

## Foreword

The FAA has published the Aviation Maintenance Technician (AMT) – General, Airframe, Powerplant ACS document to communicate the aeronautical knowledge, risk management, and skill standards for AMT certification. This ACS incorporates and supersedes the previous editions of the following documents:

- FAA-S-8081-26A, Aviation Mechanic General Practical Test Standards (with Change 1, dated 4/27/15);
- FAA-S-8081-27A, Aviation Mechanic Airframe Practical Test Standards (with Change 1, dated 4/27/15, and Change 2, dated 9/29/15);
- FAA-S-8081-28A, Aviation Mechanic Powerplant Practical Test Standards (with Change 1, dated 4/27/15); and
- FAA-G-8082-3A, Aviation Maintenance Technician-General, Airframe, and Powerplant Knowledge Test Guide (dated September 2008).

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing. Specifically, the ACS, associated guidance, and test question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, risk management and skill as integrated components of the airman certification system;
- Safety Risk Management processes through which both internal and external stakeholders identify changes in regulations, safety recommendations, or other factors. These changes are then evaluated to determine whether they require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation maintenance and training industry) and FAA policy divisions.

The FAA has developed this ACS and its associated guidance in collaboration with a diverse group of aviation training experts. The goal is to drive a systematic approach to all components of the airman certification system, including knowledge test question development and conduct of the oral and practical test. The FAA acknowledges and appreciates the many hours that these aviation experts have contributed toward this goal. This degree of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Director, Flight Standards Service

## Revision History

| Document# | Description | Revision Date |
|---|---|---|
| FAA-S-8081-26A | Aviation Mechanic General Practical Test Standards (Change 1) | April 27, 2015 |
| FAA-S-8081-27A | Aviation Mechanic Airframe Practical Test Standards (Changes 1 and 2) | September 29, 2015 |
| FAA-S-8081-28A | Aviation Mechanic Powerplant Practical Test Standards (Change 1) | April 27, 2015 |
| FAA-S-ACS-1 | Aviation Maintenance Technician – General, Airframe, and Powerplant Airman Certification Standards | **TBD** |

## Table of Contents

## Introduction

### Airman Certification Standards Concept

The goal of the airman certification process is to ensure the applicant possesses the knowledge, ability to manage risks, and basic skills consistent with the privileges of the certificate or rating being exercised. The Airman Certification Standards (ACS) concept forms a more comprehensive standard for what an applicant must know, consider, and do for the safe conduct and successful completion of each subject to be tested on the knowledge exam and oral and practical tests.

In fulfilling its responsibilities for the airman certification process, the FAA Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing. The FAA knowledge test measures the minimum standard of aeronautical knowledge required by Title 14 of the Code of Federal Regulations (14 CFR) part 65. Other materials, such as handbooks in the FAA-H-8083 series, provide guidance to applicants on aeronautical knowledge, risk management, and associated skills, including the knowledge and skill required to identify hazards and mitigate risks.

Safe operations on today's aircraft require integration of aeronautical knowledge, risk management, and skill standards. To accomplish these goals, the FAA drew upon the expertise of organizations and individuals across the aviation and training community to develop the ACS. The ACS defines the elements of knowledge and skill for each airman certificate or rating defined in 14 CFR part 65.

Through the oral and practical portion of the test, the FAA evaluators will assess the applicant's application of the knowledge, risk management, and skill in the subject area. The oral questioning may continue throughout the entire practical test. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge and demonstrate skill as required for the circumstances of the given scenario.

***Note:*** *As used in the ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector (ASI) or designated mechanic examiner (DME)).*

Compliance with these procedures makes certain that airman applicants meet a satisfactory level of competency and workmanship required for certification. Each applicant is required to demonstrate a minimum satisfactory competency level, regardless of his/her previous education or background.

Evaluators will adhere to the following standards is mandatory when evaluating an applicant's test performance for an FAA Airframe and/or Powerplant Certificate:

- 14 CFR part 65, section 65.79
- General Aviation Airman Designee Handbook, FAA Order 8900.2 (as revised)
- Applicable ACS

All applicants for an FAA Aviation Maintenance Technician Certificate must qualify by meeting the prescribed requirements as stated in 14 CFR part 65, section 65.77. They must additionally pass a knowledge test, and the oral and practical tests for the certificate and/or rating sought, in accordance with 14 CFR part 65, sections 65.75 and 65.77.

***Note:*** *FAA knowledge tests contain topics that include the maintenance, repair, alteration, and inspection of aviation products and relevant FAA regulations.*

### Using the ACS

Title 49 U.S. Code Subpart III, Chapter 447 is the foundation for the FAA's safety regulations. The FAA requires that all practical tests be conducted in accordance with the appropriate Aviation Mechanic ACS and the policies and standardized procedures set forth in the current version of FAA Order 8900.2, General Aviation Airman Designee Handbook.

***Note:*** *An evaluator conducting an oral and/or practical test must not test more than one applicant at a time.*

Definitions within:

- **Knowledge**—(FAA knowledge exam, oral) elements are indicated by use of the words "Exhibits knowledge in...."
- **Risk**— (oral, practical) elements are indicated by the use of the words “Determine, Identify, Creates…”
- **Skill**—(practical) elements are indicated by the use of the words "Demonstrates the skill to perform...."

The ACS consists of ***Sections*** **(General, Airframe, Powerplant)**. Each Section includes ***Subjects*** appropriate to that Section and consistent with 14 CFR part 65. Each Subject begins with an ***Objective*** stating what the applicant should know, consider, and/or do. The ACS then lists the aeronautical knowledge, risk management, and skill elements relevant to the specific Subjects, along with the conditions and standards for acceptable performance. The ACS uses ***Notes*** to emphasize special considerations. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The term “may” denotes items that are recommended but not required. The ***References*** for each Subject indicate the source material for Subject elements. For example, in Subjects such as “Fundamentals of Electricity and Electronics” (MG.I.A.K1), the applicant must be prepared for questions on electron theory presented in the references for that Subject.

Each Subject in the ACS is coded according to a scheme that includes four elements. For example:

**MG.I.A.K1:**
**MG** = Applicable ACS (Aviation Mechanic-General)
**I** = Section (General)
**A** = Subject (Fundamentals of Electricity and Electronics)
**K1** = Subject Element Knowledge 1 (Electron theory (conventional flow vs. electron flow).)

Knowledge test questions are linked to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC). After this transition occurs, the airman knowledge test report will list an ACS code that correlates to a specific Subject element for a given Section and Subject. At that time, remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria.
The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., “AMG,” “AMA,” and “AMP” codes) will continue to be displayed on the Airman Knowledge Test Report (AKTR).

Each ACS code is tied to a unique Subject element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC (AMG, AMA, AMP) codes and ACS codes.

Because all active knowledge test questions for the General (AMG), Airframe (AMA), and Powerplant (AMP) knowledge tests have been aligned with the corresponding ACS, evaluators can continue to use Learning Statement codes in conjunction with the ACS for the time being. The evaluator should look up the learning statement code(s) on the applicant’s AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the evaluator can use the corresponding Subject(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant’s understanding of that material in the context of the appropriate ACS Subject.

Except as provided by 14 CFR part 65, section 65.80, the applicant must pass the knowledge test before taking the oral and practical test.

The FAA encourages applicants and instructors to use the ACS when preparing for knowledge, tests. The FAA will revise the ACS as circumstances require.

## I. General

| | |
|---|---|
| **Subject** | ***A. Fundamentals of Electricity and Electronics*** |
| **References** | FAA-H-8083-30 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with basic electricity applicable to the AMT. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.A.K1* | Electron theory (conventional flow vs. electron flow). |
| *MG.I.A.K2* | Magnetism. |
| *MG.I.A.K3* | Capacitance in a circuit. |
| *MG.I.A.K4* | Inductance in a circuit. |
| *MG.I.A.K5* | Alternate Current (AC) electrical circuits. |
| *MG.I.A.K6* | Direct Current (DC) electrical circuits. |
| *MG.I.A.K7* | Ohm's law. |
| *MG.I.A.K8* | Kirchhoff's laws. |
| *MG.I.A.K9* | Voltage. |
| *MG.I.A.K10* | Current. |
| *MG.I.A.K11* | Resistance. |
| *MG.I.A.K12* | Power. |
| *MG.I.A.K13* | Series circuits. |
| *MG.I.A.K14* | Parallel circuits. |
| *MG.I.A.K15* | Aircraft batteries. |
| *MG.I.A.K16* | Transformers. |
| *MG.I.A.K17* | Circuit continuity. |
| *MG.I.A.K18* | Controlling devises including switches and relays. |
| *MG.I.A.K19* | Protective devices including fuses, circuit breakers, and current limiters. |
| *MG.I.A.K20* | Resistor types and color coding. |
| *MG.I.A.K21* | Semiconductors including diodes, transistors and integrated circuits. |
| *MG.I.A.K22* | Digital logic, including RAM, ROM, NVRAM, AND-gate, OR-gate, inverter, flip-flop. |
| *MG.I.A.K23* | Binary numbers. |
| *MG.I.A.K24* | Electrostatic discharge. |
| *MG.I.A.K25* | Electrical circuit drawings. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.A.R1* | Failure to observe safety precautions when taking voltage, current, resistance, and capacitance measurements. |
| *MG.I.A.R2* | Hazards associated with handling, storage, and inspection of different types of batteries (i.e. lead acid, NiCad, lithium ion, gel cell). |
| *MG.I.A.R3* | Hazards associated with high-voltage circuits (e.g., strobe lighting). |
| *MG.I.A.R4* | Failure to observe safety precautions when working around batteries. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.A.S1* | Perform circuit continuity test. |
| *MG.I.A.S2* | Measure voltage. |
| *MG.I.A.S3* | Measure current. |
| *MG.I.A.S4* | Measure resistance. |
| *MG.I.A.S5* | Test a switch or relay. |

| Subject | *A. Fundamentals of Electricity and Electronics* |
|---|---|
| *MG.I.A.S6* | Test a fuse or circuit breaker. |
| *MG.I.A.S7* | Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions. |
| *MG.I.A.S8* | Troubleshoot a circuit. |
| *MG.I.A.S9* | Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits). |
| *MG.I.A.S10* | Demonstrate how to test for short-circuit and open-circuit conditions. |
| *MG.I.A.S11* | Measure voltage drop across a resistor. |
| *MG.I.A.S12* | Determine or measure for open electrical circuits. |
| *MG.I.A.S13* | Inspect an aircraft battery. |
| *MG.I.A.S14* | Service an aircraft battery. |

| Subject | ***B. Aircraft Drawings*** |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft drawings. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.B.K1* | Drawings, blueprints, sketches, and/or system schematics including commonly used lines, symbols and terminology. |
| *MG.I.B.K2* | Repair or alteration of an aircraft system or component(s) using drawings/blueprints and/or system schematics to determine whether it conforms to its type design. |
| *MG.I.B.K3* | Inspection of an aircraft system or component(s) using drawings/blueprints and/or schematics. |
| *MG.I.B.K4* | Terms used in conjunction with aircraft drawings/blueprints and/or system schematics. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.B.R1* | Misinterpretation of plus or minus tolerances as depicted on aircraft drawings. |
| *MG.I.B.R2* | Misuse of manufacturers specifications for design of alterations and repairs. |
| *MG.I.B.R3* | Failure to ensure the drawing or schematic is the one applicable to the particular aircraft by model and serial number. |
| *MG.I.B.R4* | Failure to identify the correct and most current version and applicability of drawing being used. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.B.S1* | Draw a sketch of a repair or alteration. |
| *MG.I.B.S2* | Identify the meaning of lines and symbols used in an aircraft drawing. |
| *MG.I.B.S3* | Interpret dimensions used in an aircraft drawing. |
| *MG.I.B.S4* | Identify changes on an aircraft drawing. |
| *MG.I.B.S5* | Determine material requirements from an aircraft drawing. |
| *MG.I.B.S6* | Interpret graphs and charts. |

| Subject | ***C. Weight and Balance*** |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1, FAA-H-8083-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with weight and balance. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.C.K1* | Weight and balance terminology. |
| *MG.I.C.K2* | Purpose for weighing an aircraft. |
| *MG.I.C.K3* | Weighing procedures, including the general preparations for weighing, with emphasis on aircraft weighing area considerations. |
| *MG.I.C.K4* | Procedures for calculation of the following: arm, positive or negative moment, center of gravity (CG) or moment index. |
| *MG.I.C.K5* | Purpose and application of weight and CG limits. |
| *MG.I.C.K6* | Purpose of determining CG. |
| *MG.I.C.K7* | Adverse loading considerations and how to calculate if adverse loading will cause an out of limit condition. |
| *MG.I.C.K8* | Determine proper empty weight configuration. |
| *MG.I.C.K9* | Proper ballast placement. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.C.R1* | Situations that may lead to unsafe conditions when jacking an aircraft. |
| *MG.I.C.R2* | Weighing an aircraft without following recommended procedures. |
| *MG.I.C.R3* | Misuse of scales. |
| *MG.I.C.R4* | Adverse aerodynamic effect of CG that is forward or aft of CG limits. |
| *MG.I.C.R5* | Adverse aerodynamic and performance effects of weight in excess of limits. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.C.S1* | Research and explain the procedures for weighing an aircraft. |
| *MG.I.C.S2* | Perform weight and balance calculations. |
| *MG.I.C.S3* | Calculate ballast weight shift and required weight location. |
| *MG.I.C.S4* | Check aircraft weighing scales for calibration. |
| *MG.I.C.S5* | Calculate weight and balance for an aircraft after an equipment change. |
| *MG.I.C.S6* | Compute forward and aft loaded CG limit. |
| *MG.I.C.S7* | Create a maintenance record for a weight and balance change. |
| *MG.I.C.S8* | Compute the empty weight and empty weight CG of an aircraft. |
| *MG.I.C.S9* | Calculate the moment of an item of equipment. |
| *MG.I.C.S10* | Identify tare items. |
| *MG.I.C.S11* | Locate weight and balance information. |
| *MG.I.C.S12* | Locate datum. |
| *MG.I.C.S13* | Locate weight and balance placarding and limitation requirements for an aircraft. |
| *MG.I.C.S14* | Revise an aircraft equipment list after equipment change. |
| *MG.I.C.S15* | Calculate the change needed to correct an out of balance condition. |
| *MG.I.C.S16* | Determine an aircraft's CG range using aircraft specifications, Type Certificate Data Sheets (TCDSs), and aircraft listings. |
| *MG.I.C.S17* | Calculate a weight change and complete required records. |

| Subject | ***D. Fluid Lines and Fittings*** |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with fluid lines and fittings. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.D.K1* | Tubing and hose materials, applications, sizes, and fittings. |
| *MG.I.D.K2* | Flexible hose identification. |
| *MG.I.D.K3* | Rigid line fabrication and installation techniques/practices. |
| *MG.I.D.K4* | Flexible hose fabrication and installation techniques/practices. |
| *MG.I.D.K5* | Importance of using a torque wrench when securing fluid hose and line fittings. |
| *MG.I.D.K6* | Use of torque seal or similar witness techniques after installing critical fluid hose and line fittings. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.D.R1* | Failure to follow proper system configuration prior to and during maintenance. |
| *MG.I.D.R2* | Misuse of required safety equipment. |
| *MG.I.D.R3* | Failure to use precautions when working with hazardous fluids. |
| *MG.I.D.R4* | Failure to observe precautions when working with high-pressure fluid systems. |
| *MG.I.D.R5* | Hazards associated with a twisted hose. |
| *MG.I.D.R6* | Hazards associated with a loosened fitting or a hose that has moved out-of-position. |
| *MG.I.D.R7* | Improper use of tools while applying torque to a fluid line. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.D.S1* | Fabricate an aircraft rigid line or a flexible hose. |
| *MG.I.D.S2* | Install an aircraft rigid line. |
| *MG.I.D.S3* | Install an aircraft flexible hose. |
| *MG.I.D.S4* | Perform a rigid line or flexible hose inspection. |
| *MG.I.D.S5* | Identify installation and security requirements for rigid lines and flexible hoses. |
| *MG.I.D.S6* | Identify fluid lines, pneumatic lines, and fittings. |
| *MG.I.D.S7* | Fabricate a flare on tubing. |
| *MG.I.D.S8* | Fabricate a flareless-fitting-tube connection. |

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| **Subject** | ***E. Aircraft Materials, Hardware, and Processes*** |
| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with materials, hardware, and processes. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.E.K1* | Materials commonly used in aircraft and their general application. |
| *MG.I.E.K2* | Heat treatment processes, using D or DD “icebox” rivets. |
| *MG.I.E.K3* | Forces placed on aircraft materials (e.g., tension, compression, torsion, bending, strain, and shear). |
| *MG.I.E.K4* | Hardware commonly used in aircraft (e.g., bolts, nuts, screws, pins, washers, turnlock fasteners, cables, cable fittings, and rigid line couplings). |
| *MG.I.E.K5* | Safety wire and safety clip requirements and techniques. |
| *MG.I.E.K6* | Precision measurement tools, principles, and procedures. |
| *MG.I.E.K7* | Non-destructive testing methods for various materials. |
| *MG.I.E.K8* | Torqueing tools, principles, and procedures. |
| *MG.I.E.K9* | Suitability and compatibility of materials and hardware used for maintenance. |
| *MG.I.E.K10* | Relationship between torque and fastener preload. |
| *MG.I.E.K11* | Aircraft inspection methods and tools for materials, hardware, and processes. |
| *MA.II.E.K.12* | Characteristics of acceptable welds. |
| *MA.II.E.K.13* | Characteristics of unacceptable welds. |
| *MA.II.E.K14* | Procedures for weld repairs. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.E.R1* | Improper use of personal protective equipment (PPE). |
| *MG.I.E.R2* | Consequences of improper torque. |
| *MG.I.E.R3* | Consequences associated with used hardware or suspected unapproved parts (SUPS). |
| *MG.I.E.R4* | Misunderstanding and misapplication of torqueing techniques on critical, highly-stressed fasteners. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.E.S1* | Install safety wire on nuts, bolts, and/or turnbuckles. |
| *MG.I.E.S2* | Determine and properly torque aircraft hardware. |
| *MG.I.E.S3* | Perform a visual inspection of various welds. |
| *MG.I.E.S4* | Identify aircraft materials and hardware based on manufacturer’s markings. |
| *MG.I.E.S5* | Select and install aircraft bolts. |
| *MG.I.E.S6* | Make precision measurements with an instrument that has a Vernier micrometer scale. |
| *MG.I.E.S7* | Check the concentricity of a shaft. |
| *MG.I.E.S8* | Identify aircraft control cable components. |
| *MG.I.E.S9* | Fabricate a cable assembly using a swaged end fitting. |
| *MG.I.E.S10* | Select the correct aluminum alloy for a structural repair. |
| *MG.I.E.S11* | Identify rivets by physical characteristics. |
| *MG.I.E.S12* | Determine suitability of materials for aircraft repairs. |
| *MG.I.E.S13* | Distinguish between heat-treated and non-heat-treated aluminum alloys. |
| *MG.I.E.S14* | Check for proper calibration of a micrometer. |
| *MG.I.E.S15* | Inspect and check welds. |

| Subject | *F. Ground Operations and Servicing* |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1, AC 150/5210-20 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with ground operation and servicing. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.F.K1* | Aircraft towing procedures. |
| *MG.I.F.K2* | Aircraft securing procedures. |
| *MG.I.F.K3* | Aviation fueling/defueling procedures. |
| *MG.I.F.K4* | Airport operation area procedures and ATC communications, including runway incursion prevention. |
| *MG.I.F.K5* | Engine starting, ground operation, and aircraft taxiing procedures. |
| *MG.I.F.K6* | Types/classes of fire extinguishers and procedures. |
| *MG.I.F.K7* | Aircraft oil, hydraulic and pneumatic, and deicing servicing procedures. |
| *MG.I.F.K8* | Oxygen system servicing procedures. |
| *MG.I.F.K9* | Characteristics of aviation gasoline and/or turbine fuels, including basic types and means of identification. |
| *MG.I.F.K10* | Fuel additives commonly used in the field. |
| *MG.I.F.K11* | Use of approved grades/types of fuel in aircraft engines. |
| *MG.I.F.K12* | Tool and hardware accountability. |
| *MG.I.F.K13* | Material handling. |
| *MG.I.F.K14* | Parts protections. |
| *MG.I.F.K15* | Hazardous materials, Safety Data Sheets (SDS), and PPE. |
| *MG.I.F.K16* | Foreign object damage effects |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing: |
| *MG.I.F.R1* | Dangers associated with engine starting and ground operations. |
| *MG.I.F.R2* | Consequences of misfueling and/or using incorrect and/or contaminated fuel. |
| *MG.I.F.R3* | Dangers associated with failure to use an engine start/run-up checklist. |
| *MG.I.F.R4* | Failure to observe oxygen system safety practices/precautions during servicing. |
| *MG.I.F.R5* | Hazards involved in preparing to tow an aircraft. |
| *MG.I.F.R6* | Ground operations of aircraft engines with cowling removed contrary to manufacturer instructions. |
| *MG.I.F.R7* | Hazards associated with ground operation of aircraft in the vicinity of other aircraft or ground support equipment. |
| *MG.I.F.R8* | Hazards associated with engine starting and operation while troubleshooting or adjustment of engine controls. |
| *MG.I.F.R9* | Hazards associated with fueling/defueling ungrounded aircraft or using improper equipment. |
| *MGI.F.R10* | Consequences of improperly connecting external power equipment to an aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.F.S1* | Secure an aircraft. |
| *MG.I.F.S2* | Prepare an aircraft for towing. |
| *MG.I.F.S3* | Follow a start-up checklist for an aircraft reciprocating or turbine engine. |
| *MG.I.F.S4* | Start and operate an aircraft engine. |
| *MG.I.F.S5* | Use appropriate hand signals for the movement of aircraft. |
| *MG.I.F.S6* | Prepare an aircraft for fueling. |
| *MG.I.F.S7* | Inspect an aircraft fuel system for water and Foreign Object Debris (FOD) contamination. |
| *MG.I.F.S8* | Identify procedures for extinguishing fires in an engine induction system. |

| Subject | *F. Ground Operations and Servicing* |
|---|---|
| *MG.I.F.S9* | Connect external power to an aircraft. |
| *MG.I.F.S10* | Identify different grades of aviation fuel. |
| *MG.I.F.S11* | Identify procedures for securing a turbine-powered aircraft after engine shutdown. |
| *MG.I.F.S12* | Select an approved fuel for an aircraft. |
| *MG.I.F.S13* | Perform a foreign object damage control procedure. |

| Subject | *G. Cleaning and Corrosion Control* |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with cleaning, corrosion control, and aircraft finishes. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.G.K1* | Aircraft cleaning procedures. |
| *MG.I.G.K2* | Corrosion theory and causation. |
| *MG.I.G.K3* | Types and effects of corrosion. |
| *MG.I.G.K4* | Corrosion prone areas in aircraft. |
| *MG.I.G.K5* | Corrosion preventive maintenance procedures. |
| *MG.I.G.K6* | Corrosion identification and inspection. |
| *MG.I.G.K7* | Corrosion removal and treatment procedures. |
| *MG.I.G.K8* | Corrosion Preventive Compounds (CPC) (e.g., waxy sealants, thin-film dielectrics). |
| *MG.I.G.K9* | Selection of optimal CPC and frequency of treatment. |
| *MG.I.G.K10* | Use of high-pressure application equipment (e.g., fogging). |
| *MG.I.G.K11* | Improper use of cleaners on aluminum or composite materials. |
| *MG.I.G.K12* | Dissimilar metals causing accelerated corrosion, and role of protective barriers to mitigate this risk. |
| *MG.I.G.K13* | Conversion coatings. |
| *MG.I.G.K14* | Materials used for protection of airframe structures. |
| *MG.I.G.K15* | Primer materials. |
| *MG.I.G.K16* | Topcoat materials. |
| *MG.I.G.K17* | Surface preparation for a desired finishing material. |
| *MG.I.G.K18* | Effects of ambient conditions on finishing materials. |
| *MG.I.G.K19* | Effects of improper surface preparation on finishing materials. |
| *MG.I.G.K20* | Regulatory requirements for replacing identification, registration markings, and placards. |
| *MG.I.G.K21* | Inspection of aircraft finishes. |
| *MG.I.G.K22* | Safety practices/precautions when using finishing materials (e.g., PPE, fire prevention). |
| *MG.I.G.K23* | Finishing materials application techniques and practices. |
| *MG.I.G.K24* | Control surface balance considerations after refinishing. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.G.R1* | Failure to identify health concerns when using paints, solvents, finishing materials, and processes. |
| *MG.I.G.R2* | Improper ventilation. |
| *MG.I.G.R3* | Misidentification of materials and processes to be used for cleaning or corrosion treatment on a given part or structure to prevent further damage. |
| *MG.I.G.R4* | Failure to follow SDS PPE instructions for products used during removal and treatment of corrosion. |
| *MG.I.G.R5* | Failure to follow fire prevention measures when working with flammable chemicals. |
| *MG.I.G.R6* | Improper disposal of chemicals and waste materials. |
| *MG.I.G.R7* | Inappropriate use of PPE when working with paints and solvents. |
| *MG.I.G.R8* | Improper application of or incompatible finishing materials. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.G.S1* | Perform a portion of an aircraft corrosion inspection. |
| *MG.I.G.S2* | Identify and select aircraft corrosion prevention/cleaning materials. |
| *MG.I.G.S3* | Apply corrosion prevention/coating materials. |

| Subject | ***G. Cleaning and Corrosion Control*** |
|---|---|
| *MG.I.G.S4* | Inspect finishes and identify defects. |
| *MG.I.G.S5* | Inspect an aircraft compartment for corrosion. |
| *MG.I.G.S6* | Identify procedures to clean and protect plastics. |
| *MG.I.G.S7* | Determine location and/or size requirements for aircraft registration numbers. |
| *MG.I.G.S8* | Prepare composite surface for painting. |
| *MG.I.G.S9* | Identify finishing materials and appropriate thinners. |
| *MG.I.G.S10* | Layout and mask a surface in preparation for painting. |
| *MG.I.G.S11* | Prepare metal surface for painting. |
| *MG.I.G.S12* | Determine what paint system can be used on a given aircraft. |
| *MG.I.G.S13* | Apply etch solution and conversion coating. |
| *MG.I.G.S14* | Identify types of protective finishes. |

| Subject | ***H. Mathematics*** |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with mathematics as it relates to aircraft maintenance.<br>*Note: The practical portion of the Mathematics subject area may be tested simultaneously when performing calculation(s) in subject areas Basic Electricity and/or Weight and Balance.* |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.H.K1* | Areas of various geometrical shapes. |
| *MG.I.H.K2* | Volumes of various geometrical shapes. |
| *MG.I.H.K3* | Definitions/descriptions of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse. |
| *MG.I.H.K4* | Ratio problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation. |
| *MG.I.H.K5* | Proportion and percentage problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation. |
| *MG.I.H.K6* | Algebraic operations, including examples of where or how they may be used in relation to aircraft maintenance. |
| *MG.I.H.K7* | Conditions or areas where metric conversion may be necessary. |
| *MG.I.H.K8* | Scientific (exponential) notation, decimal notation, fractional notation, binary notation, and conversion between these various forms of numeric notation. |
| *MG.I.H.K9* | Rounding numbers. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing: |
| *MG.I.H.R1* | Failure to use the precedence of algebraic operators when solving an algebraic equation. |
| *MG.I.H.R2* | Failure to maintain the correct positive or negative integer in mathematical operations. |
| *MG.I.H.R3* | Implications of rounding numbers when precision is needed. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.H.S1* | Determine the square root of given numbers. |
| *MG.I.H.S2* | Compute the volume of a cylinder. |
| *MG.I.H.S3* | Compute the area of a wing. |
| *MG.I.H.S4* | Calculate the volume of a shape; such as a baggage compartment or fuel tank. |
| *MG.I.H.S5* | Convert fractional numbers to decimal equivalents. |
| *MG.I.H.S6* | Compare two numerical values using ratios. |
| *MG.I.H.S7* | Compute compression ratio. |
| *MG.I.H.S8* | Compute the torque value when converting from inch-pounds to foot-pounds or from foot-pounds to inch-pounds. |

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| **Subject** | ***I. Regulations, Maintenance Forms, Records, and Publications*** |
| **References** | FAA-H-8083-30, 14 CFR, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with regulations, publications, and recordkeeping. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.I.K1* | Privileges and limitations of a mechanic certificate. |
| *MG.I.I.K2* | Recent experience requirements and how to re-establish once lost. |
| *MG.I.I.K3* | Maintenance record entry for approval for return to service after maintenance and/or alterations. |
| *MG.I.I.K4* | Maintenance record entry for approval for return to service after inspection. |
| *MG.I.I.K5* | The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3). |
| *MG.I.I.K6* | Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration minor repair). |
| *MG.I.I.K7* | Criteria and responsibility for determining whether a repair or alteration is major or minor. |
| *MG.I.I.K8* | The regulatory framework including general subject matter of the relevant parts of 14 CFR relevant to aircraft maintenance and mechanics. |
| *MG.I.I.K9* | Agency publications and guidance materials including aircraft specifications, TCDSs, advisory circulars, and Airworthiness Directives (ADs). |
| *MG.I.I.K10* | Alternative methods of ADs compliance. |
| *MG.I.I.K11* | Manufacturer publications including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment list. |
| *MG.I.I.K12* | FAA databases and resources available including TCDSs and supplemental type certificates. |
| *MG.I.I.K13* | Compliance requirements for manufacturer-specified methods, techniques and practices. |
| *MG.I.I.K14* | Compliance requirements for manufacturer-specified maintenance and inspection intervals. |
| *MG.I.I.K15* | FAA-approved maintenance data including maintenance manuals and other methods, techniques and practices acceptable by the administrator. |
| *MG.I.I.K16* | Difference between approved data and acceptable data, and when each is required. |
| *MG.I.I.K17* | FAA-approved airworthiness limitations. |
| *MG.I.I.K18* | Alert, Caution, and Warning Indications; understand the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals. |
| *MG.I.I.K19* | Inoperative equipment. |
| *MG.I.I.K20* | Discrepancy records or placards. |
| *MG.I.I.K21* | The use of useable on, or effectivity, codes in parts manuals. |
| *MG.I.I.K22* | Determining the serial number effectivity of an item. |
| *MG.I.I.K23* | Limitations of a certificate and/or rating. |
| *MG.I.I.K24* | Mechanic address change notification procedures. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.I.R1* | Hazards resulting from incomplete or inaccurate documentation. |
| *MG.I.I.R2* | Improper use of SDS. |
| *MG.I.I.R3* | Complacency during documentation phase of maintenance procedures. |
| *MG.I.I.R4* | Failure to adhere to warnings, cautions, or notes as they are used in maintenance and operational manuals. |
| *MG.I.I.R5* | Incorrectly determining if a component is applicable to a given aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.I.S1* | Complete an FAA Form 337 for a major repair or alteration. |
| *MG.I.I.S2* | Examine an FAA Form 337 for accuracy. |

| Subject | *I. Regulations, Maintenance Forms, Records, and Publications* |
|---|---|
| *MG.I.I.S3* | Determine an aircraft's inspection status by reviewing the aircraft's maintenance records. |
| *MG.I.I.S4* | Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance or propeller. |
| *MG.I.I.S5* | Compare an equipment list for an aircraft to equipment installed. |
| *MG.I.I.S6* | Locate applicable FAA aircraft specifications and/or FAA TCDS for an aircraft or component. |
| *MG.I.I.S7* | Locate aircraft flight control travel limits. |
| *MG.I.I.S8* | Determine applicability of an AD. |
| *MG.I.I.S9* | Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings. |
| *MG.I.I.S10* | Use a manufacturer's illustrated parts catalog to locate a specific part number and applicability. |
| *MG.I.I.S11* | Locate supplemental type certificates applicable to a specific aircraft. |
| *MG.I.I.S12* | Determine the conformity of aircraft instrument range markings and/or placarding. |
| *MG.I.I.S13* | Determine approved replacement parts for installation on a given aircraft. |
| *MG.I.I.S14* | Determine maximum allowable weight of a specific aircraft. |
| *MG.I.I.S15* | Determine whether a given repair or alteration is major or minor. |
| *MG.I.I.S16* | Determine applicability of approved data for a major repair. |
| *MG.I.I.S17* | Explain the difference between "approved data" (required for major repair/alteration) and "acceptable data" (required for minor repair/alteration). |
| *MG.I.I.S18* | Complete a 100-hour inspection aircraft maintenance record entry. |

| Subject | ***J. Physics for Aviation*** |
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| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aviation physics. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.J.K1* | Matter and energy. |
| *MG.I.J.K2* | Work, power, force, and motion. |
| *MG.I.J.K3* | Simple machines and mechanics. |
| *MG.I.J.K4* | Heat and pressure. |
| *MG.I.J.K5* | Bernoulli's Principle. |
| *MG.I.J.K6* | Newton's Law of Motion. |
| *MG.I.J.K7* | Gas law and fluid mechanics. |
| *MG.I.J.K8* | Theory of flight (aerodynamics). |
| *MG.I.J.K9* | Standard atmosphere and factors affecting atmospheric conditions. |
| *MG.I.J.K10* | Primary and secondary aircraft flight controls. |
| *MG.I.J.K11* | Additional aerodynamic devices including vortex generators, wing fences, and stall strips. |
| *MG.I.J.K12* | Relationship between temperature, density, weight, and volume. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.J.R1* | Changes in aircraft and engine performance due to density altitude. |
| *MG.I.J.R2* | Effect a repair can have on a flight surface. |
| *MG.I.J.R3* | Improper use of performance/testing data. |
| *MG.I.J.R4* | Hazards associated with using incorrect units (e.g., Celsius vs. Fahrenheit). |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.J.S1* | Convert temperature units (e.g., from Celsius to Fahrenheit). |
| *MG.I.J.S2* | Determine density altitude. |
| *MG.I.J.S3* | Determine pressure altitude. |
| *MG.I.J.S4* | Calculate force, area, or pressure in a specific application. |
| *MG.I.J.S5* | Demonstrate the mechanical advantage of various types of levers. |
| *MG.I.J.S6* | Design an inclined plane on paper, indicating the mechanical advantage. |
| *MG.I.J.S7* | Identify changes in pressure and velocity as a fluid passes through a venturi. |

| Subject | ***K. Inspection Concepts and Techniques*** |
|---|---|
| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft inspections. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.K.K1* | Measuring tools including calipers, micrometers, and gauges. |
| *MG.I.K.K2* | Calibration and tool accuracy requirements. |
| *MG.I.K.K3* | Nondestructive Testing (NDT) procedures and methods. |
| *MG.I.K.K4* | Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections). |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.K.R1* | Failure to demagnetize a component following a magnetic particle inspection. |
| *MG.I.K.R2* | Inaccurate use of precision measuring instruments. |
| *MG.I.K.R3* | Noncalibrated precision measuring equipment. |
| *MG.I.K.R4* | Misuse of inspection techniques. |
| *MG.I.K.R5* | Failure to use precautions to prevent damage to aircraft components and/or test equipment when performing tests using an ohmmeter. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.K.S1* | Use Vernier calipers. |
| *MG.I.K.S2* | Use micrometers. |
| *MG.I.K.S3* | Use measurement gauges. |
| *MG.I.K.S4* | Perform a visual inspection. |
| *MG.I.K.S5* | Perform a dye penetrant inspection. |
| *MG.I.K.S6* | Inspect aircraft for compliance with an AD. |
| *MG.I.K.S7* | Identify NDT methods for composite, surface metal, and subsurface metal defects. |
| *MG.I.K.S8* | Perform a tap test on a composite component. |

| Subject | ***L. Human Factors*** |
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| **References** | FAA-H-8083-30, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with human factors. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MG.I.L.K1* | Safety culture and organizational factors. |
| *MG.I.L.K2* | Human error principles. |
| *MG.I.L.K3* | Event investigation. |
| *MG.I.L.K4* | Human performance and limitations. |
| *MG.I.L.K5* | Physical and social environment. |
| *MG.I.L.K6* | Communication/reporting of hazards. |
| *MG.I.L.K7* | Teamwork and leadership. |
| *MG.I.L.K8* | Professionalism and integrity. |
| *MG.I.L.K9* | Shift and task turnover. |
| *MG.I.L.K10* | Conditions/preconditions for unsafe acts. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MG.I.L.R1* | Failure to report hazards. |
| *MG.I.L.R2* | Fatigue management and fitness for duty. |
| *MG.I.L.R3* | Non-invasive, condition-monitoring technologies. |
| **Skills** | The applicant demonstrates the ability to: |
| *MG.I.L.S1* | File a Malfunction or Defect Report. |
| *MG.I.L.S2* | Brief a shift turnover for continuity of work. |
| *MG.I.L.S3* | Locate information regarding human factors errors. |

## II. Airframe Structures

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| **Subject** | ***A. Metallic Structures*** |
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft metallic structures. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.II.A.K1* | Inspection/testing of metal structures. |
| *MA.II.A.K2* | Types of sheet metal defects. |
| *MA.II.A.K3* | Selection of sheet metal repair materials. |
| *MA.II.A.K4* | Layout and forming of sheet metal components. |
| *MA.II.A.K5* | Selection of rivets and hardware for a sheet metal repair. |
| *MA.II.A.K6* | Heat treatment processes for aluminum. |
| *MA.II.A.K7* | Rivet layout. |
| *MA.II.A.K8* | Rivet installation methods. |
| *MA.II.A.K9* | Maintenance safety practices/precautions for sheet metal repairs or fabrications. |
| *MA.II.A.K10* | Flame welding gasses. |
| *MA.II.A.K11* | Storage/handling of welding gasses. |
| *MA.II.A.K12* | Flame welding practices and techniques. |
| *MA.II.A.K13* | Inert-gas welding practices and techniques. |
| *MA.II.A.K14* | Purpose and types of shielding gasses. |
| *MA.II.A.K15* | Types of steel tubing welding repairs. |
| *MA.II.A.K16* | Procedures for weld repairs. |
| *MA.II.A.K17* | Soldering preparation, types of solder, and/or flux usage. |
| *MA.II.A.K18* | Welding and/or soldering safety practices/precautions. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.II.A.R1* | Improper selection of repair materials. |
| *MA.II.A.R2* | Failure to utilize maintenance safety practices/precautions for sheet metal structures. |
| *MA.II.A.R3* | Inappropriate use of PPE when working with sheet metal structures. |
| *MA.II.A.R4* | Failure to observe safety procedures for handling, storage, and use of compressed gas |
| *MA.II.A.R5* | Failure to observe safety procedures in the use of electric welding equipment. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.II.A.S1* | Install and remove solid rivets. |
| *MA.II.A.S2* | Install and remove a blind rivet. |
| *MA.II.A.S3* | Determine applicability of sheet metal for a repair in a specific application. |
| *MA.II.A.S4* | Select and install special purpose fasteners. |
| *MA.II.A.S5* | Design a repair using a Manufacturer's Structural Repair Manual. |
| *MA.II.A.S6* | Prepare and install a patch to repair an aircraft or component. |
| *MA.II.A.S7* | Make a drawing of a repair including the number of rivets and size of sheet metal required. |
| *MA.II.A.S8* | Remove a repair that was installed with rivets. |
| *MA.II.A.S9* | Trim and form a piece of sheet metal to fit a prepared area. |
| *MA.II.A.S10* | Fabricate an aluminum part in accordance with a drawing. |
| *MA.II.A.S11* | Determine a rivet pattern for a specific repair. |

| Subject | *A. Metallic Structures* |
|---|---|
| *MA.II.A.S12* | Countersink rivet holes in sheet metal. |
| *MA.II.A.S13* | Perform a repair on a damaged aluminum sheet. |
| *MA.II.A.S14* | Determine extent of damage and decide if metallic structure is repairable. |
| *MA.II.A.S15* | Inspect and check welds. |

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|---|---|
| **Subject** | ***B. Non-Metallic Structures*** |
| **References** | FAA-H-8083-31, AC 43-13.1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft non-metallic structures. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.II.B.K1* | Wood structures inspection techniques, tools, and practices for wood structures. |
| *MA.II.B.K2* | Effects of moisture/humidity on wood. |
| *MA.II.B.K3* | Types and/or general characteristics of wood used in aircraft structures. |
| *MA.II.B.K4* | Permissible substitutes and/or other materials used in the construction and repair of wood structures. |
| *MA.II.B.K5* | Acceptable and unacceptable wood defects. |
| *MA.II.B.K6* | Wood repair techniques and practices. |
| *MA.II.B.K7* | Factors used in determining the proper type covering material. |
| *MA.II.B.K8* | Types of approved aircraft covering material. |
| *MA.II.B.K9* | Seams commonly used with aircraft covering. |
| *MA.II.B.K10* | Covering textile terms. |
| *MA.II.B.K11* | Structure surface preparation. |
| *MA.II.B.K12* | Covering methods commonly used. |
| *MA.II.B.K13* | Covering means of attachment. |
| *MA.II.B.K14* | Areas on aircraft covering most susceptible to deterioration. |
| *MA.II.B.K15* | Aircraft covering preservation/restoration. |
| *MA.II.B.K16* | Inspection of aircraft covering. |
| *MA.II.B.K17* | Covering repair techniques and practices. |
| *MA.II.B.K18* | Inspection/testing of composite structures. |
| *MA.II.B.K19* | Types of composite structure defects. |
| *MA.II.B.K20* | Composite structure fiber, core, and/or matrix materials. |
| *MA.II.B.K21* | Composite materials storage practices and shelf life. |
| *MA.II.B.K22* | Composite structure repair methods, techniques, and practices. |
| *MA.II.B.K23* | Thermoplastic material inspection/types of defects. |
| *MA.II.B.K24* | Thermoplastic material storage and handling. |
| *MA.II.B.K25* | Thermoplastic material installation procedures. |
| *MA.II.B.K26* | Care and maintenance of windows. |
| *MA.II.B.K27* | Window temporary and/or permanent repairs. |
| *MA.II.B.K28* | Maintenance safety practices/precautions for composite materials/structures, and/or windows. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.II.B.R1* | Using the wrong type of glue (adhesive) or fasteners for aircraft structure. |
| *MA.II.B.R2* | Improper composite structure repairs. |
| *MA.II.B.R3* | Exposure to materials used in composite repair. |
| *MA.II.B.R4* | Improper storage of composite materials. |
| *MA.II.B.R5* | Incorrect measuring and mixing of materials associated with composite construction. |
| *MA.II.B.R6* | Use of materials that are not part of an approved repair system. |
| *MA.II.B.R7* | Hazards associated with using materials beyond their shelf-life. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.II.B.S1* | Identify appropriate fasteners on composite structures. |

| Subject | ***B. Non-Metallic Structures*** |
|---|---|
| *MA.II.B.S2* | Inspect and repair fiberglass. |
| *MA.II.B.S3* | Inspect composite, plastic, or glass-laminated structures. |
| *MA.II.B.S4* | Clean and inspect acrylic type windshields. |
| *MA.II.B.S5* | Locate and explain procedures for a temporary repair to a side window. |
| *MA.II.B.S6* | Identify window enclosure materials. |
| *MA.II.B.S7* | Prepare composite surface for painting. |
| *MA.II.B.S8* | Perform a tap test on composite material. |
| *MA.II.B.S9* | Locate and explain repair standard dimensions. |
| *MA.II.B.S10* | Locate and explain repair procedures for elongated boltholes. |
| *MA.II.B.S11* | Determine extent of damage and decide if nonmetallic structure is repairable. |
| *MA.II.B.S12* | Perform lay up for a repair to a composite panel, including preparation for vacuum bagging, using a Manufacturer's Repair Manual. |

| Subject | *C. Flight Controls* |
|---|---|
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft assembly and rigging. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.II.C.K1* | Control cables. |
| *MA.II.C.K2* | Control cable maintenance. |
| *MA.II.C.K3* | Cable connectors. |
| *MA.II.C.K4* | Cable guides. |
| *MA.II.C.K5* | Control stops. |
| *MA.II.C.K6* | Push pull tubes. |
| *MA.II.C.K7* | Torque tubes. |
| *MA.II.C.K8* | Bell cranks. |
| *MA.II.C.K9* | Flutter and flight control balance. |
| *MA.II.C.K10* | Rigging of airplane flight controls. |
| *MA.II.C.K11* | Airplane flight controls and/or stabilizer systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.II.C.R1* | Misuse of and incorrect interpretation of a cable tension chart. |
| *MA.II.C.R2* | Improperly rigging aircraft flight controls. |
| *MA.II.C.R3* | Improper selection and misuse of lifting equipment used to move aircraft components into place for assembly. |
| *MA.II.C.R4* | Failure to maintain a calibration schedule for cable tension meters and other rigging equipment. |
| *MA.II.C.R5* | Incorrect use and misinterpretation of cable tensiometers. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.II.C.S1* | Identify fixed-wing aircraft rigging adjustment locations. |
| *MA.II.C.S2* | Identify control surfaces that provide movement about an aircraft's axes. |
| *MA.II.C.S3* | Inspect a primary and secondary flight control surface. |
| *MA.II.C.S4* | Remove and/or reinstall a primary flight control surface. |
| *MA.II.C.S5* | Inspect primary control cables. |
| *MA.II.C.S6* | Adjust and secure a primary flight control cable. |
| *MA.II.C.S7* | Adjust push-pull flight control systems. |
| *MA.II.C.S8* | Check the balance of a flight control surface. |
| *MA.II.C.S9* | Determine allowable axial play limits for a flight control bearing. |
| *MA.II.C.S10* | Inspect a trim tab for freeplay, travel, and operation. |
| *MA.II.C.S11* | Balance a control surface. |

| Subject | ***D. Airframe Inspection*** |
|---|---|
| **References** | FAA-H-8083-31, AC 43-13.1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with airframe inspections. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.II.D.K1* | Inspection requirements under 14 CFR Part 91. |
| *MA.II.D.K2* | Maintenance recordkeeping requirements under 14 CFR Part 43. |
| *MA.II.D.K3* | Requirements for complying with ADs. |
| *MA.II.D.K4* | Compliance with service letters, service bulletins, or instructions for continued airworthiness. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.II.D.R1* | Misinterpretation of inspection instructions, which can lead to over or under maintenance being performed. |
| *MA.II.D.R2* | Limitations of visual inspection and where its use would not be applicable. |
| *MA.II.D.R3* | Failure to observe safety considerations when performing radiographic inspections. |
| *MA.II.D.R4* | Improper selection and misuse of checklists and other maintenance publications. |
| *MA.II.D.R5* | Incorrect maintenance record documentation. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.II.D.S1* | Perform an airframe inspection to include a records check. |
| *MA.II.D.S2* | Perform a portion of a 100-hour inspection in accordance with part 43. |
| *MA.II.D.S3* | Enter results of a 100-hour inspection in a maintenance record. |
| *MA.II.D.S4* | Determine compliance with a specific AD. |
| *MA.II.D.S5* | Provide a checklist for conducting a 100-hour inspection. |
| *MA.II.D.S6* | Determine if any additional inspections are required during a particular 100-hour inspection; i.e., 300-hour filter replacement. |
| *MA.II.D.S7* | *Inspect seat and seatbelt to include TSO markings.* |

## III. Airframe Systems

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| **Subject** | ***A. Landing Gear Systems*** |
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft landing gear. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.A.K1* | Fixed and retractable landing gear systems. |
| *MA.III.A.K2* | Fixed and retractable landing gear components. |
| *MA.III.A.K3* | Landing gear strut servicing/lubrication. |
| *MA.III.A.K4* | Inspection of bungee and spring steel landing gear systems. |
| *MA.III.A.K5* | Steering systems. |
| *MA.III.A.K6* | Landing gear position and warning system inspection, check, and servicing. |
| *MA.III.A.K7* | Brake assembly inspection. |
| *MA.III.A.K8* | Anti-skid system components and operation. |
| *MA.III.A.K9* | Wheel, brake, and tire construction. |
| *MA.III.A.K10* | Tire storage, care, and/or servicing. |
| *MA.III.A.K11* | Landing gear and/or tire and wheel safety. |
| *MA.III.A.K12* | Brake actuating systems. |
| *MA.III.A.K.13* | Alternative landing gear systems (e.g., skis, floats). |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.A.R1* | Failure to observe landing gear and/or tire and wheel safety practices/precautions. |
| *MA.III.A.R2* | Improper use of aircraft jacks. |
| *MA.III.A.R3* | Hazards associated with high pressure fluids and gasses. |
| *MA.III.A.R4* | Hazards associated with the storage and handling of hydraulic fluids. |
| *MA.III.A.R5* | High-pressure strut or system disassembly. |
| *MA.III.A.R6* | Hazards associated with operation of retractable landing gear systems around personnel. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.A.S1* | Inspect and service landing gear. |
| *MA.III.A.S2* | Inspect, check, and service an anti-skid system. |
| *MA.III.A.S3* | Locate and explain procedures for checking operation of an anti-skid warning system. |
| *MA.III.A.S4* | Locate and explain troubleshooting procedures for an anti-skid system. |
| *MA.III.A.S5* | Jack aircraft. |
| *MA.III.A.S6* | Troubleshoot a landing gear retraction check. |
| *MA.III.A.S7* | Inspect wheels, brakes, bearings, and tires. |
| *MA.III.A.S8* | Install brake lining(s) or brake assembly. |
| *MA.III.A.S9* | Service landing gear and/or oil shock strut. |
| *MA.III.A.S10* | Bleed air from a hydraulic brake system. |
| *MA.III.A.S11* | Troubleshoot hydraulic brake systems. |
| *MA.III.A.S12* | Remove, inspect, and/or install a wheel brake assembly. |
| *MA.III.A.S13* | Inspect a tire for defects. |
| *MA.III.A.S14* | Locate tire storage practices. |
| *MA.III.A.S15* | Replace air/oil shock strut air valve. |
| *MA.III.A.S16* | Troubleshoot an air/oil shock strut. |

| Subject | ***A. Landing Gear Systems*** |
|---|---|
| *MA.III.A.S17* | Service a nosewheel shimmy damper. |
| *MA.III.A.S18* | Inspect nosewheel steering system for proper adjustment. |
| *MA.III.A.S19* | Inspect landing gear alignment. |
| *MA.III.A.S20* | Replace master brake cylinder packing seals. |
| *MA.III.A.S21* | Troubleshoot aircraft steering system. |
| *MA.III.A.S22* | Identify landing gear position and warning system components. |
| *MA.III.A.S23* | Troubleshoot landing gear position and/or warning systems. |
| *MA.III.A.S24* | Inspect and/or repair landing gear position indicating system. |
| *MA.III.A.S25* | Adjust the operation of a landing gear warning system. |
| *MA.III.A.S26* | Remove, install, and/or adjust a landing gear down-lock switch. |
| *MA.III.A.S27* | Inspect a brake for serviceability. |
| *MA.III.A.S28* | Troubleshoot nosewheel shimmy. |
| *MA.III.A.S29* | Inspect tube landing gear for damage. |

| Subject | ***B. Hydraulic and Pneumatic Systems*** |
|---|---|
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft hydraulic and pneumatic power systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.B.K1* | Hydraulic system components and fluids. |
| *MA.III.B.K2* | Hydraulic system operation. |
| *MA.III.B.K3* | Hydraulic system servicing requirements. |
| *MA.III.B.K4* | Hydraulic system inspection, check, servicing, and troubleshooting. |
| *MA.III.B.K5* | Pneumatic system types and components. |
| *MA.III.B.K6* | Pneumatic system servicing requirements. |
| *MA.III.B.K7* | Servicing, function, and/or operation of accumulators. |
| *MA.III.B.K8* | Types of hydraulic/pneumatic seals and/or fluid/seal compatibility. |
| *MA.III.B.K9* | Servicing hydraulic and/or pneumatic systems. |
| *MA.III.B.K10* | Pressure regulators and valves. |
| *MA.III.B.K11* | Filter maintenance procedures. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.B.R1* | Incorrectly relieving system pressure prior to system servicing or disassembly. |
| *MA.III.B.R2* | Hazards associated with high pressure gasses and fluids. |
| *MA.III.B.R3* | Hazards associated with the storage and handling of hydraulic fluids. |
| *MA.III.B.R4* | Cross-contamination of hydraulic fluids. |
| *MA.III.B.R5* | Incompatibility between hydraulic seals and hydraulic fluids. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.B.S1* | Identify different types of hydraulic fluids. |
| *MA.III.B.S2* | Identify different packing seals. |
| *MA.III.B.S3* | Install seals and backup rings in a hydraulic component. |
| *MA.III.B.S4* | Remove and install a selector valve. |
| *MA.III.B.S5* | Check a pressure regulator and adjust as necessary. |
| *MA.III.B.S6* | Remove, clean, inspect, and install a hydraulic system filter. |
| *MA.III.B.S7* | Service a hydraulic system accumulator. |
| *MA.III.B.S8* | Service a hydraulic system reservoir. |
| *MA.III.B.S9* | Remove, install, and/or perform an operational check of a hydraulic pump. |
| *MA.III.B.S10* | Troubleshoot hydraulic power system. |
| *MA.III.B.S11* | Purge air from a hydraulic system. |
| *MA.III.B.S12* | Remove and/or install a system pressure relief valve. |
| *MA.III.B.S13* | Inspect a hydraulic power system for leaks. |
| *MA.III.B.S14* | Troubleshoot a pneumatic power system leak. |
| *MA.III.B.S15* | Service pneumatic brake system air bottles. |
| *MA.III.B.S16* | Inspect a pneumatic air bottle for condition and determine service life (hydrostatic testing). |
| *MA.III.B.S17* | Adjust a pneumatic power system relief valve. |
| *MA.III.B.S18* | Locate and explain hydraulic fluid servicing instructions and identify/select fluid for a given aircraft. |
| *MA.III.B.S19* | Locate installation procedures for a seal, backup ring, and/or gasket. |
| *MA.III.B.S20* | Locate procedures for checking pneumatic/bleed air overheat warning systems. |

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| **Subject** | ***C. Environmental Systems*** |
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft cabin atmosphere control. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.C.K1* | Pressurization systems. |
| *MA.III.C.K2* | Bleed air heating. |
| *MA.III.C.K3* | Aircraft instrument cooling. |
| *MA.III.C.K4* | Exhaust heat exchanger and/or system component(s) function, operation, and/or inspection procedures. |
| *MA.III.C.K5* | Combustion heater and/or system component(s) function, operation, and/or inspection procedures. |
| *MA.III.C.K6* | Vapor-cycle system and/or system component(s) operation, servicing, and/or inspection procedures. |
| *MA.III.C.K7* | Air-cycle system and/or system component(s) operation and/or inspection procedures. |
| *MA.III.C.K8* | Cabin pressurization and/or system component(s) operation and/or inspection procedures. |
| *MA.III.C.K9* | Types of oxygen systems and/or oxygen system component(s) operation (e.g., chemical generator, pressure cylinder). |
| *MA.III.C.K10* | Oxygen system maintenance procedures. |
| *MA.III.C.K.11* | Water and waste systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.C.R1* | Hazards associated with oxygen system maintenance. |
| *MA.III.C.R2* | Failure to observe environmental precautions for recovery of vapor-cycle refrigerant. |
| *MA.III.C.R3* | Failure to observe safety precautions when handling, or performing maintenance on, chemical oxygen generating systems. |
| *MA.III.C.R4* | Failure to observe safety precautions associated with the storage, handling, and use of compressed gas cylinder and high-pressure systems. |
| *MA.III.C.R5* | Failure to observe manufacturer's recommended servicing procedures, including refrigerant types. |
| *MA.III.C.R6* | Hazards associated with maintenance of combustion heaters. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.C.S1* | Inspect an oxygen system. |
| *MA.III.C.S2* | Purge an oxygen system prior to servicing. |
| *MA.III.C.S3* | Service an oxygen system. |
| *MA.III.C.S4* | Clean and inspect a pilot emergency oxygen mask and supply hoses. |
| *MA.III.C.S5* | Inspect an oxygen system pressure regulator. |
| *MA.III.C.S6* | Inspect an oxygen system cylinder for serviceability. |
| *MA.III.C.S7* | Inspect a chemical oxygen generator for serviceability and safe handling. |
| *MA.III.C.S8* | Troubleshoot an ignition system for a combustion heater. |
| *MA.III.C.S9* | Locate the procedures for servicing a refrigerant (vapor-cycle) system. |
| *MA.III.C.S10* | Inspect a combustion heater fuel system for leaks. |
| *MA.III.C.S11* | Locate the troubleshooting procedures for an air-cycle system. |
| *MA.III.C.S12* | Locate the servicing procedures and correctly attach service equipment for a vapor-cycle air conditioning system. |
| *MA.III.C.S13* | Inspect a cabin heater system equipped with an exhaust heat exchanger for cracks. |
| *MA.III.C.S14* | Clean and inspect an outflow valve for a pressurization system. |
| *MA.III.C.S15* | Locate troubleshooting procedures for a pressurization system. |
| *MA.III.C.S16* | Troubleshoot an air-cycle air conditioning system. |

| Subject | *D. Aircraft Instrument Systems* |
|---|---|
| References | 14 FR parts 43 and 91, FAA-H-8083-31, AC 43.13-1 |
| Objective | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft instruments. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.D.K1* | Annunciator indicating systems and the meaning of warning, caution, and advisory lights. |
| *MA.III.D.K2* | Magnetic compass operation. |
| *MA.III.D.K3* | Magnetic compass swinging procedures. |
| *MA.III.D.K4* | Pressure indicating instruments. |
| *MA.III.D.K5* | Temperature indicating instruments. |
| *MA.III.D.K6* | Position indication sensors and instruments. |
| *MA.III.D.K7* | Gyroscopic instruments. |
| *MA.III.D.K8* | Direction indicating instruments. |
| *MA.III.D.K9* | Instrument pneumatic systems. |
| *MA.III.D.K10* | Pitot static system. |
| *MA.III.D.K11* | Fuel quantity indicating systems. |
| *MA.III.D.K12* | Instrument range markings. |
| *MA.III.D.K13* | Electronic displays. |
| *MA.III.D.K14* | Electrostatic sensitive devices. |
| *MA.III.D.K15* | Built in test equipment. |
| *MA.III.D.K16* | Electronic flight instrument system. |
| *MA.III.D.K17* | Engine indication and crew alerting system. |
| *MA.III.D.K18* | Heads-up guidance system. |
| *MA.III.D.K19* | 14 CFR parts 43 and/or 91 requirements for static system leak checks. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.D.R1* | Misuse of pressurized air and/or water during maintenance or cleaning of aircraft instrument systems. |
| *MA.III.D.R2* | Inappropriate or no action in response to a reported intermittent warning or caution annunciator light illumination. |
| *MA.III.D.R3* | Failure to observe safety precautions when performing maintenance on equipment identified as electrostatic sensitive. |
| *MA.III.D.R4* | Mishandling of mechanical gyros or instruments containing mechanical gyros. |
| *MA.III.D.R5* | Failure to observe precautions when performing pitot/static systems test to prevent instrument damage. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.D.S1* | Perform a static system leak test. |
| *MA.III.D.S2* | Remove and install an instrument. |
| *MA.III.D.S3* | Install range marks on an instrument glass. |
| *MA.III.D.S4* | Determine barometric pressure using an altimeter. |
| *MA.III.D.S5* | Check for proper range markings on an instrument. |
| *MA.III.D.S6* | Inspect a magnetic compass. |
| *MA.III.D.S7* | Locate the procedures for troubleshooting a vacuum operated instrument system. |
| *MA.III.D.S8* | Select proper altimeter for installation on a given aircraft. |
| *MA.III.D.S9* | Identify exhaust gas temperature system components. |
| *MA.III.D.S10* | Inspect a vacuum system filter for serviceability. |
| *MA.III.D.S11* | Adjust gyro/instrument air pressure/vacuum. |

| Subject | ***D. Aircraft Instrument Systems*** |
|---|---|
| *MA.III.D.S12* | Inspect an aircraft's alternate air (static) source. |
| *MA.III.D.S13* | Locate the adjustment procedures for a stall warning system. |
| *MA.III.D.S14* | Inspect outside air temperature gauge for condition and operation. |

| Subject | ***E. Communication and Navigation Systems*** |
|---|---|
| **References** | 14 CFR part 91, FAA-H-8083-31, AC 43.13-1, AC 43.13-2 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft communication and navigation systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.E.K1* | Radio operating principles. |
| *MA.III.E.K2* | Radio components. |
| *MA.III.E.K3* | Antenna identification and inspection and mounting requirements. |
| *MA.III.E.K4* | Interphone and intercom systems. |
| *MA.III.E.K5* | Very High Frequency (VHF), High Frequency (HF), and SATCOM systems. |
| *MA.III.E.K6* | Aircraft Communication Addressing and Reporting System (ACARS) theory, components, and operation. |
| *MA.III.E.K7* | Emergency Locator Transmitter (ELT). |
| *MA.III.E.K8* | Automatic Direction Finder (ADF). |
| *MA.III.E.K9* | VHF omnidirectional radio range (VOR) theory, components, and operation. |
| *MA.III.E.K10* | Distance Measuring Equipment (DME) theory, components, and operation. |
| *MA.III.E.K11* | Instrument Landing System (ILS) theory, components, and operation. |
| *MA.III.E.K12* | Global Positioning System (GPS) theory, components, and operation. |
| *MA.III.E.K13* | Traffic Collision Avoidance System (TCAS), theory, components, and operation. |
| *MA.III.E.K14* | Weather radar. |
| *MA.III.E.K15* | Ground Proximity Warning Systems (GPWS) theory, components, and operation. |
| *MA.III.E.K16* | Auto-pilot theory, components, and operation. |
| *MA.III.E.17* | Auto-throttle theory, components, and operation. |
| *MA.III.E.K18* | Stability augmentation. |
| *MA.III.E.K19* | Antennas and antenna inspection requirements. |
| *MA.III.E.K20* | Automatic Dependent Surveillance Broadcast (ADS-B) theory, components, and operation. |
| *MA.III.E.K21* | Radio Altimeter (RA) theory, components, and operation. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.E.R1* | Failure to use caution when testing ELT systems. |
| *MA.III.E.R2* | Failure to use precautions when performing maintenance on high power/high frequency systems (e.g., weather radar and SATCOM). |
| *MA.III.E.R3* | Improper wire harness routing and interference consequences. |
| *MA.III.E.R4* | Failure to consider safety and interference when mounting antennas. |
| *MA.III.E.R5* | Hazards associated with electro-static discharge. |
| *MA.III.E.R6* | Hazards associated with working around live electrical systems. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.E.S1* | Locate and explain return-to-service instructions for an autopilot system. |
| *MA.III.E.S2* | Locate and explain autopilot inspection procedures. |
| *MA.III.E.S3* | List autopilot major components. |
| *MA.III.E.S4* | Locate and identify navigation and/or communication antennas. |
| *MA.III.E.S5* | Check VHF communications for operation. |
| *MA.III.E.S6* | Inspect a coaxial cable installation for security. |
| *MA.III.E.S7* | Check an emergency locator transmitter for operation. |
| *MA.III.E.S8* | Inspect ELT batteries for expiration date and locate proper testing procedures. |

| Subject | *E. Communication and Navigation Systems* |
|---|---|
| *MA.III.E.S9* | Inspect electronic equipment mounting base for security and condition. |
| *MA.III.E.S10* | Inspect electronic equipment shock mount bonding jumpers for resistance. |
| *MA.III.E.S11* | Inspect static discharge wicks for security and/or resistance. |
| *MA.III.E.S12* | Inspect a radio installation for security. |
| *MA.III.E.S13* | Locate and explain the installation procedures for antennas including mounting and coaxial connections. |
| *MA.III.E.S14* | Make a list of required placards for communication and navigation avionic equipment. |
| *MA.III.E.S15* | Locate and explain the adjustment procedures for a stall warning system. |

| Subject | ***F. Aircraft Fuel Systems*** |
|---|---|
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft fuel. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.F.K1* | Fuel system types. |
| *MA.III.F.K2* | Fuel system components including filters and selector valves. |
| *MA.III.F.K3* | Aircraft fuel tanks/cells |
| *MA.III.F.K4* | Fuel flow. |
| *MA.III.F.K5* | Fuel transfer and defueling. |
| *MA.III.F.K6* | Fuel jettisoning/dump systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.F.R1* | Hazards associated with fuel system maintenance. |
| *MA.III.F.R2* | Fuel system contamination. |
| *MA.III.F.R3* | Hazards associated with fuel spills. |
| *MA.III.F.R4* | Hazards associated with performing fuel system maintenance requiring fuel tank entry. |
| *MA.III.F.R5* | Failure to observe proper safety procedures when defueling aircraft. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.F.S1* | Inspect, check, troubleshoot, or repair a fuel system. |
| *MA.III.F.S2* | Inspect a metal fuel tank. |
| *MA.III.F.S3* | Inspect a bladder fuel tank. |
| *MA.III.F.S4* | Inspect an integral fuel tank. |
| *MA.III.F.S5* | Check manually operated fuel valves for proper operation and/or leaks. |
| *MA.III.F.S6* | Troubleshoot a fuel valve problem. |
| *MA.III.F.S7* | Drain fuel system sump(s). |
| *MA.III.F.S8* | Service a fuel system strainer. |
| *MA.III.F.S9* | Inspect a fuel quantity indicating system. |
| *MA.III.F.S10* | Locate fuel system operating instructions. |
| *MA.III.F.S11* | Locate fuel system inspection procedures. |
| *MA.III.F.S12* | Locate fuel system crossfeed procedures. |
| *MA.III.F.S13* | Locate fuel system required placards. |
| *MA.III.F.S14* | Locate fuel system defueling procedures. |
| *MA.III.F.S15* | Troubleshoot fuel pressure warning system. |
| *MA.III.F.S16* | Locate troubleshooting procedures for fuel temperature systems. |
| *MA.III.F.S17* | Remove and/or install a fuel quantity transmitter. |
| *MA.III.F.S18* | Troubleshoot fuel quantity indicating system. |
| *MA.III.F.S19* | Troubleshoot aircraft fuel systems. |
| *MA.III.F.S21* | Inspect a fuel selector valve. |

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| **Subject** | ***G. Aircraft Electrical Systems*** |
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft electrical systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.G.K1* | Generators, DC generation systems, and DC power distribution systems. |
| *MA.III.G.K2* | Alternators, AC generation systems, and AC power distribution systems. |
| *MA.III.G.K3* | Starter generators. |
| *MA.III.G.K4* | Constant Speed Drive (CSD) and Integrated Drive Generator (IDG) systems and components. |
| *MA.III.G.K5* | Voltage regulators and overvolt and overcurrent protection. |
| *MA.III.G.K6* | Inverter systems. |
| *MA.III.G.K7* | Aircraft wiring sizes, types, and selection. |
| *MA.III.G.K8* | Derating factors in switch selection. |
| *MA.III.G.K9* | Aircraft wiring shielding. |
| *MA.III.G.K10* | Aircraft lightning protection. |
| *MA.III.G.K11* | Aircraft bonding. |
| *MA.III.G.K12* | Aircraft lighting systems. |
| *MA.III.G.K13* | Electrical system troubleshooting. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.G.R1* | Failure to use caution when testing/troubleshooting electrical systems or components. |
| *MA.III.G.R2* | Hazards associated with connecting or disconnecting external power. |
| *MA.III.G.R3* | Hazards associated with performing maintenance on energized circuits/systems. |
| *MA.III.G.R4* | Failure to use caution when performing maintenance in areas containing aircraft wiring. |
| *MA.III.G.R5* | Improperly routing and securing wires and wire bundles. |
| *MA.III.G.R6* | Failure to use the correct size wire in an electrical circuit. |
| *MA.III.G.R7* | Hazards created by incorrect selection or installation of wire terminals. |
| *MA.III.G.R8* | Hazards associated with soldering. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.G.S1* | Inspect aircraft wiring to verify installation and routing. |
| *MA.III.G.S2* | Perform wire terminating and splicing. |
| *MA.III.G.S3* | Assemble an aircraft electrical connector. |
| *MA.III.G.S4* | Use a wiring circuit diagram to identify components. |
| *MA.III.G.S5* | Solder aircraft wiring. |
| *MA.III.G.S6* | Troubleshoot an airframe electrical circuit. |
| *MA.III.G.S7* | Install airframe electrical wiring, switches, or protective devices. |
| *MA.III.G.S8* | Secure wire bundles. |
| *MA.III.G.S9* | Determine an electrical load in a given aircraft system. |
| *MA.III.G.S10* | Install bonding jumpers. |
| *MA.III.G.S11* | Check output voltage of a DC generator. |
| *MA.III.G.S12* | Check the resistance of an electrical system component. |
| *MA.III.G.S13* | Inspect generator brush serviceability and brush spring tension. |
| *MA.III.G.S14* | Inspect and check anti-collision, position, and/or landing lights for proper operation. |
| *MA.III.G.S15* | Inspect components in an electrical system. |
| *MA.III.G.S16* | Troubleshoot a DC electrical system supplied by an AC electrical system. |

| Subject | ***G. Aircraft Electrical Systems*** |
|---|---|
| *MA.III.G.S17* | Identify components in an electrical schematic where AC is rectified to a DC voltage. |
| *MA.III.G.S18* | Perform a continuity test to verify the condition of a conductor. |
| *MA.III.G.S19* | Perform a test on a conductor for a short to ground. |
| *MA.III.G.S20* | Perform a test on a conductor for a short to other conductors. |
| *MA.III.G.S21* | Troubleshoot an electric fault. |

| Subject | ***H. Ice and Rain Control Systems*** |
|---|---|
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft ice and rain control systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.H.K1* | Aircraft icing causes/effects. |
| *MA.III.H.K2* | Ice detection systems. |
| *MA.III.H.K3* | Anti-ice systems and components. |
| *MA.III.H.K4* | De-ice systems and components. |
| *MA.III.H.K5* | Wiper blade, chemical, and pneumatic bleed air rain control systems. |
| *MA.III.H.K6* | Anti-icing and de-icing system maintenance. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.H.R1* | Hazards associated with system testing or maintenance. |
| *MA.III.H.R2* | Improper storage and handling of deicing fluids. |
| *MA.III.H.R3* | Improper selection and/or misuse of appropriate cleaning materials for heated windshields. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.H.S1* | Inspect and operationally check pitot-static anti-ice system. |
| *MA.III.H.S2* | Inspect and/or operationally check deicer boot. |
| *MA.III.H.S3* | Clean a pneumatic deicer boot. |
| *MA.III.H.S4* | Troubleshoot an electrically-heated pitot system. |
| *MA.III.H.S5* | Inspect thermal anti-ice systems. |
| *MA.III.H.S6* | Inspect and operationally check an electrically-heated windshield. |
| *MA.III.H.S7* | Inspect an electrically-operated windshield wiper system. |
| *MA.III.H.S8* | Replace blades on a windshield wiper system. |
| *MA.III.H.S9* | Inspect a pneumatic rain removal system. |
| *MA.III.H.S10* | Inspect a chemical rain repellent system. |
| *MA.III.H.S11* | Locate procedures for application of chemical rain protection of a windscreen. |

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| **Subject** | ***I. Airframe Fire Protection Systems*** |
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft overheat and fire detection, protection, and suppression systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.I.K1* | Types of fires and aircraft fire zones. |
| *MA.III.I.K2* | Overheat and fire detection and warning systems. |
| *MA.III.I.K3* | Overheat and fire detection system maintenance and inspection. |
| *MA.III.I.K4* | Smoke and carbon monoxide detection systems. |
| *MA.III.I.K5* | Fire extinguishing agents. |
| *MA.III.I.K6* | Types of fire extinguishing systems. |
| *MA.III.I.K7* | Fire extinguishing system maintenance and inspection requirements. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.I.R1* | Failure to use precautions when performing maintenance on circuits associated with fire bottle squibs. |
| *MA.III.I.R2* | Inappropriate use of PPEs when working on or testing fire extinguishing systems. |
| *MA.III.I.R3* | Hazards associated with fire extinguishing agents. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.I.S1* | Troubleshoot an aircraft fire detection or extinguishing system. |
| *MA.III.I.S2* | Determine proper container pressure for an installed fire extinguisher system. |
| *MA.III.I.S3* | Identify maintenance procedures for fire detection and/or extinguishing system(s) and/or system component(s). |
| *MA.III.I.S4* | Inspect a smoke and/or toxic gas detection system. |
| *MA.III.I.S5* | Inspect a carbon monoxide detector. |
| *MA.III.I.S6* | Locate the procedures for checking a smoke detection system. |
| *MA.III.I.S7* | Locate the procedures for inspecting an overheat detection system. |
| *MA.III.I.S8* | Inspect fire protection system cylinders and check for hydrostatic test date. |
| *MA.III.I.S9* | Inspect fire detection/protection system. |
| *MA.III.I.S10* | Perform operational check of an optical flame detector. |
| *MA.III.I.S11* | Inspect fire extinguishing agent bottle discharge cartridge. |
| *MA.III.I.S12* | Inspect a continuous-loop type fire detection system. |

| Subject | ***J. Rotorcraft Fundamentals*** |
|---|---|
| **References** | FAA-H-8083-31, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with rotorcraft systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MA.III.J.K1* | Rotorcraft aerodynamics. |
| *MA.III.J.K2* | Flight controls. |
| *MA.III.J.K3* | Transmissions. |
| *MA.III.J.K4* | Rigging requirements for rotary wing aircraft. |
| *MA.III.J.K5* | Design, type, and operation of rotor systems. |
| *MA.III.J.K6* | Helicopter skid shoe and tube inspection. |
| *MA.III.J.K7* | Rotor blade functions and construction. |
| *MA.III.J.K8* | Rotor vibrations, track, and balance. |
| *MA.III.J.K9* | Drive system vibrations and inspection. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MA.III.J.R1* | Dangers of working around helicopter blades during ground operations. |
| *MA.III.J.R2* | Hazards associated with ground-handling procedures. |
| *MA.III.J.R3* | Improper procedures during ground operations and functional tests. |
| *MA.III.J.R4* | Improper maintenance and inspection of rotorcraft systems and components. |
| **Skills** | The applicant demonstrates the ability to: |
| *MA.III.J.S1* | Locate components of a helicopter rotor system. |
| *MA.III.J.S2* | Locate helicopter rotor blade track and balance procedures. |
| *MA.II.J.S3* | Locate and explain procedures needed to rig helicopter controls. |
| *MA.II.J.S4* | Locate and explain procedures to track and balance a rotor system. |

## IV. Powerplant Theory and Maintenance

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|---|---|
| **Subject** | ***A. Reciprocating Engines*** |
| **References** | 14 CFR part 43, FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft reciprocating engines. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.IV.A.K1* | Types of reciprocating engines. |
| *MP.IV.A.K2* | Reciprocating engine operating principles/theory of operation. |
| *MP.IV.A.K3* | Internal combustion engine operating principles/theory of operation. |
| *MP.IV.A.K4* | Horizontally-opposed engine construction and internal components. |
| *MP.IV.A.K5* | Radial engine construction and internal components. |
| *MP.IV.A.K6* | Storage and preservation. |
| *MP.IV.A.K7* | Reciprocating engine performance (e.g., PLANK, SFC). |
| *MP.IV.A.K8* | Reciprocating engine maintenance and inspection. |
| *MP.IV.A.K9* | Reciprocating engine ground operations. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.IV.A.R1* | Hazards associated with performing maintenance, which requires moving the propeller. |
| *MP.IV.A.R2* | Failure to observe safety considerations in preparation and ground operation of a reciprocating engine. |
| *MP.IV.A.R3* | Failure to take appropriate actions in the event of a reciprocating engine fire. |
| *MP.IV.A.R4* | Failure to observe manufacturer's procedures during maintenance. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.IV.A.S1* | Perform a cylinder assembly inspection. |
| *MP.IV.A.S2* | Operate and troubleshoot reciprocating engine. |
| *MP.IV.A.S3* | Install piston and/or knuckle pin(s). |
| *MP.IV.A.S4* | Identify the parts of a cylinder. |
| *MP.IV.A.S5* | Identify the parts of a crankshaft. |
| *MP.IV.A.S6* | Identify and inspect various types of bearings. |
| *MP.IV.A.S7* | Inspect and/or rig cable and push-pull engine controls. |
| *MP.IV.A.S8* | Inspect engine mounts. |
| *MP.IV.A.S9* | Demonstrate engine starting procedures. |
| *MP.IV.A.S10* | Locate top dead-center position of number one cylinder. |
| *MP.IV.A.S11* | Perform cylinder compression test. |

| Subject | ***B. Turbine Engines*** |
|---|---|
| **References** | 14 CFR part 43, FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft turbine engines. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.IV.B.K1* | Turbine engine operating principles/theory of operation. |
| *MP.IV.B.K2* | Types of turbine engines. |
| *MP.IV.B.K3* | Turbine engine construction and internal components. |
| *MP.IV.B.K4* | Turbine engine performance and monitoring. |
| *MP.IV.B.K5* | Turbine engine troubleshooting procedures. |
| *MP.IV.B.K6* | Procedures required after the installation of a turbine engine. |
| *MP.IV.B.K7* | Causes for turbine engine performance loss. |
| *MP.IV.B.K8* | Bleed air systems. |
| *MP.IV.B.K9* | Storage and preservation. |
| *MP.IV.B.K10* | Auxiliary power unit(s). |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.IV.B.R1* | Hazards associated with operation of a turbine engine. |
| *MP.IV.B.R2* | Failure to use precautions when performing maintenance on a turbine engine. |
| *MP.IV.B.R3* | Failure to take appropriate actions in the event of a turbine engine fire. |
| *MP.IV.B.R4* | Failure to use precautions to prevent foreign object damage. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.IV.B.S1* | Identify different turbine compressors. |
| *MP.IV.B.S2* | Identify different types of turbine engine blades. |
| *MP.IV.B.S3* | Identify components of turbine engines. |
| *MP.IV.B.S4* | Map airflow direction and pressure changes in turbine engines. |
| *MP.IV.B.S5* | Remove and install a fuel nozzle in a turbine engine. |
| *MP.IV.B.S6* | Inspect a combustion liner. |
| *MP.IV.B.S7* | Locate the procedures for the adjustment of a fuel control unit. |
| *MP.IV.B.S8* | Perform turbine engine inlet guide vane and compressor blade inspection. |
| *MP.IV.B.S9* | Locate the installation or removal procedures for a turbine engine. |
| *MP.IV.B.S10* | Locate the procedures for trimming a turbine engine. |
| *MP.IV.B.S11* | Identify damaged turbine engine blades. |
| *MP.IV.B.S12* | Identify causes for turbine engine performance loss. |
| *MP.IV.B.S13* | Inspect the first two stages of a turbine fan or compressor for foreign object damage. |

| Subject | *C. Engine Inspection* |
|---|---|
| References | 14 CFR part 43, FAA-H-8083-32, AC 43.13-1 |
| Objective | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine inspections. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.IV.C.K1* | Inspection requirements under 14 CFR Part 91. |
| *MP.IV.C.K2* | Identification of life limited parts and their replacement interval. |
| *MP.IV.C.K3* | Special inspections. |
| *MP.IV.C.K4* | Use of FAA-approved data. |
| *MP.IV.C.K5* | Compliance with service letters, service bulletins, or instructions for continued airworthiness, or Airworthiness Directives. |
| *MP.IV.C.K6* | Maintenance recordkeeping requirements under 14 CFR Part 43. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.IV.C.R1* | Failure to observe safety precautions when performing a compression test on a reciprocating engine. |
| *MP.IV.C.R2* | Hazards associated with performing maintenance on an operating reciprocating engine. |
| *MP.IV.C.R3* | Hazards associated with performing maintenance on an operating turbine engine. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.IV.C.S1* | Perform a compression check on a cylinder. |
| *MP.IV.C.S2* | Evaluate powerplant for compliance with FAA-approved data. |
| *MP.IV.C.S3* | Perform a powerplant records inspection. |
| *MP.IV.C.S4* | Inspect for compliance with applicable ADs. |
| *MP.IV.C.S5* | Determine engine installation eligibility. |
| *MP.IV.C.S6* | Determine compliance with engine specifications or TCDS or engine listings. |
| *MP.IV.C.S7* | Perform a portion of a required inspection on an engine. |
| *MP.IV.C.S8* | Check engine controls for proper operation and adjustment. |
| *MP.IV.C.S9* | Inspect an engine for leaks after performing maintenance. |
| *MP.IV.C.S10* | Inspect an aircraft engine accessory for serviceability. |
| *MP.IV.C.S11* | Inspect engine records for time or cycles on life-limited parts. |
| *MP.IV.C.S.12* | Perform a 100-hour inspection on a propeller. |
| *MP.IV.C.S.13* | Perform a portion of a 100-hour inspection on an engine in accordance with Part 43. |

## V. Powerplant Systems and Components

| **Subject** | ***A. Engine Instrument Systems*** |
|---|---|
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine instruments. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.A.K1* | Fuel flow. |
| *MP.V.A.K2* | Temperature (e.g. exhaust gas, oil, oil cylinder head, turbine inlet). |
| *MP.V.A.K3* | Speed indicating systems. |
| *MP.V.A.K4* | Pressure (e.g., air, fuel, manifold, oil). |
| *MP.V.A.K5* | Position indicating. |
| *MP.V.A.K6* | Torque meters. |
| *MP.V.A.K7* | Engine pressure ratio (EPR). |
| *MP.V.A.K8* | Engine indicating and crew alerting. |
| *MP.V.A.K9* | Digital engine control module (e.g., Full Authority Digital Engine Controls (FADEC)). |
| *MP.V.A.K10* | Electronic centralized aircraft monitoring. |
| *MP.V.A.K11* | Engine instrument range markings. |
| *MP.V.A.K12* | Annunciator indicating systems (e.g., warning, caution, and advisory lights). |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.A.R1* | Failure to avoid damage to the instrument or indicating system. |
| *MP.V.A.R2* | Improperly-calibrated or erroneous engine instruments. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.A.S1* | Troubleshoot an engine oil temperature instrument system. |
| *MP.V.A.S2* | Troubleshoot a low fuel pressure indicating system. |
| *MP.V.A.S3* | Remove, inspect, and/or install a fuel-flow transmitter. |
| *MP.V.A.S4* | Remove, inspect, and/or install fuel flow gauge. |
| *MP.V.A.S5* | Identify components of an electric tachometer system. |
| *MP.V.A.S6* | Check fuel flow transmitter power supply. |
| *MP.V.A.S7* | Inspect tachometer markings for accuracy. |
| *MP.V.A.S8* | Perform resistance measurements of thermocouple indication system. |
| *MP.V.A.S9* | Remove, inspect, and/or install turbine engine Exhaust Gas Temperature (EGT) component. |
| *MP.V.A.S10* | Locate procedures for troubleshooting a turbine EPR system. |
| *MP.V.A.S11* | Troubleshoot a tachometer system. |
| *MP.V.A.S12* | Replace a cylinder head temperature thermocouple. |
| *MP.V.A.S13* | Inspect EGT probes. |
| *MP.V.A.S14* | Locate and inspect engine low fuel pressure warning system components. |
| *MP.V.A.S15* | Check aircraft engine manifold pressure gauge for proper operation. |
| *MP.V.A.S16* | Inspect a manifold pressure system. |
| *MP.V.A.S17* | Repair a low oil pressure warning system. |
| *MP.V.A.S18* | Troubleshoot an EGT indicating system. |
| *MP.V.A.S19* | Inspect an oil temperature probe. |

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| **Subject** | ***B. Engine Fire Protection Systems*** |
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine fire detection and protection systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.B.K1* | Types of fires and engine fire zones. |
| *MP.V.B.K2* | Fire detection warning system operation. |
| *MP.V.B.K3* | Fire detection system maintenance and inspection requirements. |
| *MP.V.B.K4* | Fire extinguishing agents, types of systems, and operation. |
| *MP.V.B.K5* | Fire extinguishing system maintenance and inspection. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.B.R1* | Failure to observe safety considerations when working with container discharge cartridges. |
| *MP.V.B.R2* | Hazards associated with extinguishing agents. |
| *MP.V.B.R3* | Failure to observe precautions when performing maintenance on circuits associated with electrically-activated container discharge cartridges (squibs). |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.B.S1* | Troubleshoot and repair an engine fire detection system. |
| *MP.V.B.S2* | Identify fire detection sensing units. |
| *MP.V.B.S3* | Inspect fire detection continuous loop system. |
| *MP.V.B.S4* | Inspect fire detection thermal switch or thermocouple system. |
| *MP.V.B.S5* | Locate troubleshooting procedures for a fire detection system. |
| *MP.V.B.S6* | Inspect engine fire extinguisher system blowout plugs. |
| *MP.V.B.S7* | Inspect a turbine engine fire extinguisher container. |
| *MP.V.B.S8* | Inspect fire extinguisher discharge circuit. |
| *MP.V.B.S9* | Troubleshoot and repair a fire extinguishing system. |
| *MP.V.B.S10* | Inspect a fire extinguisher container discharge cartridge (squib). |
| *MP.V.B.S11* | Inspect fire extinguisher container and determine hydrostatic test requirements. |
| *MP.V.B.S12* | Inspect flame detectors for operation. |
| *MP.V.B.S13* | Check operation of fire warning press-to-test and troubleshoot faults. |
| *MP.V.B.S14* | Identify continuous-loop fire detection system components. |

| Subject | ***C. Engine Electrical Systems*** |
|---|---|
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine electrical systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.C.K1* | Generators. |
| *MP.V.C.K2* | Alternators. |
| *MP.V.C.K3* | Starter generators. |
| *MP.V.C.K4* | Voltage regulators and overvoltage and overcurrent protection. |
| *MP.V.C.K5* | DC generation systems. |
| *MP.V.C.K6* | AC generation systems. |
| *MP.V.C.K7* | The procedure for locating the correct electrical cable/wire size needed to fabricate a cable/wire. |
| *MP.V.C.K8* | The purpose and procedure for paralleling a dual-generator electrical system. |
| *MP.V.C.K9* | CSD and IDG systems and components. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.C.R1* | Failure to observe proper polarity when performing electrical system maintenance. |
| *MP.V.C.R2* | Inappropriate actions in response to a warning or caution annunciator light. |
| *MP.V.C.R3* | Failure to observe safety precautions when performing maintenance on energized aircraft circuits/systems. |
| *MP.V.C.R4* | Failure to observe safety concerns with routing and security of wiring near flammable fluid lines. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.C.S1* | Inspect engine electrical wiring, switches, and protective devices. |
| *MP.V.C.S2* | Determine suitability of a replacement component by part number. |
| *MP.V.C.S3* | Replace an engine-driven generator or alternator. |
| *MP.V.C.S4* | Inspect an engine-driven generator or alternator in accordance with manufacturer's instructions. |
| *MP.V.C.S5* | Troubleshoot an aircraft electrical generating system. |
| *MP.V.C.S6* | Remove and/or install an engine direct-drive electric starter. |
| *MP.V.C.S7* | Troubleshoot a direct-drive electric starter system. |
| *MP.V.C.S8* | Inspect an electrical system cable. |
| *MP.V.C.S9* | Determine wire size for engine electrical system. |
| *MP.V.C.S10* | Repair a broken engine electrical system wire. |
| *MP.V.C.S11* | Replace a wire bundle lacing. |
| *MP.V.C.S12* | Troubleshoot an electrical system using a schematic or wiring diagram. |
| *MP.V.C.S13* | Fabricate a bonding jumper. |
| *MP.V.C.S14* | Inspect a turbine engine starter generator. |
| *MP.V.C.S15* | Inspect engine electrical connectors. |

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| **Subject** | ***D. Lubrication Systems*** |
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft lubrication systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.D.K1* | Types, grades, and uses of engine oil. |
| *MP.V.D.K2* | Lubrication system operation and components. |
| *MP.V.D.K3* | Wet-sump system. |
| *MP.V.D.K4* | Dry-sump system. |
| *MP.V.D.K5* | Chip detectors. |
| *MP.V.D.K6* | Servicing of engine lubricating systems. |
| *MP.V.D.K7* | Excessive aircraft engine oil consumption. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.D.R1* | Improper use or mixing of engine oils. |
| *MP.V.D.R2* | Failure to follow manufacturer's recommendations regarding the use of engine lubricants. |
| *MP.V.D.R3* | Improper handling, storage, and disposal of used lubricating oil. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.D.S1* | Inspect an oil cooler. |
| *MP.V.D.S2* | Determine the correct type of oil for a specific engine. |
| *MP.V.D.S3* | Identify turbine engine oil filter bypass indicator. |
| *MP.V.D.S4* | Determine approved oils for different climatic temperatures. |
| *MP.V.D.S5* | Locate procedures for obtaining oil samples. |
| *MP.V.D.S6* | Inspect an oil filter or screen. |
| *MP.V.D.S7* | Perform oil pressure adjustment. |
| *MP.V.D.S8* | Identify oil system components. |
| *MP.V.D.S9* | Replace an oil system component. |
| *MP.V.D.S10* | Identify oil system flow. |
| *MP.V.D.S11* | Troubleshoot an engine oil pressure malfunction. |
| *MP.V.D.S12* | Troubleshoot an engine oil temperature system. |
| *MP.V.D.S13* | Identify types of metal found in an oil filter. |
| *MP.V.D.S14* | Remove and inspect an engine chip detector. |

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| **Subject** | ***E. Ignition and Starting Systems*** |
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft ignition and starting systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.E.K1* | Ignition system theory. |
| *MP.V.E.K2* | Spark plug theory. |
| *MP.V.E.K3* | Shower of sparks and impulse coupling. |
| *MP.V.E.K4* | Three electrical circuits of a magneto system. |
| *MP.V.E.K5* | Solid-state ignition systems. |
| *MP.V.E.K6* | Digital engine control module (e.g., FADEC). |
| *MP.V.E.K7* | Engine starters. |
| *MP.V.E.K8* | Magneto system components and operation. |
| *MP.V.E.K9* | Turbine engine ignition systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.E.R1* | Hazards associated with advanced and retarded ignition timing (piston engine). |
| *MP.V.E.R2* | Failure to observe precautions when performing maintenance on engines with capacitor discharge ignition systems. |
| *MP.V.E.R3* | Failure to observe safety precautions when working around reciprocating engines with an ungrounded magneto. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.E.S1* | Set magneto internal timing. |
| *MP.V.E.S2* | Time magneto to engine. |
| *MP.V.E.S3* | Remove, clean, and install spark plug. |
| *MP.V.E.S4* | Troubleshoot and repair an ignition system. |
| *MP.V.E.S5* | Inspect an electrical starting system. |
| *MP.V.E.S6* | Inspect magneto breaker points. |
| *MP.V.E.S7* | Inspect an ignition harness. |
| *MP.V.E.S8* | Inspect a magneto impulse coupling. |
| *MP.V.E.S9* | Troubleshoot an electrical starting system. |
| *MP.V.E.S10* | Troubleshoot ignition switch circuit. |
| *MP.V.E.S11* | Inspect and check gap of spark plugs. |
| *MP.V.E.S12* | Identify the correct spark plugs used for replacement installation. |
| *MP.V.E.S13* | Troubleshoot a turbine or reciprocating engine ignition system. |
| *MP.V.E.S14* | Identify the correct igniter plug and replace turbine engine igniter plugs. |
| *MP.V.E.S15* | Troubleshoot turbine engine igniters. |
| *MP.V.E.S16* | Inspect turbine engine ignition system. |
| *MP.V.E.S17* | Inspect igniters. |

| Subject | ***F. Fuel Metering Systems*** |
|---|---|
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft fuel metering systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.F.K1* | Fuel/air ratio and fuel metering. |
| *MP.V.F.K2* | Float carburetor theory, components, operation, and adjustments. |
| *MP.V.F.K3* | Pressure carburetor theory, operation, and adjustments. |
| *MP.V.F.K4* | Continuous flow fuel injection theory, components, operation, troubleshooting and adjustment. |
| *MP.V.F.K5* | Digital engine control module (e.g., FADEC). |
| *MP.V.F.K6* | Hydromechanical fuel control system design and components. |
| *MP.V.F.K7* | Fuel nozzles and manifolds design, operation, and maintenance. |
| *MP.V.F.K8* | Components of a turbine engine fuel metering system. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.F.R1* | Failure to consider safety precautions when adjusting a turbine engine fuel control. |
| *MP.V.F.R2* | Failure to consider safety precautions when adjusting reciprocating engine fuel control systems. |
| *MP.V.F.R4* | Improper handling of fuel metering system components that may contain fuel. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.F.S1* | Inspect, troubleshoot, and/or repair a continuous flow fuel injection system. |
| *MP.V.F.S2* | Remove, inspect, and install a turbine engine fuel nozzle. |
| *MP.V.F.S3* | Identify carburetor components. |
| *MP.V.F.S4* | Identify fuel and air flow through a float-type carburetor. |
| *MP.V.F.S5* | Remove and/or install a carburetor main metering jet. |
| *MP.V.F.S6* | Inspect a carburetor fuel inlet screen. |
| *MP.V.F.S7* | Adjust a continuous flow fuel injection system. |
| *MP.V.F.S8* | Inspect the needle, seat, and float level on a float-type carburetor. |
| *MP.V.F.S9* | Remove and/or install a float-type carburetor. |
| *MP.V.F.S10* | Adjust carburetor idle speed and/or mixture. |
| *MP.V.F.S11* | Locate procedures for a turbine engine Revolutions Per Minute (RPM) overspeed inspection. |
| *MP.V.F.S12* | Inspect fuel metering cockpit controls for proper adjustment. |
| *MP.V.F.S13* | Locate procedures for adjusting a hydromechanical fuel control unit. |
| *MP.V.F.S14* | Remove and/or install a turbine engine fuel control unit. |

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| **Subject** | ***G. Engine Fuel Systems*** |
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine fuel systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.G.K1* | Inspection requirements for an engine fuel system. |
| *MP.V.G.K2* | Fuel system operation. |
| *MP.V.G.K3* | Fuel heaters. |
| *MP.V.G.K4* | Fuel lines. |
| *MP.V.G.K5* | Fuel pumps. |
| *MP.V.G.K6* | Fuel valves. |
| *MP.V.G.K7* | Fuel filters. |
| *MP.V.G.K8* | Engine fuel drains. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.G.R1* | Failure to observe safety considerations during fuel system maintenance. |
| *MP.V.G.R2* | Improper handling of engine fuel control units that may contain fuel. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.G.S1* | Identify components of an engine fuel system. |
| *MP.V.G.S2* | Remove and/or install an engine-driven fuel pump. |
| *MP.V.G.S3* | Inspect a remotely operated fuel valve for proper operation. |
| *MP.V.G.S4* | Rig a remotely operated fuel valve. |
| *MP.V.G.S5* | Inspect a main fuel filter assembly for leaks. |
| *MP.V.G.S6* | Inspect fuel boost pump. |
| *MP.V.G.S7* | Locate and identify a turbine engine fuel heater. |
| *MP.V.G.S8* | Inspect fuel pressure warning light function. |
| *MP.V.G.S9* | Adjust fuel pump fuel pressure. |
| *MP.V.G.S10* | Inspect engine fuel system fluid lines and/or components. |
| *MP.V.G.S11* | Troubleshoot abnormal fuel pressure. |
| *MP.V.G.S12* | Locate the procedures for troubleshooting a turbine engine fuel heater system. |
| *MP.V.G.S13* | Remove, clean, and/or replace an engine fuel filter. |
| *MP.V.G.S14* | Troubleshoot engine fuel pressure fluctuation. |
| *MP.V.G.S15* | Inspect fuel selector valve. |
| *MP.V.G.S16* | Determine correct fuel nozzle spray pattern. |
| *MP.V.G.S17* | Locate and identify fuel selector placards. |

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| **Subject** | ***H. Engine Induction Systems*** |
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft induction and engine airflow systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.H.K1* | Reciprocating and turbine engine induction system theory, components, and operation. |
| *MP.V.H.K2* | Causes and effects of induction system icing. |
| *MP.V.H.K3* | Superchargers and controls. |
| *MP.V.H.K4* | Turbochargers, intercoolers, and controls. |
| *MP.V.H.K5* | Engine anti-ice systems. |
| *MP.V.H.K6* | Induction system filtering. |
| *MP.V.H.K7* | Carburetor heaters. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.H.R1* | Hazards of performing maintenance on turbochargers. |
| *MP.V.H.R2* | Hazards associated with the ground operation of aircraft engines. |
| *MP.V.H.R3* | Failure to observe precautions associated with maintenance-related FOD. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.H.S1* | Inspect a carburetor heat system. |
| *MP.V.H.S2* | Inspect an alternate air valve for proper operation. |
| *MP.V.H.S3* | Inspect an induction system drain for proper operation. |
| *MP.V.H.S4* | Inspect a turbine engine air intake anti-ice system. |
| *MP.V.H.S5* | Service an induction air filter. |
| *MP.V.H.S6* | Inspect a turbocharger for leaks and security. |
| *MP.V.H.S7* | Inspect and service a turbocharger waste gate. |
| *MP.V.H.S8* | Inspect an induction system for obstruction. |
| *MP.V.H.S9* | Inspect an air intake manifold for leaks. |
| *MP.V.H.S10* | Locate a reciprocating engine induction leak. |
| *MP.V.H.S11* | Inspect a particle separator. |
| *MP.V.H.S12* | Identify components of a turbocharger induction system. |
| *MP.V.H.S13* | Identify turbine engine ice and rain protection system components. |
| *MP.V.H.S14* | Inspect an air inlet duct for security. |

| Subject | ***I. Engine Cooling Systems*** |
|---|---|
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine cooling systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.I.K1* | Air cooling system theory, components, and operation. |
| *MP.V.I.K2* | Pressure cowling air flow and control. |
| *MP.V.I.K3* | Turbine engine internal cooling. |
| *MP.V.I.K4* | Engine baffle and seal installation. |
| *MP.V.I.K5* | Liquid cooling system theory, components, and operation. |
| *MP.V.I.K6* | Augmenter cooling system. |
| *MP.V.I.K7* | Turbine engine insulation blankets and shrouds. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.I.R1* | Hazards of performing maintenance on engine cooling systems. |
| *MP.V.I.R2* | Hazards associated with chemicals used in liquid cooling systems. |
| *MP.V.I.R3* | Failure to follow manufacturer's instructions during ground operation of aircraft engines. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.I.S1* | Perform an induction and cooling system inspection. |
| *MP.V.I.S2* | Repair cylinder baffle. |
| *MP.V.I.S3* | Inspect cylinder baffling. |
| *MP.V.I.S4* | Inspect cowl flap system for normal operation. |
| *MP.V.I.S5* | Inspect cylinder cooling fins. |
| *MP.V.I.S6* | Identify location of turbine engine insulation blankets. |
| *MP.V.I.S7* | Identify turbine engine cooling air flow. |
| *MP.V.I.S8* | Locate the proper specifications for coolant used in a liquid cooled engine. |
| *MP.V.I.S9* | Identify exhaust augmenter cooled engine components. |
| *MP.V.I.S10* | Inspect engine cooling rigid and flexible ducting and/or baffle seals. |
| *MP.V.I.S11* | Inspect engine exhaust augmenter cooling system. |

| Subject | ***J. Engine Exhaust and Reverser Systems*** |
|---|---|
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft engine exhaust and reverser systems. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.J.K1* | Reciprocating engine exhaust system theory, components, and operation. |
| *MP.V.J.K2* | Turbine engine exhaust system theory, components, and operation. |
| *MP.V.J.K3* | Noise suppression theory, components, and operation (e.g., mufflers, hush kits, augmenter tubes). |
| *MP.V.J.K4* | Thrust reverser theory, components, and operation. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.J.R1* | Improper maintenance and inspection of exhaust system components. |
| *MP.V.J.R2* | Hazards associated with the operation of turbine engine reversing systems. |
| *MP.V.J.R3* | Hazards associated with the operation of reciprocating engines with exhaust systems leaks. |
| *MP.V.J.R4* | Dangers associated with exhaust system failures. |
| *MP.V.J.R5* | Hazards associated with the ground operation of aircraft engines. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.J.S1* | Identify the type of exhaust system on a particular aircraft. |
| *MP.V.J.S2* | Inspect a turbine engine exhaust system component. |
| *MP.V.J.S3* | Inspect a reciprocating engine exhaust system. |
| *MP.V.J.S4* | Inspect exhaust system internal baffles or diffusers. |
| *MP.V.J.S5* | Inspect exhaust heat exchanger. |
| *MP.V.J.S6* | Locate procedures for testing and/or troubleshooting a turbine thrust reverser system. |
| *MP.V.J.S7* | Perform a pressure leak check of a reciprocating engine exhaust system. |

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| **Subject** | ***K. Propellers*** |
| **References** | FAA-H-8083-32, AC 43.13-1 |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with aircraft propellers. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *MP.V.K.K1* | Propeller theory and operation. |
| *MP.V.K.K2* | Types of propellers and blade design. |
| *MP.V.K.K3* | Pitch control and adjustment. |
| *MP.V.K.K4* | Constant speed propeller and governor theory and operation. |
| *MP.V.K.K5* | Turbine engine propeller reverse/beta range operation. |
| *MP.V.K.K6* | Propeller servicing, maintenance, and inspection requirements. |
| *MP.V.K.K7* | Procedures for removal and installation of a propeller. |
| *MP.V.K.K8* | Propeller TCDS. |
| *MP.V.K.K9* | Propeller synchronization systems. |
| *MP.V.K.K10* | Propeller ice control systems. |
| **Risk Management** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: |
| *MP.V.K.R1* | Hazards associated with ground operation. |
| *MP.V.K.R2* | Improper propeller maintenance and inspections. |
| **Skills** | The applicant demonstrates the ability to: |
| *MP.V.K.S1* | Remove and/or install a propeller. |
| *MP.V.K.S2* | Check blade static tracking. |
| *MP.V.K.S3* | Inspect a propeller for condition and airworthiness. |
| *MP.V.K.S4* | Measure propeller blade angle. |
| *MP.V.K.S5* | Repair an aluminum propeller blade. |
| *MP.V.K.S6* | Perform propeller lubrication. |
| *MP.V.K.S7* | Locate and explain the procedures for balancing a fixed-pitch propeller. |
| *MP.V.K.S8* | Adjust a propeller governor. |
| *MP.V.K.S9* | Identify propeller range of operation. |
| *MP.V.K.S10* | Repair metal propeller leading/trailing edge damage. |
| *MP.V.K.S11* | Determine what minor propeller alterations are acceptable using the propeller specifications, TCDS, and/or listings. |
| *MP.V.K.S12* | Inspect and/or repair a propeller anti-icing or de-icing system. |

## Appendix Table of Contents

# Appendix 1: Knowledge Test Description, Requirements, and Registration

### Knowledge Test Description

The knowledge test is an important part of the airman certification process. Applicants must pass the knowledge test before taking the practical test. Federal Aviation Administration (FAA) airman knowledge tests are effective instruments for aviation safety and regulation measurement. However, these tests can only sample the vast amount of knowledge every AMT needs.

Comments may be e-mailed to AFS630Comments@faa.gov.

The knowledge test consists of objective, multiple-choice questions. There is a single correct response for each test question. Each test question is independent of other questions. A correct response to one question does not depend upon, or influence, the correct response to another.

There are three Aviation Maintenance Technician knowledge tests:

| Test Code | Test Name | Number of Questions | Age | Allotted Time | Passing Score |
|---|---|---|---|---|---|
| AMG | Aviation Maintenance Technician – General | 60 | N/A | 2.0 | 70 |
| AMA | Aviation Maintenance Technician – Airframe | 100 | N/A | 2.0 | 70 |
| AMP | Aviation Maintenance Technician – Powerplant | 100 | N/A | 2.0 | 70 |

### Knowledge Test Blueprint

| AMG Knowledge Areas Required by 14 CFR section 65.75 are on the Knowledge Test | Percent of Questions Per Test |
|---|---|
| Basic Electricity | 5 – 15% |
| Aircraft Drawings | 5 – 10% |
| Weight and Balance | 5 – 10% |
| Fluid Lines and Fittings | 5 – 10% |
| Materials, Hardware, and Processes | 5 – 10% |
| Ground Operation and Servicing | 5 – 15% |
| Cleaning and Corrosion Control | 5 – 10% |
| Mathematics | 5 – 10% |
| Regulations, Publications, and Recordkeeping | 5 – 10% |
| Aviation Physics | 5 – 10% |
| Inspections | 5 – 10% |
| Human Factors | 5 – 10% |
| **Total Number of Questions** | **60** |

| AMA Knowledge Areas Required by 14 CFR section 65.75 are on the Knowledge Test | Percent of Questions Per Test |
|---|---|
| Metallic Structures | 5 – 15% |
| Non-Metallic Structures | 5 – 10% |
| Aerodynamics, Aircraft Assembly, and Rigging | 5 – 10% |
| Airframe Inspection | 5 – 15% |
| Landing Gear | 5 – 10% |
| Hydraulic and Pneumatic Systems | 5 – 10% |
| Cabin Atmosphere Control | 5 – 10% |
| Aircraft Instrument Systems | 5 – 10% |
| Communication and Navigation | 5 – 10% |
| Aircraft Fuel | 5 – 10% |
| Aircraft Electrical | 5 – 10% |
| Ice and Rain Protection | 5 – 10% |
| Overheat and Fire Protection Systems | 5 – 10% |
| Rotorcraft Fundamentals | 5 – 10% |
| **Total Number of Questions** | **100** |

| AMP Knowledge Areas Required by 14 CFR section 65.75 are on the Knowledge Test | Percent of Questions Per Test |
|---|---|
| Reciprocating Engines | 5 – 15% |
| Turbine Engines | 5 – 10% |
| Engine Inspection | 5 – 10% |
| Engine Indicating Systems | 5 – 10% |
| Engine Fire Protection Systems | 5 – 10% |
| Engine Electrical | 5 – 15% |
| Lubrication | 5 – 10% |
| Ignition and Starting | 5 – 10% |
| Fuel Metering Systems | 5 – 10% |
| Engine Fuel Systems | 5 – 10% |
| Induction and Engine Airflow | 5 – 10% |
| Engine Cooling Systems | 5 – 10% |
| Engine Exhaust and Reverser Systems | 5 – 10% |
| Propellers | 5 – 10% |
| **Total Number of Questions** | **100** |

**English Language Standard**

In accordance with the requirements of 14 CFR part 65, section 65.71 and the FAA Aviation English Language Proficiency standard, throughout the application and testing process the applicant must demonstrate the ability to read, write, speak, and understand the English language. English language proficiency is required for effective crew communication and coordination. Normal restatement of questions as would be done for a native English speaker is permitted, and does not constitute grounds for disqualification.

**Knowledge Test Requirements**

An airman applicant may present one or more of the following item(s) as authorization to take an AMT test:

- Original FAA Form 8610-2, Airman Certificate and/or Rating Application.
    - ***Note 1:*** *The proctor should verify that applicable blocks are marked (in upper left corner of form). Those not applicable will have a line drawn through them. (Example located in FAA Order 8080.6, Appendix.) If either or both the Airframe and Powerplant boxes are checked on the FAA Form 8610-2, along with the 'Original Issuance' box (and NOT the 'Added Rating' box), this serves as authorization for the Aviation Mechanic General (AMG) test.* ***Do not accept an "original issuance" application for an AMG test only****. (If the 'Added Rating' box is marked, this indicates that the AMG test is* ***not*** *required.)*
    - ***Note 2:*** *The proctor should ensure block V is completed, including the date, inspector's original signature, and FAA Flight Standards District Office (FSDO) identifier. (A sample form is located in FAA Order 8080.6, Appendix.)*
    - ***Note 3:*** *The applicant must retain both original 8610-2 forms issued by the FSDO. The proctor must make a copy of the form and attach it to the applicable daily log (refer to FAA Order 8080.6, 'Test Procedures-General' Chapter); or, if the testing center is approved for electronic filing, the proctor must file the form electronically in accordance with (IAW) their Airman Knowledge Testing (AKT) Organization Designation Authorization (ODA) Holder's Procedures Manual.*
- Certificate of graduation or completion from an FAA-certificated Aviation Maintenance Technician School (AMTS).
    - ***Note 1:*** *The proctor must ensure the certificate includes the AMTS name and certificate number, graduation date, curriculum from which the applicant graduated, applicant name, and signature of an authorized school official.*
    - ***Note 2:*** *The proctor must ensure the applicant is only allowed the test(s) authorized on the certificate.*
    - ***Note 3:*** *The proctor must make a legible photocopy of the certificate presented at the time of applicant processing, and attach this copy to the applicable daily log; or, if the testing center is approved for electronic filing, the proctor must file the certificate electronically in accordance with their AKT ODA Holder's Procedures Manual. The proctor must return the original certificate to the applicant.*
- Military Certificate of Eligibility.
    - ***Note 1:*** *The proctor must ensure the applicant is only allowed the test(s) authorized on the certificate; and that the test date does not precede the certificate date. (A sample certificate is located in Order 8080.6, Appendix.)*
    - ***Note 2:*** *The proctor must make a legible photocopy of the certificate presented at the time of applicant processing, and attach this copy to the applicable daily log; or, if the testing center is approved for electronic filing, the proctor must file the certificate electronically in accordance with their AKT ODA Holder's Procedures Manual. The proctor must return the original certificate to the applicant.*
- Acceptable form of authorization for AMG (**only** for applicants attending exempted AMTSs):
- Evidence of authorization to take the general test based on the school having an exemption, issued per 14 CFR part 11, from part 65, section 65.75 (a).

Acceptable forms of retest authorization for ALL tests listed above:

- Original passing AKTR.
- Original expired AKTR.
- Original failed AKTR.
    - ***Note 1:*** *Requires a 30-day waiting period for retesting if the applicant presents a failed AKTR, but no authorized instructor endorsement.*
    - ***Note 2:*** *Retests do not require a 30-day waiting period if the applicant presents a signed statement from an airman holding the certificate and rating(s) sought by the applicant. This statement must certify that the airman has given the applicant additional instruction in each of the subjects failed, and that the airman considers the applicant ready for retesting.*
    - ***Note 3:*** *An applicant retesting **after failure** is required to submit the applicable AKTR indicating failure to the testing center prior to retesting.*
    - *The original failed AKTR must be retained by the proctor and attached to the applicable daily log. If the testing center is approved for electronic filing, the proctor must: initial the AKTR within the embossed seal; file the AKTR in accordance with their AKT ODA Holder's Procedures Manual; verify the original failed AKTR has been successfully captured and stored prior to destruction; and destroy the AKTR.*

**Knowledge Test Centers**

The FAA authorizes hundreds of knowledge testing center locations that offer a full range of airman knowledge tests. For information on authorized testing centers, and to register for a knowledge test, contact one of the providers listed at www.faa.gov.

**Knowledge Test Registration**

The first step in taking a knowledge test is the registration process. You may either call one of the test providers or testing centers or simply use the walk-in basis. If you choose to register via phone, you will need to select a testing center and schedule a test date. You may register for tests several weeks in advance, and you may cancel your appointment according to the test provider's cancellation policy, if applicable, in order to avoid a cancellation fee.

The next step in taking a knowledge test is providing proper identification. An acceptable identification document includes a recent photograph, date of birth, signature, and actual residential address, if different from the mailing address. This information may be presented in more than one form of identification. Acceptable forms of identification include, but are not limited to, drivers' licenses, government identification cards, passports, alien residency (green) cards, and military identification cards. Information on acceptable forms of identification is available at www.faa.gov/training_testing/testing.

You also need to present authorization to test. Acceptable forms of authorization are:

- FAA Form 8610-2.
- A graduation certificate or certificate of completion to an affiliated testing center as previously explained.
- An original (not photocopy) failed Airman Knowledge Test Report, passing Airman Knowledge Test Report, or expired Airman Knowledge Test Report.

Information on acceptable forms of authorization is available at www.faa.gov/training_testing/testing.

Before you take the actual test, you will have the option to take a sample test. The actual test is time limited; however, you should have sufficient time to complete and review your test.

# Appendix 2: Knowledge Test Procedures

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.)

### Acceptable Materials

You may use aids, reference materials, and test materials within the guidelines listed below, if actual test questions or answers are not revealed. All models of aviation-oriented calculators may be used, including small electronic calculators that perform only arithmetic functions (add, subtract, multiply, and divide). Simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory, are permissible. Also, simple functions such as square root and percent keys are permissible.

The following guidelines apply:

1. You may use any reference materials provided with the test. In addition, you may use scales, straightedges, protractors, plotters, and electronic or mechanical calculators that are directly related to the test.
2. Manufacturer's permanently inscribed instructions on the front and back of such aids (e.g., formulas, conversions, and weight and balance formulas) are permissible.
3. Testing centers may provide a calculator to you and/or deny use of your personal calculator based on the following limitations:
    a. Prior to and upon completion of the test while in the presence of the proctor, you must actuate the ON/OFF switch and perform any other function that ensures erasure of any data stored in memory circuits.
    b. The use of electronic calculators incorporating permanent or continuous type memory circuits without erasure capability is prohibited. The proctor may refuse the use of your calculator when unable to determine the calculator's erasure capability.
    c. Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature.
    d. The use of magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which prewritten programs or information related to the test can be stored and retrieved is prohibited.
    e. You are not permitted to use any booklet or manual containing instructions related to use of test aids.
4. Dictionaries are not allowed in the testing area.
5. The proctor makes the final determination relating to test materials and personal possessions you may take into the testing area.

### Applicant Misconduct During Testing

To avoid test compromise, airman knowledge testing centers must follow strict security procedures established by the FAA, and described in FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test any time a proctor suspects a cheating incident has occurred.

The FAA will investigate; and, if the agency determines that cheating or unauthorized conduct has occurred, any airman certificate or rating you hold may be revoked. You may also be prohibited from applying for or taking any test for a certificate or rating for a period of up to one year.

### Testing Procedures for Applicants Requesting Special Accommodations

An applicant with learning or reading disability may request approval from the Airman Testing Branch through the local FSDO or International Field Office (IFO) to take an airman knowledge test, using one of the three options listed below, in preferential order:

**Option 1:** The applicant may request up to 1½ times the standard time allotted to complete the airman knowledge test.

**Option 2:** The applicant may use a self-contained, electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process. The applicant must provide his or her own device, with approval of the device to be determined by the proctor.

***Note:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack, for private listening, in order to avoid disturbing others during testing.*

**Option 3:** The applicant may request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise; and must provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO representative must contact the Airman Testing Branch for assistance in selecting the test site and assisting proctor.

***Note:*** *Applicants desiring to test using procedures other than those described in the preceding options must first seek permission from the Airman Testing Branch.*

Before approving any option, the FSDO or IFO representative must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

***Note:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack, for private listening, in order to avoid disturbing others during testing.*

# Appendix 3: Airman Knowledge Test Report

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report (AKTR) documenting the score with the testing center's raised, embossed seal. The applicant must retain the original AKTR. When taking the practical test, the applicant must present the original Airman Knowledge Test Report to the evaluator, who is required to assess the noted areas of deficiency during the oral portion of the practical test.

An AKTR expires 24 calendar months after the month the applicant completes the knowledge test. If the AKTR expires before completion of the practical test, the applicant must retake the knowledge test.

To obtain a duplicate AKTR due to loss or destruction of the original, the applicant can send a signed request accompanied by a check or money order for $12.00 (U.S. funds), payable to the FAA to:

> Federal Aviation Administration
> Airmen Certification Branch
> P.O. Box 25082
> Oklahoma City, OK 73125

To obtain a copy of the application form or a list of the information required, please see the Airmen Certification Branch Webpage.

### FAA Knowledge Test Question Coding

Each Subject in the ACS document includes an ACS code. This ACS code will soon be displayed on the AKTR to indicate what Subject element was proven deficient on the knowledge test. Instructors can then provide remedial training in the deficient areas; and evaluators can re-test this element during the practical exam.

The ACS coding consists of four elements. For example, this code is deciphered as follows:

**MG.I.A.K1**:
- **MG** = Applicable ACS (Aviation Mechanic-General)
- **I** = Section (General)
- **A** = Subject (Basic Electricity)
- **K1** = Subject element Knowledge 1 [Electron theory (conventional flow vs. electron flow).]

Knowledge test questions are mapped to the ACS codes, which will soon replace the system of "Learning Statement Codes." After this transition occurs, the AKTR will list an ACS code that correlates to a specific Subject element for a given Section and Subject. Remedial study and re-testing will be specific, targeted, and based on specified learning criteria.

### Missed Knowledge Test Questions

As part of the oral portion of the Oral and Practical Test, applicants will be retested on the subjects identified by the codes shown on the AKTR.

## Appendix 4: The Oral and Practical Test – Eligibility and Prerequisites

Each applicant for a Mechanic certificate must successfully pass an Oral and Practical test. These tests are normally conducted by an FAA Designated Mechanic Examiner (DME). An applicant who is prepared for the Oral and Practical test will contact a DME and make an appointment for the test. A list of DMEs is available at www.faa.gov, or contact your local Flight Standards District Office for more information on DMEs in your area.

Prior to the actual test, the DME will conduct a pre-test interview with the applicant to determine eligibility and to provide information needed for the test, such as the date/time and location of the test and obtain the codes from the AKTR. FAA designees are allowed to charge a reasonable fee for their services and this fee should be discussed and agreed upon prior to the scheduled test.

In accordance with the requirements of 14 CFR 65.71 and the FAA Aviation English Language Proficiency standard, throughout the application and testing process the applicant must demonstrate the ability to read, write, speak, and understand the English language. All testing instructions and oral questions will be conducted in English. Normal restatement of questions as would be done for a native English speaker is permitted, and does not constitute grounds for disqualification.

Bring to the O&P Test:

- Two identically prepared FAA Form 8610-2, Airman Certificate and/or Rating Applications with original signatures.
- If testing on the basis of:
    - Graduation from an FAA-approved 14 CFR part 147 Aircraft Maintenance Technician School (AMTS), provide the original graduation certificate(s) for the applicable rating applied for.
    - A Military Certificate of Eligibility, provide the original certificate showing eligibility for the ratings applied for.
    - Practical experience as provided in 14 CFR part 65, section 65.77, an FAA signature in Block V of FAA Form 8610-2 authorizing the applicant to test.
    - 14 CFR part 65, section 65.80 for AMTS students who have made satisfactory progress, a signature in Block II of FAA Form 8610-2 from a school official and FAA Inspector authorizing the applicant to test.
- Knowledge test results indicating a passing grade (70% or >) for the appropriate tests based on ratings applied for. Test results must not be expired at the scheduled completion of the O&P test.
- A current government issued photo identification with a signature from the issuing official, such as a passport, U.S. Military ID, Driver's License, etc.

The oral portion of the Oral and Practical Test will consist of questions to re-test the knowledge proven deficient on the FAA knowledge test. Applicants should expect to be questioned on the topics associated with the codes displayed on their AKTR.

# Appendix 5: Practical Test Roles, Responsibilities, and Outcomes

### Applicant Responsibilities

The applicant is responsible for mastering the established standards for knowledge, skill, and risk management elements in all subjects appropriate to the certificate and rating sought. The applicant should use this ACS and its references in preparation to take the oral and practical test.

An applicant is not permitted to know, before testing begins, which selections from each subject area are to be included in his/her test. Therefore, an applicant should be well prepared in all knowledge, risk management, and skill elements included in the ACS.

The oral portion of the test will consist of question specific to the topics associated with the codes on the AKTR. Applicants will need to demonstrate mastery of the subjects missed on the FAA knowledge test. The practical portion of the test will continue with oral questioning, specific to the projects being tested.

The practical portion of the subject areas may be test simultaneously with the oral portion, provided all skill elements are covered. For example, Mathematics may be combined when performing calculation(s) in subject areas such as Basic Electricity or Weight and Balance.

Additional information on requirements for conducting a practical test is contained in FAA Order 8900.2 (as revised).

All applicants must demonstrate an approval for return to service standard, where applicable, and demonstrate the ability to locate and apply the required reference materials. In instances where an approval for return to service standard cannot be achieved, the applicant must be able to explain why the return to service standard was not met (e.g., when tolerances are outside of a product's limitations).

AMT applicants meeting the experience requirements of 14 CFR 65.77 are eligible to take the airman knowledge test for the general, airframe, and powerplant knowledge exams without any additional formal training. It is highly recommended that applicants seek guidance from an experienced certificated mechanic, and/or review the references listed in this ACS in those subject areas in which they may not have direct experience. It is the applicants' responsibility to prepare and review the subjects listed in this ACS in order to increase one's ability to obtain a passing score on the exam.

### Examiner Responsibilities

The examiner must generate a complete test planning sheet to conduct the oral and practical test. The evaluator must ask the applicant to provide the missed codes from the AKTR prior to generating the test planning sheet. The examiner must include all the questions and projects obtained from the Internet-based Oral and Practical Test Generator at: https://av-info.faa.gov/DsgReg/Login.aspx. (See FAA Order 8900.2, chapter 6, for details.) The Oral and Practical Test Generator will include oral questions from the knowledge elements of the ACS to retest those topics missed on the FAA Knowledge Exam; these should be asked during the oral portion of the test. The Oral and Practical Test Generator will include questions on the knowledge and risk management elements of the ACS, specific to the selected projects; these should be asked, in context, during the practical demonstration portion of the test.

The examiner who conducts the practical test is responsible for determining the applicant has met the prescribed experience requirements as stated in 14 CFR part 65, section 65.77, or is an authorized school student per 14 CFR part 65, section 65.80. (See FAA Order 8900.2 (as revised) for information about testing under the provisions of 14 CFR part 65, section 65.80.)

At the initial stage of the oral and practical test, the examiner must also determine that the applicant meets FAA Aviation English Language Proficiency (AELP) standards by verifying that he or she can read, write and understand instructions and communicate in English. The examiner should use the English Language Skill Standards, required by 14 CFR part 65, when examining the applicant's ability to meet the standard.

The examiner must personally observe all practical projects performed by the applicant. The examiner who conducts the practical test is responsible for determining that the applicant meets acceptable standards of knowledge and skill in the assigned subject areas within the appropriate ACS.

The following terms may be reviewed with the applicant prior to, or during, element assignment.

1. **Inspect**—means to examine by sight and/or touch (with or without inspection enhancing tools/equipment).
2. **Check**—means to verify proper operation.
3. **Troubleshoot**—means to analyze and identify malfunctions.
4. **Service**—means to perform functions that assure continued operation.
5. **Repair**—means to correct a defective condition; and repair of an airframe or powerplant system includes component replacement and adjustment.
6. **Overhaul**—means disassembled, cleaned inspected, repaired as necessary, and reassembled.

An applicant is not permitted to know before testing begins which selections in each subject area are to be included in his/her test. Therefore, an applicant should be well prepared in **all** knowledge, risk, and skill elements included in the airman certification standards.

The practical portion of the subject areas may be tested simultaneously with other subject areas provided all skill elements are covered. For example, “Mathematics” can be combined when performing calculation(s) in subject areas such as Basic Electricity and Weight and Balance.

Further information and requirements for conducting a practical test is contained in FAA Order 8900.2 (as revised).

The evaluator who conducts the oral and practical test is responsible for determining that the applicant meets the established standards of aeronautical knowledge, risk management, and skill for each subject in the appropriate ACS. This responsibility includes verifying the experience requirements specified for a certificate or rating.

In the integrated ACS framework, the sections contain subjects, which are further broken down into knowledge elements (i.e., K1), risk management elements (i.e., R1), and skill elements (i.e., S1). Knowledge and risk management elements are primarily evaluated during the knowledge testing phase of the airman certification process. The evaluator administering the oral and practical test has the discretion to combine subjects/elements as appropriate to testing scenarios.

# Appendix 6: Safety

**General**

Safety must be the prime consideration at all times. The examiner and applicant must be constantly alert while performing maintenance or troubleshooting project~~s~~. Should any project require an action that would jeopardize safety, the examiner will ask the applicant to simulate that portion of the project.

The DME will ensure the applicant follows all safety recommendations/precautions while performing the assigned projects including, but not limited to, the following:

1. Approach to the project; proper information and tools; preparation of the equipment; and observation of safety precautions, such as wearing safety glasses, hearing protection, and any other required Personal Protective Equipment (PPE).
2. Cleaning, preparing, and protecting parts; skill in handling tools; thoroughness and cleanliness.
3. Use of current maintenance and/or overhaul publications and procedures.
4. Application of appropriate rules, risk management, and safety assessments.
5. Attitude toward safety, manufacturer's recommendations, and acceptable industry practices.

The applicant should be aware that any disregard for safety is not tolerated and will result in a failure.

# Appendix 7: References

This ACS is based on the following 14 CFR parts, FAA publications, and FAA guidance documents.

| Reference | Title |
|---|---|
| 14 CFR part 43 | Maintenance, Preventive Maintenance, Rebuilding and Alteration |
| 14 CFR part 45 | Identification and Registration Marking |
| 14 CFR part 65 | Certification: Airmen Other Than Flight Crewmembers |
| 14 CFR part 91 | General Operating and Flight Rules |
| 14 CFR part 147 | Aviation Maintenance Technician Schools |
| FAA-H-8083-1 | Weight and Balance Handbook |
| FAA-H-8083-30 | Aviation Maintenance Technician Handbook – General |
| FAA-H-8083-31 | Aviation Maintenance Technician Handbook – Airframe (Volumes 1 and 2) |
| FAA-H-8083-32 | Aviation Maintenance Technician – Powerplant (Volumes 1 and 2) |
| AC 43.13-1 | Acceptable Methods, Techniques and Practices Aircraft Inspection & Repair |
| AC 43.13-2 | Acceptable Methods, Techniques and Practical Aircraft Alterations |
| AC 43-204 | Visual Inspection for Aircraft |
| AC 45-2 | Identification and Registration Marking |
| AC 60-11 | Test Aids and Materials that May be Used by Airman Knowledge Testing Applicants |
| AC 60-28 | English Language Skill Standards Required by 14 CFR Parts 61, 63, and 65 |

**Note:** *Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.*

# Appendix 8: Abbreviations and Acronyms

The following abbreviations and acronyms are used in the ACS.

| Abb./Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AC | Advisory Circular |
| AC | Alternate Current |
| ACARS | Aircraft Communication Addressing and Reporting System |
| ACS | Airman Certification Standards |
| AD | Airworthiness Directive |
| ADF | Automatic Direction Finder |
| ADS-B | Automatic Dependent Surveillance Broadcast |
| AELP | Aviation English Language Proficiency |
| AFS | Flight Standards Service |
| AIS | Audio Integration System |
| AKT | Airman Knowledge Test |
| AKTR | Airman Knowledge Test Report |
| AMA | Airframe |
| AMG | General |
| AMP | Powerplant |
| AMT | Aviation Maintenance Technician |
| AMTS | Aviation Maintenance Technician School |
| ASI | Aviation Safety Inspector |
| ASRS | Aviation Safety Reporting System |
| ATC | Air Traffic Control |
| CFR | Code of Federal Regulations |
| CG | Center of Gravity |
| CPC | Corrosion Preventive Compounds |
| CSD | Constant Speed Drive |
| DC | Direct Current |
| DME | Designated Mechanic Examiner |
| DME | Distance Measuring Equipment |
| EGT | Exhaust Gas Temperature |
| ELT | Emergency Locator Transmitter |
| EPR | Engine Pressure Ratio |
| FAA | Federal Aviation Administration |
| FADEC | Full Authority Digital Engine Controls |
| FOD | Foreign Object Debris |
| FSDO | Flight Standards District Office |
| GPS | Global Positioning System |

| | |
|---|---|
| GPWS | Ground Proximity Warning Systems |
| HF | High Frequency |
| IDG | Integrated Drive Generator |
| IFR | Instrument Flight Rules |
| ILS | Instrument Landing System |
| INS | Inertial Navigation System |
| LSC | Learning Statement Code |
| MAC | Mean Aerodynamic Chord |
| NDT | Nondestructive Testing |
| NiCad | Nickle-Cadmium (battery) |
| NVRAM | Nonvolatile Random Access Memory |
| ODA | Organization Designation Authorization |
| RA | Radio Altimeter |
| RAM | Random Access Memory |
| ROM | Read Only Memory |
| RPM | Revolutions Per Minute |
| SATCOM | Satellite Communications |
| SDS | Safety Data Sheets |
| SFC | Specific Fuel Consumption |
| SMS | Safety Management System |
| STC | Supplemental Type Certificate |
| SUPS | Suspected Unapproved Parts |
| TCAS | Traffic Collision Avoidance System |
| TCDS | Type Certificate Data Sheet |
| TSO | Technical Standard Order |
| VHF | Very High Frequency |
| VOR | Very High Frequency Omnidirectional Radio Range |

# Aviation Maintenance Technician – Powerplant Handbook

## FAA-H-8083-32A

# Comments and Requested Changes to AMT Powerplant Handbook, FAA-H-8083-32A

https://s3.amazonaws.com/FAA/AMT+Powerplant+Volume+1+DRAFT+_1%2C+Nov+17%2C+2017.pdf
https://s3.amazonaws.com/FAA/AMT+Powerplant+Volume+2+DRAFT+_1%2C+Nov+17%2C+2017.pdf

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| **General** | | | The reading level on this material is higher than we are likely to see in most Part 147 schools. I tested incoming students for many years and found that most read at an 8th grade level. The samples I took from this material never got down to an 8th grade level, and ran as high as 14.7. The average of the samples that I checked was 11.3. This will limit the value of this handbook. |
| **General** | | | The material reads like it was assembled by a committee. There is a high degree of repetition. Concepts introduced in one section are presented again as new material a few sections later. While I am an advocate of the value of repetition as a learning tool, this is somewhat distracting. |
| **General** | | Organization | Suggested to divide information throughout by recip and turbine engines |
| **Throughout** | Ch 4, 7, Glossary | Outdated terminology | Search “flyweights” and replace with “counterweights” |
| **Ch 1** | Radial: 1-2, 1-4, 1-5 | | I was quite disappointed that the handbook still spends a great deal of time on radial engines, and then only one paragraph each on the new piston technologies. They may be covered again, later in the handbook, but shorting them in this introductory chapter is a missed opportunity. |
| **Ch 11** | New piston technologies | | See comment regarding Ch 1 – much discussion on radial engines, minimum on new 2-cycle engines. This chapter mentions operational items with no introduction or explanation. It appears that knowledge of two-cycle engines is assumed. |
| **4-2** | | | under Magneto-Ignition System Operating Principles; suggest modifying the first sentence as follows: The magneto, a special type of engine-driven alternating current (AC) generator, uses a permanent magnet as a source of energy. |
| **4-4** | | | the last paragraph on page 4-6 states, Since there are four lobes on the cam,….., please reword the sentence to indicate that this particular example has four lobes on the cam, there are some magnetos with cams that have only two lobes. |
| **4-8** | | | In the last paragraph on the page it states; "By reversing the polarity during servicing by rotating the plugs to new locations", the wording can be confusing. Consider revising to read; "Reversing the polarity during servicing by rotating the plugs to new locations." |
| **4-10** | Column 1, second paragraph from bottom | | First sentence, "When the ignition switch is placed in the on position switch open," Please add comma after the word position. |
| **4-32** | Right column | Incomplete information | Spark plug tray states it is used to keep spark plugs from bumping into is each other. (It is used to identify where the spark plug came from and for proper rotation not just a storage tray) |
| **4-13** | Fig 4-22 | | Caption for figure reads; "Typical six-cylinder engine electronic control and low-voltage harness." The caption does not match the picture, it is clearly a four cylinder , high tension magneto system harness. |
| **4-13** | Low-Voltage Harness | | The first sentence refers to figure 4-22 as a low voltage harness, which clearly resembles a high voltage harness. |
| **4-16** | | | Between pages 4-15 and 4-16 the discussion jumps from FADEC Electronic Control Systems to Low Voltage Booster Coils used on Radial |

| Page # | Location | Issue Type | Issue Description |
|---|---|---|---|
| | | | engines. This leads to confusion on the part of the reader. There should be some type of transition into Low Voltage Ignition Systems. |
| **4-18** | | | The discussion on the impulse coupling make it sound like it's design has more disadvantages than advantages. |
| **4-20** | | | Last sentence of first paragraph; consider rewording for grammar, "Both magnetos now fire at the normal running advanced degree position of crankshaft rotation before top dead center piston position. |
| **4-20** | | Low-Tension Retard Breaker vibrator | First sentence states, "is designed for light aircraft reciprocating engines." This system was designed for use on radial engines that were typically installed on heaver aircraft. |
| **4-25** | | | Recommend adding a picture of the Eastern Electronics E50 timing light as well as the Inductor Magneto Synchronizer. |
| **4-34** | Figure 4-56 | Wrong picture | It is closer than the picture in the previous edition but it shows a flat (automotive) gauge rather than a round or "wire gauge". Other companies make round wire gauges but the only picture I could grab quickly was from the Champion website catalog:   |
| **4-43** | Left column | Add info | Check System Operation states" the ignitor can also be checked by removing the it and activating the cycle" (this procedure is not common practice, only when the maintenance manual uses it as an alternate method.) |
| **11-16** | Left column | | Continental O-200 series engines are discussed, but they have omitted the D model which is a product developed especially for light sport aircraft. They shaved 25 pounds off of the engine to help performance. |
| **G-26** | Glossary | Typo | Standard day conditions: It says 52$^{o}$F when it should say 59$^{o}$ |

# Flight Instructor for Airplane

## Airman Certification Standards

FAA-S-ACS-9

U.S. Department
of Transportation

**Federal Aviation Administration**

**FAA-S-ACS-9**

# Instructor

## Airman Certification Standards

**Date TBD**

**Flight Standards Service**
**Washington, DC 20591**

## Acknowledgments

The U.S. Department of Transportation, Federal Aviation Administration (FAA), Airman Testing Standards Branch, AFS-630, and P.O. Box 25082, Oklahoma City, OK 73125 developed this Airman Certification Standards (ACS) document with the assistance of the aviation community. The FAA gratefully acknowledges the valuable support from the many individuals and organizations who contributed their time and expertise to assist in this endeavor.

## Availability

This ACS is available for download from www.faa.gov. Please send comments regarding this document to AFS630comments@faa.gov.

Material in FAA-S-ACS-9 will be effective XXXX 201X. All previous editions of the Flight Instructor for Airplane Practical Test Standards will be obsolete as of this date for Airplane applicants.

## Foreword

The Federal Aviation Administration (FAA) has published the Instructor Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, risk management, and flight proficiency standards for the Flight Instructor certificate (FI) in the airplane category. This ACS incorporates and supersedes the previous Practical Test Standards (PTS), FAA-ACS-8081-9, for Flight Instructor Airplane applicants.

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing. Specifically, the ACS, associated guidance, and test question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which internal and external stakeholders identify and evaluate regulatory changes, safety recommendations, and other factors that require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

The FAA has developed this ACS and its associated guidance in collaboration with a diverse group of aviation training experts. The goal is to drive a systematic approach to all components of the airman certification system, including knowledge test question development and conduct of the practical test. The FAA acknowledges and appreciates the many hours that these aviation experts have contributed toward this goal. This level of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

John S. Duncan
Director, Flight Standards Service

Revision History

| Rev. # | Description | Effective Date |
| --- | --- | --- |
| FAA-S-8081-6D | Flight Instructor Practical Test Standards for Airplane, (with Changes 1-4) | January 2010 |
| FAA-S-ACS-9 | Flight Instructor for Airplane, Airman Certification Standards | XXXX, 201X |

Table of Contents

## Introduction

### *Airman Certification Standards Concept*

The goal of the airman certification process is to ensure the flight instructor applicant possesses knowledge, risk management and skill consistent with the privileges of the certificate or rating being exercised, as well as the ability to teach these concepts while managing the risks inherent with instructional flight.

In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing. These materials include several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. Other materials, such as handbooks in the FAA H-8083 series, provide guidance to applicants on aeronautical knowledge, risk management, and flight proficiency.

The FAA recognizes that safe operation in today's complex National Airspace System (NAS) require a more systematic integration of aeronautical knowledge, risk management, and flight proficiency standards than those prescribed in the PTS. The FAA further recognizes the need to more clearly calibrate knowledge, risk management and skills to the level of the certificate or rating, and to align standards with guidance and test questions.

To accomplish this goal, the FAA drew upon the expertise of organizations and individuals across the aviation and training community to develop the Airman Certification Standards (ACS). The ACS integrates the elements of knowledge, risk management, and skill listed in 14 CFR part 61 for each airman certificate or rating. It thus forms a more comprehensive standard for what an applicant must know, consider, and do for the safe conduct and successful completion of each Task to be tested on either the knowledge exam or the practical test.

The ACS significantly improves the knowledge test part of the certification process by enabling the development of test questions, from FAA reference documents, that are meaningful and relevant to safe operation in the NAS. The ACS does not change the tolerances for any skill Task, and it is important for applicants, instructors, and evaluators to understand that the addition of knowledge and risk management elements is not intended to lengthen or expand the scope of the practical test. Rather, the integration of knowledge and risk management elements associated with each Task is intended to enable a more holistic approach to learning, training, and testing. During the ground portion of the practical test, for example, the ACS provides greater context and structure both for retesting items missed on the knowledge test and for sampling the applicant's mastery of knowledge and risk management elements associated with a given skill Task.

Through the ground and flight portion of the practical test, the FAA expects evaluators to assess the applicant's mastery of the topic in accordance with the level of learning most appropriate for the specified Task. The oral questioning will continue throughout the entire practical test. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge, experience, and information to the circumstances of the given scenario. The flight portion of the practical test requires the applicant to demonstrate knowledge, risk management, flight proficiency, and operational skill in accordance with the ACS.

> ***Note:*** *As used in the ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA aviation safety inspector, designated pilot examiner, or other individual authorized to conduct test for a certificate or rating).*

### *Using the ACS*

The ACS for the flight instructor consists of ***Areas of Operation*** arranged in a logical sequence, beginning with Fundamentals of Instructing, Technical Subject Areas, Preflight Preparation and ending with Postflight Procedures. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know, consider, and/or do. The ACS then lists the aeronautical knowledge, risk management, and skill elements relevant to the specific Task, along with the conditions and standards for acceptable performance. The ACS uses ***Notes*** to emphasize special considerations. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The term “may” denotes items that are recommended but not required. The ***References*** for each Task indicate the source material for Task elements. When a **Foundational ACS** is listed for a Task, it indicates the Foundational ACS (Private or Commercial) Area of Operation and referenced Task for the Task elements. For example, in Area of Operation II. *Technical Subject Areas*, Task F. *Navigation and Flight Planning*, the applicant must be prepared for questions on any element of Cross-Country Flight Planning Task in the Commercial Pilot Foundational ACS.

The abbreviation(s) within parentheses immediately following a Task refer to the category and/or class aircraft appropriate to that Task. The meaning of each abbreviation is as follows.

ASEL: Airplane – Single-Engine Land
ASES: Airplane – Single-Engine Sea
AMEL: Airplane – Multiengine Land
AMES: Airplane – Multiengine Sea

***Note:*** *When administering a test based on this ACS, the Tasks appropriate to the class airplane (ASEL, ASES, AMEL, or AMES) used for the test must be included in the plan of action. The absence of a class indicates the Task is for all classes.*

Each Task in the ACS is coded according to a scheme that includes four elements. For example:

AIA.II.B.K6:
AIA = Applicable ACS Applicable ACS and Section denoting Aircraft category (Instructor, Airplane, which is Section 2 of this document)
II = Area of Operation (Technical Subject Areas)
B = Task (14 CFR and Publications)
K6 = Task Element Knowledge 6 (Flight information publications (e.g., Aeronautical Information Manual (AIM) and Chart Supplements U.S. (formerly Airport/Facility Directory)).

Knowledge test questions are linked to the ACS codes, which will soon replace the system of “Learning Statement Codes.” After this transition occurs, the airman knowledge test report will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. Remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task element(s).

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the Learning Statement Codes (e.g., “PLT” codes will continue to be displayed on the Airman Knowledge Test Report (AKTR). The PLT codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC (PLT) codes and ACS codes.

Because all active knowledge test questions for the Fundamentals of Instructing and Flight Instructor knowledge tests have been aligned with the corresponding ACS, evaluators can use PLT codes in conjunction with the ACS for a more targeted retesting of missed knowledge. The evaluator should look up the PLT code(s) on the applicant’s AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the evaluator can use the corresponding Area(s) of Operation Task(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant’s understanding of that material in the context of the appropriate ACS Area(s) of Operation and Task(s).

The applicant must pass the Fundamentals of Instructing knowledge test (if required) and the appropriate Flight Instructor knowledge test before taking the practical test. The practical test is conducted in accordance with the ACS that is current as of the date of the test. Further, the applicant must pass the ground portion of the practical test before beginning the flight portion. The ground portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test. The oral questioning will continue throughout the entire practical test.

The FAA encourages applicants and instructors to use the ACS to measure progress during training, and as a reference to ensure the applicant is adequately prepared for the knowledge and practical tests. The FAA will revise the ACS as circumstances require.

### *Organization*

The Instructor ACS includes sections that define the acceptable standards for knowledge, risk management, and skills in the aeronautical proficiency Tasks unique to a particular instructor certificate or rating.

Instructor-Applicants, instructors, and evaluators need to understand that the Instructor ACS is not a stand-alone document. Rather, it is to be used in conjunction with the appropriate ACS for which the instructor-applicant seeks authorization to provide instruction. Therefore, in addition to mastery of the knowledge and skills defined in the Instructor ACS, the instructor-applicant must demonstrate instructional competence and risk management with the Tasks in the appropriate ACS, to include analyzing and correcting common learner errors.

Because the ***Fundamentals of Instructing (FOI)*** Area of Operation is foundational to each particular instructor certificate or rating, FOI Tasks are incorporated as a stand-alone Area of Operation at the beginning of this ACS, which will be referenced in each certificate/rating.

The FAA encourages applicants and instructors to use the ACS to measure progress during training, and as a reference to ensure the applicant is adequately prepared for the knowledge and practical tests. The FAA will revise the ACS as circumstances require.

### *Instructional Knowledge*

Tasks will often include the beginning phrase with the Knowledge elements: “The applicant demonstrates instructional knowledge by describing and explaining: “instructional knowledge” means the instructor applicant can effectively present the what, how and why involved with the task elements.

### *Risk Management for the Instructor*

Risk Management is a critical component to aviation safety. The Instructor is involved with risk management on multiple levels. The levels include not only managing risk of a particular phase of flight or maneuver, but also teaching risk management, both in the classroom and in the cockpit, and managing the additional risks of in-flight instruction with a Pilot-in-Training (PIT). Appendix 6 of this ACS outlines the scope of Risk Management that an Instructor applicant (flight) will need to demonstrate.

The Fundamentals of Instructing (FOI) includes a Task G: *Aeronautical Decision Making and Risk Management* that focuses on teaching risk management and on those risks encountered by a flight instructor while providing in-flight instruction not experienced by a pilot during their personal training or other flight operations.

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Section 1. Fundamentals of Instructing

***Fundamentals of Instructing***

| | |
|---|---|
| **Task** | ***Task A. Learning Process*** PTS I.B |
| **References** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant understands the elements of the learning process and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AI.I.A.K1* | Definitions of learning, with practical examples that show when learning has occurred. |
| *AI.I.A.K2* | Educational theories as they apply to ground and flight instruction, to include: |
| *AIA.I.A.K2a* | a. Theories of learning |
| *AI.I.A.K2b* | b. Learner motivation, to include instructor’s role in fostering motivation. |
| *AI.I.A.K2c* | c. Learning styles and their impact on effective instruction. |
| *AI.I.A.K2d* | d. Transfer of learning. |
| *AI.I.A.K2e* | e. Memory and retention. |
| *AI.I.A.K3* | Levels of learning, to include: |
| *AI.I.A.K3a* | a. Acquisition and application of higher order thinking skills. |
| *AI.I.A.K3b* | b. Appropriate use of scenario-based training and different types of practice to achieve different levels of learning |
| **Risk Management** | The applicant demonstrates the ability to identify and mitigate the risks arising from: |
| *AI.I.A.R1* | Inadequate or incomplete instruction. |
| *AI.I.A.R2* | Lack of learner motivation. |
| *AI.I.A.R3* | Failure to recognize and correct learner errors. |
| **Skills** | The applicant demonstrates the ability to: |
| *AI.I.A.S1* | Explain and apply educational theories to ground and flight instructional scenarios specified by the evaluator. |
| *AI.I.A.S2* | Recognize and correct conditions that undermine the learning process. |

| Task | ***Task B. Human Behavior and Effective Communication*** |
|---|---|
| **References** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant understands the elements of human behavior and effective communication and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AI.I.B.K1* | Elements of human behavior, to include: |
| *AI.I.B.K1a* | a. Human needs. |
| *AI.I.B.K1b* | b. Personality types. |
| *AI.I.B.K1c* | c. Normal and abnormal emotional reactions. |
| *AI.I.B.K1d* | d. Defense mechanisms. |
| *AI.I.B.K2* | Human factors such as situational awareness, workload, and stress, and how they affect learning. |
| *AI.I.B.K3* | Effective communication, to include: |
| *AI.I.B.K3a* | a. Basic elements of communication. |
| *AI.I.B.K3b* | b. Techniques for effective communication. |
| *AI.I.B.K3c* | c. Barriers to effective communication and how to avoid them. |
| **Risk Management** | The applicant demonstrates the ability to identify and mitigate the risks arising from: |
| *AI.I.B.R1* | Failure to recognize and accommodate human behavior. |
| *AI.I.B.R2* | Failure to use effective and appropriate communication techniques. |
| **Skills** | The applicant demonstrates the ability to: |
| *AI.I.B.S1* | Give examples of how human behavior (e.g., needs, personality types) affects motivation and learning. |
| *AI.I.B.S2* | Describe techniques the instructor can use to identify and manage: |
| *AI.I.B.S2a* | a. Normal and abnormal emotional reactions |
| *AI.I.B.S2b* | b. Defense mechanisms |
| *AI.I.B.S3* | Use effective communication in ground and flight instructional scenarios specified by the evaluator. |

| Task | ***Task C. Teaching Process and Methods*** |
|---|---|
| **References** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant understands the elements of the teaching process and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AI.I.C.K1* | Essential teaching skills, to include: |
| *AI.I.C.K1a* | a. Various methods of presentation (e.g., lecture, discussion, scenario). |
| *AI.I.C.K1b* | b. Organization of content. |
| *AI.I.C.K1c* | c. Recognition and accommodation of differences in learning style. |
| *AI.I.C.K1d* | d. Importance of communicating the “why” and “how” as well as the “what.” |
| *AI.I.C.K1e* | e. Response to learner questions. |
| **Risk Management** | The applicant demonstrate the ability to identify and mitigate the risks arising from: |
| *AI.I.C.R1* | Failure to use effective teaching methods. |
| **Skills** | The applicant demonstrates the ability to: |
| *AI.I.C.S1* | Prepare an instructional plan of action using teaching methods and materials appropriate for Task and learner characteristics in a scenario specified by the evaluator, to include: |
| *AI.I.C.S1b* | a. Aeronautical knowledge ground lesson applicable for a classroom. |
| *AI.I.C.S1c* | b. Maneuver ground lesson for an individual pilot in training. |
| *AI.I.C.S1d* | c. Maneuver introduction for a flight lesson. |

| Task | ***Task D. Assessment*** |
|---|---|
| **References** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant understands the elements of effective assessment and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AI.I.D.K1* | Purpose and characteristics of effective assessment. |
| *AI.I.D.K2* | Assessment methods and techniques, to include: |
| *AI.I.D.K2a* | a. Critique |
| *AI.I.D.K2b* | b. Oral questions |
| *AI.I.D.K2c* | c. Written tests |
| *AI.I.D.K2d* | d. Authentic assessment |
| *AI.I.D.K2e* | e. Collaborative assessment/learner-centered grading |
| **Risk Management** | The applicant demonstrate the ability to identify and mitigate the risks arising from: |
| *AI.I.D.R1* | Failure to deliver an effective assessment |
| **Skills** | The applicant demonstrates the ability to: |
| *AI.I.D.S1* | Use appropriate methods and techniques to assess learner performance in a ground and/or flight training scenario specified by the evaluator. |

| Task | ***Task E. Instructor Responsibilities and Professional Characteristics*** |
|---|---|
| **References** | FAA-H-8083-9 |
| **Objective** | To determine that the applicant understands instructor responsibilities and professional characteristics and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AI.I.E.K1* | Instructor responsibilities, to include: |
| *AI.I.E.K1a* | a. Providing effective instruction that enables learners to gain the knowledge and skill required for initial certification and safe operation. |
| *AI.I.E.K1b* | b. Evaluating and supervising pilots in training. |
| *AI.I.EK1c* | c. Modeling and demanding the highest standards for knowledge, risk management, and skill in aviation operations. |
| *AI.I.E.K1d* | d. Conducting specialized training, evaluating proficiency, and granting privileges through appropriate endorsements. |
| *AI.I.E.K1e* | e. Recommending applicants for knowledge and practical tests. |
| *AI.I.E.1f* | f. Minimizing learner frustrations. |
| *AI.I.E.K1g* | g. Recognizing and managing abnormal behaviors. |
| *AI.I.E.K2* | Instructor professional characteristics, to include: |
| *AI.I.E.K2a* | a. Preparing for each instructional activity. |
| *AI.I.E.K2b* | b. Making learner's needs the top priority. |
| *AI.I.E.K2c* | c. Advancing professional knowledge and skills. |
| **Risk Management** | The applicant demonstrate the ability to identify and mitigate the risks arising from: |
| *AI.I.E.R1* | Failure to fulfill instructor responsibilities. |
| *AI.I.E.R2* | Failure to exhibit professionalism. |
| **Skills** | The applicant demonstrates the ability to: |
| *AI.I.E.S1* | Deliver ground and/or flight instruction on an evaluator-assigned Task, and in accordance with a scenario specified by the evaluator, in a manner consistent with instructor responsibilities and professional characteristics as stated in K1-K2 above. |

| Task | ***Task F. Risk Management and Aeronautical Decision-Making*** |
|---|---|
| **References** | FAA-H-8083-9; FAA-H-8083-2; FAA-H-8083-25 |
| **Objective** | To determine that the applicant understands the elements of risk management and aeronautical decision-making and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates understanding of: |
| *AI.I.F.K1* | Definition and principles of risk management, to include: |
| *AI.I.F.K1a* | a. Identification of hazards (e.g., PAVE items, hazardous attitudes) |
| *AI.I.F.K1b* | b. Assessing the level of risk |
| *AI.I.F.K1c* | c. Methods of mitigating risk (e.g., CRM, SRM, personal minimums) |
| *AI.I.F.K2* | Definition and principles of aeronautical decision-making (ADM) |
| **Risk Management** | The applicant demonstrate the ability to identify and mitigate the risks arising from: |
| *AI.I.F.R1* | Hazards associated with providing flight instruction. |
| *AI.I.F.R2* | Obstacles to maintaining situational awareness during flight instruction. |
| *AI.I.F.R3* | Failure to recognize and manage hazards arising from human behavior. |
| **Skills** | The applicant demonstrates the ability to: |
| *AI.I.F.S1* | Use scenario-based training (SBT) to demonstrate, teach, and assess risk management and ADM skills in the context of a Task and scenario specified by the evaluator. |
| *AI.I.F.S2* | Identify, assess, and mitigate risks commonly associated with providing flight instruction through maintaining: |
| *AI.I.F.S2a* | a. Awareness and oversight of the learner's actions, with timely intervention or mitigation as needed. |
| *AI.I.F.S2b* | b. Awareness of the learner's cognitive/physiological state, with timely action to mitigate anxiety, fatigue, etc. |
| *AI.I.F.S2c* | c. Overall situational awareness while delivering flight instruction, to include continuous awareness of the aircraft's dynamic state and navigation position as well as vigilance for unexpected events in the training environment. |
| *AI.I.F.S3* | Model and teach safety practices, to include maintaining: |
| *AI.I.F.S3a* | a. Collision avoidance while simultaneously providing instruction. |
| *AI.I.F.S3b* | b. A "sterile cockpit" as appropriate. |
| *AI.I.F.S3c* | c. Coordinated flight. |
| *AI.I.G.S3d* | d. Positive exchange of flight controls. |

## Section 2: Ground Instructor

### *Completion Standards*

A. Basic Ground Instructor (BGI)

(1) Pass the Fundamentals of Instructing (FOI) Knowledge Test (if required), which is comprised of questions from the FOI Tasks.

(2) Pass the BGI Knowledge Test, which is comprised of questions developed from the Knowledge elements of Tasks contained in the Sport Pilot, Recreational Pilot, and Private Pilot ACS (or PTS) documents.

B. Advanced Ground Instructor (AGI)

(1) Pass the FOI Knowledge Test (if required), which is comprised of questions from the Tasks.

(2) Pass the AGI Knowledge Test, which is comprised of questions developed from the Knowledgeelements of Tasks contained in the Sport Pilot, Recreational Pilot, Private Pilot and Commercial Pilot ACS (or PTS) documents.

C. Instrument Ground Instructor (IGI)

(1) Pass the FOI Knowledge Test (if required), which is comprised of questions from the FOI Tasks in this Section.

(2) Pass the IGI Knowledge Test, which is comprised of questions developed from the Knowledgeelements of Tasks contained in the Instrument Instructor section of the Instructor ACS.

D. ACS System Reference Matrix

The ACS System Reference Matrix below includes the appropriate ACS document reference for each Task required for the FOI Knowledge Test.

| Ground Instructor (Section 1) ACS Task | ACS | AI ACS Reference (Task) |
|---|---|---|
| Learning Process | AI-FOI | A. Learning Process |
| Human Behavior and Effective Communication | AI-FOI | B. Human Behavior and Effective Communication |
| Teaching Process | AI-FOI | C. Teaching Process and Methods |
| Teaching Methods | AI-FOI | C. Teaching Process and Methods |
| Assessment | AI-FOI | D. Assessment |
| Flight Instructor Characteristics & Responsibilities | AI-FOI | E. Instructor Responsibilities & Prof. Characteristics |
| Flight Instructor Characteristics & Responsibilities | AI-FOI | F. Risk Management & Aeronautical Decision-Making |

**Legend:**

AI-FOI Instructor Airman Certification Standards: Fundamentals of Instructing (FOI) Tasks

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# Section 3. Flight Instructor – Airplane

### *Completion Standards*

A. Knowledge Test

(1) Pass the appropriate Knowledge Test.

B. Practical Test

(1) To determine that the instructor-applicant can:

(a) Demonstrate instructional competence in the Tasks;
(b) Facilitate the learning of subject material;
(c) Explain and demonstrate the maneuvers;
(d) Exemplify risk management skills;
(e) Promote professionalism; and
(f) Analyze and correct common learner errors.

C. Evaluator's Practical Test Checklist

The following Evaluator's Practical Test Checklist (below) sets forth the ACS or Foundational ACS reference for each Task required by the Flight Instructor-Airplane ACS. This checklist should be used to ensure that each required Task is accomplished.

The Flight Instructor-Airplane section of the Instructor ACS is intended to be used in conjunction with the Fundamentals of Instructing (FOI) (immediately following the Introduction of this document), the Commercial Pilot ACS, and the Private Pilot ACS (separate documents). All Tasks will indicate the referenced ACS if the foundational Task elements are contained in other than this *Instructor Airplane* section of the *Instructor ACS* [AIA].

***Evaluator's Practical Test Checklist***

## Flight Instructor – Airplane (AIA)

**Applicant's Name:** ______________________________________________________________

**Examiner's Name:** ______________________________________________________________

**Date:** ____________________________

**Areas of Operation:**

**Note:** ACS document or Foundational ACS reference for Instructor-Airplane Tasks are indicated in brackets with Area of Operation and Task identifier e.g. [AIA/CAX-I.G.] for Commercial ACS, Area of Operation I. Preflight Preparation, Task G, Operation of Systems. All Tasks incorporating descriptions contained in the CAX or PAR are further described in the AIA.

**Legend:**

| | |
|---|---|
| AI-FOI | Instructor Airman Certification Standards: Fundamentals of Instructing (FOI) Tasks |
| AIA | Instructor Airman Certification Standards: Flight Instructor – Airplane (Section 2) |
| CAX | Commercial Pilot – Airplane Airman Certification Standards |
| PAR | Private Pilot – Airplane Airman Certification Standards |

**I. Fundamentals of Instructing**

**Note:** The evaluator must select Tasks E and F and one other Task.

- ☐ A. Learning Process [AI-FOI]
- ☐ B. Human Behavior and Effective Communication [AI-FOI]
- ☐ C. Teaching Process and Methods [AI-FOI]
- ☐ D. Assessment [AI-FOI]
- ☐ E. Instructor Responsibilities and Professional Characteristics [AI-FOI]
- ☐ F. Risk Management and Aeronautical Decision-Making [AI-FOI]

**II. Technical Subject Areas**

**Note:** The evaluator must select Tasks C and D and at least one other Task.

- ☐ A. Principles of Flight [AIA]
- ☐ B. 14 CFR and Publications [AIA]
- ☐ C. Endorsements and Logbook Entries [AIA]
- ☐ D. Runway Incursion Avoidance [AIA]
- ☐ E. Human Factors [AIA/CAX-I.H.]
- ☐ F. Navigation and Flight Planning [AIA/CAX-I.D.]
- ☐ G. Airplane Flight Controls and Operation of Systems [AIA/CAX-I.G.]
- ☐ H. Airplane Performance, Limitations, Weight and Balance [AIA/CAX-I.F.]
- ☐ I. Night Operations [AIA/PAR-IX.A. & CAX-II.D,K6d]
- ☐ J. High Altitude Operations-Supplemental Oxygen [AIA/CAX-VIII.A.]
- ☐ K. High Altitude Operations-Pressurization [AIA/CAX-VIII.B.]
- ☐ L. National Airspace System [AIA/CAX-I.E.]
- ☐ M. Pilotage and Dead Reckoning [AIA/ CAX-VI.A.]
- ☐ N. Navigation Systems and Radar Services [AIA/CAX-VI.B.]

- ☐ O. Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules and Aids to Marine Navigation (ASES, AMES) [AIA/CAX-I.I.]

**III. Preflight Preparation**

**Note:** The evaluator must select at least one Task.

- ☐ A. Pilot Qualifications [AIA]
- ☐ B. Airworthiness Requirements [AIA/CAX-I.B.]
- ☐ C. Weather Information [AIA/CAX-I.C.]

**IV. Preflight Lesson on a Maneuver to be Performed in Flight**

- ☐ A. Maneuver Lesson [AIA]

**V. Preflight Procedures**

**Note:** The evaluator must select at least one Task.

- ☐ A. Preflight Assessment [AIA/CAX-II.A.]
- ☐ B. Cockpit Management [AIA/CAX-II.B.]
- ☐ C. Engine Starting [AIA/CAX-II.C.]
- ☐ D. Taxiing, Airport Signs, Markings, and Lighting [AIA/CAX-II.D.]
- ☐ E. Taxiing and Sailing (ASES, AMES) [AIA/CAX-II.E.]
- ☐ F. Before Takeoff Check [AIA/CAX-II.F.]

**VI. Airport and Seaplane Base Operations**

- ☐ A. Radio Communications and Light Gun Signals [AIA/CAX-III.A.]
- ☐ B. Traffic Patterns [AIA/CAX-III.B.]

**VII. Takeoffs, Landings, and Go-Arounds**

**Note:** The evaluator must select at least two takeoff and two landing Tasks.

- ☐ A. Normal Takeoff and Climb [AIA/CAX-IV.A.]
- ☐ B. Normal Approach and Landing [AIA/CAX-IV.B.]
- ☐ C. Soft-Field Takeoff and Climb [AIA/CAX-IV.C.]
- ☐ D. Soft-Field Approach and Landing [AIA/CAX-IV.D.]
- ☐ E. Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL) [AIA/CAX-IV.E.]
- ☐ F. Short-Field Approach and Landing (ASEL, AMEL) [AIA/CAX-IV.F.]
- ☐ G. Confined Area Takeoff and Maximum Performance Climb (ASES, AMES) [AIA/CAX-IV.G]
- ☐ H. Confined Area Approach and Landing (ASES, AMES) [AIA/CAX-IV.H.]
- ☐ I. Glassy-Water Takeoff and Climb (ASES, AMES) [AIA/CAX-IV.I.]
- ☐ J. Glassy-Water Approach and Landing (ASES, AMES) [AIA/CAX-IV.J.]
- ☐ K. Rough-Water Takeoff and Climb (ASES, AMES) [AIA/CAX-IV.K.]
- ☐ L. Rough-Water Approach and Landing (ASES, AMES) [AIA/CAX-IV.L.]
- ☐ M. Forward Slip to a Landing (ASEL, ASES) [AIA/PAR-IV.M.]
- ☐ N. Go-Around/Rejected Landing [AIA/CAX-IV.N.]
- ☐ O. Power-Off 180° Accuracy Approach and Landing (ASEL, ASES) [AIA/CAX-IV.M]

### VIII. Fundamentals of Flight

**Note:** The evaluator must select at least one Task.

- ☐ A. Straight-and-Level Flight [AIA]
- ☐ B. Level Turns [AIA]
- ☐ C. Straight Climbs and Climbing Turns [AIA]
- ☐ D. Straight Descents and Descending Turns [AIA]

### IX. Performance Maneuvers

**Note:** The evaluator must select at least Task A or B, and Task C or D.

- ☐ A. Steep Turns [AIA/CAX-V.A.]
- ☐ B. Steep Spiral [AIA/CAX-V.B.]
- ☐ C. Chandelles [AIA/CAX-V.C.]
- ☐ D. Lazy Eights [AIA/CAX-V.D.]

### X. Ground Reference Maneuvers

**Note:** The evaluator must select both Tasks A and B**.**

- ☐ A. Ground Reference Maneuvers [AIA/PAR-V.B.]
- ☐ B. Eights on Pylons [AIA/CAX-V.E.]

### XI. Slow Flight, Stalls and Spins

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), at least one demonstration stall (Task D, E, F, or G), and Task H.

- ☐ A. Maneuvering During Slow Flight [AIA/CAX-VII.A.]
- ☐ B. Power-Off Stalls (Proficiency) [AIA/PAR-VII.B.]
- ☐ C. Power-On Stalls (Proficiency) [AIA/PAR-VII.C.]
- ☐ D. Cross-controlled Stalls (Demonstration) [AIA]
- ☐ E. Elevator Trim Stalls (Demonstration) [AIA]
- ☐ F. Secondary Stalls (Demonstration) [AIA]
- ☐ G. Accelerated Maneuver Stalls (Demonstration) [AIA]
- ☐ H Spin Awarness and Spins [AIA]

### XII. Basic Instrument Maneuvers

**Note:** The evaluator must select at least one Task.

- ☐ A. Straight-and-Level Flight [AIA/PAR-VIII.A.]
- ☐ B. Constant Airspeed Climbs [AIA/PAR-VIII.B.]
- ☐ C. Constant Airspeed Descents [AIA/PAR-VIII.C.]
- ☐ D. Turns to Headings [AIA/PAR-VIII.D.]
- ☐ E. Recovery from Unusual Flight Attitudes [AIA/PAR-VIII.E.]

### XIII. Emergency Procedures

**Note:** The evaluator must select at least Tasks A and C.

- ☐ A. Emergency Descent [AIA/CAX-IX.A.]

- ☐ B. Emergency Approach and Landing (Simulated) [AIA/CAX-IX.B.]
- ☐ C. Systems and Equipment Malfunctions [AIA/CAX-IX.C.]
- ☐ D. Emergency Equipment and Survival Gear [AIA/CAX-IX.D.]

### XIV. Multiengine Operations

- ☐ A.
- ☐ B.
- ☐ C.
- ☐ D.
- ☐ E.
- ☐ F.
- ☐ G.
- ☐ H.

### XV. Postflight Procedures

**Note:** The evaluator must select Task A and, for ASES Applicants, Task B.

- ☐ A. After Landing, Parking and Securing [AIA/CAX-XI.A.]
- ☐ B. Seaplane Post-Landing Procedures (ASES, AMES) [AIA/CAX-XI.B.]

[Flight Instructor Multiengine Airplane Tasks will be developed and incorporated in Section 2 of this ACS prior to publication.]

### *Areas of Operation*

The Areas of Operation for the Flight Instructor-Airplane certificate are set forth below. Some of the Tasks included in these Areas of Operation incorporate by reference descriptions contained elsewhere. In particular, during the Flight Instructor-Airplane practical test the applicant will be evaluated on various Tasks described in the FOI section of this Instructor ACS, the Commercial Pilot Airplane (CAX) ACS or the Private Pilot Airplane (PAR) ACS document(s). Tasks that incorporate descriptions by reference are indicated with preceding notes and annotated on the Evaluator's Practical Test Checklist.

The instructor-applicant will be required to demonstrate instructional competence in the Task elements, skills, associated with each Task, regardless of whether the Task is unique to the Instructor or whether it is incorporated by reference from the CAX ACS or the PAR ACS. Instructional competence includes the ability to demonstrate instructional knowledge of the elements of each Task and the ability to demonstrate and simultaneously explain the skills associated with each Task from an instructional standpoint, while simultaneously managing the risks associated with flight instruction. Where indicated below, the instructor-applicant must also demonstrate instructional competence with respect to describing, analyzing, and correcting common errors associated with certain Tasks described in CAX or the PAR ACS document(s).

### *I. Fundamentals of Instructing*

For each of the Tasks included in this Area of Operation, refer to the description contained in the FOI.

**Note:** The evaluator must select Tasks E and F and one other Task.

Task A. Learning Process

Task B. Human Behavior and Effective Communication

Task C. Teaching Process and Methods

Task D. Assessment

Task E. Instructor Responsibilities and Professional Characteristics

Task F. Risk Management and Aeronautical Decision-Making

## II. Technical Subject Areas

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

| Task | *Task A. Principles of Flight* |
|---|---|
| **References** | FAA-H-8083-3, FAA-H-8083-25 |
| **Objective** | To determine that the applicant understands the elements of aerodynamics appropriate to the desired instructor certificate and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.II.A.K1* | Airfoil design characteristics. |
| *AIA.II.A.K2* | Airplane stability, maneuverability and controllability. |
| *AIA.II.A.K3* | Turning tendency (e.g., torque, p-factor, spiraling slipstream, and gyroscopic precession). |
| *AIA.II.A.K4* | Forces acting on an airplane. |
| *AIA.II.A.K5* | Load factors in airplane design. |
| *AIA.II.A.K6* | Wingtip vortices and precautions to be taken. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.II.A.R1* | Failure to understand the basic aerodynamic principles of flight. |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.II.A.S1* | Deliver instruction on principles of flight, to include at least one of the elements listed in K1-K6, in a lesson or scenario specified by the evaluator: |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

| **Task** | ***Task B. 14 CFR and Publications*** |
|---|---|
| **References** | 14 CFR parts 1, 61, 91; NTSB part 830; FAA-H-8083-25; AIM; POH/AFM |
| **Objective** | To determine that the applicant understands the Code of Federal Regulations and other publications relevant to safe operation and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction.. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.II.B.K1* | The purpose, general content, means of distribution/access and of verifying currency of each of the following documents: |
| *AIA.II.B.K1a* | a. 14 CFR parts 1, 61, and 91. |
| *AIA.II.B.K1b* | b. NTSB part 830. |
| *AIA.II.B.K1c* | c. Advisory Circulars. |
| *AIA.II.B.K1d* | d. Airman Certification Standards or Practical Test Standards |
| *AIA.II.B.K1e* | e. Pilot's Operating Handbooks or FAA-approved airplane flight manuals. |
| *AIA.II.B.K1f* | f. Flight information publications (e.g., Aeronautical Information Manual (AIM) and Chart Supplements U.S. (formerly Airport/Facility Directory)). |
| **Risk Management** | The applicant demonstrate the ability to teach and manage the risks arising from: |
| *AIA.II.B.R1* | [Intentionally left blank] |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.II.B.S1* | Deliver instruction on 14 CFR parts 1, 61, and 91 plus at least one of the elements in K1a-K1f above in a lesson or scenario specified by the evaluator: |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

| **Task** | ***Task C Endorsements and Logbook Entries*** |
|---|---|
| **References** | 14 CFR parts 61; AC 61-65 |
| **Objective** | To determine that the applicant understands the elements of logbook entries and endorsements and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.II.C.K1* | Required logbook entries for instruction given. |
| *AIA.II.C.K2* | Required student pilot solo endorsements and logbook entries. |
| *AIA.II.C.K3* | Other required pilot logbook endorsements (e.g., tailwheel, high performance). |
| *AIA.II.C.K4* | Preparation of a recommendation for a pilot practical test, to include appropriate logbook entry and relevant certificate/rating application for: |
| *AIA.II.C.K4a* | a. Initial pilot certification |
| *AIA.II.C.K4b* | b. Additional pilot certification |
| *AIA.II.C.K4c* | c. Additional aircraft qualification |
| *AIA.II.C.K5* | Required endorsement of a pilot logbook for the satisfactory completion of the required FAA flight review. |
| *AIA.II.C.K6* | Required flight instructor records. |
| **Risk Management** | The applicant demonstrate the ability to teach and manage the risks arising from: |
| *AIA.II.C.R1* | [Intentionally left blank] |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.II.C.S1* | Prepare simulated logbook entries and endorsements required for at least two of the events specified in K1-K5 above. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

| **Task** | ***Task D. Runway Incursion Avoidance*** |
|---|---|
| **References** | FAA-H-8083-2; FAA-H-8083-3, FAA-H-8083-25; AC 91-73, A/FD, AIM |
| **Objective** | To determine that the applicant understands the elements of runway incursion avoidance and demonstrates the ability to apply that knowledge in ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.II.D.K1* | Taxi instructions/clearances. |
| *AIA.II.D.K2* | Airport markings, signs, and lights. |
| *AIA.II.D.K3* | Procedures for: |
| *AIA.II.D.K3a* | a. Appropriate flight deck activities during taxiing including taxi route planning, briefing the location of Hot Spots, communicating and coordinating with ATC |
| *AIA.II.D.K3b* | b. Safe taxi at towered and non-towered airports |
| *AIA.II.D.K3c* | c. Entering or crossing runways |
| *AIA.II.D.K3d* | d. Night taxi operations |
| *AIA.II.D.K3e* | e. Low visibility taxi operations |
| **Risk Management** | The applicant demonstrate the ability to teach and manage the risks arising from: |
| *AIA.II.D.R1* | Distractions, loss of situational awareness, and/or improper Task management. |
| *AIA.II.D.R2* | Confirmation or expectation bias as related to taxi instructions. |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.II.D.S1* | Deliver instruction on the elements and techniques for runway incursion avoidance in a scenario specified by the evaluator. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an “AIA” for Instructor Airplane, **i.e. AIA.CA.I.H.K1a = Hypoxia.**

| **Task** | **Task E. Human Factors** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.H, Human Factors |
| **Objective** | To determine that the applicant understands the elements of personal health, flight physiology, aeromedical and human factors as they relate to safety of flight and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Personal health, flight physiology, aeromedical and human factors relating to safety of flight as noted in the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to personal health, flight physiology, aeromedical and human factors relating to safety of flight as noted in the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on personal health, flight physiology, aeromedical and human factors relating to safety of flight in accordance with the referenced Task in a scenario specified by the evaluator. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an "AIA" for Instructor Airplane, **i.e. AIA.CA.I.D.K1F = TAS and ground speed.**

| **Task** | ***Task F. Navigation and Flight Planning*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.D, Cross-Country Flight Planning |
| **Objective** | To determine that the applicant understands the elements of VFR cross-country flight planning and navigation and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Flight planning and navigation on cross-country flights in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of cross-country flight planning and navigation in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on cross-country flight planning and navigation in accordance with the referenced Task in a scenario specified by the evaluator. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an "AIA" for Instructor Airplane, **i.e. AIA.CA.I.G.R1 = Handling a failure properly**

| **Task** | ***Task G. Airplane Flight Controls and Operation of Systems*** . |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.G., Operation of Systems |
| **Objective** | To determine that the applicant understands the elements of flight controls and safe operation of systems on the airplane provided for the flight test and has the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | The flight controls and systems operation in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to flight controls and operation of systems in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on airplane flight controls and operating aircraft systems in accordance with the referenced Task in a scenario specified by the evaluator. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an "AIA" for Instructor Airplane, **i.e. AIA.CA.I.F.R1 = Performance charts**

| **Task** | ***Task H. Airplane Performance, Limitations, Weight and Balance*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.F., Performance and Limitations |
| **Objective** | To determine that the applicant understands the elements of operating an aircraft safely within the parameters of its performance capabilities and limitations and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Airplane performance, limitations and weight and balance in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to aircraft performance, limitations and weight and balance in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on aircraft performance, limitations and weight and balance in accordance with the referenced Task for the aircraft to be used in the practical test. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an “AIA” for Instructor Airplane, **i.e. AIA.PA.XI.A.R2 = CFIT avoidance.**

| **Task** | ***Task I. Night Operation*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task XI.A., Night Preparation and Commercial Pilot ACS II.D.K6d Night Taxi Operations. |
| **Objective** | To determine that the applicant understands the elements of night operations and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Night operations in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to night operations in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on night operations in accordance with the referenced Task. |
| *AIA.II.I.S2* | Provide a pre-takeoff briefing appropriate for night operations |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an "AIA" for Instructor Airplane, **i.e. AIA.CA.IX.A.R4 = Combustion hazards in an oxygen-rich environment**

| **Task** | ***Task J. High Altitude Operations – Supplemental Oxygen*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task VIII.A., Supplemental Oxygen |
| **Objective** | To determine that the applicant understands the elements of flight at altitudes where supplemental oxygen is required or recommended. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | High altitude operations involving supplemental oxygen in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to high altitude operations requiring supplemental oxygen in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on high altitude operations involving the use of supplemental oxygen in accordance with the referenced Task. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IX.B.R1 = High altitude flight**

| **Task** | ***Task K. High Altitude Operations – Pressurization*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task VIII.B., Pressurization |
| **Objective** | To determine that the applicant understands the elements of flight in pressurized aircraft at high altitudes and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | High altitude operations involving pressurized aircraft in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to high altitude operations involving pressurized aircraft in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on high altitude operations involving pressurized aircraft in accordance with the referenced Task. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.I.E.K2 = Charting Symbology**

| **Task** | ***Task L. National Airspace System*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.E., National Airspace System |
| **Objective** | To determine that the applicant understands the elements of operating under VFR in the National Airspace System as a private or commercial pilot and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | The National Airspace System in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to operating in the National Airspace System in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on the National Airspace System in accordance with the referenced Task. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, i.e. **AIA.CA.VI.A.K3 = Topography**

| **Task** | ***Task M. Pilotage and Dead Reckoning*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task VI.A., Pilotage and Dead Reckoning |
| **Objective** | To determine that the applicant understands the elements associated with pilotage and dead reckoning and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Pilotage and dead reckoning in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to pilotage and dead reckoning in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on pilotage and dead reckoning in accordance with the referenced Task. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, i.e. **AIA.CA.VI.B.K4 = Transponder (Modes(s) A, C, and S)**

| **Task** | ***Task N. Navigation Systems and Radar Services*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task VI.B., Navigation Systems and Radar Services |
| **Objective** | To determine that the applicant understands the elements of navigation systems and radar services and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Navigation systems and radar services in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements elated to navigation systems and radar services in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on navigation systems and radar services in accordance with the referenced Task. |

**Note:** The evaluator must select Tasks C and D and at least one other Task from Area of Operation II, Technical Subject Areas.

For each of the following Tasks (E through O) included in the Technical Subject Areas Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, i.e. **AIA.CA.I.I.R2 = Impact of marine traffic**

| **Task** | ***Task O. Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules and Aids to Marine Navigation (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.I., Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules and Aids to Marine Navigation (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements associated with water and seaplane characteristics, seaplane bases, maritime rules, and aids to marine navigation, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules and Aids to Marine Navigation in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements related to Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules and Aids to Marine Navigation in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Deliver instruction on Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules and Aids to Marine Navigation in accordance with the referenced Task. |

## III. Preflight Preparation

**Note:** The evaluator must select at least one Task from Area of Operation III, Preflight Preparation.

| **Task** | ***Task A. Pilot Qualifications*** |
|---|---|
| **References** | 14 CFR parts 61, 67, 91; FAA-H-8083-3, FAA-H-8083-25; Commercial Pilot ACS Task I.A and Private Pilot ACS Task I.A; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of pilot training and qualification requirements for certificates and ratings at the sport, recreational, private, and commercial levels, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.III.A.K1* | Certification requirements, currency, and recordkeeping, to include training and logbook entries. |
| *AIA.III.A.K2* | Privileges and limitations of pilot certificates and ratings at sport, recreational, private, and commercial levels. |
| *AIA.III.A.K3* | Documents required to exercise privileges of the specified certificate and/or rating. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.III.A.R1* | [Intentionally left blank] |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.III.A.S1* | Deliver instruction on at least two of the elements specified in K1 through K3 above in a scenario specified by the evaluator. |

**1.**

**Note:** The evaluator must select at least one Task from Area of Operation III, Preflight Preparation.

Tasks B and C in the *Preflight Preparation* Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane.

| | |
|---|---|
| **Task** | ***Task B. Airworthiness Requirements*** .E |
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.B., Airworthiness Requirements |
| **Objective** | To determine that the applicant understands the elements of airworthiness requirements, including aircraft certificates, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Airworthiness requirements in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Airworthiness requirements in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.III.B.S1* | Deliver instruction on Airworthiness Requirements in accordance with the referenced Task. |

**Note:** The evaluator must select at least one Task from Area of Operation III, Preflight Preparation.

Tasks B and C in the *Preflight Preparation* Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, i.e. **AIA.CA.I.C.K1 = Acceptable sources of weather data for flight planning purposes**

| **Task** | ***Task C. Weather Information*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task I.C., Weather Information |
| **Objective** | To determine that the applicant understands the elements of weather information for a flight under VFR, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Weather Information in accordance with the referenced Task. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Weather information in accordance with the referenced Task. |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.III.C.S1* | Deliver instruction on weather information in accordance with the referenced Task, using a scenario specified by the evaluator. |

IV. Preflight Lesson on a Maneuver to be Performed in Flight

| **Task** | ***Task A. Maneuver Lesson*** |
|---|---|
| **References** | FAA-H-8083-3, FAA-H-8083-9, FAA-H-8083-23, FAA-H-8083-25; Commercial Pilot ACS, Private Pilot ACS; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of a maneuver Task selected from AIA VII through AIA XIII and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.IV.A.K1* | Purpose of the maneuver. |
| *AIA.IV.A.K2* | Elements of the maneuver and common learner errors associated with it. |
| *AIA.IV.A.K3* | Desired outcome(s), including completion standards. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.IV.A.R1* | Selected maneuver Task. |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.IV.A.S1* | Deliver instruction on the selected maneuver, using teaching methods and aids that incorporate K1 through K3 above as appropriate. |

## V. Preflight Procedures

**Note:** The evaluator must select at least one Task from Area of Operation V, Preflight Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.II.A.K1 = Pilot self-assessment**

| **Task** | ***Task A. Preflight Assessment*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task II.A, Preflight Assessment |
| **Objective** | To determine that the applicant understands the elements of preflight assessment and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Preflight assessment as noted in the referenced Task. |
| *AIA.V.A.K2* | Common errors related to preflight assessment, to include: |
| *AIA.V.A.K2a* | a. Failure to use a checklist. |
| *AIA.V.A.K2b* | b. Improper use of a checklist. |
| *AIA.V.A.K2c* | c. Allowing distractions to interrupt a visual inspection |
| *AIA.V.A.K2d* | d. Inability to recognize discrepancies |
| *AIA.V.A.K2e* | e. Failure to ensure servicing with the proper fuel and oil |
| *AIA.V.A.K2f* | f. Failure to ensure proper loading and securing of baggage, cargo, and equipment |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of preflight assessment as noted in the referenced Task. |
| *AIA.V.A.R2* | Instructional risks associated with preflight assessment. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain preflight assessment as noted in the referenced Task. |
| *AIA.V.A.S2* | Analyze and correct simulated common errors related to preflight assessment, to include those stipulated in K2a through K2f above. |

**Note:** The evaluator must select at least one Task from Area of Operation V, Preflight Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.II.B.K3 = Use of appropriate checklists**

| **Task** | ***Task B. Flight Deck Management*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task II.B., Flight Deck Management |
| **Objective** | To determine that the applicant understands the elements of flight deck management and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Flight deck management as noted in the referenced Task. |
| *AIA.V.B.K2* | Common errors related to flight deck management encompassing: |
| *AIA.V.B.K2a* | a. Failure to place and secure essential materials and equipment for easy access |
| *AIA.V.B.K2b* | b. Failure to properly adjust and secure safety belts, shoulder harnesses, rudder pedals, and seats |
| *AIA.V.B.K2c* | c. Failure to brief occupants on use of safety belts, opening door(s), sterile cockpit, keeping hands and feet away from controls, and emergency procedures. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of flight deck management as noted in the referenced Task. |
| *AIA.V.B.R2* | Instructional risks associated with flight deck management. |
| **Skills** | The applicant exhibits the ability to : |
| * | Demonstrate and simultaneously explain flight deck management as noted in the referenced Task. |
| *AIA.V.B.S2* | Analyze and correct simulated common errors related to flight deck management, to include those stipulated in K2a through K2e above. |

**Note:** The evaluator must select at least one Task from Area of Operation V, Preflight Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.II.C.R3 = Abnormal start**

| **Task** | ***Task C. Engine Starting*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task II.C., Engine Starting |
| **Objective** | To determine that the applicant understands the elements of engine starting and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Engine starting as noted in the referenced Task. |
| *AIA.V.C.K2* | Common errors related to engine starting encompassing: |
| *AIA.V.C.K2a* | a. Failure to use the appropriate checklist |
| *AIA.V.C.K2b* | b. Failure to use safety precautions related to starting, to include ensuring proper clearance around the aircraft. |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of engine starting as noted in the referenced Task. |
| *AIA.V.C.R2* | Instructional risks associated with engine starting. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain engine starting as noted in the referenced Task. |
| *AIA.V.C.S2* | Analyze and correct simulated common errors related to engine starting including those stipulated in K2a through K2b above. |

**Note:** The evaluator must select at least one Task from Area of Operation V, Preflight Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.II.D.K5 = Aircraft lighting**

| **Task** | ***Task D. Taxiing*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task II.D. Taxiing (ASEL, AMEL). |
| **Objective** | To determine that the applicant understands the elements of taxiing an airplane and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Taxiing as noted in the referenced Task. |
| *AIA.V.D.K2* | Common errors related to taxiing encompassing: |
| *AIA.V.D.K2a* | a. Improper use of brakes and/or power to manage taxi speed |
| *AIA.V.D.K2b* | b. Improper positioning of the flight controls for various wind conditions |
| *AIA.V.D.K2c* | c. Improper taxi speed |
| *AIA.V.D.K2d* | d. Failure to comply with airport/taxiway/runway surface markings, signs, signals, lighting and ATC clearances or instructions |
| *AIA.V.D.K2e* | e. Failure to use proper runway incursion avoidance procedures (e.g., planning and briefing the taxi route). |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of taxiing as noted in the referenced Task. |
| *AIA.V.D.R2* | Instructional risks associated with taxiing. |
| **Skills** | The applicant exhibits the ability to: |
| *AIA.V.D.S1* | Demonstrate and simultaneously explain taxiing as noted in the referenced Task. |
| *AIA.V.D.S2* | Analyze and correct simulated common errors related to taxiing, to include those stipulated in K2a through K2e above. |

**Note:** The evaluator must select at least one Task from Area of Operation V, Preflight Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.II.E.K5 = Aircraft lighting**

| **Task** | ***Task E. Taxiing and Sailing (ASES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task II.E., Taxiing and Sailing (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of taxiing and sailing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Taxiing and sailing as noted in the referenced Task. |
| *AIA.V.E.K2* | Common errors related to taxiing and/or sailing encompassing: |
| | *Taxiing* |
| *AIA.V.E.K2a* | a. Improper positioning of flight controls for wind conditions |
| *AIA.V.E.K2b* | b. Improper control of speed and direction |
| *AIA.V.E.K2c* | c. Failure to prevent porpoising and skipping |
| *AIA.V.E.K2d* | d. Failure to use the most suitable course and available marking aids, signs and lighting |
| *AIA.V.E.K2e* | e. Failure to use proper clearing procedures to avoid hazards |
| *AIA.V.E.K2f* | f. Failure to follow right-of-way rules |
| | *Sailing* |
| *AIA.V.E.K2g* | g. Failure to select the most favorable course to destination |
| *AIA.V.E.K2h* | h. Improper use of controls, flaps, and water rudders |
| *AIA.V.E.K2i* | i. Improper procedure when changing direction |
| *AIA.V.E.K2j* | j. Improper procedure for speed control |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of taxiing and sailing as noted in the referenced Task. |
| *AIA.V.E.R2* | Instructional risks associated with taxiing and sailing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain taxiing and sailing as noted in the referenced Task. |
| *AIA.V.E.S2* | Analyze and correct simulated common errors related to taxiing and sailing, to include those stipulated in K2a through K2f (taxiing) and/or K2g through K2j (sailing). |

**Note:** The evaluator must select at least one Task from Area of Operation V, Preflight Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.II.F.K1 = Purpose of pre-takeoff checklist items**

| **Task** | ***Task F. Before Takeoff Check*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task II.F., Before Takeoff Check |
| **Objective** | To determine that the applicant understands the elements of before takeoff checks and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Before takeoff checks as noted in the referenced Task. |
| *AIA.V.F.K2* | Common errors related to before takeoff checks encompassing: |
| *AIA.V.F.K2a* | a. Failure to use the appropriate checklist |
| *AIA.V.F.K2b* | b. Failure to review takeoff and emergency procedures |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of before takeoff checks as noted in the referenced Task. |
| *AIA.V.F.R2* | Instructional risks associated with before takeoff check. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain before takeoff checks as noted in the referenced Task. |
| *AIA.V.F.S2* | Analyze and correct simulated common errors related to before takeoff checks, to include those stipulated in K2a and K2b above. |

## VI. Airport and Seaplane Base Operations

**Note:** The evaluator must select at least one other Task from Area of Operation VI, Airport and Seaplane Base Operations.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.III.A.K5 = Lost communication procedures**

| Task | ***Task A. Communications and Light Signals*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task III.A., Communications and Light Signals |
| **Objective** | To determine that the applicant understands the elements of communications and ATC light signals and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Communications and light signals as noted in the referenced Task. |
| *AIA.VI.A.K2* | Common errors related to communications and light signals encompassing: |
| *AIA.VI.A.K2a* | a. Failure to use proper frequencies |
| *AIA.VI.A.K2b* | b. Improper procedure and phraseology when using communications (e.g., neglecting to state the aircraft call sign/N-number at non-towered airports, failure to accurately state position, runway of takeoff, and the airport of operation) |
| *AIA.VI.A.K2c* | c. Failure to acknowledge or correctly comply with ATC clearances and instructions |
| *AIA.VI.A.K2d* | d. Failure to understand or correctly comply with light signals |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of communications and light signals as noted in the referenced Task. |
| *AIA.VI.A.R2* | Instructional risks associated with communications and light signals. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain communications and light signals as noted in the referenced Task. |
| *AIA.VI.A.S2* | Analyze and correct common errors related to communications and light signals, to include those stipulated in K2a through K2d above. |

**Note:** The evaluator must select at least one other Task from Area of Operation VI, Airport and Seaplane Base Operations.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.III.B.K6 = Proper communications procedures**

| **Task** | ***Task B. Traffic Patterns*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task III.B., Traffic Patterns |
| **Objective** | To determine that the applicant understands the elements of airport traffic patterns and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Airport traffic patterns as noted in the referenced Task. |
| *AIA.VI.B.K2* | Common errors related to traffic patterns encompassing: |
| *AIA.VI.B.K2a* | a. Failure to comply with traffic pattern instructions, procedures, and rules |
| *AIA.VI.B.K2b* | b. Improper correction for wind drift |
| *AIA.VI.B.K2c* | c. Inadequate spacing from other traffic |
| *AIA.VI.B.K2d* | d. Poor altitude or airspeed control |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of airport traffic patterns as noted in the referenced Task. |
| *AIA.VI.B.R2* | Instructional risks associated with traffic patterns. |
| **Skills** | The applicant exhibits the ability to: |
| | Demonstrate and simultaneously explain airport traffic patterns as noted in the referenced Task. |
| *AIA.VI.B.S2* | Analyze and correct simulated common errors related to airport traffic patterns, to include those stipulated in K2a through K2d above. |

## VII. Takeoffs, Landings, and Go-Arounds

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.A.K3 = Appropriate aircraft configuration**

| **Task** | ***Task A. Normal Takeoff and Climb*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.A., Normal Takeoff and Climb |
| **Objective** | To determine that the applicant understands the elements of normal takeoff and climb and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Normal takeoff and climb as noted in the referenced Task. |
| *AIA.VII.A.K2* | Common errors related to normal takeoff and climb encompassing: |
| *AIA.VII.A.K2a* | a. Improper use of takeoff performance data and limitations |
| *AIA.VII.A.K2b* | b. Improper use of checklist |
| *AIA.VII.A.K2c* | c. Improper runway incursion avoidance procedures |
| *AIA.VII.A.K2d* | d. Improper use of controls during a normal or crosswind takeoff |
| *AIA.VII.A.K2e* | e. Inappropriate lift-off procedures |
| *AIA.VII.A.K2f* | f. Improper climb attitude, power setting, and airspeed ($V_Y$) |
| *AIA.VII.A.K2g* | g. Failure to confirm instrument indications (proper power, oil pressure, fuel flow, airspeed alive) prior to rotation |
| *AIA.VII.A.K2h* | h. Failure to maintain directional control |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of normal takeoff and climb as noted in the referenced Task. |
| *AIA.VII.A.R2* | Instructional risks associated with normal takeoff and climb. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain a normal takeoff and climb as noted in the referenced Task. |
| *AIA.VII.A.S2* | Analyze and correct simulated common errors related to normal takeoff and climb, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.B.K3 = Wind correction techniques on approach and landing**

| **Task** | ***Task B. Normal Approach and Landing*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.B., Normal Approach and Landing |
| **Objective** | To determine that the applicant understands the elements of normal approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Normal approach and landing as noted in the referenced Task. |
| *AIA.VII.B.K2* | Common errors related to normal approach and landing encompassing: |
| *AIA.VII.B.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.B.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.B.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.B.K2d* | d. Failure to consider the effect of wind and landing surface |
| *AIA.VII.B.K2e* | e. Improper procedure in use of power, wing flaps, or trim |
| *AIA.VII.B.K2f* | f. Inappropriate removal of hand from throttle |
| *AIA.VII.B.K2g* | g. Improper procedure during round out and touchdown |
| *AIA.VII.B.K2h* | h. Failure to hold back elevator pressure after touchdown |
| *AIA.VII.B.K2i* | i. Closing the throttle too soon after touchdown |
| *AIA.VII.B.K2j* | j. Poor directional control during round out, touchdown, and/or after touchdown |
| *AIA.VII.B.K2k* | k. Improper use of brakes |
| *AIA.VII.B.K2l* | l. Failure to ensure receipt and acknowledgement of landing clearance |
| *AIA.VII.B.K2m* | m. Failure to use runway incursion avoidance practices |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of normal approach and landing as noted in the referenced Task. |
| *AIA.VII.B.R2* | Instructional risks associated with normal approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain normal approach and landing as noted in the referenced Task. |
| *AIA.VII.BS2* | Analyze and correct simulated common errors related to normal approach and landing to include those stipulated in K2a through K2j above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.C.K4 = Ground effect**

| **Task** | ***Task C. Soft-Field Takeoff and Climb*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.C., Soft-Field Takeoff and Climb (ASEL) |
| **Objective** | To determine that the applicant understands the elements of soft-field takeoff and climb and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Soft-field takeoff and climb as noted in the referenced Task. |
| *AIA.VII.C.K2* | Common errors related to soft-field takeoff and climb encompassing: |
| *AIA.VII.C.K2a* | a. Improper use of takeoff performance data and limitations |
| *AIA.VII.C.K2b* | b. Improper use of checklist |
| *AIA.VII.C.K2c* | c. Improper runway incursion avoidance procedures |
| *AIA.VII.C.K2d* | d. Improper use of controls during a soft-field takeoff |
| *AIA.VII.C.K2e* | e. Improper lift-off procedures |
| *AIA.VII.C.K2f* | f. Improper climb attitude, power setting, and airspeed ($V_Y$ or $V_X$) |
| *AIA.VII.C.K2g* | g. Failure to confirm instrument indications (proper power, oil pressure, fuel flow, airspeed alive) prior to rotation |
| *AIA.VII.C.K2h* | h. Failure to maintain directional control |
| *AIA.VII.C.K2i* | i. Climbing out of ground effect prior to accelerating to $V_X$ or $V_Y$ |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of soft-field takeoff and climb as noted in the referenced Task. |
| *AIA.VII.C.R2* | Instructional risks associated with soft-field takeoff and climb. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain soft-field takeoff and climb as noted in the referenced Task. |
| *AIA.VII.C.S2* | Analyze and correct simulated common errors related to soft-field takeoff and climb, to include those stipulated in K2a through K2h above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.D.K3 = Wind correction techniques on approach and landing**

| **Task** | ***Task D. Soft-Field Approach and Landing*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.D., Soft-Field Approach and Landing (ASEL) |
| **Objective** | To determine that the applicant understands the elements of soft-field approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Soft-field approach and landing as noted in the referenced Task. |
| *AIA.VII.D.K2* | Common errors related to soft-field approach and landing, encompassing: |
| *AIA.VII.D.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.D.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.D.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.D.K2d* | d. Failure to consider the effect of wind and landing surface |
| *AIA.VII.D.K2e* | e. Improper procedure in use of power, wing flaps, or trim |
| *AIA.VII.D.K2f* | f. Inappropriate removal of hand from throttle |
| *AIA.VII.D.K2g* | g. Improper procedure during round out and touchdown |
| *AIA.VII.D.K2h* | h. Failure to hold back elevator pressure after touchdown |
| *AIA.VII.D.K2i* | i. Closing the throttle too soon after touchdown |
| *AIA.VII.D.K2j* | j. Poor directional control during round out, touchdown, and/or after touchdown |
| *AIA.VII.D.K2k* | k. Improper use of brakes |
| *AIA.VII.D.K2l* | l. Failure to ensure receipt and acknowledgement of landing clearance |
| *AIA.VII.D.K2m* | m. Improper runway incursion avoidance procedures |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of soft-field approach and landing as noted in the referenced Task. |
| *AIA.VII.D.R2* | Instructional risks associated with soft-field approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain soft-field approach and landing as noted in the referenced Task. |
| *AIA.VII.D.S2* | Analyze and correct simulated common errors related to soft-field approach and landing, to include those stipulated in K2a through K2j above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAXACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.E.K3 = Appropriate aircraft configuration**

| **Task** | ***Task E. Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.E., Short-Field Takeoff and Maximum Performance Climb (ASEL, AMEL) |
| **Objective** | To determine that the applicant understands the elements of short-field takeoff and maximum performance climb and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Short-field takeoff and maximum performance climb as noted in the referenced Task. |
| *AIA.VII.E.K2* | Common errors related to short-field takeoff and maximum performance climb encompassing: |
| *AIA.VII.E.K2a* | a. Improper use of takeoff performance data and limitations |
| *AIA.VII.E.K2b* | b. Improper use of checklist |
| *AIA.VII.E.K2c* | c. Improper runway incursion avoidance procedures |
| *AIA.VII.E.K2d* | d. Improper use of controls during a short-field takeoff |
| *AIA.VII.E.K2e* | e. Improper lift-off procedures |
| *AIA.VII.E.K2e* | f. Improper initial climb attitude, power setting, and airspeed ($V_X$) to clear obstacle and then transition to $V_Y$ |
| *AIA.VII.E.K2g* | g. Failure to confirm instrument indications (proper power, oil pressure, fuel flow, airspeed alive) prior to rotation |
| *AIA.VII.E.K2h* | h. Failure to maintain directional control |
| *AIA.VII.E.K2i* | i. Failure to fully release brakes at start of takeoff roll |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of short-field takeoff and maximum performance climb as noted in the referenced Task. |
| *AIA.VII.E.R2* | Instructional risks associated with short-field takeoff and maximum performance climb. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain short-field takeoff and maximum performance climb as noted in the referenced Task. |
| *AIA.VII.E.S2* | Analyze and correct common errors related of short-field takeoff and maximum performance climb, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.F.K3 = Wind correction techniques on approach and landing**

| **Task** | ***Task F. Short-Field Approach and Landing*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.F., Short-Field Approach and Landing (ASEL, AMEL) |
| **Objective** | To determine that the applicant understands the elements of short-field approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Short-field approach and landing as noted in the referenced Task. |
| *AIA.VII.F.K2* | Common errors related to short-field approach and landing, encompassing: |
| *AIA.VII.F.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.F.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.F.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.F.K2d* | d. Failure to consider the effect of wind and landing surface |
| *AIA.VII.F.K2e* | e. Improper procedure in use of power, wing flaps, or trim |
| *AIA.VII.F.K2f* | f. Inappropriate removal of hand from throttle |
| *AIA.VII.F.K2g* | g. Improper procedure during round out and touchdown |
| *AIA.VII.F.K2h* | h. Failure to hold back elevator pressure after touchdown |
| *AIA.VII.F.K2i* | i. Closing the throttle too soon after touchdown |
| *AIA.VII.F.K2j* | j. Poor directional control during round out, touchdown, and/or after touchdown |
| *AIA.VII.F.K2k* | k. Improper use of brakes |
| *AIA.VII.F.K2l* | l. Failure to ensure receipt and acknowledgement of landing clearance |
| *AIA.VII.F.K2m* | m. Improper runway incursion avoidance procedures |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of short-field approach and landing as noted in the referenced Task. |
| *AIA.VII.F.R2* | Instructional risks associated with short-field approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain short-field approach and landing as noted in the referenced Task. |
| *AIA.VII.F.S2* | Analyze and correct simulated common errors related to short-field approach and landing, to include those stipulated in K2a through K2j above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.G.K10 = Emergency procedures during takeoff and climb.**

| **Task** | ***Task G. Confined Area Takeoff and Maximum Performance Climb (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.G., Confined Area Takeoff and Maximum Performance Climb (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of confined area takeoff and maximum performance climb and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Confined area takeoff and maximum performance climb as noted in the referenced Task. |
| *AIA.VII.G.K2* | Common errors related to confined area takeoff and maximum performance climb, encompassing: |
| *AIA.VII.G.K2a* | a. Improper takeoff water way clearance procedures |
| *AIA.VII.G.K2b* | b. Poor judgment in the selection of a suitable takeoff area |
| *AIA.VII.G.K2c* | c. Improper use of controls during a confined area takeoff |
| *AIA.VII.G.K2d* | d. Improper lift-off procedures |
| *AIA.VII.G.K2e* | e. Hazards of inadvertent contact with the water after becoming airborne |
| *AIA.VII.G.K2f* | f. Improper initial climb attitude, power setting, and airspeed ($V_X$) to clear obstacle and then transition to $V_Y$ |
| *AIA.VII.G.K2g* | g. Improper use of checklist |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of confined area takeoff and maximum performance climb as noted in the referenced Task. |
| *AIA.VII.G.R2* | Instructional risks associated with confined area takeoff and maximum performance climb. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain confined area takeoff and maximum performance climb as noted in the referenced Task. |
| *AIA.VII.G.S2* | Analyze and correct simulated common errors related to confined area takeoff and maximum performance climb, to include those stipulated in K2a through K2f above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.H.K5 = Energy management.**

| **Task** | ***Task H. Confined Area Approach and Landing (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.H., Confined Area Approach and Landing (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of confined area approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Confined area approach and landing as noted in the referenced Task. |
| *AIA.VII.H.K2* | Common errors related to confined area approach and landing, encompassing: |
| *AIA.VII.H.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.H.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.H.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.H.K2d* | d. Improper procedure in use of power, wing flaps, or trim |
| *AIA.VII.H.K2e* | e. Inappropriate removal of hand from throttle |
| *AIA.VII.H.K2f* | f. Improper procedure during round out and touchdown |
| *AIA.VII.H.K2g* | g. Failure to maintain positive control after landing |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of confined area approach and landing as noted in the referenced Task. |
| *AIA.VII.H.R2* | Instructional risks associated with confined area approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain confined area approach and landing as noted in the referenced Task. |
| *AIA.VII.H.S2* | Analyze and correct simulated common errors related to confined area approach and landing, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.I.K1 = Water effects on operations**

| **Task** | ***Task I. Glassy-Water Takeoff and Climb (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.I., Glassy-Water Takeoff and Climb (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of glassy-water takeoff and climb and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Glassy-water takeoff and climb as noted in the referenced Task. |
| *AIA.VII.I.K2* | Common errors related to glassy-water takeoff and climb, encompassing: |
| *AIA.VII.I.K2a* | a. Improper takeoff water way clearance procedures |
| *AIA.VII.I.K2b* | b. Poor judgment in the selection of a suitable takeoff area |
| *AIA.VII.I.K2c* | c. Improper use of controls during a glassy-water takeoff |
| *AIA.VII.I.K2d* | d. Improper lift-off procedures |
| *AIA.VII.I.K2e* | e. Hazards of inadvertent contact with the water after becoming airborne |
| *AIA.VII.I.K2f* | f. Improper climb attitude, power setting, and airspeed ($V_Y$ or $V_X$) |
| *AIA.VII.I.K2g* | g. Improper use of checklist |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of glassy-water takeoff and climb as noted in the referenced Task. |
| *AIA.VII.I.R2* | Instructional risks associated with glassy-water takeoff and climb. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain glassy-water takeoff and climb as noted in the referenced Task. |
| *AIA.VII.I.S2* | Analyze and correct simulated common errors related to glassy-water takeoff and climb, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.J.K4 = Stabilized approach.**

| **Task** | ***Task J. Glassy-Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.J., Glassy-Water Approach and Landing (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of glassy-water approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Glassy-water approach and landing as noted in the referenced Task. |
| *AIA.VII.J.K2* | Common errors related glassy-water approach and landing, encompassing: |
| *AIA.VII.J.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.J.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.J.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.J.K2d* | d. Improper procedure in use of power, wing flaps, or trim |
| *AIA.VII.J.K2e* | e. Inappropriate removal of hand from throttle |
| *AIA.VII.J.K2f* | f. Improper procedure during round out and touchdown |
| *AIA.VII.J.K2g* | g. Failure to maintain positive control after landing |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of glassy-water approach and landing as noted in the referenced Task. |
| *AIA.VII.J.R2* | Instructional risks associated with glassy-water approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain glassy-water approach and landing as noted in the referenced Task. |
| *AIA.VII.J.S2* | Analyze and correct simulated common errors related to glassy-water approach and landing, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.K.S9 = Complete the appropriate checklist.**

| **Task** | ***Task K. Rough Water Takeoff and Climb (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.K., Rough Water Takeoff and Climb (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of rough water takeoff and climb and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Rough water takeoff and climb as noted in the referenced Task. |
| *AIA.VII.K.K2* | Common errors related to rough water takeoff and climb, encompassing: |
| *AIA.VII.K.K2a* | a. Improper takeoff water way clearance procedures |
| *AIA.VII.K.K2b* | b. Poor judgment in the selection of a suitable takeoff area |
| *AIA.VII.K.K2c* | c. Improper use of controls during a rough-water takeoff |
| *AIA.VII.K.K2d* | d. Improper lift-off procedures |
| *AIA.VII.K.K2e* | e. Hazards of inadvertent contact with the water after becoming airborne |
| *AIA.VII.K.K2f* | f. Improper climb attitude, power setting, and airspeed ($V_Y$ or $V_X$) |
| *AIA.VII.K.K2g* | g. Improper use of checklist |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of rough water takeoff and climb as noted in the referenced Task. |
| *AIA.VII.K.R2* | Instructional risks associated with rough water takeoff and climb. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain rough water takeoff and climb as noted in the referenced Task. |
| *AIA.VII.K.S2* | Analyze and correct simulated common errors related to rough water takeoff and climb, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.L.K4 = Stabilized approach.**

| **Task** | ***Task L. Rough Water Approach and Landing (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.L., Rough Water Approach and Landing (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of rough water approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Rough water approach and landing as noted in the referenced Task. |
| *AIA.VII.L.K2* | Common errors related rough water approach and landing, encompassing: |
| *AIA.VII.L.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.L.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.L.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.L.K2d* | d. Improper procedure in use of power, wing flaps, or trim |
| *AIA.VII.L.K2e* | e. Inappropriate removal of hand from throttle |
| *AIA.VII.L.K2f* | f. Improper procedure during round out and touchdown |
| *AIA.VII.L.K2g* | g. Failure to maintain positive control after landing |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of rough water approach and landing as noted in the referenced Task. |
| *AIA.VII.L.R2* | Instructional risks associated with rough water approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain rough water approach and landing as noted in the referenced task. |
| *AIA.VII.L.S2* | Analyze and correct simulated common errors related to rough water approach and landing, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.IV.M.K3 = Landing distance.**

| **Task** | ***Task M. Forward Slip to a Landing (ASEL, ASES)*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task IV.M., Forward Slip to a Landing |
| **Objective** | To determine that the applicant understands the elements of forward slip to a landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Forward slip to a landing as noted in the referenced Task. |
| *AIA.VII.M.K2* | Common errors related to forward slip to a landing, encompassing: |
| *AIA.VII.M.K2a* | a. Improper use of landing performance data and limitations |
| *AIA.VII.M.K2b* | b. Failure to establish approach and landing configuration at appropriate time or in proper sequence |
| *AIA.VII.M.K2c* | c. Failure to maintain a stabilized approach while slipping |
| *AIA.VII.M.K2d* | d. Carrying power in a forward slip |
| *AIA.VII.M.K2e* | e. Inappropriate removal of hand from throttle |
| *AIA.VII.M.K2f* | f. Improper procedure during transition from the slip to the touchdown |
| *AIA.VII.M.K2g* | g. Poor directional control after touchdown |
| *AIA.VII.M.K2h* | h. Improper use of brakes (landplane) |
| **Risk Management** | The applicant demonstrates the ability to teach and manage: |
| * | Elements of go-around/rejected landing as noted in the referenced Task. |
| *AIA.VII.M.R2* | Instructional risks associated with forward slip to a landing. |
| **Skills** | The applicant exhibits the ability to by: |
| * | Demonstrate and simultaneously explain forward slip to a landing as noted in the referenced Task. |
| *AIA.VII.M.S2* | Analyze and correct simulated common errors related to forward slip to a landing, to include those stipulated in K2a through K2h above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.N.K3 = Energy management.**

| **Task** | ***Task N. Go-Around/Rejected Landing*** |
|---|---|
| **Foundational ACS** | Refer to the to the Commercial Pilot ACS, Task IV.N., Go-Around/Rejected Landing |
| **Objective** | To determine that the applicant understands the elements of go-around/rejected landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Go-around/rejected landing as noted in the referenced *Task*. |
| *AIA.VII.N.K2* | Common errors related to go-around/rejected landing, encompassing: |
| *AIA.VII.N.K2a* | a. Failure to recognize a situation where a go-around/rejected landing is necessary |
| *AIA.VII.N.K2b* | b. Hazards of delaying a decision to go-around/rejected landing |
| *AIA.VII.N.K2c* | c. Improper power application |
| *AIA.VII.N.K2d* | d. Failure to control pitch attitude |
| *AIA.VII.N.K2e* | e. Failure to compensate for left turning tendencies |
| *AIA.VII.N.K2f* | f. Improper trim procedure |
| *AIA.VII.N.K2g* | g. Failure to maintain recommended airspeeds |
| *AIA.VII.N.K2h* | h. Improper wing flaps or landing gear retraction procedures |
| *AIA.VII.N.K2i* | i. Failure to maintain proper track during climb-out |
| *AIA.VII.N.K2j* | j. Failure to remain well clear of obstructions and other traffic |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of go-around/rejected landing as noted in the referenced Task. |
| *AIA.VII.N.R2* | Instructional risks associated with go-around/rejected landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain go-around/rejected landing as noted in the referenced Task. |
| *AIA.VII.N.S2* | Analyze and correct simulated common errors related to go-around/rejected landing, to include those stipulated in K2a through K2j above. |

**Note:** The evaluator must select at least two Takeoff and two Landing Tasks from Area of Operation VII, Takeoffs, Landings, and Go-Arounds.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in either the CAX ACS or the PAR ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.IV.M.R1 = Wind effects.**

| **Task** | ***Task O. Power-Off 180º Accuracy Approach and Landing (ASEL, ASES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IV.M., Power-Off 180° Accuracy Approach and Landing |
| **Objective** | To determine that the applicant understands the elements of a power-off 180° accuracy approach and landing and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Power-off 180° accuracy approach and landing as noted in the referenced *Task*. |
| *AIA.VII.O.K2* | Common errors related to power-off 180° accuracy approach and landing, encompassing: |
| *AIA.VII.O.K2a* | a. Failure to establish approach and landing configuration at proper time or in proper sequence |
| *AIA.VII.O.K2b* | b. Failure to identify the key points in the pattern |
| *AIA.VII.O.K2c* | c. Failure to establish and maintain a stabilized approach |
| *AIA.VII.O.K2d* | d. Failure to consider the effect of wind and landing surface |
| *AIA.VII.O.K2e* | e. Improper use of wing flaps, or trim |
| *AIA.VII.O.K2f* | f. Improper procedure during round out and touchdown or diving to touchdown on “spot” |
| *AIA.VII.O.K2g* | g. Failure to land within specified limits on the centerline without inappropriate side loads |
| *AIA.VII.O.K2h* | h. Failure to hold back elevator pressure after touchdown |
| *AIA.VII.O.K2i* | i. Poor directional control after touchdown |
| *AIA.VII.O.K2j* | j. Improper use of brakes |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of forward power-off 180° accuracy approach and landing as noted in the referenced Task. |
| *AIA.VII.O.R2* | Instructional risks associated with power-off 180° accuracy approach and landing. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain power-off 180° accuracy approach and landing as noted in the referenced Task. |
| *AIA.VII.O.S2* | Analyze and correct simulated common errors related to power-off 180° accuracy approach and landing, to include those stipulated in K2a through K2j above. |

## VIII. Fundamentals of Flight

**Note:** The evaluator must select at least one Task from Fundamentals of Flight.

| Task | *Task A. Straight and Level Flight* |
|---|---|
| **Reference** | FAA-H-8083-3, FAA-H-8083-23 |
| **Objective** | To determine that the applicant understands the elements of straight-and-level flight, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.VIII.A.K1* | Purpose of the maneuver. |
| *AIA.VIII.A.K2* | Basic elements of the maneuver. |
| *AIA.VIII.A.K3* | Desired outcome. |
| *AIA.VIII.A.K4* | Flight control and trim use. |
| *AIA.VIII.A.K5* | The pilot’s visual references when performing the maneuver. |
| *AIA.VIII.A.K6* | Common errors related to straight and level flight: |
| *AIA.VIII.A.K6a* | a. Failure to cross-check and correctly interpret outside and instrument references |
| *AIA.VIII.A.K6b* | b. Application of control movements rather than pressures |
| *AIA.VIII.A.K6c* | c. Failure to maintain coordinated flight |
| *AIA.VIII.A.K6d* | d. Faulty trim procedure |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.VIII.A.R1* | Elements of straight and level flight |
| *AIA.VIII.A.R2* | Instructional risks association with straight and level flight, to include: |
| *AIA.VIII.A.R2a* | a. Distractions, loss of situational awareness, and/or improper task management |
| *AIA.VIII.A.R2b* | b. Collision hazards, to include aircraft, terrain, obstacles, and wires |
| **Skills** | The applicant exhibits the ability to: |
| *AIA.VIII.A.S1* | Demonstrate and simultaneously explain straight and level flight. |
| *AIA.VIII.A.S2* | Analyze and correct simulated common errors related to straight and level flight, to include those stipulated in K6a through K6d above. |

**Note:** The evaluator must select at least one Task from Fundamentals of Flight.

| | |
|---|---|
| **Task** | ***Task B. Level Turns*** |
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine that the applicant understands the elements of level turns, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.VIII.B.K1* | Purpose of the maneuver. |
| *AIA.VIII.B.K2* | Basic elements of the maneuver. |
| *AIA.VIII.B.K3* | Desired outcome. |
| *AIA.VIII.B.K4* | Flight control and trim use. |
| *AIA.VIII.B.K5* | The pilot’s visual references when performing the maneuver. |
| *AIA.VIII.B.K6* | Common errors related to level turns: |
| *AIA.VIII.B.K6a* | a. Failure to cross-check and correctly interpret outside and instrument references |
| *AIA.VIII.B.K6b* | b. Application of control movements rather than pressures |
| *AIA.VIII.B.K6c* | c. Failure to maintain coordinated flight |
| *AIA.VIII.B.K6d* | d. Faulty trim procedure |
| *AIA.VIII.B.K6e* | e. Failure to clear area prior to initiating turn |
| *AIA.VIII.B.K6f* | f. Faulty altitude and bank control |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.VIII.B.R1* | Elements of level turns |
| *AIA.VIII.B.R2* | Instructional risks associated with level turns, to include: |
| *AIA.VIII.B.R2a* | a. Distractions, loss of situational awareness, and/or improper task management |
| *AIA.VIII.B.R2b* | b. Collision hazards, to include aircraft, terrain, obstacles, and wires |
| **Skills** | The applicant exhibits the ability to: |
| *AIA.VIII.B.S1* | Demonstrate and simultaneously explain level turns. |
| *AIA.VIII.B.S2* | Analyze and correct simulated common errors related to level turns, to include those stipulated in K6a through K6e above. |

**Note:** The evaluator must select at least one Task from Fundamentals of Flight.

| **Task** | ***Task C. Straight Climbs and Climbing Turns*** |
|---|---|
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine that the applicant understands the elements of straight climbs and climbing turns, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.VIII.C.K1* | Purpose of the maneuver. |
| *AIA.VIII.C.K2* | Basic elements of the maneuver. |
| *AIA.VIII.C.K3* | Desired outcome. |
| *AIA.VIII.C.K4* | Flight control and trim use. |
| *AIA.VIII.C.K5* | The pilot's visual references when performing the maneuver. |
| *AIA.VIII.C.K6* | Common errors related to straight climbs and climbing turns: |
| *AIA.VIII.C.K6a* | a. Failure to cross-check and correctly interpret outside and instrument references |
| *AIA.VIII.C.K6b* | b. Application of control movements rather than pressures |
| *AIA.VIII.C.K6c* | c. Failure to maintain coordinated flight |
| *AIA.VIII.C.K6d* | d. Faulty trim procedure |
| *AIA.VIII.C.K6e* | e. Failure to clear area prior to initiating turn |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.VIII.C.R1* | Elements of straight climbs and climbing turns encompassing: |
| *AIA.VIII.C.2* | Instructional risks associated with straight climbs and climbing turns, to include: |
| *AIA.VIII.C.R2a* | a. Distractions, loss of situational awareness, and/or improper task management |
| *AIA.VIII.C.R2b* | b. Collision hazards, to include aircraft, terrain, obstacles, and wires |
| **Skills** | The applicant exhibits the ability to: |
| *AIA.VIII.C.S1* | Demonstrate and simultaneously explain straight climbs and climbing turns. |
| *AIA.VIII.C.S2* | Analyze and correct simulated common errors related to straight climbs and climbing turns, to include those stipulated in K6a through K6d above. |

**Note:** The evaluator must select at least one Task from Fundamentals of Flight.

| **Task** | ***Task D. Straight Descents and Descending Turns*** |
|---|---|
| **Reference** | FAA-H-8083-3 |
| **Objective** | To determine that the applicant understands the elements of straight descents and descending turns, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.VIII.D.K1* | Purpose of the maneuver. |
| *AIA.VIII.D.K2* | Basic elements of the maneuver. |
| *AIA.VIII.D.K3* | Desired outcome. |
| *AIA.VIII.D.K4* | Flight control and trim use. |
| *AIA.VIII.D.K5* | The pilot's visual references when performing the maneuver. |
| *AIA.VIII.D.K6* | Common errors related to straight descents and descending turns: |
| *AIA.VIII.D.K6a* | a. Failure to cross-check and correctly interpret outside and instrument references |
| *AIA.VIII.D.K6b* | b. Application of control movements rather than pressures |
| *AIA.VIII.D.K6c* | c. Failure to maintain coordinated flight |
| *AIA.VIII.D.K6d* | d. Faulty trim procedure |
| *AIA.VIII.D.K6e* | e. Failure to clear area prior to initiating turn |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.VIII.D.R1* | Elements of straight descents and descending turns |
| *AIA.VIII.D.R2* | Instructional risks associated with straight descents and descending turns, to include: |
| *AIA.VIII.D.R2a* | a. Distractions, loss of situational awareness, and/or improper task management |
| *AIA.VIII.D.R2b* | b. Collision hazards, to included aircraft, terrain, obstacles, and wires |
| **Skills** | The applicant exhibits the ability to: |
| *AIA.VIII.D.S1* | Demonstrate and simultaneously explain straight descents and descending turns. |
| *AIA.VIII.D.S2* | Analyze and correct simulated common errors related to straight descents and descending turns, to include those stipulated in K6a through K6f above. |

## IX. Performance Maneuvers

**Note:** The evaluator must select at least Task A or B and Task C or D from Area of Operation IX, Performance Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.V.A.K6 = Overbanking tendencies.**

| **Task** | ***Task A. Steep Turns*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task V.A., Steep Turns |
| **Objective** | To determine that the applicant understands the elements of steep turns and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Steep turns as noted in the referenced Task. |
| *AIA.IX.A.K2* | Common errors related to steep turns encompassing: |
| *AIA.IX.A.K2a* | a. Improper planning for each phase of the maneuver |
| *AIA.IX.A.K2b* | b. Improper pitch, bank, and power coordination during entry or completion |
| *AIA.IX.A.K2c* | c. Improper procedure in correcting altitude deviations |
| *AIA.IX.A.K2d* | d. Uncoordinated use of flight controls |
| *AIA.IX.A.K2e* | e. Loss of orientation and/or situational awareness |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of steep turns as noted in the referenced Task. |
| *AIA.IX.A.R2* | Instructional risks associated with steep turns. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain steep turns as noted in the referenced Task. |
| *AIA.IX.A.S2* | Analyze and correct simulated common errors related to steep turns, to include those stipulated in K2a through K2d above. |

**Note:** The evaluator must select at least Task A or B and Task C or D from Area of Operation IX Performance Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.V.B.R6 = Low altitude maneuvering.**

| **Task** | ***Task B. Steep Spirals*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task V.B., Steep Spiral |
| **Objective** | To determine that the applicant understands the elements of steep spirals and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Steep spirals as noted in the referenced Task. |
| *AIA.IX.B.K2* | Common errors related to steep spirals encompassing: |
| *AIA.IX.B.K2a* | a. Improper planning for each phase of the maneuver |
| *AIA.IX.B.K2b* | b. Improper pitch, bank, yaw, and power coordination during entry or completion |
| *AIA.IX.B.K2c* | c. Failure to maintain constant airspeed and radius |
| *AIA.IX.B.K2d* | d. Uncoordinated use of flight controls |
| *AIA.IX.B.K2e* | e. Loss of orientation and/or situational awareness |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of steep spirals as noted in the referenced Task. |
| *AIA.IX.B.R2* | Instructional risks associated with steep spirals. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain steep spirals as noted in the referenced Task. |
| *AIA.IX.B.S2* | Analyze and correct simulated common errors related to steep spirals, to include those stipulated in K2a through K2d above. |

**Note:** The evaluator must select at least Task A or B and Task C or D from Area of Operation IX, Performance Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.V.C.R3 = Energy management.**

| **Task** | ***Task C. Chandelles*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task V.C., Chandelles |
| **Objective** | To determine that the applicant understands the elements of chandelles and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Chandelles as noted in the referenced Task. |
| *AIA.IX.C.K2* | Common errors related to chandelles encompassing: |
| *AIA.IX.C.K2a* | a. Improper planning for each phase of the maneuver, to include poor timing of pitch and bank attitude changes |
| *AIA.IX.C.K2b* | b. Improper pitch, bank, yaw, and power coordination during entry or completion |
| *AIA.IX.C.K2c* | c. Failure to achieve maximum performance |
| *AIA.IX.C.K2d* | d. Uncoordinated use of flight controls |
| *AIA.IX.C.K2e* | e. Loss of orientation and/or situational awareness |
| *AIA.IX.C.K2f* | f. Over-reliance on flight instruments |
| *AIA.IX.C.K2g* | g. Stalling the aircraft during the maneuver |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of chandelles as noted in the referenced Task. |
| *AIA.IX.C.R2* | Instructional risks associated with chandelles. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain chandelles as noted in the referenced Task. |
| *AIA.IX.C.S2* | Analyze and correct simulated common errors related to chandelles, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least Task A or B and Task C or D from Area of Operation IX, Performance Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.V.D.K1 = Aircraft coordination.**

| **Task** | ***Task D. Lazy Eights*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task V.D., Lazy Eights |
| **Objective** | To determine that the applicant understands the elements of lazy eights and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Lazy eights as noted in the referenced Task. |
| *AIA.IX.D.K2* | Common errors related to lazy eights encompassing: |
| *AIA.IX.D.K2a* | a. Improper planning for each phase of the maneuver, to include poor selection of reference points |
| *AIA.IX.D.K2b* | b. Improper pitch, bank, yaw, and power coordination during entry or completion |
| *AIA.IX.D.K2c* | c. Failure to execute symmetrical loops |
| *AIA.IX.D.K2d* | d. Uncoordinated use of flight controls |
| *AIA.IX.D.K2e* | e. Loss of orientation and/or situational awareness |
| *AIA.IX.D.K2f* | f. Over-reliance on flight instruments |
| *AIA.IX.D.K2g* | g. Inconsistent airspeed and altitude at key points |
| *AIA.IX.D.K2h* | h. Excessive deviation from reference points |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of lazy eights as noted in the referenced Task. |
| *AIA.IX.D.R2* | Instructional risks associated with lazy eights. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain lazy eights as noted in the referenced Task. |
| *AIA.IX.D.S2* | Analyze and correct common errors related to lazy eights, to include those stipulated in K2a through K2g above. |

## X. Ground Reference Maneuvers

**Note:** The evaluator must select both Tasks A and B from Area of Operation X, Ground Reference Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.V.B.S2 = Select a suitable ground reference.**

| **Task** | ***Task A. Ground Reference Maneuvers*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task V.B., Ground Reference Maneuvers |
| **Objective** | To determine that the applicant understands the elements of ground reference maneuvers and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining |
| * | Ground reference maneuvers as noted in the referenced Task. |
| *AIA.X.A.K2* | Common errors related to ground reference maneuvers encompassing: |
| *AIA.X.A.K2a* | a. Improper planning for each phase of the maneuver |
| *AIA.X.A.K2b* | b. Selection of ground reference with no suitable emergency landing area within gliding distance |
| *AIA.X.A.K2c* | c. Faulty entry procedure |
| *AIA.X.A.K2d* | d. Improper ground track |
| *AIA.X.A.K2e* | e. Failure to maintain selected altitude or airspeed |
| *AIA.X.A.K2f* | f. Improper correction for wind drift |
| *AIA.X.A.K2g* | g. Uncoordinated use of flight controls |
| *AIA.X.A.K2h* | h. Loss of orientation and/or situational awareness |
| *AIA.X.A.K2i* | i. Failure to properly divide attention |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of ground reference maneuvers as noted in the referenced Task. |
| *AIA.X.A.R2* | Instructional risks associated with ground reference maneuvers. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain ground reference maneuvers as noted in the referenced Task. |
| *AIA.X.A.S2* | Analyze and correct simulated common errors related to ground reference maneuvers, to include those stipulated in K2a through K2g above. |

**Note:** The evaluator must select at least Task D and one other Task from Area of Operation X, Ground Reference Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR or CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.V.E.R4 = CFIT avoidance.**

| **Task** | ***Task B. Eights on Pylons*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task V.E., Eights on Pylons |
| **Objective** | To determine that the applicant understands the elements of eights on pylons and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining |
| * | Eights on pylons as noted in the referenced Task. |
| *AIA.X.B.K2* | Common errors related to eights on pylons encompassing: |
| *AIA.X.B.K2a* | a. Improper planning for each phase of the maneuver |
| *AIA.X.B.K2b* | b. Selection of pylons with no suitable emergency landing area within gliding distance |
| *AIA.X.B.K2c* | c. Faulty entry procedure |
| *AIA.X.B.K2d* | d. Improper “line-of-sight” reference |
| *AIA.X.B.K2e* | e. Application of rudder alone to maintain “line-of-sight” on the pylon |
| *AIA.X.B.K2f* | f. Improper correction for wind drift |
| *AIA.X.B.K2g* | g. Uncoordinated use of flight controls |
| *AIA.X.B.K2h* | h. Loss of orientation and/or situational awareness |
| *AIA.X.B.K2i* | i. Failure to properly divide attention |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of eights on pylons as noted in the referenced Task. |
| *AIA.X.B.R2* | Instructional risks associated with eights on pylons. |
| **Skills** | The applicant exhibits the ability to: |
| * | Demonstrate and simultaneously explain eights on pylons as noted in the referenced Task. |
| *AIA.X.B.S2* | Analyze and correct simulated common errors related to eights on pylons, to include those stipulated in K2a through K2j above. |

XI. Slow flight, Stalls, and Spins

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Task H from Area of Operation XI, Slow Flight, Stalls, and Spins.

The following Task refers to the description contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.VII.A.K2 = Use of slow flight in normal operations.**

| **Task** | ***Task A. Maneuvering During Slow Flight*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task VII, A., Maneuvering During Slow Flight |
| **Reference** | FAA-H-8083-3; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements associated with maneuvering during slow flight, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Maneuvering During Slow Flight as noted in the referenced *Task*. |
| *AIA.XI.A.K2* | Common errors related to maneuvering during slow flight encompassing: |
| *AIA.XI.A.K2a* | a. Failure to establish specified gear and flap configuration prior to entry |
| *AIA.XI.A.K2b* | b. Improper entry |
| *AIA.XI.A.K2c* | c. Improper pitch, heading, yaw, and bank control during straight-ahead flight |
| *AIA.XI.A.K2d* | d. Improper pitch, heading, yaw, and bank control during turning flight |
| *AIA.XI.A.K2e* | e. Rough and/or uncoordinated use of flight controls |
| *AIA.XI.A.K2f* | f. Failure to maintain coordinated flight |
| *AIA.XI.A.K2g* | g. Failure to establish and maintain the specified airspeed and altitude |
| *AIA.XI.A.K2h* | h. Unintentional stall |
| *AIA.XI.A.K2i* | i. Improper correction for left-turning tendencies |
| *AIA.XI.A.K2j* | j. Improper trim technique |
| *AIA.XI.A.K2k* | k. Inappropriate removal of hand from throttle(s) |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of maneuvering during slow flight as noted in the referenced *Task*. |
| *AIA.XI.A.R2* | Instructional risks associated with maneuvering during slow flight. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain maneuvering during slow flight as noted in the referenced *Task*. |
| *AIA.XI.A.S2* | Analyze and correct simulated common errors related to maneuvering during slow flight, to include those stipulated in K2a through K2k above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Task H from Area of Operation XI, Slow Flight, Stalls, and Spins.

| **Task** | ***Task B. Power-Off Stalls (Proficiency)*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VII, B., and Commercial Pilot ACS, Task VII, B., Power-Off Stalls |
| **Reference** | FAA-H-8083-3; FAA-H-8083-9; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of power-off stalls, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Power-Off Stalls as noted in the referenced Tasks |
| *AIA.XI.B.K2* | Common errors related to power-off stalls, encompassing: |
| *AIA.XI.B.K2a* | a. Failure to establish the specified landing gear and flap configuration prior to entry |
| *AIA.XI.B.K2b* | b. Improper entry |
| *AIA.XI.B.K2c* | c. Improper pitch, heading, yaw, and bank control during straight-ahead stalls |
| *AIA.XI.B.K2d* | d. Improper pitch, yaw, and bank control during turning stalls |
| *AIA.XI.B.K2e* | e. Rough and/or uncoordinated use of flight controls |
| *AIA.XI.B.K2f* | f. Failure to maintain coordinated flight |
| *AIA.XI.B.K2g* | g. Failure to recognize the first indications of a stall |
| *AIA.XI.B.K2h* | h. Failure to achieve a stall |
| *AIA.XI.B.K2i* | i. Poor stall recognition and delayed recovery |
| *AIA.XI.B.K2j* | j. Excessive altitude loss or excessive airspeed during recovery |
| *AIA.XI.B.K2k* | k. Secondary stall during recovery |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of Power-Off Stalls as noted in the referenced Tasks. |
| *AIA.XI.B.R2* | Instructional risks associated with power-off stalls. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain impending and full power-off stalls as noted in the referenced Tasks. |
| *AIA.XI.B.S2* | Analyze and correct simulated common errors related to power-off stalls, in descending flight (straight or turning), with selected landing gear and flap configurations, to include those stipulated in K2a through K2k above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or H), and Tasks G and I from Area of Operation XI, Slow Flight, Stalls, and Spins.

| **Task** | ***Task C. Power-On Stalls (Proficiency)*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VII, C., and Commercial Pilot ACS, Task VII, C., Power-On Stalls |
| **Reference** | FAA-H-8083-3; FAA-H-8083-9; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of power-on stalls, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Power-On Stalls as noted in the referenced Tasks. |
| *AIA.XI.C.K2* | Common errors related to power-on stalls, encompassing: |
| *AIA.XI.C.K2a* | a. Failure to establish the specified landing gear and flap configuration prior to entry |
| *AIA.XI.C.K2b* | b. Improper entry |
| *AIA.XI.C.K2c* | c. Improper pitch, heading, yaw, and bank control during straight-ahead stalls |
| *AIA.XI.C.K2d* | d. Improper pitch, yaw, and bank control during turning stalls |
| *AIA.XI.C.K2e* | e. Rough and/or uncoordinated use of flight controls |
| *AIA.XI.C.K2f* | f. Failure to maintain coordinated flight |
| *AIA.XI.C.K2g* | g. Failure to recognize the first indications of a stall |
| *AIA.XI.C.K2h* | h. Failure to achieve a stall |
| *AIA.XI.C.K2i* | i. Poor stall recognition and delayed recovery |
| *AIA.XI.C.K2k* | j. Excessive altitude loss or excessive airspeed during recovery |
| *AIA.XI.C.K2k* | k. Secondary stall during recovery |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of Power-On Stalls as noted in the referenced Tasks. |
| *AIA.XI.C.R2* | Instructional risks associated with power-on stalls. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain impending and full power-on stalls as noted in the referenced Tasks. |
| *AIA.XI.C.S2* | Analyze and correct simulated common errors related to power-on stalls, in climbing flight (straight or turning), with selected landing gear and flap configurations, to include those stipulated in K2a through K2k above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Task H from Area of Operation XI, Slow Flight, Stalls, and Spins.

| **Task** | ***Task D. Cross-Controlled Stalls (Demonstration)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-H-8083-9; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of cross-controlled stalls, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.XI.D.K1* | Aerodynamics of cross-controlled stalls. |
| *AIA.XI.D.K2* | Flight situations where unintentional cross-controlled stalls may occur. |
| *AIA.XI.D.K3* | Recognition of cross-controlled stalls. |
| *AIA.XI.D.K4* | Entry procedure and minimum entry altitude. |
| *AIA.XI.D.K5* | Recovery procedure. |
| *AIA.XI.D.K6* | Common errors related to cross-controlled stalls, encompassing: |
| *AIA.XI.D.K6a* | a. Failure to establish selected configuration prior to entry |
| *AIA.XI.D.K6b* | b. Failure to establish a cross-controlled turn and stall condition that will adequately demonstrate the hazards of a cross-controlled stall |
| *AIA.XI.D.K6c* | c. Improper or inadequate demonstration of the recognition and recovery from a cross-controlled stall |
| *AIA.XI.D.K6d* | d. Failure to present simulated student instruction that emphasizes the hazards of a cross-controlled condition in a gliding or reduced airspeed condition |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.XI.D.R1* | Failure to present simulated instruction that demonstrates and emphasizes the hazards of a cross-controlled stall. |
| *AIA.XI.D.R2* | Instructional risks associated with cross-controlled stalls to include. |
| *AIA.XI.D.R2a* | a. Disorientation, loss of situational awareness, and/or improper task management |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.XI.D.S1* | Demonstrate and simultaneously explain a cross-controlled stall in a specified configuration. |
| *AIA.XI.D.S2* | Demonstrate and simultaneously explain proper stall recovery techniques promptly after a cross-controlled stall has occurred. |
| *AIA.XI.D.S3* | Analyze and correct simulated common errors related to cross-controlled stalls, to include those stipulated in K6a through K6d above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Task H from Area of Operation XI, Slow Flight, Stalls, and Spins.

| **Task** | ***Task E. Elevator Trim Stalls (Demonstration)*** |
|---|---|
| **Foundational ACS** | FAA-H-8083-3; FAA-H-8083-9; POH/AFM |
| **Objective** | To determine that the applicant understand the elements of elevator trim stalls and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.XI.E.K1* | Aerodynamics of elevator trim stalls. |
| *AIA.XI.E.K2* | Flight situations where elevator trim stalls could occur. |
| *AIA.XI.E.K3* | Recognition of elevator trim stalls. |
| *AIA.XI.E.K4* | Entry procedure and minimum entry altitude. |
| *AIA.XI.E.K5* | Recovery procedure. |
| *AIA.XI.E.K6* | Common errors related to elevator trim stalls, encompassing: |
| *AIA.XI.E.K6a* | a. Failure to present simulated student instruction that adequately emphasizes the hazards of poor correction for propeller and torque effects and up-elevator trim during go-around and other maneuvers |
| *AIA.XI.E.K6b* | b. Failure to establish selected configuration prior entry |
| *AIA.XI.E.K6c* | c. Improper or inadequate demonstration of the recognition of, and the recovery from an elevator trim stall |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.XI.E.R1* | Failure to present simulated instruction that adequately emphasizes the hazards of an elevator trim stall. |
| *AIA.XI.E.R2* | Instructional risks associated with elevator trim stalls to include: |
| *AIA.XI.E.R2a* | a. Disorientation, loss of situational awareness, and /or improper task management |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.XI.E.S1* | Demonstrate and simultaneously explain elevator trim stalls in a specified configuration. |
| *AIA.XI.E.S2* | Demonstrate and simultaneously explain proper stall recovery techniques promptly after an elevator trim stall has occurred. |
| *AIA.XI.E.S3* | Analyze and correct simulated common errors related to elevator trim stalls, to include those stipulated in K6a through K6c above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Tasks H from Area of Operation XI, Slow Flight, Stalls, and Spins.

| | |
|---|---|
| **Task** | b. ***Task F. Secondary Stalls (Demonstration)*** |
| **Reference** | FAA-H-8083-3; FAA-H-8083-9; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of secondary stalls, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.XI.F.K1* | Aerodynamics of secondary stalls. |
| *AIA.XI.F.K2* | Flight situations where secondary stalls may occur. |
| *AIA.XI.F.K3* | Recognition of a secondary stall. |
| *AIA.XI.F.K4* | Entry procedure and minimum entry altitude. |
| *AIA.XI.F.K5* | Recovery procedure. |
| *AIA.XI.F.K6* | Common errors related to secondary stalls, encompassing: |
| *AIA.XI.F.K6a* | a. Failure to establish selected configuration prior to entry |
| *AIA.XI.F.K6b* | b. Improper or inadequate demonstration of the recognition of and recovery from a secondary stall |
| *AIA.XI.F.K6c* | c. Failure to present simulated student instruction that adequately emphasizes the hazards of poor procedure in recovering from a primary stall |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.XI.F.R1* | Failure to present simulated instruction that adequately demonstrates and emphasizes the hazards of a secondary stall. |
| *AIA.XI.F.R2* | Instructional risks associated with a secondary stall to include: |
| *AIA.XI.F.R2a* | a. Disorientation, loss of situational awareness, and/or improper task management |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.XI.F.S1* | Demonstrate and simultaneously explain secondary stalls in a specified configuration. |
| *AIA.XI.F.S2* | Demonstrate and simultaneously explain proper stall recovery techniques after a secondary stall has occurred. |
| *AIA.XI.F.S3* | Analyze and correct simulated common errors related to secondary stalls, to include those stipulated in K6a through K6c above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Tasks H from Area of Operation XI, Slow Flight, Stalls, and Spins.

| **Task** | ***Task G. Accelerated Maneuver Stalls (Demonstration)*** |
|---|---|
| **Reference** | FAA-H-8083-3; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of accelerated maneuver stalls and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| *AIA.XI.G.K1* | Aerodynamics of accelerated maneuver stalls. |
| *AIA.XI.G.K2* | Flight situations where accelerated maneuver stalls may occur. |
| *AIA.XI.G.K3* | Recognition of an accelerated maneuver stall. |
| *AIA.XI.G.K4* | Entry procedure and minimum entry altitude. |
| *AIA.XI.G.K5* | Recovery procedure. |
| *AIA.XI.G.K6* | Common errors related to accelerated maneuver stalls, encompassing: |
| *AIA.XI.G.K6a* | a. Failure to establish proper configuration prior to entry |
| *AIA.XI.G.K6b* | b. Improper or inadequate demonstration of the recognition and recovery from a accelerated maneuver stall |
| *AIA.XI.G.K6c* | c. Failure to present simulated student instruction that adequately emphasizes the hazards of poor procedures in recovering from an accelerated stall |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.XI.G.R1* | Failure to present simulated instruction that adequately demonstrates and emphasizes the hazards of an accelerated maneuver stall. |
| *AIA.XI.G.R2* | Instructional risks associated with an accelerated maneuver stall to include: |
| *AIA.XI.G.R2a* | a. Disorientation, loss of situational awareness, and/or improper task management |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.XI.G.S1* | Demonstrate and simultaneously explain accelerated maneuver stall. |
| *AIA.XI.G.S2* | Demonstrate and simultaneously explain proper stall recovery techniques promptly after an accelerated stall has occurred. |
| *AIA.IX.G.S3* | Analyze and correct simulated common errors related to accelerated maneuver stalls, to include those stipulated in K6a through K6c above. |

**Note:** The evaluator must select Task A, at least one proficiency stall (Task B or C), one demonstration stall (Task D, E, F or G), and Tasks H from Area of Operation XI, Slow Flight, Stalls, and Spins.

| Task | *Task H. Spin Awareness and Spins* PTS XI.G |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task VII E., Spin Awareness |
| **Reference** | FAA-H-8083-3; FAA-H-8083-25; POH/AFM |
| **Objective** | To determine that the applicant understands the elements of spins, and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction.<br>**NOTE**: At the discretion of the examiner, a logbook record attesting applicant instructional competency in spin entries, spins, and spin recoveries may be accepted in lieu of this Task. The flight instructor who conducted the spin instruction must certify the logbook record. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Spin awareness as noted in the referenced Task. |
| *AIA.XI.H.K2* | Anxiety factors associated with spin instruction. |
| *AIA.XI.H.K4* | Airplanes approved for the spin maneuver based on airworthiness category and type certificate. |
| *AIA.XI.H.K5* | Flight situations where unintentional spins may occur. |
| *AIA.XI.H.K6* | Entry procedure and minimum entry altitude for intentional spins. |
| *AIA.XI.H.K7* | Control procedure to maintain a stabilized spin. |
| *AIA.XI.H.K8* | Orientation during a spin, to include which instrument(s) are reliable for determining the direction of spin |
| *AIA.XI.H.K9* | Recovery procedure and minimum recovery altitude for intentional spins. |
| *AIA.XI.H.K10* | Common errors related to performing spins, encompassing: |
| *AIA.XI.H.K10a* | a. Failure to establish proper configuration prior to spin entry |
| *AIA.XI.H.K10b* | b. Failure to achieve and maintain a full stall during spin entry |
| *AIA.XI.H.K10c* | c. Failure to close throttle when a spin entry is achieved |
| *AIA.XI.H.K10d* | d. Failure to recognize the indications of an imminent, unintentional spin |
| *AIA.XI.H.K10e* | e. Improper use of flight controls during spin entry, rotation, or recovery |
| *AIA.XI.H.K10f* | f. Disorientation during a spin |
| *AIA.XI.H.K10g* | g. Failure to distinguish between a spiral dive and a spin |
| *AIA.XI.H.K10h* | h. Excessive speed or accelerated stall during recovery |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| *AIA.XI.H.R1* | Failure to provide adequate instruction on spin awareness as noted in the referenced Task. |
| *AIA.XI.H.R2* | Instructional risks associated with performing spins. |
| **Skills** | The applicant demonstrates the ability to: |
| *AIA.XI.H.S1* | Explain spin awareness as noted in the referenced task. |
| *AIA.XI.H.S2* | Demonstrate and simultaneously explain proper intentional spin entry and recovery procedures, if requested by the evaluator. |
| *AIA.XI.H.S3* | Analyze and correct simulated common errors related to spins, to include those stipulated in K10a through K10h above. |

## XII. Basic Instrument Maneuvers

**Note:** The evaluator must select at least one Task from Area of Operation XII, Basic Instrument Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR ACS document as indicated:

*Referenced Task Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.VIII.A.K1 = Flight instrument function and operation.**

| **Task** | ***Task A. Straight-and-Level Flight*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VIII.A., Straight-and-Level Flight |
| **Objective** | To determine that the applicant understands the elements of attitude instrument flying during straight-and-level flight and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Straight and level flight solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.A.K2* | Common errors related to straight and level flight solely referring to the instruments, encompassing: |
| *AIA.XII.A.K2a* | a. “Fixation,” “omission,” and “emphasis” errors during instrument cross-check |
| *AIA.XII.A.K2b* | b. Improper instrument interpretation |
| *AIA.XII.A.K2c* | c. Improper control applications |
| *AIA.XII.A.K2d* | d. Failure to establish proper pitch, bank, or power adjustments during altitude, heading, or airspeed corrections |
| *AIA.XII.A.K2e* | e. Faulty trim procedure |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of straight and level flight solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.A.R2* | Instructional risks associated with straight and level flight solely referring to the instruments. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain straight and level flight solely referring to the instruments as noted in the referenced *Task*. |
| *AIA.XII.A.S2* | Analyze and correct simulated common errors related to straight and level flight solely referring to the instruments, to include those stipulated in K2a through K2e above. |

**Note:** The evaluator must select at least one Task from Area of Operation XII, Basic Instrument Maneuvers..

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.VIII.B.R6 = Situational awareness.**

| **Task** | ***Task B. Constant Airspeed Climbs*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VIII.B., Constant Airspeed Climbs |
| **Objective** | To determine that the applicant understands the elements of attitude instrument flying during constant airspeed climbs and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Constant airspeed climbs solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.B.K2* | Common errors related to constant airspeed climbs solely referring to the instruments, encompassing: |
| *AIA.XII.B.K2a* | a. “Fixation,” “omission,” and “emphasis” errors during instrument cross-check. |
| *AIA.XII.B.K2b* | b. Improper instrument interpretation |
| *AIA.XII.B.K2c* | c. Improper control applications |
| *AIA.XII.B.K2d* | d. Failure to establish proper pitch, bank, or power adjustments during altitude, heading, or airspeed changes |
| *AIA.XII.B.K2e* | e. Faulty trim procedure |
| *AIA.XII.B.K2f* | f. Improper entry or level-off procedure |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of constant airspeed climbs solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.B.R2* | Instructional risks associated with constant airspeed climbs solely referring to the instruments. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain constant airspeed climbs solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.B.S2* | Analyze and correct simulated common errors related to constant airspeed climbs solely referring to the instruments, to include those stipulated in K2a through K2f above. |

**Note:** The evaluator must select at least one Task from Area of Operation XII, Basic Instrument Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.VIII.C.R2 = Good cockpit management.**

| **Task** | ***Task C. Constant Airspeed Descents*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VIII.C., Constant Airspeed Descents |
| **Objective** | To determine that the applicant understands the elements of attitude instrument flying during constant airspeed descents and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Constant airspeed descents solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.C.K2* | Common errors related to constant airspeed descents solely referring to the instruments, encompassing: |
| *AIA.XII.C.K2a* | a. “Fixation,” “omission,” and “emphasis” errors during instrument cross-check |
| *AIA.XII.C.K2b* | b. Improper instrument interpretation |
| *AIA.XII.C.K2c* | c. Improper control applications |
| *AIA.XII.C.K2d* | d. Failure to establish proper pitch, bank, or power adjustments during altitude, heading, or airspeed changes |
| *AIA.XII.C.K2e* | e. Faulty trim procedure |
| *AIA.XII.C.K2f* | f. Improper entry or level-off procedure |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of constant airspeed descents solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.C.R2* | Instructional risks associated with constant airspeed descents solely referring to the instruments. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain constant airspeed descents solely referring to the instruments as noted in referenced Task. |
| *AIA.XII.C.S2* | Analyze and correct common errors related to constant airspeed descents solely referring to the instruments, to include those stipulated in K2a through K2f above. |

**Note:** The evaluator must select at least one Task from Area of Operation XII, Basic Instrument Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.VIII.D.R2 = Good cockpit management.**

| **Task** | ***Task D. Turns to Headings*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VIII.D., Turns to Headings |
| **Objective** | To determine that the applicant understands the elements of attitude instrument flying during turns to headings and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Turns to headings solely referring to the instruments as noted in the referenced *Task*. |
| *AIA.XII.D.K2* | Common errors related to turns to headings solely referring to the instruments, encompassing: |
| *AIA.XII.D.K2a* | a. “Fixation,” “omission,” and “emphasis” errors during instrument cross-check |
| *AIA.XII.D.K2b* | b. Improper instrument interpretation |
| *AIA.XII.D.K2c* | c. Improper control applications |
| *AIA.XII.D.K2d* | d. Failure to establish proper pitch, bank, or power adjustments during altitude, heading, or airspeed changes |
| *AIA.XII.D.K2e* | e. Faulty trim procedure |
| *AIA.XII.D.K2f* | f. Improper entry or level-off procedure |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of turns to headings solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.D.R2* | Instructional risks associated with turns to headings solely referring to the instruments. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain turns to headings solely referring to the instruments as noted in the referenced *Task*. |
| *AIA.XII.D.S2* | Analyze and correct simulated common errors related to turns to headings solely referring to the instruments, to include those stipulated in K2a through K2f above. |

**Note:** The evaluator must select at least one Task from Area of Operation XII, Basic Instrument Maneuvers.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the PAR ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.PA.VIII.E.K7 = Hazards of inappropriate control response.**

| **Task** | ***Task E. Recovery from Unusual Flight Attitudes*** |
|---|---|
| **Foundational ACS** | Refer to the Private Pilot ACS, Task VIII.E., Recovery from Unusual Flight Attitudes |
| **Objective** | To determine that the applicant understands the elements of attitude instrument flying during unusual attitudes and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Recovery from unusual flight attitudes solely referring to the instruments as noted in the referenced Task. |
| *AIA.XII.E.K2* | Common errors related to recovery from unusual flight attitudes solely referring to the instruments, encompassing: |
| *AIA.XII.E.K2a* | a. Failure to recognize an unusual flight attitude |
| *AIA.XII.E.K2b* | b. Consequences of attempting to recover from an unusual flight attitude by “feel” rather than by instrument indications |
| *AIA.XII.E.K2c* | c. Inappropriate control applications during recovery |
| *AIA.XII.E.K2d* | d. Failure to recognize from instrument indications when the airplane is passing through a level flight attitude |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of recovery from unusual flight attitudes solely referring to the instruments as noted in the referenced *Task*. |
| *AIA.XII.E.R2* | Instructional risks associated with recovery from unusual flight attitudes solely referring to the instruments. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain recovery from unusual flight attitudes solely referring to the instruments as noted in the referenced *Task*. |
| *AIA.XII.E.S2* | Analyze and correct common errors related to recovery from unusual flight attitudes solely referring to the instruments, to include those stipulated in K2a through K2d above. |

## XIII. Emergency Procedures

**Note:** The evaluator must select at least Tasks A and B from Area of Operation XIII, Emergency Procedures,

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.VIII.B.R1 = Wind.**

| **Task** | ***Task A. Emergency Descent*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IX.A., Emergency Descent |
| **Objective** | To determine that the applicant understands the elements of emergency descent and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Emergency descent as noted in the referenced Task. |
| *AIA.XIII.A.K2* | Common errors related to emergency descent, encompassing: |
| *AIA.XIII.A.K2a* | a. Failure to recognize need for an emergency descent |
| *AIA.XIII.A.K2b* | b. Failure to use the emergency checklist |
| *AIA.XIII.A.K2c* | c. Failure to clear the area before initiating the emergency descent |
| *AIA.XIII.A.K2d* | d. Exceeding $V_{FE}$ or $V_{NE}$, as appropriate to configuration |
| *AIA.XIII.A.K2e* | e. Improper recovery from an emergency descent |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of emergency descent as noted in the referenced Task. |
| *AIA.XIII.A.R2* | Instructional risks associated with emergency descent. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain emergency descent as noted in the referenced Task. |
| *AIA.XIII.A.S2* | Analyze and correct simulated common errors related to emergency descent, to include those stipulated in K2a through K2e above. |

**Note:** The evaluator must select at least Tasks A and B from Area of Operation XIII, Emergency Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.VIII.A.K5 = Energy management.**

| **Task** | ***Task B. Emergency Approach and Landing (Simulated)*** P |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IX.B., Emergency Approach and Landing (Simulated) |
| **Objective** | To determine that the applicant understands the elements of power failure at altitude and associated emergency approach and landing procedures; and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Power failure at altitude as noted in the referenced *Task*. |
| *AIA.XIII.B.K2* | Common errors related to power failure at altitude, encompassing: |
| *AIA.XIII.B.K2a* | a. Failure to establish “best glide” airspeed |
| *AIA.XIII.B.K2b* | b. Improper configuration |
| *AIA.XIII.B.K2c* | c. Poor selection of an emergency landing area |
| *AIA.XIII.B.K2d* | d. Failure to fly the most suitable pattern for existing wind speed, direction, and other conditions |
| *AIA.XIII.B.K2e* | e. Undershooting or overshooting selected emergency landing area |
| *AIA.XIII.B.K2f* | f. Failure to accomplish the emergency checklist |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of power failure at altitude as noted in the referenced Task. |
| *AIA.XIII.B.R2* | Instructional risks associated with power failure at altitude. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain power failure at altitude, as noted in the referenced Task. |
| *AIA.XIII.B.S2* | Analyze and correct simulated common errors related to power failure at altitude, to include those stipulated in K2a through K2f above. |

**Note:** The evaluator must select at least Tasks A and C from Area of Operation XIII, Emergency Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, i.e. AIA.CA.VIII.C.R3 = Maintenance.

| **Task** | ***Task C. Systems and Equipment Malfunctions*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IX.C., Systems and Equipment Malfunctions |
| **Objective** | To determine that the applicant understands the elements of systems and equipment malfunctions and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Systems and equipment malfunctions as noted in the referenced Task. |
| *AIA.XIII.C.K2* | Common errors related to equipment and systems malfunctions, encompassing: |
| *AIA.XIII.C.K2a* | a. Failure to understand aircraft systems |
| *AIA.XIII.C.K2b* | b. Lack of familiarity with emergency section of the POH/AFM |
| *AIA.XIII.C.K2c* | c. Failure to memorize immediate action items |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of emergency descent as noted in the referenced Task. |
| *AIA.XIII.C.R2* | Instructional risks associated with emergency descent. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain emergency descent as noted in the referenced Task. |
| *AIA.XIII.C.S2* | Analyze and correct simulated common errors related to emergency descent, to include those stipulated in K2a through K2c above. |

**Note:** The evaluator must select at least Tasks A and B from Area of Operation XIII, Emergency Procedures.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.VIII.D.K2 = Climate extremes (hot/cold).**

| **Task** | ***Task D. Emergency Equipment and Survival Gear*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task IX.D., Emergency Equipment and Survival Gear |
| **Objective** | To determine that the applicant understands the elements of emergency equipment and survival gear and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Emergency equipment and survival gear as noted in the referenced Task. |
| *AIA.XIII.D.K2* | Common errors related to emergency equipment and survival gear, encompassing: |
| *AIA.XIII.D.K2a* | a. Failure to plan for environmental changes on cross-country flights |
| *AIA.XIII.D.K2b* | b. Lack of familiarity with installed emergency equipment |
| *AIA.XIII.D.K2c* | c. Lack of familiarity with survival gear |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of emergency equipment and survival gear as noted in the referenced Task. |
| *AIA.XIII.D.R2* | Instructional risks associated with emergency equipment and survival gear. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain emergency equipment and survival gear as noted in the referenced Task. |
| *AIA.XIII.D.S2* | Analyze and correct simulated common errors related to emergency equipment and survival gear, to include those stipulated in K2a through K2c above. |

## XIV. Multiengine Operations (to be developed)

**Note:** The evaluator must select Task A and, for ASES applicants, Task B from Postflight Procedures XV.

| **Task** | ***Task A.*** |
|---|---|
| **Foundational ACS** | |
| **Objective** | |
| **Knowledge** | |
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| **Task** | ***Task B.*** |
| **Foundational ACS** | |
| **Objective** | |
| **Knowledge** | |
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XV. Postflight Procedures

**Note:** The evaluator must select at least Tasks A and for ASES Applicants, Task B.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.XI.A.K3 = Aircraft lighting.**

| **Task** | ***Task A. After Landing, Parking and Securing*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task XI.A., After Landing, Parking and Securing. |
| **Objective** | To determine that the applicant understands the elements of after landing, parking, and securing procedures and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Parking and securing as noted in the referenced Task. |
| *AIA.XV.A.K2* | Common errors related to parking and securing, encompassing: |
| *AIA.XV.A.K2a* | a. Failure to follow recommended procedures |
| *AIA.XV.A.K2b* | b. Poor planning, improper procedure, or faulty performance of postflight procedures |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of parking and securing as noted in the referenced Task. |
| *AIA.XV.A.R2* | Instructional risks associated with parking and securing. |
| **Skills** | The applicant demonstrates the ability to: |
| * | Demonstrate and simultaneously explain parking and securing as noted in the referenced Task. |
| *AIA.XV.A.S2* | Analyze and correct simulated common errors related to parking and securing, to include those stipulated in K2a through K2b above. |

**Note:** The evaluator must select at least Tasks A and for ASES Applicants, Task B.

For each of the following Tasks included in this Area of Operation, refer to the descriptions contained in the CAX ACS document as indicated:

*Referenced *Task* Knowledge, Skill and Risk Management elements when noted will be preceded by an AIA for Instructor Airplane, **i.e. AIA.CA.XI.B.R3 = Propeller safety.**

| **Task** | ***Task B. Seaplane Post-Landing Procedures (ASES, AMES)*** |
|---|---|
| **Foundational ACS** | Refer to the Commercial Pilot ACS, Task XI.B., Seaplane Post-Landing Procedures (ASES, AMES) |
| **Objective** | To determine that the applicant understands the elements of anchoring, docking, mooring, and ramping/beaching and demonstrates the ability to apply that knowledge in delivering ground and/or flight instruction. |
| **Knowledge** | The applicant demonstrates instructional knowledge by describing and explaining: |
| * | Seaplane post-landing procedures as noted in the referenced Task. |
| *AIA.XV.B.K2* | Common errors related to seaplane post-landing procedures, encompassing: |
| *AIA.XV.B.K2a* | a. Failure to follow recommended procedures |
| *AIA.XV.B.K2b* | b. Poor planning, improper procedure, or faulty performance of postflight procedures |
| *AIA.XV.B.K2c* | c. Consequences of failure to use anchor, docking, or mooring lines of adequate length and strength to ensure seaplane security |
| **Risk Management** | The applicant demonstrates the ability to teach and manage the risks arising from: |
| * | Elements of seaplane post-landing procedures as noted in the referenced Task. |
| *AIA.XV.B.R2* | Instructional risks associated with seaplane post-landing procedures. |
| **Skills** | The applicant demonstrates the ability to: |
| | Demonstrate and simultaneously explain seaplane post-landing procedures as noted in the referenced Task. |
| *AIA.XV.B.S2* | Analyze and correct common errors related to seaplane post-landing procedures, to include those stipulated in K2a through K2c above. |
| *AIA.XV.B.S3* | Demonstrate and simultaneously explain seaplane post-landing procedures as noted in the referenced Task |

Section 3: Flight Instructor – Instrument Airplane and Helicopter

***Completion Standards***

A. Knowledge Test

(1) Pass the appropriate Knowledge Test.

B. Practical Test

(1) To determine that the instructor-applicant can:

(a) Demonstrate instructional competence in the *Task*s;

(b) Facilitate the learning of subject material;

(c) Explain and demonstrate the maneuvers;

(d) Exemplify risk management skills;

(e) Promote professionalism; and

(f) Analyze and correct common student errors found in the Flight Instructor ACS.

C. ACS System Reference Matrix

- [To be developed and published in conjunction with the Flight Instructor ACS.]

***Areas of Operation***

- [To be developed and published in conjunction with the Flight Instructor ACS.]

# Section 4: Flight Instructor – Rotorcraft Helicopter

## *Completion Standards*

A. Knowledge Test

   (1) Pass the appropriate Knowledge Test.

B. Practical Test

   (1) To determine that the instructor-applicant can:

      (a) Demonstrate instructional competence in the *Task*s;

      (b) Facilitate the learning of subject material;

      (c) Explain and demonstrate the maneuvers;

      (d) Exemplify risk management skills;

      (e) Promote professionalism; and

      (f) Analyze and correct common student errors found in the Commercial Pilot – Rotorcraft (Helicopter and Gyroplane).

C. ACS System Reference Matrix

   [To be developed and published in conjunction with the Private Pilot ACS for Rotorcraft and the Commercial Pilot ACS for Rotorcraft.]

## *Areas of Operation*

[To be developed and published in conjunction with the Private Pilot ACS for Rotorcraft and the Commercial Pilot ACS for Rotorcraft.]

# Section 5: Flight Instructor – Glider

***Completion Standards***

A. Knowledge Test

   (1) Pass the appropriate Knowledge Test.

B. Practical Test

   (1) To determine that the instructor-applicant can:

      (a) Demonstrate instructional competence in the *Task*s;

      (b) Facilitate the learning of subject material;

      (c) Explain and demonstrate the maneuvers;

      (d) Exemplify risk management skills;

      (e) Promote professionalism; and

      (f) Analyze and correct common student errors found in the Commercial Pilot – Glider ACS, and the Areas of Operation in this ACS:

         I. Fundamentals of Instructing
         II. Technical Subject Areas (ACS System Reference)
         III. Preflight Preparation
         IV. Preflight Lesson on a Maneuver to be Performed in Flight
         V. Fundamentals of Flight
         VI. Slow Flight, Stalls, and Spins

C. ACS System Reference Matrix

[To be developed and published in conjunction with the Private Pilot ACS for Glider and the Commercial Pilot ACS for Glider.]

***Areas of Operation***

[To be developed and published in conjunction with the Private Pilot ACS for Glider and the Commercial Pilot ACS for Glider.]

Section 6: Flight Instructor – Sport Pilot

***Completion Standards***

A. Knowledge Test

(1) Pass the appropriate Knowledge Test.

B. Practical Test

(1) To determine that the instructor-applicant can:

(a) Demonstrate instructional competence in the *Task*s;

(b) Facilitate the learning of subject material;

(c) Explain and demonstrate the maneuvers;

(d) Exemplify risk management skills;

(e) Promote professionalism; an

(f) Analyze and correct common student errors found in the Sport Pilot ACS (appropriate exceptions/additions for category and class), and the following Areas of Operation in this ACS:

I. Fundamentals of Instructing
II. Technical Subject Areas (ACS System Reference)
IV. Preflight Lesson on a Maneuver to be Performed in Flight

C. ACS System Reference Matrix

[To be developed and published in conjunction with the Sport Pilot ACS.]

***Areas of Operation***

[To be developed and published in conjunction with the Sport Pilot ACS.]

Appendix Table of Contents

# Appendix 1: The Knowledge Test Eligibility, Prerequisites and Testing Centers

***Knowledge Test Description***

The knowledge test is an important part of the airman certification process. The instructor-applicant must pass the knowledge test before taking the practical test.

The knowledge test consists of objective, multiple-choice questions. There is a single correct response for each test question. Each test question is independent of other questions. A correct response to one question does not depend upon, or influence, the correct response to another.

***Knowledge Tests for Instructor Certificates and Ratings***

| Code | Title | Questions | Time |
|---|---|---|---|
| FOI | Fundamentals of Instructing | 50 | 1.5 |
| MCI | Military Competency Instructor | 125 | 3.0 |

**Ground Instructor**

| Code | Title | Questions | Time |
|---|---|---|---|
| BGI | Basic Ground Instructor | 80 | 2.5 |
| AGI | Advanced Ground Instructor | 100 | 2.5 |
| IGI | Instrument Ground Instructor | 50 | 2.5 |

**Airplane**

| | | | |
|---|---|---|---|
| FIA | Flight Instructor – Airplane | 100 | 2.5 |
| AFA | Flight Instructor – Airplane-Added Rating | 25 | 1.0 |
| FII | Flight Instructor – Instrument Airplane | 50 | 2.5 |
| AIF | Flight Instructor – Instrument – Airplane – Added Rating | 25 | 1.0 |

**Helicopter**

| | | | |
|---|---|---|---|
| FRH | Flight Instructor – Rotorcraft Helicopter | 100 | 2.5 |
| HFA | Flight Instructor – Helicopter-Added Rating | 25 | 1.0 |
| FIH | Flight Instructor – Instrument Helicopter | 50 | 2.5 |
| HIF | Flight Instructor – Instrument – Helicopter – Added Rating | 25 | 1.0 |

**Gyroplane**

| | | | |
|---|---|---|---|
| FRG | Flight Instructor – Gyroplane | 100 | 2.5 |
| GFA | Flight Instructor – Gyroplane– Added Rating | 25 | 1.0 |

**Glider**

| | | | |
|---|---|---|---|
| FIG | Flight Instructor – Glider | 100 | 2.5 |
| AFG | Flight Instructor – Glider– Added Rating | 25 | 1.0 |

**Sport Pilot**

| | | | |
|---|---|---|---|
| SIA | Flight Instructor – Sport Airplane | 70 | 2.5 |
| SIB | Flight Instructor – Sport Balloon | 70 | 2.5 |
| SIG | Flight Instructor – Sport Glider | 70 | 2.5 |
| SIL | Flight Instructor – Sport Lighter-Than-Air (Airship) | 70 | 2.5 |
| SIP | Flight Instructor – Sport Powered Parachute | 70 | 2.5 |
| SIW | Flight Instructor – Sport Weight-Shift-Control | 70 | 2.5 |
| SIY | Flight Instructor – Sport Gyroplane | 70 | 2.5 |

### *Knowledge Test Blueprint*

*(Placeholder)*

### *English Language Proficiency*

In accordance with the requirements of 14 CFR Section 61.153(b) and the FAA Aviation English Language Proficiency standard, throughout the application and testing process the applicant must demonstrate the ability to read, write, speak, and understand the English language. English language proficiency is required to communicate effectively with ATC, to comply with ATC instructions, and to ensure clear and effective crew communication and coordination. Normal restatement of questions as would be done for a native English speaker is permitted, and does not constitute grounds for disqualification. [back]

### *Knowledge Test Requirements*

In order to take the Instructor knowledge test, you must provide proper identification. To verify your eligibility to take the test, you must also provide one of the following in accordance with the requirements of 14 CFR, part 61:

Section 61.35 lists the prerequisites for taking the knowledge test, to include the minimum age an applicant must be to sit for the test.

Received an endorsement, if required by this part, from an authorized instructor certifying that the applicant accomplished the appropriate ground-training or a home-study course required by this part for the certificate or rating sought and is prepared for the knowledge test;

Proper identification at the time of application that contains the applicant's—

(i) Photograph;
(ii) Signature;
(iii) Date of birth;

(iv) If the permanent mailing address is a post office box number, then the applicant must provide a government official residential address

Section 61.49 acceptable forms of retest authorization for **all** Instructor tests:

- An applicant retesting **after failure** is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training. The endorsement must certify that the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.

  ***Note:*** *If the applicant no longer possesses the original test report, he or she may request a duplicate replacement issued by AFS-760.*

Acceptable forms of authorization for PCP only:

— Confirmation of Verification Letter issued by the Airmen Certification Branch (Knowledge Testing Authorization Requirements Matrix).

Requires **no** instructor endorsement or other form of written authorization.

***Knowledge Test Centers***

The FAA authorizes hundreds of knowledge testing center locations that offer a full range of airman knowledge tests. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

***Knowledge Test Registration***

When you contact a knowledge testing center to register for a test, please be prepared to select a test date, choose a testing center, and make financial arrangements for test payment when you call. You may **register** for test(s) several weeks in advance, and you may cancel in accordance with the testing center's cancellation policy.

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# Appendix 2: Knowledge Test Procedures and Tips

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.) [back]

### *Acceptable Materials*

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
| --- | --- | --- |
| Supplement book provided by proctor | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators |
| All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages | Magnetic Cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature |
| Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

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### *Test Tips*

When taking a knowledge test, please keep the following points in mind:

- Carefully read the instructions provided with the test.
- Answer each question in accordance with the latest regulations and guidance publications.
- Read each question carefully before looking at the answer options. You should clearly understand the problem before trying to solve it.
- After formulating a response, determine which answer option corresponds with your answer. The answer you choose should completely solve the problem.
- Remember that only one answer is complete and correct. The other possible answers are either incomplete or erroneous.
- If a certain question is difficult for you, mark it for review and return to it after you have answered the less difficult questions. This procedure will enable you to use the available time to maximum advantage.
- When solving a calculation problem, be sure to read all the associated notes.
- For questions involving use of a graph, you may request a printed copy that you can mark in computing your answer. This copy and all other notes and paperwork must be given to the testing center upon completion of the test.

***Cheating or Other Unauthorized Conduct***

To avoid test compromise, computer testing centers must follow strict security procedures established by the FAA and described in FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test at any time a test unit member suspects that a cheating incident has occurred.

The FAA will investigate and, if the agency determines that cheating or unauthorized conduct has occurred, any airman certificate or rating you hold may be revoked. You will also be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of one year.

***Testing Procedures for Applicants Requesting Special Accommodations***

An applicant with learning or reading disability may request approval from AFS-630 through the local Flight Standards District Office (FSDO) or International Field Office/International Field Unit (IFO/IFU) to take airman knowledge test using one of the three options listed below, in preferential order:

**Option 1:** Use current testing facilities and procedures whenever possible.

**Option 2:** Use a self-contained, electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

> ***Note:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.*

**Option 3:** Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO/IFU inspector must contact the Airman Testing Standards Branch (AFS-630) for assistance in selecting the test site and assisting the proctor. Before approving any option, the FSDO or IFO/IFU inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

# Appendix 3: Airman Knowledge Test Report

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report documenting the score with the testing center's raised, embossed seal. The applicant must retain the original Airman Knowledge Test Report. The instructor must provide instruction in each area of deficiency and provide a logbook endorsement certifying that the applicant has demonstrated satisfactory knowledge in each area. When taking the practical test, the applicant must present the original Airman Knowledge Test Report to the evaluator, who is required to assess the noted areas of deficiency during the oral portion of the practical test.

An Airman Knowledge Test Report expires 24 calendar months after the month the applicant completes the knowledge test. If the Airman Knowledge Test Report expires before completion of the practical test, the applicant must retake the knowledge test.

To obtain a duplicate Airman Knowledge Test Report due to loss or destruction of the original, the applicant can send a signed request accompanied by a check or money order for $12.00 (U.S. funds), payable to the FAA to:

Federal Aviation Administration
Airmen Certification Branch, AFS-760
P.O. Box 25082
Oklahoma City, OK 73125

To obtain a copy of the application form or a list of the information required, please see the Airman Certification Branch (AFS-760) web page.

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***FAA Knowledge Test Question Coding***

Each *Task* in the Airman Certification Standard includes an Airman Certification Standards (ACS) code. This ACS code will soon be displayed on the airman test report to indicate what *Task* element was proven deficient on the Knowledge Exam. Instructors can then provide remedial training in the deficient areas and evaluators can re-test this element during the practical exam.

The ACS coding consists of 4 elements. For example: this code is deciphered as follows:

**AIA.I.B.K6:**

**AIA** = Applicable ACS Applicable ACS and Section denoting Aircraft category (Instructor, Airplane, which is Section 2 of this document)
**I** = Area of Operation (Technical Subject Areas)
**B** = Task (14 CFR and Publications)
**K6** = Task Element Knowledge 6 (Flight information publications (e.g., Aeronautical Information Manual (AIM) and Chart Supplements U.S. (formerly Airport/Facility Directory)).

Knowledge test questions are mapped to the ACS codes, which will soon replace the system of “Learning Statement Codes.” After this transition occurs, the airman knowledge test report will list an ACS code that correlates to a specific Task Element for a given Area of Operation and Task. Remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task elements. [back]

# Appendix 4: The Practical Test – Eligibility and Prerequisites

The prerequisite requirements and general eligibility for a practical test and the specific requirements for the original issuance of an instrument rating in the airplane can be found in 14 CFR sections 61.39 and 61.65, respectively.

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# Appendix 5: Practical Test Roles, Responsibilities, and Outcomes

### *Applicant Responsibilities*

The applicant is responsible for mastering the established standards for knowledge, skill, and risk management elements in all Tasks appropriate to the certificate and rating sought. The applicant should use this ACS, its references, and the Practical Test Checklist in this Appendix in preparation to take the practical test.

### *Instructor Responsibilities*

The instructor is responsible for training the applicant to meet the established standards for knowledge, risk management and skill elements in all Tasks appropriate to the certificate and rating sought. The instructor should use this ACS and its references as part of preparing the applicant to take the practical test and, if necessary, in retraining the applicant to proficiency in all subject(s) missed on the knowledge test.

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### *Evaluator Responsibilities*

An Evaluator is:

- Aviation safety inspector (ASI)
- Pilot examiner (other than administrative pilot examiners) or
- Chief instructor, assistant chief instructor or check instructor of pilot school holding examining authority
- CFII conducting IPC

The evaluator who conducts the practical test is responsible for determining that the applicant meets the established standards of aeronautical knowledge, skills (flight proficiency), and risk management for each Task in the appropriate ACS. This responsibility also includes verifying the experience requirements specified for a certificate or rating.

At the initial stage of the practical test, the evaluator must also determine that the applicant meets FAA Aviation English Language Proficiency (AELP) standards by verifying that he or she can understand ATC instructions and communicate in English at a level that is understandable to ATC and other pilots. The evaluator should use AC 60-28, English Language Skill Standards required by 14 CFR parts 61, 63, and 65 (current version) when evaluating the applicant's ability to meet the standard. If, at any point during the practical test, the applicant does not meet the AELP standards, the evaluator must issue a Notice of Disapproval, FAA form 8060-5, with "NOT FAA AELP" in the comments. If there is any doubt, the evaluator should contact the local Flight Standards District Office (FSDO) for assistance.

The evaluator must develop a Plan of Action (POA), written in English, to conduct the practical test, and it must include all of the required Areas of Operation and Tasks. The POA must include a scenario that evaluates as many of the required Areas of Operation and Tasks as possible. As the scenario unfolds during the test, the evaluator will introduce problems and emergencies that the applicant must manage. The evaluator has the discretion to modify the POA in order to accommodate unexpected situations as they arise. For example, the evaluator may elect to suspend and later resume a scenario in order to assess certain *Task*s.

In the integrated ACS framework, the Areas of Operation contain Tasks that include "knowledge" elements (such as K1), "risk management" elements (such as R1), and "skill" elements (such as S1). Knowledge and risk management elements are primarily evaluated during the knowledge testing phase of the airman certification process. The evaluator must assess the applicant on all skill elements for each Task included in each Area of Operation of the ACS, unless otherwise noted. The evaluator administering the practical test has the discretion to combine *Task*s/elements as appropriate to testing scenarios.

The required minimum elements to include in the POA from each applicable Task are as follows:

- At least one knowledge element;
- At least one risk management element;
- All skill elements unless otherwise noted; and
- Any Task elements in which the applicant was shown to be deficient on the knowledge test.

**Note:** Task elements added to the POA on the basis of being listed on the AKTR may satisfy the other minimum Task element requirements. The missed items on the AKTR are not required to be added in addition to the minimum Task element requirements.

There is no expectation for testing every knowledge and risk management element in a Task, but the evaluator has discretion to sample as needed to ensure the applicant's mastery of that Task.

Unless otherwise noted in the Task, the evaluator must test each item in the skills section by asking the applicant to perform each one. As safety of flight conditions permit, the evaluator may use questions during flight to test knowledge and risk management elements not evident in the demonstrated skills. To the greatest extent practicable, evaluators shall test the applicant's ability to apply and correlate information, and use rote questions only when they are appropriate for the material being tested. If the Task includes sub-elements (such as AIA.II.B.S1c Advisory Circulars), the evaluator may select either the primary element (such as S1) or an appropriate sub-element (such as S1c). If the broader primary element is selected, the evaluator must develop questions only from material covered in the references listed for the Task.

[back]

***Possible Outcomes of the Test***

There are three possible outcomes of the practical test: (1) Temporary Airman Certificate (satisfactory), (2) Notice of Disapproval (unsatisfactory), or (3) Letter of Discontinuance.

If the evaluator determines that a Task is incomplete, or the outcome is uncertain, the evaluator may require the applicant to repeat that Task, or portions of that Task. This provision does not mean that instruction, practice, or the repetition of an unsatisfactory Task is permitted during the practical test.

If the evaluator determines the applicant's skill and abilities are in doubt, the outcome is unsatisfactory and the evaluator must issue a Notice of Disapproval. [back]

***Satisfactory***

Satisfactory performance requires that the applicant:

- Demonstrate the Tasks specified in the Areas of Operation for the certificate or rating sought within the established standards;
- Demonstrate mastery of the aircraft by performing each Task successfully;
- Demonstrate proficiency and competency in accordance with the approved standards;
- Demonstrate sound judgment and exercise aeronautical decision-making/risk management;
- Demonstrate competence in crew resource management in aircraft certificated for more than one required pilot crew member, or, single-pilot competence in an airplane that is certificated for single-pilot operations.

Satisfactory performance will result in the issuance of a temporary certificate.

***Unsatisfactory***

If, in the judgment of the evaluator, the applicant does not meet the standards for any Task, the applicant fails the Task and associated Area of Operation. The test is unsatisfactory, and the evaluator issues a Notice of Disapproval.

When the evaluator issues a Notice of Disapproval, he or she shall list the Area of Operation in which the applicant did not meet the standard. The Notice of Disapproval must also list the Area(s) of Operation not tested, and the number of practical test failures.

The evaluator or the applicant may end the test if the applicant fails a Task. The evaluator may continue the test only with the consent of the applicant, and the applicant is entitled to credit only those Areas of Operation and the associated Tasks satisfactorily performed. Though not required, the evaluator has discretion to reevaluate any Task, including those previously passed, during the retest.

Typical areas of unsatisfactory performance and grounds for disqualification include:

- Any action or lack of action by the applicant that requires corrective intervention by the evaluator to maintain safe flight.
- Failure to use proper and effective visual scanning techniques to clear the area before and while performing maneuvers.
- Consistently exceeding tolerances stated in the skill elements of the Task.
- Failure to take prompt corrective action when tolerances are exceeded.
- Failure to exercise risk management.

***Discontinuance***

When it is necessary to discontinue a practical test for reasons other than unsatisfactory performance (e.g., equipment failure, weather, illness), the evaluator must return all test paperwork to the applicant. The evaluator must prepare, sign, and issue a Letter of Discontinuance that lists those Areas of Operation the applicant successfully completed and the time period remaining to complete the test. The evaluator should advise the applicant to present the Letter of Discontinuance to the evaluator when the practical test resumes in order to receive credit for the items successfully completed. The Letter of Discontinuance becomes part of the applicant's certification file.

[back]

# Practical Test Checklist (Applicant)
***Appointment with Evaluator***

**Evaluator's Name:** ______________________________

**Location:** ______________________________

**Date/Time:** ______________________________

**Acceptable Aircraft**

- ☐ Aircraft Documents:
  - ☐ Airworthiness Certificate
  - ☐ Registration Certificate
  - ☐ Operating Limitations
- ☐ Aircraft Maintenance Records:
  - ☐ Logbook Record of Airworthiness Inspections and AD Compliance
- ☐ Pilot's Operating Handbook, FAA-Approved Aircraft Flight Manual

**Personal Equipment**

- ☐ View-Limiting Device
- ☐ Current Aeronautical Charts (Printed or Electronic)
- ☐ Computer and Plotter
- ☐ Flight Plan Form
- ☐ Flight Plan Form and Flight Logs (printed or electronic)
- ☐ Chart Supplements U.S. (formerly Airport Facility Directory) Airport Diagrams and Appropriate Publications
- ☐ Current AIM

**Personal Records**

- ☐ Identification—Photo/Signature ID
- ☐ Pilot Certificate
- ☐ Current Medical Certificate
- ☐ Completed FAA Form 8710-1, Airman Certificate and/or Rating Application with Instructor's Signature
- ☐ Original Knowledge Test Report
- ☐ Pilot Logbook with appropriate Instructor Endorsements
- ☐ FAA Form 8060-5, Notice of Disapproval (if applicable)
- ☐ Letter of Discontinuance (if applicable)
- ☐ Approved School Graduation Certificate (if applicable)
- ☐ Evaluator's Fee (if applicable)

***Additional Rating Task Table***

(Placeholder)

# Appendix 6: Safety of Flight

### General

Safety of flight must be the prime consideration at all times. The evaluator, applicant, and crew must be constantly alert for other traffic. If performing aspects of a given maneuver, such as emergency procedures, would jeopardize safety, the evaluator will ask the applicant to simulate that portion of the maneuver. The evaluator will assess the applicant's use of visual scanning and collision avoidance procedures throughout the entire test.

### Stall and Spin Awareness

During flight training and testing, the applicant and the instructor or evaluator must always recognize and avoid operations that could lead to an inadvertent stall or spin and inadvertent loss of control.

### Use of Checklists

Throughout the practical test, the applicant is evaluated on the use of an appropriate checklist.

Assessing proper checklist use depends upon the specific Task. In all cases, the evaluator should determine whether the applicant appropriately divides attention and uses proper visual scanning. In some situations, reading the actual checklist may be impractical or unsafe. In such cases, the evaluator should assess the applicant's performance of published or recommended immediate action "memory" items along with his or her review of the appropriate checklist once conditions permit.

In a single-pilot airplane, the applicant should demonstrate the CRM principles described as SRM. Proper use is dependent on the specific Task being evaluated. The situation may be such that the use of the checklist while accomplishing elements of an Objective would be either unsafe or impractical in a single-pilot operation. In this case, a review of the checklist after the elements have been accomplished is appropriate [back]

### Use of Distractions

Numerous studies indicate that many accidents have occurred when the pilot has been distracted during critical phases of flight. The evaluator should incorporate realistic distractions during the flight portion of the practical test to evaluate the pilot's situational awareness and ability to utilize proper control technique while dividing attention both inside and outside the cockpit.

### Positive Exchange of Flight Controls

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls."

. [back]

### Aeronautical Decision Making, Risk Management, CRM and SRM

Throughout the practical test, the evaluator must assess the applicant's ability to use sound aeronautical decision making procedures in order to identify hazards and mitigate risk. The evaluator must accomplish this requirement by reference to the risk management elements of the given Task(s), and by developing scenarios that incorporate and combine Tasks appropriate to assessing the applicant's risk management in making safe aeronautical decisions. For example, the evaluator may develop a scenario that incorporates weather decisions and performance planning.

In assessing the applicant's performance, the evaluator should take note of the applicant's use of CRM and, if appropriate, SRM. CRM/SRM is the set of competencies that includes situational awareness, communication skills, teamwork, *Task* allocation, and decision making within a comprehensive framework of standard operating procedures (SOP). SRM specifically refers to the management of all resources onboard the aircraft as well as outside resources available to the single pilot.

Deficiencies in CRM/SRM almost always contribute to the unsatisfactory performance of a Task. While evaluation of CRM/SRM may appear to be somewhat subjective, the evaluator should use the risk management elements of the given Task(s) to determine whether the applicant's performance of the Task(s) demonstrates both understanding and application of the associated risk management elements.

[back]

***Multiengine Considerations***

On multiengine practical tests, where the failure of the most critical engine after liftoff is required, the evaluator must consider local atmospheric conditions, terrain, and type of aircraft used. The evaluator must not simulate failure of an engine until attaining at least $V_{SSE}/V_{XSE}/V_{YSE}$ and an altitude not lower than 400 feet AGL.

For multiengine practical tests conducted in the airplane, the evaluator will set zero thrust after the applicant has simulated feathering the propeller following a simulated engine failure. The applicant must demonstrate feathering one propeller in flight unless the manufacturer prohibits this action. Practical tests conducted in a flight simulation training device (FSTD) can only be accomplished as part of an approved curriculum or training program. Any limitations or powerplant failure will be noted in that program.

The applicant must also demonstrate at least one landing with a simulated feathered propeller with the engine set to zero thrust.

[back]

*VII. Emergency Procedures- Powerplant Failure—Multiengine Airplane*

In a multiengine airplane or FSTD equipped with propellers (including turboprop), the applicant must demonstrate feathering one propeller and engine shutdown unless:

- The practical test is for a type rating, and
- The airplane used for the practical test was not certificated with inflight unfeathering capability.

In this situation, the applicant may perform a simulated powerplant failure. In all other cases, the applicant must demonstrate the ability to safely feather and unfeather the propeller while airborne.

For safety reasons, when the practical test is conducted in the airplane, the applicant shall perform Tasks that require feathering or shutdown only under conditions and at a position and altitude (i.e., no lower than 3,000 feet AGL) where it is possible to make a safe landing on an established airport if there is difficulty in unfeathering the propeller or restarting the engine. If it is not possible to unfeather the propeller or restart the engine while airborne, the applicant and the evaluator should treat the situation as an emergency.

Practical tests conducted in a FSTD can only be accomplished as part of an approved curriculum or training program. Any limitations on powerplant failure will be noted in that program.

Engine failure (simulated) shall be accomplished before reaching 50 percent of the calculated $V_{MC}$.

### *Single-Engine Considerations*

*VII. Emergency Procedures- Powerplant Failure—Single-Engine Airplane*

For safety reasons, the evaluator will not request a simulated powerplant failure in a single engine airplane unless it is possible to safely complete a landing.

### *High Performance Aircraft Considerations*

In some high performance airplanes, the power setting may have to be reduced below the ACS guidelines power setting to prevent excessively high pitch attitudes (greater than 30° nose up.

### *Risk Management for the Instructor*

The Airman Certification Standards (ACS) approach presents Tasks in terms of Knowledge, Risk Management and Skill elements. Risk management requires the pilot to identify hazards related to a flight maneuver, assess the risk, and then develop and use mitigation strategies to manage the risk. Because it is not possible to anticipate and list every possible risk, risk management also requires the skill to identify and manage a previously unknown risk by correlating evidence of non-specific or undefined hazards, assessing the risk, and applying appropriate mitigation strategies. By applying these principles, the instructor is both mentally and physically prepared for unexpected event, reducing the startled response and maintaining control of the aircraft.

Risk Management requirements for the instructor are greater than those defined for a particular airman certificate or rating. The applicant must also demonstrate:

- Instructional knowledge of hazards and risk management strategies associated with a particular *Task*
- Instructional skill to transfer that knowledge to a pilot-in-training (PIT) in both ground and flight lessons.
- Ability to recognize, assess and mitigate the risk inherent in giving flight instruction to a PIT who is manipulating the controls. This skill requires the instructor to correctly decide when intervention is required to ensure the safe outcome of the maneuver.

The instructor applicant will therefore be evaluated on three aspects of the Risk Management elements listed for each assigned flight Task:

1. **Knowledge**: Demonstrate declarative and procedural understanding of the Risk Management elements associated with the Task being evaluated.
2. **Instructional Risk Management**: Demonstrate the ability to recognize and mitigate the risks associated with providing flight instruction to a simulated PIT (evaluator).
3. **Skill**: Demonstrate the ability to teach a simulated PIT (evaluator) the Risk Management elements associated with the Task being evaluated.

Some flight instructional risks are common to almost every Task, while others are Task-specific.

Examples of risks commonly associated with providing flight instruction include, but are not limited to:

a. Maintaining active collision avoidance while simultaneously providing instruction.
b. Maintaining a “sterile cockpit” at appropriate times.
c. Ensuring a positive exchange of flight controls.
d. Maintaining awareness of the actions, cognitive state, and physiological state of the pilot in training.
e. Maintaining vigilance regarding oversight of the pilot in training.
f. Monitoring coordination of flight controls by the pilot in training.
g. Maintaining continuous awareness of the dynamic state and navigation position of the aircraft.

h. Maintaining overall situational awareness while executing instructional responsibilities.
i. Recognizing and mitigating pilot-in-training anxiety.
j. Correcting pilot-in-training “hazardous attitudes.”
k. Maintaining due diligence for unexpected events which may occur in the training environment.
l. Intervening in a timely fashion.

The instructor applicant will be expected to demonstrate knowledge and skill with respect to such common risks noted in Task G in the Fundamentals of Instructing evaluation. In addition, throughout the flight portion of the practical test, the applicant will be expected to maintain safety of flight by applying principles of instructional risk management from the beginning of preflight procedures through the conclusion of postflight procedures. Accordingly, the applicant’s instructional ability to recognize and mitigate the common instructional risks listed as examples above shall continuously be evaluated during the flight portion of the practical test. Because these common risks are not Task-specific, deficient recognition or mitigation of these risks by the applicant will be identified in a Notice of Disapproval with Section ACS codes, e.g. AIA.IRM.Sa through AIA.IRM.Sk corresponding to list above for Instructor, Airplane.

It is important to understand, however, that this ACS does not presume to anticipate and list every possible instructional risk. Rather, it broadly defines instructional risk management elements to provide a framework for the mastery and evaluation of this critical competency.

[back]

# Appendix 7: Aircraft, Equipment, and Operational Requirements and Limitations

### *Aircraft Requirements and Limitations*

Section 61.45 prescribes the required aircraft and equipment for a practical test. The regulation states the minimum aircraft registration and airworthiness requirements as well as the minimum equipment requirements, to include the minimum required controls.

Multiengine practical tests require normal engine shutdowns and restarts in the air, to include propeller feathering and unfeathering. The AFM must not prohibit these procedures, but low power settings for cooling periods prior to the actual shutdown in accordance with the AFM are acceptable and encouraged. For a type rating in an airplane not certificated with inflight unfeathering capability, a simulated powerplant failure is acceptable.

If the multiengine airplane used for the practical test does not publish a $V_{MC}$, then the "Limited to Centerline Thrust" limitation will be added to the certificate issued from this check, unless the applicant has already demonstrated competence in a multiengine airplane with a published $V_{MC}$.

Any equipment inoperative in an aircraft with a minimum equipment list (MEL) shall be placarded in accordance with the approved MEL procedures. The applicant shall describe the procedures accomplished, the resulting operational restrictions, and the documentation for the inoperative item(s).

### *Equipment Requirements and Limitations*

The equipment examination should be administered before the flight portion of the practical test, but it must be closely coordinated and related to the flight portion.

This section requires the aircraft must be:

- Of U.S., foreign, or military registry of the same category, class and type, if applicable, for the certificate and/or rating for which the applicant is applying.
- The aircraft must have fully functional dual controls, except as provided for in 14 CFR section 61.45(c) and (e); and
- Capable of performing all Areas of Operation appropriate to the rating sought and have no operating limitations, which prohibit its use in any of the Area of Operation, required for the practical test.

To assist in management of the aircraft during the practical test, the applicant is expected to demonstrate automation management skills by utilizing installed equipment such as autopilot, avionics and systems displays, and/or flight management system (FMS). The evaluator is expected to test the applicant's knowledge of the systems that are installed and operative during both the oral and flight portions of the practical test.

If the practical test is conducted in an aircraft, the applicant is required by 14 CFR section 61.45(d) (2) to provide an appropriate view limiting device acceptable to the evaluator. The applicant and the evaluator should establish a procedure as to when and how this device should be donned and removed, and brief this procedure before the flight. The device must be used during all testing that requires flight "solely by reference to instruments." This device must prevent the applicant from having visual reference outside the aircraft, but it must not restrict the evaluator's ability to see and avoid other traffic.

### *Operational Requirements and Limitations*

*[Reserved]*

[back]

# Appendix 8: Use of Flight Simulation Training Devices (FSTD) and Aviation Training Devices (ATD): Airplane Single-Engine, Multi Engine Land and Sea

***Use of FSTDs***

Section 61.4, *Qualification and approval of flight simulators and flight training devices*, states in paragraph (a) that each full flight simulator (FFS) and flight training device (FTD) used for training, and for which an airman is to receive credit to satisfy any training, testing, or checking requirement under this chapter, must be qualified and approved by the Administrator for—

> *(1) The training, testing, and checking for which it is used;*
>
> *(2) Each particular maneuver, procedure, or crewmember function performed; and*
>
> *(3) The representation of the specific category and class of aircraft, type of aircraft, particular variation within the type of aircraft, or set of aircraft for certain flight training devices.*

14 CFR part 60 prescribes the rules governing the initial and continuing qualification and use of all FSTDs used for meeting training, evaluation, or flight experience requirements for flight crewmember certification or qualification.

An FSTD is defined in 14 CFR part 60 as an FFS or FTD:

> *Full Flight Simulator (FFS)—a replica of a specific type, make, model, or series aircraft. It includes the equipment and computer programs necessary to represent aircraft operations in ground and flight conditions, a visual system providing an out-of-the-flight deck view, a system that provides cues at least equivalent to those of a three-degree-of-freedom motion system, and has the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the QPS for a specific FFS qualification level. (part 1)*
>
> *Flight Training Device (FTD)—a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft flight deck replica. It includes the equipment and computer programs necessary to represent aircraft (or set of aircraft) operations in ground and flight conditions having the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the qualification performance standard (QPS) for a specific FTD qualification level (part 1).*

The FAA National Simulator Program (NSP) qualifies Level A-D FFSs and Level 4 – 7[4] FTDs. In addition, each operational rule part identifies additional requirements for the approval and use of FSTDs in a training program[5]. Use of an FSTD for the completion of the instrument-airplane rating practical test is permitted only when accomplished in accordance with an FAA approved curriculum or training program. Use of an FSTD for the completion of an instrument proficiency check is also permitted when accomplished in accordance with an FAA approved curriculum or training program. [back]

***Use of ATDs***

[4]The FSTD qualification standards in effect prior to part 60 defined a Level 7 FTD for airplanes (see Advisory Circular 120-45A, Airplane Flight Training Device Qualification, 1992). This device required high fidelity, airplane specific aerodynamic and flight control models similar to a Level D FFS, but did not require a motion cueing system or visual display system. In accordance with the "grandfather rights" of part 60, section 60.17, these previously qualified devices will retain their qualification basis as long as they continue to meet the standards under which they were originally qualified. There is only one airplane Level 7 FTD with grandfather rights that remains in the U.S. As a result of changes to part 60 that were published in the Federal Register in March 2016, the airplane Level 7 FTD was reinstated with updated evaluation standards. The new Level 7 FTD will require a visual display system for qualification. The minimum qualified Tasks for the Level 7 FTD are described in Table B1B of Appendix B of part 60.

[5] 14 CFR part 121, section 121.407; part 135, section 135.335; part 141, section 141.41; and part 142, section 142.59.

14 CFR section 61.4(c) states the Administrator may approve a device other than an FFS or FTD for specific purposes. Under this authority, the FAA's General Aviation and Commercial Division provide approval for aviation training devices (ATD).

Advisory Circular (AC) 61-136A, *FAA Approval of Aviation Training Devices and Their Use for Training and Experience,* provides information and guidance for the required function, performance, and effective use of ATDs for pilot training and aeronautical experience (including currency). FAA issues a letter of authorization (LOA) to an ATD manufacturer approving an ATD as a basic aviation training device (BATD) or an advanced aviation training device (AATD). The LOA will be valid for a five-year period with a specific expiration date and include the amount of credit a pilot may take for training and experience.

> *Aviation Training Device (ATD)—a training device, other than an FFS or FTD, that has been evaluated, qualified, and approved by the Administrator. In general, this includes a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit. It includes the hardware and software necessary to represent a category and class of aircraft (or set of aircraft) operations in ground and flight conditions having the appropriate range of capabilities and systems installed in the device as described within the AC for the specific basic or advanced qualification level.*
>
> *Basic Aviation Training Device (BATD)—provides an adequate training platform for both procedural and operational performance* Tasks *specific to instrument experience and the ground and flight training requirements for the private pilot certificate and instrument rating per 14 CFR parts 61 and 141.*
>
> *Advanced Aviation Training Device (AATD)—provides an adequate training platform for both procedural and operational performance* Tasks *specific to the ground and flight training requirements for the private pilot certificate, instrument rating, commercial pilot certificate, airline transport pilot (ATP) certificate, and flight instructor certificate per 14 CFR parts 61 and 141. It also provides an adequate platform for* Tasks *required for instrument experience and the instrument proficiency check.*

**ATDs cannot be used for practical tests, aircraft type specific training, or for an aircraft type rating; therefore the use of an ATD for the instructor practical test is not permitted. An AATD, however, may be used for an instructor proficiency check.** [back]

### *Credit for Time in an FSTD*

Section 61.109 specifies the minimum aeronautical experience requirements for a person applying for a private pilot certificate. Paragraphs (a) and (b) specify the time requirements for a private pilot certificate in a single-engine airplane and a multiengine airplane, respectively[6]. These paragraphs include specific experience requirements that must be completed in an airplane. Paragraph (k) of this section specifies the amount of credit a pilot can take for time in an FFS or FTD. For those that received training in programs outside of part 142, section 61.109(k)(1)[7]. For those pilots that received training through a part 142 program, section 61.109(k)(2).

### *Credit for Time in an ATD*

Section 61.109 specifies the minimum aeronautical experience requirements for a person applying for a private pilot certificate Paragraphs (a) and (b) specify the time requirements for a private pilot certificate in a single-engine airplane and a multiengine airplane, respectively[8]. These paragraphs include specific experience requirements that must be completed in an airplane. Paragraph (k) of this section specifies the amount of credit a pilot can take towards the private pilot certificate aeronautical experience requirements.

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[6] The minimum aeronautical experience requirements may be further reduced as permitted in part 61, section 61.109(k)(3).

[7] As part of program approval, part 141 training providers must also adhere to the requirements for permitted time in an FFS or FTD per Appendix B to part 141.

[8] The minimum aeronautical experience requirements may be further reduced as permitted in part 61, section 61.109(k)(3).

In order to credit the time, the ATD must be FAA-approved and the time must be provided by an authorized instructor. AC 61-136A, states the LOA for each approved ATD will indicate the credit allowances for pilot training and experience, as provided under parts 61 and 141. Time with an instructor in a BATD and an AATD may be credited towards the aeronautical experience requirements for the private pilot certificate as specified in the LOA for the device used. It is recommended that applicants who intend to take credit for time in a BATD or an AATD towards the aeronautical experience requirements for the private pilot certificate obtain a copy of the LOA for each device used so they have a record for how much credit may be taken. For additional information on the logging of ATD time reference AC 61-136A, see Appendix 4.

***Instrument Experience***

Section 61.57 provides the recent flight experience requirements to serve as a PIC. Paragraph (c) specifies the necessary instrument experience required to serve as a PIC under IFR. The experience may be gained in an airplane, an FSTD, or an ATD. Refer to the subparagraphs of section 61.57(c) to determine the experience needed, which varies depending upon whether an airplane, FSTD, ATD, or combination of airplane and training devices is used.

***Instrument Proficiency Check***

If a person fails to meet the experience requirements of section 61.57(c), a pilot may only establish instrument currency through an instrument proficiency check as described in section 61.57(d). An FSTD may be used as part of an approved curriculum to accomplish all or portions of this check. If specified in its LOA, an AATD may be used to complete most of the required *Task*s. A BATD cannot be used for an instrument proficiency check. [back]

***Use of an FSTD on a Practical Test***

Section 61.45 specifies the required aircraft and equipment that must be provided for a practical test unless permitted to use an FFS or FTD for the flight portion. Section 61 64 provides the criteria for using an FSTD for a practical test. Specifically, paragraph (a) states –

> *If an applicant for a certificate or rating uses a flight simulator or flight training device for training or any portion of the practical test, the flight simulator and flight training device—*
>
> *(1) Must represent the category, class, and type (if a type rating is applicable) for the rating sought; and*
>
> *(2) Must be qualified and approved by the Administrator and used in accordance with an approved course of training under part 141 or part 142 of this chapter; or under part 121 or part 135 of this chapter, provided the applicant is a pilot employee of that air carrier operator.*

Therefore, practical tests or portions thereof, when accomplished in an FSTD, may only be conducted by FAA aviation safety inspectors (ASI), aircrew program designees (APD) authorized to conduct such tests in FSTDs in parts 121 or 135, qualified personnel and designees authorized to conduct such tests in FSTDs for part 141 pilot school graduates, or appropriately authorized part 142 Training Center Evaluators (TCE). [back]

In addition, section 61.64(b) states if an airplane is not used during the practical test for a type rating for a turbojet airplane (except for preflight inspection), an applicant must accomplish the entire practical test in a Level C or higher FFS and the applicant must meet the specific experience criteria listed. If the experience criteria cannot be met, the applicant can either—

> *(f)(1) […] complete the following Tasks on the practical test in an aircraft appropriate to category, class, and type for the rating sought: Preflight inspection, normal takeoff, normal instrument landing system approach, missed approach, and normal landing; or*
>
> *(f)(2) The applicant's pilot certificate will be issued with a limitation that states: "The [name of the additional type rating] is subject to pilot in command limitations," and the applicant is restricted from serving as pilot in command in an aircraft of that type.*

When flight Tasks are accomplished in an airplane, certain Task elements may be accomplished through "simulated" actions in the interest of safety and practicality. However, when accomplished in an FFS or FTD, these same actions would not be "simulated." For example, when in an airplane, a simulated engine fire may be addressed by retarding the throttle to idle, simulating the shutdown of the engine, simulating the discharge of the fire suppression agent, if applicable, and simulating the disconnection of associated electrical, hydraulic, and pneumatics systems. However, when the same emergency condition is addressed in a FSTD, all Task elements must be accomplished as would be expected under actual circumstances.

Similarly, safety of flight precautions taken in the airplane for the accomplishment of a specific maneuver or procedure (such as limiting altitude in an approach to stall or setting maximum airspeed for an engine failure expected to result in a rejected takeoff) need not be taken when a FSTD is used. It is important to understand that, whether accomplished in an airplane or FSTD, all Tasks and elements for each maneuver or procedure shall have the same performance standards applied equally for determination of overall satisfactory performance.

## Appendix 9: References

This ACS is based on the following 14 CFR parts, FAA guidance documents, manufacturer's publications, and other documents.

| Reference | Title |
|---|---|
| 14 CFR part 39 | Airworthiness Directives |
| 14 CFR part 43 | Maintenance, Preventive Maintenance, Rebuilding and Alteration |
| 14 CFR part 61 | Certification: Pilots, Flight Instructors, and Ground Instructors |
| 14 CFR part 71 | Designation of Class A, B, C, D and E Airspace Areas; Air Traffic Service Rotes; and Reporting Points |
| 14 CFR part 91 | General Operating and Flight Rules |
| 14 CFR part 93 | Special Air Traffic Rules |
| AC 00-6 | Reporting of Aircraft Accidents and Incidents |
| AC 00-45 | Aviation Weather |
| AC 60-28 | English Language Skill Standards Required by 14 CFR parts 61, 63 and 65 |
| AC 61-67 | Stall and Spin Awareness Training |
| AC 91-73 | Parts 91 and 135 Single Pilot, Flight School Procedures During Taxi Operations |
| AIM | Aeronautical Information Manual |
| Chart Supplements U.S. | Chart Supplements U.S. (previously Airport/Facility Directory or A/FD) |
| FAA-H-8083-1 | Aircraft Weight and Balance Handbook |
| FAA-H-8083-2 | Risk Management Handbook |
| FAA-H-8083-3 | Airplane Flying Handbook |
| FAA-H-8083-6 | Advanced Avionics Handbook |
| FAA-H-8083-15 | Instrument Flying Handbook |
| FAA-H-8083-23 | Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook |
| FAA-H-8083-25 | Pilot's Handbook of Aeronautical Knowledge |
| FAA-P-8740-19 | Flying Light Twins Safely |
| POH/AFM | Pilot's Operating Handbook/FAA-Approved Airplane Flight Manual |
| Other | Navigation Charts |

| | |
|---|---|
| | Navigation Equipment Manual |
| | USCG Navigation Rules, International-Inland |
| | NOTAMS |

**Note:** Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.

[back]

# Appendix 10: Abbreviations and Acronyms

The following abbreviations and acronyms are used in the ACS.

| Abb./Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AATD | Advanced Aviation Training Device |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| AD | Airworthiness Directive |
| ADF | Automatic Direction Finder |
| ADM | Aeronautical Decision-Making |
| AFS | Flight Standards Service |
| AELP | Aviation English Language Proficiency |
| AFM | Airplane Flight Manual |
| AFS | Flight Standards Service |
| AGL | Above Ground Level |
| AIM | Aeronautical Information Manual |
| AKTR | Airman Knowledge Test Report |
| ALD | Alternative Lighting Devices |
| AMEL | Airplane Multiengine Land |
| AMES | Airplane Multiengine Sea |
| AOA | Angle of Attack |
| AOO | Area of Operation |
| ASEL | Airplane Single Engine Land |
| ASES | Airplane Single Engine Sea |
| ASI | Aviation Safety Inspector |
| ATC | Air Traffic Control |
| ATD | Aviation Training Device |
| ATP | Airline Transport Pilot |
| BATD | Basic Aviation Training Device |
| CDI | Course Deviation Indicator |
| CFIT | Controlled Flight Into Terrain |
| CFR | Code of Federal Regulations |
| CG | Center of Gravity |
| CP | Completion Phase |
| CRM | Crew Resource Management |
| CTP | Certification Training Program |
| DA | Decision Altitude |
| DH | Decision Height |
| DME | Distance Measuring Equipment |

| | |
|---|---|
| DP | Departure Procedures |
| DPE | Designated Pilot Examiner |
| ELT | Emergency Locator Transmitter |
| FAA | Federal Aviation Administration |
| FADEC | Full Authority Digital Engine Control |
| FFS | Full Flight Simulator |
| FMS | Flight Management System |
| FSB | Flight Standardization Board |
| FSDO | Flight Standards District Office |
| FSTD | Flight Simulation Training Device |
| FTD | Flight Training Device |
| GBAS | Ground Based Augmentation System |
| GNSS | Global Navigation Satellite System |
| GLS | Ground Landing System |
| GPS | Global Positioning System |
| HAT | Height Above Threshold (Touchdown) |
| HSI | Horizontal Situation Indicator |
| IA | Inspection Authorization |
| IAP | Instrument Approach Procedure |
| IFO | International Field Office |
| IFR | Instrument Flight Rules |
| IFU | International Field Unit |
| ILS | Instrument Landing System |
| IMC | Instrument Meteorological Conditions |
| IPC | Instrument Rating Airplane Canadian Conversion |
| IPC | Instrument Proficiency Check |
| IR | Instrument Rating |
| IRA | Instrument Rating Airplane |
| KOEL | Kinds of Operation Equipment List |
| LAHSO | Land and Hold Short Operations |
| LDA | Localizer-Type Directional Aid |
| LOA | Letter of Authorization |
| LOC | ILS Localizer |
| LPV | Localizer Performance Vertical |
| MAP | Missed Approach Point |
| MDA | Minimum Descent Altitude |
| MEL | Minimum Equipment List |
| MFD | Multi-functional Displays |
| NAS | National Airspace System |
| NOD | Notice of Disapproval |

| | |
|---|---|
| NOTAMs | Notices to Airmen |
| NSP | National Simulator Program |
| NTSB | National Transportation Safety Board |
| PA | Private Airplane |
| PAR | Private Pilot Airplane |
| PAT | Private Pilot Airplane/Recreational Pilot – Transition |
| PCP | Private Pilot Canadian Conversion |
| PFD | Primary Flight Display |
| PIC | Pilot-in-Command |
| POA | Plan of Action |
| POH | Pilot's Operating Handbook |
| PTS | Practical Test Standards |
| QPS | Qualification Performance Standard |
| RAIM | Receiver Autonomous Integrity Monitoring |
| RMP | Risk Management Process |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| SAE | Specialty Aircraft Examiner |
| SFRA | Special Flight Rules Area |
| SIAP | Standard Instrument Approach Procedure |
| SMS | Safety Management System |
| SOP | Standard Operating Procedures |
| SPRM | Single-Pilot Resource Management |
| SRM | Safety Risk Management |
| STAR | Standard Terminal Arrival |
| SUA | Special Use Airspace |
| TAEA | Track Advisory Environmental Assessment |
| TAF | Terminal Forecast |
| TAS | True Airspeed |
| TCH | Threshold Crossing Height |
| TEM | Threat and Error Management |
| TFR | Temporary Flight Restrictions |
| UTC | Coordinated Universal Time |
| $V_A$ | Maneuvering speed |
| VDP | Visual Descent Point |
| $V_{FE}$ | Maximum flap extended speed |
| VFR | Visual Flight Rules |
| VMC | Visual Meteorological Conditions |
| $V_{MC}$ | Minimum Control Speed with the Critical Engine Inoperative |
| $V_{NE}$ | Never exceed speed |

| | |
|---|---|
| VOR | Very High Frequency Omnidirectional Range |
| $V_S$ | Stall Speed |
| $V_X$ | Best Angle of Climb Speed |
| $V_Y$ | Best Rate of Climb Speed |
| $V_{SSE}$ | Safe, intentional one-engine-inoperative speed. Originally known as safe single-engine speed |
| $V_{XSE}$ | Best angle of climb speed with one engine inoperative |
| $V_{YSE}$ | Best rate of climb speed with one engine inoperative |
| $V_{SO}$ | Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration |

# Recommendations on Instructor ACS, Development, Prototype, and Guidance

## INSTRUCTOR ACS DEVELOPMENT

The Instructor Subgroup conducted two "Tabletop" Prototype exercises since the last ARAC meeting.
The first took place in the Orlando, FL Flight Standards District in March 2018 and the second occurred in the Scottsdale, AZ Flight Standards District at the end of April 2018.

Designated Pilot Examiners (DPE) who conduct initial flight instructor practical tests from both districts were invited to review the draft Instructor Airman Certification Standards and meet with members of the ACS Working Group at the respective Flight Standards District Office to provide feedback.

The objective was to evaluate the draft Instructor ACS for the following prior to testing the document operationally with applicants (aka, a full prototype):

1. Is the document usable in its current form for its intended purpose?
2. Can an experienced DPE understand and adapt to the different format used by the Instructor ACS?
3. Can an experienced DPE utilize the document to conduct a CFI-Initial practical test?
4. Are there topic areas that are not adequately addressed in the current Instructor ACS?

The results in both cases indicated that the Instructor ACS format is understandable and usable for preparing an initial CFI practical test plan of action.

The DPEs offered many suggestions regarding preparing individuals to become flight instructors, latitude for task selection for an Instructor practical test, and minor content inputs. One particularly cogent suggestion was a desire to integrate the Fundamentals of Instructing (FOI) evaluation into each of the tasks in which an applicant would be expected to demonstrate instructional knowledge and skills.

The participating DPEs were excited to be a part of the process and willingly expended their personal time to be involved.

## RECOMMENDATIONS

- The ACS WG's Instructor ACS Subgroup should:
    - Evaluate and incorporate some of the DPE recommendations in the next draft. These include the idea of embedding the FOI into each task in which an applicant would be expected to demonstrate instructional knowledge and skills.
    - Begin work needed to conduct a full prototype (control group involving actual practical tests) by the September-December 2018 timeframe.

## INSTRUCTOR GUIDANCE

The ACS WG's Instructor ACS Subgroup has started a project to develop an additional chapter for the *Aviation Instructor Handbook* (FAA-H-8083-9) to focus on instructional risk management.

## RECOMMENDATIONS

- Review the revised Aviation Instructor Handbook for consistency with the Instructor ACS.
- Incorporate the new chapter on instructional risk management
- Publish the next revision to the Aviation Instructor Handbook (FAA-H-8083-9) by December 2018.

# Recommendations to Align Training Regulations with AMT ACS

May 21, 2018

Yvette A. Rose
Chair, Aviation Rulemaking Advisory Committee
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Ms. Rose,

On behalf of the Airman Certification System Working Group (ACSWG), we submit the following recommendation to the Aviation Rulemaking Advisory Committee (ARAC) for consideration and implementation. The recommendations, once implemented, will help align training regulation and guidance with the airman certification standards.

The ARAC working group was tasked with developing recommended testing standards, training guidance, test management, and reference materials for the aircraft mechanic certificate with airframe and powerplant (A&P) ratings. The Aviation Maintenance Technician (AMT) Airman Certification Standards (ACS) will replace current practical test standards (PTS) and clearly define minimum knowledge, risk management and skill requirements for A&P mechanics. Once completed, it will provide the framework for the Knowledge Exam (written), oral and practical mechanic tests; and subsequently, a guide for revising handbooks, oral questions, practical projects and the knowledge test bank.

14 Code of Federal Regulations (CFR) part 147 governs certification requirements for aviation maintenance technician schools (AMTS). Completion of an AMTS program is one way to satisfy experience requirements for an A&P certificate (see § 65.77). In the absence of a comprehensive testing standard, training standards (i.e., curriculum requirements) provided in part 147 has effectively provided the framework for the skill and knowledge required of an A&P mechanic. While we understand and appreciate how we got to this point, it is the working group's opinion that the standard is misplaced.

Title 14 CFR part 65 sets forth the knowledge, experience and skill requirements for a mechanic certificate (see §65.75, §65.77 and §65.79). Requisite knowledge and skill is verified through written, oral and practical tests (see §65.75(b) and §65.79). The AMT ACS is the guidance that sets forth specifics on what a candidate must know, consider and do to successfully pass those tests. Part 65 is therefore the impetus for testing *and* training. In contrast, part 147 should be reserved for dictating AMTS certification and operating requirements, not mechanic knowledge and skill standards.

The working group therefore makes the following recommendations:

1. **Revise part 65 to provide the baseline standard for mechanic knowledge and skill requirements**

Incorporating general knowledge and skill elements in part 65 would ensure that testing and training standards fall directly out of the regulation.Until formal rulemaking can take place, the AMT ACS would provide the requisite specificity. The standard would be "enforceable" through part 65, which requires applicants to pass an agency developed and controlled mechanic test.

2. **Remove any reference to curriculum requirements or subject areas from part 147**

As stated above, part 65 is the impetus for testing *and* training. The inclusion of required curriculum or subject headings in part 147 creates a separate, inflexible, and inconsistent standard that training organizations will be forced to reconcile for decades to come.

3. **Reference the AMT ACS in AMTS operations specifications to ensure that training and testing are directly correlated**

Utilizing the AMT ACS as the basis for curriculum ensures that the agency can enforce AMTS adherence to the standard, requires schools to adjust their curriculum as mechanic knowledge and skill requirements evolve, and utilizes less government resources to maintain and update separate training specifications.

If the agency elects to dictate any specific curriculum requirements through the part 147 operation specification, it should directly mirror the subject areas provided for in the AMT ACS (see attachment 1). The agency should also ensure there is a mechanism available to update AMTS operations specifications as the AMT ACS periodically evolves.

4. **Utilize the ARAC Airman Certification System Working Group as the driver for changes to training requirements**

The AMT ACS will be periodically reviewed and updated, ensuring it is in line with mechanic knowledge and skill requirements as technology evolves. The working group could serve as the vehicle to ensure that training and testing keeps up with ever-evolving safety considerations.

We thank you for your consideration of these recommendations and encourage the committee to accept and forward to the FAA for consideration and action.

Sincerely,

David Oord
ACSWG Chair
ARAC Vice-Chair
Senior Director, Regulatory Affairs
Aircraft Owners and Pilots Association

Jackie Spanitz
AMT ACS Subgroup Co-chair
General Manager
Aviation Supplies & Academics, Inc.

Janeen Kochan, PhD, FRAeS,
AMT ACS Subgroup Co-chair
Human Factors Scientist/Designated Pilot Examiner/Instructor Pilot
Aviation Research, Training, and Services, Inc.

Attachment 1 AMT ACS subjects

## Attachment 1
## AMT ACS (FAA-S-ACS-1) Subjects

**General**
Fundamentals of Electricity and Electronics
Aircraft Drawings
Weight and Balance
Fluid Lines and Fittings
Aircraft Materials, Hardware, and Processes
Ground Operations and Servicing
Cleaning and Corrosion Control
Mathematics
Regulations, Maintenance Forms, Records, and Publications
Physics for Aviation
Inspection Concepts and Techniques
Human Factors

**Airframe Structures**
Metallic Structures
Non-Metallic Structures
Aircraft Finishes
Flight Controls
Airframe Inspection

**Airframe Systems**
Landing Gear Systems
Hydraulic and Pneumatic Systems
Environmental Systems
Aircraft Instrument Systems
Communication and Navigation Systems
Aircraft Fuel Systems
Aircraft Electrical Systems
Ice and Rain Control Systems
Airframe Fire Protection Systems
Rotorcraft Fundamentals

**Powerplant Theory and Maintenance**
Reciprocating Engines
Turbine Engines
Engine Inspection

**Powerplant Systems and Components**
Engine Instrument Systems
Engine Fire Protection Systems
Engine Electrical Systems
Lubrication Systems
Ignition and Starting Systems
Fuel Metering Systems
Engine Fuel Systems
Engine Induction Systems
Engine Cooling Systems
Engine Exhaust and Reverser Systems
Propellers

Rulemaking Information Management System

# Committee Request

## Airman Certification System (ACS) Working Group (WG):
## Call to Action Safety Review of Pilot Certification Standards

## Request Information

| Committee Type | ARM Analyst | OPR |
|---|---|---|
| Aviation Rulemaking Advisory Committee (ARAC) | Shelly Waddell Smith<br>Airman Testing Standards Branch (AFS-630) | AFS |

Project Title: Initiation of "Call to Action Safety" Review of Pilot Certification Standards as mandated by the Aircraft Certification, Safety, and Accountability Act, a requirement of Division V of the Consolidated Appropriations Act, 2021[1]

Project Short Title: Call to Action Safety Review of Pilot Certification Standards

Summary of Committee Request:

In response to the referenced bill, which was passed by Congress on 12/21/20, and signed into law by the President on 12/27/20, the FAA is tasking the ARAC ACS WG to:

- ✓ Conduct a "Call to Action" safety review of the Pilot Airman Certification Standards (ACS), to include –
  - the transition from Practical Test Standards (PTS) to ACS.
  - all associated -
    - regulations,
    - guidance,
    - directives,
    - processes, and
    - oversight of their development and implementation.
  - revisions to Airplane ACS relating to possible effects on pilot competency in -
    - manual flying skills, and
    - managing automation.
- ✓ Establish a process for aviation stakeholders to provide and discuss observations, feedback, lessons learned, and best practices.
- ✓ Provide results of this review, including recommended actions, to the FAA.

[1] *H.R. 133 (116th): H.R. 133: Consolidated Appropriations Act, 2021 [Including Coronavirus Stimulus & Relief]*

## ARAC Proposed Milestones

| Milestone | Proposed Date |
|---|---|
| Issuance of ARAC Tasking Notice | 3/18/21 |
| ARAC Recommendation Report | 6/30/22 |

OPR Lead:

Manager/Supervisor:

Karen E Lucke

Digitally signed by KAREN E LUCKE
Date: 2021.01.29 08:00:36 -06'00'

Executive Director:

Robert C. Carty

Digitally signed by Robert C. Carty
Date: 2021.01.29 08:41:59 -05'00'

RIMS Version: 2.14 (2021-01-11). - Api Version: 2.14 (2020-11-25)

**Aviation Rulemaking Advisory Committee Task Notice**
[ DATE ]

**ACTION:** This document serves as notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC).

**SUMMARY:** The FAA assigned the ARAC a new task to perform a "call to action" safety review of pilot certification standards. The FAA Administrator has been directed to initiate this review in order to bring stakeholders together to share lessons learned and best practices, and to implement actions necessary to address any safety issues identified. This notice informs the public of the new ARAC activity for the Airman Certification Standards (ACS) Working Group (WG).

**BACKGROUND:** The ARAC is governed by the Federal Advisory Committee Act (5 U.S.C., Appendix 2). The FAA established the ARAC to provide information, advice, and recommendations on aviation related issues that could result in rulemaking, to the FAA Administrator, through the Associate Administrator of Aviation Safety.

Congress passed the Consolidated Appropriations Act on December 21, 2020; and the President signed the bill into law on December 27, 2020. This legislation established the Aircraft Certification, Safety, and Accountability Act. Sections 119(c)(2)(D) and 119(d) of this Act directs the FAA to initiate a "call to action" safety review of pilot certification standards:

> *(D) a review of revisions made to the airman certification standards for certificates over the last 4 years, including any possible effects on pilot competency in basic manual flying skills;*

> *(d) CALL TO ACTION ON AIRMAN CERTIFICATION STANDARDS.—*
> *(1) IN GENERAL.—Not later than 60 days after the date of enactment of this title, the Administrator shall initiate a call to action safety review of pilot certification standards in order to bring stakeholders together to share lessons learned, best practices, and implement actions to address any safety issues identified.*
> *(2) CONTENTS.—The call to action safety review required under paragraph (1) shall include—*
> *(A) a review of Administration regulations, guidance, and directives related to the pilot certification standards, including the oversight of those processes;*
> *(B) a review of revisions made to the pilot certification standards for certificates over the last 5 years, including any possible effects on pilot competency in manual flying skills and effectively managing automation to improve safety; and*
> *(C) a process for aviation stakeholders, including aviation students, instructors, designated pilot examiners, pilots, airlines, labor, and aviation safety experts, to provide and discuss any observations, feedback, and best practices.*

*(3) REPORT AND RECOMMENDATIONS.—Not later than 90 days after the conclusion of the call to action safety review pursuant to paragraph (1), the Administrator shall submit to the congressional committees of jurisdiction a report on the results of the review, any recommendations for actions or best practices to ensure pilot competency in basic manual flying skills and in effective management of automation, and actions the Administrator will take in response to the recommendations.*

The FAA is tasking the ARAC ACS WG to conduct this call to action safety review, and to provide recommendations to address any findings. The review must include the following areas:

- regulations, guidance, and directives related to pilot certification standards;
- oversight of associated processes;
- the transition from Practical Test Standards (PTS) to ACS, including revisions made to standards and any possible effects on pilot competency in:
  - manual flying skills; and
  - managing automation to improve safety; and
- a process for aviation stakeholders (including students, instructors, designated pilot examiners, pilots, airlines, labor representatives, and safety experts) to discuss observations, provide feedback, share lessons learned, and document best practices.

On [ DATE ], the FAA assigned the task to the ARAC; and the ARAC designated the task to the ACS WG. Participants of the existing ACS WG will serve as members of the working group reporting to the ARAC. The ACS WG will solicit and collect stakeholder feedback, provide advice and recommendations on the assigned task, and review and approve submission of the recommendation report to the ARAC for its consideration. The ARAC must deliberate and discuss the report prior to voting on whether to submit the recommendation report to the FAA.

**THE TASK:** The ACS WG will provide advice and recommendations, to the ARAC, on the most effective ways for the FAA to:

- provide oversight of pilot certification standards processes;
- manage the possible effects of changing standards on pilot competency in relation to manual flying skills and effectively managing automation; and
- receive, adjudicate, and implement feedback from internal and external aviation stakeholders.

1. The ACS WG will review and identify any safety issues concerning pilot certification standards, and associated references and materials, including, but not limited to:
   a. PTS documents;
   b. ACS documents;
   c. regulations, orders, handbooks, advisory circulars, and other FAA-produced documents used as ACS references; and
   d. pilot knowledge test questions.

   The review must include aviation stakeholder input, as described in the Act. For any safety issues identified, the ACS WG will develop recommendations for addressing those issues.

2. The ACS WG will review existing processes for the development and management of pilot certification standards and identify any areas for improvement.

3. Develop a report containing recommendations on the findings and results of the tasks explained above:
   a. The recommendation report should document both majority and dissenting positions on the findings and the rationale for each position.
   b. Any disagreements should be documented, including the rationale for each position and the reasons for the disagreement.

**SCHEDULE:**

The ACS WG will provide a status update at each ARAC meeting, and will submit a final recommendation report for the ARAC's consideration in June 2022. The final recommendation report is due to the FAA no later than June 30, 2022.

**ACS WG ACTIVITY:** The ACS WG will comply with the procedures adopted by the ARAC and as follows:

1. Conduct a review and analysis of the assigned tasks and any other related materials or documents.
2. Draft and submit to the ARAC Chair a work plan for completion of the task, including the rationale supporting such a plan.
3. Provide a status report at each ARAC ACS WG Meeting.
4. Draft and submit the recommendation report based on the review and analysis of the assigned tasks.
5. Present the final recommendation report at the June 2022 ARAC Meeting.

**PARTICIPATION IN THE WORKING GROUP:** The ARAC ACS WG is comprised of technical experts having an interest in the assigned task. A working group member need not be a member representative of the ARAC. The ACS WG includes a wide range of stakeholders to ensure all aspects of this task is considered in development of the recommendations.

The provisions of the guidance from the Office of Management and Budget, dated August 13, 2014, "Revised Guidance on Appointment of Lobbyists to Federal Advisory Committees, Boards, and Commissions" (79 FR 47482), continues the ban on registered lobbyists participating on agency boards and commissions if participating in their "individual capacity". The revised guidance now allows registered lobbyists to participate on agency boards and commissions in a "representative capacity" for the "express purpose of providing a committee with the views of a nongovernmental entity, a recognizable group of persons or nongovernmental entities (an industry, sector, labor unions, or environmental groups, etc.) or state or local government". (For further information see Lobbying Disclosure Act of 1995 (LDA) as amended, 2 U.S.C 1603, 1604, and 1605.)

Roles and Responsibilities

Members of the ACS WG, assigned to this new tasking, should actively participate in the working group by attending all meetings, and providing written comments when requested. Members should devote the resources necessary to support the ACS WG in meeting any assigned deadlines. Members should also keep their management, and those they may represent, advised of ACS WG activities and decisions to ensure the proposed technical solutions do not conflict with the position of those they represent. Once the working group has begun deliberations, members will not be added or substituted without the approval of the ARAC ACS WG Chair and the FAA's ARAC ACS WG Sponsor.

Confidential Information

All final work products submitted to the ARAC are public documents. Therefore, it should not contain any nonpublic, proprietary, privileged, business, commercial, and other sensitive information (collectively, "confidential information") that WG members would not want to be publicly available. With respect to WGs, there may be instances where members will share commercial information, within the WG, for purposes of completing an assigned tasked. Members must not disclose to any third party, or use for any purposes other than the assigned task, any and all confidential information disclosed to one party by the other party, without the prior written consent of the party whose confidential information is being disclosed. All parties must treat the confidential information of the disclosing party as it would treat its own confidential information; but, in no event, shall it use less than a reasonable degree of care. If any confidential information is shared with an FAA representative on a working and/or task groups, it must be properly marked in accordance with the Office of Rulemaking Committee Manual, ARM-001-15.

The Secretary of Transportation determined the formation and use of the ARAC is necessary and in the public interest in connection with the performance of duties imposed on the FAA by law.

ARAC meetings are open to the public. However, working group meetings are not open to the public, except to the extent individuals with an interest and expertise are selected to participate. The FAA will make no public announcement of the ACS WG meetings.

**FOR FURTHER INFORMATION CONTACT:** Karen Lucke, Acting Manager of the Federal Aviation Administration's Flight Standards Service, Regulatory Support Division (AFS-600), via email at: karen.lucke@faa.gov.

Aviation Rulemaking Advisory Committee (ARAC)
Airman Certification Standards (ACS) Working Group (WG)
**Call to Action (CtA) Subgroup (SG)**

CALL TO ACTION
C A
PILOT ACS SAFETY REVIEW

**DESCRIPTION** ARAC ACS WG – CtA SG Interim Recommendation Report

**DATE** August 12, 2021

**SUMMARY** This report explains the CtA SG's concerns regarding the delay in publishing revised and new ACS documents.

**TEAM MEMBERS**

**ARAC ACS WG Leads:** David Oord (Lilium), Susan Parson (FAA, AFX-001)
**CtA SG Community Lead:** Jackie Spanitz (Aviation Supplies & Academics, Inc. (ASA))
**CtA SG Program Manager:** Shelly Waddell Smith (FAA, AFS-630)

**Community Partners:**

| | | | |
|---|---|---|---|
| Emelia Bernava | Balloon SME | Jens Hennig | GAMA |
| Paul Cairns | ERAU | Janeen Kochan | Aviation Research, Training & Services |
| Kevin Comstock | ALPA | Justin Madden | AMFA/Southwest Airlines |
| Chris Cooper | AOPA | Crystal Maguire | ATEC |
| Mariellen Couppee | Mobido Creative | Jimmy Rollison | FedEx *(Retired)* |
| Eric Crump | Polk State College | Kevin Semler | Leonardo Helicopters |
| Maryanne DeMarco | CAPA | Roger Sharp | Pilot/Instructor *(original ARC ACS WG Member)* |
| David Earl | Flight Safety | Tim Tucker | Robinson Helicopters |

**FAA**

| | | | |
|---|---|---|---|
| Barbara Adams | Air Carrier Training & Voluntary Safety | Darendia McCauley | Airman Testing Standards |
| Leisha Bell | Certification & Flight Training | Kieran O'Farrell | Airman Testing Standards |
| Tim Hayward | Air Carrier Training & Voluntary Safety | Matthew Porter | Certification & Flight Training |
| Dr. Barry Hyde | Airman Testing Standards | Rob Reckert | Regulatory Support |
| Daniel Klingler | Technical Operations | Amanda Thiesen | Certification & Flight Training |

**ISSUE**

The ACS WG is concerned by continuing delays and uncertainty in the FAA publishing new and amended ACS documents.

**BACKGROUND**

The ACS are the product of a decades-long industry-FAA collaboration. The process in place for the past decade is informed by input by prior FAA Aviation Rulemaking Committee's and safety recommendations. The ACS, building on the legacy Practical Test Standards, integrates knowledge, risk management, and skills elements into a single comprehensive framework for pilot certification while also providing a clear bridge between the regulatory requirements in Part 61 and the FAA guidance documents, such as Handbooks. By providing a comprehensive framework for what a well-trained applicant should know, consider and do, to qualify for a certificate or rating, these documents contribute to the safety of the U.S. aviation system.

The ACS framework originated in 2011, when a diverse group of aviation community stakeholders, convened in the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC), which recommended this approach to the FAA. A succession of ARAC-chartered WGs and SGs established starting in 2012 have since invested countless hours in developing this integrated approach to defining the knowledge, risk management, and skill elements for use in certification testing.

The FAA published the first two ACS in 2016, and has released several additional ACS, plus revisions to the original documents, in 2017, 2018, and 2019 (https://www.faa.gov/training_testing/testing/acs/). The ACS improves on the PTS by adding the knowledge and risk management sections that correspond to the skills section, as well as adding ACS Codes to track test questions with guidance material and ACS elements which support the overall airman certification system that is: (1) initial training; (2) FAA Knowledge Exam resulting in airman knowledge test report; (3) retraining based on airman knowledge test report, (4) retesting based on airman knowledge test report + overall testing of context-based knowledge, risk management, skills. This ACS format (knowledge, risk management, skills + ACS codes) allows for a more effective means to align FAA guidance with testing, as well as correlate training and testing. It also provides a means for continuous improvement for review and changes over time. The aviation community has fully accepted this approach and embraces the ACS testing framework as a significantly improved guide to ensuring certification training activity focuses on overall proficiency to help prevent rote memorization or performance of tasks, sometimes without context.

The collaborative process that developed the ACS and associated guidance materials (FAA-H-series Handbooks) has also offered greater transparency, fairness, and trust between aviation community stakeholders and the FAA. In addition to using the ARAC ACS WG to develop and update ACS documents, the FAA has made completed ACS available for public comment and review on the agency's website, as well as through Federal Register Notices of Availability.

**CURRENT STATUS OF ACS PUBLICATION AND UPDATES**

While development and revision work of ACS documents continues (there are fourteen completed ACS, with more in progress) the ACS WG and the broader industry remains frustrated by the fact that no new ACS documents have been released since 2019. The ACS WG understands this delay arises from the previous administration's concerns[1] the ACS (along with the legacy Practical Test Standards (PTS)) imposes testing requirements not explicitly listed in 14 CFR part 61 and other regulations. The current administration's decisions (e.g., Repeal of (a) DOT's 2018 Policies and Procedures for Rulemaking, (b) a 2018 General Counsel Memorandum on the "Review and Clearance of Guidance Documents," (c) a 2019 General Counsel Memorandum on "Procedural Requirements for DOT Enforcement Actions," and (d) a 2019 Rule on Administrative Rulemaking, Guidance and Enforcement procedures) eliminated a key roadblock. The action by the Department of Transportation (DOT) to amend 49 CFR part 5 also provided an important step toward reestablishing a process for ACS publication.

Should there be any other additional concerns to the approval of proposed ACS submitted, we would request:

- the identification of any specific problems, concerns, or obstacles blocking approval of the submitted ACS, and
- recommended appropriate mitigation to any identified problems, concerns, or obstacles.

The negative impacts of the stalled publication of ACS are significant and accumulating. In the absence of new and/or revised certification testing standards, aviation training and testing providers rely on outdated PTS, ACS documents that have no path to be updated with current safety information, or no published standard at all. With the rapid proliferation of new entrants (e.g., drones, powered lift, vertical takeoff and landing, and urban air mobility), a way forward for the publication of ACS documents and a reactivation of the standards and testing framework envisioned by the FAA and industry is urgently needed.

While the ACS WG understands and appreciates the need to avoid "rulemaking by policy" or requirements that could impose an undue burden on the public, the ARAC process and the ARAC-developed product (i.e., ACS) have proven to offer an efficient, effective, and transparent means to create and manage certification testing elements for a highly dynamic industry with safety as the highest priority. The process includes opportunities for both expert input through the ARAC and public comment that achieves the desired transparency. Through ARAC, the FAA benefits from stakeholder collaboration and input that helps to maintain systematic alignment among certification testing requirements flowing from topics defined in regulation, guidance, and testing. This process also provides the flexibility needed to ensure that certification testing standards can be regularly revised, in a timely way, to support both advances in technology and evolving safety issues.

[1] Administrative Rulemaking, Guidance and Enforcement Procedures, 84 FR 71714, published Dec. 27, 2019

The FAA needs to create a path that provides for the effective, efficient, and transparent maintenance and publication of ACS documents, for both those ACS documents that have been approved by the ARAC, and those ACS documents pending with the FAA for coordination and review, and then, continue development of new editions and new titles. To best serve the interest of safety, as well as stakeholder needs, such a path must:

- accommodate safety needs (including NTSB, FAA, and stakeholder input);
- allow timely changes when circumstances require;
- provide for predictable revisions;
- allow for public consultation; and
- promote continued communication and interaction with community partners.

We respectfully request the ARAC engage with the FAA, as soon as possible, to find such a path. This Congressionally-mandated Call to Action is pointless without a means to publish, and revise as necessary, the ACSs.

**REFERENCES**

https://www.congress.gov/116/bills/hr133/BILLS-116hr133enr.pdf
**H.R. 133-1160: Page 1158, Sec. 119. Domestic and International Pilot Training. (c) (2) (D):** "a review of revisions made to the airman certification standards for certificates over the last 4 years, including any possible effects on pilot competency in basic manual flying skills"

https://www.congress.gov/116/bills/hr133/BILLS-116hr133enr.pdf
**H.R. 133-1160: Pages 1159-1160, Sec. 119. Domestic and International Pilot Training. (d) (1); (d) (2) (A), (B), and (C); and (d) (3):**
"(d) CALL TO ACTION ON AIRMAN CERTIFICATION STANDARDS.—
(1) IN GENERAL.—Not later than 60 days after the date of enactment of this title, the Administrator shall initiate a call to action safety review of pilot certification standards in order to bring stakeholders together to share lessons learned, best practices, and implement actions to address any safety issues identified.
(2) CONTENTS.—The call to action safety review required under paragraph (1) shall include—
(A) a review of Administration regulations, guidance, and directives related to the pilot certification standards, including the oversight of those processes;
(B) a review of revisions made to the pilot certification standards for certificates over the last 5 years, including any possible effects on pilot competency in manual flying skills and effectively managing automation to improve safety; and
(C) a process for aviation stakeholders, including aviation students, instructors, designated pilot examiners, pilots, airlines, labor, and aviation safety experts, to provide and discuss any observations, feedback, and best practices.
(3) REPORT AND RECOMMENDATIONS.—Not later than 90 days after the conclusion of the call to action safety review pursuant to paragraph (1), the Administrator shall submit to the congressional committees of jurisdiction a report on the results of the review, any recommendations for actions or best practices to ensure pilot competency in basic manual flying skills and in effective management of automation, and actions the Administrator will take in response to the recommendations."

# Appendix 6

# Practical Test Standards Transition to Airman Certification Standards: Comparison of Airman Performance

Prepared by:
Aviation Rulemaking Advisory Committee (ARAC)
Airman Certification Standards (ACS) Working Group (WG)
Call to Action (CtA) Subgroup (SG)

May 3, 2022

Submitted to ARAC, recommended to FAA in response to Congressional request H.R. 133-1160

# Executive Summary

*Objective:* The purpose of this two-part analysis was to investigate and identify significant differences in applicant performance on the FAA Airman (a) practical tests, and (b) FAA knowledge tests. This process investigated and identified the factors that contribute to pilot training and testing for manual flying skills and automation management.

*Background:* These analyses were part of the response to the Aircraft Certification, Safety, and Accountability Act, a requirement of Division V, of the Consolidated Appropriations Act, 2021, which was passed by Congress on 12/21/20, and signed into law by the President on 12/27/20. This effort was part of the FAA tasking of the Aviation Rulemaking Advisory Committee (ARAC) Airman Certification Standards (ACS) Work Group (WG) (ARAC ACS WG) to conduct a "Call to Action" safety review of pilot certification standards.

*Method:* To evaluate the differences in practical tests, the Areas of Operation that were found unsatisfactory for the Private Pilot Airplane, Instrument Rating Airplane, Commercial Pilot Airplane, and Airline Transport Pilot and Type Rating Airplane practical test results from pre- and post ACS implementation were analyzed. The data were normalized for the total number of practical tests given in the selected years. The knowledge test results for pre- and post ACS were also evaluated.

*Results:* These analyses directly addressed the FAA's charge to conduct a "Call to Action" safety review of the Pilot Airman Certification Standards (ACS), to include (a) the transition from Practical Test Standards (PTS) to ACS and (b) revisions to Airplane ACS relating to possible effects on pilot competency in manual flying skills and managing automation. The results of the practical test analysis showed several significant differences in pilot performance between the PTS and ACS years. The results of the knowledge test comparison showed no significant differences in the pre- and post ACS implementation scores, though all have increased (improved) slightly.

*Conclusion:* The results of this investigation show the differences in the Areas of Operation and rates of unsatisfactory performance with respect to manual flying skills and automation management on FAA Airman practical tests and FAA airman knowledge tests as reviewed and analyzed by the Call to Action subgroup.

# Table of Contents

## 1. Overview

The purpose of this two-part analysis was to investigate and identify significant differences in applicant performance on the FAA Airman (a) practical tests, and (b) knowledge tests when using the Practical Test Standards (PTS) versus the Airman Certification Standards (ACS). Factors that contribute to the training and testing for manual flying skills and automation management were specifically under investigation. To evaluate the differences in practical tests, the data for Areas of Operation that were found unsatisfactory for the Airline Transport Pilot and Type Rating Airplane, Commercial Pilot Airplane, Private Pilot Airplane, and Instrument Rating Airplane practical test results from pre- and post ACS implementation were acquired for analysis. The data were to be normalized for the total number of practical tests given in the selected years. In addition, the knowledge test results for pre- and post ACS were to be evaluated for any significant pre- and post ACS differences. The identification and analysis of significant changes in pilot performance will contribute to our understanding of the trends in airman training and testing under different guidance documents (PTS or ACS).

The results of the practical test analysis showed several significant differences in pilot performance between the PTS and ACS years. Pertinent to manual flying skills, the most notable change was in the ATP Airplane Stall Prevention Area of Operation where there was a significant *decrease* in the number of failures[1] between pre- and post ACS implementation (24% and 5%, respectively). However, equally of interest is the change in the ATP Airplane Instrument Procedures Area of Operation where there was a significant *increase* in the failures between pre- and post ACS implementation (20% and 34%, respectively). The number of overall unsatisfactory practical tests shows significant increases in the number of failures on the ATP Airplane and Instrument Rating Airplane practical tests.

The results of the knowledge test comparison showed no significant differences in the pre- and post ACS implementation scores, though all have increased (improved) slightly. This may be an artifact of the more specific language used in the ACS elements and the coordination between the knowledge test and the ACS that has been built into the airman certification.

## 2. Method

The method of this study was to compare and contrast the Areas of Operation, Tasks, and Elements that were found unsatisfactory on airmen practical tests when using the FAA Practical Test Standards (PTS) to those found unsatisfactory *since* the Airman Certification Standards

[1] The term "failure" (or "failures") is used in this report when the outcome of an activity (practical test or knowledge test) was unsuccessful. In the case of a practical test, the applicant would be issued a Notice of Disapproval. Though the term "failure" is not an outcome of a practical test, it is used generically in this sense.

(ACS) were implemented. The goal was to (a) investigate and identify significant differences in pilot applicant performance on the FAA practical tests pre- and post ACS implementation (b) evaluate the differences in the total *rates* of unsatisfactory performance on the practical tests, and (c) identify Areas of Operation found unsatisfactory under the ACS associated with manual flying skills and automation management. This could be used to directly address the knowledge, risk management, and/or skills in need of attention.

The first part of the study included four ACS to evaluate practical test performance: Airline Transport Pilot and Type Rating Airplane, Commercial Pilot Airplane, Private Pilot Airplane, and Instrument Rating Airplane practical test results. The second part looked at the associated FAA knowledge test resultsfor the same tests, comparing  data from 2014 and 2015 (pre-ACS implementation) and 2018 and 2019 (post-ACS implementation). These years were chosen to be representative of the pilot applicant population at times without significant disruptions to the aviation system in play (e.g., the 2020 pandemic). However, the ATP data comparison uses 2014, 2015, and 2018 compared to 2020, as the ATP Airplane ACS was not introduced until mid-2019. A year-by-year analysis was also conducted to identify trends in the practical test failure rates. Data sources were obtained from the FAA's Flight Standards, Safety Analysis and Promotion Division FS-900 via Excel spreadsheets or FAA public domain websites.

The elements that were found to be unsatisfactory on practical tests were entered as variables and coded into categories that included the identification of Tasks associated with "manual flying skills" and "effective management of automation." The failure rates were shown as raw numbers as well as percentages of the failure rates. A chi-square test of equal frequencies was conducted to investigate differences in the frequencies of the failures in Areas of Operation found under the PTS and ACS. The chi-square indicates whether the frequencies (number of values) in each category or group are statistically different from each other.

## 3. Pilot Performance Pre- and Post ACS Implementation Data

The following sections present the data sources and data analyses (chi square) for the four ACS under investigation. Data sources and data analyses for each of the four airman practical tests (see Table 1) used in this study are presented separately. All data analyzed were obtained from the FAAs' Flight Standards, Safety Analysis and Promotion Division FS-900 via Excel spreadsheets unless otherwise noted.

**Table 1*: Airman Certification Standards Analyzed***

| Airman Certification Standard | Publication Date | Change Date | Status |
|---|---|---|---|
| Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards (FAA-S-ACS-11) (Change 1) (PDF) | May-19 | 5/28/19 | Effective June 28, 2019 |
| Commercial Pilot — Airplane Airman Certification Standards (FAA-S-ACS-7A) (Change 1) (PDF) | Jun-18 | 6/6/19 | Effective June 28, 2019 |
| Private Pilot — Airplane Airman Certification Standards (FAA-S-ACS-6B) (Change 1) (PDF) | Jun-18 | 6/6/19 | Effective June 28, 2019 |
| Instrument Rating — Airplane Airman Certification Standards (FAA-S-ACS-8B) (Change 1) (PDF) | Jun-18 | 6/6/19 | Effective June 28, 2019 |

Each of the following four sections contain two tables. The first tables (2,4,6, and 8) in each section display the raw numbers and percentage that each Area of Operation accounted for in the failure of the practical test. The second tables (3,5,7, and 9) in each section present the results of the chi square tests. The green shading on the chi square test results indicates a decrease in failures from PTS to ACS.

## 3.1. Airline Transport Pilot

**Table 2*: Airline Transport Pilot Areas of Operation found Unsatisfactory on Practical Test by Year***

| **Airline Transport Pilot** | | **ATP** | | **ATP** | | **ATP** | | **ATP** | |
|---|---|---|---|---|---|---|---|---|---|
| **Area of Operation - only on Disaproved Evaluations** | | **2014** | | **2015** | | **2018** | | **2020** | |
| **Name** | **Code** | **Count** | **Percent** | **Count** | **Percent** | **Count** | **Percent** | **Count** | **Percent** |
| PREFLIGHT PREPARATION | **I** | 138 | 7% | 149 | 8% | 190 | 9% | 104 | 10% |
| PREFLIGHT PROCEDURES | **II** | 96 | 5% | 90 | 5% | 128 | 6% | 66 | 7% |
| TAKEOFFS AND LANDINGS | **III** | 218 | 11% | 212 | 11% | 292 | 13% | 146 | 14% |
| INFLIGHT MANEUVERS | **IV** | 219 | 11% | 220 | 12% | 249 | 11% | 115 | 11% |
| STALL PREVENTION | **V** | 492 | 25% | 455 | 24% | 496 | 22% | 49 | 5% |
| INSTRUMENT PROCEDURES | **VI** | 374 | 19% | 384 | 20% | 460 | 21% | 349 | 34% |
| EMERGENCY OPERATIONS | **VII** | 217 | 11% | 186 | 10% | 230 | 10% | 171 | 17% |
| POSTFLIGHT PROCEDURES | **VIII** | 189 | 9% | 176 | 8% | 151 | 7% | 21 | 2% |
| POSTFLIGHT PROCEDURES | **IX** | 51 | 3% | 40 | 2% | 28 | 1% | | |
| **Area of Operation Total** | | **1943** | **100%** | **1912** | **100%** | **2224** | **100%** | **1021** | **100%** |
| | | | | | | | | | |
| **Total # Disapproved Evaluations** | | **999** | | **1050** | | **1270** | | **657** | |
| **Total # of Discontinued Evaluations** | | **27** | | **20** | | **15** | | **8** | |

Note: These are raw numbers and are not corrected for total number of practical tests given. Areas of Operation VIII and IX were combined in the ACS to Area of Operation VIII.

**Table 3:** ***Airline Transport Pilot Chi-Square Test Results***

| Area of Operations | | Chi-Square Test Results PTS to ACS Comparison | | Chi-Square Test Results - Year by Year Comparison | | |
|---|---|---|---|---|---|---|
| | | | | **2014-2015** | **2015-2018** | **2015-2020** |
| **Airline Transport Pilot** | | $X^2(8) = 342.01$, $p < .001$ | ----> | $X^2(8) = 4.74$, $p = .785$ | $X^2(8) = 19.95$, $p = .011$ | $X^2(8) = 305.62$, $p < .001$ |
| **Area of Operation** - **only on Disaproved Evaluations** | | vvvv | | | vvvv | vvvv |
| **Name** | **Code** | Bonferroni Correction = .05/9; Alpha = 0.0056 | | Bonferroni Correction = .05/9; Alpha = 0.0056 | | |
| PREFLIGHT PREPARATION | **I** | $X^2(1) = 6.78$, $p = .009$ | | | $X^2(1) = 0.77$, $p = .380$ | $X^2(1) = 4.84$, $p = .028$ |
| PREFLIGHT PROCEDURES | **II** | $X^2(1) = 3.13$, $p = .077$ | | | $X^2(1) = 2.26$, $p = .133$ | $X^2(1) = 4.08$, $p = .043$ |
| TAKEOFFS AND LANDINGS | **III** | $X^2(1) = 5.22$, $p = .022$ | | | $X^2(1) = 4.01$, $p = .045$ | $X^2(1) = 6.41$, $p = .011$ |
| INFLIGHT MANEUVERS | **IV** | $X^2(1) = 0.001$, $p = .970$ | | | $X^2(1) = 0.10$, $p = .754$ | $X^2(1) = 0.04$, $p = .844$ |
| STALL PREVENTION | **V** | $X^2(1) = 186.17$, $p < .001$ | | | $X^2(1) = 1.30$, $p = .255$ | $X^2(1) = 168.80$, $p < .001$ |
| INSTRUMENT PROCEDURES | **VI** | $X^2(1) = 104.78$, $p < .001$ | | | $X^2(1) = 0.23$, $p = .633$ | $X^2(1) = 70.57$, $p < .001$ |
| EMERGENCY OPERATIONS | **VII** | $X^2(1) = 36.17$, $p < .001$ | | | $X^2(1) = 0.43$, $p = .513$ | $X^2(1) = 30.68$, $p < .001$ |
| POSTFLIGHT PROCEDURES | **VIII** | $X^2(1) = 50.99$, $p < .001$ | | | $X^2(1) = 8.24$, $p = .004$ | $X^2(1) = 54.28$, $p < .001$ |
| POSTFLIGHT PROCEDURES | **IX** | $X^2(1) = 20.16$, $p < .001$ | | | $X^2(1) = 4.41$, $p = .036$ | $X^2(1) = 21.66$, $p < .001$ |

Note: Green highlighting indicates significant decrease in failures. Yellow highlighting indicates a significant increase in failures.

## 3.2. Commercial Pilot Airplane

**Table 4*: Commercial Pilot Areas of Operation found Unsatisfactory on Practical Test by Year***

| Commercial Pilot - Airplane | | COM | | COM | | COM | | COM | | COM | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area of Operation - only on Disaproved Evaluations | | 2014 | | 2015 | | 2018 | | 2019 | | 2020 | |
| Name | Code | Count | Percent | Count | Percent | Count | Percent | Count | Percent | Count | Percent |
| PREFLIGHT PREPARATION | I | 621 | 10% | 1246 | 11% | 987 | 10% | 1045 | 9% | 855 | 10% |
| PREFLIGHT PROCEDURES | II | 305 | 5% | 630 | 5% | 556 | 5% | 617 | 6% | 468 | 5% |
| AIRPORT AND SEAPLANE BASE OPERATIONS | III | 382 | 6% | 791 | 7% | 625 | 6% | 658 | 6% | 514 | 6% |
| TAKEOFFS, LANDINGS, AND GO-AROUNDS | IV | 1198 | 19% | 2219 | 19% | 2191 | 21% | 2541 | 23% | 2159 | 25% |
| PERFORMANCE AND GROUND REFERENCE MANEUVERS | V | 634 | 10% | 1253 | 11% | 1189 | 11% | 1358 | 12% | 1006 | 11% |
| NAVIGATION | VI | 516 | 8% | 1072 | 9% | 750 | 7% | 748 | 7% | 524 | 6% |
| SLOW FLIGHT AND STALLS | VII | 476 | 8% | 869 | 7% | 807 | 8% | 898 | 8% | 680 | 8% |
| HIGH ALTITUDE OPERATIONS | VIII | 748 | 12% | 1292 | 11% | 396 | 4% | 367 | 3% | 265 | 3% |
| EMERGENCY OPERATIONS | IX | 455 | 7% | 1001 | 8% | 1394 | 13% | 1493 | 13% | 1183 | 13% |
| MULTIENGINE OPERATIONS | X | 708 | 11% | 1001 | 8% | 1096 | 11% | 1052 | 9% | 914 | 10% |
| POSTFLIGHT PROCEDURES | XI | 234 | 4% | 473 | 4% | 404 | 4% | 434 | 4% | 298 | 3% |
| **Area of Operation Total** | | **6277** | **100%** | **11847** | **100%** | **10395** | **100%** | **11211** | **100%** | **8866** | **100%** |
| | | | | | | | | | | | |
| **Total # Disapproved Evaluations** | | **2340** | | **4179** | | **3820** | | **4288** | | **3712** | |
| **Total # of Discontinued Evaluations** | | **67** | | **102** | | **84** | | **94** | | **99** | |

Note: These are raw numbers and are not corrected for total number of practical tests given.

**Table 5*: Commercial Pilot Chi-Square Test Results***

| Area of Operations | | Chi-Square Test Results PTS to ACS Comparison | | Chi-Square Test Results - Year by Year Comparison | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2014-2015 | 2015-2018 | 2018-2019 | 2019-2020 |
| **Commercial Pilot - Airplane** | | $X^2(10) = 1{,}585.29, p < .001$ | ----> | $X^2(10) = 56.83, p < .001$ | $X^2(10) = 572.65, p < .001$ | $X^2(10) = 23.33, p = .010$ | $X^2(10) = 23.94, p = .008$ |
| **Area of Operation** - only on Disaproved Evaluations | | vvvv | | vvvv | vvvv | vvvv | vvvv |
| **Name** | **Code** | Bonferroni Correction = .05/11; Alpha = 0.0045 | | Bonferroni Correction = .05/11; Alpha = 0.0045 | | | |
| PREFLIGHT PREPARATION | I | $X^2(1) = 8.81, p = .003$ | | $X^2(1) = 1.73, p = .188$ | $X^2(1) = 6.41, p = .011$ | $X^2(1) = 0.19, p = .662$ | $X^2(1) = 0.60, p = .438$ |
| PREFLIGHT PROCEDURES | II | $X^2(1) = 1.16, p = .281$ | | $X^2(1) = 1.77, p = .184$ | $X^2(1) = 0.01, p = .918$ | $X^2(1) = 0.25, p = .616$ | $X^2(1) = 0.49, p = .484$ |
| AIRPORT AND SEAPLANE BASE OPERATIONS | III | $X^2(1) = 6.55, p = .011$ | | $X^2(1) = 2.37, p = .124$ | $X^2(1) = 4.10, p = .043$ | $X^2(1) = 0.20, p = .656$ | $X^2(1) = 0.05, p = .829$ |
| TAKEOFFS, LANDINGS, AND GO-AROUNDS | IV | $X^2(1) = 96.18, p < .001$ | | $X^2(1) = 0.34, p = .561$ | $X^2(1) = 19.19, p < .001$ | $X^2(1) = 7.95, p = .0048$ | $X^2(1) = 7.85, p = .0051$ |
| PERFORMANCE AND GROUND REFERENCE MANEUVERS | V | $X^2(1) = 17.81, p < .001$ | | $X^2(1) = 1.00, p = .318$ | $X^2(1) = 4.21, p = .040$ | $X^2(1) = 2.36, p = .124$ | $X^2(1) = 2.80, p = .094$ |
| NAVIGATION | VI | $X^2(1) = 74.71, p < .001$ | | $X^2(1) = 3.52, p = .061$ | $X^2(1) = 24.76, p < .001$ | $X^2(1) = 2.47, p = .116$ | $X^2(1) = 4.84, p = .028$ |
| SLOW FLIGHT AND STALLS | VII | $X^2(1) = 2.64, p = .104$ | | $X^2(1) = 0.37, p = .544$ | $X^2(1) = 1.46, p = .227$ | $X^2(1) = 0.45, p = .502$ | $X^2(1) = 0.79, p = .374$ |
| HIGH ALTITUDE OPERATIONS | VIII | $X^2(1) = 1{,}193.76, p < .001$ | | $X^2(1) = 4.20, p = .040$ | $X^2(1) = 397.55, p < .001$ | $X^2(1) = 4.55, p = .033$ | $X^2(1) = 1.32, p = .251$ |
| EMERGENCY OPERATIONS | IX | $X^2(1) = 319.51, p < .001$ | | $X^2(1) = 8.01, p = .0047$ | $X^2(1) = 141.82, p < .001$ | $X^2(1) = 0.04, p = .841$ | $X^2(1) = 0.003, p = .957$ |
| MULTIENGINE OPERATIONS | X | $X^2(1) = 4.92, p = .027$ | | $X^2(1) = 38.47, p < .001$ | $X^2(1) = 28.44, p < .001$ | $X^2(1) = 8.11, p = .0044$ | $X^2(1) = 4.8, p = .028$ |
| POSTFLIGHT PROCEDURES | XI | $X^2(1) = 0.93, p = .335$ | | $X^2(1) = 0.767, p = .381$ | $X^2(1) = 0.17, p = .685$ | $X^2(1) = 0.003, p = .954$ | $X^2(1) = 3.67, p = .056$ |

Note: Green highlighting indicates significant decrease in failures. Yellow highlighting indicates a significant increase in failures.

## 3.3. Private Pilot Airplane

**Table 6*: Private Pilot Areas of Operation found Unsatisfactory on Practical Test by Year***

| Private Pilot-Airplane | | PVT | | PVT | | PVT | | PVT | | PVT | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area of Operation - only on Disaproved Evaluations | | 2014 | | 2015 | | 2018 | | 2019 | | 2020 | |
| Name | Code | Count | Percent | Count | Percent | Count | Percent | Count | Percent | Count | Percent |
| PREFLIGHT PREPARATION | I | 1237 | 10% | 1456 | 10% | 1954 | 10% | 2066 | 11% | 1779 | 11% |
| PREFLIGHT PROCEDURES | II | 669 | 5% | 800 | 5% | 1089 | 6% | 1121 | 6% | 899 | 6% |
| AIRPORT AND SEAPLANE BASE OPERATIONS | III | 998 | 8% | 1087 | 7% | 1439 | 8% | 1492 | 8% | 1211 | 8% |
| TAKEOFFS, LANDINGS, AND GO AROUNDS | IV | 2507 | 19% | 2682 | 18% | 3512 | 19% | 3857 | 20% | 3203 | 20% |
| PERFORMANCE MANEUVER | V | 1100 | 8% | 1206 | 8% | 1906 | 10% | 1965 | 10% | 1507 | 10% |
| GROUND REFERENCE MANEUVERS | VI | 985 | 8% | 1082 | 7% | 1784 | 9% | 1806 | 9% | 1419 | 9% |
| NAVIGATION | VII | 1234 | 9% | 1376 | 9% | 1809 | 10% | 1818 | 9% | 1470 | 9% |
| SLOW FLIGHT AND STALLS | VIII | 1159 | 9% | 1376 | 9% | 1544 | 8% | 1569 | 8% | 1225 | 8% |
| BASIC INSTRUMENT MANEUVERS | IX | 997 | 8% | 1113 | 8% | 2054 | 11% | 2110 | 11% | 1675 | 11% |
| EMERGENCY OPERATIONS | X | 1202 | 9% | 1540 | 10% | 114 | 1% | 124 | 1% | 114 | 1% |
| NIGHT OPERATION | XI&XII | 365 | 3% | 555 | 4% | 564 | 3% | 595 | 3% | 442 | 3% |
| POSTFLIGHT PROCEDURES | XII&XIII | 447 | 3% | 573 | 4% | 841 | 5% | 879 | 4% | 681 | 4% |
| MULTI-ENGINE OPERATIONS | XI | 134 | 1% | 115 | 1% | **18631** | **100%** | **19402** | **100%** | | |
| **Area of Operation Total** | | **13034** | **100%** | **14961** | **100%** | | | | | **15625** | **100%** |
| | | | | | | **5676** | | **6135** | | **5326** | |
| **Total # Disapproved Evaluations** | | **4171** | | **4948** | | **162** | | **178** | | **157** | |
| **Total # of Discontinued Evaluations** | | **130** | | **123** | | | | | | | |

Note: These are raw numbers and are not corrected for total number of practical tests given.

**Table 7:** ***Private Pilot Chi-Square Test Results***

| Area of Operations | | Chi-Square Test Results PTS to ACS Comparison | | Chi-Square Test Results - Year by Year Comparison | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2014-2015 | 2015-2018 | 2018-2019 | 2019-2020 |
| **Private Pilot-Airplane** | | $X^2(12) = 4{,}992.41$, $p < .001$ | ----> | $X^2(12) = 46.79$, $p < .001$ | $X^2(12) = 1{,}976.77$, $p < .001$ | $X^2(12) = 8.30$, $p = .687$ | $X^2(12) = 12.64$, $p = .317$ |
| **Area of Operation** - **only on Disaproved Evaluations** | | vvvv | | vvvv | vvvv | | |
| **Name** | **Code** | Bonferroni Correction = .05/13; Alpha = 0.0038 | | Bonferroni Correction = .05/13; Alpha = 0.0038 | | | |
| PREFLIGHT PREPARATION | I | $X^2(1) = 28.04$, $p < .001$ | | $X^2(1) = 0.47$, $p = .494$ | $X^2(1) = 5.36$, $p = .021$ | | |
| PREFLIGHT PROCEDURES | II | $X^2(1) = 10.47$, $p = .001$ | | $X^2(1) = 0.65$, $p = .422$ | $X^2(1) = 3.97$, $p = .046$ | | |
| AIRPORT AND SEAPLANE BASE OPERATIONS | III | $X^2(1) = 1.97$, $p = .161$ | | $X^2(1) = 1.55$, $p = .213$ | $X^2(1) = 2.60$, $p = .107$ | | |
| TAKEOFFS, LANDINGS, AND GO AROUNDS | IV | $X^2(1) = 16.30$, $p < .001$ | | $X^2(1) = 7.89$, $p = .005$ | $X^2(1) = 4.92$, $p = .027$ | | |
| PERFORMANCE MANEUVER | V | $X^2(1) = 69.08$, $p < .001$ | | $X^2(1) = 1.32$, $p = .251$ | $X^2(1) = 46.90$, $p < .001$ | | |
| GROUND REFERENCE MANEUVERS | VI | $X^2(1) = 88.83$, $p < .001$ | | $X^2(1) = 1.08$, $p = .300$ | $X^2(1) = 58.86$, $p < .001$ | | |
| NAVIGATION | VII | $X^2(1) = 0.70$, $p = .405$ | | $X^2(1) = 0.60$, $p = .438$ | $X^2(1) = 2.65$, $p = .104$ | | |
| SLOW FLIGHT AND STALLS | VIII | $X^2(1) = 22.30$, $p < .001$ | | $X^2(1) = 0.79$, $p = .375$ | $X^2(1) = 8.47$, $p = .0036$ | | |
| BASIC INSTRUMENT MANEUVERS | IX | $X^2(1) = 234.74$, $p < .001$ | | $X^2(1) = 0.44$, $p = .507$ | $X^2(1) = 125.65$, $p < .001$ | | |
| EMERGENCY OPERATIONS | X | $X^2(1) = 4{,}212.50$, $p < .001$ | | $X^2(1) = 9.05$, $p = .003$ | $X^2(1) = 1{,}659.36$, $p < .001$ | | |
| NIGHT OPERATION | XI&XII | $X^2(1) = 5.58$, $p = .018$ | | $X^2(1) = 18.12$, $p < .001$ | $X^2(1) = 11.87$, $p = .001$ | | |
| POSTFLIGHT PROCEDURES | XII&XIII | $X^2(1) = 31.78$, $p < .001$ | | $X^2(1) = 3.18$, $p = .074$ | $X^2(1) = 9.76$, $p = .002$ | | |
| MULTI-ENGINE OPERATIONS | XI | $X^2(1) = 478.53$, $p < .001$ | | $X^2(1) = 5.32$, $p = .021$ | $X^2(1) = 143.54$, $p < .001$ | | |

Note: Green highlighting indicates significant decrease in failures. Yellow highlighting indicates a significant increase in failures.

## 3.4. Instrument Rating Airplane

**Table 8*: Instrument Rating Airplane Areas of Operation found Unsatisfactory on Practical Test by Year***

| **Instrument** | | **IRA** | | **IRA** | | **IRA** | | **IRA** | | **IRA** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of Operation** - only on Disaproved Evaluations | | **2014** | | **2015** | | **2018** | | **2019** | | **2020** | |
| **Name** | **Code** | **Count** | **Percent** | **Count** | **Percent** | **Count** | **Percent** | **Count** | **Percent** | **Count** | **Percent** |
| PREFLIGHT PREPARATION | **I** | 699 | 11% | 849 | 11% | 1114 | 11% | 1106 | 11% | 948 | 11% |
| PREFLIGHT PROCEDURES | **II** | 415 | 7% | 517 | 7% | 744 | 7% | 744 | 7% | 638 | 8% |
| AIR TRAFFIC CONTROL CLEARANCES AND PROCEDURES | **III** | 1023 | 16% | 1213 | 16% | 1509 | 15% | 1542 | 15% | 1215 | 15% |
| FLIGHT BY REFERENCE TO INSTRUMENTS | **IV** | 605 | 10% | 718 | 9% | 1027 | 10% | 1028 | 10% | 793 | 10% |
| NAVIGATION SYSTEMS | **V** | 684 | 11% | 799 | 10% | 1121 | 11% | 1103 | 11% | 839 | 10% |
| INSTRUMENT APPROACH PROCEDURES | **VI** | 1716 | 27% | 2097 | 28% | 2727 | 27% | 2874 | 27% | 2274 | 28% |
| EMERGENCY OPERATIONS | **VII** | 741 | 12% | 953 | 13% | 1259 | 12% | 1272 | 12% | 961 | 12% |
| POSTFLIGHT PROCEDURES | **VIII** | 391 | 6% | 473 | 6% | 711 | 7% | 713 | 7% | 530 | 6% |
| **Area of Operation Total** | | **6274** | **100%** | **7619** | **100%** | **10211** | **100%** | **10382** | **100%** | **8198** | **100%** |
| | | | | | | | | | | | |
| **Total # Disapproved Evaluations** | | **2448** | | **2965** | | **3812** | | **3983** | | **3274** | |
| **Total # of Discontinued Evaluations** | | **67** | | **68** | | **71** | | **78** | | **99** | |

Note: These are raw numbers and are not corrected for total number of practical tests given.

**Table 9*: Instrument Rating Airplane Chi-Square Test Results***

| **Area of Operations** | | **Chi-Square Test Results PTS to ACS Comparison** | | **Chi-Square Test Results - Year by Year Comparison** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **2014-2015** | **2015-2018** | **2018-2019** | **2019-2020** |
| **Instrument** | | $X^2(7) = 22.13, p = .002$ | ----> | $X^2(7) = 2.61, p = .919$ | $X^2(7) = 13.20, p = .067$ | $X^2(7) = 3.06, p = .880$ | $X^2(7) = 8.87, p = .262$ |
| **Area of Operation - only on Disaproved Evaluations** | | vvvv | | | | | |
| **Name** | **Code** | Bonferroni Correction = .05/8; Alpha = 0.0063 | | | | | |
| PREFLIGHT PREPARATION | **I** | $X^2(1) = 0.19, p = .667$ | | | | | |
| PREFLIGHT PROCEDURES | **II** | $X^2(1) = 6.43, p = .011$ | | | | | |
| AIR TRAFFIC CONTROL CLEARANCES AND PROCEDURES | **III** | $X^2(1) = 11.85, p = .001$ | | | | | |
| FLIGHT BY REFERENCE TO INSTRUMENTS | **IV** | $X^2(1) = 1.45, p = .229$ | | | | | |
| NAVIGATION SYSTEMS | **V** | $X^2(1) = 0.01, p = .910$ | | | | | |
| INSTRUMENT APPROACH PROCEDURES | **VI** | $X^2(1) = 0.04, p = .838$ | | | | | |
| EMERGENCY OPERATIONS | **VII** | $X^2(1) = 0.04, p = .848$ | | | | | |
| POSTFLIGHT PROCEDURES | **VIII** | $X^2(1) = 4.90, p = .027$ | | | | | |
| **Area of Operation Total** | | | | | | | |

Note: Green highlighting indicates significant decrease in failures. Yellow highlighting indicates a significant increase in failures.

## 3.5. Results of Area of Operation Comparisons

The data presentation offers raw counts and percentages of unsatisfactory performance by Area of Operation (See Tables 2, 4, 6, and 8) and then a chi square analysis of those counts (Tables 3, 5, 7, and 9). While the chi square statistic shows whether there were significant differences in the values, we have coded the direction of significance by showing an increase in failures with green highlighting and a decrease in failures with yellow highlighting.

In addressing the requirements posed by the "Call to Action," the following observations are offered. First, we provide a general overview of the perceptions of the data. Then we look at each certification level separately in detail.

### 3.5.1. General Observations

The year-by-year comparisons for all ACS show the trends from 2014 to 2020 without specifically calling out the differences in pre- and post-ACS. What we find, though, is that the Instrument Rating had no significant differences year-by-year, and only one Area of Operation had significant differences when comparing overall PTS to ACS. Conversely, all four year-by-year comparisons were significant for the Commercial pilot practical test. Multiengine Operations was the Area of Operation that differed. For both Private Pilot and Commercial Pilot, the 2015 to 2018 comparison had many Areas of Operation with significant differences, but those disappeared for 2018 to 2019 and 2019 to 2020. Perhaps the change to ACS resulted in a change in the way unsatisfactory areas of operation were evaluated/recorded but remained consistent after the change. The same could be relevant for the ATP, which only had one Area of Operation with significant differences in the 2015 to 2018 comparison but had many in the 2015 to 2020 comparison. Additionally, it's possible applicants were better prepared for the practical tests, with the ACS providing a stronger correlation between training and testing, mapping what applicants must know, consider and do to earn an FAA rating or certificate. The ACS coding system, supported with the curated references for each task, further guided applicants with the proper retraining and retesting between the knowledge and practical exams.

### 3.5.2. Specific ACS Comparison Details

When evaluating the specific airman certifications separately, we find some remarkable results. It is important to note, though that the change in failure *rates* is only based on the change in the relative percentage that Task contributes to a failure.

*Stall Prevention/Slow Flight and Stalls*—TStall Prevention (ATP) and Slow Flight and Stalls (Private and Commercial) is a task indicative of manual flying skills. For the ATP and Private Pilot, this task showed a lower percentage of failures. This could be a product of the additional focus placed on this Area of Operation in the ACS or it could also be an artifact of an industry-wide awareness campaign on the topic.

*Instrument Procedures*—This task showed a significant increase in failures at the ATP, Commercial, and Private Pilot levels. As this task can be a proxy measure of automation management, this should be investigated. Although the ACS is more detailed on the knowledge and risk management elements, the skill elements did not change from the PTS. Therefore, the Instrument Procedures failures could be indicative of the more complex aircraft, more complex airspace, or the more complete specifications of the requirements found in the ACS versus PTS. There is no difference in the failure rates for the Instrument Approach Procedure Task for the Instrument Rating.

*Emergency Operations*—Both the Private and Commercial levels show a significant decrease in failures in this Task. Again, it is likely that the additional specific detail in the risk management elements contributed to this improvement.

Of course, plausible alternatives to any effect from the transition from PTS to ACS must be considered in these findings. For example, higher failure rates on instrument tasks could be due to the avionics on the aircraft being much more complex in recent years. Pilots must learn how to program flight management systems (FMS), how to operate autopilots, and program legacy navigation systems (VOR, ILS, etc.) on the glass displays at the same time they are learning basic instrument navigation.

## 4. Rates of Overall Unsatisfactory Performance (Unsatisfactory Practical Test)

The Call to Action Subgroup was also interested in any differences in the rates of unsatisfactory performance for the entire practical test (Notice of Disapproval issued) between pre- and post ACS implementation. This analysis was accomplished by comparing the disapproval rates between the sample years as indicated in Table 10.

**Table 10:** ***Pre- and Post ACS Implementation Notice of Disapproval Counts and Rates (Unsatisfactory Performance) on Entire Practical Test***

| Airline Transport Pilot and Type Rating Airplane | | |
|---|---|---|
| **Year** | **Number of Unsatisfactory Practical Tests/Number of Tests Conducted** | **Rate (%) of Unsatisfactory Practical Tests** |
| 2014 | 999/27,240 | 3.67 |
| 2015 | 1,050/26,367 | 3.98 |
| Total Pre-ACS | 2,049/53,607 | 3.82 |
| 2018 | 2,224/27,917 | 7.97 |
| 2019 | 2,071/27,452 | 7.54 |
| 2020 | 991/21,153 | 4.68 |
| Total Post-ACS | 4,295/55,369 | 7.76 |
| **Commercial Pilot Airplane** | | |
| **Year** | **Number of Unsatisfactory Practical Tests/Number of Tests Conducted** | **Rate (%) of Unsatisfactory Practical Tests** |
| 2014 | 2,340/18,643 | 12.55 |
| 2015 | 4,179/17,559 | 23.80 |
| Total Pre-ACS | 6,519/36,202 | 18.01 |
| 2018 | 3,812/25,287 | 15.07 |
| 2019 | 3,983/28,249 | 14.10 |
| Total Post-ACS | 7,795/53,536 | 14.56 |
| **Private Pilot Airplane** | | |
| **Year** | **Number of Unsatisfactory Practical Tests/Number of Tests Conducted** | **Rate (%) of Unsatisfactory Practical Tests** |
| 2014 | 4,171/29,191 | 14.29 |
| 2015 | 4,948/32,488 | 15.23 |
| Total Pre-ACS | 9,119/61,679 | 14.78 |
| 2018 | 5,676/34,719 | 16.35 |
| 2019 | 6,135/39,678 | 15.46 |
| Total Post-ACS | 11,811/74,397 | 15.88 |
| **Instrument Rating Airplane** | | |

| Year | Number of Unsatisfactory Practical Tests/Number of Tests Conducted | Rate (%) of Unsatisfactory Practical Tests |
|---|---|---|
| 2014 | 2,448/29,337 | 8.34 |
| 2015 | 2,965/18,204 | 16.29 |
| Total Pre-ACS | 5,413/47,541 | 11.39 |
| 2018 | 3,812/25,219 | 15.12 |
| 2019 | 3,983/29,337 | 13.58 |
| Total Post-ACS | 7,795/54,556 | 14.29 |

Note: The Number of Tests Conducted values are from public domain FAA Civil Airman Statistics.

### 4.1. Results for Overall Unsatisfactory Performance

The chi square evaluating differences in the overall performance on a practical test indicates a significant difference for all ACS investigated. When looking at all certification levels, the results show $X^2(3) = 2{,}769.64$, $p < .001$ indicating this is a significant difference. When looking at each certification level, the results are:

Private: $X^2(1) = 175.90$, $p < .001$ (significantly higher percentage of failures)
Instrument: $X^2(1) = 266.84$, $p < .001$ (significantly higher percentage of failures)
Commercial: $X^2(1) = 20.08$, $p < .001$ (significantly lower percentage of failures)
ATP: $X^2(1) = 2{,}712.10$, $p < .001$ (significantly higher percentage of failures)

These analyses show that only at the Commercial Pilot level are the total number of failures decreasing after the implementation of the ACS. Taking a closer look at Tables 4 and 5 shows an improvement in one Area of Operation (High Altitude Operations) though significant increases in failures in many others. However, the overall outcome of the practical tests cannot be estimated by these data as one failure may have multiple Areas of Operation that were unsatisfactory.

## 5. Areas of Operation Associated with Manual Flying Skills and Automation Management in 2020

The last analysis conducted was performed to identify the Areas of Operation where unsatisfactory performance could be associated with manual flying skills and/or automation management. Table 11 displays the Areas of Operation that had unsatisfactory performance on practical tests for each certification level and the percent of total disapproved evaluations represented by each of the Areas of Operation.

**Table 11.**: ***Area of Operation with Unsatisfactory Performance on Practical Tests by Certification Level Relevant to Manual Flying Skills and Automation Management***

## ATP 2020 Airline Transport Pilot

**Area of Operation—only on Disapproved Evaluations**

| Code | Name | Count | Percent of disapproved evaluations |
|---|---|---|---|
| **I** | PREFLIGHT PREPARATION | 104 | 10% |
| **II** | PREFLIGHT PROCEDURES | 66 | 7% |
| **III** | TAKEOFFS AND LANDINGS | 146 | 14% |
| **IV** | INFLIGHT MANEUVERS | 115 | 11% |
| **V** | STALL PREVENTION | 49 | 5% |
| **VI** | INSTRUMENT PROCEDURES | 349 | 34% |
| **VII** | EMERGENCY OPERATIONS | 171 | 17% |
| **VIII** | POSTFLIGHT PROCEDURES | 21 | 2% |
| | **Area of Operation Total** | **1021** | **100%** |
| | | | |
| | **Total # Disapproved Evaluations** | **657** | |

## COM 2020 Commercial Pilot—Airplane

**Area of Operation—only on Disapproved Evaluations**

| Code | Name | Count | Percent |
|---|---|---|---|
| I | PREFLIGHT PREPARATION | 855 | 10% |
| II | PREFLIGHT PROCEDURES | 468 | 5% |
| III | AIRPORT AND SEAPLANE BASE OPERATIONS | 514 | 6% |
| IV | TAKEOFFS, LANDINGS, AND GO-AROUNDS | 2159 | 25% |
| V | PERFORMANCE AND GROUND REFERENCE MANEUVERS | 1006 | 11% |
| VI | NAVIGATION | 524 | 6% |
| VII | SLOW FLIGHT AND STALLS | 680 | 8% |
| VIII | HIGH ALTITUDE OPERATIONS | 265 | 3% |
| IX | EMERGENCY OPERATIONS | 1183 | 13% |
| X | MULTIENGINE OPERATIONS | 914 | 10% |
| XI | POSTFLIGHT PROCEDURES | 298 | 3% |
| | **Area of Operation Total** | **8866** | **100%** |

**Total # Disapproved Evaluations** **3712**

## PVT 2020 Private Pilot—Airplane

| Code | Area of Operation—only on Disapproved Evaluations<br>Name | Count | Percent |
|---|---|---|---|
| I | PREFLIGHT PREPARATION | 1779 | 11% |
| II | PREFLIGHT PROCEDURES | 899 | 6% |
| III | AIRPORT AND SEAPLANE BASE OPERATIONS | 1211 | 8% |
| IV | TAKEOFFS, LANDINGS, AND GO AROUNDS | 3203 | 20% |
| V | PERFORMANCE MANEUVER | 1507 | 10% |
| VI | GROUND REFERENCE MANEUVERS | 1419 | 9% |
| VII | NAVIGATION | 1470 | 9% |
| VIII | SLOW FLIGHT AND STALLS | 1225 | 8% |
| IX | BASIC INSTRUMENT MANEUVERS | 1675 | 11% |
| X | EMERGENCY OPERATIONS | 114 | 1% |
| XI | NIGHT OPERATION | 442 | 3% |
| XII | POSTFLIGHT PROCEDURES | 681 | 4% |
| | **Area of Operation Total** | **15625** | **100%** |

**Total # Disapproved Evaluations** **5326**

## IRA 2020 Instrument

| Code | Area of Operation—only on Disapproved Evaluations<br>Name | Count | Percent |
|---|---|---|---|
| **I** | PREFLIGHT PREPARATION | 948 | 11% |
| **II** | PREFLIGHT PROCEDURES | 638 | 8% |
| **III** | TAKEOFFS AND LANDINGS | 1215 | 15% |
| **IV** | INFLIGHT MANEUVERS | 793 | 10% |
| **V** | STALL PREVENTION | 839 | 10% |
| **VI** | INSTRUMENT PROCEDURES | 2274 | 28% |
| **VII** | EMERGENCY OPERATIONS | 961 | 12% |
| **VIII** | POSTFLIGHT PROCEDURES | 530 | 6% |
| | **Area of Operation Total** | **8198** | **100%** |

**Total # Disapproved Evaluations** **3274**

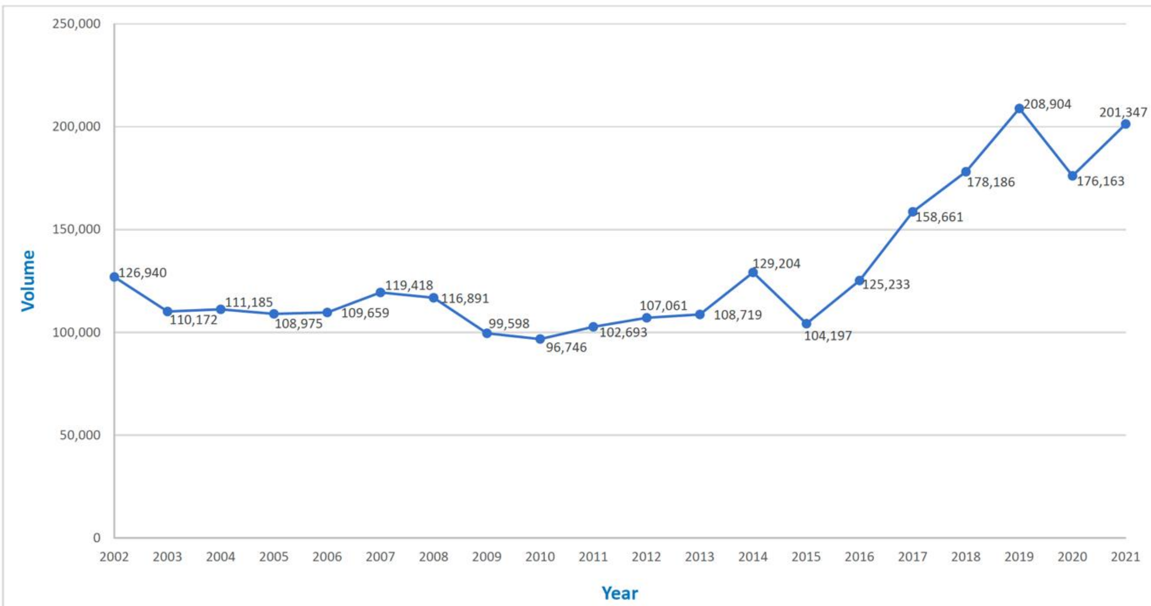
Note: Blue shading denotes tasks associated with manual flying skills; green shading denotes tasks associated with automation management. This data includes tests conducted for Airplane Single Engine Land, Airplane Single Engine Sea, Airplane Multiengine Land, and Airplane Multiengine Sea.

This section supports the finding from the Call to Action Subgroup Gap Analysis (see Airman Certification Standards Mapping Task and Gap Analysis for Manual Flying Skills and Automation Management report) with what is seen on the practical tests by corroborating the number of elements associated with manual flying skills and automation management found in the Gap Analysis. A cursory look at the data in these tables supports the Gap Analysis. Particularly, there is indication that additional training is needed in instrument procedures at the Instrument Rating and ATP levels. Most of the Tasks in these Areas of Operation were associated with automation management (e.g., programming an FMS or GPS, operation of the autopilot and/or flight director system, etc.).

# 6. Knowledge Test Comparison

To finish our evaluation of Pre- and Post-ACS implementation, we evaluated the pass rates and average scores on the FAA knowledge tests associated with the four ACS under study. For reference, Figure 1 presents the total number of knowledge tests taken (of all types) from 2002 through 2021, which includes our study years.

**Figure 1*: Airman Knowledge Test Volume by Year***




## 6.1. Pre- and Post ACS Implementation Knowledge Test Results and Discussion

Table 12 displays the number of knowledge tests of that type taken ("Volume"), the percentage of tests passed ("Pass Rate"), and the average score received on the knowledge test ("Average Score") in 2015 and 2020. From these data we can observe that all the pass rates and average scores have improved while the volume has also increased.

**Table 12.** ***Pre- and Post ACS Implementation Pass Rate and Average Score on FAA Knowledge Test***

| Knowledge Test Name | 2015 (PTS, Pre-ACS) | | | 2020 (Post-ACS) | | |
|---|---|---|---|---|---|---|
| | Volume | Pass Rate | Average Score | Volume | Pass Rate | Average Score |
| Airline Transport Pilot Multiengine Airplane | 1,115 | 94.98% | 84.95 | 3216 | 99.50% | 92.77 |
| Airline Transport Pilot Single Engine Airplane | 30 | 83.33% | 77.83 | 72 | 97.22% | 87.54 |
| Commercial Pilot Airplane | 9,074 | 95.70% | 86.07 | 13,455 | 97.18% | 87.31 |
| Private Pilot Airplane | 25,587 | 89.44% | 82.07 | 31,976 | 90.09% | 82.96 |
| Instrument Rating Airplane | 13,279 | 86.70% | 80.28 | 17,547 | 94.72% | 83.48 |

We used 2015 and 2020 for our pre- and post-ACS comparison. Confidence in the data is cautioned with the disparate volume of tests taken for the study years. Additionally, the ATP knowledge test was significantly changed in 2015. However, concurrent with ACS implementation was improved construction of the test questions and the improvement of study guides to include FAA sources, which may account for improved performance on knowledge tests.

In summary, there has been a slight, but not significant, improvement in the pass rates and scores on the knowledge tests associated with the ACS.

## 7. Conclusion and Discussion

The aim of this effort was to investigate differences in the performance of pilot applicants when tested for airman certificates using the PTS or ACS. The results of the practical test analysisshows that there are several significant differences in pilot performance between PTS and ACS years. The results of the knowledge test comparison showed no significant differences in the pre-and post ACS implementation scores. The results of our in-depth investigation into Areas of Operation associated with manual flying skills and automation management found to be unsatisfactory are congruent with the ACS mapping and gap analysis. [See Appendix 7.]

The results of the practical test analysis showed several significant differences in pilot performance between the PTS and ACS years. Pertinent to manual flying skills, the most notable change was in the ATP Airplane Stall Prevention Area of Operation where there was a significant *decrease* in the number of failures[2] between pre- and post ACS implementation (24% and 5%, respectively). However, equally of interest is the change in the ATP Airplane Instrument Procedures Area of Operation where there was a significant *increase* in the failures between pre- and post ACS implementation (20% and 34%, respectively). The number of overall unsatisfactory practical tests shows significant increases in the number of failures on the ATP Airplane and Instrument Rating Airplane practical tests.

The results of the knowledge test comparison showed no significant differences in the pre- and post ACS implementation scores, though all have increased (improved) slightly.

It is beyond the scope of this report to investigate the reasons for all the changes found in the analysis. However, our interpretation of the results in view of strictly the change from PTS to ACS suggests that (a) the specificity of the ACS may enhance communication of the expectations of practical tests and knowledge exams providing a stronger correlation between training and testing, (b) the ACS codes and curated references associated with each task provide a method to facilitate retraining deficient knowledge and retesting during the practical test resulting in better trained applicants and prepared airman; (c) we have identified Areas of Operation that are still in need of improvement, and (d) the increase in failures may be indicative of the more thorough and complete evaluation of applicants seeking airman certification and an artifact of the more specific language used in the ACS elements.

### 7.1. Limitations of the Analysis

The data analysis presented is constrained by the availability of data. Future analyses would be more interpretable if more granular data is used. Other limitations of our study include the disruption to airman training and testing in 2020 due to the pandemic. There are also additional methods and study techniques that could be employed for better monitoring and feedback of the tools in use for airman training and testing.

## 8. Recommendations

From these analyses, we formulated the following recommendations:

- Methods should be developed to focus on continued improvement of the Airman Certification Standards, associated process, and reference material, to ensure training and testing remain correlated.
- Processes to maintain current and relevant training and testing elements that include incorporating new technologies (for example, virtual reality training) and procedures

[2] The term “failure” (or “failures”) is used in this report when the outcome of an activity (practical test or knowledge test) was unsuccessful. In the case of a practical test, the applicant would be issued a Notice of Disapproval. Though the term “failure” is not an outcome of a practical test, it is used generically in this sense.

should be established to ensure tests remain meaningful and relevant to the equipment, procedures and safety needs of the National Airspace System (NAS).

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# Appendix 7

# Airman Certification Standards
# Mapping Task and Gap Analysis
# for Manual Flying Skills and Automation Management

Prepared by:
Aviation Rulemaking Advisory Committee (ARAC)
Airman Certification Standards (ACS) Working Group (WG)
Call to Action (CtA) Subgroup (SG)

May 3, 2022

Submitted to: ARAC, recommended to FAA in response to Congressional request H.R. 133-1160

# Executive Summary

Objective: The purpose of this investigation was to identify the specific elements, Tasks and Areas of Operation in the Private Pilot Airplane, Commercial Pilot Airplane, Instrument Rating Airplane, and Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards (ACS) that contribute to the training and testing for Manual Flying Skills and Automation Management.

Background: This analysis is part of the response to the Aircraft Certification, Safety, and Accountability Act, a requirement of Division V, of the Consolidated Appropriations Act, 2021, which was passed by Congress on 12/21/20, and signed into law by the President on 12/27/20. This effort is part of the FAA tasking of the Aviation Rulemaking Advisory Committee (ARAC) ACS Working Group (WG) to conduct a "Call to Action" safety review of pilot certification standards.

Method: This analysis was a two-step process. First, we examined all elements in each of the four ACS Areas of Operation and Tasks. A spreadsheet was assembled to track where an element was associated, and the strength of association, with Manual Flying Skills or Automation Management. The listing was reviewed by team members and refined to a consensus. In the second step, we identified any gaps in the ACS pertaining to Manual Flying Skills and Automation Management.

Results: Through the ACS mapping task, we found the topics under investigation, "Manual Flying Skills" and "Automation Management," to be directly addressed in hundreds of elements in the Airplane ACS documents. The gap analysis identified several areas that could be enhanced in future revisions to the ACS to ensure the continued improvement and relevance of the documents.

Conclusion: The result of this investigation shows the status of the ACS with respect to manual flying skills and automation management as reviewed and analyzed by the Call to Action Subgroup.

# 1. Introduction

In response to the Aircraft Certification, Safety, and Accountability Act, a requirement of Division V, of the Consolidated Appropriations Act, 2021, which was passed by Congress on 12/21/20, and signed into law by the President on 12/27/20, the FAA tasked the ARAC ACS WG to conduct a "Call to Action" safety review of pilot certification standards. Per H.R. 133-1160, this working group reviewed revisions made to the airman certification standards for certificates over the last 5 years, searching for any possible effects on pilot competency in basic manual flying skills and effective automation management. Regulations, guidance, and directives related to pilot certification standards, including the oversight process, were also taken into consideration.

The Airman Certification Standards Mapping Task and Gap Analysis for Manual Flying Skills and Automation Management captured the applicable ACS Tasks and elements in an Excel spreadsheet for each of the three areas (knowledge, risk management, and skill) for the Private, Instrument Rating, Commercial, and ATP ACS with respect to the two concepts (Manual Flying Skills and Automation Management). An additional sheet was created to capture gaps and suggested enhancements for the ACS. The documentation provided has been prepared by the ARAC, the ACS WG, and the Call to Action (CtA) Subgroup (SG).

The Federal Aviation Administration (FAA) issues airman certificates in compliance with Title 14 of the Code of Federal Regulations. The Pilot airmen follow this certification process:

1. Training
2. FAA Knowledge Exam
3. Retraining of knowledge proven deficient, per the airman knowledge test report
4. FAA Practical Exam
5. Practical Exam Retesting of knowledge found deficient, per the airman knowledge test report

This analysis focuses on performance of practical testing.

The ACS are the product of a decades-long, industry-FAA collaboration. The process is informed by input by prior FAA Aviation Rulemaking Committees and safety recommendations. The ACS, building on the legacy Practical Test Standards, integrates knowledge, risk management, and skills elements into a single comprehensive framework for pilot certification while also providing a clear bridge between the regulatory requirements in Part 61 and the FAA guidance documents, such as handbooks. By providing a comprehensive framework for what a well-trained applicant should know, consider, and do to qualify for a certificate or rating, these documents contribute to the safety of the U.S. aviation system.

The ACS framework originated in 2011 when a diverse group of aviation community stakeholders convened in the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC), which recommended this approach to the FAA. A succession of ARAC-chartered working groups and subgroups established starting in 2012 have since invested countless hours in developing this integrated approach to defining the knowledge, risk management, and skill elements for use in certification testing. The FAA published the first two ACS in 2016 and released several additional ACS, plus revisions to the original documents, in 2017, 2018, and 2019. (https://www.faa.gov/training_testing/testing/acs/)

The ACS improves upon the Practical Test Standards (PTS) by adding the knowledge and risk management sections that correspond to the skills section, as well as adding ACS codes to track test questions with guidance material, and ACS elements, which support the overall airman certification system that is: (1) initial training; (2) FAA Knowledge Exam resulting in airman knowledge test report; (3) retraining based on airman knowledge test report; and (4) retesting, based on the airman knowledge test report, (5) plus overall testing of context-based knowledge, risk management, and skills. This ACS format (knowledge, risk management, and skills plus ACS codes) allows for a more effective means to align FAA guidance with testing as well as to correlate training and testing. It also provides a means for continuous improvement for review and changes over time. The aviation community embraces the ACS testing framework as a significantly improved guide to ensuring certification training activity focuses on overall competency to help prevent rote memorization or performance of tasks, sometimes without context.

The collaborative process that developed the ACS and associated guidance materials (FAA-H-series handbooks) has also resulted in greater transparency, fairness, and trust between aviation community stakeholders and the FAA. This collaboration should be encouraged and continued. In addition to using the ARAC ACS WG to develop and update ACS documents, the FAA has made completed ACS available for public comment and review on the agency's website, as well as through *Federal Register* Notices of Availability. This process helps continue the collaborative relationship and improves the effectiveness of the results.

## 2. Definitions and Acronyms

- ***Airman Certification Standards (ACS)***: An enhanced version of the PTS. The PTS-to-ACS transition started on June 15, 2016. The ACS adds task-specific knowledge and risk management elements to each PTS Area of Operation/Task. The result is an integrated presentation of specific knowledge, risk management, and skill elements for each Task. In summary, the ACS provides a single source set of standards for both the knowledge exam and the practical test. The integrated format of the ACS has several benefits such as:

    - It clearly tells applicants, instructors, and evaluators what an airman must KNOW, CONSIDER, and DO to pass the knowledge test and the practical test for an airman certificate or rating.
    - It shows how the required knowledge, risk management, and skill elements for each Area of Operation/Task are connected.
    - It defines expectations and behaviors for risk management and connects them to specific Tasks.
    - It puts the "special emphasis" items from the PTS in the right context.
    - The ACS approach (training, FAA Knowledge Exam, retraining, testing, and retesting) enhances safety by making tests meaningful and relevant to actual operations and contributes to standardization in teaching and testing these concepts.

- ***Practical Test Standards (PTS)***: Expands upon the standards for pilot practical tests, as established by 14 CFR Part 61. FAA inspectors, designated pilot examiners, and check airmen conduct practical tests in compliance with these standards. Flight instructors and applicants should find these standards helpful in practical test (checkride) preparation.

- ***Automation Management***: The allocation of functions to machines that would otherwise be allocated to humans. The term is also used to refer to the machines that perform those functions. Flight deck automation, therefore, consists of machines on the commercial transport aircraft flight deck that perform functions otherwise performed by pilots. Current flight deck automation includes autopilots, flight management systems, electronic flight instrument systems, and warning and alerting systems.

    - Full Auto-flight: The aircraft's control is fully automated based on information preprogrammed by the pilots.
    - Tactical Auto-flight: The aircraft's autopilot is engaged, but pilots can direct changes to heading, speed, and altitude using a control panel.

- ***Manual Flight Operations***: Manual flight operations require foundational knowledge and skill proficiency in the following motor and cognitive areas: (a) pitch and power basics, (b) energy management, (c) high- vs low-altitude aircraft performance, (d) aircraft type-specific factors with an impact on handling (e.g., effects of swept- vs straight-wings, turbojet vs turbo prop vs piston prop engines, underwing vs tail mounted engines, trimmable stabilizer vs trimmable elevator, etc.), (e) timing, coordination, and anticipation, and (f) steps required and corresponding instrument display changes that occur as automation levels are changed for manual flight operations (FAA, 2017a).

- ***Manual Flying Skills – Manual***: The pilot is manually controlling the aircraft without the assistance of flight directors. This would be used to avoid collisions with other aircraft or to recover from an undesired aircraft state such as a stall.

- ***All Automation Off/Full Manual***: The pilot is manually controlling the aircraft based on guidance assistance from the preprogrammed flight directors. This is primarily used for takeoff, initial departure, and landings.

# 3. Airman Certification Standards Mapping

The CtA SG developed this analysis to respond, in part, to the Aircraft Certification, Safety, and Accountability Act, a requirement of Division V, of the Consolidated Appropriations Act, 2021, which was passed by Congress on 12/21/20, and signed into law by the President on 12/27/20. This effort is part of the FAA tasking of the ARAC ACS WG to conduct a "Call to Action" safety review of pilot certification standards.

## 3.1. Airman Certification Standards Review

There are currently four (4) ACS in use that were considered in this analysis as displayed in Table 1.

***Table 1: Airman Certification Standards Analyzed***

| Airman Certification Standard | Publication Date | Change Date | Status |
|---|---|---|---|
| Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards (FAA-S-ACS-11) (Change 1) (PDF) | May-19 | 5/28/19 | Effective June 28, 2019 |
| Commercial Pilot—Airplane Airman Certification Standards (FAA-S-ACS-7A) (Change 1) (PDF) | Jun-18 | 6/6/19 | Effective June 28, 2019 |
| Instrument Rating—Airplane Airman Certification Standards (FAA-S-ACS-8B) (Change 1) (PDF) | Jun-18 | 6/6/19 | Effective June 28, 2019 |
| Private Pilot—Airplane Airman Certification Standards (FAA-S-ACS-6B) (Change 1) (PDF) | Jun-18 | 6/6/19 | Effective June 28, 2019 |

## 3.2. Initial ACS Mapping

The initial analysis was conducted by a former airline pilot, current FAA Designated Pilot Examiner (DPE), and human factors researcher. Every element in each of the reviewed ACS was read and categorized as to whether it was associated with manual flying skills or automation management as defined by the following:

***Manual Flying Skills*****:** Although the term, "manual flying skills" is used in the Call-to-Action documentation, we chose to consider more appropriately "manual flight operations." Manual flying skills are part of, and required for, manual flight operations; however, only considering the perceptual motor skills needed to guide the aircraft would be limiting in this analysis. Therefore, we considered: (a) pitch and power basics, (b) energy management, (c) high vs low-altitude aircraft performance, (d) aircraft type-specific factors with an impact on handling (e.g., effects of swept- vs straight-wings, turbojet vs turbo prop vs piston prop engines, underwing vs tail mounted engines, trimmable stabilizer vs trimmable elevator, etc.), (e) timing, coordination, and anticipation, and (f) steps required and corresponding instrument display changes that occur as automation levels are changed for manual flight operations (FAA, 2017a).

These definitions were considered in determining (a) whether specific Tasks and/or their underlying Elements were described in the ACS under investigation (ACS mapping) and (b) if there were Tasks and/or Elements identified that were missing from the ACS (gap analysis). The applicable Tasks and Elements were captured in an Excel spreadsheet for each of the three areas (knowledge, risk management, and skills) for all four ACS with respect to the two concepts (Manual Flying Skills and Automation Management). An additional sheet was created to capture gaps and suggested enhancements for the ACS (See companion Excel file "CtA ACS Mapping and Gap Analysis").

## 3.3. Team Member Review of ACS Initial Mapping

Once the initial analysis was complete, all working group team members had the opportunity to review the spreadsheet for comment, corrections, and/or additions. A total of seven (7) additional team members conducted the review. Their comments were recorded on the "Gap Analysis & Enhancements" tab in the companion Excel file.

## 3.4. Reconciliation of Team Member ACS Mapping Comments

The input from participating team members was considered and all discrepancies among team members were resolved. The approach was to be conservative and not include elements if any one team member was opposed to it being listed. All comments were welcome, and all were in consensus.

## 3.5. Results of ACS Mapping Task

Table 2 shows the results of the ACS mapping task. Each column presents the total number of Tasks or Elements associated with Manual Flying Skills or Automation Management for each of the three areas (knowledge, risk management, and skill) for the four ACS under study. The percentage of Tasks and Elements for each is also displayed.

**Table 2:** ***Results of ACS Mapping Task for Manual Flying Skills and Automation Management***

| ACS | Manual Flying Skills | | Automation Management | |
|---|---|---|---|---|
| **Airline Transport Pilot and Type Rating for Airplane ACS** | **Count of Tasks/Total Tasks (%)** | **Count of Elements/Total Elements (%)*** | **Count of Tasks/Total Tasks (%)** | **Count of Elements/Total Elements (%)*** |
| ***ATP Knowledge Elements*** The applicant demonstrates understanding of: | 15/48 (31.25%) | 53/232 (22.84%) | 10/48 (20.83%) | 22/232 (9.48%) |
| ***ATP Risk Management Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | 17/48 (35.42%) | 48/273 (17.58%) | 7/48 (14.58%) | 17/273 (6.23%) |
| ***ATP Skill Elements*** The applicant demonstrates the ability to: | 19/48 (39.58%) | 81/397 (20.40%) | 8/48 (16.71%) | 19/397 (4.78%) |
| **Commercial Pilot—Airplane ACS** | | | | |
| ***Commercial Pilot Knowledge Elements*** The applicant demonstrates understanding of: | 28/60 (46.67%) | 121/227 (55.95%) | 6/60 (10%) | 12/227 (5.29%) |
| ***Commercial Pilot Risk Management Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | 32/60 (53.33%) | 219/281 (77.93%) | 6/60 (10%) | 16/281 (5.69%) |
| ***Commercial Pilot Skill Elements*** The applicant demonstrates the ability to: | 30/59 (50.85%) | 222/418 (53.11%) | 3/59 (5.08%) | 10/418 (2.39%) |
| **Private Pilot - Airplane ACS** | | | | |
| ***Private Pilot Knowledge Elements*** The applicant demonstrates understanding of: | 27/61 (44.26%) | 114/213 (53.52%) | 7/61 (11.47%) | 14/213 (6.57%) |
| ***Private Pilot Risk Management Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | 31/61 (50.82%) | 172/275 (62.54%) | 7/61 (11.47%) | 17/275 (6.18%) |
| ***Private Pilot Skill Elements*** The applicant demonstrates the ability to: | 29/59 (49.15%) | 189/396 (47.73%) | 4/59 (6.78%) | 13/396 (3.29%) |

| ACS | Manual Flying Skills | | Automation Management | |
|---|---|---|---|---|
| **Instrument Rating Airplane ACS** | | | | |
| ***Instrument Rating - Airplane Knowledge Elements*** The applicant demonstrates understanding of: | 8/22 (36.36%) | 17/49 (34.69%) | 10/22 (45.45%) | 29/49 (59.18%) |
| ***Instrument Rating - Airplane Risk Management Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | 11/22 (50.00%) | 43/88 (48.86%) | 13/22 (59.09%) | 43/88 (48.86%) |
| ***Instrument Rating - Airplane Skill Elements*** The applicant demonstrates the ability to: | 12/22 (54.54%) | 79/136 (58.09%) | 12/22 (54.54%) | 47/136 (34.56%) |

**Note that some elements are repeated across Tasks.*

Careful consideration of the percentages of Tasks and Elements included in the ACS for the topics of interest showing an emphasis on Manual Flying Skills for the Private, Commercial, and Instrument Rating Airplane ACS. Additionally, there is a strong target on Automation Management in all three focused areas of knowledge, risk management, and skills. The lower percentages of Tasks and Elements for the ATP ACS still shows more than 35% of the Tasks are associated with Manual Flying Skills and almost 20% are directly associated with Automation Management.

### 3.6. Additional Comments for ACS Mapping Task

In addition to the information provided in Table 2, the team had specific comments for the Airline Transport Pilot and Type Rating ACS. For example, it was noted from a broad perspective, an applicant must be observed conducting a minimum of three tasks manually, and at the discretion of the evaluator, may be asked to demonstrate three or four additional tasks, bringing the total number of tasks involving manual flying to six or seven. There are four tasks in the ATP ACS that require the demonstration of manual flying skills; however, the evaluator administering the practical test has the discretion to combine tasks/elements as appropriate to testing scenarios. Combining VI and VII (below), which is routinely accomplished, reduces the total to three (3).

- IV. Inflight Maneuvers, Task A. Steep Turns
- VI. Instrument Procedures, Task D. Nonprecision Approaches (one must be flown without use of autopilot)
- VI. Instrument Procedures, Task E. Precision Approaches (one must be flown without use of autopilot)
- VII. Emergency Operations, Task F. Precision Approach (Manually Flown) w/ a Powerplant Failure (Simulated) (AMEL, AMES) (one must be flown w/o use of autopilot)

There are also four* (4) tasks in the ATP ACS that give the evaluator discretion to have the applicant fly these tasks manually or with the autopilot engaged.

- III. Takeoffs and Landings, Task B. Normal Approach and Landing (one should be manually flown)
- V. Stall Prevention, Task A. Partial Flap Configuration Stall Prevention (Either manually or with the autopilot engaged)
- V. Stall Prevention, Task B. Clean Configuration Stall Prevention (Either manually or with the autopilot engaged)
- V. Stall Prevention, Task C. Landing Configuration Stall Prevention

**Appendix 7 adds one (1) Stall Prevention task that should be induced by commands to the autopilot.*

## 4. Gap Analysis

Once the ACS Tasks and Elements were identified, an analysis was conducted to determine if there are gaps in the existing document with respect to manual flying skills and automation management. The intent was to discover (a) if any knowledge, risk management, or skill previously listed in the former Practical Test Standards had been overlooked or the intent changed, and (b) given the dynamic nature of the industry, if there are knowledge, risk management, and/or skills that should be added to enhance the training and testing of the target topics.

## 4.1. Gap Analysis Process

Once the ACS mapping task was complete, all working group team members were asked to review the output and identify pertinent items that were missing, incorrect, needed revision, or otherwise were not satisfactory in the training and testing of manual flying skills and automation management. This analysis also reviewed the last published Practical Test Standards to investigate if there were items not brought forward to the ACS that replaced them.

## 4.2. Gap Analysis Team Member Input Consolidation

Each team member's input was communicated by email and entered on the "Gap Analysis and Enhancements" tab in the master spreadsheet. Once all input was assembled, the information was reviewed and consolidated into the following general topics. Specific comments are available in the companion spreadsheet.

## 4.3. Summary of Enhancements to Manual Flying Skills Tasks and Elements

The topic areas where gaps and enhancements may be added with respect to Manual Flying Skills were found to be:

- Takeoff, landing, and go-around tasks need additional emphasis on tail strikes, porpoising, pilot-induced oscillations, and bounces.
- Additional coverage of de-ice/anti-ice procedures and policies for pre-flight and inflight activities.
- Upset Prevention and Recovery Training (UPRT) can be correlated to the Unusual Attitude tasks, and reviewed further, for all certificates.
- All the requirements of the ATP and Type Rating ACS do not need to be met for air carrier training. This should be addressed so training standards are consistent in all environments.
- The use of simulation, unusual attitudes, and emergency procedures should be reviewed, and the guidance enhanced.

## 4.4. Summary of Enhancements to Automation Management Tasks and Elements

The topic areas where gaps and enhancements may be added with respect to Automation Management were found to be:

- Processes to keep up to date with technology training and testing, to include installed, on-board equipment and ancillary equipment.

- All the requirements of the ATP and Type Rating ACS do not need to be met for air carrier training. This should be addressed so training standards are consistent in all environments..
- The use of simulation, unusual attitudes, emergency procedures, and GPS operations should be reviewed, and the guidance enhanced.

### 4.5. Gap Analysis Results

The results of the ACS gap analysis show that there are some specific topics that could be enhanced throughout the ACS, particularly the ATP ACS with respect to Automation Management.

## 5. Conclusion and Discussion

The aim of this effort was to identify, specify, and evaluate the adequacy of the content in four (4) ACS with respect to manual flying skills and automation management. We found that for the most part, the documents covered these topics extensively and in great detail as evidenced by the number of Tasks and Elements displayed in Table 2.

The ACS capture the requirements for airmen to know, consider, and do to effectively balance flying the plane, using combinations of automation and manual flying to build and retain all skills necessary for flight path management. ACS publishing has been delayed for more than a year and the ACS WG is intensely concerned; the FAA needs to find a way to publish the ACS while maintaining agility, efficiency, and collaboration. ACS are needed for new aircraft categories not supported with a PTS, to include Powered Lift, which leaves a gap for testing and pilot certification until the ACS is published.

## 6. Limitations of Analysis of Study

This study was conducted with publicly available references and data. There were many reviews of the selection of tasks to be included in the constructs of interest (manual flying skills and automation management) by subject matter experts. We also defined our parameters specifically for this analysis. However, a different approach or focus on other specific characteristics of airman training and testing could result in different data for analysis.

Additionally, the interpretation of the data and what it means in the context of this investigation is still a qualitative approach. It was in the opinion and consensus of the Call to Action workgroup that the conclusions in this report are accurate, though additional analysis of these data and other sources could add to the understanding of benefits and gaps in the training and testing documents.

## 7. Recommendations

From these analyses, we formulated the following recommendations:

- The ACS be published while maintaining agility, efficiency, collaboration, and transparency.
- Methods and focus on continued improvement for operation in the National Airspace System, which is shared by a wide variety of aircraft and airman of varying capabilities and limitations.
- Use the ACS process to establish and maintain an effective system across all airman certificates, ratings, and aircraft categories.
- Utilize ways to maintain current and relevant training and testing elements to ensure the airman certification system remains cohesive and meaningful to aviation safety.
- Utilize a process for continual improvement to the FAA standards, guidance, and testing with change management and communication maintained with the training community.
- Follow a method to ensure a balanced test map and means to include new and/or change existing requirements for a sound airman certification process.
- Establish a means for ongoing data evaluation based on the ACS codes, airman knowledge test reports, and practical exam reports for the purpose of ongoing improvement and collaboration between training and testing and to support emerging technologies.
- Update the *Airplane Flying Handbook* (FAA-H-8083-3) to correlate Unusual Attitude and UPRT and loss of control more directly.
- Private ACS: Move the Unusual Attitude task out of “Basic Instrument Maneuvers” to “Emergency Procedures” Area of Operation; expand task to include from both a VFR and IFR perspective (in and out of hood) and applicability to various phases of flight.
- Instrument ACS: Move the Unusual Attitude task out of “Flight by Reference to Instruments” to “Emergency Procedures” Area of Operation; expand task to include from both a VFR and IFR perspective (in and out of hood) and applicability to various phases of flight.
- Commercial ACS: Add new Unusual Attitude task to Emergency Operations Area of Operation, consistent with Private and Instrument ACS.
- ATP ACS: Update Unusual Attitude task, to move from “Inflight Maneuver” to “Emergency Operations Area” of Operation; correlate to term UPRT. Note: “upset prevention and recovery” is used in Task Preflight Preparation. Include option for more extreme upsets when FFS or FTD is used for test.
    - Consider a more in-depth analysis of the Tasks and Elements in the ACS with respect to specific knowledge, skills, and abilities that apply to Manual Flying Skills and Automation Management.

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## Definitions

"Manual Flying Skills" (MFS)

Manual flight operations requires foundational knowledge and skill proficiency in the following motor and cognitive areas: 1. Pitch and power basics 2. Energy management 3. High vs low altitude aircraft performance 4. Aircraft type-specific factors with an impact on handling (e.g., effects of swept- vs straight-wings, turbojet vs turbo prop vs piston prop engines, underwing vs tail mounted engines, trimmable stabilizer vs trimmable elevator, etc.) 5. Timing, coordination, anticipation 6. Steps required and corresponding instrument display changes that occur as automation levels are changed for manual flight operations. (IATA)

"Automation Management" (AM)

**Manual:** The pilot is manually controlling the aircraft without the assistance of flight directors. This would be used to avoid collisions with other aircraft or to recover from an undesired aircraft state such as a stall. **All Automation Off/Full Manual:** The pilot is manually controlling the aircraft based on guidance assistance from the preprogrammed flight directors. This is primarily used for takeoff, initial departure and landings.
**Full Auto-flight**: The aircraft's control is fully automated based on information preprogrammed by the pilots.
**Tactical Auto-flight:** The aircraft's autopilot is engaged, but pilots can direct changes to heading, speed, and altitude using a control panel.

## Legend

Knowledge elements are shaded green
Risk Management elements are shaded grey
Skill elements are shaded blue
Elements with direct association to the concepts of manual handling and automation management are highlighted in darker colors.

## Miscellaneous Resource Materials

***Table 1. Levels of Flight Deck Automation***

| Level | Auto-pilot Engaged | Auto-throttle Engaged | Overview |
|---|---|---|---|
| **Full Auto-flight** | X | X | The aircraft's control is fully automated based on information preprogrammed by the pilots. |
| **Tactical Auto-flight** | X | X | The aircraft's autopilot is engaged, but pilots can direct changes to heading, speed, and altitude using a control panel. |
| **Manual** | | X | The pilot is manually controlling the aircraft based on guidance assistance from the preprogrammed |

| | |
|---|---|
| | flight directors. This is primarily used for takeoff, initial departure and landings. |
| **All Automation Off/Full Manual** | The pilot is manually controlling the aircraft without the assistance of flight directors. This would be used to avoid collisions with other aircraft or to recover from an undesired aircraft state such as a stall. |

Source: OIG analysis of air carrier and manufacturer data

***Automation*** is the allocation of functions to machines that would otherwise be allocated to humans. The term is also used to refer to the machines which perform those functions. Flight deck automation, therefore, consists of machines on the commercial transport aircraft flight deck which perform functions otherwise performed by pilots. Current flight deck automation includes autopilots, flight management systems, electronic flight instrument systems, and warning and alerting systems.

Source: http://www.flightdeckautomation.com/issues.html#intro

**Table 1.** ***Levels of Automation of Decision and Action Selection*** **(Parasuraman, Sheridan, & Wickens, 2000, p. 287)**

| | |
|---|---|
| **High** | 10. The computer decides everything, acts autonomously, ignoring the human |
| | 9. informs the human only if it, the computer, decides to |
| | 8. informs the human only if asked or |
| | 7. executes automatically, then necessarily informs the human |
| | 6. allows the human a restricted time to veto before automatic execution, or |
| | 5. executes that suggestion if the human approved, or |
| | 4. suggests one alternative |
| | 3. narrows the selection down to a few, or |
| | 2. The computer offers a complete set of decision/action alternatives, or |
| **Low** | 1. The computer offers no assistance: human must make all decisions and actions |

| | |
|---|---|
| **Low** | 1. The computer offers no assistance: human must make all decisions and actions |

## Manual Flying Mapping

| Airline Transport Pilot and Type Rating for Airplane ACS | | | | | | |
|---|---|---|---|---|---|---|
| ***ATP Knowledge Elements*** The applicant demonstrates understanding of: | AA.I.A.K12: Flight controls—ailerons, elevator(s), rudder(s), control tabs, control boost/augmentation systems, flaps, spoilers, leading edge devices, speed brakes, stability augmentation system (e.g., yaw damper), and trim systems. | AA.I.B.K3 Factors affecting performance, to include: AA.I.B.K3a a. Atmospheric conditions AA.I.B.K3b b. Pilot technique AA.I.B.K3c c. Aircraft configuration (e.g., flap setting) AA.I.B.K3d d. Airport environment (e.g., runway condition, land and hold short operations (LAHSO)) AA.I.B.K3e e. Loading (e.g., center of gravity) AA.I.B.K3f f. Weight and balance AA.I.B.K4 Aerodynamics and how it relates to performance. AA.I.B.K5 Adverse effects of exceeding an airplane limitation or the airplane operating envelope. | AA.I.C.K4 Flight deck displays of digital weather and aeronautical information, their use to navigate around weather, and equipment limitations. | AA.I.D.K1 Aerodynamics of large transport category airplanes to include flight characteristics of swept wing airplanes (e.g., Mach buffet).<br>AA.I.D.K2 Energy managementAA.I.D.K4 Load factor at high altitude and its effect on high and low speed operating margins.<br>AA.I.D.K5 Relationship between altitude capability, weight, and temperature.<br>AA.I.D.K6 VMO/MMO convergence and stall angle of attack.<br>AA.I.D.K7 Maximum Lift over Drag Ratio (L/D Max).<br>AA.I.D.K9 Factors which contribute to airplane upsets at high altitude and upset prevention and recovery techniques. | AA.I.E.K7 Appropriate rudder use in transport aircraft to avoid rudder reversal. | AA.I.F.K1d d. Spatial disorientation<br>AA.I.F.K1e e. Motion sickness<br>AA.I.F.K1k k. Optical illusions |
| ***ATP Risk Managment Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | AA.I.B.R1 Inaccurate use of performance charts, tables, and data. | AA.I.B.R2 Exceeding airplane limitations. | AA.I.B.R3 Possible differences between calculated performance and actual performance. | AA.I.D.R1 Failure to manage the airplane's energy state.<br>AA.I.D.R2 High operating altitudes at high operational weights.<br>AA.I.D.R3 High altitude slow-downs and excursions behind the power curve.<br>AA.I.D.R4 Turbulence at high altitude. | | AA.I.F.R3 Distractions, loss of situational awareness, or improper task management |
| ***ATP Skill Elements*** The applicant demonstrates the ability to: | | | | AA.I.D.S1 If a cruise altitude is reached, manage the airplane's systems and energy state. | | |
| | | | | | | |
| **Commercial Pilot - Airplane ACS** | | | | | | |
| *Commercial Pilot Knowledge Elements* The applicant demonstrates understanding of: | | | | | | |
| *Commercial Pilot Risk Managment Elements* The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | | | |
| *Commercial Pilot Skill Elements* The applicant demonstrates the ability to: | | | | | | |
| | | | | | | |
| **Private Pilot - Airplane ACS** | | | | | | |
| *Private Pilot Knowledge Elements* The applicant demonstrates understanding of: | | | | | | |
| *Private Pilot Risk Managment Elements* The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | | | |
| *Private Pilot Skill Elements* The applicant demonstrates the ability to: | | | | | | |
| | | | | | | |
| **Instrument Rating Airplane ACS** | | | | | | |
| *Instrument Rating - Airplane Knowledge Elements* The applicant demonstrates understanding of: | | | | | | |
| *Instrument Rating - Airplane Risk Managment Elements* The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | | | |
| *Instrument Rating - Airplane Skill Elements* The applicant demonstrates the ability to: | | | | | | |

| Airline Transport Pilot and Type Rating for Airplane ACS | | | | | |
|---|---|---|---|---|---|
| ***ATP Knowledge Elements*** The applicant demonstrates understanding of: | | AA.III.B.K1 A stabilized approach, to include energy management concepts.<br>AA.III.B.K2 Effects of atmospheric conditions, including wind, on approach and landing performance. AA.III.B.K3 Wind correction techniques on approach and landing. | AA.III.J.K1 A stabilized approach, to include energy management concepts. | AA.IV.A.K1 Energy management concepts. AA.IV.A.K2 Aerodynamics associated with steep turns, to include: AA.IV.A.K2a a. Coordinated and uncoordinated flight AA.IV.A.K2b b. Overbanking tendencies AA.IV.A.K2c c. Maneuvering speed, including the impact of weight changes AA.IV.A.K2d d. Load factor and accelerated stalls AA.IV.A.K2e e. Rate and radius of turn | AA.IV.B.K1 Procedures for recovery from unusual flight attitudes. AA.IV.B.K2 Unusual flight attitude causal factors, including physiological factors, system and equipment failures, and environmental factors.<br>AA.IV.B.K3 The operating envelope and structural limitations for the airplane. AA.IV.B.K4 Effects of engine location, wing design, and other specific design characteristics that could affect aircraft control during the recovery. |
| ***ATP Risk Managment Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | AA.III.B.R2 Wake turbulence.<br>AA.III.B.R3 Go-Around/Rejected Landing<br>AA.III.B.R6 Low altitude maneuvering including stall, spin, or CFIT. | AA.III.J.R3 Improper application of power.<br>AA.III.J.R4 Improper airplane configuration.<br>AA.III.J.R5 Collision hazards, to include aircraft, terrain, obstacles, wires vessels, vessels, persons, and wildlife.<br>AA.III.J.R6 Low altitude maneuvering including stall, spin, or CFIT. | AA.IV.A.R3 Low altitude maneuvering including stall, spin, or CFIT.<br>AA.IV.A.R5 Failure to maintain coordinated flight. | AA.IV.B.R2 Failure to recognize an unusual flight attitude and follow the proper recover procedure. AA.IV.B.R3 Exceeding the operating envelope during the recovery. |
| ***ATP Skill Elements*** The applicant demonstrates the ability to: | AA.III.A.S13 Establish a power setting and a pitch attitude to maintain the desired climb airspeed/V-speed, ±5 knots for each climb segment. | AA.III.B.S3 Maintain a ground track that ensures the desired traffic pattern will be flown taking into consideration obstructions and ATC or evaluator instructions.<br>AA.III.B.S4 Ensure the airplane is aligned with the correct/assigned runway or landing surface.<br>AA.III.B.S5 Scan runway or landing surface and adjoining area for traffic and obstructions.<br>AA.III.B.S6 Select a suitable touchdown point considering wind, landing surface, and obstructions. AA.III.B.S7 Establish the recommended approach and landing configuration and airspeed, ±5 knots, and adjust pitch attitude and power as required to maintain a stabilized approach.<br>AA.III.B.S8 Maintain directional control and appropriate crosswind correction throughout the approach and landing.<br>AA.III.B.S9 Make smooth, timely, and correct control application before, during, and after touchdown.<br>AA.III.B.S10 Touch down with the runway centerline between the main landing gear at the appropriate speed and pitch attitude at the runway aiming point markings -250/+500 feet, or where there are no runway markings 750 to 1,500 feet from the approach threshold of the runway. (ASEL, AMEL)<br>AA.III.B.S11 During round out and touchdown contact | AA.III.J.S2 Apply the appropriate power setting for the flight condition and establish a pitch attitude necessary to obtain the desired performance.<br>AA.III.J.S3 Establish a positive rate of climb and the appropriate airspeed/V-speed, ±5 knots.<br>AA.III.J.S4 Configure and trim the airplane, when appropriate.<br>AA.III.J.S6 Maintain the ground track, heading, or course appropriate for the conditions, or as specified by ATC or the evaluator. | AA.IV.A.S2 Establish the manufacturer's recommended airspeed; or if one is not available, an airspeed not to exceed VA. AA.IV.A.S3 Establish at least a 45° bank solely by reference to instruments and make a coordinated steep turn of at least 180°, as specified by the evaluator. AA.IV.A.S4 Perform the Task in the opposite direction, as specified by the evaluator.<br>AA.IV.A.S5 Make smooth pitch, bank, and power adjustments as needed. AA.IV.A.S6 Maintain the entry altitude ±100 feet, airspeed ±10 knots, bank ±5°, and roll out on the specified heading, ±10°. AA.IV.A.S7 Avoid any indication of an impending stall, abnormal flight attitude, or exceeding any structural or operating limitation during any part of the Task. | AA.IV.B.S1 Use instrument cross-check and interpretation to identify an unusual attitude (including both nose-high and nose-low), and apply the appropriate pitch, bank, and power corrections, in the correct sequence, to return to a stabilized level flight attitude. |

| Airline Transport Pilot and Type Rating for Airplane ACS | | | | | |
|---|---|---|---|---|---|
| ***ATP Knowledge Elements*** The applicant demonstrates understanding of: | AA.V.A.K4 Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. | AA.V.B.K1 Aerodynamics associated with stalls in a clean configuration, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and balance, and aircraft attitude. AA.V.B.K2 Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). AA.V.B.K3 Factors and situations that can lead to a stall during cruise flight and actions that can be taken to prevent it. AA.V.B.K4 Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. AA.V.B.K5 Fundamentals of stall recovery. AA.V.B.K6 Effects of altitude on performance (e.g., thrust available) and flight control effectiveness during a recovery. | AA.VI.F.K1 Elements related to the pilot's responsibilities, and the environmental, operational, and meteorological factors that affect landing from a precision approach. | | |
| ***ATP Risk Managment Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | AA.V.A.R4 Improper stall recovery procedure.<br>AA.V.A.R5 Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. AA.V.A.R6 Effect of environmental elements on aircraft performance while in a partial flap configuration as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). | AA.V.B.R4 Improper stall recovery procedure. AA.V.B.R5 Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. AA.V.B.R6 Effect of environmental elements on aircraft performance while in cruise flight as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). | AA.VI.F.R7 Attempting to land from an unstable approach.<br>AA.VI.F.R8 Flying below the glidepath. AA.VI.F.R9 Transitioning from instrument to visual references for landing. | AA.VI.G.R5 Failure to maintain an appropriate altitude or airspeed while circling. AA.VI.G.R6 Low altitude maneuvering including stall, spin, or CFIT. | |
| ***ATP Skill Elements*** The applicant demonstrates the ability to: | AA.V.A.S4 Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. AA.V.A.S5 Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). AA.V.A.S6 Execute a stall recovery in accordance with procedures set forth in the POH/AFM.<br>AA.V.A.S7<br>Retract the flaps or other lift/drag devices to the recommended setting, if applicable; retract the landing gear after a positive rate of climb is established, if applicable; and return to the desired flight path as specified by the evaluator. | AA.V.B.S3 While in cruise flight, maintain coordinated flight in simulated or actual instrument conditions throughout the maneuver. AA.V.B.S4 Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. AA.V.B.S5 Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). AA.V.B.S6 Execute a stall recovery in accordance with procedures set forth in the POH/AFM. AA.V.B.S7 Return to the desired flight path as specified by the evaluator. | AA.VI.F.S1 Maintain the desired airspeed, ±5 knots, and vertical and lateral guidance within ¼-scale deflection of the indicators during the descent from DA/DH to a point where visual maneuvering is used to accomplish a normal landing. AA.VI.F.S2 Adhere to all ATC or evaluator advisories, such as NOTAMs, windshear, wake turbulence, runway surface, braking conditions, and other operational considerations. AA.VI.F.S3 Coordinate with crew, if applicable, and complete the appropriate checklist(s) in a timely manner. AA.VI.F.S4 Touch down at the aiming point markings, -250/+500 feet, or where there are no runway aiming point markings, 750 to 1,500 feet, from the approach threshold of the runway. AA.VI.F.S5 Maintain positive airplane control throughout the landing using drag and braking devices, as appropriate, to come to a stop. | AA.VI.G.S5 Maintain airspeed ±5 knots, desired heading/track ±5°, and altitude +100/-0 feet until descending below the MDA or the preselected circling altitude above the MDA. AA.VI.G.S6 Visually maneuver to a base or downwind leg appropriate for the landing runway and environmental conditions. AA.VI.G.S7 If a missed approach occurs, turn in the appropriate direction using the correct procedure and appropriately configure the airplane. | AA.VI.H.S4 Aligns the airplane for a normal landing on the selected runway without excessive maneuvering and without exceeding the normal operating limits of the airplane. The angle of bank should not exceed 30°. AA.VI.H.S5 Make smooth, timely, and correct control application throughout the circling maneuver and maintain appropriate airspeed, ±5 knots. If applicable, maintain altitude +100/−0 feet, and desired heading/track, ±5°. AA.VI.H.S6 Ensure the airplane is configured for landing. AA.VI.H.S7 Scan the landing runway and adjoining area for traffic and obstructions. (ASEL, AMEL). AA.VI.H.S8 Touch down at the aiming point markings - 250/+500 feet, or where there are no runway aiming point markings 750 to 1,500 feet from the approach threshold of the runway. AA.VI.H.S9 Maintain positive aircraft control throughout the landing using drag and braking devices, as appropriate, to come to a stop. |

| Airline Transport Pilot and Type Rating for Airplane ACS | | | | | | Appendix Notes |
|---|---|---|---|---|---|---|
| ***ATP Knowledge Elements*** The applicant demonstrates understanding of: | | | | AA.VII.F.K1 Flight characteristics and controllability associated with maneuvering to a landing with inoperative powerplant(s). | | Task A. Steep Turns The applicant must demonstrate his or her ability to control the airplane manually without any intervention from the pilot monitoring, if applicable, or the evaluator. Use of available aircraft instrumentation is acceptable.<br>V. Stall Prevention<br>The applicant must demonstrate his or her ability to control the aircraft without the intervention from the pilot<br>monitoring, if applicable |
| ***ATP Risk Managment Elements*** The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | AA.VII.F.R3 Improper airplane configuration.<br>AA.VII.F.R4 Low altitude maneuvering including stall, spin, or CFIT. AA.VII.F.R5 Distractions, loss of situational awareness, or improper task management. AA.VII.F.R6 Landing with a powerplant failure. AA.VII.F.R7 Missed approach with a powerplant failure. AA.VII.F.R8 Maneuvering in IMC with a powerplant failure. | AA.VII.G.R5 Collision hazards, to include aircraft, terrain, obstacles, wires, vehicles, vessels, persons, and wildlife.<br>AA.VII.G.R6 Low altitude maneuvering including stall, spin, or CFIT.<br>AA.VII.G.R7 Distractions, loss of situational awareness, or improper task management. | |
| ***ATP Skill Elements*** The applicant demonstrates the ability to: | AA.VI.I.S1 Promptly initiate the missed approach procedure and report it to ATC. AA.VI.I.S2 Apply the appropriate power setting for the flight condition and establish a pitch attitude necessary to obtain the desired performance. AA.VI.I.S3 Retract the wing flaps/drag devices and landing gear, if appropriate, in the correct sequence and at a safe altitude, and establish a positive rate of climb and the appropriate airspeed/Vspeed, ±5 knots. AA.VI.I.S4 Coordinate with crew, if applicable, and complete the appropriate procedures and checklist(s) in a timely manner. AA.VI.I.S5 Comply with the published or alternate missed approach procedure.<br>AA.VI.I.S6 Advise ATC or the evaluator if unable to comply with a clearance, restriction, or climb gradient.<br>AA.VI.I.S7 Maintain the heading, course, or bearing ±5°, and altitude(s) ±100 feet during the missed approach procedure. | AA.VII.D.S3 Use flight controls in the proper combination as recommended by the manufacturer, or as required, to maintain best performance, and trim as required.<br>AA.VII.D.S4 Determine the cause for the powerplant(s) failure and if a restart is a viable option. AA.VII.D.S5 Maintain the operating powerplant(s) within acceptable operating limits. AA.VII.D.S6 Maintain the airspeed ±10 knots, the specified heading ±10°, and altitude ±100 feet as specified by the evaluator and within the airplane's capability. | AA.VII.E.S6 Prior to beginning the final approach segment, maintain the desired altitude ±100 feet, the desired airspeed ±10 knots, the desired heading ±5°, and accurately track courses, radials, and bearings.<br>AA.VII.E.S7 Establish the recommended approach and landing configuration and airspeed, ±5 knots, and adjust pitch attitude and power as required to maintain a stabilized approach. AA.VII.E.S8 Maintain directional control and appropriate crosswind correction throughout the approach and landing. AA.VII.E.S9 Make smooth, timely, and correct control application before, during, and after touchdown. AA.VII.E.S10 Touch down at the appropriate speed and pitch attitude at the runway aiming point markings -250/+500 feet, or where there are no runway markings 750 to 1,500 feet from the approach threshold of the runway. (AMEL) AA.VII.E.S11 During round out and touchdown contact the water at the proper pitch attitude within 200 feet beyond a specified point. In addition, for AMES, the touchdown will be within the first one-third of the water landing area.<br>AA.VII.E.S12 Maintain positive aircraft control throughout the landing using drag and braking devices, as appropriate, to come to a stop. | AA.VII.F.S3 Use flight controls in the proper combination as recommended by the manufacturer, or as required, to maintain best performance, and trim as required.AA.VII.F.S8 Establish the appropriate airplane configuration and airspeed considering meteorological and operating conditions.<br>AA.VII.F.S9<br>Prior to beginning the final approach segment, maintain the desired altitude ±100 feet, the desired airspeed ±10 knots, the desired heading ±5°, and accurately track courses, radials, and bearings.<br>AA.VII.F.S10<br>Apply adjustments to the published DA/DH and visibility criteria for the aircraft approach category, as appropriate, for factors that include NOTAMs, Inoperative aircraft or navigation equipment, inoperative visual aids associated with the landing environment, etc.<br>AA.VII.F.S11 Establish a predetermined rate of descent at the point where vertical guidance begins, which approximates that required for the aircraft to follow the vertical guidance.<br>AA.VII.F.S12 Fly and maintain a stabilized approach, adjusting pitch and power as required, allowing no more than ¼-scale deflection of either the vertical or | AA.VII.G.S5 Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. AA.VII.G.S6 Select a suitable touchdown point considering wind, landing surface, and obstructions.<br>AA.VII.G.S7 Make smooth, timely, and correct control application before, during, and after touchdown.<br>AA.VII.G.S8 Touch down at an acceptable point on the runway. Touch down at the appropriate speed and pitch attitude at the runway aiming point markings -250/+500 feet, or where there are no runway markings 750 to 1,500 feet from the approach threshold of the runway. (ASEL, AMEL) AA.VII.G.S9 Touch down at an acceptable point on the landing surface. During round out and touchdown contact the water at the proper pitch attitude within 200 feet beyond a specified point (ASES, AMES). In addition, for AMES, the touchdown will be within the first one-third of the water landing area. AA.VII.G.S10 Maintain positive aircraft control throughout the landing using drag and braking devices, as appropriate, to come to a stop. | |

| | Automation Management Mapping | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Airline Transport Pilot and Type Rating for Airplane ACS** | | | | | | | | | | | |
| *ATP Knowledge Elements*<br>The applicant demonstrates understanding of: | AA.I.A.K15 Envelope protection—angle of attack warning and protection and speed protection. | AA.I.E.K3 Advanced navigation equipment (e.g., FMS, RNP, ADS-B, EFB, etc.) and how it is used inflight.<br>AA.I.E.K4 Flightpath warning systems (e.g., TCAS, TAWS) and how to respond to a warning.<br>AA.I.E.R2 Failure to manage automation and navigation equipment.<br>AA.I.E.R3 Failure to respond to a flightpath warning system alert. | AA.III.A.R6 Low altitude maneuvering including stall, spin, or CFIT. | AA.V.A.K4 Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. | AA.V.B.K1 Aerodynamics associated with stalls in a clean configuration, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and balance, and aircraft attitude. AA.V.B.K2 Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). AA.V.B.K3 Factors and situations that can lead to a stall during cruise flight and actions that can be taken to prevent it. AA.V.B.K4 Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. AA.V.B.K5 Fundamentals of stall recovery. AA.V.B.K6 Effects of altitude on performance (e.g., thrust available) and flight control effectiveness during a recovery | AA.V.C.K4 Effects of autoflight, flight envelope protection in normal and degraded modes, and unexpected disconnects of the autopilot or autothrottle/autothrust, if applicable to the aircraft used for the evaluation. AA.V.C.K5 Fundamentals of stall recovery | AA.VI.B.K2 Use of a Flight Management System (FMS) or Global Positioning System (GPS) to follow a DP.<br>AA.VI.B.K5 Ground-based and satellite-based navigation (orientation, course determination, equipment, tests and regulations, interference, appropriate use of navigation data, signal integrity). | AA.VI.C.K2 Use of a Flight Management System (FMS) or GPS to follow a STAR.<br>AA.VI.C.K5 Ground-based and satellite-based navigation (orientation, course determination, equipment, tests and regulations, interference, appropriate use of navigation data, signal integrity). | AA.VI.G.R4 Failure to manage automated navigation and autoflight systems. | | AA.VI.J.K4 Use of automation for holding to include autopilot and flight management systems, if equipped. |
| *ATP Risk Managment Elements*<br>The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | AA.II.E.R3 Failure to verify performance data is correct and airspeeds and flight instruments are set for actual conditions and the departure runway. AA.II.E.R4 Failure to set navigation and communication equipment for departure.<br>AA.II.E.R5 Failure to configure autopilot and flight director controls for departure. | | AA.V.A.R4 Improper stall recovery procedure. AA.V.A.R5 Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. AA.V.A.R6 Effect of environmental elements on aircraft performance while in a partial flap configuration as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). | AA.V.B.R4 Improper stall recovery procedure. AA.V.B.R5 Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. AA.V.B.R6 Effect of environmental elements on aircraft performance while in cruise flight as it relates to stalls (e.g., turbulence, microbursts, and high-density altitude). | AA.V.C.R4 Improper stall recovery procedure. AA.V.C.R5 Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. AA.V.C.R6 Effect of environmental elements on aircraft performance while landing as it relates to stalls (e.g., turbulence, icing, microbursts, and high-density altitude). AA.V.C.R7 Stalls at a low altitude. | AA.VI.B.R3 Improper automation management. | AA.VI.C.R4 Improper automation management.<br>AA.VI.C.R5 ATC instructions that modify an arrival or discontinue/resume the aircraft's lateral or vertical navigation on an arrival. | | | AA.VI.J.R6 Improper automation management |
| *ATP Skill Elements*<br>The applicant demonstrates the ability to: | | AA.II.E.S4 Determine airspeeds/V-speeds and set flight instruments appropriately, configure flight director, autopilot controls, and navigation and communication equipment for the current flight conditions and takeoff and departure clearances. | | AA.V.A.S4 Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. AA.V.A.S5 Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). AA.V.A.S6 Execute a stall recovery in accordance with procedures set forth in the POH/AFM. AA.V.A.S7<br>Retract the flaps or other lift/drag devices to the recommended setting, if applicable; retract<br>the landing gear after a positive rate of climb is established, if applicable; and return to the<br>desired flight path as specified by the evaluator. | AA.V.B.S3 While in cruise flight, maintain coordinated flight in simulated or actual instrument conditions throughout the maneuver. AA.V.B.S4 Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. AA.V.B.S5 Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.).<br>AA.V.B.S6 Execute a stall recovery in accordance with procedures set forth in the POH/AFM. AA.V.B.S7 Return to the desired flight path as specified by the evaluator. | AA.V.C.S4 Either manually or with the autopilot engaged, smoothly adjust pitch attitude, bank angle (15°-30°), and power setting in accordance with evaluator's instructions to an impending stall. AA.V.C.S5 Acknowledge the cue(s) and promptly recover at the first indication of an impending stall (e.g., buffet, stall horn, stick shaker, etc.). AA.V.C.S6 Execute a stall recovery in accordance with procedures set forth in the POH/AFM. AA.V.C.S7<br>Retract the flaps or other lift/drag devices to the recommended setting, if applicable; retract<br>the landing gear after a positive rate of climb is established, if applicable; and return to the<br>desired flight path as specified by the evaluator. | AA.VI.B.S1 Select the appropriate instrument departure procedure. Then select, identify (as necessary), and use the appropriate communication and navigation facilities associated with the procedure. AA.VI.B.S2 Program the FMS prior to departure and set avionics to include flight director and autopilot controls, as appropriate, for the departure, if applicable. | AA.VI.C.S2 Set FMS and avionics to include flight director and autopilot controls for the arrival, if applicable. | | AA.VI.I.S10 Re-engage autopilot (if installed) at appropriate times during the missed approach procedure. | AA.VI.J.S8 If available, uses automation to include autopilot, flight director controls, and navigation displays associated with the assigned hold. |
| | | | | | | | | | | | |
| **Commercial Pilot - Airplane ACS** | | | | | | | | | | | |
| *Commercial Pilot Knowledge Elements*<br>The applicant demonstrates understanding of: | | | | | | | | | | | |
| *Commercial Pilot Risk Managment Elements*<br>The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | | | | | | | | |
| *Commercial Pilot Skill Elements*<br>The applicant demonstrates the ability to: | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Private Pilot - Airplane ACS** | | | | | | | | | | | |
| *Private Pilot Knowledge Elements*<br>The applicant demonstrates understanding of: | | | | | | | | | | | |
| *Private Pilot Risk Managment Elements*<br>The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | | | | | | | | |
| *Private Pilot Skill Elements*<br>The applicant demonstrates the ability to: | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Instrument Rating Airplane ACS** | | | | | | | | | | | |
| *Instrument Rating - Airplane Knowledge Elements*<br>The applicant demonstrates understanding of: | | | | | | | | | | | |
| *Instrument Rating - Airplane Risk Managment Elements*<br>The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | | | | | | | | | | | |
| *Instrument Rating - Airplane Skill Elements*<br>The applicant demonstrates the ability to: | | | | | | | | | | | |

## General References


Abbott, K. A., McKenney, D., & Railsback, P. (2013). Operational use of flight path management ystems–Final report of the Performance-based operations Aviation Rulemaking Committee. Commercial Aviation Safety Team Flight Deck Automation Working Group.

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AC 120-111, Upset Prevention and Recovery Training

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IATA - Guidance Material and Best Practices for the Implementation of Upset Prevention and Recovery Training, 1st Edition, June 2015.

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## Airman Certification Standards (ACS) References

| Title | *Publication Date* | *Change Date* | *Status* |
|---|---|---|---|
| Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards (FAA-S-ACS-11) (Change 1) (PDF) | May-19 | 5/28/2019 | Effective June 28, 2019 |
| Commercial Pilot — Airplane Airman Certification Standards (FAA-S- | Jun-18 | 6/6/2019 | Effective June 28, 2019 |
| Commercial Pilot — Military Competence Airman Certification Standards (FAA-S-ACS-12) (PDF) | Aug-18 | n/a | Effective October 15, 2018 |
| Instrument Rating Airman Certification Standards (FAA-S-ACS-8B) (Change 1) (PDF) | Jun-18 | 6/6/2019 | Effective June 28, 2019 |
| Private Pilot - Airplane Airman Certification Standards (FAA-S-ACS-6B) (Change 1) (PDF) | Jun-18 | 6/6/2019 | Effective June 28, 2019 |
| Remote Pilot – Small Unmanned Aircraft Systems Airman Certification Standards (FAA-S-ACS-10B) (PDF) | Apr-21 | n/a | Effective April 6, 2021 |

# Federal Aviation Administration

# Memorandum

Date: JUN 16 2014

To: All Headquarters and Regional Division Managers

From: for James Viola, Manager, General Aviation & Commercial Division, AFS-800

Subject: Use of Airman Certification Standards (ACS) in lieu of Practical Test Standards

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**Purpose**

This policy memo explains the Airman Certification Standards (ACS) and authorizes use of the appropriate ACS (in lieu of the PTS) to conduct both oral and flight portions of the practical test for the private pilot certificate and/or the instrument rating.

**Background**

To address longstanding industry concerns about the quality and relevance of the FAA's airman testing standards and training materials, in September 2011 the FAA chartered an Aviation Rulemaking Committee (ARC) to make recommendations on content, process, methodology, and priorities for updating these products. The ARC, which included broad representation from industry associations, universities, training providers, and professional associations, submitted its report and nine recommendations to the FAA in April 2012. The ARC's key recommendation called for the FAA to integrate knowledge and risk management for each PTS skill into a single Airman Certification Standards (ACS) document.

In August 2012, the industry-led Aviation Rulemaking Advisory Committee (ARAC) established the Airman Testing Standards and Training (ATST) Working Group (WG) to develop proposed ACS documents for the private pilot certificate, the flight instructor certificate, and the instrument rating. The FAA received the ARAC ATST WG's report and recommendations on September 30, 2013.

**Discussion**

The FAA has decided to adopt the approach recommended by the ATST WG and is taking the steps necessary to replace the existing PTS model with the ACS concept. The ATST WG report included proposed ACS documents for the private pilot certificate, flight instructor certificate, and the instrument rating. These documents have been further refined through the continuing activities of the working group.

An FAA team consisting of SMEs from appropriate policy divisions (AFS-200, AFS-400, AFS-600, and AFS-800) has carefully reviewed the industry-developed ACS documents for the private pilot certificate and the instrument rating, validated the content/approach, and verified that the ACS incorporates each task in the existing PTS to the same performance standard.

The next step toward ACS transition is a series of prototype training and testing programs using the developed ACS documents. AFS-800 supports the ACS WG's prototyping effort. The FAA has determined that the ACS is an enhancement to the PTS. Accordingly, AFS-800 hereby authorizes instructors and evaluators in facilities or entities selected by the ACS WG to participate in ACS prototype programs to use the private pilot ACS and/or the instrument rating ACS as the basis for developing training course outlines and the required plan of action to conduct the practical test.

Concerning the use of the ACS during the practical test, AFS-800 notes that there is no requirement for an evaluator to carry the PTS in the aircraft when conducting a flight check. Rather, the requirements center on conducting the practical test in accordance with the Examiner Test Guide (Figure 7-8A to 7-8G) in FAA Order 8900.2 and in accordance with the metrics set forth in the appropriate PTS. Use of the ACS will meet these requirements.

**Action**

Aviation Safety Inspectors with oversight for individuals, entities, and facilities selected by the ACS WG to participate in ACS prototype efforts should be familiar with the ARAC ATSTS WG report, focusing on pages 1 through 36 as well as Appendices A (private pilot ACS), B (instrument rating ACS), and M (FAQs). Instructors and evaluators (i.e., designees) should be encouraged to review these pages as well. The report can be found at the following link:

> http://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/Airmen.Testing.Standards.Recommendation.Report.9.30.2013.PDF

The use of the ACS by individuals, entities, and facilities involved in airman certification training programs to prepare applicants for the private pilot and/or instrument rating practical tests should not be discouraged. Any reference(s) to the use of the PTS standards in the training course outline should be considered synonymous with the ACS. In addition, use of the ACS by individuals, entities, and facilities selected by the ACS WG to participate in ACS prototype efforts during a practical test should not be discouraged.

Please direct any questions or comments on this memo or the use of the ACS to Robert L. Newell, Manager, Airman Testing Standards Branch (AFS-630) (Robert.L.Newell@faa.gov). Feedback on ease of using the ACS in the training and testing environments is especially welcome.

**QMS- Work Instructions**
**(Version 6.2)**

U.S. Department
of Transportation

**Federal Aviation Administration**

# Alignment of Airman Certification Standards Development Review Revision Work Instructions for AFS-630 and ARAC ACS Workgroup

## Date TBD

# Contents

| REVISION HISTORY | | |
|---|---|---|
| **Rev** | **Description of Change** | **Effective Date** |
| 1 | Original | 07/17/2015 |
| | | |
| | | |
| | | |

## Purpose

This process documents how Airman Flight Safety (AFS) policy divisions, including the Air Transportation Division (AFS-200), Aircraft Maintenance Division (AFS-300), the Flight Technologies and Procedures Division (AFS-400), the Regulatory Support Division (AFS-600), and the General Aviation and Commercial Division (AFS-800), coordinate with one another and with the significant input and support of the non-FAA aviation industry members of the ARAC Airman Certification System Working Group (ACS WG) on the development, review, revision and continued alignment of the three components comprising the FAA airman certification system. These include the Airman Certification Standards (ACS) for each airman certificate and rating, associated guidance such as the FAA H-series handbooks and CT-series computer testing supplements, and Federal Aviation Administration (FAA) Knowledge Exams.

## Scope

This process applies to all employees (both government and contract) whose assigned duties include supporting the standards, guidance, and/or test development components of the airman certification system. This process is accomplished in accordance with applicable FAA policies, guidance, and Work Instruction AFS-xxx-xxx.

## Approval

**Approval Name**

**[Title ]**

# ACRONYMS

The following abbreviations and acronyms are used in the ACS

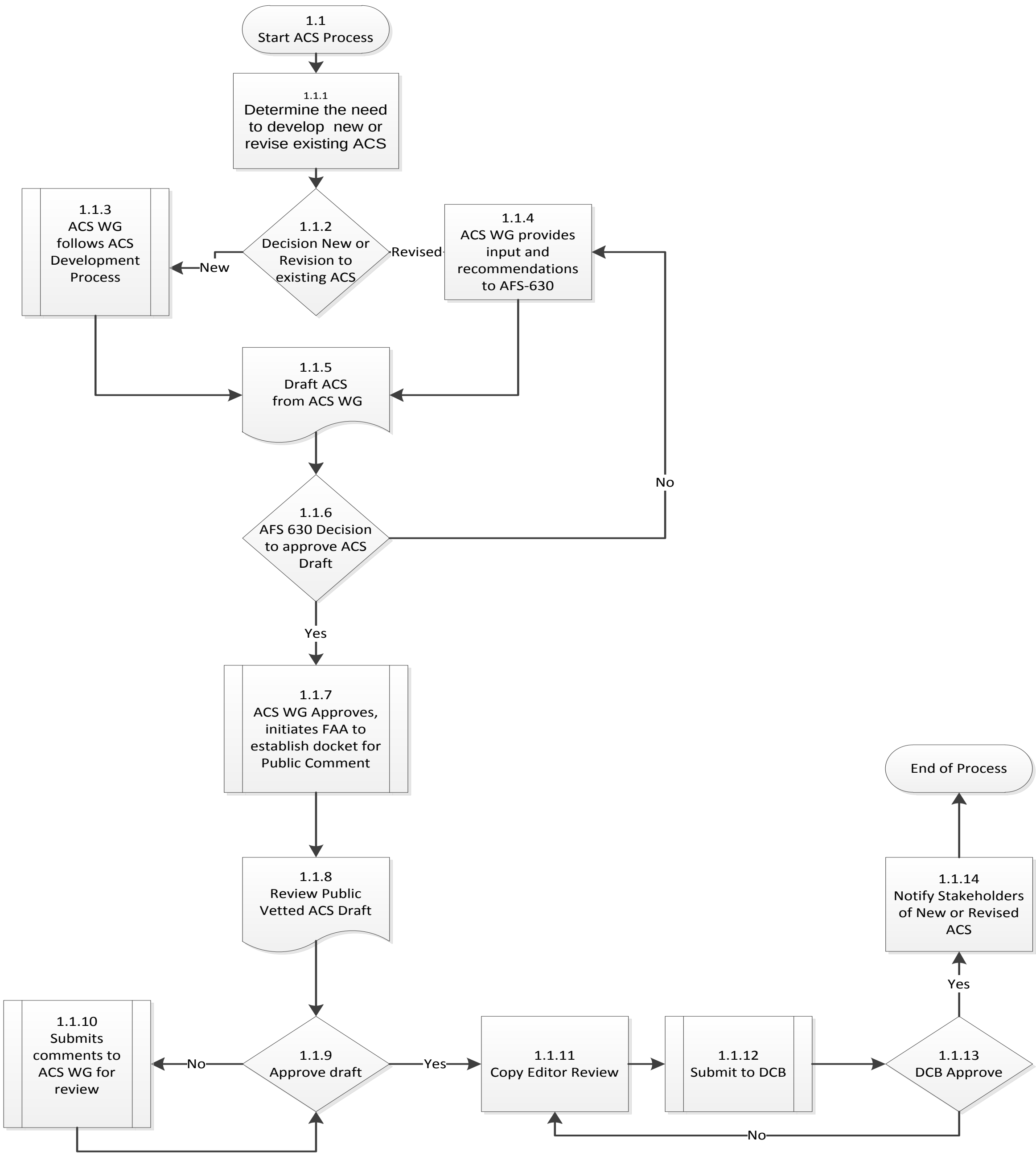
| Abb./Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AATD | Advanced Aviation Training Device |
| AC | Advisory Circular |
| ACS | Airman Certification Standards |
| AD | Airworthiness Directive |
| ADF | Automatic Direction Finder |
| ADM | Aeronautical Decision-Making |
| AFS | Flight Standards Service |
| AELP | Aviation English Language Proficiency |
| AFM | Airplane Flight Manual |
| AFS | Flight Standards Service |
| AGL | Above Ground Level |
| AIM | Aeronautical Information Manual |
| AKTR | Airman Knowledge Test Report |
| ALD | Alternative Lighting Devices |
| AMEL | Airplane Multiengine Land |
| AMES | Airplane Multiengine Sea |
| AOA | Angle of Attack |
| AOO | Area of Operation |
| ASEL | Airplane Single Engine Land |
| ASES | Airplane Single Engine Sea |
| ASI | Aviation Safety Inspector |
| ATC | Air Traffic Control |
| ATD | Aviation Training Device |
| ATP | Airline Transport Pilot |
| BATD | Basic Aviation Training Device |
| CDI | Course Deviation Indicator |
| CFIT | Controlled Flight Into Terrain |
| CFR | Code of Federal Regulations |
| CG | Center of Gravity |
| CP | Completion Phase |
| CRM | Crew Resource Management |
| CTP | Certification Training Program |
| DA | Decision Altitude |

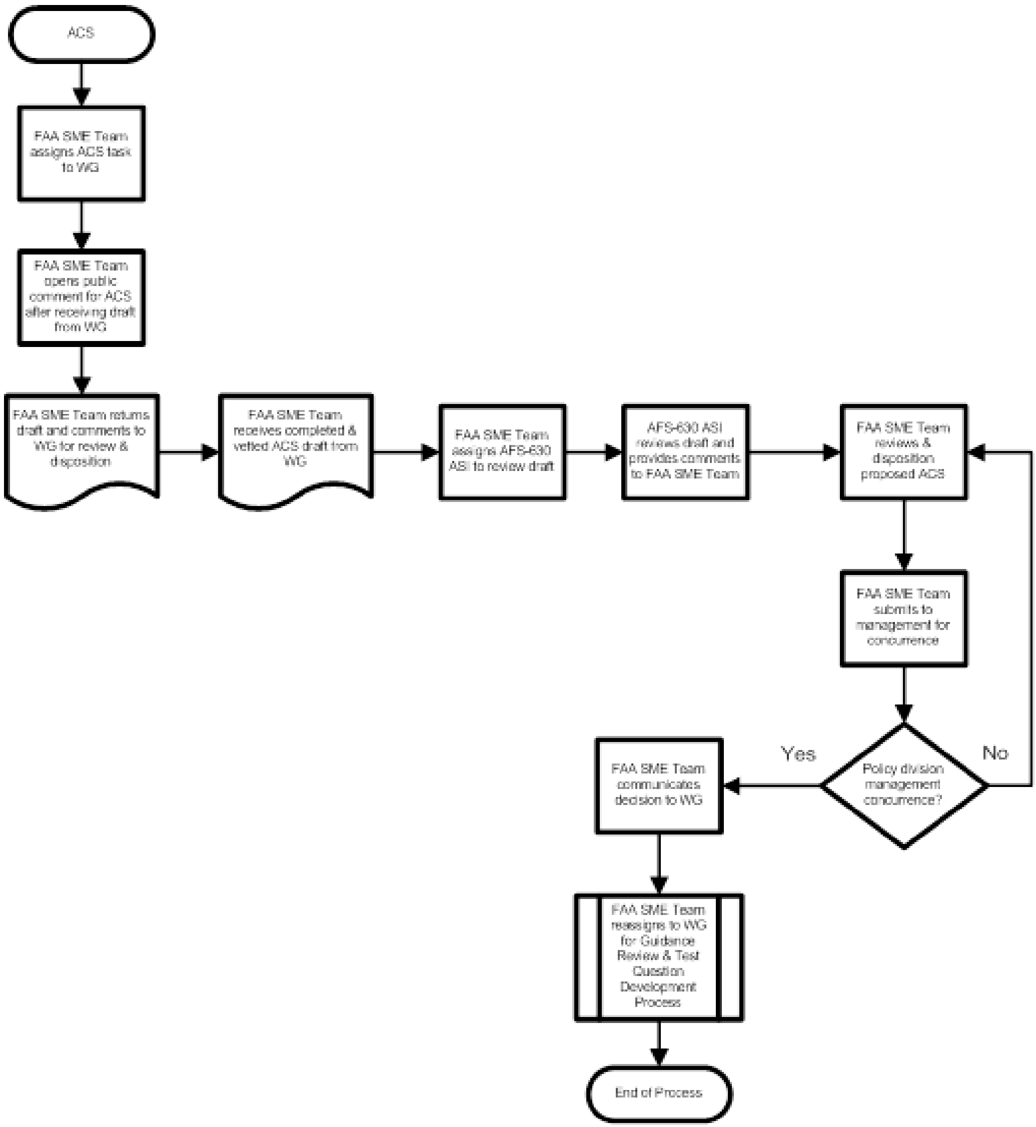
| Abb./Acronym | Definition |
|---|---|
| DH | Decision Height |
| DME | Distance Measuring Equipment |
| DP | Departure Procedures |
| DPE | Designated Pilot Examiner |
| ELT | Emergency Locator Transmitter |
| FAA | Federal Aviation Administration |
| FADEC | Full Authority Digital Engine Control |
| FFS | Full Flight Simulator |
| FMS | Flight Management System |
| FSB | Flight Standardization Board |
| FSDO | Flight Standards District Office |
| FSTD | Flight Simulation Training Device |
| FTD | Flight Training Device |
| GBAS | Ground Based Augmentation System |
| GBAS GLS | Ground Based Augmentation Landing System |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning System |
| HAT | Height Above Threshold (Touchdown) |
| HSI | Horizontal Situation Indicator |
| IA | Inspection Authorization |
| IAP | Instrument Approach Procedure |
| IFO | International Field Office |
| IFR | Instrument Flight Rules |
| IFU | International Field Unit |
| ILS | Instrument Landing System |
| IMC | Instrument Meteorological Conditions |
| IPC | Instrument Rating – Airplane *Canadian Conversion* |
| IPC | Instrument Proficiency Check |
| IR | Instrument Rating |
| IRA | Instrument Rating – Airplane |
| KOEL | Kinds of Operation Equipment List |
| LAHSO | Land and Hold Short Operations |
| LDA | Localizer-Type Directional Aid |
| LOA | Letter of Authorization |
| LOC | ILS Localizer |
| LPV | Localizer Performance with Vertical Guidance |
| MAP | Missed Approach Point |
| MDA | Minimum Descent Altitude |

| Abb./Acronym | Definition |
|---|---|
| MEL | Minimum Equipment List |
| MFD | Multi-functional Displays |
| NAS | National Airspace System |
| NOD | Notice of Disapproval |
| NOTAMs | Notices to Airmen |
| NSP | National Simulator Program |
| NTSB | National Transportation Safety Board |
| PA | Private Airplane |
| PAR | Private Pilot Airplane |
| PAT | Private Pilot Airplane/Recreational Pilot – Transition |
| PCP | Private Pilot Canadian Conversion |
| PFD | Primary Flight Display |
| PIC | Pilot-in-Command |
| POA | Plan of Action |
| POH | Pilot's Operating Handbook |
| PTS | Practical Test Standards |
| QPS | Qualification Performance Standard |
| RAIM | Receiver Autonomous Integrity Monitoring |
| RMP | Risk Management Process |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| SAE | Specialty Aircraft Examiner |
| SFRA | Special Flight Rules Area |
| SIAP | Standard Instrument Approach Procedure |
| SMS | Safety Management System |
| SOP | Standard Operating Procedures |
| SRM | Single-Pilot Resource Management |
| SRM | Safety Risk Management |
| STAR | Standard Terminal Arrival |
| SUA | Special Use Airspace |
| TAEA | Track Advisory Environmental Assessment |
| TAF | Terminal Forecast |
| TAS | True Airspeed |
| TCH | Threshold Crossing Height |
| TEM | Threat and Error Management |
| TFR | Temporary Flight Restrictions |
| UTC | Coordinated Universal Time |
| $V_A$ | Maneuvering speed |

| Abb./Acronym | Definition |
|---|---|
| VDP | Visual Descent Point |
| $V_{FE}$ | Maximum flap extended speed |
| VFR | Visual Flight Rules |
| VMC | Visual Meteorological Conditions |
| $V_{MC}$ | Minimum Control Speed with the Critical Engine Inoperative |
| $V_{NE}$ | Never exceed speed |
| VOR | Very High Frequency Omnidirectional Range |
| $V_s$ | Stall Speed |
| $V_X$ | Best Angle of Climb Speed |
| $V_Y$ | Best Rate of Climb Speed |
| $V_{SSE}$ | Safe, intentional one-engine-inoperative speed. Originally known as safe single-engine speed |
| $V_{XSE}$ | Best angle of climb speed with one engine inoperative |
| $V_{YSE}$ | Best rate of climb speed with one engine inoperative |
| $V_{SO}$ | Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration |

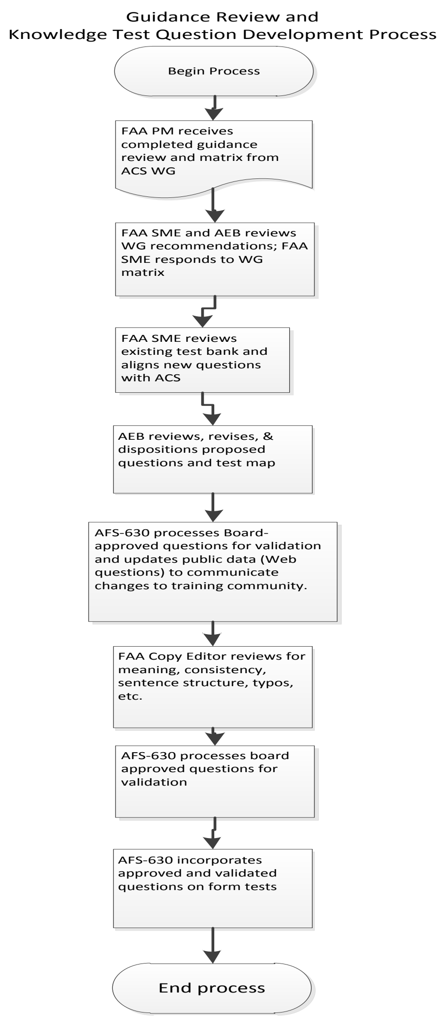
## A. ACS Development Process





ACS
FAA SME Team assigns ACS task to WG
FAA SME Team opens public comment for ACS after receiving draft from WG
FAA SME Team returns draft and comments to WG for review & disposition
FAA SME Team receives completed & vetted ACS draft from WG
FAA SME Team assigns AFS-630 ASI to review draft
AFS-630 ASI reviews draft and provides comments to FAA SME Team
FAA SME Team reviews & disposition proposed ACS
FAA SME Team submits to management for concurrence
Policy division management concurrence?
Yes
No
FAA SME Team communicates decision to WG
FAA SME Team reassigns to WG for Guidance Review & Test Question Development Process
End of Process

## B.Guidance Review and Knowledge Test Question Development Process



# 1. Airman Certification Standards

The FAA's airman certification system, which includes both knowledge ("written") and practical ("check ride") testing, is intended to measure an applicant's mastery of the regulations, procedures, knowledge areas, practical skills, and risk management required to earn an FAA airman certificate or rating. The FAA, aviation community stakeholders, and the public thus have a compelling interest in airman testing (knowledge and practical tests) that provides an accurate and meaningful assessment of an applicant's ability to operate safely in the National Airspace System (NAS).

The Airman Certification System is designed to improve airman training and testing by implementing an integrated, holistic process that clearly aligns airman testing with certification standards and guidance materials, maintains that alignment, and uses regular input from expert industry stakeholders to ensure that airman testing standards and training materials remain relevant to the current operating environment.

Built on the existing Practical Test Standards (PTS), which explicitly define the performance metrics for each flight proficiency element listed in 14 CFR, the ACS enhances the PTS by defining the specific aeronautical knowledge and risk management elements needed to support each Area of Operation/Task. By presenting the elements of knowledge, skill, and risk management in the integrated ACS format, the ACS better serves the applicant, the instructor, and the evaluator. In addition, the integrated and holistic ACS enables the FAA to create and maintain alignment among the regulations, knowledge/skill performance standards, guidance, and test materials.

## A. Airman Certification Standards Development or Revision

1.1. The FAA Subject Matter Expert (SME) team, consisting of representatives from appropriate Flight Standards Service (AFS) policy divisions (i.e., AFS-200, AFS-400, AFS-600, and AFS-800) consults with the industry members of the ARAC ACS Wigand determines the need to develop a new ACS document for a specific airman certificate or rating, or to revise an existing ACS.

2.1. The FAA SME team assigns the ACS development or revision task to the ARAC ACS WG.

A.2.1.1. The ACS WG assigns the task to a subgroup.

A.2.1.2. For a new ACS, the assigned ACS WG subgroup uses the ACS drafting process outlined in the ARAC ATST WG Final Report Section 4.0, Development of an ACS. (Final report can be found at the following link: http://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/Airmen.Testing.Standards.Recommendation.Report.9.30.2013.PDF

A.2.1.3. This process includes development of a detailed tracking document to indicate any changes from the corresponding PTS and explain the ACS WG's rationale for such changes.

A.2.1.4. Upon completion of the subgroup's draft ACS, the ACS WG chair provides the draft ACS to the AFS630 ASI to identify any contradictions or errors regarding policy. AFS630 ASI reports back to ACS WG Chair with any initial comments or request for changes.

A.2.1.5. ACS WG's FAA representative with a request for the FAA to establish a docket for public comment.

2.1.1 The FAA representative coordinates with the Office of Rulemaking (ARM) to establish the docket on behalf of the ACS WG, and to publish a Federal Register notice advising the public of its availability.

A.2.2.1. At the conclusion of the public comment period (normally 60 days), the FAA representative compiles and categorizes comments, and returns them to the ACS WG for review and disposition.

A.2.2.2. The ACS WG gathers and analyzes public comments in a written tracker that clearly indicates whether, how, and why each comment resulted in modifications to the draft ACS.

A.2.2.3. When the ACS WG has completed this phase of ACS development, the ACS WG chair submits the completed and publicly-vetted ACS draft to the FAA representative(s).

3.1.1 Upon receipt of the draft ACS, the AFS-630 manager assigns initial review of the proposed ACS to the appropriate Aviation Safety Inspector (ASI) in AFS-630.

A.2.3.1. Using the draft ACS, the tracking document, and the corresponding PTS (for initial ACS development) or existing approved ACS (for revisions) the assigned AFS-630 ASI performs an initial validation to ensure that all PTS/ACS elements are incorporated in the draft ACS.

A.2.3.2. Through the AFS-630 manager, the assigned AFS-630 ASI makes a report and recommendations to the FAA SME Team.

4.1.1 The FAA SME Team reviews the draft ACS, the tracking document, and the AFS-630 ASI's recommendations, and decides whether to accept the proposed ACS and/or its individual elements.

A.2.4.1. If the FAA SME Team does not concur with any element of the proposed ACS, the ACS is returned to the ACS WG with an explanation and a request for further discussion and/or changes.

A.2.4.2. The ACS WG provides the requested material and/or changes to the FAA representative(s) for re-referral to the FAA SME Team.

A.2.4.3. The FAA SME Team adjudicates the revised ACS.

A.2.4.4. FAA Copy Editor reviews document for meaning, consistency, sentence structure, typos, etc.

A.2.4.5.

5.1.1 Once the FAA SME Team accepts the proposed ACS, either on first presentation or upon completion of requested revision(s), the FAA SME Team submits the proposed ACS to the FAA's Document Control Board (DCB) and follows the DCB process to obtain management-level concurrence on the proposed ACS.

6.1.1 Upon receiving DCB and management approval of the proposed ACS, the FAA SME Team communicates the FAA's concurrence to the ACS WG chair.

7.1.1 The FAA SME Team returns the FAA-approved ACS to the ACS WG for mapping to guidance and development of proposed knowledge exams.

# 2. Guidance Documents

The FAA's guidance material provides an essential link between the statutory certification requirements for airman certificates and ratings, the proficiency standards described in documents such as the ACS, and the knowledge exams. For this reason, it is important for the FAA and the ACS WG to ensure the continued alignment and timely review of FAA external guidance material with ACS documents and knowledge exams, as well as alignment with FAA internal guidance material.

For the purposes of this process, external guidance material is defined to include the FAA-H series handbooks and the Computer Testing Supplement (CT-8080) series, and FAA Advisory Circulars (ACs). Internal guidance includes the FAA's Order 8900.1 and training/standardization for ASIs, designated pilot examiners (DPEs), and other designees.

## A. Initial ACS Mapping to Guidance

1.1. For any newly-developed and approved ACS, the FAA representative provides the approved ACS to the ACS WG, which creates a subgroup to review external guidance. The purpose of this review is identify gaps and, using ACS codes, to map external guidance to appropriate ACS Areas of Operation and Tasks.

A.1.1.1. The ACS WG submits the completed guidance review and recommendations for ACS-conforming changes to the FAA SME Team.

2.1.1 The FAA SME Team reviews and considers the ACS WG's recommendations for external guidance.

A.1.2.1. If the FAA SME Team concurs with the ACS WG's recommendations, AFS-630 incorporates them into the Scope of Work (SOW) for the next scheduled update of the guidance document(s).

A.1.2.2. The FAA representative communicates this action to the ACS WG.

A.1.2.3. If the FAA SME Team does not concur with any of the ACS WG's recommendations, the FAA representative informs the ACS WG of this decision and, as appropriate, includes this item on the agenda for the next scheduled meeting of the full ACS WG.

### 2.1. Updates to Existing Guidance Materials

2.1.1 In advance of each quarterly meeting of the ACS WG, AFS-630 prepares a list of H-series, the CT-series, and other reference or guidance materials scheduled for review and revision, as well as feedback and comments received from other agencies (NTSB, TSA, etc.), agency divisions, and the public (sent to afs630comments@faa.gov or other contact with AFS630) pertaining to these documents and provides that list to the ACS WG.

A.2.2.1. The ACS WG reviews the list and feedback and, during the quarterly ACS WG meeting, makes recommendations to the FAA for prioritizing the guidance materials proposed for review and revision. The ACS WG recommendations should include a list of any obsolete terms and technologies.

A.2.2.2. The FAA SME Team reviews and adjudicates the ACS WG recommendations, and communicates its decision to the ACS WG via the ACS WG chair.

3.1.1 Once the FAA has established guidance revision priorities in consultation with the ACS WG, AFS-630 provides the documents slated for revision to the ACS WG for review and recommendations.

A.2.3.1. The ACS WG develops recommendations for revision of the guidance document(s) and provides these recommendations to the FAA representative.

A.2.3.2. The FAA SME Team reviews and adjudicates the ACS WG recommendations, and communicates its decision to the ACS WG via that ACS WG chair.

A.2.3.3. If the FAA SME Team concurs with the ACS WG's recommendations, AFS-630 incorporates them into the Scope of Work (SOW) for the next scheduled update of the guidance document(s).

A.2.3.4. The FAA SME Team also reviews knowledge test bank questions and associated sample questions in the public data to ensure that these items are correctly aligned with any changes to guidance documents.

A.2.3.5. The FAA representative communicates this action to the ACS WG.

A.2.3.6. If the FAA SME Team does not concur with any of the ACS WG's recommendations, the FAA representative informs the ACS WG of this decision and, as appropriate, includes this item on the agenda for the next scheduled meeting of the full ACS WG.

### 3.1. Communication and Coordination

2.1.1 To provide predictability and stability to stakeholders with respect to updates, AFS-630 publishes information on mid-cycle updates to its FAA website page on a scheduled (quarterly) basis.

3.1.1 These published updates clearly distinguish between non-safety-related corrections (e.g., typos) and substantive updates or additions to existing material.

4.1.1 In addition, AFS-630 publishes a standardized set of data for each title to maintain and establish version control, to include (a) the date last updated; (b) the series number for the current edition; (c) the date next edition is expected; and (d) how to submit feedback.

### 4.1. Distribution of Guidance

2.1.1 AFS-630 releases each H-series handbook in both PDF (print-ready) and HTML form, with hyperlinked table of contents, figures, and index tags, in order to enable distribution in eBook format.

3.1.1 AFS-630 maintains version control with all distributed files; if any change is made to a document the date and change is identified to distinguish it from previous versions of the document by the same title and/or document number.

4.1.1 AFS-630 provides a publicly-accessible library of high-resolution images and illustrations (or "figures"), organized by handbook and chapter, for public use in safety presentations, handouts, etc.

5.1.1 AFS-630 creates and maintains a single source “library” of those figures (e.g., in the CT-8080 series) referenced in the testing process to reduce redundancy and increase cost-savings.

6.1.1 The FAA creates and maintains a bibliography of advisory circulars (AC) and other reference documents not otherwise accounted for or cited in the handbook content. (*NOTE: This could be accommodated as part of the ARC 313 implementation process*.[1])

[1] http://arsa.org/wp-content/uploads/2012/11/ARC-313-Final-Report-112812-Submitted-to-FAA.pdf

# 3. Knowledge Exams

The most fundamental recommendation for knowledge test development is to ensure that the overall knowledge test, both the individual test questions and their allocation/distribution in terms of subject matter, accurately reflects and measures mastery of the material deemed necessary for safe operations as defined in the ACS document for the specific airman certificate or rating.

## A. Knowledge Test Blueprint

1.1.1 Using the approved ACS, AFS-630 develops a proposed knowledge test "blueprint" showing the subject area distribution of knowledge test questions.

2.1.1 The FAA SME Team reviews and approves the AFS-630 test blueprint.

3.1.1 At each quarterly ACS WG meeting, the FAA SME Team and the ACS WG members jointly review data (e.g., NTSB accident data, General Aviation Joint Steering Committee focus areas, rule changes, stakeholder feedback) to determine whether such information suggests any need for re-distribution of test question subject areas.

4.1.1 If available information suggests re-allocation of test question subject areas, the FAA SME Team reviews and adjudicates ACS WG recommendations for question distribution.

5.1.1 AFS-630 uses the approved knowledge test blueprint to populate the appropriate number of form tests for the specified certificate or rating and prepares an accurate replication of the revised form test for distribution to the public. This will help ensure training and testing remain correlated

6.1.1 Data should be provided to the ACS WG Executive leaders ahead of the F2F to facilitate informed discussion and decision-making when at the table.

## B. Knowledge Test Question Revision, Boarding, and Deployment

1.1.1 The ACS Exam Board (AEB), consisting of FAA SMEs from relevant policy divisions and selected external stakeholder(s), uses the completed and approved ACS to review, revise and, by applying the appropriate ACS code, align existing test questions with the ACS.

B.1.1.1. In consultation with AEB members and in accordance with operational needs, AFS-630 provides "banks" of subject-specific test questions or full form tests to the AEB.

B.1.1.2. The AEB reviews, revises, and codes each knowledge test question in accordance with the ACS elements and with instructions and guidelines contained in the AFS-630 Item Writing Guide for test question content, construction of stems and distractors, and ACS coding.

B.1.1.3. The AEB confirms or, as necessary, corrects references listed for each knowledge test question.

B.1.1.4. If AEB revisions substantially change the content of the question, AFS-630 places it in "validation" status in accordance with established work procedures.

B.1.1.5. If the AEB determines that a question cannot be revised or that it is otherwise unsuitable for use on an ACS-coded form test, AFS-630 archives that question (thus removing it from future use on all form tests for that certificate or rating).

B.1.1.6. Once the AEB has approved ("boarded") a question, AFS-630 marks that question as available for use in populating the appropriate form test in accordance with the approved test blueprint and updates the public test to ensure it remains an accurate representation of the form tests being issued

**C. ASI: Knowledge Test Question Development, Boarding, and Deployment**

1.1.1 Using the approved ACS for a given certificate or rating, members of the AEB and the ACS WG develop proposed knowledge test questions aligned with the ACS-coded task elements.

C.1.1.1. The question-writer follows instructions and guidelines in the AFS-630 Item Writing Guide for the content, construction, and coding of new questions.

C.1.1.2. The question-writer provides appropriate references for each proposed question.

C.1.1.3. The question-writer submits the proposed new question, with suggested ACS code and references, to AFS-630.

C.1.1.4. AFS-630 refers the new question to the AEB for review and approval in accordance with the procedures stated in 3.2.

2.1.1 The AEB reviews the proposed new question in accordance with the procedure described in Section 3.2

3.1.1 Once the AEB communicates its approval of a proposed new question, AFS-630 follows its work instructions to place the new question in validation.

C.1.3.1. If the validation process indicates a need for revision, AFS-630 returns the question to the AEB for revision.

C.1.3.2. AFS-630 returns a revised new question to validation status.

C.1.3.3. Once a question successfully completes the validation period, AFS-630 marks it as available for populating the appropriate form test in accordance with the approved test blueprint and updates the public test to ensure it remains an accurate representation of the form tests being issued

C.1.3.4. New questions/form tests are implemented by the scheduled defined on the AFS630 website. FAA advises stakeholders of the new question or topic area.

### D. Airman Knowledge Test New Question Development Process Steps

The following steps will assist in developing a new knowledge test question:

1. Identify the need for a new question based on:
    a. Known topic area gaps in existing bank of available/boarded questions
    b. Gap(s) in questions framed to measure knowledge, skill, and/or risk management
    c. New developments (e.g., ICAO vs. FAA flight plan; new ATM requirements)

2. Establish regulatory basis for the question.
    a. What is the corresponding 14 CFR part 61 aeronautical knowledge or skill topic?
    b. What certificate(s) or rating(s) knowledge test bank(s) should include it?
    c. Is the topic on the existing test blueprint for the target certificate(s)/rating(s)?
    d. If not on the existing test blueprint(s), where and how should it be added?

3. Select the target Task element(s) in the ACS.
    a. Identify target Area of Operation.
    b. Identify most appropriate Task.
    c. Select most appropriate Task element(s).
        i. Should the question measure knowledge, skill, or risk management?
        ii. Should there be a question in more than one of these areas?

4. Identify the best reference for the target AoO/Task/Task element(s).
    a. Review references already included in the ACS AoO.
    b. Do the existing references support the target topic / Task element(s)?
        i. If yes, locate and list the specific source (e.g., chapter).
        ii. If no:
            1. Determine the correct reference to add, OR
            2. Stop the process at this point if there is no suitable reference.

5. Does the new topic suggest a question that requires calculations and/or charts?
    a. If yes:
        i. Identify the required chart(s)
        ii. Verify legibility and currency of the required chart(s).
    b. If no, proceed to the next step.

6. Review Section 1.5.2 (Item Writing) in the AFS-630 Item Writing & Evaluation Guidelines.
    a. Knowledge – see “rote” and “understanding”
    b. Skill – see “application” and “correlation”
    c. Risk Management – as appropriate, but aim for “application”/”correlation”

7. Develop proposed question IAW Section 1.5.4 (Item Format) and guidelines below:

a. Stem should clearly align with the target Area of Operation and Task
b. Distractors should be framed to provide the "right" wrong answer
c. Questions should not require use of more than three (3) charts
d. Required calculations do not involve :
    i. Excessive time (e.g., more than five (5) minutes
    ii. Inappropriate presentation of numerical responses (e.g., no airspeed values in decimals)
    iii. Improperly spaced numerical values (no "gotcha")

8. Review completed question to ensure that it meets all criteria listed above.

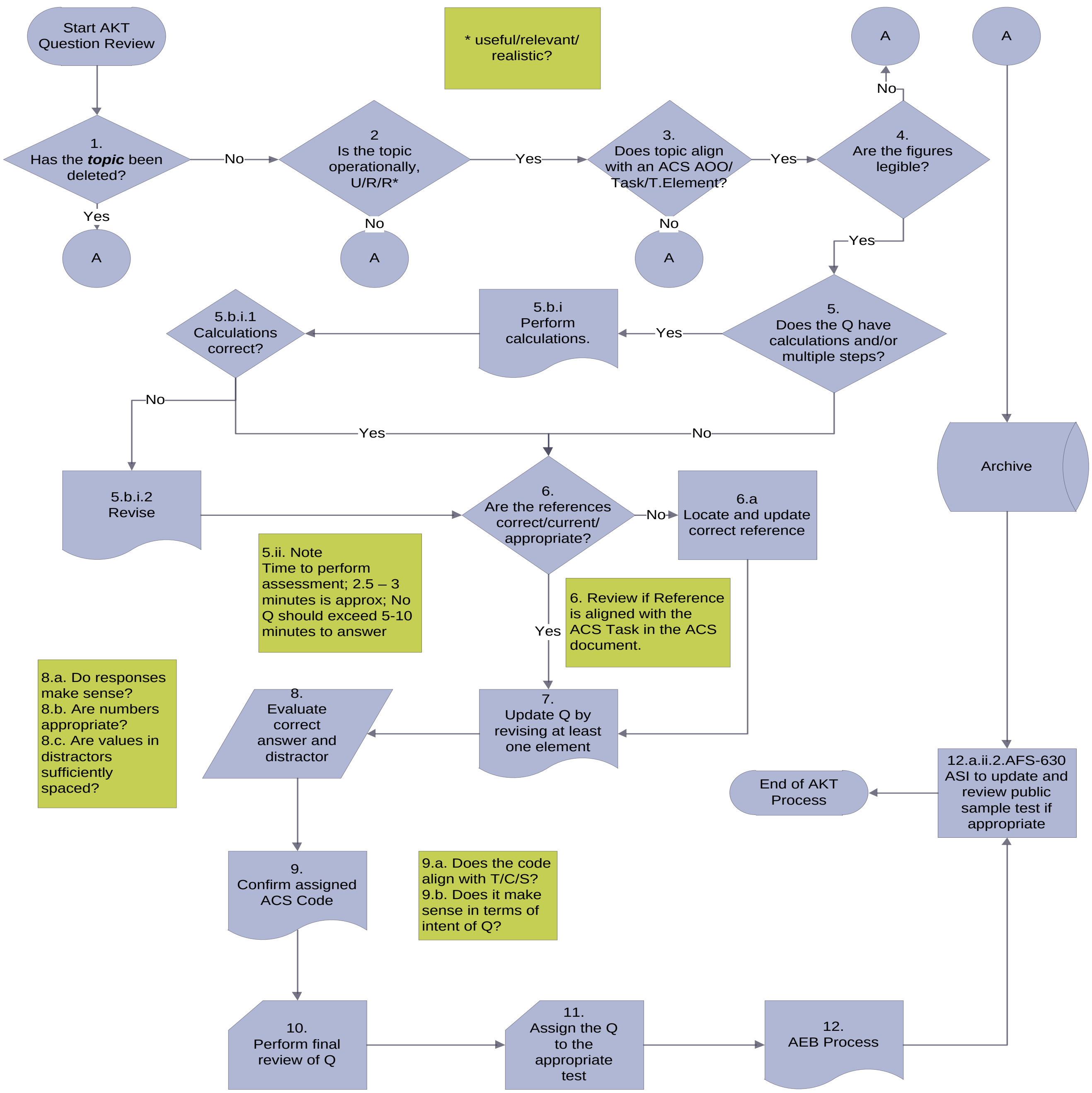
9. ACS Exam Review Board evaluates ("boards") the question.
    a. If the AEB determines that the questions is unsuitable:
        i. AEB assigns it for revision (R&R) OR
        ii. AEB archives the question, thus preventing its future use.
            1. If the AEB archives a question because the entire topic is obsolete or otherwise unsuitable for use in testing, AFS-630 will add this topic to the "What's New in Airman Testing" page on the AFS-630 website to maintain continued alignment of testing with the regulations and training.
            2. AFS-630 will revise the public sample test as appropriate to ensure that it remains an accurate representation of the actual form test(s).
    b. If the AEB determines that the question is approved:
        i. AFS-630 marks that question as available for use in populating the appropriate form test(s) in accordance with the approved test blueprint.
        ii. AFS-630 updates the public sample test as appropriate to ensure that it remains an accurate representation of the actual form test(s).

The following steps are internal to AFS-630 and are not included in the AKT Boarding Process flowchart below.

When a question is archived add the following steps during the AEB review for AFS-630 SMEs and Item Bank process manager:

1. Is the question applicable for another bank?
   a. If yes, decide what bank will be sufficient; boarding (certification) will be determined after it is entered into the new bank.
   b. If no, archive the question entirely.
2. AFS-630 item bank process manager will send the question with notations to the appropriate SME(s).
   a. AFS-630 SME will alter the question to fit its repurposing.
      i. Is the question unsalvageable (so bad nothing can/should be continued on it)?
         1) If yes, the process ends without further notification to anyone.
         2) If no, the SME will notify the Item Bank process manager who will enter the question into the process and assure the question will be boarded at a future date.
3. If the final decision on the original question is to ARCHIVE the question:
   a. The question must be removed from all forms.
   b. The Item Bank process manager must be notified so the question can be scheduled for archiving.
      i. This step is critical to assure the question from not accidently working its way back into activation sometime in the future.
      ii. THE ITEM BANK PROCESS MANAGER MUST BE NOTIFIED OF ALL QUESTIONS BOARDED FOR ARCHIVAL – OR ELSE IT WILL NOT HAPPEN.

## AKT Boarding Process Flowchart



## E. Alignment of Public Data

1.1.1 In reviewing an existing question or form test, the AEB also reviews the "parallel" question(s) published on the Internet sample test to ensure that the public data provides an accurate reflection of actual tests being issued.

2.1.1 If the AEB determines that any of the publicly-available sample test question do not accurately reflect their corresponding actual test question, the AEB uses the review and revision process described in Section 3.2 to correct the situation AFS630 communicates via the AFS630 website when public sample questions have been removed so training can be updated accordingly.

## C. AVS Technical Business Process Measures

| Measure Type | Paragraph Reference | Measure |
|---|---|---|
| **Process Performance** | | Quantifiable method to determine how the process is performing or whether the process achieves its intended result |
| **Product Conformity:** | | Quantifiable method to determine whether the output of the process (product or service) meets requirements |
| **Customer Satisfaction** | | Quantifiable method to measure customer perception of whether customer requirements were met. |

# AFS 600 – 005

## Airman Knowledge Test Question Development, Review and Revision

**Purpose:** This process documents how the Airman Testing Standards Branch (AFS-630) develops, reviews, revises, and maintains airman knowledge test questions. This includes airman knowledge tests for the following certification areas: Aircraft Dispatcher, Airline Transport Pilot, Aviation Mechanic, Commercial Pilot, Designated Mechanic Examiner, Designated Parachute Rigger Examiner, Flight Engineer, Flight Instructor, Flight Navigator, Ground Instructor, Inspection Authorization, Instrument Rating, Military Competency, Parachute Rigger, Pilot Examiner, Private Pilot, Recreational Pilot, and Sport Pilot.

**Scope:** This process applies to all branch employees (both government and contract) who are responsible for the conduct and support of airman knowledge testing activities. This process is accomplished in accordance with applicable FAA policies and guidance and Work Instruction AFS-600-005-WI01.

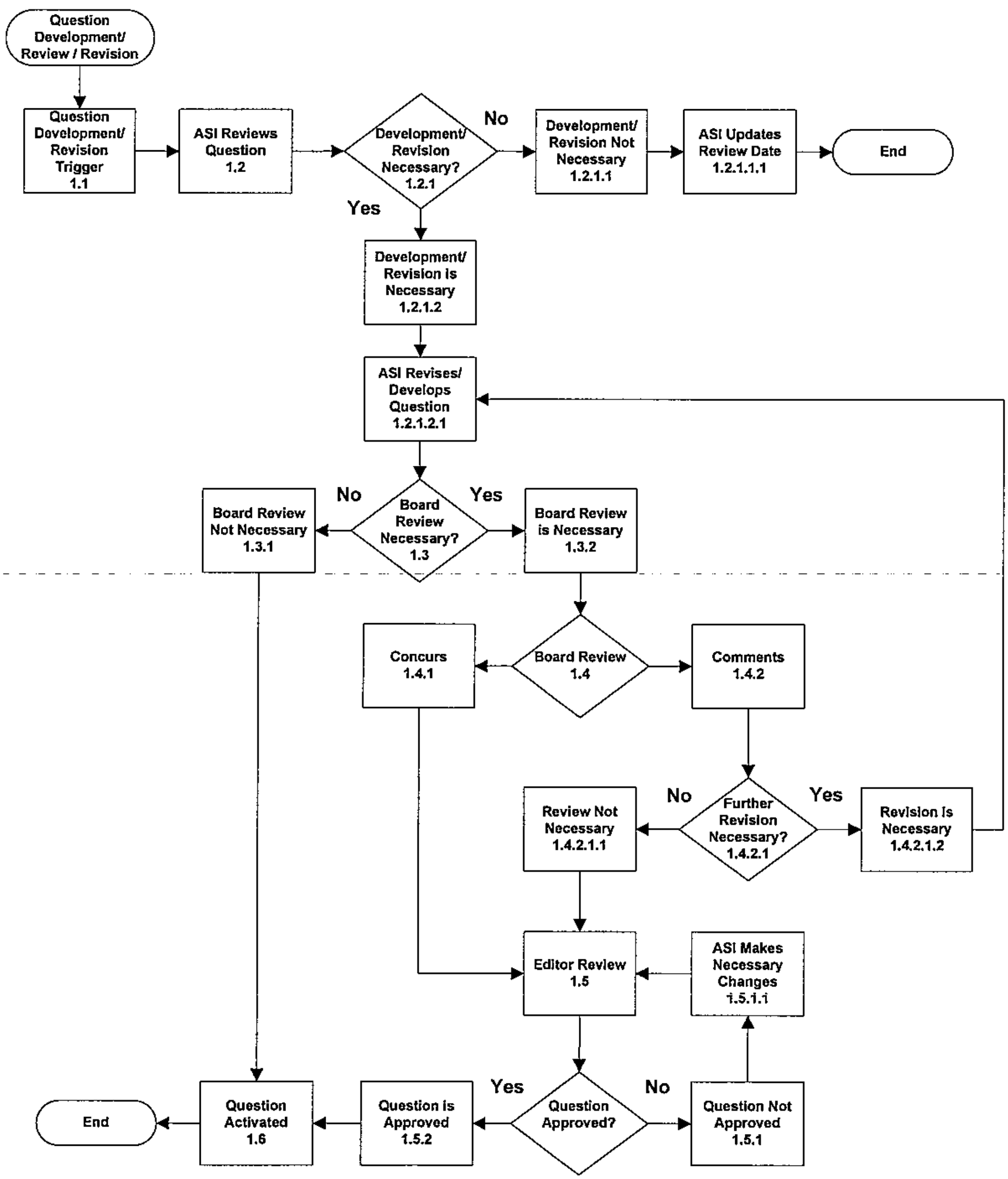
**Approval:** Delia Entricker
Acting Manager, Regulatory Support Division

| REVISION HISTORY | | |
|---|---|---|
| **Rev** | **Description of Change** | **Effective Date** |
| 0 | Original | 07/07/04 |
| 1 | Renamed & revised AFS-630 Business Product 1 | 12/29/04 |
| 2 | Made editorial changes | 02/09/05 |
| 3 | Revised flowchart & made editorial changes | 08/23/05 |
| 4 | Revised process & flowchart | 06/20/06 |
| 5 | Revised process & flowcharts | 08/10/06 |
| 6 | 4/15/09: Converted format to most recent AVS QMS process template. Rearranged decision point paragraphs, as needed for consistency, in sections 1.0 and 2.0. Rewrote par. 2-1 to list triggers for test question revision/development. Revised flowcharts as needed to correspond with minor changes and rearrangement of text. Added Customer Satisfaction, Process Performance, and Product Conformity Measures throughout process, including Measures paragraph on last page. Added References paragraph on last page. 8/7/09: Renamed process. Added acronyms section on page 2. Removed section 1.0. Removed "References" section. Document reduced from 12 to 7 pages. | 08/07/09 |

## ACRONYMS

| | |
|---|---|
| AFS-630 | Airman Testing Standards Branch |
| AOD | Analysis of Data |
| ASI | Aviation Safety Inspector |
| CFR | Code of Federal Regulations |
| FAA | Federal Aviation Administration |
| IAW | In Accordance With |
| LAN | Local Area Network |
| SOW | Statement of Work |

## Airman Knowledge Test Question Development, Review, and Revision Process Flow Chart



# 1.0 Airman Knowledge Test Question Development, Review, and Revision

Airman knowledge test question development and revision is an ongoing, continual improvement process. It is a completely automated process accomplished through an application called "ItemBank", which is a sophisticated, interactive software tool for managing a large test development and delivery environment. All phases of test question development, review, revision, and other actions taken are conducted, recorded, and maintained electronically in ItemBank. A variety of data regarding test questions, including reference sources, relevant regulations, topic/ content/specific categories, notes, and statistics on the performance of the question are also maintained in the application, and are readily available to the ASI in charge of each certification area/bank.

**1.1** Test question development/revision is initiated by one or more of the following triggers: quarterly review of applicant survey comments regarding FAA test questions; statistical analysis of active test question performance and validation test question performance; biennial review of questions; and/or a variety of non-scheduled outside sources, such as technological advances in aviation, updated references, changes to the CFR, and public feedback.

**1.2** The responsible ASI reviews the question(s) identified via the trigger(s). (Test question/bank assignments are based on information contained in Form AFS-600-005-F02, ASI Certification Area of Responsibility.)

**1.2.1** The ASI determines if development/revision is necessary using the edit question screen in ItemBank, the Item Writing and Evaluation Guidelines, and applicable aviation publications.

**1.2.1.1** If revision is not necessary:

**1.2.1.1.1** The ASI updates the "review date" in ItemBank to reflect that the question was reviewed and left unchanged. Review dates will be monitored on a quarterly basis to ensure that all questions are reviewed at least every 2 years. **(Process Performance Measure)**

**1.2.1.2** If development/revision is necessary:

**1.2.1.2.1** The ASI develops a new question or revises the existing question. (AFS-600-005-WI01)

**1.3** The ASI determines if a board review of the question is necessary. All new questions and major changes (as defined in AFS-600-005-WI01) require board review. **(Product Conformity Measure)**

**1.3.1** If a board review is not necessary, the revised question will be activated with the next cycle roll. (Proceed to step 1.6.)

**1.3.2** If a board review is necessary, the question will be forwarded to the board.

**1.4** Members of the review board will conduct their review and concur or make comments.

**1.4.1** If the board concurs with the developed/revised question, the assigned ASI will forward the question to the Editor.

**1.4.2** If the board has comments on the developed/revised question:

**1.4.2.1** The assigned ASI will determine if further revision is necessary using the edit question screen in ItemBank, the Item Writing and Evaluation Guidelines, and applicable aviation publications.

**1.4.2.1.1** If further revision is not necessary, the question is forwarded to the Editor.

**1.4.2.1.2** If further revision is necessary, the question is revised and boarded again. (Return to step 1.2.1.2.1.)

**1.5** The Editor will conduct an editorial review to determine approval of the question.

**1.5.1** If the Editor does not approve due to comments, the question is returned to the ASI.

**1.5.1.1** The ASI makes the necessary changes and forwards the question back to the Editor. This process will be repeated until the Editor approves the question.

1.5.2 If the Editor approves the question, the question becomes available for use in the test bank and on a form test(s).

1.6 The approved question may be activated during the next cycle roll. (Cycle rolls for new and updated questions and form tests are processed three times per calendar year. A new cycle roll updates the active database with question and form test changes made since the last scheduled cycle roll completion.)

**End of Airman Knowledge Test Question Development, Review, and Revision Process.**

## Measures:

AFS-630's stakeholders include: academia and aviation industry representatives; 14 CFR parts 61 and 65 operators; 14 CFR part 141 and 147 schools; students and airman applicants; private company, military-based, and alternate arrangement test providers; international entities, and numerous other internal and external customers. Customer feedback regarding airman knowledge test questions may be captured through several sources:

- Responses to airman applicant surveys (offered at the close of the knowledge test administration process);
- Responses to customer satisfaction surveys (returned from contacts documented in the "ScratchPad" application);
- Comments received in AFS-630's email inbox (afs630comments@faa.gov);
- Comments submitted on Form AVS-001-003-F1, AVS Stakeholder/Customer Feedback.

Customer satisfaction, process performance, and product conformity is continuously monitored. The branch Statistician analyzes and reports on customer satisfaction in the quarterly AOD meetings. Examples of measures which may be reported in the AOD meetings are: airman applicant survey results, customer satisfaction survey results, customer comments and stakeholder feedback, and test question biennial review/development/revision activity.

## Explanation

### WHAT IS A "CHANGE DRIVER"?

- ✓ The **Change Driver** process is the method the FAA utilizes to process agency and industry feedback that may affect training and/or testing.
- ✓ A **Change Driver** is anything that may impact training and/or testing.
- ✓ A **Change Driver** is any existing or planned document revision, aviation-related event, or change in safety enhancements or technology that may impact airman training and/or testing, particularly items that affect existing or planned airman certification standards, guidance, or knowledge testing. *For example, changes in BasicMed resulted in a Change Driver submission.*
- ✓ **Change Drivers** include, but are not limited to: regulations, policies, advisory circulars, notices, publications, instrument approach procedures, commercial and general aviation and maintenance incidents and accidents, safety recommendations, technology, and stakeholder feedback.
- ✓ Some **Change Drivers** won't need immediate action. *For example, an AIM procedure may require revision airman knowledge test questions; or maybe a new Advisory Circular needs to be added as a reference to an Airman Certification Standards (ACS) document, and then the material addressed in a handbook revision.*

Supporting documentation for the Change Driver process is located here: K:\- - Change Drivers.

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## Process

### **SUBMIT / RECEIVE** Change Drivers

Any internal or external stakeholder may submit a Change Driver (CD) suggestion:

1. The stakeholder uses the Change Driver Submission Template to submit a CD suggestion, via email, to afs630comments@faa.gov, including the following information:
   a. Tracking information –
      i. Date submitted; and
      ii. Submitter's name, job title, organization, and contact information.
   b. CD title (e.g., AC #, NTSB Safety Recommendation #, CFR 14 Part #, Handbook topic, technology update) and brief description.
   c. Whether the CD is –
      i. Airworthiness (A/W) related,
      ii. Operations (Ops) related,
      iii. or both.
   d. **Guidance** –
      i. Is guidance affected by this CD? Yes or no?
      ii. If so, what guidance?
      iii. How is the guidance affected?
   e. **Standards** –
      i. Are standards affected by this CD? Yes or no?
      ii. If so, what standards?
      iii. How are the standards affected?
   f. **Knowledge Testing** –
      i. Is knowledge testing affected by this CD? Yes or no?
      ii. If so, what knowledge test(s) is affected?
      iii. How is the knowledge test(s) affected?

g. Suggested course of action.
h. Additional notes (if any).
i. Attachments (if any).

2. The afs630comments@faa.gov Point of Contact (POC) forwards the email to the AFS-630 CD POC.

3. The CD POC:
   a. saves the CD Submission Template to the A/W or Ops **OPEN** CDs folder on the K Drive. (If the CD applies to both A/W and Ops, the CD documentation should be saved to the **OPEN** CD folders for both specialties.)
   b. saves the stakeholder's email and any supporting attachment(s) to the appropriate folder.
   c. notifies the stakeholder their CD suggestion has been logged to the CD listing for consideration.

## **REVIEW** Change Drivers

**OPEN** A/W and Ops CDs are reviewed quarterly.

1. The CD POC:
   a. schedules quarterly CD Review;
   b. coordinates virtual meeting details;
   c. transmits invites to team members;
   d. updates the "UPDATED" date, in cell B1, of each tab of the spreadsheet that is updated during the quarterly review;
   e. facilitates meetings, including –
      i. capturing notes within the A/W and Ops CD spreadsheets; and
      ii. preparing and transmitting notifications of resulting action items; and
   f. tracks the CD until it is deemed ready for closeout.

**AWAITING PUBLICATION** Ops CD are reviewed quarterly.

*(Refer to the steps for **OPEN** CDs above.)*

***NOTE:*** *As of 2/24/22, and until further notice, the submitter will NOT be notified of Change Drivers being moved to the "Awaiting Publication" status. This is due to concerns regarding the potential release of ex parte Incorporation by Reference (BR) information.*

## Change Drivers **CLOSEOUT**

If the review team determines a CD does not significantly impact our training and/or testing processes and/or products, or the topic has been deemed fully-addressed, the CD is moved to the **CLOSED** list:

1. The CD POC moves the CD from the **OPEN** tab, to the **CLOSED** tab, of the A/W or Ops tracking spreadsheet, and makes the following entries:
   a. Date **closed**;
   b. **Guidance** – any guidance-related decisions made/actions taken to close out the CD;
   c. **Standards** – any standards-related decisions made/actions taken to close out the CD;
   d. **Knowledge Testing** – any knowledge testing-related decisions made/actions taken to close out the CD;

e. **Other Details** – other certificates and/or ratings affected; OPR decisions, with dates; and other pertinent information including –
   i. FAA research/findings;
   ii. FAA action taken;
   iii. pertinent dates or milestones; and

f. **Public Data** – comments pertaining to whether or not an faa.gov posting will be made, along with a summary of what will be included in such posting(s).
   ***NOTE:*** *As of 2/24/22, and until further notice, the submitter will NOT be notified of any "Public Data" posting. This is due to concerns regarding the potential release of ex parte Incorporation by Reference (BR) information.*

2. The CD POC moves all supporting documentation, for the **CLOSED** CD, to the **CLOSED** CDs subfolder on the K Drive.

3. The CD POC requests a managerial review of the **CLOSED** CD response, prior to sending the notification to the original submitter.
   ***NOTE:*** *The managerial review is to ensure no potential release of ex parte Incorporation by Reference (IBR) information.*

4. Whether or not the CD resulted in a change to training and/or testing, the CD POC notifies the submitter, via email, with a copy to afs630comments@faa.gov, that the CD has been moved to the **CLOSED** listing, including pertinent explanatory details.
   ***NOTE:*** *As of 2/24/22, and until further notice, the submitter will NOT be notified of any "Public Data" posting. This is due to concerns regarding the potential release of ex parte IBR information.*

## Change Drivers **TELECON LOG**

The CD POC logs the date of each Airworthiness and Operations CD Review Telecon, in the Telecon Log spreadsheet, located in the main CD folder on the K Drive.

## Change Drivers **BEST PRACTICES**

★ Stakeholders should consult their community partner point of contact, for their pre-adjudication/buy-in, prior to submitting a CD suggestion to AFS-630.
★ When distributing a draft ACS document to a Subgroup/review team for comment, the CD Drivers list should be added as an attachment to the corresponding email.
★ AFS-630 will communicate any changes made to training or testing, as a result of CD adjudication, to our Stakeholders, via the 'What's New' document, on the Airman Testing Website.

# Airman Certification System


Changes (e.g., regulations, policies, procedures, technologies)

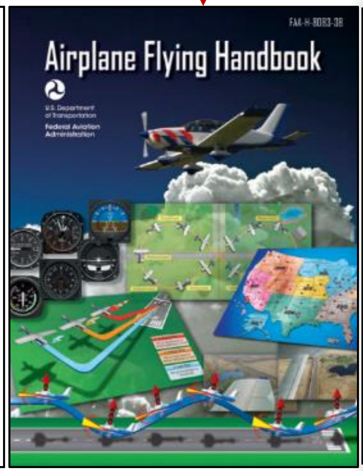

FAA-S-ACS-6B

U.S. Department of Transportation
Federal Aviation Administration

Private Pilot – Airplane
Airman Certification Standards

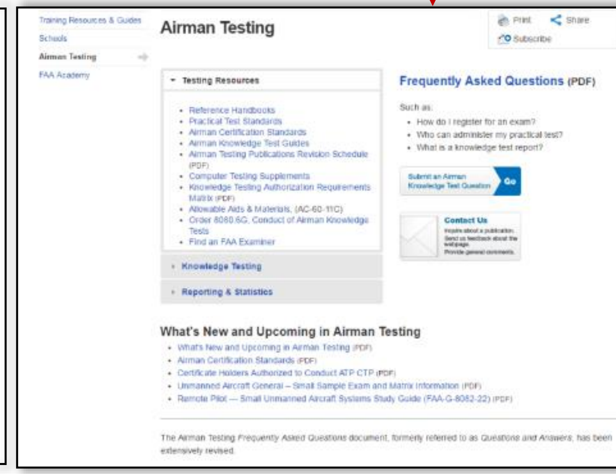
June 2018

Flight Standards Service
Washington, DC 20591




*Knowledge exam questions are meaningful, relevant, up-to-date, and aligned with standards and guidance.*

*Oral and practical tests are more focused; more efficient.*




*ACS codes enable continuous alignment*

## Standards

*Combined certification testing standards for knowledge, risk management, and skill*

## Guidance

*Rules, Advisory Circulars, other FAA information sources*

## Testing

*Knowledge exam, oral and practical tests for issuance of certificate or rating*

## Change Management

*Awareness, Desire, Knowledge, Ability, Reinforcement via disciplined change management plan with associated communications strategy*

Alignment as appropriate with other certificates / ratings