September 5, 2017

Van Kerns, AFS-600
FAA / Mike Monroney Aeronautical Center
6500 S. MacArthur Boulevard
Oklahoma City, OK 73169

Dear Mr. Kerns,

On behalf of the Aviation Rulemaking Advisory Committee's (ARAC) Airman Certification System Working Group (ACSWG), we submit the following recommendations for the draft edition of the *Aviation Instructor's Handbook* (FAA-H-8083-9B): https://s3.amazonaws.com/FAA/Aviation+Instructor's+Handbook+DRAFT+_1%2C+Jul+28%2C+2017+1550.pdf

Consistent with the recommendations made for the FAA Guidance Documents Vision submitted July 2 2015, we request the FAA include a production schedule for all FAA Handbooks (FAA-H-8083 documents) as well as a projected timeline for the next revision (i.e. how long do you anticipate this FAA-H-8083-9B to remain in effect). Doing so will allow the training community to plan for and update material to ensure training and testing remain correlated, as well as provide feedback in a timely way to help with continued development of this title and the other FAA handbooks.

These recommendations are a follow-up to those we submitted on the FAA-H-8083-9A edition in 2015. We hope these recommendations will be useful to the FAA as you gear up to release these new editions to support airman testing and the release of the Instructor Airman Certification Standards.

The ACSWG and its members welcome the opportunity to provide feedback and thank you for this opportunity and please let us know if we can provide anything further.

Sincerely,

David Oord, ACSWG Chair
Senior Director, Regulatory Affairs
Aircraft Owners and Pilots Association

Jackie Spanitz, AMT ACS Subgroup Co-chair
Curriculum Director
Aviation Supplies & Academics, Inc.

AVIATION RULEMAKING ADVISORY COMMITTEE
OPS AIRMAN CERTIFICATION SYSTEM WORKING GROUP

Aviation Instructor Handbook (FAA-H-8083-9B)

https://s3.amazonaws.com/FAA/Aviation+Instructor's+Handbook+DRAFT+_1%2C+Jul+28%2C+2017+1550.pdf

General Comments

- WG Member (Wilt) provided marked-up PDF with edits implemented; this PDF includes Wilt comments only – all WG comments are included in this file – available for download here: https://www.dropbox.com/s/1kzfv6bpsksedyh/Aviation%2BInstructor%27s%2BHandbook%2BDRAFT%2B_1%2C%2BJul%2B28%2C%2B2017%2B1550%20dfw%20comments%208-23.pdf?dl=0
- It would be great if this revised version would be applicable to AMT instruction as well as Pilot instruction. I would like to recommend the FAA consider a chapter concerning the AMT instructor that would address instruction principles as it relates directly to the AMT instructor and the unique instruction techniques of group instruction in the classroom and in the shop environment. In the FAA-H-8083-9; there is a reference to an example of an Aviation Maintenance Training lesson plan on page 10-13. There is also some mention about AMT students and instruction in Chapter 10. In Chapter 11, on page 11-2, the Aviation Maintenance Awards Program is also mentioned. The AMT Instructor is not mentioned much, but is mentioned. I believe that the handbook would become a more well-rounded Aviation Instructor's Handbook reference if a chapter were devoted to the AMT Instructor and the uniqueness of classroom, shop and multi-student training.
    - Having taught in a Part 147 AMT school for three years, I see in the handbook the appropriate word and term usage, but almost all the examples are related to pilotage and not an AMT environment. The Table of Contents outlines things well, but the content of the chapters do not address the environment for an AMT instructor (tools, to include calibrated tools, certified parts, aircraft, aircraft system mock-ups, hazards, hangar safety, distractions, noise, HAZMAT, current maintenance manuals, aircraft ground handling and servicing, tasks requiring a crew (towing and jacking)). The handbook should at least provide some general examples of some of these items as they do for pilotage. The bottom line is that the handbook is very one-sided towards pilotage, and only provides a few brief maintenance examples.
    - Chapter 2 "The Learning Process" includes "The Check Ride" and a description of First Flight and Check Ride. The same thing should be provided to describe the AMT process through the written (computerized) tests and the DME (Designated Mechanic Examiner) Oral and Practical testing.
    - Appendix D – Personal Minimums Checklist should include "The Dirty Dozen Errors in Maintenance".http://www.faa.gov/about/initiatives/maintenance_hf/library/documents/media/mx_faa_(formerly_hfskyway)/human_factors_issues/meeting_11/meeting11_7.0.pdf
    - The Certificates, Ratings, and Endorsements should include a description of the maintenance certificates, to include the A&P, Repairman and IA (Inspection Authorization).
    - There is no sample of the 8610-2 form like the detailed example of the 8710-1 provided in the handbook (Figure C-2).
    - Under Course of Training, it provides a curriculum example for a pilot school (Flight Planning, Figure 4-3). A similar example for an AMT task should be included.
    - Some of the images in the handbook show business executives (suit and tie, dresses, white shirts and ties (Figure 3-4, 4-11, 4-13, 5-1, etc.), in an office/business environment. It doesn't depict the AMT environment, or in many cases the pilot environment.
    - From my personal experience as an AMT instructor, my class sizes were as high as 25 students, with age ranges from 18 to 75 (I was an FAA PMI for five AMT schools, and saw the same thing in other AMT school environments). There is a wide range of educational backgrounds and learning styles that needed to be addressed for such large groups and comprehension levels. Reading the procedure in a maintenance manual would work fine for some, but a description with visual examples worked better for others, while a video of the task would help others to understand. All this must be taken into account and described when teach large groups, as compared to one on one with a pilot student.
    - Discuss the interface of the pilot and mechanic in certain chapters such as Chapter 3 – Effective Communication.

- Chapter 9 – Risk Management, should be Chapter 1 to set the stage for the topic. We will want to suggest bolstering the content to include AMT's. Changing Section Headings and being mindful to include all aviation instructors in the text will take some work, but the basic concepts being discussed will not have to change.
- The current Chapter 8 – Techniques of Flight Instruction should have a corresponding Chapter XX for Techniques of Maintenance Instruction. Or include both in the same chapter and change the name to be inclusive of all aviation instructors.

PAGE	COMMENT AND JUSTIFICATION
V	'While this handbook primarily uses the traditional term "student" to denote someone who is seeking certification in aviation, the accepted term in educational psychology is "learners."' If this is the case, then why don't we use the term "learners?"
Ch 1	Notice use of acronyms in titles (ILS, VAK, STM, LTM) that may be useful the higher-levels of instructional study, but I find them not helpful and even distracting (i.e. ILS). Aviation is replete with acronyms and we don't need more that are unrelated to the subject matter. They also become low-hanging fruit (but not fruitful) for test writers.
1-2	Suggest the opening graphic be anything besides Maslow's hierarchy. "A change of behavior results from learning" is not an accurate statement and is contradicted in Chapter 2 (2-2).
1-4	Change c to C in Chapter 1; Capitalize specific chapter, consistency
1-4	"Teaching the adult learner was discussed in chapter 1, but aviation instructors should keep in mind that adult learners who are motivated to seek out a learning experience do so primarily because they have a use for the knowledge or skill being sought. Learning is a means to an end, not an end…" This is Chapter 1.
1-5	Define ACS; first use of ACS. Need to define acronym, and also briefly define what it is.
1-5	"Student Questionnaire" heading not in table of contents.
1-5	Suggest including an example "student questionnaire."
1-6	Para 2, There should be a statement talking about the information: According to multiple psychological studies, it has been proven the humans can experience higher levels of motivation while not having lower basic needs met. In a study from 2011, researchers at the University of Illinois found that Maslow's hierarchy was not universal and the order in which these needs were met did not have much impact on the satisfaction or happiness of an individual. Maslow's theory has little to no empirical data to support his findings on the five-need hierarchy (Whaba and Bridgewell, 1976). Maslow's hierarchy states that each level has to be meet 100% before moving on to the next level of need. However, a person can still achieve what they were "born to do" while still being hungry. What was apparent in multiple studies, however, was that humans have needs that need to be fulfilled if their motivation and concentration is to be focused on the task at hand. Student will tend to show little to no motivation or attention if most of their needs are not met. If a student is hungry (physiological), their focus of perceptions (attention) will not be on the instructor and the subject being presented. Rather, it will be on satisfying the physiological need as soon as possible. The same can be said about an anxious student attempting a fully-developed stall for the first time. If the student feels unsafe (safety and security), their focus of perception is on their "flee" response, and not the skill that the student it trying to acquire. However, what is important here is the focus of perceptions, and the ability of the instructor to concentrate the student's senses on the subject being presented. Many students are able to complete a maneuver or demonstrate knowledge while being hungry or thirsty, which means that for the most part, the entire need does not have to be fulfilled to 100%. What needs to be addressed is whether parts of each level has been met, which will allow the focus of perception to be concentrated on the instruction given. It does not matter which order the needs are met, the order has little to no effect on the student's learning ability. What matters is that the instructor verifies that most of the needs has been met (law of readiness), and is then able to focus the student's senses (perception) on the lesson. One of the main responsibilities of an aviation instructor is to help students learn, which encompasses the law of readiness. To satisfy the law of readiness, an instructor can verify that a student's needs have been met by conducting a thorough pre-assessment prior to beginning the lesson. The pre-assessment should verify whether the student is physically and mentally ready to learn.

	Some extra reading that points out to the studies conducted that point to Maslow's theory being generally false (as he wrote it). https://news.illinois.edu/blog/view/6367/205291 https://www.td.org/Publications/Blogs/Science-of-Learning-Blog/2015/06/Maslows-Hierarchy-Separating-Fact-from-Fiction https://hbr.org/2014/11/what-maslows-hierarchy-wont-tell-you-about-motivation https://search-proquest-com.ezproxy.libproxy.db.erau.edu/central/docview/223200429/64CC7CA60BC941ECPQ/1?accountid=27203 (Wahba and Bridgewell study in ProQuest database).
1-8	Highly suggest deleting 1960's era Theory X and Theory Y and replace with more recent information from Daniel Kahneman, "Thinking, Fast and Slow."
1-9	Para just before "Repression" first sentence the kerning and spacing between words is too tight.
1-11	Needs expanded section on stress, to include AMTs and Flight Instructors as students. This should be wrapped into how it fits with a Flight Risk Assessment Tool and how all trainers the system need to be observant of their learners.
1-12	First para at the top of page left column extra space added between 4th and 5th line.
2-3	Col 1, Delete all of paragraph on social learning except for first sentence. Rewrite paragraph. [Text does not define social learning. Change to define Bandura's four stages of social learning which addresses attention, motivation, reproducing, and retention. See https://en.wikipedia.org/wiki/Observational_learning#Stages My earlier recommendation was to include Bandura's characteristics of an effective model of social learning - not this example.]
2-6	Change c to C in Chapter 9 [Capitalize specific chapter, consistency]
2-12	Rt Column 2nd paragraph, remove space in middle of last sentence.
2-12	Rt Column 3rd paragraph, last sentence, add comma (,) after "differentiate"
2-18	Index of Learning Styles (ILS): let's ditch the acronyms
2-18	Visual, Auditory, Kinesthetic Learners (VAK): let's ditch the acronyms
2-22	Rt Column, 2nd paragraph is split by a space near the end of the 1st sentence.
2-22	Suggest Figure 2-18 and all figures and photos be reviewed to reflect today's predominant methods used in flying (e.g., electronic flight bag instead of paper chart), current training tools, and current, most numerous training aircraft.
2-24	The information on multitasking is not accurate. Suggest pulling from "The Multitasking Myth: Handling Complexity in Real-World Operations," Loukia D. Loukopoulos, R. Key Dismukes, Immanuel Barshi.
2-25	Rt Column, 2nd paragraph is split by a space in middle of 2nd sentence.
2-26	The jump to scenario-based training here seems out of place.
2-26	Rt Column, 4th paragraph is split by a space in middle of 5th sentence.
2-27	The small segment on expertise is not tied to the chapter.
2-28	Then jumping to James Reason's theory on errors ("Errors" section) is not connected to the chapter and this section might be better relocated and used in the context of Threat and Error Management.
2-28, 29	"Many aircraft instruments such as altimeters offer bugs that can be used to remind the pilot about assigned altitudes, airspeeds, headings, and courses." Very few small GA (typical training) aircraft have altitude bugs—recommend: "Many aircraft instruments such as heading indicators offer bugs that can be used to remind the pilot about assigned headings and courses and some may also prompt altitudes and airspeeds."
2-30	Rt Column, last paragraph, 3rd sentence split with a space.
4-3	Col 2, Either change name of heading or add a section heading; A higher level heading needs to go just above the heading 'Instructor's Code of Conduct'. [This starts a new section that I would call Curriculum Development or such]
4-3	Col 2, Change 'conduct' to 'ethics' in heading Add that NAFI and SAFE both have Codes of Ethics for instructors. The Aviators Model Code Of Conduct is another example which is available on the Internet. State that all groups have codes posted on their web sites and what is below is a simple code applicable to any area of aviation education. [Example is better described as code of ethics. Training industry has better examples of code of conduct/ethics than what is in text.]

4-4	Col 1, Delete the following or move to a better location: The teaching process organizes the material an instructor wishes to teach in such a way that the learner understands what is being taught. The teaching process consists of four steps: preparation, presentation, application, and assessment. Regardless of the teaching or training delivery method used, the teaching process remains the same. To be effective, an instructor utilizes people skills, subject matter expertise, management skills, and assessment skills. [this para' and next have nothing to do with code of ethics/conduct. Move it or give it a heading.]
4-4	Col 1, If you keep this paragraph, insert "The remainder of this chapter" at beginning of paragraph [Paragraph sounds like an introduction left over from the original version. Delete or reword]
4-4	Figure 4-3, Replace lesson plan with image; Retitle figure [Figure caption is says syllabus, but figure shows lesson plan. This lesson plan is totally messed up on multiple levels. Rather than fix it, just replace it with an image that shows a complete course, with training syllabus, lesson plans and ACS fanned out in a picture. See attached comment for idea for image.]
4-4	col 1, 2nd last line - Insert: multiple lessons. The syllabus has [Clarity in defining a syllabus versus a lesson.]
4-5	Change c to C in Chapter 9 [Capitalize specific chapter, consistency]
4-5	Left column, last para: Uses PTS instead of ACS. In this case the paragraph also discusses AMT students. So a combination of ACS/ PTS may be necessary.
4-6	Col 2, Replace 'a' with 'the' [grammar]
4-7	Change c to C in Chapter 2; Change c to C in Chapter 1 [Capitalize specific chapter, consistency]
4-8	Right column, last para: The first sentence under the title "Motivation" seems confusing (this also exists in the previous version of the Instructor Handbook). It tries to explain how offering the student reasons why the lesson content is important to ensuring student readiness (Thorndike's law). This is important and some readers may connect the dots but it would be easier to interpret without having to re-read. I'd suggest it read- **"The purpose of the motivation element is to offer the students specific reasons why the lesson content is important to know, understand, apply or perform and thus ensures students' readiness (Thorndike's law of readiness)**
4-10	Change c to C in Chapter 3 [Capitalize specific chapter, consistency]
4-10	Left column, middle para under "Lecture Method": I don't know how often this happens but it stood out to me on this occasion. The chapter references the example of Bob, the aviation instructor but in this paragraph specifically states **'the instructor delivers his knowledge…"** but throughout the remainder of the section it keeps it gender neutral by writing **"the instructor"**. Not a huge issue in my mind but I thought I'd bring it up. It could read **"his or her knowledge" or "their knowledge"**
4-12	Change c to C in Chapter 2 [Capitalize specific chapter, consistency]
4-21	Change c to C in Chapter 2 [Capitalize specific chapter, consistency]
4-22, 4-26	Change c to C in Chapter [Capitalize specific chapter, consistency]
4-26	Left column, middle para, line 3: References PTS instead of ACS or combination of PTS and ACS
5-1	Change 'an email' to 'a message' throughout [Make term generic so it won't become dated]
5-1	Rework scenario that runs through chapter [This flight planning scenario runs throughout the chapter. Recommend this lesson be an example of exemplary lesson of planning and conducting a private-pilot, scenario-based lesson. It should be a specific lesson from a curriculum, so it can model good curriculum, as well as lesson planning, scenario development, and assessment.]
5-2	Insert 'a stage-check,' [Include in example of where summary assessments are used]
5-2	Change 'knowledge assessment' back to 'traditional assessment' through out [This was correct terminology in previous version as written. "Traditional Assessment" is a documented in the education literature]
5-4	Change 'written test to written-test' 'test writing' to 'test-writing' [grammar]
5-5	Change 'which' to 'and' [clarity]
5-5	Rewrite :"Please see the Reference Section" [?? give the specific reference for where to find this information. The reader can't know which reference document is the correct one.]
5-5	Change 'Learner Centered Assessment' to –'Learner-Centered Assessment' [grammar]
5-6	Delete: 'Did you perform in accordance with the PTS'; Replace with: How did your performance compare to the standards in the ACS? [Don't ask yes/no questions.]

Comment [DW1]:

5-6	Insert: 'might include' [Clarify list is examples, not specific]
5-6	Current: Single-Pilot Resource Management (SRM) Grades; Proposed: Assessing Risk Management Skills [Change section title to a more general Risk Management grades? The information in this section is more broadly applicable than just to SRM]
5-6	Change 'skill assessment' back to 'authentic assessment' through out [This was correct terminology in previous version as written. "Assessment" terminology is documented in the literature.]
5-7	this whole section on SRM should be condensed by 50% [The running training example in chapter is rambling and inconsistent]
5-7	Change 'sheet' to 'performance levels [Be specific]
5-7	Delete 'finds … and Perform.' [wordy]
5-7	bottom col 1 top of col 2, Delete discussion of scenario [The running training example in chapter is rambling and inconsistent]
5-7	Change 'the automation management area' to 'a task' ['automation management area' doesn't appear anywhere else in text. Out of context and confusing. Stay high level]
5-7	Redraw Figure 5-4 and change PTS to ACS [this figure is a very poor rendition of a real assessment rubric. This should be more of a chart with a row for each maneuver and a place to check the cell for performance and write comments]
5-8	Change 'skill assessment' back to 'authentic assessment' through out [this doesn't make sense now due to substituting 'knowledge' for traditional' and 'skill' for 'authentic']
5-8	Change c to C in Chapter [Capitalize specific chapter, consistency]
5-8	Change PTS to ACS
5-9	Change 'practical test' to 'airman certification'
5-9	Change PTS to ACS, multiple occurances
5-9	Left column, last para, right column, top and 2nd para: These sections lists the PTS only. The discussion in the paragraphs may apply to pilots or mechanics. The only change necessary is to include "**Airmen Certifications Standards (ACS)" and the ACS** acronym in the discussion so that readers are aware of the two sets of standards that exist.
5-9	Delete 'aviation maintenance technician'; Delete () around AMT [Already defined acronym]
5-11	Delete 'ever' [Avoid absolutes]
6-2	Change c to C in Chapter [Capitalize specific chapter, consistency]
6-9	Change c to C in Chapter [Capitalize specific chapter, consistency]
7-1	Need updated photo and ACSs instead of PTSs (in many other figures as well such as 7-1).
7-2	Change c to C in Chapter [Capitalize specific chapter, consistency]
7-2	In this section the headings do not flow – first Aviation Instructor Responsibilities, the Flight Instructor Responsibilities. The AMT instructor is hardly mentioned. More important is to bring safety to the forefront of this (and every other) chapter. The idea of safety is sprinkled here and there and then there is a small section on "Safety Practices and Accident Prevention." This handbook should be chock full of how to teach safety.
7-3	Figure 7-2: References "Appropriate PTS" and also includes a picture of the PTS. Needs to also include Appropriate ACS and Picture Changed.
7-5	Right Column, Paragraph 3, line 2 references only PTS and addresses special emphasis areas from PTS. Possibly amend to include how Special emphasis is now included in each line item in the ACS
7-6	Paragraph 1, line 5: Only references appropriate PTS, needs to also include ACS
7-8	Right Column, last paragraph, last line: Only references appropriate PTS, needs to also include ACS
7-10	Right Column, Paragraph 1, line 5: Only references appropriate PTS, needs to also include ACS
Ch 8	Human behavior and human performance is covered in Chapters 1 and 2 so the section on "Obstacles to Learning During Flight Instruction" is redundant and should be covered in the earlier chapters. This chapter is about "techniques of instruction" and should include ground, simulator, classroom, part-task trainer, and on-aircraft instruction.
8-2	Inset 'such as the FAASTeam/SAFE quarterly series of Flight Instructor Open Forums.' [Give example and advertise]
8-2	"Flight Instructor Qualification" should be in Chapter 7 with safety and professionalism.

8-2	Insert: that social cognitive learning tells us that students learn through observing others, therefore the CFI needs to model safe and professional behavior. [Tie desired behavior to theories in Ch 2]
8-2	Replace 'aviation sense' with current terminology [Old term]
8-2	Insert 'aircraft control' and 'situational awareness and workload management' [Make examples of good CFI behavior more inclusive of current emphasis items]
8-2	Fig 8-1 Delete 'tape recorder and/or' Change 'camera' to device; Define acronym PT or don't use acronym [Update terminology; acronym not defined]
8-3	delete 'poweroff, stall warning blaring' and rearrange words in sentence [All landings are not power off, stall horn blaring]
8-3	Delete Practical Test and (); Change PTS to ACS [ACS already defined]
8-3	Left column, line 13: Only references appropriate PTS, needs to also include ACS
8-3	Rewrite sentence. Suggest: The minimum standards in the ACS should first be introduced as a target. The completion standards for each lesson should gradually reach the ACS standards before final preparation for the checkride. [Should not wait until 3 hrs before checkride to introduce ACS performance standards]
8-3	Insert 'Blowing fresh air across the face also helps reduce symptoms of incipient sickness." [An easy and important tip for new instructors]
8-5	Insert '. High altitude is an issue' [Clarity. Break into two sentences]
8-6	Change c to C in Chapter [Consistency. Specific chapter should be capitalized]
8-11	Change c to C in Chapter [Consistency]
8-12	Change c to C in Chapter [Consistency]
8-13	Right Column, Paragraph 1, last line: Only references appropriate PTS, needs to also include ACS
8-13	Right column, Paragraph 5, line 6: Only references appropriate PTS, needs to also include ACS
8-19	Paragraph 3, line 11, References Instrument PTS—Needs to Reference Instrument ACS
Ch 9	Chapter 9 should be Chapter 1 to flavor the intent of this handbook.
9-1	Chapter should be renamed "Risk Management and Single-Pilot Resource Management." SRM is arguably the most important basket of skills that pilots must be proficient in to operate high performance aircraft in a modernizing National Airspace System. SRM includes risk management, the most critical of SRM elements, although automation management, task and workload management and situational awareness are nearly as important.
9-3 9-4	This discussion of risk management principles is heavily oriented to organizations rather than individual pilots. It appears to be excerpted nearly verbatim from the FAA System Safety course. It needs to be placed in the context of pilot decision-making and risk management. For example, the six-step process cited should be replaced with three steps: identify, assess, and mitigate, to keep the guidance parallel with the Airman Certification Standards.
9-4	A new section should be added here: "Identifying Risk," since it is the necessary precursor to assessing and mitigating risk. The section should include the IMSAFE and PAVE material from pages 9-5 through 9-8. It should also include examples of hazards that almost always entail high risk levels (convection, icing, etc.).
9-4	The section "Level of Risk" (in red) should be renamed "Risk Assessment." The discussion should then begin with levels of risk (risk likelihood and risk severity) and emphasize how these determine overall risk level (high, etc.).
9-5	The section on "Mitigating Risk" is woefully inadequate. Risk mitigation is the "payoff" for performing risk management and will often allow for mission accomplishment (the reason most pilots fly). Hence, it must be taught and understood successfully or the whole risk management process loses credibility. Examples need to be provided to illustrate the nearly infinite (and intuitive) variety of actions that pilots can take to reduce risk likelihood and/or severity.
9-8	The 3P process needs to be related to the process of risk management. Specifically, that means the perceive=Identify, process=Assess, and perform=Mitigate. The 3P process is more of a psychological description and the three risk management steps are the ones that need to be emphasized to keep the guidance and standards in alignment.
9-17	Change c to C in Chapter [Consistency]
9-17	Change c to C in Chapter (2nd same page) [Consistency]

C-1	Right Column, last paragraph, line 9: Only references appropriate PTS, needs to also include ACS
C-5	Change c to C in Chapter [Consistency]
C-5	Right Column, Paragraph 4, lines 5 & 8, References Instrument PTS—Needs to Reference Instrument ACS
C-6	Left Column, last paragraph, line 2: Only references appropriate PTS, needs to also include ACS
G-1	Glossary defines PTS, and maybe should include definition for ACS if it is referenced throughout the book.
New	A section should be added to describe use of Flight Risk Assessment Tools (FRAT). The numerical FRAT used in the *Risk Management Handbook* and elsewhere has too many flaws. I suggest using a non-numerical FRAT as an example. See https://www.nbaa.org/ops/safety/single-pilot/risk-management-guide/

Aviation Instructor Handbook (FAA-H-8083-9B Draft):
https://s3.amazonaws.com/FAA/Aviation+Instructor's+Handbook+DRAFT+_1%2C+Jul+28%2C+2017+1550.pdf

Comments from the 09/01/17 WG Recommendations submitted to AFS630 specific to AMT:

- It would be great if this revised version would be applicable to AMT instruction as well as Pilot instruction. I would like to recommend the FAA consider a chapter concerning the AMT instructor that would address instruction principles as it relates directly to the AMT instructor and the unique instruction techniques of group instruction in the classroom and in the shop environment. In the FAA-H-8083-9 (1999 edition); there is a reference to an example of an Aviation Maintenance Training lesson plan on page 10-13. There is also some mention about AMT students and instruction in Chapter 10. In Chapter 11, on page 11-2, the Aviation Maintenance Awards Program is also mentioned. The AMT Instructor is not mentioned much, but is mentioned. I believe that the handbook would become a more well-rounded Aviation Instructor's Handbook reference if a chapter were devoted to the AMT Instructor and the uniqueness of classroom, shop and multi-student training.
- The WG recommends continued development of this handbook, with each new edition adding more information relevant to the non-flight instructor segments. Flight instruction most often happens one on one instruction. Conversely, maintenance instruction at a Part 147 school is done in much larger groups (up to 25). Suggest future review and editions include creating some in-depth guidance for the AMT instructor community that addresses the dynamics of giving instruction in a group environment.
- Modify cover to include all types of Aviation Instructors; cover on DRAFT is specific to Flight Instructor – Airplane readers. See FAA-H-8083-9 (1999 edition) as one example.
    - Suggest the cover be a solid color with iconography (rather than photos) to depict the contents are relevant for both Flight and AMT audiences. Gives it a modern look as well.
- Create matrix for quick reference outlining which sections are pertinent to each audience.
- Suggest simplifying with generic audience sentence structure for lead ins and intro rather than including specific phrases. Example: use "pre-action briefing" or "pre-activity briefing" rather than "pre-flight and pre-shop briefing". (This was suggested on attached word doc and it adds too many unnecessary words to the document.)
- Having taught in a Part 147 AMT school for three years, I see in the handbook the appropriate word and term usage, but almost all the examples are related to pilotage and not an AMT environment. The Table of Contents outlines things well, but the content of the chapters do not address the environment for an AMT instructor (tools, to include calibrated tools, certified parts, aircraft, aircraft system mock-ups, hazards, hangar safety, distractions, noise, HAZMAT, current maintenance manuals, aircraft ground handling and servicing, tasks requiring a crew (towing and jacking)). The handbook should at least provide some general examples of some of these items as they do for pilotage. The bottom line is that the handbook is very one-sided towards pilotage, and only provides a few brief maintenance examples.
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- From my personal experience as an AMT instructor, my class sizes were as high as 25 students, with age ranges from 18 to 75 (I was an FAA PMI for five AMT schools, and saw the same thing in other AMT school environments). There is a wide range of educational backgrounds and learning styles that needed to be addressed for such large groups and comprehension levels. Reading the procedure in a maintenance manual would work fine for some, but a description with visual examples worked better for others, while a video of the task would help others to understand. All this must be taken into account and described when teach large groups, as compared to one on one with a pilot student.

Text in quotes is existing in the handbook. Text that is underlined is recommended to be added.

Page	Action
1-11	Needs expanded section on stress, to include AMTs and Flight Instructors as students. This should be wrapped into how it fits with a Flight Risk Assessment Tool and how all trainers in the system need to be observant of their learners.

	Left hand column, under heading Normal Reaction to Stress First paragraph, last sentence. Add the term freeze to list. …the threat or to retreat from it – the fight, fright <u>or freeze</u> syndrome.
Ch 2	"The Learning Process" includes "The Check Ride" and a description of First Flight and Check Ride. The same thing should be provided to describe the AMT process through the written (computerized) tests and the DME (Designated Mechanic Examiner) Oral and Practical testing. Basic Requirements to Become an Aircraft Mechanic The requirements for obtaining a mechanic certificate are: • Be at least 18 years of age. • Be able to read, write, speak, and understand the English language. (Note: If the applicant does not meet this requirement and is employed outside the United States by a U.S. carrier, the certificate will be endorsed "valid only outside the United States.") • Have passed all the required tests (written, oral, and practical) within the preceding 24 months from application. • Possess and demonstrate the appropriate knowledge and skill for the certificate rating being sought. If a technician has one of the ratings, and desires to add the other, he/she must meet the requirements set forth in section (§) 65.77, and take the written, oral, and practical tests within 24 months. Any applicant meeting the experience requirements listed in 65.77 must pass a written test (minimum passing score of 70, reference §65.17) covering the construction and maintenance of aircraft. Applicable portions of 14 CFR 43 and 91 are also included in the testing. Basic principles for the installation and maintenance of propellers are included with the testing that is administered for the powerplant rating. Successful completion of the written test is required before the candidate may apply for the oral and practical tests identified in section 65.79. Oral and practical tests to determine the applicant's basic knowledge and skills necessary for the certificate or rating sought are required to be completed after the applicant has successfully completed the written test. Minor repairs and minor alterations to propellers are required to be demonstrated as part of the powerplant rating. Once a technician becomes a certificated mechanic, he or she may perform or supervise the maintenance, preventive maintenance, or alterations of an aircraft or appliance (or part thereof) for which he or she is rated.
Ch 2	Add "Differentiated Instruction" to Chapter 2 "The Learning Process" to address an AMT training environment with groups of students with varied ages, education levels and learning styles. Differentiation means tailoring instruction to meet individual needs. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to instruction. At its most basic level, differentiation consists of the efforts of teachers to respond to variance among learners in the classroom. Whenever a teacher reaches out to an individual or small group to vary his or her teaching in order to create the best learning experience possible, that teacher is differentiating instruction. Differentiation is a way of teaching; it's not a program or package of worksheets. It asks teachers to know their students well so they can provide each one with experiences and tasks that will improve learning. As Carol Ann Tomlinson has said, differentiation means giving students multiple options for taking in information (1999). Differentiating instruction means that you observe and understand the differences

	and similarities among students and use this information to plan instruction. Here is a list of some key principles that form the foundation of differentiating instruction. • Ongoing, formative assessment: Teachers continually assess to identify students' strengths and areas of need so they can meet students where they are and help them move forward. • Recognition of diverse learners: The students we teach have diverse levels of expertise and experience with reading, writing, thinking, problem solving, and speaking. Ongoing assessments enable teachers to develop differentiated lessons that meet every students' needs. • Group Work: Students collaborate in pairs and small groups whose membership changes as needed. Learning in groups enables students to engage in meaningful discussions and to observe and learn from one another. Differentiated instruction, according to Carol Ann Tomlinson (as cited by Ellis, Gable, Greg, & Rock, 2008, p. 32), is the process of "ensuring that what a student learns, how he or she learns it, and how the student demonstrates what he or she has learned is a match for that student's readiness level, interests, and preferred mode of learning." Teachers can differentiate through four ways: 1) through content, 2) process, 3) product, and 4) learning environment based on the individual learner. [4] Differentiation stems from beliefs about differences among learners, how they learn, learning preferences, and individual interests (Anderson, 2007). Therefore, differentiation is an organized, yet flexible way of proactively adjusting teaching and learning methods to accommodate each students learning needs and preferences to achieve maximum growth as a learner. [5] To understand how our students learn and what they know, pre-assessment and ongoing assessment are essential. This provides feedback for both teacher and student, with the ultimate goal of improving student learning. [4] Delivery of instruction in the past often followed a "one size fits all" approach. In contrast, differentiation is individually student centered, with a focus on appropriate instructional and assessment tools that are fair, flexible, challenging, and engage students in the curriculum in meaningful ways.
2-13	Left hand column, 3rd paragraph. 1st sentence. Change to: For aviation instructors, educational objectives for the first three levels (knowledge, comprehension, and application) are generally gained as the result of <u>classroom</u> instruction, reading about aircraft systems, listening to a pre-flight <u>or pre-shop</u> briefing, or taking part in computer-based training.
2-20	Right hand column, heading Automatic Response State – add example for AMT students. Certain actions performed repeatedly by aviation maintenance technicians can reach the automatic response stage also. Driving rivets may require a great deal of attention and frequent checks to avoid over-driving, but after a certain amount of practice the student begins to learn from the sound and the feel what is happening with the rivet. At this stage they will be able to confidently drive rivets with consistently acceptable results.
2-26	Scenario-Based Training This needs an example of SBT applied in the AMT Training realm. This will be all new material, and could use "pilot write-ups" to establish the scenario and the process used by the AMT to locate and cure the problem encountered.
Ch 3	Discuss the interface of the pilot and mechanic in certain chapters such as Chapter 3 – Effective Communication.
3-1	"Terms like SIGMET, taildragger, FBO, IO-540 do not carry the same meaning to a beginning student." **(Add)** <u>The student must first be taught the background, meaning, and the definition of terms and abbreviations before they are used, otherwise they will have no meaning to the student and learning and</u>

	understanding will take much longer than anticipated. For example, IO-540 is a model designation of a particular reciprocating engine. It is a fuel **I**njected, with the cylinders horizontally **O**pposed, and it has a 540 cubic inch displacement engine that is made by Lycoming Engines. "Use of technical language will always be necessary, but the student must be taught the language first."
3-7	"A new instructor is more likely to find a comfortable style of communication in an environment that is not threatening, for a prospective maintenance instructor, this might take the form of conducting a class on welding while under the supervision of a person who has experience teaching welding or is an experienced welder.
3-10	Instructional Enhancement "For example, a maintenance instructor teaching basic electricity might be able to teach at a minimally satisfactory level if the instructor had only the same training level" and a certain level of experience for the subject being taught.
4-4	Under Course of Training, it provides a curriculum example for a pilot school (Flight Planning, Figure 4-3). A similar example for an AMT task should be included.
4-10	Presentation "The lecture method is suitable for presenting new material, for summarizing ideas, and for showing relationships between theory and practice." It is also the preferred method of relaying information to larger groups such as an aviation maintenance technician class. "This method is most effective when accompanied by instructional aids and training devices. In the case of a lecture on weight and balance, a chalkboard, a marker board, flip chart, or electronic media such as PowerPoint or other documents presented with a projector could be used effectively." When teaching a class of AMT students, the demonstration-performance method is usually ideal to provide a visual presentation of what was covered during the lecture and to provide an opportunity for the students to complete an actual exercise in performing a weight and balance adjustment or weighting procedure on an actual aircraft. The will demonstrate the skill or task that is being learned, and immediately following the demonstration the students will perform the task or skill themselves. The same applies to flight instruction, "such as a ground school lesson on the flight computer, or during instruction on most flight maneuvers. Showing a student pilot how to recognize stalls, for example, would be appropriate for this method." Combining the lecture and the demonstration-performance methods would be useful for teaching students to overhaul an engine. The initial information on overhaul procedures would be taught in the classroom using the lecture method, and the actual hands on portion in the shop would use the demonstration-performance method. In the shop, the instructor would first demonstrate a procedure and then the student would have an opportunity to perform the same procedure. In the demonstration-performance method, the steps must be sequenced in the proper order so the students get a correct picture of each separate process or operation, as well as the overall procedure.
5-9	Practical tests for maintenance technicians and pilots are criterion-referenced tests. The practical tests, defined in the Practical Test Standards (PTS) and the Airman Certification Standards (ACS), are criterion referenced because the objective is for all successful applicants to meet the high standards of knowledge, skill, and safety required by the regulations. The purpose of the PTS and the ACS is to delineate the standards by which FAA inspectors, designated pilot examiners (DPEs), and designated maintenance examiners (DMEs) conduct tests for ratings and certificates. The standards are in accordance with the requirements of the appropriate section of Title 14 of the Code of Federal Regulations (14 CFR) parts 61, 65, 91, and other FAA publications, including the Aeronautical Information manual (AIM) and pertinent advisory circulars and handbooks. The objective of the PTS/ACS is to ensure the certification of pilots and maintenance technicians at a high level of performance and proficiency, consistent with safety. The PTS/ACS for aeronautical certificates and ratings include areas of operation and tasks that reflect the requirements of the FAA publications mentioned above. The PTS/ACS for the maintenance technician is arranged by subject areas in the three

	sections of the mechanic exam. These are the General subjects, Airframe subjects, and Powerplant subjects. Each pilot exam for a certificate or rating is divided into areas of operations and tasks that reflect the requirements for that particular certificate or rating. Areas of operation define phases of the practical test arranged in a logical sequence within each standard. They usually begin with preflight preparation and end with postflight procedures. Tasks are titles of knowledge areas, flight procedures, or maneuvers appropriate to an area of operation. Included are references to the applicable regulations or publications. Private pilot applicants are evaluated in all tasks of each area of operation. Flight instructor applicants are evaluated on one or more tasks in each area of operation. In addition, certain tasks are required to be covered and are identified by notes immediately following the area of operation titles.
Ch 6	Add to Chapter 6 Lesson Plan Formats (see example at end of this table).
Ch 6	Add a section on distance learning and the preparation of online training materials – to include designing the materials, presentation, and how the aviation instructor should use the tools. (Ch 4 has some of this now, using antiquated terms)
7-5	Add section on AMT Instructor Responsibilities This will be all new material.
7-6	Add Aviation Maintenance Technicians Model Code of Conduct (www.securav.com) The Code of Conduct has seven sections, each containing Principles and Sample Recommended Practices. 1. General Responsibilities of Aviation Maintenance Technicians 2. Third-Party Safety 3. Training and Proficiency 4. Security 5. Environmental Issues 6. Use of Technology 7. Advancement and Promotion of Aviation Maintenance
7-8	The role of the AMT Instructor and the difference in the AMT certification system needs to be addressed here.
Ch 8	Rename to be “Techniques of Instruction” (so applicable to both flight and maintenance instructors)
Ch 8	Add information in each sub-section to reflect manual skill instruction (e.g., how to safety wire)
8-1	Add dirty dozen or similar to background photo; add generalized fatigue graphic
8-2	re-write such as: The recognition of aviation training and flight operations as a system led to a “system approach” to aviation safety. Since instructors are a critical part of the aviation safety system, this chapter introduces system safety—aeronautical decision-making (ADM), risk management, situational awareness, and single-pilot resource management (SRM)—in the modern aviation training environment. It also provides methods instructors can use to teach students to use practical risk management tools and discusses how to evaluate student decision-making. The chapter begins with practical strategies instructors can use to enhance their instruction, the demonstration-performance training delivery method of flight instruction, integrated instruction, positive exchange of flight controls, use of distractions, obstacles to learning encountered during training, and how to evaluate students.
8-2	“Flight Instructor Qualification” should be in Chapter 7 with safety and professionalism. Change header to “Practical Instructor Strategies”: During all phases of training, instructors should remember they are role models for the student. The instructor should demonstrate good aviation sense at all times: • Before the task—discuss safety and the importance of a proper planning and use of checklists.

	• During the task—prioritize the tasks. In flight instruction follow the age-old "aviate, navigate, communicate" mantra. In maintenance instruction, instill the importance of following published procedures and asking questions when in doubt.
Figure 8-1	• (Figure 8-1 could be generalized easily to include all learners.) During landing—conduct stabilized approaches, maintain desired airspeed on final, demonstrate good judgment for go-arounds, wake turbulence, traffic, and terrain avoidance. Use ADM to correct faulty approaches and landing errors. Make power-off, stall-warning blaring, on centerline touchdowns in the first third of runway. • Always—remember safety is paramount. ~~F~~Flight ~~i~~instructors have the responsibility of producing the safest aviation professionals~~pilots~~ possible. For that reason, instructors ~~CFIs~~ should encourage each student to learn as much as he or she is capable of and keep raising the bar. When introducing new~~lesson~~ tasks, ~~flight~~ instructors should not introduce the minimum acceptable standards for passing the checkride. ~~The Practical Test Standard (PTS) is not a teaching tool. It is a testing tool.~~ The overall focus of aviation~~flight~~ training should be on education, learning, and understanding why the standards are there and how they were set. The ~~minimum~~ standards to pass the practical test~~checkride~~ should ~~not~~ be introduced early in the training curriculum of students.~~until the 3 hours of preparation for the checkride.~~ (Note to AFS630: This is how the Aviation Instructors Handbook could be edited to include all aviation instructors. The rest of Chapter 8 and Chapter 9 are easily modified and I believe the entire Handbook would be easy to adjust."
8-14	Material needs to be added to include the AMT in the concept of Aeronautical Decision Making. The difference between how decision making affects the immediate response required of a pilot, and the latent results possible when an AMT makes a bad decision. This will be all new material.
Ch 9	Chapter 9 – Risk Management, should be Chapter 1 to set the stage for the topic. Bolster the content to include AMT's. Changing Section Headings and being mindful to include all aviation instructors in the text will take some work, but the basic concepts being discussed will not have to change.
9-9	Need to add AMT Self-Assessment to this section. Reference can be made to the Maintenance Personal Minimums checklist.
Appendix C	The Certificates, Ratings, and Endorsements should include a description of the maintenance certificates, to include the A&P, Repairman and IA (Inspection Authorization). Airframe Rating: A mechanic who holds an airframe rating may approve and return to service an airframe, an appliance, or any related part after he or she has performed, supervised, or inspected minor repairs or alterations. He or she may also perform the maintenance actions required for a major repair or alteration, and should initiate the appropriate form (FAA Form 337, Major Repair and Alteration) associated with that work. However, the return to service action must be accomplished by a certificated A & P technician holding an Inspection Authorization (IA). (Refer to 14 CFR §65.95.) The airframe mechanic is also authorized to perform the 100-hour inspection (if required per 14 CFR part 91 §91.409) on the airframe. The FAA recently added a new category of aircraft called Light Sport. (Refer to 14 CFR part 21, §21.190.) A certificated Airframe technician can approve and return to service the airframe after performing and inspecting a major repair or major alteration. The work must have been done on products that are not produced under FAA approval (i.e., are not type certificated) and must have been performed in accordance with instructions developed by the manufacturer or person acceptable to the FAA. Powerplant Rating: Similarly, a mechanic holding a powerplant rating has the same limitations imposed regarding the powerplant and propeller as the airframe technician has on the airframe rating. He or she may perform and return to service minor repairs or alterations. He or she may also accomplish the work activities required for a major repair or alteration, but the work must be signed off for return to service by

Commented [JK1]: This section would be deleted as the technical topics do not add to the conversation here.

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Commented [JK2]: PTS is not a teaching tool, but the ACS is.

	an IA. The privilege of performing a 100-hour inspection (if required by part 91) on a powerplant or propeller is also authorized. A certificated Powerplant technician can approve and return to service a Light Sport powerplant or propeller after performing and inspecting a major repair or major alteration. The work must have been done on products that are not produced under FAA approval (i.e., are not type certificated) and must have been performed in accordance with instructions developed by the manufacturer or person acceptable to the FAA. Inspection Authorization: An A & P mechanic who has held his or her certificate for at least 3 years, and has been active for the last 2 years, may submit application using FAA Form 8610-1, Mechanic's Application for Inspection Authorization, to the FAA for consideration as an IA. In addition to the preceding time requirements, the IA candidate must have: • A fixed base of operation where he or she can be located in person or by phone. • Available equipment, facilities, and inspection data necessary to properly inspect the airframe, powerplants, propeller, or any related part or appliance he or she will be approving for return to service. The applicant who meets all the above criteria must then pass a written (computerized) test to determine his or her ability to inspect the airworthiness of an aircraft following either a major repair or alteration action or the performance of an annual or progressive inspection. The minimum passing score for the computer test is 70 percent. If the applicant fails the test, retesting cannot be attempted until a minimum of 90 days have elapsed from the failure date. Unlike the A & P test, there is no reduction in this time if the applicant receives additional training.
Appendix C	There is no sample of the 8610-2 form like the detailed example of the 8710-1 provided in the handbook (Figure C-2). https://www.faa.gov/documentLibrary/media/Order/Order_8900.2B.pdf The instructions for completing the form start on page 6-33, and can be used to create the same visual given for the 8710-1.
Appendix D	Appendix D – Personal Minimums Checklist should include "The Dirty Dozen Errors in Maintenance".http://www.faa.gov/about/initiatives/maintenance_hf/library/documents/media/mx_faa_(formerly_hfskyway)/human_factors_issues/meeting_11/meeting11_7.0.pdf

Add to chapter 6 Lesson Plan Formats

LESSON PLAN
AVIATION MAINTENANCE TRAINING

INSTRUCTOR: Charles Taylor

METHOD OF INSTRUCTION: Lecture, Discussion, and Practical Applications

TITLE: Maintenance Record Documentation for OEM part replacement and major alterations.

Objective 1: Demonstrate an understanding of proper maintenance record entries in accordance with §43.9.
Objective 2: Demonstrate the ability to determine the correct replacement for OEM parts, that meet FAA PMA approval in accordance with §43.13.
Objective 3: Demonstrate the understanding and ability to correctly complete the required documentation for the installation and incorporation of a Supplemental Type Certificate (STC) alteration in accordance with §43, Appendix B and AC 43.9-1.

MATERIALS/EQUIPMENT

1. Sample log book entries
2. Sample completed 337 forms

REFERENCES

1. 14 CFR Part 43
2. AC 43-9
3. AC 43.9-1
4. Manufactures Parts Manuals

PRESENTATION

1. Discuss general maintenance documentation requirements.
2. Discuss specific documentation requirements for maintenance.
3. Review various manufacturer parts manuals (preferable using what the individual under training is accustom to using)
    a. Standard Parts
    b. Usable on Codes
    c. Non-interchangeable Parts
    d. Interchangeable Parts
    e. Symbols & Part Number Terms
    f. Parts Supersedure
4. Review STC installation and documentation requirements

PRACTICE

Provide scenarios for the student to demonstrate the ability to properly complete FAA Form 337, complete an associated log book entry and determine the correct replacement parts replacement using a manufacture parts manual and related information such as service bulletins or service instructions.

ASSESSMENT:

Written and Practical assessment that will provide an objective score demonstrating an understanding of maintenance record requirements.

October 10, 2017

Larry West, AFS-630
FAA / Mike Monroney Aeronautical Center
6500 S. MacArthur Boulevard
Oklahoma City, OK 73169

Dear Mr. West,

On behalf of the Aviation Rulemaking Advisory Committee's (ARAC) Airman Certification System Working Group (ACSWG), we submit the following interim recommendations for revisions to the Oral and Practical (O&P) associated with Aviation Maintenance Technician (AMT) certification. Additionally, these recommendations will be tested as part of the proposed AMT ACS prototype.

The areas that change from the current O&P process under the Practical Test Standards as a result of these interim recommendations are identified with highlights. In summary, the changes are as follows:

- Missed ACS codes from the Airman Knowledge Test Report will be used to generate the oral questions in the test generator: The results of the written exam are populated to the mechanic oral & practical exam test generator. The codes for the missed questions will generate oral questions in the subject area that directly relate to the missed questions. All subjects in which the applicant did not miss any questions will have oral questions generated on a random basis.
- Subject weighting will be removed: All practical projects will be generated from the test generator without any weighting. The Test Generator randomly produces 6-9 practical projects for each of the three sections (General, Airframe, Powerplant)

The ACSWG and its members welcome the opportunity to provide feedback and thank you for this opportunity and please let us know if we can provide anything further.

Sincerely,

David Oord, ACSWG Chair
Senior Director, Regulatory Affairs
Aircraft Owners and Pilots Association

Jackie Spanitz, AMT ACS Subgroup Co-chair
Curriculum Director
Aviation Supplies & Academics, Inc.

Janeen Kochan, PhD, FRAeS
Human Factors Scientist/Designated Pilot
Examiner/Instructor Pilot
Aviation Research, Training, and Services, Inc.

AMT ACS O&P Process

	AMT Exam Process under FAA-S-8081-26A, 27A, 28A (PTS)	Proposed AMT Exam Process under FAA-S-ACS-1
1	In accordance with 14 CFR 65.77, an applicant for a mechanic certificate must show an Aviation Safety Inspector that they meet the experience requirements of 65.77 in order to received authorization to take the exams for certification. If an applicant is a graduate of an approved school under 14 CFR 147, a certificate of completion only need to be presented to take the certification exams **§65.77 Experience requirements.** Each applicant for a mechanic certificate or rating must present either an appropriate graduation certificate or certificate of completion from a certificated aviation maintenance technician school or documentary evidence, satisfactory to the Administrator, of— (a) At least 18 months of practical experience with the procedures, practices, materials, tools, machine tools, and equipment generally used in constructing, maintaining, or altering airframes, or powerplants appropriate to the rating sought; or (b) At least 30 months of practical experience concurrently performing the duties appropriate to both the airframe and powerplant ratings.	In accordance with 14 CFR 65.77, an applicant for a mechanic certificate must show an Aviation Safety Inspector that they meet the experience requirements of 65.77 in order to received authorization to take the exams for certification. If an applicant is a graduate of an approved school under 14 CFR 147, a certificate of completion only need to be presented to take the certification exams **§65.77 Experience requirements.** Each applicant for a mechanic certificate or rating must present either an appropriate graduation certificate or certificate of completion from a certificated aviation maintenance technician school or documentary evidence, satisfactory to the Administrator, of— (a) At least 18 months of practical experience with the procedures, practices, materials, tools, machine tools, and equipment generally used in constructing, maintaining, or altering airframes, or powerplants appropriate to the rating sought; or (b) At least 30 months of practical experience concurrently performing the duties appropriate to both the airframe and powerplant ratings.
2	In accordance with 14 CFR 65.75, an applicant must pass all appropriate written exams prior to applying for an oral and practical exam for a mechanic certificate or rating. **§65.75 Knowledge requirements.** (a) Each applicant for a mechanic certificate or rating must, after meeting the applicable experience requirements of §65.77, pass a written test covering the construction and maintenance of aircraft appropriate to the rating he seeks, the regulations in this subpart, and the applicable provisions of parts 43 and 91 of this chapter. The basic principles covering the installation and maintenance of propellers are included in the powerplant test. (b) The applicant must pass each section of the test before applying for the oral and practical tests prescribed by §65.79. A report of the written test is sent to the applicant.	In accordance with 14 CFR 65.75, an applicant must pass all appropriate written exams prior to applying for an oral and practical exam for a mechanic certificate or rating. **§65.75 Knowledge requirements.** (a) Each applicant for a mechanic certificate or rating must, after meeting the applicable experience requirements of §65.77, pass a written test covering the construction and maintenance of aircraft appropriate to the rating he seeks, the regulations in this subpart, and the applicable provisions of parts 43 and 91 of this chapter. The basic principles covering the installation and maintenance of propellers are included in the powerplant test. (b) The applicant must pass each section of the test before applying for the oral and practical tests prescribed by §65.79. The applicants will receive the Airman Knowledge Test Report upon completion of the test.

3	Applicant obtains a passing score on the appropriate written exams (Mechanic General, Airframe, and/or Powerplant)	Applicant obtains a passing score on the appropriate written exams (Mechanic General, Airframe, and/or Powerplant) 1. The results of the written exam are populated to the mechanic oral & practical exam test generator
4	Applicant contacts DME to request and schedule a mechanic oral & practical exam	Applicant contacts DME to request and schedule a mechanic oral & practical exam
5	DME conducts pre-test interview and requests a copy of FAA Form 8610-2, and a copy of all pertinent airman knowledge exam results for review.	DME conducts pre-test interview and requests a copy of FAA Form 8610-2, and a copy of all pertinent airman knowledge exam results for review.
6	DME submits requested testing schedule to FSDO DME Focal Point	DME submits requested testing schedule to FSDO DME Focal Point
7	DME downloads an exam from the FAA Test Generator for the requested mechanic exam. DME identifies if the exam is an initial or retest, an initial or an added rating.	DME downloads an exam from the FAA Test Generator for the requested mechanic exam. DME identifies if the exam is an initial or retest, an initial or an added rating.
8	**For a Full A&P Exam the FAA Test Generator provides the following:**	**For a Full A&P Exam the FAA Test Generator provides the following:**
9	7 questions for each of the 44 subjects in the General, Airframe, and Powerplant sections. The DME is required to ask a minimum of 4 questions in each subject, the applicant must answer at least 70% of the questions correctly.	The results of the written exam are populated to the mechanic oral & practical exam test generator. The codes for the missed questions will generate oral questions in the subject area that directly relate to the missed questions. All subjects in which the applicant did not miss any questions will have oral questions generated on a random basis.
10	The Test Generator randomly produces 6-9 practical projects for each of the three sections (General, Airframe, Powerplant)	The practical projects will continue to be randomly generated with the previous core comp 2 projects being generated on an 80% basis. All other subjects will be generated on a 20 % basis. The Test Generator randomly produces 6-9 practical projects for each of the three sections (General, Airframe, Powerplant)
11	Applicant must successfully complete each practical assignment on the first attempt using tools and reference material provided by the DME.	Applicant must successfully complete each practical assignment on the first attempt using tools and reference material provided by the DME.
12	The Examiner must ask at least 4 questions in each subject. The applicant must answer at least 3 of the 4 questions or 5 of the 7 questions correctly to pass the subject for the oral portion of the exam.	The Examiner must ask at least 4 questions in each subject. The applicant must answer at least 3 of the 4 questions or 5 of the 7 questions correctly to pass the subject for the oral portion of the exam.
13	After the oral exam is completed, the applicant must correctly complete all of the various practical task assignments.	After the oral exam is completed, the applicant must correctly complete all of the various practical task assignments.
14	After all of the oral exam and the practical exam is successfully completed by the applicant, the Examiner records the results of the exam on page 2 of the 8610-2 form and the exam planning sheet.	After all of the oral exam and the practical exam is successfully completed by the applicant, the Examiner records the results of the exam on page 2 of the 8610-2 form and the exam planning sheet.
15	The Examiner compiles all required documents for the exam and forwards to the local FSDO DME Focal Point.	The Examiner compiles all required documents for the exam and forwards to the local FSDO DME Focal Point.
16	After the exam documents has been reviewed at the FSDO and found to be correct, they are then forwarded to Airman Records in Oklahoma City	After the exam documents has been reviewed at the FSDO and found to be correct, they are then forwarded to Airman Records in Oklahoma City
17	Airman Records Office completes a final review and issues the airman mechanic certificate.	Airman Records Office completes a final review and issues the airman mechanic certificate.

AMT ACS Prototype Process

Comments
• Do NOT make the process longer
• DO make the process:
⇒ more valid, meaningful
⇒ less burdensome on the DME
• Test the Risk Management Elements in context
• Determine if the failure is in the Risk Management Element or the Skill Element
• We are not prototyping the training, only the testing

Criteria
• Group agreed on NO weighting, which requires applicants to be prepared for all subjects – this stresses training to the standard, and emphasizes better preparation – then the test is a truer demonstration of the training
• Required projects for every practical test:
⇒ logbook entry (could result from different ACS code than that of knowledge test ACS code); and
⇒ propellers.
• Notes regarding failures should tie the deficiency back to the ACS code:
⇒ The failed ACS code(s) would then show up at the top of the planning sheet for a retest.

Suggested Process:
• Board/code the public sample exams with the current ACS
o AMG Sample Test – Board/Code 60 questions
o AMA Sample Test – Board/Code 100 questions
o AMP Sample Test – Board/Code 100 questions
• Document lessons learned for AEB process
o Revise process as necessary
 Distribute revised process to internal (via OPM) and external stakeholders

• Generate two sample AKTRs with ACS codes (simulating missed questions) o One report with score near 100 o Another report with score near 70
• Apply ACS Codes to oral questions
• Apply ACS Codes to practical projects to correlate with Risk Elements associated with the tasks
• Determine if the AKTR ACS Codes correlate with the oral question ACS Codes and related practical tasks

Recommendations:
• Use 'rote knowledge' oral questions as potential knowledge test questions.

Outcomes:
• Based on results, determine:
⇒ Improvements in pre-training interview;
⇒ Training materials required;
⇒ Materials needing updates; and
⇒ Changes required to MTEL.

Action Items:
• David Dagenais / Florida State College: Perform the prototype with a DME as a simulated applicant
• Larry West / FAA – AFS-630/640: Provide makeup of oral test – may have fewer, but better questions, that produce a reliable measure of learning

October 3, 2017

Larry D. West
Acting Branch Manager, Airman Testing Standards
Aviation Records Building (ARB) 22
FAA Mike Monroney Aeronautical Center
6500 S. MacArthur Boulevard
Oklahoma City, OK 73169

Dear Mr. West,

On behalf of the Aviation Rulemaking Advisory Committee's (ARAC) Airman Certification System Working Group (ACSWG), we submit the attached recommendation for ACS development and prioritization.

On September 14, 2017 ARAC unanimously approved a continuation and expansion of the tasks assigned to the Airman Certification System Working Group. The expanded task includes revisions to the standards, training guidance, test management, and reference materials for the Private Pilot, Commercial Pilot and Remote Pilot certificates and the Instrument rating, and added the Sport Pilot and Recreational Pilot certificates in all airplane categories, and the Private Pilot, Commercial Pilot, Airline Transport Pilot, and Instructor certificates and the Instrument rating in the remaining aircraft categories to include rotorcraft, powered lift, and glider to the list of certificates and ratings.

Per your request, the working group leadership has developed the attached list, which prioritizes the standards and guidance, based on applicant volume. The list can serve as a basis for both the FAA and industry to focus our limited resources to accomplish the task. We encourage the agency to utilize industry as much as practical and leverage both the subgroup structure and use of subject matter expertise.

We collectively look forward to framing out the remaining components of the new airman certification system and work together to maintain and improve it.

Sincerely,

David Oord
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Priorities	ACS/PTS	Affected Handbooks
Airplane	Private ACS-6 Instrument Rating ACS-8 Commercial ACS-7 Instructor ACS-9 [in development] ATP [in development] Convert 8081-29 PTS Sport & Instructor Convert 8081-3 PTS Recreational	FAA-H-8083-25 FAA-H-8083-3 FAA-H-8083-1
Aviation Mechanic	AMT ACS-1 [in development]	FAA-H-8083-30 FAA-H-8083-31 FAA-H-8083-32
Dispatcher	Convert 8081-10 PTS	
Rotorcraft Helicopter Gyroplane Powered Lift*	Convert 8081-15 PTS Private Convert 8081-4 PTS Instrument Convert 8081-16 PTS Commercial Convert 8081-20 PTS ATP Convert 8081-7 PTS Instructor Convert 8081-9 PTS Instrument Instructor Convert 8081-29 PTS Sport & Instructor Convert 8081-3 PTS Recreational Convert 8081-4 PTS Powered Lift	FAA-H-8083-21
Glider	Convert 8081-22 PTS Private Convert 8081-23 PTS Commercial Convert 8081-8 PTS Instructor Convert 8081-29 PTS Sport & Instructor	FAA-H-8083-13
Lighter-Than-Air Balloon Airship	Convert 8081-17 PTS Private Convert 8081-18 PTS Commercial & Instructor	FAA-H-8083-11
Powered Parachute	Convert 8081-32 PTS Private & Instructor Convert 8081-31 PTS Sport & Instructor	FAA-H-8083-29
Weight-Shift Control	Convert 8081-32 PTS Private & Instructor Convert 8081-31 PTS Sport & Instructor	FAA-H-8083-5
Parachute Rigger	Convert 8081-25 PTS	FAA-H-8083-17
Flight Engineer	Convert 8081-21	
Flight Navigator		FAA-H-8083-18

*Priority based on aircraft certification and industry needs

Aircraft categories and ratings on radar – to be developed before they are enabled through rulemaking and/or exemption

- Electric Vertical Take-off and Land (eVTOL)
- Large UAS