FAA Aviation Rulemaking Advisory Committee

Training Standardization Working Group (TSWG)
September 2024 Recommendation Report

1 Table of Contents

Contents

1 Executive Summary

1.1 Summary

The Standardized Curriculum Concept supports the overarching goals to enhance training and checking and promote safer operational practices in part 135 operations through a common and consistent methodology for training and evaluating. This supported the 2019-2020 National Transportation Safety Board Most Wanted List initiative to improve the safety of part 135 flight operations.

The TSWG is comprised of representatives from the aviation industry, including training centers, aircraft manufacturers, operators and industry organizations, serving as members of the group and report to ARAC. This recommendation report includes the results of the following TSWG actions:

- Identified the components of Adaptive Recurrent standardized curricula, which incorporate the maneuvers, procedures and functions to be performed during training and checking.

- Recommended revision to Federal Aviation Administration (FAA) guidance to facilitate the execution of the standardized curricula.

2 Background

2.1 The Task and Tasking

The FAA established the Air Carrier Training Aviation Rulemaking Committee (ACT ARC) in 2014 to provide a forum for the U.S. aviation community to discuss, prioritize, and provide recommendations to the FAA about operations conducted under parts 121, 135, and 142, addressing air carrier training.

The ACT ARC produced several part 135-specific recommendations it believed would achieve standardization (where appropriate) and significant administrative efficiency in check pilot qualification, flight instructor qualification, and part 135 air carrier training curricula delivered by part 142 training centers. The ACT ARC also recommended the FAA establish a Standardized Curriculum Concept for part 135 training provided by part 142 training centers.

On March 19, 2020, the FAA assigned this task to the Aviation Rulemaking Advisory Committee (ARAC), who established a new Training Standardization Working Group (TSWG) for this purpose. The TSWG tasking for standardization includes addressing inefficiencies that exist between part 135 and part 142, such as:

1. *Training, Testing, and Checking: Operators may not receive training that matches its operational environment; instructors and check pilots may focus on multiple operational methods, which decreases the quality of training, and checking.*

2. *Lack of curriculum uniformity and improvements.*

3. *Complicated Approval Process: Multiple Principal Operations Inspectors (POIs) are currently required to review technical elements of the same curriculum.*

4. *Administrative Inefficiencies: Supplemental training for training center instructors and check pilots is required, with individual letters of approvals for each, which leaves an administrative gap with no easy means to verify qualifications. Additionally, part 135 operators must develop their own aircraft-specific fleet curriculum and must reproduce a physical copy of each as part of their training program records.*

Standardized curricula will provide a common method for quality training accessible to any operator that obtains approval to use the curriculum in its FAA-approved training program. The Standardized Curriculum Concept aims to provide an efficient means to approve training curricula offered by part 142 training centers while increasing the consistency of training, testing, and checking delivered to part 135 operators. The use of standardized curricula is strictly voluntary and is one means to comply with the applicable regulatory requirements of parts 135 and 142. The standardized curriculum does not modify existing regulatory requirements for pilot training or qualification.

The Aircraft-Specific Part 135 Standardized Curriculum Model will enhance operator/training center safety programs and create a feedback loop that allows part 135 operators and part 142 training centers to partner in an effort to systematically use safety information to continually review and improve the standardized curriculum, as well as target areas of emphasis to enhance the quality of training provided. This “train as you fly, fly as you train” approach harmonizes with safety management principles, industry best practices, and risk mitigation, raising the level of safety competencies, threat awareness, and feedback for continual evaluation.

This improvement feedback mechanism forms the basis for revising the standardized curriculum, conducting training and administering checking. These three components then work together to allow the part 135 operator to spotlight the quality of the training program rather than the administration of the training program. Likewise, it also allows the part 142 training center to deliver a standardized and consistent training product that has the capability for continual improvement on a national level.

The TSWG will provide advice and recommendations to the ARAC on the most effective ways to standardize part 135 air carrier curricula delivered by training centers. The group is formally tasked with the following:

1. *Recommend a detailed master schedule for the development of part 135 standardized curricula for each aircraft or series of aircraft.*

2. *Develop and recommend a standardized curriculum to qualify training center instructors and evaluators (check pilots) to provide part 135 training, testing, and checking.*

3. *Develop and recommend part 135 standardized curricula for each aircraft or series of aircraft, which includes the maneuvers, procedures, and functions to be performed during training and checking.*

4. *Recommend continuous improvements to each part 135 standardized curriculum for a specific aircraft or series of aircraft.*

5. *Develop reports that contain recommendations for standardized curricula and results of the tasks listed. The group should review relevant materials to assist in achieving their objective, including FAA Advisory Circular 142-1, Standardized Curricula Delivered by Part 142 Training Centers.*

Under the Standardized Curriculum Concept, the TSWG uses formalized stakeholder input to develop and recommend to the ARAC standardized curricula for each aircraft fleet. The ARAC uses the work of the TSWG to make recommendations to the FAA. The FAA reviews the recommendations and, if acceptable, makes draft standardized curricula available for public comment through published notices in the Federal Register. The FAA may task the ARAC, through the TSWG, to use the public comments to refine its recommendations to ARAC. The FAA reviews the recommendations and, if acceptable, publishes the standardized curricula at a national level.

2.2 Participants in the Training Standardization Working Group (TSWG)

TSWG Members	
Name	**Organization**
Brian Koester, Chair	National Business Aviation Association
Thomas Benvenuto	Solairus Aviation
Greg Brown	Helicopter Association International
Gene Copeland*	Jet Aviation
Doug Carr	National Business Aviation Association
Jon Dodd	Coalition of Airline Pilots Associations
Aimee Hein	CAE, Inc.
Jens Hennig	General Aviation Manufacturers Association
Todd Lisak	Air Line Pilots Association
Steve Maloney	Sun Air Jets
Jacqueline Rosser *	National Air Transportation Association
Brian Neuhoff	Airbus Helicopters
Fabricio Oliveira de Toledo*	Embraer
Janine Schwahn	Summit Aviation, Inc.
Brian Small	FlightSafety International
Annmarie Stasi	Northwell
Daniel Von Bargen	Contract Pilot

*TSWG membership pending DOT review

FAA Advisory and Support Staff	
Name	**Organization**
Josh Tarkington, Project Lead	Training and Simulation Group, AFS-280
Jim Sapoznik, Subject Matter Expert	Training and Simulation Group, AFS-280
Shannon Salinsky, Change Practitioner	Training and Simulation Group, AFS-260
Kristin Tullius, Program Specialist	Training and Simulation Group, AFS-280

2.3 Working Group Activity

The TSWG members agreed to form subgroup teams to research and analyze:

- Curriculum, which includes published guidance, regulations, reference materials, data sources, and airframes practical for standardization.
- Qualifications, to include instructors, pilots, and safety-implications.
- Continuous Improvement methods, which includes data-driven metrics and recommendations.

The TSWG must comply with the procedures adopted by the ARAC as follows:

- Conduct a review and analysis of the assigned tasks and any other related materials or documents.
- Draft and submit a work plan for completion of the task, which includes the rationale to support the plan, for consideration by ARAC.
- Provide a status report at each ARAC meeting.
- Draft and submit the recommendation report based on the review and analysis of the assigned tasks.
- Present the recommendation report at the ARAC meeting.

TSWG was able to comply with the schedule and deadlines as outlined in the FAA Tasking Notice:

> *June 2021 – Deadline to submit the initial recommendation report, which includes the proposed master schedule for standardized curriculum development to ARAC. The deadline to submit the interim report to the FAA is June 30, 2021.*
>
> *December 2021 – Deadline to submit the addendum recommendation report, which includes a standardized curriculum to qualify training center instructors and check pilots to provide part 135 training, testing, and checking to ARAC. The deadline to submit the interim report to the FAA is December 31, 2021.*

The TSWG will submit ad hoc recommendation reports, which includes type-specific standardized curricula packages (SCPs) and continuous improvements to the standardized curricula, via ARAC to the FAA for review and consideration at any time.

3 Historical Information

3.1 Overview

The Air Carrier Training Aviation Rulemaking Committee recommended the concept of the standardized curriculum to remedy inefficiencies in the current dynamic between part 135 and part 142. Stakeholders expect the standardized curriculum to improve the efficiency of approval processes and increase the consistency of training, testing, and checking delivered to part 135 operators.

FAA Advisory Circular 142-1, Standardized Curricula Delivered by Part 142 Training Centers, provides the framework for implementation of the Standardized Curriculum Concept. Under the concept, the FAA accepts an aircraft-specific standardized curriculum at a national level. A part 142 training center may deliver the nationally accepted standardized curriculum to any part 135 operator that obtains approval to use it.

The part 135 operator's POI reviews the curriculum and grants approval for use of the aircraft-specific part 135 standardized curriculum, without changes, as part of the operator's training program. In discussions with the operator, the POI determines whether use of the aircraft-specific standardized curriculum (which comes with a cadre of qualified instructors and check pilots, along with use of the standardized curriculum) is appropriate for that operator based on the published guidance, rather than reviewing the specific content of individual modules in the aircraft-specific curriculum and the accompanying training center instructor/evaluator documentation. Introducing an aircraft-specific part 135 standardized curriculum for operators, coupled with guidance that enables part 142 training centers to develop a curriculum that would qualify part 142 training center instructors and evaluators to conduct training/checking under that aircraft-specific part 135 standardized curriculum, would address a number of inefficiencies in the current system.

3.2 Defining the Problem

Part 142 training centers generally have clients operating under a variety of 14 CFR parts and develop a core curriculum to meet the needs of their stakeholders. Currently, these core curriculums cannot be used by part 135 operators. Instead, each part 135 operator must have its own training program approved by the operator's POI. The training program can be based on the part 142 training center's core curriculum; however, the operator or POI may require changes so that the resulting curriculum meets all part 135 regulatory requirements. Because some of these curricula were not originally designed for part 135 operators, many adjustments

and improvements may be necessary, which results in a lack of curriculum uniformity.

These changes, combined with the time it takes for each POI to conduct an in-depth review of each operator's curriculum, creates strain on the POI, the operator, and the training center. The operator is required to obtain POI approval of the "contract check pilot" to conduct checks under the operator's training curriculum, generally through the center's Training Center Evaluators (TCE).

The framework for the aircraft-specific part 135 standardized curriculum model, which also addresses the inefficiencies involved with each operator having approved instructors/contract check pilots, should include a manner by which training center instructors/evaluators can be qualified as instructors/check pilots under part 135. Specific guidance can be developed that would assist training centers to develop a standard non-aircraft-specific training curriculum that satisfies the requirements of § 135.329, 135.345, 135.293, and 135.297 in a manner consistent with the size, scope, and complexity of the operator (in this case, a part 142 training center) and can be approved under part 142. The training center would use this special curriculum to train and qualify its instructors/evaluators to conduct training, testing, and checking under standardized curriculums for part 135 operators.

3.3 Resolution and Benefits

The standardized curriculum may be valuable to the industry due to the expectation it will enhance safety and increase administrative benefits. Within the industry, this curriculum will be especially advantageous to part 142 training centers, part 135 operators that use a part 142 training center, training personnel who develop and deliver training under parts 135 and 142, as well as individual contract pilot.

Enhanced Training, Testing, and Checking.

The use of a common set of Standard Operating Procedures (SOPs) eliminates the situation in which part 142 training center personnel deliver training and checking to numerous part 135 operators with widely varying objectives, standards, and procedures. This approach allows instructors and check pilots to focus on one operational method, which increases their ability to evaluate comprehensively the pilots they are checking.

Leveraging Expertise.

An industry-led group composed of subject matter experts (SMEs) that represent manufacturers, part 135 operators, part 142 training centers, and industry trade organizations develops the standardized curriculum. Any stakeholder can recommend improvement at any time. This means that as risks are identified (i.e., NTSB safety recs), the curriculum can be updated at a global level, with those improvements drilled down to all the operators using the curriculum.

Streamlined Approval Process.

The FAA approves and publishes the standardized curriculum at a national level. This eliminates the need for multiple POIs to review technical elements of the same curriculum. Instead, POIs evaluate if the curriculum (and associated standards and procedures) fit the needs of the part 135 operator.

Administrative Efficiency.
A part 142 training center qualifies its personnel as instructors and check pilots for the part 135 standardized curriculum. This eliminates the need for individually issued check pilot letters of approval for each part 135 operator. Also, a part 135 standardized curriculum listed in a training center's Training Specifications (TSpecs) may be referenced in the part 135 operator's training program as an FAA-published curriculum in accordance with § 135.341, without the need to reproduce a physical copy of the curriculum.

3.4 The Scope of a Standardized Curriculum

An aircraft-specific standardized curriculum is only one segment of the training required to serve as a pilot in part 135 operations. It will not provide part 135 operators with a complete training program and is only a segment of training in accordance with § 135.324(b). See Figure 2-1 Standardized Curriculum Elements below:

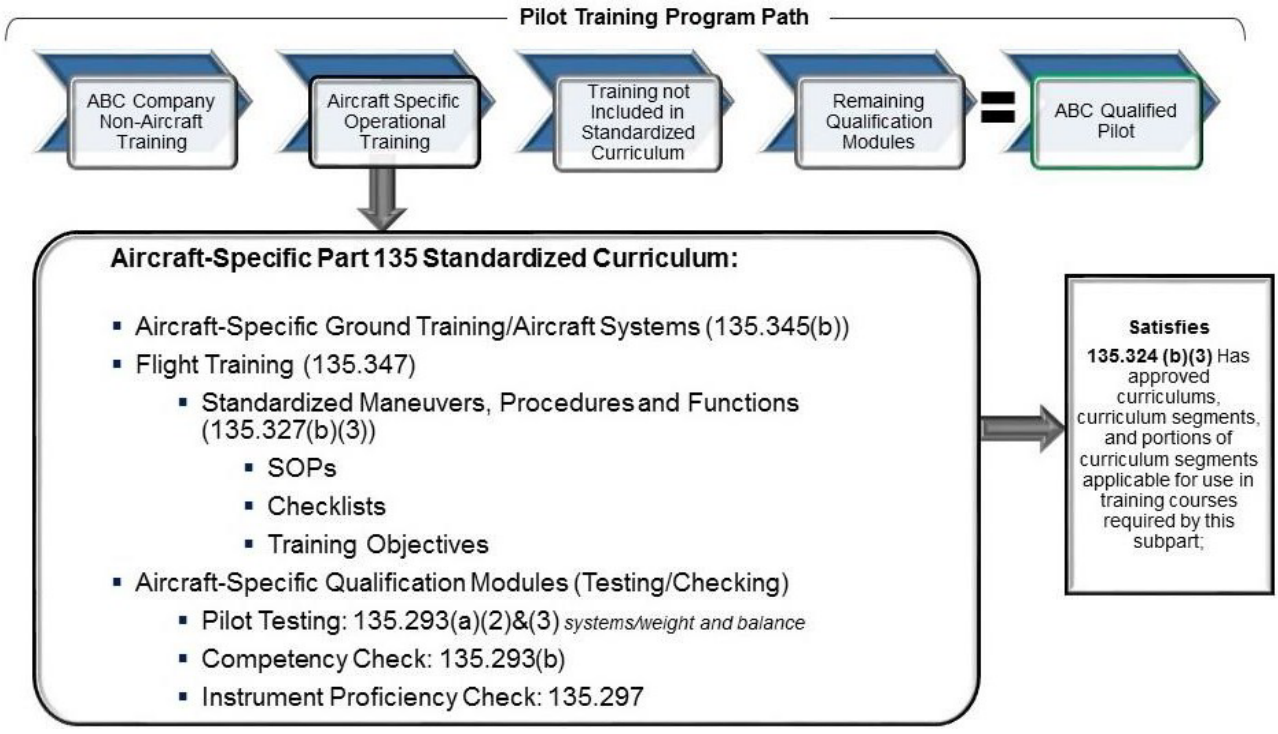


Figure 2-1 Standardized Curriculum Elements

As required for any training conducted in accordance with § 135.324(b), the part 142 training center must qualify its personnel to provide part 135 training, testing, and checking as outlined in AC 142-1 in order to deliver the standardized curriculum. The image above, Figure 2-1, Standardized Curriculum Training Elements, illustrates "the box" in which training, testing, and checking is included in the standardized curriculum. Figure 2-1 also illustrates where the standardized curriculum resides in the path to part 135 pilot qualification. The expanded area, "Aircraft-Specific Operational Training portion of the Pilot Training Program Path", defines the

elements within the box of the standardized curriculum, and represents what the ACT ARC recommended.

The Standardized Curriculum Package (SCP) is a package comprised of the training curricula and the supporting courseware, equipment, records, personnel, and facilities necessary to deliver a curriculum or group of curricula for part 135 training. The part 142 training center qualifies its personnel to deliver the part 135 training.

A part 142 training center may deliver the nationally accepted standardized curriculum to any part 135 operator that obtains approval for its use. It is one, voluntary way to comply with existing regulations as well as a way to simplify the approval process for an air carrier's training program.

4 Recommendations

4.1 Recommendation for CL-30 Curriculum

The TSWG recommends the FAA adapt the curriculum in Appendix A as the standardized curricula for the CL-30 type rating. Experts from the FAA, the manufacturer, part 135 operators, part 142 training centers worked together to develop the curriculum, checklists, and SOPs.

4.2 Recommendation to Improve Efficiency of SCP Implementation

As discussed in Sections 2 and 3, the FAA established the TSWG in 2020 to carry out the recommendations of the ACT ARC. Since then, the TSWG has been moving the industry towards the goal of a data-driven, standardized training programs that reflect best practices and reduce the administrative barriers to implementing part 135 training provided by part 142 training centers. Over the last four years, the TSWG has:

- Recommended improvements to the FAA proposed SC instructor and check pilot qualification curriculum;
- Recommended a master schedule based on curricula that would impact the most training events;
- Conducted a training needs analysis for part 135 pilot training provided by part 142 training centers;
- Established a framework for callouts, checklists, and SOPs;
- Developed training program templates for large cabin and small/medium cabin aircraft;
- Recommended a detailed plan to modernize part 135 recurrent training, so it responds to data and reflects best practices;
- Recommended approach grouping, guidance revisions and updates necessary to maximize training outcomes for pilots; and
- Recommended curricula for the G-V, HS-125, CE-560, and CL-30 type ratings representing nearly 25% of all part 135 training events provided by 142 training centers.

Sunset the TSWG
The TSWG recommends sunsetting the TSWG and pursuing the goals of the working group through an

alternate pathway. The part 135 and part 142 industries remain committed to the original goals of improved safety though standardization, data-driven training, and administrative efficiencies.

Due to circumstances beyond the control of any stakeholder, the current curriculum development program is not efficient or sustainable. The program gradually shifted as it attempted to address barriers. The TSWG believes it is now far from the ACT ARC's original concept. To execute the current approach to the standardized curriculum concept, the training centers would need to:

1. Develop a new instructor/check pilot qualification curriculum to support both initial and transition courses including associated courseware development in compliance with the FAA published Master while also maintaining existing curricula supporting 14 CFR §§ 135.337 and 135.338 requirements.
2. Revise, reorganize or expand existing training programs to create a new program for each aircraft type, which may impact training days or hours, thereby becoming incompatible with training programs approved for non-SC operators and other authorities.
3. Maintain these additional curricula and separate instructor/check pilot qualification tracking which requires the assigned part 142 CMO to individually review, authorize, and surveil an additional training program without the ability to recommend or require changes until the master curriculum is revised.

The shift caused additional administrative burden, not less.

Since the ACT ARC conceived the Standardized Curriculum concept in 2015, many things have changed. Notably, the industry is busier, and data is more available than ever. In 2015, part 135 certificate holders flew approximately one million hours in fixed wing, turbojet-powered aircraft, according to the FAA’s annual GA Activity Survey. In 2022, the most recent year for which data was available, the industry flew twice as many hours, leaving little room for volunteers to participate in working groups.

The TSWG cannot build industry lead teams of aircraft-specific experts in the current climate. At the current pace of part 135 flight operations, many willing subject matter experts do not have time to dedicate to volunteer duties. While the TSWG was successful in establishing action teams comprised of subject matter experts on the four aircraft types with the most part 135 training events at part 142 training centers, it was difficult to find and retain consistent voluntary support. The TSWG does not believe it will be practical to build teams of part 135 experts for less popular aircraft types. Because of the way part 142 training centers run their business, part 91 pilots often train with part 135 pilots. Opening the scope of the project to include experts from mature flight departments operating under part 91 would enhance industry capability to develop aircraft specific call outs, abbreviated checklists, flows, and SOPs. However, the TSWG believes adding part 91 pilot experts is outside the scope of the TSWG’s charter.

Training centers can now generate, retrieve, analyze, and act on data from training events through Simulator Operations Quality Assurance (SOQA) programs. This capability did not exist in 2015 and 2016. The ACT ARC originally envisioned using aggregated data from the FAA’s ASIAS program to drive training subject to review and recommendation via the ARAC TSWG subcommittee. Today, the data simulators generate is of such quality that centers can use it to determine pilot strengths and opportunities for improvement. The training centers can use that data to adapt their training programs for better training and, ultimately, safer pilots. They can be more responsive without waiting on the TSWG to recommend changes to ARAC, who then recommends changes to the FAA, who would then make the changes available for implementation in

SCPs. The bureaucracy of the current approach would slow implementation of safety enhancing changes to training programs. Developing recommendations, making the recommendations available for public comment, adjudicating the comments, and posting the final document has taken industry and FAA combined nearly a year. Part 142 training centers cannot run a business waiting on guidance revisions that take more than a year. Nor is it necessary.

Given the shift in the standardized curriculum program, increased part 135 flight activity, need to include part 91 operators, ability of part 142 training centers to generate and analyze data, the TSWG now believes sunsetting the TSWG is the best way to accomplish goals the goals of modernizing recurrent training, standardization, and increased efficiency.

Base Policy on the Current Training Paradigm

The TSWG recommends the FAA amend guidance to reflect the state of the industry. Part 135 training programs are already standardized at each part 142 training center. The concept that part 142 training centers deliver training programs developed by the operator has extremely limited applicability. Instead, operators use the part 135 training programs developed by part 142 Training Center certificate holders as their own and they may use that training program with multiple contract training providers by way of contract differences training. Training centers develop the programs and operators adopt them - not the other way around. The training center programs already meet or exceed part 135 training requirements. Asking operators to submit the part 142 training center programs as their own is redundant. It causes FAA inspectors to waste time reviewing and authorizing the same programs that have been reviewed and authorized dozens of times.

Further to the point, when an operator proposes using a program developed by a training center, the operator's POI must review the program. Often, the POI will require the operator to modify the program in a small way. The training center will then implement the requested modification, which makes the program less standardized with each review.

The FAA should change guidance to reflect reality, rather than expecting businesses and flight operations to remain constrained by guidance conceptualized three decades ago. The FAA can enhance efficiency by recognizing the current paradigm. If the training centers implement industry consensus SOPs, the already compliant training program at each center would effectively meet the same criteria as the standardized curriculum concept. No new training programs required. No additional instructor curricula. No additional FAA reviews. No additional FAA approvals. No delay from comment periods. No barriers to efficiency.

FAA headquarters should provide a single review and nationwide approval for curriculum meeting part 135 requirements offered by part 142 training centers. FAA recognition of this paradigm would entail formalizing part 135 training program oversight responsibility and authority by part 142 Certificate Management Offices (CMO) and Training Center Program Managers (TCPM) via amendment to FAA Order 8900.1, Volume 3, Chapter 54, Section 5. A dedicated team of inspectors responsible for reviewing training programs and all related courseware already surveil part 142 Certificate Holders meeting §135.324 requirements serving as part 135 contract training providers. For efficiency and ease of approval, these aircraft specific training programs align with Flightcrew Member Training and Qualification Programs guidance outlined in FAA Order 8900.1, Volume 3, Chapter 19. The majority of part 135 operators accept a part 135 compliant version of the approved part 142 training program and adopt it as their own, with limited to no amendment, after a Standardization Review and POI approval. Just as the CMOs are required to retain a copy of the current approved part 142

training programs, the same offices could approve and retain the version of the program intended for use with part 135 certificate holders. If the training program meets the regulations and guidance requirements, there is no need for additional detailed review by each POI and retention of the approval documents would allow access and oversight by the Training and Simulation Group. Precedent for this type of review and authorization exists in the FAA's streamlined LOA (SLOA) program. Under SLOA, dedicated FAA inspectors approve courses as meeting OpSpec/MSpec/LOA requirements, eliminating the need to review the same course every time a new client requests an FAA authorization. Here, the FAA would review and retain the training center's aircraft-specific training program. If compliant, part 135 operators would not need additional review to use the training program.

The TSWG recommends the FAA use this opportunity to modernize the guidance in Order 8900.1, Volume 3, Chapter 54, Section 5. Specifically, paragraph 3-4412 C. Arrangements. provides an explanation of how operators lease simulators or training centers execute the operators training program. Adding information about how a part 142 training center can develop training programs that are adopted by part 135 operators would reflect reality. Such a concept would embrace the curriculum development, regulatory, and training expertise inherent at the training centers.

This concept ensures that training centers can move at the speed of business and react to SOQA data. Training centers can modify the training programs, if the modified program still meet part 135 regulations and guidance. Training centers modify programs within these constraints today. Even if two training centers make different modifications, the training programs would still count as standardized if compliant and using the same callouts, checklists, and SOPs. While this may result in minute differences, it has always been important that the SCP maintain some flexibility for training centers to showcase their instructional expertise. The original recommendation never envisioned an SCP so prescriptive that training centers could not compete by differentiating their training. In fact, it is in the best interest of safety to ensure training centers can compete by developing better and better training. Consequently, the framework of the standardized curriculum should facilitate training approaches at different airports or training required items in a different order. Ensuring the programs remain compliant with the regulations and guidance should serve as sufficient guardrails for standardization.

The FAA proposed developing aircraft specific curricula without the TSWG's recommendations. Even if the FAA uses the TSWG's templates as a model, it would not be an efficient use of FAA resources. Due to the shift from the original vision of SCPs, the resulting curricula would still create an increased administrative burden on the FAA, training providers and operators. The resulting increased burden means few training providers or operators would be likely to implement the voluntary standardized curriculum.

Industry Developed and Adopted SOPs

If SOPs call outs and checklists are standardized, the training programs should still be able to reap the benefits of interchangeable instructors and check pilots. If those elements are not standardized, the training center's program may not facilitate interchangeability of instructors and check pilots not trained on that SOP.

The TSWG recommends industry trade groups, or another neutral third party, develop and publish consensus recommended SOPs. The group recommending SOPs should reflect best practices, maintain, and modify the SOPs. Trade groups can make these available much more quickly than the FAA, because they are not constrained by the same administrative processes that have thus far taken a year for publication. Additionally, trade groups may receive input from part 91 operators, who also operate these aircraft on a full-time,

professional basis and will participate in the same training course as part 135 operators.

If a training center uses a single set of SOPs that does not conform to the recommendation, the training center would lose the benefits of interchangeable instructors and check pilots. Plus, any operator adopting a nonconforming SOP would lose transportability. If a subset of training centers used one set of SOPs and a second subset used a second set of SOPs, operators would be able to gain the benefits of transportable pilots within each subset, but not across subsets.

If a training center uses a single set of SOPs that does not conform to the recommendation, the training center would lose the benefits of interchangeable instructors and check pilots for that program. Plus, any operator adopting a nonconforming SOP would lose transportability.

Maneuvers (aircraft specific SOP) should be defined by the OEM or accepted by the OEM to ensure standardization. For newer aircraft, a part 142 training provider is selected by the OEM and then participates in the Flight Standardization Board (FSB). The FSB develops aircraft specific maneuvers and profiles and thus these should be the only standard accepted for use by all training providers.

Feedback and Continuous Improvement

Trade groups and training centers would still be responsive to industry needs. And, as part 135 operators implement a part 5 compliance SMS, they will report hazards to entities with the ability to rectify the hazard. This means part 135 operators will report hazards identified in the consensus SOPs to the publishing trade groups or training centers. The trade groups will not have to wait on the TSWG to recommend changes to ARAC, who then would recommend changes to the FAA, who would then need to analyze and publish the change. The trade group can skip straight to analyzing and publishing the change.

This process would provide more opportunity for industry input into safe SOPs than exists today. Under the current process, each operator may develop and implement its own set of SOPs, which results in considerable variation between operators. The variation may result in confusion when pilots from different operators end up partners for simulator training. Moving forward, such partners would use the SOPs on the line and have a path to provide feedback, either through the trade group or the training provider, if they do not feel the SOPs reflect the safest way to operate the aircraft.

Additional Guidance

The recommendations described here may require additional guidance and clarification for the FAA. The TSWG recommends the FAA consult with subject matter experts and industry trade groups to address these additional areas:

- Checklist use in training
- Safety and Quality Management Systems used by contract training providers
- Data collection capability by contract training providers
- FAA Order 8900.1, Volume 3, Chapter 19, Section 6 guidance amendment to ensure part 135 mirrors part 121 instrument approach equivalency
- Establishing Checking and Testing uniformity by removing part 135 flexibility as offered in the Airman Certification Standard and FAA Order 8900.1, Volume 3, Chapter 19, Section 7.
- Establishing consistency seat dependent task training, checking, and testing as outlined in previous TSWG recommendations.

The SLOA program may also serve as a model for additional guidance.

Minority Opinion
The Air Line Pilots Association, International (ALPA-I) does not fully support the TSWG recommendations for future Standardized Curricula (SC) development and approval. Specifically, ALPA-I recommends the work be continued in a standards development organization, which enables transparency with many experts in the industry. The retention of a broad base of subject matter experts would result in higher quality training under the SCs and maximize the potential safety gains.

Another acceptable alternative to ALPA-I would be for the FAA to take over the task of developing the remaining SCs.

In any case, each SC should be published by the FAA in the Federal Register for public comment and subsequent FAA publication of their adjudication of all comments received prior to final FAA approval of that SC's implementation. Any modifications to already approved SCs, once that occurs, should have to go through the same public comment and adjudication process. This will help ensure the greatest safety gains resulting from the SC pilot training.

5 Adaptive Recurrent Training

Industry first recommended the concept of adaptive recurrent training, originally called scenario enhanced recurrent, in ACT ARC recommendation 16-1, more than eight years ago. The pilots in FAA's flight program office have been using the recommended program since 2018. Over the last six years the FAA's pilots have fully endorsed the modernized training. Industry again recommended modernized recurrent training in ARAC's TSWG recommendation reports in September 2022 and March 2023. Adaptive recurrent training is a pathway to enhance training and therefore enhance safety. The TSWG reiterates their recommendation for the FAA to make authorizing data-driven training that enhances pilot skills a top priority.

The FAA posed five questions seeking additional clarity to the ARAC's TSWG March 2023 recommendation report. The TSWG responds to those questions below.

> 1. Ground School - The recommendation report proposes a new concept to omit hours and to base training solely on learning objectives, including training outside the classroom. Please provide further clarification for this new concept, especially with regard to methodology for computer-based training, and recordkeeping of training records.

The TSWG did not intend to recommend omitting planned hours and basing training solely on learning objectives. However, the report included robust discussion on giving learning objectives precedence over minimum planned hours for the Adaptive Recurrent Training Ground School course. The TSWG intended to recommend making the adaptive recurrent ground school available either with traditional planned hours in a classroom setting or by allowing innovation and emphasizing learning objectives instead in addition to planned hours. For example, modern eLearning courses can evaluate knowledge in advance of completing a training module and then adapt the content to reflect the pilot's demonstrated knowledge. This innovative approach to leaning still has some planned hours, but not predetermined published planned hours devoid of

adapted innovations and continuous improvements to effectively ensure learning objectives. Publishing only one set of planned minimum hours discourages innovation in delivery where no delivery efficiency credit can be realized. Publishing one set of planned hours fails to account for any innovative means of training delivery.

Pilot safety is at the forefront of all training, testing, and checking. Pilot training and assessment is based on the standards as set forth in the ATP ACS. Previously, a Part 142 Training Center was bound by the hour requirement in order to complete a clients training. While recognizing the FAA needs to maintain an hours requirements to ensure a minimum level of training, hours within a Curriculum should be Planned Hours. Planned Hours would allow reduced times when the instructor completes all the required learning objectives. The reduction should not require a written request, since said reduction is based on learning objectives and the pilot's mastery of the skill. The adaptive recurrent ground training program would then verify pilot understanding of the learning objectives via a written exam, followed by the Oral and Flight portions of the Proficiency Check.

The FAA has recognized this concept in the 8900.1 guidance on Distance Learning, which includes but is not limited to Computer Based Training (CBT). The following are excerpts from FAA Order 8900.1:

> "Validation Strategy. Training centers must develop a distance learning validation strategy that addresses the effectiveness of the ground training itself, and the learning accomplished by each person trained. Key features of a satisfactory validation strategy include:
>
> a) Measuring the effectiveness of the ground training being conducted.
>
> 1. One validation method is to establish a performance baseline as a reference from which to measure the effectiveness of the ground training proposed.
>
> b) Learning accomplished by each person trained.
>
> 1. Testing should be designed to determine that training objectives are being met by each trainee."

Additionally, the 8900.1 clearly states that "Part 142 does not specify programmed hours for flightcrew members". While National Norms give a starting point from where to begin, they are non-binding and not an end-all-be-all for training hours. An hour requirement depletes training efficiency. For example, the FAA not only reviews overall training hours, but the FAA also reviews the individual hours for each module within a course. Why would Day 1 of Ground School need to run for the full allotted hours, when the specific client may need more emphasis on Day 2 elements? When the learning objectives are met and the pilot has "mastery" of the concepts, the task should be complete.

Furthermore, the 14 CFR 61.43 (shown below) does not base a Satisfactory Check based on training, testing, or checking times, but instead, based on the mastery of the aircraft. Repetition builds mastery. Time for the sake of time does not. Having a target goal of say eight hours for ground training is great, but if the clients demonstrate mastery of the knowledge in four, then only the program should only require four hours. At the completion of four hours (in this example) a written test would validate the appropriate level of knowledge.

> "61.43 Practical tests: General procedures.
> (a) Completion of the practical test for a certificate or rating consists of—

(1) Performing the tasks specified in the areas of operation contained in the applicable Airman Certification Standards or Practical Test Standards (incorporated by reference, see § 61.14) as listed in appendix A of this part for the airman certificate or rating sought;

(2) Demonstrating mastery of the aircraft by performing each task required by paragraph (a)(1)of this section successfully;

(3) Demonstrating proficiency and competency of the tasks required by paragraph (a)(1) of this section within the approved standards; and

(4) Demonstrating sound judgment."

If the FAA cannot make all hours "Planned Hours" while allowing for the automatic reduction in times based on learning objectives being successfully achieved, then at a minimum, the FAA should align FAA Order 8900.1 guidance and policy for Part 135 and Part 142 to reflect the intent of "planned hours". The guidance should make clear that it is permissible to be above or below planned hours, with the only hard requirement to meet learning objectives. The longstanding issue is that many FAA inspectors will not allow "planned hours" to be lower due to misunderstanding learning objectives. Time constraints by the FAA (ie: programmed hours) do not take into account the use of technology to aid and expedite student learning. Again, it comes down to "Does the trainee meet the learning objectives?". In many cases, instructors are wasting valuable time training students on concepts the trainee has mastered, leaving less time for areas where the trainee may be less competent.

Definitions:
Planned Hours - Includes a recommended range for curricula training planned hours.
CBT – Computer Based Training
DL – Distance Learning. DL includes both Virtual Classroom and CBT based Distance Learning.

2. Supplemental Grading Criteria - A 4-point grading scales for training events was proposed but the TSWG has not outlined the procedures that will be used to implement such a different type of grading system. Please provide a sample grading sheet with grading scales to illustrate how the grading system is used for either training, checking, or both, and a suggested process for extracting the data and using it for continuous improvement.

A 4-point grading scale is already the industry standard for flight training delivery and does not require major implementation. The value of a 4-point scale is that it supports continuity of training from day-to-day training events and allows for a record of improvement. This report recommendation 5.4 is in support of the original recommendation on Grading Criteria in the September 2022 report. There is no sample SC grading sheet created at this time because development resources are wasted without a means for continuous improvement and adaptable training delivery credit being implemented for SC. There are several existing examples for 4-point grading scales with 1 being proficient and 4 being no improvement, or 1 being entirely Unsat and 4 being proficient with both cases being for training delivery only with checking remaining Sat/Unsat binary grading only. A 4-point grading process supports continuous improvement and adaptable flight training tasks based on pilot performance of individual task performance. This allows standardized curriculum to build and

adapt the principle of “first look” from AQP. Each training center will need to process this continuous improvement data, similar to how AQP works for airline training. Any attempt to collect and disseminate pilot performance data universally would be prohibitive as it would require additional rulemaking to comply with the APA processes for data collection. Individually, each training provider would analyze the data to improve training and checking on tasks that pilots are performing poorly. The analysis should evaluate tasks that pilots normally perform to proficiency. Focusing on tasks that need practice without changing the final pilot proficiency task requirements maximizes efficient use of training time. The efficiency enables individual provider variations to continuous improvements, without diminishing pilot proficiency from Adaptive Recurrent programs.

> 3. Scenarios - The recommendation report proposes training and checking that focuses on day-to-day operationally based scenarios that are developed, regularly evaluated, and updated by the SC Continuous Improvement Team. Further clarification is needed on the suggested process for initial development of scenarios and standardization between training centers and organizations, i.e., methodology for managing the regular evaluation and revision of scenarios on a regular basis that supports continuous improvement.

The TSWG March 2023 recommendation report, Appendix A, Adaptive Recurrent Training recommends the Flight Lesson Plans for Adaptive Recurrent be constructed in a scenario-based format that allows for continuous improvement. While the idea of scenario-based lesson plans and evaluator plans of action is already in FAA policy, the current FAA SC guidance obstructs any possibility of continuous improvement where the guidance requires SC to be followed verbatim with no timely means for update or improvement. The proposals in the March 2023 Recommendation Report are integrated such that concurrent implementation is essential to accomplish the recommendations. Specifically, the methodology for continuous improvement is dependent on data capture from a 4-point grading scale which are not all the same but allow for capture an analysis of pilot performance data. The initial development of scenarios is based on current FAA guidance and the final pilot proficiency outcome is the same for all Adaptive Recurrent Training courses therefore variations in task order by separate sets of continuous improvement data is inconsequential to Adaptive Recurrent, hence the term adaptive.

The ACT ARC's original 2016 recommendation suggested that the Training Standards Board develop scenario-based training and checking based on data collection. If, as discussed in Section 4.2 of this report, an operator is permitted to conduct that analysis and amend lessons and plans of action then the 142-certificate holder should be afforded this ability within a framework defined by the standardized curriculum. The concept of a “Training Standards Board” being a separate entity staffed by volunteers is untenable. Each training provider meeting the standard to serve in the capacity of a contract training provider in accordance with 14 CFR part 135.324 should have a system in place for data capture and analysis based on grading criteria as well as analysis of industry incident and accident data to formulate appropriate scenarios. If effective, each qualified training provider will have an internal Training Standards Board and, in fact, part 142 certificate holders, like CAE and FlightSafety, operate this way today. The FAA ACS fixes the tasks required, so the training provider may build relevant training and checking scenarios to train and evaluate those tasks today. Standardized Curriculum should not inhibit industry’s ability to quickly modify these scenarios to ensure crews are trained and evaluated based on a realistic operational environment.

> 4. Oral Exam Split Across Multiple Days - One section of the recommendation report suggests the FAA develop new guidance for Standardized Curriculum that supports

completing the oral exam over multiple days, rather than the traditional method of completing the oral portion prior any flight checking. Further clarification is needed on the suggested process for conducting this multi-day oral examination process within adaptive recurrent.

In the TSWG's March 2023 recommendation report, Appendix A, Adaptive Recurrent Training, 135.293(a) Evaluation course explains this issue. Current FAA guidance presumes a single evaluator conducts the Oral Exam as a single event, the same as it presumes the Flight Check portion is conducted as a single event, except for segmented partial checking in the aircraft. The TSWG recommended the FAA guidance for the Adaptive Recurrent Oral Exam permit segmenting the Oral Exam into more than one event by more than one evaluator, even to the point of finishing the Oral Exam after the flight portion of a check ride is completed. Executing and recording a segmented Oral Exam would require recording which subjects of the Oral Exam the candidate completed in which segments and require accomplishing all Qualification Segment subjects prior to course completion.

Additionally

a) By regulation, 135.293 oral exams require the inclusion of clearly defined topics (FARs, systems, W&B, weather, ATC, navigation, etc.).
b) Scenario/adaptive training, based on real world operational situations, is the perfect time to integrate questions about all required 135.293 topics.
c) Example:
    i. Questions about weather and navigation can be incorporated into the preflight briefings for sim session #1. Sim session #1 would then incorporate problems involving weather and navigation into its scenario.
    ii. Questions about systems and ATC can be incorporated into the preflight briefings for sim session #2. Sim session #2 would then incorporate problems involving systems and ATC in its scenario.
    iii. And so on until all topics are covered in preflight briefings and incorporated into the associated sim sessions.
    iv. Any follow-on issues that need to be covered due to inadequate performance or questions in the check airman’s mind could be covered in a final session prior to the check ride- either separately or incorporated into the pre-flight briefing.
d) Part 142 providers will need to tailor scenarios appropriately to cover all required topics, but given that scenarios (hopefully) need to be developed anyway, incorporating 135.293 topics in them should not add any additional burden. It would be possible to develop three or four scenarios for each topic or combination of topics to provide a variety of problems that pilots need to address over several recurrent training sessions. Check airmen can also ask appropriate questions to further delve into a pilot’s knowledge as circumstances or performance dictate.
e) This could possibly lead to a reduction in training hours and more efficient training sessions, all while exposing pilots to more realistic problems, which allows check airmen to evaluate pilot knowledge based on real-world interactions.
f) CAVEAT: like much of the responsibility involved with adaptive/scenario training, this will require check airmen to be able to integrate questions into training without making them distractions to pilots. Most check airmen are very good at identifying very quickly those pilots that may need extra time or an extra layer of questioning to determine adequate knowledge as defined by 135.293.

For further clarification, the TSWG recommends the FAA work with the Flight Program Office, who has been testing split oral exams since 2018.

5. Incomplete FSTD Events - Clarification is needed to address incomplete simulator events. In cases of incomplete FSTD events, the pilot may not have completed all required checking events. How will these incomplete checking events be recorded? How will certificate holders and training centers ensure regulatory requirements are met with respect to using pilots as flight crewmember in operations when they have not demonstrated satisfactory performance of all required maneuvers?

Related information is in the TSWG's March 2023 recommendation report, Appendix A, Adaptive Recurrent Training, Consecutive Checking and Initial Observation. The premise of this information is to allow Adaptive Recurrent to segment a recurrent proficiency check into a “initial observation” segment containing normal everyday tasks and an Abnormal Procedure then complete the remaining tasks for “consecutive checking” in a later segment. The intent for the Adaptive Recurrent Appendix is to approve a segmented proficiency check constructed based on “consecutive checking” principles with two specific Qualification Segments. A pilot must complete the tasks within these two Qualification Segments within the lesson plan segment per principles of 135.301(b) and 121.441(e) for retraining or rechecking. A pilot that cannot satisfactorily complete all the tasks within the Qualification Segment lesson plan, whether by flight time or the number of tasks unsatisfactory is not eligible to continue in an Adaptive Recurrent course. Pilots who fail to meet the tasks and objectives of a Qualification Segment must enroll in “other training” and complete a standalone proficiency check as would be completed for a pilot certification event. As a result, for this procedure there is no possibility of Qualification Segment checking tasks being incomplete from one Qualification Segment to another. If a pilot does not complete the Day 1 Qualification Segment “Initial Observation” tasks satisfactorily within the scheduled segment, the amount of additional training needed is not built into Adaptive Recurrent, therefore they must enroll in a course for “other training” followed by a standalone check based on a traditional recurrent course.

All paperwork will accurately account for training and checking events. Safeguards ensure that checks are fully completed and result in completed paperwork. Training center tracking systems capture checking events and training events separately and use a different grading scale. Check pilots capture unsatisfactory performance of any item in the training record. The check pilot will not grade events that the candidate did not attempt nor complete. The check pilot must grade all items before publishing the candidates record or providing a Graduation Certificate. Neither the client, nor the Certificate Holder will receive a fully completed copy of their training records until all required training and checking is completed satisfactorily.

- All tasks and maneuvers required by the ATP ACS for a type rating must be satisfactorily demonstrated by the client during the accomplishment of the Proficiency Check.
    - Unsatisfactory performance during the evaluation requires training before being checked again. The airman’s training record must be documented accordingly to reflect the additional training and subsequent checking.
    - The TCE must make a clear distinction to the applicant between training segments and checking segments.
    - The TCE may only halt the check twice to provide additional training during the entire training program. An individual task which is failed can only be retrained one time. After exceeding either of these thresholds, the check is considered unsatisfactory and

the applicant must complete additional simulator training and complete a new, standalone proficiency check.

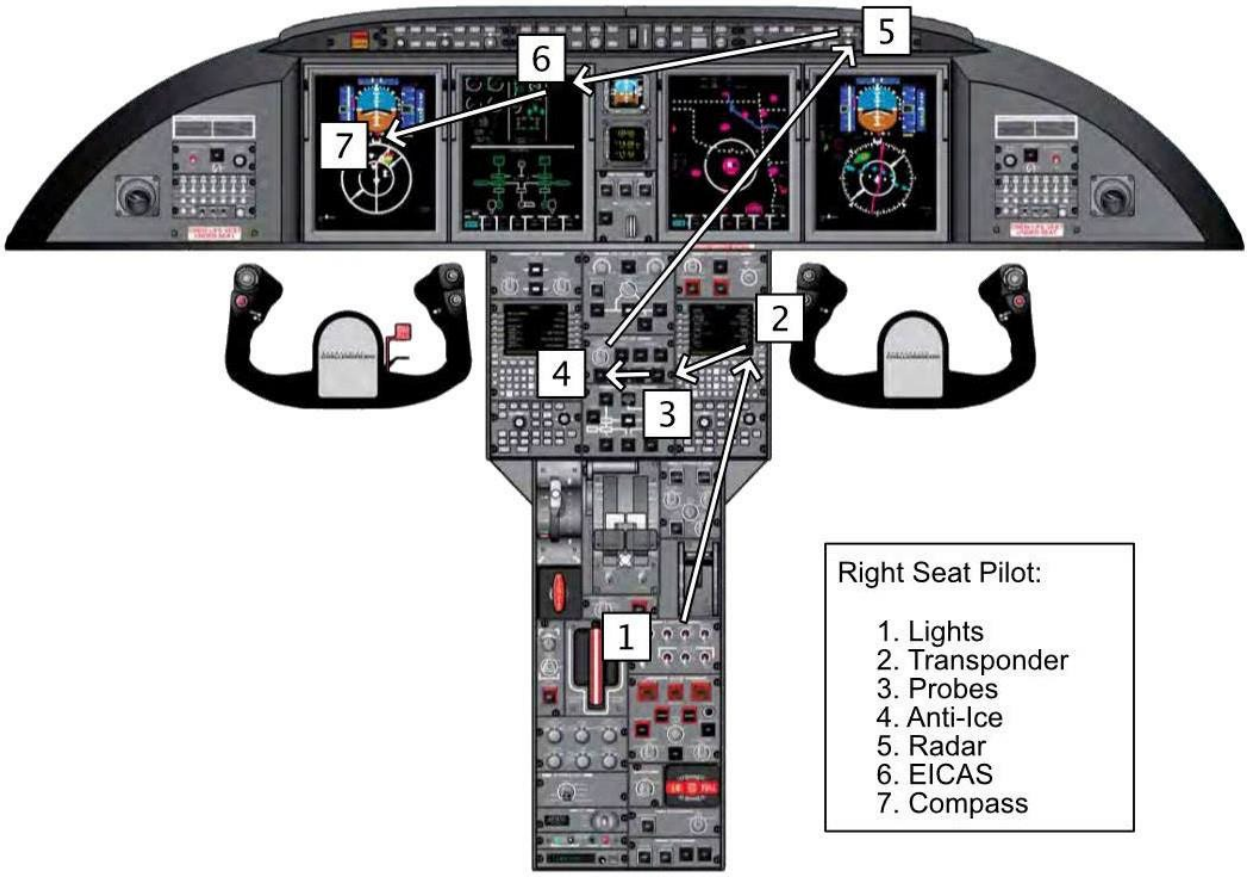
Appendix A. CL-30 Standardized Curriculum

FAA Aviation Rulemaking Advisory Committee

Training Standardization Working Group (TSWG)
CL-30 Curriculum Report

Table of Contents

Contents



Appendix A – CL-30 Curriculum Document

CL-30 Standardized Curriculum

1 Maintaining Training Syllabi

Parts 135 operators should maintain training syllabi (e.g., initial, upgrade, or recurrent) and other appropriate materials including operational practices and procedures. Training for other personnel must be included where appropriate (e.g., operational control personnel or maintenance). A part 135 standardized curriculum listed in TSpecs may be referenced in the part 135 operator's training program as an Federal Aviation Administration (FAA)-published curriculum in accordance with §135.341 without the need to reproduce a physical copy of the curriculum.

2 Applicable Regulations and Guidance

FAA Reference Documents
FAA Advisory Circular 00-54 11/25/1988 Pilot Windshear Guide
FAA Advisory Circular 90-100A CHG 2, 04/14/2015 U.S. Terminal and En Route Area Navigation (RNAV) Operations with Change 2
FAA Advisory Circular 90-105A 03/07/2016 Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace
FAA Advisory Circular 90-106B 05/02/2022 Enhanced Flight Vision Systems
FAA Advisory Circular 90-107 02/11/2011 Guidance for Localizer Performance with Vertical Guidance and Localizer Performance without Vertical Guidance Approach Operations in the U.S. National Airspace System
FAA Advisory Circular 90-108 04/21/2015 Use of Suitable Area Navigation (RNAV) Systems on Conventional Routes and Procedures
FAA Advisory Circular 90-117 10/03/2017 Data Link Communications
FAA Advisory Circular 91-74B 10/08/2015 Pilot Guide: Flight In Icing Conditions
FAA Advisory Circular 91-79A CHG 2 02/20/2018 Mitigating the Risks of a Runway Overrun Upon Landing
FAA Advisory Circular 120-35D 03/03/2015 March 18 2013 Flightcrew Member Line-Operational Simulations: Line-Oriented Flight Training, Special Purpose Operational Training, Line Operational Evaluation
FAA Advisory Circular 120-55C CHG 1 March 18 2013 Air Carrier Operational Approval and Use of TCAS II
FAA Advisory Circular 120-74B 07/30/2012 Part 91, 121, 125, and 135 Flightcrew Procedures during Taxi
FAA Advisory Circular 120-76D 10/20/2017 Authorization for Use of Electronic Flight Bag
FAA Advisory Circular 120-91A January 13 2020 Airport Obstacle Analysis
FAA Advisory Circular 120-108 01/20/2011 Continuous Descent Final Approach
FAA Advisory Circular 120-109A CHG 1 11/24/2015 Stall Prevention and Recovery Training
FAA Advisory Circular 120-118 07/2/2018 Criteria for Approval/Authorization of All Weather Operations (AWO) for Takeoff, Landing, and Rollout
FAA Advisory Circular 135-17 12/14/1994 Small Aircraft Ground Deicing

FAA Reference Documents
FAA Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards with change 1, June 2019
FAA CFR Title 14 Subchapter C Part 25
FAA CFR Title 14 Subchapter D Part 61.66
FAA CFR Title 14 Subchapter F Part 91.176
FAA CFR Title 14 Subchapter G Part 135 subpart G
FAA CFR Title 14 Subchapter G Part 135 subpart H
FAA 8900.1 Vol. 3 Ch. 19 Sec. 5 CHG 702, 04/24/2020
FAA 8900.1 Vol. 3 Ch. 19 Sec. 6 CHG 702, 04/24/2020
FAA 8900.1 Vol. 3 Ch. 19 Sec. 7 CHG 702, 10/19/2020
FAA 8900.1 Vol. 3 Ch. 19 Sec 8 CHG 702, 4/24/2020
FAA 8900.1 Vol. 3 Ch. 19 Sec 9 CHG 555, 4/21/2020
FAA 8900.1 Vol. 3 Ch. 19 Sec 10 CHG 702, 4/24/2020
FAA 8900.1 Vol. 3 Ch. 19 Sec 11 CHG 702, 4/24/2020
FAA 8900.1 Vol. 3 Ch. 54 Sec. 6 CHG 711, 6/20/2020
FAA 8900.1 Vol. 4 Ch. 3 Sec. 6 CHG 627, 10/15/18
FAA-H-8083-16B, Instrument Procedures Handbook 2017
FAA FSB Report BD-100-1A10 Rev 6 08/09/2022
FAA Operational Suitability Report (OSR) Rev.3 08/14/2020 (Operational Credit for EFVS)
FAA Pilot Guide to Takeoff Safety (2004)
FAA InFO 18014, 11/19/2018
FAA SAFO 17010 Incorrect Airport Surface Approaches and Landings
FAA SAFO 19001 Landing Performance Assessments at Time of Arrival
FAA Fact Sheet - Engineered Material Arresting System (EMAS), 12/16/2020

3 Base Aircraft

This document sets forth the recommended Training Curricula for Bombardier BD-100-1A10 series aircraft, including the Challenger 300 and Challenger 350. The curricula satisfy the aircraft-specific training, testing, and checking requirements of §135.293, §135.297, §135.345, §135.347, and §135.351. A training provider must identify in their standardized curriculum package which aircraft in the series is the base aircraft represented by the flight training equipment to be used, and identify which variants can be trained using the appropriate differences course(s) from the standardized curriculum.

4 Aircraft Configuration

This recommended standardized training curriculum addresses the Bombardier BD-100-1A10 series aircraft, including the Challenger 300 and Challenger 350. Appendix E contains detailed differences of training and learning objectives based on the BD-100-1A10 Flight Standards Board Report.

5 Curricula

The purpose of the training program is to standardize part 135 air carrier curricula delivered by part 142 training centers to meet the training requirements of part 135 subpart H. This training specification is the mechanism with which the Training Standardization Working Group (TSWG) will formalize stakeholder input for each aircraft type, prior to developing a standardized curricula document for each aircraft fleet. Upon completion of a fleet specific standardized curricula document, the TSWG will recommend that curricula document to the Aviation Rulemaking Advisory Committee (ARAC).

The ARAC will either return the document to the TSWG for revision or recommend the document to the FAA for review. When the ARAC recommends a standardized curricula document to the FAA, the FAA will review the recommendations and, if acceptable, publish the standardized curricula at a national level.

The final output of the TSWG design process is a curriculum document for review by the ARAC. The remaining components of the training program are the responsibility of the operator and part 142 training provider.

In scope of the CL-30 Standardized Curriculum:

- Part 135 Curriculum Document

Out of scope:

- Air Carrier Indoc subjects – §135.345(a)(1)-(10)
- Company Qualification Modules – §135.293(a)(1) & (4)-(8) and §135.299
- Company-Specific Weight and Balance Qualification Modules – 135.293(a)(3), except that crewmembers will be required to utilize their company-specific procedures to establish required weight and balance computations and performance requirements during training under the Standardized Curriculum.
- Company Specialty Curriculum Modules
- Courseware (including ground and simulator lesson plans)
- Facilities
- Flight Training Equipment
- General Emergency Training - §135.331
- Hazardous Materials Training (Recognition or Will-Carry) - §135.505
- Personnel
- Records

Additionally, this curriculum meets the training requirements for operators with the following authorizations:

- B034 - IFR Class I Terminal and En Route Navigation Using Area Navigation Systems
- B035 - Class I Navigation in US Class A Airspace Using Area or Long-Range Navigation Systems

- C052 - Straight-In, Non-Precision, APV, and Category I Precision Approach and Landing Minima - All Airports
- C063 - Area Navigation (RNAV) and Required Navigation Performance (RNP) Terminal Operations).
- C073 - Using Minimum Descent Altitude (MDA) as a Decision Altitude (DA)/Decision Height (DH).
- C075 - CAT I IFR Landing Minimum - Circling Approaches
- C079 - IFR Lower-than-Standard Takeoff Minima Airplane Operations - All Airports (Part 135)

5.1 Standardized Curriculum Interface with the Overall Pilot Training Curriculums

The Standardized Curriculum does not include training subjects outside of the aircraft specific training curriculum, such as Basic Indoctrination, Emergency training, or other curriculum segments in the certificate holder's FAA Approved Training Program.

The standardized curriculum contains three course footprints which are used to satisfy multiple curriculums described below.

- Course 1 is a long course
- Course 2 is a short course

5.1.1 Initial New-Hire Training Curriculum (INH)

This training category is for personnel who have no previous experience with the Certificate Holder (CH) (e.g., newly hired personnel). However, it also applies to personnel employed by the CH who have not previously held a flightcrew member duty position with that CH. Initial new-hire training includes basic indoctrination training and training for a specific duty position and aircraft type. Except for a basic indoctrination curriculum segment, the regulatory requirements for initial new-hire and initial equipment training are the same. Since initial new-hire training is usually the employee's first exposure to specific certificate holder's methods, systems, and procedures, it must be the most comprehensive of the categories of training.

For this reason, initial new-hire training is a distinct, separate category of training and should not be confused with initial equipment training. As defined by 8900.1, initial equipment training is a separate category of training.

Prerequisites and Standardized Curriculum (SC) Enrollment:

The pilots will complete all certificate holder basic Indoc training curriculum segments prior to enrollment in the standardized curriculum. The pilot must have completed the certificate holder §135.293(a)(1), and (3)-(8).

For a Pilot in Command (PIC) training course and qualification, the pilot must possess:

1. Unrestricted Airline Transport Pilot (ATP), or

2. Commercial, Instrument, Multi Engine not limited to centerline thrust, and successfully have passed the ATP Knowledge Test and meet the eligibility requirements of §61.153.

The PIC Curriculum leads to a PIC §135.293 Competency Check and PIC §135.297 Proficiency Check, and additionally is eligible for an ATP and/or PIC Type Rating in accordance with §61.157(f).

For a Second in Command (SIC) Curriculum and qualification, the pilot must possess:
1. ATP, or
2. Commercial, Instrument and Multi Engine not limited to centerline thrust

The SIC Curriculum leads to an IFR SIC §135.293 Competency Check and is eligible for an SIC Type Rating in accordance with §61.55(e).

SC Training Footprint:
See Standardized Curriculum Aircraft/Simulator Training Matrix.

5.1.2 Initial Equipment Training Curriculum (IE)

This category of training is for personnel who have been previously trained and qualified for a flightcrew member duty position by the certificate holder (i.e., not new hires) and who are being reassigned to a different flightcrew member duty position on a different aircraft type, and the flightcrew member has not been previously trained and qualified by the certificate holder for that flightcrew member duty position and aircraft type. For example, an SIC on a Cessna 400 series is reassigned as a PIC on a G-V.

Prerequisites and SC enrollment:

The pilots will complete all certificate holder training curriculum segments prior to enrollment in standardized curriculum. The pilot must have a current §135.293(a)(1), and (3)-(8) for the certificate holder.

For a PIC training course and qualification, the pilot must possess:
1. Unrestricted ATP, or
2. Commercial, Instrument, Multi Engine not limited to centerline thrust, and successfully have passed the ATP Knowledge Test and meet the eligibility requirements of §61.153.

The PIC Curriculum leads to a PIC §135.293 and PIC §135.297 Proficiency Check, and additionally is eligible for an ATP and/or PIC Type Rating in accordance with §61.157(f).
For a SIC Curriculum and qualification, the pilot must possess:
1. ATP, or
2. Commercial, Instrument and Multi Engine not limited to centerline thrust

The SIC Curriculum leads to a IFR SIC §135.293 and is eligible for an SIC Type Rating in accordance with §61.55(e).

SC Training Footprint:
See Standardized Curriculum Aircraft/Simulator Training Matrix.

5.1.3 Transition Training Curriculum (TRA)

This category of training is for a flightcrew member who has been previously trained and qualified for a specific flightcrew member duty position by the certificate holder and who is being reassigned to the same flightcrew member duty position on a different aircraft type. For example, an SIC on a H800 is reassigned as an SIC on a G-V.

Prerequisites and SC Enrollment:

The pilots will complete all certificate holder training curriculum segments prior to enrollment in the standardized curriculum. The pilot must have a current §135.293(a)(1), and (3)-(8) for the certificate holder.

For a PIC training course and qualification, the pilot must possess:

1. Unrestricted ATP, or
2. Commercial, Instrument, Multi Engine not limited to centerline thrust, and successfully have passed the ATP Knowledge Test and meet the eligibility requirements of §61.153.

The PIC Curriculum leads to a PIC §135.293 and PIC §135.297 Proficiency Check, and additionally is eligible for an ATP and/or PIC Type Rating in accordance with §61.157(f).

For a SIC Curriculum and qualification, the pilot must possess:

1. ATP, or
2. Commercial, Instrument and Multi Engine not limited to centerline thrust

The SIC Curriculum leads to a IFR SIC §135.293 and is eligible for an SIC Type Rating in accordance with §61.55(e).

SC Training Footprint:
See Standardized Curriculum Aircraft/Simulator Training Matrix.

5.1.4 Upgrade Training Curriculum (UPGD)

This category of training is for a flightcrew member who has been previously trained and qualified as an SIC by the certificate holder and is being reassigned as a PIC to the same aircraft type for which the flightcrew member was previously trained and qualified. For example, an SIC on a G-V is reassigned as a PIC on a G-V.

Prerequisites and SC enrollment:

The pilots will complete all certificate holder training curriculum segments prior to enrollment in the standardized curriculum. The pilot must have a current §135.293(a)(1), and (3)-(8) for the certificate holder.

For a PIC training course and qualification, the pilot must possess:

1. Unrestricted ATP, or
2. Commercial, Instrument, Multi Engine not limited to centerline thrust, and successfully have passed the ATP Knowledge Test and meet the eligibility requirements of §61.153.

The PIC Curriculum leads to a PIC §135.293 and PIC §135.297 Proficiency Check, and additionally is eligible for an ATP and/or PIC Type Rating in accordance with §61.157(f).

SC Training Footprint:
See Standardized Curriculum Aircraft/Simulator Training Matrix.

5.1.5 Recurrent Training Curriculum (REC)

This category of training is for a flightcrew member who has been trained and qualified by the certificate holder, who will continue to serve in the same duty position and aircraft type, and who must receive recurring training and/or checking within an appropriate eligibility period. Pilots that are not within the eligibility period for recurrent require a requalification curriculum.

Prerequisites and SC enrollment:

The pilots will complete all certificate holder training curriculum segments prior to enrollment in SC.

The pilot must have a current §135.293(a)(1), and (3)-(8) for the certificate holder.

The PIC pilot is within §135.293 & §135.297 currency, or

The SIC pilot is within §135.293.

The PIC Curriculum leads to a PIC §135.293 and PIC §135.297 Proficiency Check.

The SIC Curriculum leads to a IFR SIC §135.293 Competency Check.

SC Training Footprint:
Course 2 - Short Footprint

5.1.6 Requalification Training Curriculum (REQ)

This category of training is for a flightcrew member who has been trained and qualified by the certificate holder or standardized curriculum but has become unqualified to serve in a particular flightcrew member duty position on an aircraft type due to not having received

recurrent ground or flight training and/or a required proficiency check, flight check, line check, or competency check within the appropriate eligibility period. Requalification training is also applicable in the following situations:

- PICs who are being reassigned as SICs on the same aircraft type.

Prerequisites and SC enrollment:

The certificate holder will complete all training curriculum segments prior to enrollment in standardized curriculum. The pilot must have a current §135.293(a)(1), and (3)-(8) for the certificate holder.

The PIC Curriculum leads to a PIC §135.293 and PIC §135.297 Proficiency Check.

The SIC Curriculum leads to a IFR SIC §135.293 Competency Check.

SC Training Footprint:
See Standardized Curriculum Aircraft/Simulator Training Matrix.

5.1.7 Standardized Curriculum Aircraft/Simulator Training Matrix

STANDARDIZED CURRICULUM AIRCRAFT/SIMULATOR TRAINING MATRIX				
Pilot is:	**Aircraft Ground Training Segment**	**Aircraft Flight Training Segment**	**Aircraft Qualification Segment**	**SC Course Footprint**
SC 135 current in type and duty position.	N/A	N/A	N/A	No Flight Training Required
SC 135 current in type and duty position **AND** is upgrading from SIC to PIC duty position	All recurrent ground training elements. 16 training hours.	All recurrent flight training elements. 12 training hours plus qualification segment.	§135.293(a)(2) & §135.293(b) & §135.297* *PIC only	2
Non-SC 135 current in type and duty position; **OR** 61.58 current in type and duty position.	All recurrent ground training elements. 16 training hours.	All recurrent flight training elements. 12 training hours plus qualification segment.	§135.293(a)(2) & §135.293(b) & §135.297* *PIC only	2

STANDARDIZED CURRICULUM AIRCRAFT/SIMULATOR TRAINING MATRIX				
Pilot is:	**Aircraft Ground Training Segment**	**Aircraft Flight Training Segment**	**Aircraft Qualification Segment**	**SC Course Footprint**
Previously qualified in SC and is outside of eligibility period for recurrent; **OR** is changing duty position from PIC to SIC and is **< 35 months** past due month.	All recurrent ground training elements. 16 training hours.	All recurrent flight training elements. 12 training hours plus qualification segment.	§135.293(a)(2) & §135.293(b) & §135.297* *PIC only	2
Previously qualified in SC and is outside of eligibility period for recurrent; **OR** is changing duty position from PIC to SIC and is **> 35 months** past due month.	SAME AS INITIAL EQUIPMENT TRAINING AND QUALIFICATION			2
Other	SAME AS INITIAL EQUIPMENT TRAINING AND QUALIFICATION			1

NOTE: §135.299 Qualification is operator specific and not included in this table.

6 Course Contents

Each instructor, supervisor or check pilot will certify the proficiency and knowledge of each crewmember upon completion of required training or checking in accordance with §135.323(c). This certification may occur at any time when the instructor believes that the individual has reached the required level of proficiency during his or her scheduled training, provided that all elements and events of the approved training program have been successfully trained.

6.1 Course 1 Training Hours Summary

COURSE 1	
Day 1	**Planned Hours**
Aircraft General	1.0
Aircraft Manuals	1.0
Auxiliary Power Unit	1.0
Electrical	3.0
Powerplant	2.0
Day 2	**Planned Hours**
Oil System	0.5
Fuel System	1.5
Hydraulic System	1.0
Landing Gear and Brakes	1.5
Thrust Reverse	1.0
Pneumatic and Environmental Systems	2.5
Day 3	**Planned Hours**
Avionics	8.0
Day 4	**Planned Hours**
Ice Protection	1.7
Oxygen	1.0
Pitot-static System	0.8
Flight Controls	3.0
Fire and Smoke Detection Protection and Suppression	1.5
Day 5	**Planned Hours**
Lighting	0.8
Flight Profiles and Maneuvers	2.0
CRM	4.0
Windshear	1.0
Day 6	**Planned Hours**
Weight and Balance	1.0
Flight Planning and Performance	3.0
MEL and CDL	0.5
Preflight	2.5
Ground School Completion Exam	1.0

6.2 Course 2 Training Hours Summary

Course 2	
Day 1	**Planned Hours**
Aircraft Manuals	0.25
MEL and CDL	0.25
CRM	1.00
Aircraft General	0.75
Weight and Balance	1.00
Flight Planning and Performance	1.00
Flight Profiles and Maneuvers	0.50
Avionics and Communications	1.50
Windshear	0.25
Lighting	0.25
Auxiliary Power Unit	0.25
Electrical System	1.00
Day 2	**Planned Hours**
Avionics and Communications	0.50
Powerplant	1.00
Oil System	0.25
Thrust Reverse	0.50
Fuel System	0.50
Hydraulic System	0.50
Landing Gear and Brakes	0.50
Fire and Smoke Detection, Protection and Suppression	0.50
Flight Controls	0.75
Pneumatic and Environmental Systems	1.50
Pitot-static System	0.25
Ice Protection	0.50
Oxygen	0.25
Ground School Completion Exam	0.50

6.3 Operational Procedures

Procedures to be used for curriculum development and implementation by training centers will be those outlined in the recommended CE-560XL Standardized Maneuvers and Call Outs.

6.4 Pilot Flying (PF) and Pilot Monitoring (PM) Duties

Crewmembers should be able to perform either PF or PM duties, unless otherwise limited by the operator's policies or aircraft characteristics (e.g., single HUD).

6.5 Training Environment

Ground curriculum instruction may take place in any combination of four operational environments, as approved by the relevant Certificate Management Office (CMO). In accordance with guidance in the order 8900.1, a ground school instructor will always be available while distance learning is taking place. Creation of courseware to support the curriculum operating environment is the responsibility of the training provider.

1. Asynchronous distance learning with validation exam upon arrival at the center
2. Synchronous distance learning with validation exam upon arrival at the center
3. On-site computer-based training with ground school completion exam
4. On-site instructor led training with ground school completion exam

Air carriers operating under part 135 and adopting the standardized curriculum may conduct the ground curriculum segment in any operational environment for which the training provider is approved. Flight training curriculum segments will be conducted using regionally relevant airports appropriate to the flight training equipment in use. Training will take place during marginal visual meteorological conditions (VMC) and instrument meteorological conditions (IMC), icing and non-icing conditions. Training will include operations in temperatures/elevations sufficient to reduce aircraft performance. Approach training relevant to all installed equipment will be conducted and simulator plans of action will be drafted by each training provider as appropriate to the FTE in use.

6.6 Operational/Simulated Systems Requirements

The training program must contain a flight check in the aircraft or a check in the simulator or training device to the level of proficiency of a pilot in command or second in command, as applicable, in at least the maneuvers and procedures that are capable of being performed in an aircraft simulator or training device.

Flight training and part-task training conducted under the curriculums in this chapter will be accomplished in one of the following FAA-approved devices:

- CL-30 Flight Simulation Training Device (FSTD)
- Other training device, mockup, system trainer, procedures trainer, simulator, or training aid

NOTE: A current copy of the Statement of Qualification for each FAA-approved FSTD should be available from the 142 Training Center.

7 Types of Instrument Procedures, Conditions, and Minima to Be Addressed

Maneuvers and procedures trained should be tailored to the types of instrument procedures used by the operator, the environment in which they are flown, the airborne and ground equipment required for each type of operation, and any special considerations that may apply. Operating policies, procedures, and documentation applicable to the operator should

be used. Training and evaluation should ensure that procedures can be safely flown considering the following factors:

1. Types of instrument procedures used (standard and special, lowest straight-in, or circling minima, if applicable);
2. The operator's manuals, charts, and checklists;
3. Aircraft type(s) model and/or series flown;
4. Flight guidance and/or visual system(s) and their corresponding category(s) of minima for each authorized system;
5. NAVAID(s) and visual aids used (LVO/SMGCS lighting if applicable);
6. Flightcrew procedures used (e.g., PF/PM duties or call-outs);
7. Airport and runway characteristics typically experienced;
8. Nearby critical terrain or obstruction environment;
9. Relevant normal, non-normal, and environmental conditions. Training and evaluation need only be conducted using relevant and representative procedures and conditions as allowed by the flight training equipment used (e.g., a representative mix of day, night, dusk, variable/patchy conditions, representative temperatures, landing runway altitudes, precipitation conditions, turbulence, and icing conditions); and
10. When multiple types of equipment, flight guidance, and/or systems are used (e.g., FD, SVGS, HUD, autoland, RA), training programs should address each combination of equipment and category of minima. For example, if the operator is authorized to conduct SA CAT I approaches using HUD and CAT II approaches using autoland, training should address each authorized combination separately.

7.1 Guidance for RNAV and ILS Instrument Approaches

NOTE: No special crew qualifications, other than those necessary for Area Navigation (RNAV) and Instrument Landing System (ILS) Instrument approaches, are currently specified for WAAS operations. If RNAV approaches are already integrated into a current training program, operators are not required to have a separate program to incorporate localizer performance with vertical guidance (LPV) and LP specific training elements from AC 90-107.

In the absence of a training program, operators should use this guidance to develop their training curriculum and document the training as outlined in subparagraph 9b.

7.2 WAAS Training Documentation

Parts 135 operators' applications for operational approval to use WAAS without restrictions or limitations on Instrument Approach Procedures (IAPs) should include documentation of the Wide Area Augmentation System (WAAS)-related training provided to flight crews, dispatchers and maintenance personnel, as appropriate.

7.3 Continuous Descent Final Approach (CDFA) Pilot Knowledge and Training

Pilots should be familiar with the information in AC 120-108 prior to conducting the operations discussed herein. For parts 135 operators, the approved operating procedures and training

program should address the elements listed in AC 120-108. A review of applicable portions of the Pilot Knowledge Requirements and Training section in AC 90-100 is also recommended.

7.4 CAT I Qualification

Training, testing, checking, and evaluation for CAT I are basic to qualification for instrument flight rules (IFR) operations and should be accomplished in conjunction with basic aircraft type, model and/or series qualification. Training, testing, and evaluation should ensure each pilot has the necessary knowledge and skill appropriate to the type of qualification being completed. If CAT I Landing Minima with Reduced Lighting (Runway Visual Range (RVR) 1800) authorization is sought, flight crews must demonstrate proficiency in approaches to authorized minima using the FD, AP, or HUD as applicable.

8 Required Navigation Performance (RNP) Training

Parts 135 operators should have a training program addressing the operational practices, procedures, and training items related to Required Navigation Performance (RNP) operations (e.g., initial, upgrade, or recurrent training for flight crew, operational control personnel, and maintenance personnel).

> **NOTE:** A separate training program is not required if RNP training is integrated in the current training program. However, the applicant must identify the elements required training elements from AC 90-105 within the existing training program.

9 Data Link Communications

Parts 135 operators should have a training program addressing the operational practices, procedures, and training items related to data link communication operations (e.g., initial, upgrade, or recurrent training for pilots, operational control personnel, and maintenance personnel). If criteria for training or checking are other than as specified in AC 90-117, the criteria may be found in Flight Standardization Board (FSB) reports applicable to a particular aircraft type.

> **NOTE:** A separate training program is not required if data link communication training is integrated in the current training program. However, the applicant must identify the training elements from AC 90-117 within the existing training program.

Parts 135 operators should ensure their process contains training for pilots on equipment requirements, normal and non-normal operations and procedures, and limits of their data link communication capability. Pilots must receive data communications training specific to the avionics suite they will be operating. A common type rating does not guarantee the pilot has received training on the data communications equipment installed on a particular aircraft.

Operators should include the following objectives to ensure appropriate pilot data link communications qualification: (1) Provide necessary pilot knowledge of data link performance-based communication and surveillance concepts, systems, procedures, and skills to properly respond to data link communication clearances and advisories; and (2) Identify human factor issues specific to pilot operation and interaction with the communication software, hardware, and operating environment (e.g., head-down time, situational awareness, or loss of pilot response

time in the Required Communication Performance (RCP) specification).

10 Testing and Checking

The training program must contain a flight check in the aircraft or a check in the simulator or training device to the level of proficiency of a pilot in command or second in command, as applicable, in at least the maneuvers and procedures that are capable of being performed in an aircraft simulator or training device.

Testing and checking conducted under the training curriculums in this chapter will be accomplished in an FAA-approved FSTD.

10.1 Added Type Rating Practical Test §61.157

The objective of the added type rating practical test is to ensure the pilot is eligible to receive a CL-30 type rating on his or her ATP Certificate.

The pilot must successfully complete the added type rating practical test qualification segment and receive a CL-30 type rating.

The added type rating practical test may be administered by an FAA Inspector or a contract training provider Training Center Evaluator.

10.2 Pilot Testing §135.293

The objective of the pilot testing qualification segment is to test the pilot's knowledge of general operating subjects and aircraft-specific systems, procedures and limitations, as well as ensure the pilot possesses the skills necessary to perform the maneuvers and procedures for the operations authorized and appropriate to the category, class, and type of aircraft involved.

10.2.1 Aircraft Knowledge Test Modules §135.293(a)(2) & (3)

The scope of the oral/written portion of the aircraft knowledge test is defined by regulation. The items that will be evaluated during the oral portion of the practical test/proficiency check are specified in the 14 CFR parts and the Airline Transport Pilot (ATP) and Aircraft Type Rating Practical Test Standards for Airplane (ATP PTS). The aircraft knowledge testing modules may be administered by a Standardized Curriculum Check Pilot or FAA Inspector.

Once every 12 calendar months, each pilot qualified in an aircraft type is required to pass a written or oral test on that pilot's knowledge in aircraft-specific areas.

10.2.2 Aircraft Competency Check Modules §135.293(b)

Every 12 months, a pilot qualified in an aircraft type is required to complete an aircraft competency check in that type of aircraft. The aircraft competency check may include any of the maneuvers and procedures currently required for the original issuance of the particular pilot certificate required for the operations authorized and appropriate to the category, class

and type of aircraft involved. The aircraft competency check qualification modules may be administered by a Contract Provider Check Airman or FAA Inspector.

NOTE: The instrument proficiency check required by §135.297 may be substituted for the aircraft competency check for the type of aircraft used in the check in accordance with §135.293(c).

10.3 Instrument Proficiency Check §135.297

The objective of the instrument proficiency check qualification segment is to ensure the pilot possesses the knowledge and skills necessary to perform the duties and responsibilities of a PIC under IFR.

The pilot must have completed an instrument proficiency check within the preceding six months to continue IFR revenue operations. If the pilot is assigned to more than one type of aircraft, that pilot must take the instrument proficiency check in each type of aircraft to which that pilot is assigned, in rotation, but not more than one flight check is required during each six-month period.

The instrument proficiency check qualification modules may be administered by a Standardized Curriculum Check Pilot or FAA Inspector.

10.4 Seat Dependent Checking

To ensure pilots are qualified for the flightcrew assignment and duty position each pilot will be assigned in the aircraft, pilots should demonstrate proficiency during qualification checking modules as follows:

1. A PIC who is only assigned PF from the left seat will undergo qualification checks from the left seat.
2. A SIC who is only assigned to the right seat will undergo qualification checks from the right seat.
3. A PIC who is assigned to left and right seat duty positions will demonstrate all PF duties from the left seat during qualification and train rejected takeoff, V1 cut, single engine approach to miss, and single engine landing from the right seat.
4. A SIC who is assigned to the left and right seat will demonstrate PF duties during qualification events from the left seat and demonstrate proficiency in all maneuvers required of a PIC.

NOTE: A SIC qualified to operate in both seats may document training in both (e.g., Nosewheel Steering Tiller – left seat) but is only required to demonstrate proficiency in the left seat.

10.5 PIC Qualification Checking Modules

The qualification segments in this curriculum include the testing and checking modules used to determine successful completion of the applicable curriculum. The pilot must complete the training set forth in the curriculum within the required eligibility period in order to be eligible for a qualification segment.

TASKS	§135.297(c)/135.293(a)(2), (b) PIC QUALIFICATION
Checking Module: Preflight Inspection	Per ATP and Type Rating ACS
Checking Module: Start Procedures	Per ATP and Type Rating ACS
Checking Module: Taxiing/Runway Operations	Per ATP and Type Rating ACS
Checking Module: Pretakeoff Checks	Per ATP and Type Rating ACS
Checking Module: Normal Takeoff	Per ATP and Type Rating ACS
Checking Module: Crosswind Takeoff	Per ATP and Type Rating ACS
Checking Module: Instrument Takeoff	Per ATP and Type Rating ACS
Checking Module: Takeoff with Powerplant Failure	Per ATP and Type Rating ACS
Checking Module: Rejected Takeoff	Per ATP and Type Rating ACS
Checking Module: Area Departure	Per ATP and Type Rating ACS
Checking Module: Steep Turns	Per ATP and Type Rating ACS
Checking Module: Stall Prevention (Approaches to Stalls)	Per ATP and Type Rating ACS
Checking Module: Powerplant Failure	Per ATP and Type Rating ACS
Checking Module: Area Arrival	Per ATP and Type Rating ACS
Checking Module: Holding	Per ATP and Type Rating ACS
Checking Module: Normal ILS Approach	Per ATP and Type Rating ACS
Checking Module: Engine-out ILS	Per ATP and Type Rating ACS
Checking Module: Coupled Approach	Per ATP and Type Rating ACS
Checking Module: Nonprecision Approach	Per ATP and Type Rating ACS
Checking Module: Second Nonprecision Approach	Per ATP and Type Rating ACS
Checking Module: Missed Approach from an ILS	Per ATP and Type Rating ACS
Checking Module: Second Missed Approach	Per ATP and Type Rating ACS
Checking Module: Circling Approach	Per ATP and Type Rating ACS
Checking Module: Normal Landing	Per ATP and Type Rating ACS
Checking Module: Crosswind Landing	Per ATP and Type Rating ACS
Checking Module: Landing from an ILS	Per ATP and Type Rating ACS
Checking Module: Landing with an Engine Out	Per ATP and Type Rating ACS
Checking Module: Circling Approach to Landing	Per ATP and Type Rating ACS
Checking Module: Rejected Landing	Per ATP and Type Rating ACS
Checking Module: No-flap Approach to Landing	Per ATP and Type Rating ACS
Checking Module: System Malfunction	Per ATP and Type Rating ACS
Checking Module: Maneuver by Partial Panel	Per ATP and Type Rating ACS
Checking Module: Unusual Attitude Recovery	Per ATP and Type Rating ACS

10.6 SIC Qualification Checking Modules

The qualification segments in this curriculum include the testing and checking modules used to determine successful completion of the applicable curriculum. The pilot must complete the training set forth in the curriculum within the required eligibility period in order to be eligible for a qualification segment.

Tasks	SIC Qualification 135.293(a)(2) and (b)	SIC Qualifications Checking Modules added by TSWG Recommendation:
Checking Module: Preflight Inspection	Per ATP and Type Rating ACS	
Checking Module: Start Procedures	Per ATP and Type Rating ACS	
Checking Module: Taxiing/Runway Operations	Per ATP and Type Rating ACS	
Checking Module: Pretakeoff Checks	Per ATP and Type Rating ACS	
Checking Module: Normal Takeoff	Per ATP and Type Rating ACS	
Checking Module: Crosswind Takeoff	Per ATP and Type Rating ACS	
Checking Module: Instrument Takeoff	Per ATP and Type Rating ACS	X
Checking Module: Takeoff with Powerplant Failure	Per ATP and Type Rating ACS	
Checking Module: Rejected Takeoff	Per ATP and Type Rating ACS	X
Checking Module: Area Departure	Per ATP and Type Rating ACS	X
Checking Module: Steep Turns	N/A	
Checking Module: Stall Prevention (Approaches to Stalls)	Per ATP and Type Rating ACS	X
Checking Module: Powerplant Failure	Per ATP and Type Rating ACS	X
Checking Module: Area Arrival	Per ATP and Type Rating ACS	X

Checking Module: Holding	Per ATP and Type Rating ACS	X
Checking Module: Normal ILS Approach	Per ATP and Type Rating ACS	
Checking Module: Engine-out ILS	Per ATP and Type Rating ACS	X
Checking Module: Coupled Approach	Per ATP and Type Rating ACS	X
Checking Module: Nonprecision Approach	Per ATP and Type Rating ACS	
Checking Module: Second Nonprecision Approach	NA	
Checking Module: Missed Approach from an ILS	Per ATP and Type Rating ACS	X
Checking Module: Second Missed Approach	N/A	
Checking Module: Circling Approach	Per ATP and Type Rating ACS	X
Checking Module: Normal Landing	Per ATP and Type Rating ACS	
Checking Module: Crosswind Landing	Per ATP and Type Rating ACS	
Checking Module: Landing from an ILS	Per ATP and Type Rating ACS	X
Checking Module: Landing with an Engine Out	Per ATP and Type Rating ACS	
Checking Module: Circling Approach to Landing	Per ATP and Type Rating ACS	X
Checking Module: Rejected Landing	Per ATP and Type Rating ACS	X
Checking Module: No-flap Approach to Landing	N/A	

Checking Module: System Malfunction	Per ATP and Type Rating ACS	
Checking Module: Maneuver by Partial Panel	Per ATP and Type Rating ACS	
Checking Module: Unusual Attitude Recovery	Per ATP and Type Rating ACS	

11 Training Segments

The objective of this curriculum is to provide adequate training to enable a pilot to understand the specific airplane systems and performance parameters.

11.1 Ground Training Segment

The primary objective of aircraft ground training is to provide pilots with the necessary knowledge for understanding the basic functions of aircraft systems, the use of the individual system components, and the integration of aircraft systems and operational procedures.

Instruction on each aircraft system must be given in sufficient detail to ensure the pilot clearly understands system components, limitations, relevant controls, actuators, annunciators, and procedures for various system configurations. The pilot will also become familiar with the normal, abnormal, and emergency operations of each aircraft system.

11.2 Systems Integration

Systems integration training provides the pilot with training on how aircraft systems interrelate with respect to normal, abnormal, and emergency procedures. System integration training includes flightcrew interaction in the use of checklists, CRM, and other operational procedures.

Effective systems integration training serves as a logical bridge between conventional ground training instructional delivery methods and flight training. This training allows students to become familiar with the flight deck layout, checklists, operator procedures, and other areas that are best learned before they conduct actual flight maneuvers and procedures.

Pilots will perform the tasks listed in the SIT modules under the observation of an instructor or check pilot. Each pilot must demonstrate the associated learning objectives to the listed task expectation rating.

TASK EXPECTATION RATING	DESCRIPTION
Low	Trainee may require a significant level of instructor intervention (e.g., demonstrations, explanations, repetitions). Applicable to the first introduction of a task, maneuver or procedure, or where a task is a "train only" item.
Medium	The trainee may require a moderate level of instructor intervention or input. Some limited assistance is required. (e.g., coaching, instructing, prompting) to correct errors or improve task performance.
High	Minor instructional inputs, coaching or prompting is sometimes required to enhance task performance. Applicable where the trainee should be able to demonstrate the expected level of task maneuver or procedure proficiency with minimal or no instructor input.
Per ATP and Type Rating ACS	The ATP and Type Rating ACS will be used for evaluation purposes for checking and testing during any qualification segment.

NOTE: Applied CRM is monitored/practiced in each System Integration Lesson/Flight Simulator/Aircraft Module. Areas of applied CRM include checklist utilization, briefings, decision making, stress management, communications, use of automation, and situational awareness.

11.3 Flight Training Segment

The primary objective of flight training is to provide an opportunity for pilots to acquire the skills and knowledge necessary to perform to the ATP and Type Rating ACS. This provides for demonstration, instruction and practice of maneuvers and procedures (training events) pertinent to the pilot duty position in the CL-30.

The training flight will emphasize cold and hot weather operations in accordance with the Aircraft Flight Manual (AFM) and Aerodrome Operating Minima (AOM).

General briefing notes should include: Standards, expectations, SOPs, Crew interactions, overview of events, location of start point, applicable systems, weather, and common errors.

Pilots will perform the tasks listed in in the flight training modules under the observation of an instructor or check pilot. Each pilot must demonstrate the associated learning objectives to the listed task expectation rating.

TASK EXPECTATION RATING	DESCRIPTION
Low	Trainee may require a significant level of instructor intervention (e.g., demonstrations, explanations, repetitions). Applicable to the first introduction of a task, maneuver or procedure, or where a task is a "train only" item.
Medium	The trainee may require a moderate level of instructor intervention or input. Some limited assistance is required. (e.g., coaching, instructing, prompting) to correct errors or improve task performance.
High	Minor instructional inputs, coaching or prompting is sometimes required to enhance task performance. Applicable where the trainee should be able to demonstrate the expected level of task maneuver or procedure proficiency with minimal or no instructor input.
Per ATP and Type Rating ACS	The ATP and Type Rating ACS will be used for evaluation purposes for checking and testing during any qualification segment.

General debriefing notes should include: facilitated, ask the crew how they did, preview of the next day, how it was graded.

> **NOTE:** For those curriculums that lead to the issuance of a type rating or an ATP, at least one en route segment must be flown prior to the proficiency check. This segment must include a takeoff and departure from one airport with an arrival and a landing at a second airport. This segment must be flown in real time without repositioning. Normal and abnormal procedures may be accomplished during the en route segment. This module may be used to accomplish the en route segment.

> **NOTE:** Applied CRM is monitored/practiced in each System Integration Lesson/Flight Simulator/Aircraft Module. Areas of applied CRM include checklist utilization, briefings, decision making, stress management, communications, use of automation, and situational awareness.

11.4 Seat Dependent Training

There are no seat-dependent tasks.

> **NOTE:** A SIC qualified to operate in both seats will document training in both (e.g., Nosewheel Steering Tiller – left seat) but is only required to demonstrate proficiency in the left seat.

> **NOTE:** A PIC who is assigned to left and right seat duty positions will demonstrate all PF duties from the left seat during qualification and train rejected takeoff, V1 cut, single engine approach to miss, and single engine landing from the right seat.

11.5 Training Course Outlines

The curricula outlines include the planned training hours that will be applied to each curriculum segment. Planned hours for flight training modules do not include preflight/post-flight briefings.

CL-30 COURSE 1			
Day 1	**Planned Hours**	**Ground**	**Systems Integration**
Aircraft General	1.0	8.0	
Aircraft Manuals	1.0		
Auxiliary Power Unit	1.0		
Electrical	3.0		
Powerplant	2.0		
Day 2	**Planned Hours**	**Ground**	**Systems Integration**
Oil System	0.5	8.0	
Fuel System	1.5		
Hydraulic System	1.0		
Landing Gear and Brakes	1.5		
Thrust Reverse	1.0		
Pneumatic and Environmental Systems	2.5		
Day 3	**Planned Hours**	**Ground**	**Systems Integration**
Avionics	8.0	8.0	
Day 4	**Planned Hours**	**Ground**	**Systems Integration**
Ice Protection	1.7	8.0	
Oxygen	1.0		
Pitot-static System	0.8		
Flight Controls	3.0		
Fire and Smoke Detection Protection and Suppression	1.5		
Day 5	**Planned Hours**	**Ground**	**Systems Integration**
Lighting	0.8	7.8	
Flight Profiles and Maneuvers	2.0		
CRM	4.0		
Windshear	1.0		
Day 6	**Planned Hours**	**Ground**	**Systems Integration**
Weight and Balance	1.0	8.0	
Flight Planning and Performance	3.0		
MEL and CDL	0.5		
Preflight	2.5		
Ground School Completion Exam	1.0		

SYSTEMS INTEGRATION TRAINING (SIT)			
Day 7 SIT 1	**Planned Hours**	**Ground**	**Systems Integration**
Interior preflight and prestart procedures			4.0
Powerplant Start			
Use of FMS			
Before Takeoff Checks			

CL-30 COURSE 1			
SYSTEMS INTEGRATION TRAINING (SIT)			
Day 8 SIT 2	**Planned Hours**	**Ground**	**Systems Integration**
Interior preflight and prestart procedures			4.0
Powerplant Start			
Use of FMS			
Before Takeoff Checks			
Normal Takeoff and Climb with Crosswind			
Departure Procedures			
Holding			
Normal Approach and Landing with Crosswind			
Instrument Takeoff			
Arrival Procedures			
Precision Approach			
Missed Approach			
Non-precision Approach			
Go-Around/Rejected Landing			
Landing From a Precision Approach			
After Landing, Parking and Securing			

CL-30 COURSE 1			
SYSTEMS INTEGRATION TRAINING (SIT)			
Day 9 SIT 3	**Planned Hours**	**Ground**	**Systems Integration**
Interior preflight and prestart procedures			4.0
Powerplant Start			
Use of FMS			
Before Takeoff Checks			
Rejected Takeoff			
Powerplant Failure During Takeoff at V1			
Powerplant Failure During Second Segment			
Missed Approach - OEI			
Normal Takeoff and Climb with Crosswind			
Departure Procedures			
Holding			
Arrival Procedures			
Precision Approach			
Missed Approach			
Non-precision Approach			
Go-Around/Rejected Landing			
Landing From a Precision Approach			
Instrument Takeoff			
Normal Approach and Landing with Crosswind			
After landing, parking and securing			

Simulator Session 1	Brief	Crew	Single
Interior preflight and prestart procedures	2.0	4.0	4.0 (2.0 PF and 2.0 PM)
Powerplant start			
Taxi			
Before takeoff checks			
Normal Takeoff and Climb with Crosswind			
Departure procedures			
Steep turns			
Stick Pusher Demonstration			
Clean configuration stall prevention			
Partial flap configuration stall prevention			
Landing configuration stall prevention			
Recovery from unusual flight attitudes			
Arrival procedures			
Normal Approach and Landing with Crosswind			
Go around/rejected landing			
Precision approach			
Missed approach			
Landing from a precision approach			
After landing, parking and securing			

Simulator Session 2	Brief	Crew	Single
Powerplant start	2.0	4.0	2.0
Taxi			
Before takeoff checks			
Lower than Standard Minimum Takeoff			
Departure procedures			
EGPWS escape maneuver			
TCAS resolution advisory (RA)			
TCAS resolution advisory (TA)			
Inflight powerplant failure and restart			
Holding			
Non precision approach			
Missed approach			
Conduct Visual Approach (VFR Procedures)			

Simulator Session 2	Brief	Crew	Single
Normal Takeoff and Climb with Crosswind			
Powerplant Failure During Second Segment			
OEI Climb to En Route Altitude			
Normal Approach and Landing with Crosswind			

Simulator Session 3	Brief	Crew	Single
Taxi	2.0	4.0	2.0
Before takeoff checks			
Instrument takeoff			
Powerplant Failure During Takeoff at V1			
Departure procedures			
Arrival procedures			
Precision Approach with Powerplant Failure (manual control)			
Missed approach OEI			
Approach and landing with a powerplant failure			
Rejected takeoff			
Normal Takeoff and Climb with Crosswind			
Inflight Powerplant Failure and Restart			
Holding			
Airframe icing			
Flight by reference to standby flight instruments, backup instrumentation, or partial panel			
Non precision approach			
Conduct Visual Approach (VFR Procedures)			
Normal Approach and Landing with Crosswind			
Inflight fire and smoke			
Precision Approach			
Landing From a Precision Approach			
Emergency evacuation			

Simulator Session 4	Brief	Crew	Single
Taxi	2.0	4.0	2.0
Before Takeoff Checks			
Normal Takeoff and Climb with Crosswind			
Windshear escape maneuver during take off			
Departure Procedures			
EGPWS escape maneuver			
Steep Turns			
Recovery From Unusual Flight Attitudes			
TCAS Traffic Advisory (TA)			
TCAS Resolution Advisory (RA)			
Decompression			
Emergency Descent			
Nonprecision Approach			
Circling Approach			
Missed Approach			
Landing From a Circling Approach			
Powerplant Failure During Second Segment			
OEI Climb to En Route Altitude			
Conduct Visual Approach (VFR Procedures)			
Windshear escape maneuver during landing			
Go-Around/Rejected Landing			
Normal Approach and Landing with Crosswind			
Landing from a No Flap or Nonstandard Flap Approach			
After landing, parking and securing			

Simulator Session 5	Brief	Crew	Single
Interior preflight and prestart procedures	2.0	4.0	2.0

Powerplant Start			
Taxi			
Before Takeoff Checks			
Rejected Takeoff			
Normal Takeoff and Climb with Crosswind			
Inflight Powerplant Failure and Restart			
Precision Approach			
Landing From a Precision Approach			
Instrument Takeoff			
Powerplant Failure During Takeoff at V1			
Departure Procedures			
Precision Approach with Powerplant Failure (manual control)			
Missed Approach - OEI			
Approach and Landing with a Powerplant Failure			
Stall Prevention and Recovery			
Circling Approach			
Landing From a Circling Approach			
Visual Approach (VFR Procedures)			
Approach and landing with pitch mistrim			
Inflight fire and smoke			
Normal Approach and Landing with Crosswind			
Emergency evacuation			

Simulator Session 6 (LOFT)	**Brief**	**Crew**	**Single**
LOS scenario(s) shall be constructed in accordance with AC 120-35D (Flightcrew Member Line-Operational Simulations: Line-Oriented Flight Training, Special Purpose Operational Training, Line Operational Evaluation).	2.0	4.0	4.0

CL-30 Course 2			
Day 1	**Planned Hours**	**Ground**	**Systems Integration**
Aircraft Manuals	0.25	8.0	0.0
MEL and CDL	0.25		
CRM	1.00		
Aircraft General	0.75		
Weight and Balance	1.00		
Flight Planning and Performance	1.00		
Flight Profiles and Maneuvers	0.50		
Avionics and Communications	1.50		
Windshear	0.25		
Lighting	0.25		
Auxiliary Power Unit	0.25		
Electrical System	1.00		
Day 2	**Planned Hours**	**Ground**	**Systems Integration**
Avionics and Communications	0.50	8.0	0.0
Powerplant	1.00		
Oil System	0.25		
Thrust Reverse	0.50		
Fuel System	0.50		
Hydraulic System	0.50		
Landing Gear and Brakes	0.50		
Fire and Smoke Detection, Protection and Suppression	0.50		
Flight Controls	0.75		
Pneumatic and Environmental Systems	1.50		
Pitot-static System	0.25		
Ice Protection	0.50		
Oxygen	0.25		
Ground School Completion Exam	0.50		

11.5.1 Differences Training Curricula

None.

Appendix B – CL-30 Standardized Operating Procedures, Maneuvers, and Callouts

CL-30 Standardized Curriculum

1 Introduction

Standard Operating Procedures (SOPs) are essential to the safety of flight because they provide a common methodology of flying the aircraft. Compliance with SOPs means following the appropriate procedure at the appropriate time. In other words, doing it the right way, every time. SOPs are an important barrier to potential crewmember errors caused by fatigue, distraction, stress, or inattention. Therefore, SOPs create a more reliable crew as these errors are more likely to be captured if nonstandard procedures are introduced into a given flight scenario. In addition, strict adherence to SOPs allows a crew to more effectively manage the flight when unforeseen issues arise such as mechanical irregularities or unexpected weather.

The crew concept is an important element of SOPs. The spirit of Crew Resource Management (CRM) is utilizing all available resources (including cabin staff) to maintain flight safety, by recognizing threats, and preventing threats from becoming errors.

There are external and internal resources available. For example, Air Traffic Control (ATC) is an external resource. ATC can provide important information about weather, traffic, and airport flow management. In addition, a Flight Service Station (FSS) can help with clearances and provide other essential information when contact with ATC is not possible (such as during ground operations).

The crew is the primary internal source of CRM. Communication is the essential element of CRM on the flight deck. Therefore, a crewmember must be able to demonstrate effective oral, non-verbal, and written communications in normal and non-normal situations. Briefings are an example of a strategy used in CRM because they create a shared mental model of how a flight will be managed. In addition to departure and arrival briefings, there are items that can be briefed as needed, in real time during the flight. For example, if a crossing restriction is issued, the pilot flying (PF) should brief the pilot monitoring (PM) how they intend to meet the restriction. Briefings give the PM an opportunity to remind the PF of the plan in case of distractions.

Even though the pilot in command (PIC) is responsible for the conduct of the flight, the second in command (SIC) must offer input to address any questions or concerns regarding the condition and safety of that flight. It's important to remember that each crewmember can communicate identifiable conditions which may interfere with the safe outcome of a flight. Just as the PIC should seek information from an external resource such as ATC, input from the SIC should also be sought. Again, communication and agreement between PIC and SIC are imperative.

Implementation of any procedure as an SOP is most effective when:

- The procedure is appropriate to the situation
- The procedure is practical to use
- Crewmembers understand the reasons for the procedure
- Crewmember duties are clearly delineated
- Effective training is conducted

- Adherence to the standard is emphasized by flight crews, and reinforced by instructors, check pilots, and managers alike
- Crewmembers are aware of the potential risks/hazards if SOPs are not followed

2 Checklists

Checklists are tools that support a flight crew's effectiveness in ensuring that all required actions are performed without omission and in an orderly manner. Effective checklists are pertinent and concise. Use them the way they are written—verbatim, smartly, and professionally. Checklists for abnormal/emergency procedures are typically presented in a Quick Reference Handbook (QRH).

Several naming conventions for checklists exist. Regardless of the convention, the execution of checklists falls into two general categories:

- Those that allow for items to be accomplished using a flow, and then verified using the appropriate checklist; and
- Those where each item is actioned in response to a challenge.

If using Flow Patterns, accomplish the cockpit setup for each phase of flight with the desired flow pattern then refer to the checklist to verify the setup. Use normal checklists as "done lists" rather than "do lists." Flow patterns are disciplined procedures; they require pilots who understand the aircraft systems/controls and who methodically accomplish the flow pattern. For those flight departments who do not use flow patterns, the normal "Challenge -Do-Verify" method may be used.

The **Do-Verify (DV), also known as Challenge and Response**, method consists of the checklist being accomplished in a variable sequence without a preliminary challenge, typically following a flow pattern. These checklists usually relate to the normal operation of the aircraft. Specific critical items are checked/cross-checked, whereby the PM reads the items to be checked and the PF confirms (visually) the proper status/configuration of the appropriate items. The DV method allows the flight crew to use flow patterns from memory to accomplish a series of actions quickly and efficiently. Each individual crewmember can work independently, which helps balance the workload between crewmembers.

The **Challenge-Do-Verify (CDV), also known as Read-Do**, method consists of a crewmember making a challenge before an action is initiated, taking the action, and then verifying that the action item has been accomplished. This method is most effective when one crewmember issues the challenge and the second crewmember takes the action and responds to the first crewmember, verifying that the action was taken. This requires that the checklist be accomplished methodically, one item at a time, in an unvarying sequence. These types of checklists usually relate to non-normal (abnormal and emergency) procedures for which a cockpit flow pattern performed from memory is not suitable.

Mechanical or **electronic checklists** differ in format from paper, hand-held checklists, but not in the design method or use. The actions these checklists contain and their sequencing are consistent with the paper version (when required) available to the flight crew. Some electronic checklists will have an ability to automatically detect the completion of an action based on switch position, system state, or both. In electronic checklists, the verification required may be a matter of observing that the items are complete via the display method used (for example, a completed item turns green).

2.1 Normal Procedures

The normal procedures checklist should be thought of as routine in day-to-day flying. It should be accomplished using the following procedures. The application of a normal procedure checklist should be initiated (called for or requested) by the pilot flying (PF) and then read by the pilot monitoring (PM).

2.1.1 Checklist Initiation

It is the PF's responsibility to call for the checklist at the appropriate time to ensure the aircraft is in correct configuration for that portion of flight. The PM will be responsible for verifying checklists items as appropriate.

If a Flow Pattern is used, the PM will generally accomplish the flow pattern and then verify that the items have been completed using the checklist. The PM then acknowledges completion of the checklist to the PF, stating "checklist complete."

If a challenge-response method is used to execute a checklist, after the PF initiates the checklist, the PM challenges by reading the checklist item aloud. The PF is responsible for verifying that the items designated as PF or seat position (i.e., L or R) are accomplished and for responding orally to the challenge.

Items designated on the checklist as PM or by seat position are the PM's responsibility. The PM accomplishes the item, then responds orally to their own challenge. In all cases, the response by either pilot is confirmed by the other and any disagreement is resolved prior to continuing the checklist.

After the completion of any checklist, the PM states "checklist is complete." This allows the PF to maintain situational awareness during checklist phases and prompts the PF to continue to the next checklist, if required.

If the PF fails to initiate a normal checklist at the appropriate time, good CRM practice requires that the PM suggest the initiation of the applicable checklist. Normal procedures checklist operations should be called for in a timely manner during low-workload periods (conditions permitting) to prevent any undue pressure or possible interruption that could defeat the purpose of the checklist and potentially be detrimental to safety. For example,

calling for the Before Takeoff Checklist while the PM is copying the ATC clearance is poor timing and should be avoided.

Situational awareness is not limited to only understanding the time/space relationship of the aircraft, but also includes an awareness of each crew member's current workload. Time and workload management, including the availability of the other pilot to participate, are key factors in the initiation and effective conduct of normal checklists.

2.2 One Pilot in Cockpit

The Preflight Inspection, Cockpit Preparation, Before Starting Engines and Shutdown checklist may be accomplished by one pilot alone. The Normal Engine Ground Start checklist may also be accomplished by one pilot but this is considered a non-normal procedure. A pilot that completes a checklist alone must advise the other pilot which checklist(s) has/have been completed.

2.3 Both Pilots in Cockpit

The normal method for conducting checklists in the CL-30 is using "Challenge and Response." Any response that is different from that which is listed indicates something is abnormal and must be challenged by the other crewmember before continuing. In all cases, follow specific company operating procedures when accomplishing checklists in the aircraft. When a response on a checklist is "as required" the appropriate crewmember should respond according to the actual switch position.

2.3.1 Omission of Checklists

While the PF is responsible for initiating checklists, the PM should ask the PF whether a checklist should be started if, in their opinion, a checklist is overlooked. As an expression of good crew resource management, such prompting is appropriate for any flight situation.

2.3.2 Actioning Normal Checklists

Critical items require a response by the PF. Less-critical items may be both challenged, completed, and responded to by the PM alone. To enhance communication and understanding between crewmembers, standard rules and phraseology should be used when conducting normal checklists:

- The challenged crewmember should respond only after verifying the required configuration and correcting any deviations from the correct settings
- If the required configuration is not possible, the challenged crewmember should clearly and completely respond by stating the actual configuration
- The challenging crewmember should always wait for a definitive response (and should cross-check the validity of the response) before moving to the next item
- For all aircraft, the crewmember responsible for reading the checklist should be responsible for ensuring that the checklist is completed systematically and expeditiously. This crewmember should be responsible for managing interruptions, cross-checking the controls and indicators to ensure that the required actions have been accomplished, and for reporting that the checklist has been completed.

NOTE: Some checklists include a line that defines a logical hold point to allow partial completion of the checklist. The crew can complete the checklist down to that line and then pause until further action is appropriate, and the remaining checklist items can be meaningfully completed. For those checklists, the PF would initiate the checklist by saying, "(Checklist name) to the line." Once those items are complete, the PM should state, "(Checklist name) to the line, complete."

2.3.3 Interrupting and Resuming Checklists

If a normal checklist must be interrupted for any reason, the PF should state a clear hold at the specific item in the checklist such as, "Hold checklist at (item)." An explicit call such as, "Resume (continue) checklist at (item)," should be made before the checklist is resumed.

NOTE: Upon resuming the normal checklist after an interruption, consideration may also be given by either the PF or PM to starting the entire checklist over, with the possible exception of electronic checklists.

2.3.4 Checklist Terminology

Checklist terminology is controlled to ensure clarity and common understanding between crewmembers.

- The challenges and responses on the checklist should be consistent with the labeling on the switches and controls in the cockpit
- Terms such as "tested," "checked," and "set" are acceptable terms only when they are clearly defined and consistently used
- The term "AS REQUIRED" on a checklist requires a response stating the actual status of that item, such as "ON" or "OFF" ("as required is not an acceptable response).
- This document establishes a consistent policy concerning responses to items with variable settings. "As required" may be printed on the checklist but a response that gives the actual setting is normally appropriate.
    - Items that require variable responses should be carefully evaluated. Such items may not actually be required on the checklist or may be more appropriately included in the system management portion of a checklist.
- With limited exception, when specific quantities are required, a response of "checked" is not acceptable. Responses to checklist items concerning liquid or gas quantities should be made in terms of the actual quantities on board compared to the specific quantity required, for example: "10,000 pounds required, 10,400 on board."
    - A response of "checked" is acceptable when a range of quantity is permitted and the range is marked on an indicator, such as a green arc on an oil quantity gauge.
- Excess verbiage on checklists should be discouraged. For example, a checklist item of "Reduce airspeed to 130 KIAS for best glide" can be abbreviated as "BEST GLIDE – 130 KIAS."

- Ambiguous verbiage on checklists is not acceptable. For example, “takeoff power” can mean either to advance the power or to retard the power.
- Emergency procedures should be clearly defined prior to the first flight of the day to determine each crew member’s responsibilities in the event an emergency or abnormal condition arise during the flight segment(s) (e.g., crew member priorities for passenger handling, aircraft securing, etc.)

2.4 Challenge/No Response

If the PM observes and challenges a flight deviation or critical situation, the PF should respond immediately. If the PF does not respond by oral communication or action, the PM must issue a second challenge that is loud and clear. If the PF does not respond after the second challenge, the PM must ensure the safety of the aircraft, announce that they are assuming control, and then take the necessary actions to return the aircraft to a safe operating envelope.

2.5 Definitions

L/R: Pilot Station

- Designation of seat position for accomplishing a given task because of proximity to the respective control/indicator. Regardless of PF or PM role, the pilot in that seat performs tasks and responds to checklist challenges accordingly.
  1. PF: Pilot Flying
  2. The pilot responsible for controlling the flight of the aircraft, either manually or through automation monitoring.
  3. PM: Pilot Monitoring
  4. The pilot who is monitoring the flight of the aircraft and actions of the PF.
  5. PIC: Pilot-in-Command
  6. The Pilot responsible for the operation and safety of an aircraft during flight time.

3 Briefings

Understanding that your fellow crew members do not have an infinite attention span, a long and detailed briefing is of little value if other crew members are task saturated.

Briefings enhance standardization and open communication between flight crewmembers by setting expectations and encouraging participation and teamwork. Effective communication requires both input and feedback. The ultimate objective is for the flight crew to know and understand the operation, not just cover a rote, generic list of items in each briefing.

A significant difference from prior briefing standards is the intentional identification of threats, and who initiates the identification of threats, relative to each phase of flight. In each briefing, the PM should identify relevant threats for the flight and open the briefing discussion with PF. A threat-based briefing concept, referred to as Threats, Plan, Considerations (TPC) has been designed to allow for the flight crewmembers to generate a discussion applicable to Threat and Error Management (TEM) in each specific phase of flight. Flight crewmembers should conduct TPC briefings in an interactive and collaborative manner, with each flight crewmember given the

opportunity to give and receive input. Therefore, it is up to the flight crew to decide, based on professional judgement, what is appropriate to be discussed.

NOTE: It is recognized that the number and quality of threats will vary based on each flight-specific scenario, and the briefings will be scaled to account for the variability of the present conditions.

Appendix 1 provides examples of how briefings may be structured to provide a standardized approach to the TPC concept.

3.1 General

The departure Briefing should always be accomplished during a low stress environment such as on the ramp before aircraft movement. If a runway change occurs during aircraft movement, the aircraft should be stopped when possible and the Takeoff Briefing accomplished with the Parking Brake set. Loading FMS data or accomplishing a Takeoff Briefing while the aircraft is taxiing is not recommended. The Takeoff Briefing has the most variables of any crew briefing. While it is impossible to list every variable, The departure briefing is conducted by the designated PF after the threats have been identified by the PM. It enables the PF to inform the PM of the planned course of actions (e.g., expectations, roles and responsibilities, unique requirements) for both normal and abnormal conditions during takeoff.

A full briefing should be conducted during the first flight of the day. Subsequent briefings may either be abbreviated or expanded to address specific threats and/or aspects of each subsequent flight segment.

The departure briefing should be guided and illustrated by referring to the applicable flight management system (FMS) pages, paper or electronic charts, and the navigation display to visualize the departure route and confirm the applicable data entries. Crews should exercise caution to avoid the element of complacency from detracting from the departure briefing. The briefing should focus on situationally relevant considerations.

Elements of a departure briefing/aircraft set-up should include, but are not limited to, the identified threats and plan(s) to mitigate errors, as applicable, related to:

- Weather information, runway/taxiway in use, and operational factors (such as de-icing information or land-and-hold short operations in effect), and weather required for an air-return or continuation to a takeoff alternate
- Applicable NOTAMs to determine the effect of airport surface closures, construction, NAVAID outages, and airspace restrictions
- Operational impacts of weather to include use of radar, windshear recovery procedures, use of anti-icing systems
- Dispatch conditions affecting takeoff performance such as high temperature operations, cold temperature conversions, or operating in mountainous terrain
- Maintenance logbook (MEL/CDL) to determine operational impact

- Takeoff performance limitations (structural, runway, second segment climb, obstacles) as well as any specific takeoff performance limitations (minimum climb gradient needed)
- Weight and balance data
- Engine-out procedures and departure path/altitude
- Expected takeoff runway, the runway condition and wind component
- Set computed takeoff data for the prevailing conditions including slats/flaps configuration, V-speeds, thrust settings, bleed air configuration, and anti-ice
- Noise-abatement procedure
- Initial altitude, routing, airspeed, airspace restrictions, and any special considerations
- NAVAIDs as required to fly and/or cross-check the departure path including altitude constraints
- Considerations for a rejected takeoff (RTO). Unless prohibited by the OEM, either pilot may call for a rejected takeoff (RTO). The PF will initiate the abort
    - **NOTE:** In aircraft where a tiller is present and the PF is in a pilot station without access to, or control of, the tiller, the PM will maintain directional control of the aircraft until a safe condition is available to transfer flight controls.
- When operating an aircraft that does not have a door between the flight deck and the passenger compartment, the pilot may need to ask passengers to maintain a sterile cockpit and refrain from unnecessary conversation from the time the preflight preparations begin until the time the aircraft is clear of the terminal area and at cruising altitude. The same procedure should be followed on arrival, from the time landing preparations begin until the aircraft is safely stopped at the terminal.

3.2 Takeoff Briefing and the Go/No-Go Decision

3.2.1 Go/No-Go Decision Criteria

The takeoff phase is arguably the most dangerous phase of aviation. Unlike other decisions in aviation, the Go/No-Go decision to abort or continue a takeoff is almost always irrevocable once it has been made. For this reason, the need for mental preparation based on current conditions cannot be overemphasized. Since conditions can vary greatly, it is best to decide on general guidelines and principles rather than extreme levels of detail:

- The first general guideline is to recall that the only malfunction, for which an aborted takeoff must be accomplished in order to meet performance criteria, is engine failure prior to V1. An aborted takeoff for all other malfunctions or conditions is at the discretion of the PIC.
- The second guideline deals with a loss of directional control. This could happen due to many factors including engine failure, thrust reverser deployment, nosewheel steering malfunctions, etc. If any of these events occur, it would be prudent to abort the takeoff. But what if there was an indication of thrust reverser deployment, but no

loss of directional control? If the takeoff is on a minimum length runway, it may be prudent to continue the takeoff since no loss of directional control would indicate an erroneous indication.

- The last general guideline is an aircraft deemed unsafe to fly. More than any other, this guideline highlights the many items that could influence the crew's decision to abort a takeoff or continue a takeoff. Given the inherent risks associated with a high-speed abort, great care must be taken when aborting the takeoff for indications alone absent any other evidence of an actual concern about the aircraft's ability to safely become airborne. This is especially critical for those situations where you are runway length limited and is approaching V1. Examples include, but are not limited to the following:
    - If the stick shaker is activated just prior to V_1 – is that a truly unsafe condition, or an erroneous angle of attack issue?
    - If multiple tire failures produced high vibration at V1, would you continue the takeoff, or try to stop with multiple failed tires?
    - If a red Door Open CAS message illuminates at V1, does that make the aircraft unsafe to fly?

Understanding that your fellow crew members do not have an infinite attention span, a long and detailed takeoff briefing is of little value if other crew members are not really listening. A high-speed abort can be a very serious event, and depending on runway length, weather conditions, and runway conditions, the situation can become critical.

3.2.2 Takeoff Briefing

If not previously briefed and confirmed in the departure briefing, a Takeoff Briefing should be conducted and include the following minimum items:

- Identified threats, plans, and considerations (TPC) to mitigate errors, as applicable
- Departure runway
- Departure procedure
- Power settings
- Speeds
- Abnormal or emergency procedures prior to or after reaching decision speed (i.e., RTO)
- Emergency return intentions
- Expectations of the other crewmember during the takeoff/departure

3.3 Arrival/Approach Briefing

While approach briefings are a very important part of a safe and effectively flown approach, two human factor realities must be considered: First is that the best briefings are not necessarily defined as the longest briefings. In most cases, short and to the point is better. Second is the attention and stress level of the pilot being briefed. Studies have shown that even at moderate

cockpit stress levels, most of a long approach briefing will be tuned out by the other pilot as he/she attempts to manage their stress and prioritize duties.

When setting up for an arrival/approach, a standard briefing format (see below) should be used. Under normal operations, each pilot is responsible for setting up their respective radios and NAVAIDs. The PF briefs the approach/landing after transferring (monitoring) the flight controls to the PM. Emergency operations (or absence of autopilot) may require deviations from this procedure.

After confirming the correct page number and date of the approach, start on the briefing strip at the top of the approach plate, and read across. Read the initial portion of the missed approach strip. Read any special notes pertinent to the approach. End the briefing with required visibility and approach lighting.

An arrival/approach briefing should communicate the following general elements with due consideration to the actual operational situation:

- Identified threats, plans, and considerations (TPC) to mitigate errors, as applicable
- For arrival procedures, a review of lateral and vertical flight path management including published, or ATC assigned speed restrictions
- Runway in use
- Instrument approach procedure identification and details
- Weather information (operational impacts such as use of radar, anti-ice, windshear)
- Applicable NOTAMs
- Landing performance considerations
- Runway(s)/taxiway(s) in use (surface conditions, wind direction, Deice, LAHSO, etc.)
- Terrain considerations / Obstacle clearance
- Required NAVAIDS
- Minimum altitudes
- Method required to establish aircraft on approach (radar vectors, transition route)
- Lateral and vertical flight path management
- Automation use
- Speed restrictions
- Communication requirements
- Fuel requirements (including alternate fuel)
- Any abnormal procedures such as system malfunctions, MELs
- Missed approach procedure (radar and non-radar procedures)

Following a chart brief, the airport diagram should be reviewed with emphasis on runway conditions, length, landing distance requirements, landing speeds, anticipated turnoff point,

anticipated taxi routes, and low-visibility taxi operations. Additionally, if a planned departure from normal SOPs is required to meet an operational requirement, this should be clearly reviewed and discussed during the briefing and prior to commencing the approach.

4 Philosophy for the Use of Advanced Technology Equipment

1. **Fly the aircraft**
   The flight crew is always responsible, above all else, to fly the airplane. This responsibility cannot be delegated or be allowed to pass unattended to automated equipment.
2. **Cockpit automation should enhance flight crew situational awareness**
   The use of cockpit automation should contribute to situational awareness of the flight crew. It should always be managed to increase situational awareness and reduce workload.
3. **Reversion to manual flight control / navigation**
   When cockpit automation interferes with situational awareness, automation should be removed and the flight crew should revert to manual flying to the extent necessary to regain situational awareness and maintain safe flight. If the automation is producing a result that is not immediately recognizable as unquestionably accurate, **DO NOT** attempt to diagnose the problem by interacting with the automation **while** the automation is still in control of the aircraft. Remove the automation's control of the aircraft and manually fly the aircraft along the correct lateral and vertical flight path, then the pilot monitoring can diagnose the discrepancy with the automation.
4. **Confirmation of information**
   Flight crewmembers should confirm receipt of information from each other, from sources outside the cockpit, and from automated sources. This can be accomplished by read-back, challenge and response, using independent resources, and announcing data from automated sources. Furthermore, all information and data received should be considered for logic and appropriateness.
5. **Human-centered automation**
   The safe, efficient operation of an aircraft is the sole responsibility of the flight crew. Use of automated equipment should always support the ability of the flight crew to perform required tasks safely and in as low a workload environment as possible. Whether using something as basic as the autopilot, or as advanced as the HUD/EVS, if you don't understand the automation completely, your workload will increase. While there can be no substitution for an extremely high level of proficiency with all of the G550's automation, it should only be used to the extent that it supports the flight crew. Remember, automation is there to serve us. We are not there to serve the automation.
6. **Guidance Panel Setting**
   When hand flying the aircraft, DO NOT make inputs into the Guidance Panel (GP). The PF should command the PM to make the GP inputs that you wish to make. When Autopilot is engaged, the PF should make all GP inputs with the exception of an ATC cleared altitude. An ATC cleared altitude should always be set into the GP Preselect

Window by the PM. This methodology keeps both pilots "in the loop" to the greatest degree possible.

4.1 Use of Automation

Automation features vary widely among aircraft. Regardless of the level of automation, the flight crew must be able to master its use, know when it is not working properly, and be able to assume manual control when necessary to maintain safety of flight and situational awareness. Crew coordination is required for successful use of automation. When the autopilot is engaged, the PF shall set all inputs on the Flight Guidance System (FGS), except altitude (or as defined by OEM). When the autopilot is off, the PF shall command all inputs and the PM will set all inputs to the FGS. When mode selections are set or commanded, both crewmembers must confirm that the desired selection has been made. Incorporating flight mode annunciators and flight guidance systems into a scan is essential. If automation is not responding according to expectations, it is important to remove the automation promptly and assume manual control.

The PM accomplishes navigation and communication radio tuning, identification, and ground communication. For navigation radios, the PM tunes and identifies all navigation aids. Before tuning the PF's radios, he announces the NAVAID to be set. In tuning the primary NAVAID, in particular, the PM coordinates with the PF to ensure proper selection sequencing with the autopilot mode. After tuning and identifying the PF's NAVAID (via auto tune feature or manually), the PM announces "(Facility) tuned and identified."

In tuning the VHF radios for ATC communication, the PM places the newly assigned frequency in the COM Tune window at the time of receipt. Pressing the appropriate line select key transfers the preselect frequency to the active frequency. After contact on the new frequency, the PM retains the previously assigned frequency for a reasonable time period. Any confusion in the flight deck related to ATC communication is immediately cleared up by requesting ATC confirmation.

4.1.1 Flight Management System

The crew should review the programmed FMS flight plan prior to starting engines. Normally, the pilot conducting the cockpit setup has programmed the FMS flight plan through either CDU. The flight plan is then displayed for review by both pilots against the dispatch release or ATC clearance routing. Any flight plan errors are corrected at this time.

Once the briefing is complete and both pilots agree with the FMS flight plan, it is cross-filled to the other FMS if operating in the Initiated Transfer mode.

During FMS navigation, both crewmembers should have the FMS mode selected on their Flight Displays. Any underlay information required should be displayed with the bearing pointers. The PFD-CMD mode of the guidance panel (GP) should always be selected to the flying pilot's side. When transitioning from VHF NAV mode to FMS mode or vice versa, the crewmember making the change will state the mode selected.

In the event of a discrepancy between a charted airway or procedure and the FMS database, the chart/map is the final authority. It is the responsibility of the crew to ensure that the FMS

guidance conforms to the chart. When the aircraft is operating below 10,000 feet MSL, regardless of autopilot operation, the PF should not program the FMS. Programming should be commanded by the PF to the PM. Above 10,000 feet, with the autopilot on, the PF may elect to provide input to the FMS, provided aircraft control is either transferred to the PM, or a briefing of flight conditions is conducted for the PM to have and maintain situational awareness of the aircraft. All FMS inputs should be verified by both crewmembers.

For arrival and approaches, the appropriate charts should be displayed and readily available. Full NAV/VNAV guidance using the FMS during terminal operations must be limited to situations permitting advance preparations, review of FMS programming and complete crew briefings.

This level of automation is not appropriate when significant changes to route or landing runway have been issued by ATC. In such situations, pilots should revert, at least temporally, to a lower level of automation. All approaches, both FMS Coupled and advisory (FMS data used for situational awareness), should be programmed in the FMS.

FMS Coupled approaches should be flown by using the FMS and the flight guidance system in NAV or Approach mode. Editing the flight plan after the approach label is permitted on advisory approaches only. Editing on an FMS Coupled approach cannot be done without consequences such as loss of the approach vertical guidance and canceling approach scaling if available.

WARNING
Extreme caution must be exercised by monitoring appropriate annunciators to ensure that the proper navigation information is selected and utilized on each approach.

NOTE: The PF will monitor/control the aircraft, regardless of the level of automation employed. The PM will monitor the aircraft and actions of the PF.

5 General Callouts/Procedures

NOTE: Changes to the aircraft state by one pilot should not be conducted without prior communication to the other pilot.

5.1 Setting up the Flight Deck for an Approach

In training as in actual line operations, setting up the flight deck for an approach is a critical step that must be absolutely mastered during training. For this reason, pilots should use the following standardized method of setting up the flight deck for every approach. Ensure the approach is "built, bugged, and briefed" prior to completing the Approach Checklist.

- PM normally obtains current weather and approach in use
- PF normally commands the PM to program the FMS
    - Ensures correct destination airport for the approach (if required)
    - Select Runway, Arrival, and Approach
    - Activates vectors to the appropriate approach fix (or use the PVOR function for UNS-equipped aircraft), when on radar vectors

    - Ensure RAIM, RNP, EPU and any charted temperature limitation if GPS approach
- PM hard selects navaid identifier on both NAV radios (if not already auto-tuned)
- PF/PM sets their respective inbound course (for approaches not coupled to FMS)
- PF/PM sets DA/MDA on their respective PFD
- PM ensures airspeeds (Vapp/Vref) are bugged

CDU:

- **"D"**estination - PM changes the destination airport (if required)
- **"A"**rrival - PM selects Arrival, Runway and Approach
- **"L"**anding - PM selects Landing prompt and fills in all the pages
- **"C"**ruise Altitude - PM selects cleared altitude in PERF CRUISE (CRZ annunciated between EPR gauges)
- **"A"**ctivate Vectors - PM selects ACT VECTORS when on radar vectors
- **"R"**aim - PM checks RAIM, RNP, EPU and any charted temperature limitation if GPS approach

Briefing Strip Items:

- PM hard selects navaid identifier on both NAV radios via the CDU PROG page (if not already auto-tuned)
- PF/PM sets their respective inbound course (for approaches not coupled to FMS)
- PF/PM sets DA/MDA on their respective PFD

5.1.2 Stabilized Approach Criteria

Approach callouts are aircraft specific. These callouts may include configurations, altitudes, and profile information specific to the type. However, all approaches should incorporate and meet stabilized approach criteria.

An approach is considered stabilized when the following criteria are met prior to reaching 1000' (IMC) or 500' (VMC) above TDZE:

- The aircraft is on the correct flight path
- Only small changes in heading/pitch are necessary
- From the final approach fix (point) inbound, maintain the selected airspeed as recommended by the manufacturer at plus/minus 5 knots to designated DA/H or MDA/H.
- The aircraft is in the correct landing configuration
- Sink rate is no greater than 1000 feet/minute; if an approach requires a sink rate greater than 1000 feet/minute, a special briefing should be conducted prior to beginning the approach
- Power/thrust setting is appropriate for the aircraft configuration and is not below the minimum power for the approach

- All briefings and checklists have been conducted

Specific types of approach are stabilized if they also fulfil the following:

- ILS approaches must be flown within one dot of the glideslope and localizer
- Category II or III approach must be flown within the expanded localizer band
- Circling approaches: wings should be level on final prior to 300 feet above touchdown zone elevation; and,
- Unique approach conditions or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing

Except for circling approaches, non-precision approaches should be conducted using Constant Descent Final Approach (CDFA) procedures unless conditions require and both crew members agree otherwise.

VMC	500 ft above TDZE

5.1.3 Altitude Changes

Prior to any altitude change, ensure the altitude preselector is set to the correct altitude. When passing one thousand feet (1000') to the selected altitude, the PM shall announce the following:

"{xxx} thousand climbing {xxx} thousand"

For example, "5000 climbing 6000" or "Flight level 230 descending flight level 220."

For aircraft equipped with an EPGWS, there is no need for the crew to echo altitude callouts such as "1000". However, to maintain situational awareness and prevent over-reliance on automation, the crew should confirm that the information from the EPGWS is consistent with other data available from the primary instruments. In non-EPGWS equipped aircraft, the crew should make callouts as published according to the OEM procedures.

5.1.4 Heading Changes

When a heading change is required, the PF will announce and set the new heading with the heading selector or direct the PM to set the heading when workload requires. The PM will verbally confirm the heading change matches with the PF announcement. When the PM makes the heading change for the PF, the PF will verbally confirm the heading change matches with the directed change.

5.1.5 Altimeter Changes

When a new altimeter setting is required (either ATC provided or by passing through the Transition Attitude/Level) the crew will set their respective altimeters and the PM pilot will

set the standby altimeter. The altimeters will be crosschecked for accuracy by the crew and verbally verified by stating:

"[altimeter setting]. Set and crosschecked."

5.1.6 Aircraft Control Transfer

The following standard callouts are used when there is a need to transfer aircraft control from one pilot to the other. In addition, the pilot transferring the controls will also state the status of the flight guidance system or aircraft state when flying without the use of automation and the pilot accepting controls will reiterate the aircraft state. Transferring aircraft control should take place in a three-step sequence:

1. Pilot transferring control states: *"*You have the flight controls, heading is 250, altitude is 6000, autopilot is ON, your flight controls…*"*
2. Pilot accepting control states: *"*I have the flight controls, heading is 250, altitude is 6000, autopilot is ON, my flight controls…*"*
3. Pilot transferring states second time: *"*You have the flight controls*"* and visually confirms the other pilot has the controls

5.1.7 Approach Altitude Call Outs

The minimum expected vertical path callouts on an approach are 1000, 500, 100 to minimums.

5.1.8 Pilot Monitoring (PM) Standard Callouts

Callouts between crew members is based on the philosophy of not calling out normal items to the greatest extent possible, and only calling out an abnormal situation. This keeps the cockpit "chatter" to a minimum and allows each crew member to focus on their duties. The following callouts apply generally and are not specific to any maneuver.

Whenever an ATC cleared altitude is selected in the GP's altitude preselect window:	PM states the new altitude and points to the preselect window. PF also states the new altitude and points to the preselect window.
When one thousand feet prior to the ATC cleared altitude:	"ONE THOUSAND TO GO"
When 1000' AGL above the touchdown zone	"ONE THOUSAND FEET"
When 100 feet prior to the DH, DA, or MDA:	"APPROACHING MINIMUMS" (See Note 1)
When at minimums:	"MINIMUMS" (See Note 1)
When 100 feet above touchdown zone:	"ONE HUNDRED" (See Note 1)

NOTE: Callout not required if it has been made by the EGPWS.

The following callouts are made by the PM when a deviation from normal is encountered. The response from the PF must always be: "CORRECTING" and then the PF must actually correct the situation. Stating the words "CORRECTING" but not actually correcting should be considered by the PM as a non-response. If there is no response by the PF, the PM must make the deviation from normal callout one more time. If there is still no response from the PF, the PM

MUST assume that a subtle incapacitation of the PF has taken place and take control of the aircraft by stating: “I HAVE THE AIRCRAFT.”

Altitude ±100 feet from target:	"ALTITUDE"
Localizer/Course deviation of 1/2 dot or more:	"LOCALIZER"
Glide path deviation of 1/2 dot or more:	"GLIDE SLOPE" or "GLIDE PATH"
Airspeed greater than 10 Knots above target:	"_____ KNOTS FAST"
Airspeed less than target:	"_____ KNOTS SLOW"
If Ground Spoilers DO NOT deploy after main gear touchdown:	"NO GROUND SPOILERS"
"If Thrust Reverser(s) DO NOT deploy or are not selected by the PF:	"NO THRUST REVERSERS"

6 Taxi

Extreme vigilance during taxi operations is required by both crewmembers to reduce the possibility of taxiway or runway incursions. The following procedures should be used as applicable to the operation:

- Identified threats, plans, and considerations (TPC) to mitigate errors, as applicable
- Conduct a pre-taxi/departure briefing that includes the expected taxi route. Review the airport layout and identify critical areas such as Hot Spots and constructions areas listed in NOTAMs. This briefing is essential to maintain coordination and prevent ground incursions since the crew member who receives the clearance may not be the crew member taxiing the aircraft.
- After taxi clearance has been received, verify the runway assigned, any restrictions, and the taxi route. The use of written taxi instructions is a good operating technique and should be encouraged.
- Have the airport diagram(s) out, available, and in use, to include any low visibility taxi routes depicted. As appropriate, cross check the aircraft heading, airport diagram, and airport signage to confirm aircraft position while taxiing.
- Use aircraft lighting as appropriate for the conditions.
- Use of all available exterior lighting is recommended when crossing a runway
- When crossing taxiways or runways, both crew members should be looking outside the aircraft to scan for traffic. Programming the FMS, running checklists, or other activities that keep the crew inside should be discontinued until the aircraft is in a position of reduced threats or stopped.
- Before crossing active taxiways/runways, the crew will visually verify any intersecting paths for the absence of traffic. Use of TCAS may indicate aircraft on final approach. The left seat pilot will state, “Clear Left” and the right seat pilot will state “Clear Right.”

- When approaching an entrance to an active runway, pilots will ensure compliance with hold short or crossing clearances by discontinuing non-monitoring tasks.
- Prior to crossing or taxiing onto any runway, verbally confirm ATC clearance with other crewmembers and visually scan the runway and approach area. The crew will confirm, per ATC clearance, that they are taxiing onto the correct takeoff runway.
- Once aligned with the assigned runway, the crew should visually and verbally confirm that heading indicator is appropriate for that runway. An aircraft equipped with the Runway Awareness Advisory System (RAAS) may provide this callout provided there is verbal acknowledgment from the crew.
- Read back all clearances/instructions to enter a specific runway, hold short of a runway, and taxi into the "line up and wait" position, including the runway designator.

7 Maneuvers Training

7.1 Stalls

Stall prevention and recovery should be trained in the following minimum configurations. OEM procedures may require additional training configurations.

- Clean
- Partial Flap (Takeoff Configuration)
- Landing
- High Altitude

Stall prevention will be accomplished in the appropriate phase of flight in accordance with the OEM's procedures. Stall recovery should be initiated at the first indication of an impending stall. Altitude loss and recovery altitude should be evaluated based on the phase of flight. The focus of stall recovery is to manage angle of attach and thrust needed to maintain safe flight.

7.2 Steep Turns

Steep turns are flown with 45 degrees of bank solely by reference to instruments. The minimum requirement is a turn of at least 180° in both directions. This task must be accomplished without intervention from the PM. Entry speed should be that prescribed by the OEM. In the absence of a manufacturer speed, the ACS should be consulted for applicable standards.

7.3 Time Critical Situations

When the aircraft, passengers, and/or crew are in jeopardy, remember three things:

- FLY THE AIRCRAFT – Maintain aircraft control.
- RECOGNIZE CHALLENGE – Analyze the situation.
- RESPOND – Take appropriate action.

7.4 Rejected Takeoffs

The aborted takeoff procedure is a pre-briefed maneuver; both crewmembers must be aware of and briefed on the types of malfunctions that mandate an abort. Assuming that the crew trains to a firmly established SOP, either crewmember may call for an abort.

Regardless of who calls the abort or RTO, the PF will initiate the abort. Reasons for rejecting a takeoff include:

- For Low-Speed Events – takeoff may be rejected for any non-normal condition
- For High-Speed Events – reject takeoff for an engine failure below V1, loss of directional control, or aircraft deemed unsafe to fly. At high speeds, it may be safer to continue the takeoff, even if below V1, based on weather, runway condition, runway length or indications that have no adverse effect on aircraft performance.

NOTE: In aircraft where a tiller is present and the PF is in a pilot station without access to, or control of, the tiller, the PM will maintain directional control of the aircraft until a safe condition is available to transition flight controls to the PF.

7.5 Critical Malfunctions in Flight

In flight, the observing crewmember positively announces a malfunction. As time permits, the other crewmember makes every effort to confirm/identify the malfunction before initiating any emergency action.

If the PM is the first to observe any indication of a critical failure, the PM announces it and simultaneously identifies the malfunction to the PF by pointing to the indicator/annunciator. After verifying the malfunction, the PF announces their decision and commands accomplishment of any checklist recall items. The PF monitors the PM during the accomplishment of those tasks assigned to him. It is a common crew practice for the PF to take control of the communications while the PM is performing abnormal and emergency procedures from the QRH.

7.6 Non-Critical Malfunctions in Flight

Procedures for recognizing and verifying a noncritical malfunction or impending malfunction are the same as those used for time-critical situations: use positive oral and graphic communication to identify and direct the proper response. Time, however, is not as critical and allows a more deliberate response to the malfunction. Always use the appropriate checklist to accomplish the corrective action.

8 Standard Operating Procedures and Callouts

8.1 Takeoff – Normal

Procedures for recognizing and verifying a noncritical malfunction or impending malfunction are the same as those used for time-critical situations: use positive oral and graphic communication to identify and direct the proper response. Time, however, is not as critical and allows a more deliberate response to the malfunction. Always use the appropriate checklist to accomplish the corrective action.

Lineup and Wait / Cleared for Takeoff	
PF	Confirm runway and final approach clear of traffic. ***CLEAR LEFT; CLEAR RIGHT***
PM	***CLEAR LEFT; CLEAR RIGHT***

PF	***RUNWAY LINEUP CHECKLIST*** Arm AT if installed
PM	Initiates Runway Lineup Checklist items. EICAS, Exterior lights, probes as required Confirm runway and final approach clear of traffic. ***RUNWAY LINEUP CHECKLIST COMPLETE***
PF	Confirm correct heading and runway alignment. ***RUNWAY [xx] CONFIRMED***
PM	Confirm correct heading and runway alignment. ***RUNWAY [xx] CONFIRMED***
If Right Pilot (RP) takeoff **PM and PF**	**LP:** ***YOU HAVE THE CONTROLS*** **RP:** ***I HAVE THE CONTROLS*** **LP:** ***YOU HAVE THE CONTROLS***
PM	Landing lights when aligned with runway and cleared for takeoff.
Takeoff	
PF	Place hand on thrust levers. Move up two clicks to the TO detent. If AT installed, advance past 23 degrees TLA (approx. mid−point travel) until servos engage. ***SET POWER***
PF	Verify Thrust levers in the TO detent
PM	Check engine instruments. ***POWER SET*** Monitor airspeed indications.
80 Knots	
PM	***80 KNOTS CROSSCHECKED*** Confirm Green HOLD mode if autothrottle equipped
V1 (Decision Speed)	
PM	At calculated decision speed: ***V1***
PF	Pilot commits to flight by removing hand from thrust levers.
VR (Rotation Speed)	
PM	***ROTATE***
PF	Rotate to align pitch with Flight Director command setting.
Positive Rate of Climb	
PM	When a positive rate of climb is indicated, announce: ***POSITIVE RATE***
PF	***GEAR UP*** Airspeed — accelerate to predetermined climb speed. Command desired F/D modes (400 AGL or as req.)
PM	Select gear up when commanded by PF.
Above Minimum Flap Retraction Altitude and Speed	

PM	At a minimum of 400' AGL, V2+15 and as prescribed by approved derived performance data **Approaching _____ Feet or "Acceleration Altitude"** **V2+15 (Flaps 10)** **V2+25 (Flaps 20)**
PF	***FLAPS UP*** Calls for desired A/P, and F/D modes
PM	Move flap selector to requested position and completes climb flows. Once flaps are indicating in that position, announce: **FLAPS UP**

8.2 Takeoff – Climb

At Initial Climb Speed after flap retraction (<200 KIAS), Prior to acceleration	
PM	***ANNUNICATORS CLEAR***
PF	Accelerates to Climb Speed and establishes Thrust Setting (CLB or as required) ***AFTER TAKEOFF-CLIMB CHECKLIST***
PM	Initiates After Takeoff Checklist silently ***AFTER TAKEOFF ITEMS COMPLETE***
Transition Altitude	
Crew	Sets altimeters to 29.92
PM	Confirms primary and standby altimeters set to 29.92 ***ALTIMETERS SET THREE TIMES*** Completes Climb (Transition Items) Checklist ***CLIMB CHECKLIST COMPLETE***

*8.3 Takeoff – Powerplant Failure at or Above V1*****

Lineup and Wait / Cleared for Takeoff	
PF	Confirm runway and final approach clear of traffic. ***CLEAR LEFT; CLEAR RIGHT, FINAL ITEMS***
PM	***CLEAR LEFT; CLEAR RIGHT***
PF	***RUNWAY LINEUP CHECKLIST*** Arm AT if installed
PM	Initiates Runway Lineup Checklist items. EICAS, Exterior lights, probes as required Confirm runway and final approach clear of traffic. ***RUNWAY LINEUP CHECKLIST COMPLETE***
PF	Confirm correct heading and runway alignment. ***RUNWAY [xx] CONFIRMED***
PM	Confirm correct heading and runway alignment. ***RUNWAY [xx] CONFIRMED***

If Right Pilot (RP) takeoff PM and PF	LP: ***YOU HAVE THE CONTROLS*** RP: ***I HAVE THE CONTROLS*** LP: ***YOU HAVE THE CONTROLS***
PM	Landing lights when aligned with runway and cleared for takeoff.
Takeoff	
PF	Place hand on thrust levers. Move up two clicks to the TO detent. If AT installed, advance past 23 degrees TLA (approx. mid−point travel) until servos engage. ***SET POWER***
PF	Verify Thrust levers in the TO detent
PM	Check engine instruments. ***POWER SET*** Monitor airspeed indications. ***AIRSPEED ALIVE***
80 Knots	
PM	***80 KNOTS CROSSCHECKED*** Confirm Green HOLD mode if autothrottle equipped
V1 (Decision Speed)	
PM	At calculated decision speed: ***V1***
PF	Pilot commits to flight by removing hand from thrust levers.
Engine Failure	
PF or PM	Pilot observing the failure: ***ENGINE FAILURE***
VR	
PF	Maintain Centerline and Directional Control
PM	***ROTATE***
PF	Smoothly rotate to FD command bars.
Positive Rate of Climb	
PM	***POSITIVE RATE***
PF	***GEAR UP*** Request desired FD mode. Climb to briefed Flap Retraction Altitude at V2. (If above V2, slow to no more than V2+10)
PM	Select gear up and requested FD modes. Declare emergency with ATC.
Note	Do not perform any checklists until 1,500 feet AGL or as defined by performance data

Reaching Briefed Acceleration Altitude [Part 2]	
PF	Maintain altitude at or above acceleration altitude and accelerate to enroute climb speed
PM	Verify airspeed is V2+15 (flaps 10) / V2+25 (flaps 20) or greater. **V2+15 (Flaps 10)**

	V2+25 (Flaps 20)
PF	***FLAPS UP, ENGINE FAILURE (ABOVE V1) CHECKLIST***
PM	Move flap selector to requested position. Once flaps are indicating in that position, announce: ***FLAPS UP*** PM Initiates Required Checklist

8.4 Powerplant Failure During Second Segment

Lineup and Wait / Cleared for Takeoff	
PF	Confirm runway and final approach clear of traffic. ***CLEAR LEFT; CLEAR RIGHT, FINAL ITEMS***
PM	***CLEAR LEFT; CLEAR RIGHT***
PF	***RUNWAY LINEUP CHECKLIST*** Arm AT if installed
PM	Initiates Runway Lineup Checklist items. EICAS, Exterior lights, probes as required Confirm runway and final approach clear of traffic. ***RUNWAY LINEUP CHECKLIST COMPLETE***
PF	Confirm correct heading and runway alignment. ***RUNWAY [xx] CONFIRMED***
PM	Confirm correct heading and runway alignment. ***RUNWAY [xx] CONFIRMED***
If Right Pilot (RP) takeoff PM and PF	LP: ***YOU HAVE THE CONTROLS*** RP: ***I HAVE THE CONTROLS*** LP: ***YOU HAVE THE CONTROLS***
PM	Landing lights when aligned with runway and cleared for takeoff.
Takeoff	
PF	Place hand on thrust levers. Move up two clicks to the TO detent. If AT installed, advance past 23 degrees TLA (approx. mid−point travel) until servos engage.***SET POWER***
PF	Verify Thrust levers in the TO detent
PM	Check engine instruments. ***POWER SET*** Monitor airspeed indications. ***AIRSPEED ALIVE***
80 Knots	
PM	***80 KNOTS CROSSCHECKED*** Confirm Green HOLD mode if autothrottle equipped
V1 (Decision Speed)	
PM	At calculated decision speed: ***V1***

PF	Pilot commits to flight by removing hand from thrust levers.
VR	
PM	***ROTATE***
PF	Rotate to align pitch with Flight Director command setting.
Positive Rate of Climb	
PM	When a positive rate of climb is indicated, announce: ***POSITIVE RATE***
PF	***GEAR UP*** Airspeed — accelerate to predetermined climb speed. Command desired F/D modes (400 AGL or as req.)
PM	Select gear up when commanded by PF.
Engine Failure	
PF	Climb at V2 to Acceleration Altitude
PF or PM	Pilot observing the failure: ***ENGINE FAILURE***
PM	Declares Emergency
Note	Do not perform any checklists until 1,500 feet AGL or as defined by performance data
Reaching Briefed Acceleration Altitude [Part 2]	
PF	Maintain altitude at or above acceleration altitude and accelerate to V2+15 (flaps 10) / V2+25 (flaps 20) (minimum)
PM	Verify airspeed is V2+15 (flaps 10) / V2+25 (flaps 20) or greater. **V2+15 (Flaps 10)** **V2+25 (Flaps 20)**
PF	***FLAPS UP, ENGINE FAILURE (ABOVE V1) CHECKLIST***
PM	Move flap selector to requested position. Once flaps are indicating in that position, announce: ***FLAPS UP*** PM Initiates Required Checklist
PIC	Delegate flying, communication, and checklist duties, as required.
PF	Continue climb at VT if necessary. Reduce thrust to CLB.

8.5 OEI During Climb to En-route Altitude

After acceleration and completion of ENGINE FAILURE AFTER TAKEOFF CHECKLIST	
PF	Maintains VENR Sets thrust on operative engine to CLB within ten minutes Calls for appropriate Checklist ***ENGINE FAILURE CHECKLIST***
PM	Initiates required checklist

PM	***ENGINE FAILURE CHECKLIST COMPLETE***
Reaching En-route Altitude	
PF	Set thrust as required
Crew	*Crew to discuss and decide next steps*

8.6 Steep Turns

Steep turns are flown with 45 degrees of bank solely by reference to instruments. The minimum requirement is a turn of at least 180° in both directions. (Unless applicant is checking for an initial rating, and then turns must be 360° in both directions.) This task must be accomplished without intervention from the PM. Entry speed should be that prescribed by the OEM. In the absence of a manufacturer speed, the ACS should be consulted for applicable standards.

8.6.1 Recovery from Nose-High Attitude

After confirming a nose-high attitude, low-airspeed condition exists, disengage AT, disconnect AP, and apply T.O. thrust while rolling toward the nearest horizon. Use up to 60° bank, depending on severity of the condition. When the nose passes through the horizon, smoothly roll to a wings-level attitude and recover to level flight.

8.6.2 Recovery from Nose-Low Attitude

After confirming a nose-low attitude with airspeed increasing, disengage AT, disconnect AP, and reduce thrust to idle while simultaneously rolling to a wings-level attitude. Increase pitch attitude to recover to level or climbing flight. Use spoilers, if necessary, to minimize increase in airspeed and altitude loss. Use caution to avoid exceeding G-limits during recovery.

8.7 TCAS/ACAS Resolution Advisory

TCAS RA	
PF	Simultaneously accomplish the following: Autothrottle (if installed) - Disengage Autopilot — Disconnect. Thrust — Adjust as required. Comply with displayed TCAS RA Guidance
PM	Monitor PF actions to ensure compliance with RA guidance. Advise ATC: ***[call sign] TCAS RA***
After Clear of Conflict Callout	
PF	Return to previously cleared altitude.

PM	Advise ATC returning to previously cleared altitude: ***[call sign] CLEAR OF CONFLICT, RETURNING TO [assigned altitude]***

8.8 CFIT/TAWS Escape Maneuver

Caution (Amber Alert)	
PF	Adjust aircraft flight path as necessary to eliminate the caution.
Warning (Red Alert)	
PF	Autothrottle – Disengage Autopilot – Disconnect Thrust — APR. Flight Spoilers – Retract Pitch — Increase up to stall warning, if necessary. Gear - Up Flaps— Do not retract until safe climb out is assured.
PM	Verify PF is responding to alert and provide climbing and descending trends.
PF	Climb to safe altitude.
Safe Altitude and Warning No Longer Present	
PM	**Advise clear of obstacles.**
PF	Resume normal flight path.
PM	**Notify ATC of deviations.**

8.9 Windshear Escape

8.9.1 Windshear

The best windshear procedure is avoidance. Recognize the indications of potential windshear and then: **AVOID**

8.9.2 Microbursts

Microbursts are small scale intense downdrafts that spread outward in all directions from the downdraft center as it nears the surface. This can result in both vertical and horizontal wind shears that can be extremely hazardous, especially at low altitudes. The aircraft may encounter a headwind with increasing performance (climb/increased airspeed), followed by a downdraft and tailwind, which decreases performance (descent and low airspeeds) to the point that terrain impact can occur.

8.9.3 Acceptable Performance Guidelines

- Understand that avoidance is primary
- Ability to recognize potential windshear situations
- Ability to fly the aircraft to obtain optimum performance

8.10 Windshear Procedures

Windshear Recognition	
PF or PM	***WINDSHEAR***
Windshear Callout	
PF	1. Thrust - APR 2. Spoilers – retract 3. Airplane Pitch Attitude - Initial pitch of 10° -15° (Flight Director Go-around pitch command) Note: Pitch attitudes in excess of 15° may be required for terrain avoidance. 4. Flight Spoilers - Confirm retracted Maintain configuration until obstacle clearance is assured. Pitch attitude should be increased smoothly and in small increments, bleeding airspeed as necessary to stop the descent.
PM	Verify PF is responding to alert and provide climbing and descending trends.
After Recovery	
PF	Flaps and gear — Retract as speed and altitude permit. Adjust thrust as required. Return to previous clearance or accomplish missed approach.
PM	**Provide PIREP to ATC.**

NOTE: *Windshear escape flight guidance is not provided. Do not retract the flaps or landing gear until a safe climb out is assured.* Flight at intermittent stick shaker may be required to obtain a positive rate of climb. Optimum performance may be obtained with airplane pitch attitude that results in the top of the red LSA tape.

8.11 Stall Recovery

Stall Indication	
PF or PM	Pilot observing indication: ***STALL***
Stall Callout	
PF	Autopilot — Disconnect. Pitch Control — Reduce angle of attack. Bank — Wings level. Thrust — APR. Spoilers — Retract.
PM	Monitor airspeed and altitude throughout the recovery, announce any continued divergence and advise ATC if deviating from clearance.
Airspeed Sufficiently Increasing	

PF	Recover to normal level flight path and if required, retract flaps and gear on schedule. NOTE If inside FAF on instrument approach procedure or less than 500 feet AGL on visual approach, accomplish go-around procedure.
PM	**Advise ATC if deviation from clearance occurred**.

NOTE: Recovery from an impending stall will not mandate predetermined altitude loss or a predetermined recovery altitude.

8.12 Stabilized Approach Criteria

Approach callouts are aircraft specific. These callouts may include configurations, altitudes, and profile information specific to the type. However, all approaches should incorporate and meet stabilized approach criteria.

An approach is considered stabilized when the following criteria are met prior to reaching 1000’ (IMC) or 500’ (VMC) above TDZE:

- The aircraft is on the correct flight path
- Only small changes in heading/pitch are necessary
- From the final approach fix (point) inbound, maintain the selected airspeed as recommended by the manufacturer at plus/minus 5 knots to designated DA/H or MDA/H.
- The aircraft is in the correct landing configuration
- Sink rate is no greater than 1000 feet/minute; if an approach requires a sink rate greater than 1000 feet/minute, a special briefing should be conducted prior to beginning the approach
- Power/thrust setting is appropriate for the aircraft configuration and is not below the minimum power for the approach
- All briefings and checklists have been conducted
- Specific types of approach are stabilized if they also fulfil the following:
- ILS approaches must be flown within one dot of the glideslope and localizer
- Circling approaches: wings should be level on final prior to 300 feet above touchdown zone elevation; and,
- Unique approach conditions or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing
- Except for circling approaches, non-precision approaches should be conducted using Constant Descent Final Approach (CDFA) procedures unless conditions require and both crew members agree otherwise.

8.13 Visual Approach – Normal

Cleared for Visual Approach	
PF	Minimum Airspeed — 180 kts ***FLAPS 10***
PM	Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ***FLAPS 10 SELECTED*** ***FLAPS 10 INDICATED***
PF	***FLAPS 20***
PM	Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ***FLAPS 20 SELECTED*** ***FLAPS 20 INDICATED***
Downwind Leg Abeam Threshold or Top of Descent for Straight-in Approach	
PF	Minimum Airspeed — 140 kts ***GEAR DOWN, FLAPS 30, BEFORE LANDING CHECKLIST***
PM	Select gear down, then verify indication. ***GEAR DOWN*** ***THREE GREEN, NO RED*** Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ***FLAPS 30 SELECTED*** ***FLAPS 30 INDICATED*** Complete Before Landing Checklist. ***BEFORE LANDING CHECKLIST COMPLETE***
PF	Maintain Airspeed - Vref
1000 ft Above Runway Elevation	
PM	***1000 FEET, MISSED APPROACH ALTITUDE SET*** Note: Missed approach altitude shall be 1500AGL or as previously briefed.
500 ft Above Runway Elevation	
PM	***500 FEET***
PF	Ensure stabilized approach criteria are met. ***STABLE, CONTINUING*** When landing is assured: ***LANDING***

8.14 Visual Approach – One Engine Inoperative (OEI)

In Range-	
Descent	
PF	***SINGLE ENGINE DESCENT CHECKS***
PM	Completes Single Engine Landing Descent Checks ***SINGLE ENGINE DESCENT CHECKS COMPLETE***
Transition Level (or FL 180)	
PF	***SINGLE ENGINE TRANSITION LEVEL CHECKS***
PM	Completes Single Engine Landing Transition Level Checks ***SINGLE ENGINE TRANSITION LEVEL CHECKS COMPLETE***
Transition through 10,000'	
PF	***SINGLE ENGINE APPROACH CHECKS***
PM	Completes Single Engine Landing Approach Checks ***SINGLE ENGINE APPROACHCHECKS COMPLETE***
Downwind Leg Abeam Threshold or Top of Descent for Straight-in Approach	
PF	***SINGLE ENGINE BEFORE LANDING CHECKS***
PM	Completes Single Engine Before Landing Checks. ***SINGLE ENGINE BEFORE LANDING CHECKS COMPLETE***
PF	Minimum Airspeed — 140 kts ***GEAR DOWN***
PM	Select gear down, then verify indication. ***GEAR DOWN*** ***THREE GREEN, NO RED***
PF	Minimum Airspeed — 180 kts ***FLAPS 10***
PM	Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ***FLAPS 30 SELECTED*** ***FLAPS 30 INDICATED***
1000 ft Above Runway Elevation	
PM	***1000 FEET, MISSED APPROACH ALTITUDE SET***
PF	Ensure stabilized approach criteria are met. ***CONTINUING*** When landing is assured: ***LANDING***

8.15 Visual Approach – Flap Malfunction

Cleared for Visual Approach	
PF	Minimum Airspeed — Adjusted Maneuvering VREF ***FLAPS FAIL CHECKLIST TO BEFORE LANDING CHECKS***
PM	Accomplish Flaps Fail Checklist to Before Landing Checks. ***FLAPS FAIL CHECKLIST TO BEFORE LANDING CHECKS COMPLETE***
Downwind Leg Abeam Threshold or Top of Descent for Straight-in Approach	
PF	***GEAR DOWN, BEFORE LANDING CHECKS***
PM	Select gear down, then verify indication. ***GEAR DOWN*** ***THREE GREEN, NO RED*** Complete Flaps Fail Before Landing Checks. Set missed approach altitude in the Altitude Preselector.
1000 ft Above Runway Elevation	
PM	***1000 FEET, MISSED APPROACH ALTITUDE SET*** Note: Missed approach altitude shall be 1500AGL or as previously briefed.
500 ft Above Runway Elevation	
PM	***500 FEET***
PF	Ensure stabilized approach criteria are met. ***STABLE, CONTINUING*** When landing is assured: ***LANDING***

8.16 Precision Approach

Approaching IAF	
PF	Minimum Airspeed — 180 kts **APPROACH CHECKLIST**
Radar Vector Base Leg, or IAF Outbound	
PF	Minimum Airspeed — 160 kts ***FLAPS 10***
PM	Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ***FLAPS 10 SELECTED*** ***FLAPS 10 INDICATED***
Vector to Intercept or Procedure Turn Inbound	
PM	***COURSE ALIVE***
Prior to Glideslope/Glidepath Intercept (or FAF for CDFA non-precision approach)	
PF	Minimum Airspeed — 160 kts ***GEAR DOWN, FLAPS 35, BEFORE LANDING CHECKLIST***

PM	Select gear down, then verify indication ***GEAR DOWN*** ***THREE GREEN, NO RED*** Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ****FLAPS 35 SELECTED*** ***FLAPS 35 INDICATED*** **2 Eng Only* Complete Before Landing Checklist (or SE Appr/Ldg Checklist Below the Line) Set missed approach altitude in the Altitude Preselector.
Glideslope/Glidepath Captured	
PF	***SET MISSED APPROACH ALTITUDE***
PM	Set missed approach altitude in Altitude Preselector.
1000 ft Above TDZE	
PM	Ensure stabilized approach criteria are met. ***1000 FEET, STABLE, MISSED APPROACH ALTITUDE SET***
100 ft Above DA/DH (or DDA for CDFA non-precision approach)	
PM	***APPROACHING MINIMUMS*** Look outside for runway environment.
Reaching DA/DH (or DDA for CDFA non-precision approach)	
PF	***MINIMUMS***
(1) Runway in Sight	
PM	***RUNWAY ___ O'CLOCK***
PF	***LANDING***
(2) Approach Lights Visible	
PM	***APPROACH LIGHTS***
PF	***CONTINUING*** Continue approach to 100 ft above TDZE.
(a) 100 ft Above TDZE — Runway in Sight	
PM	***RUNWAY ___ O'CLOCK***
PF	***LANDING***

(b) 100 ft Above TDZE — Runway Not in Sight	
PM	***GO-AROUND***
PF	Initiates Go-Around Procedure
(3) Runway/Runway Environment Not in Sight — Accomplish Missed Approach Profile	
PM	***GO-AROUND***
PF	Initiates Go-Around Procedure

8.17 Non-precision Approach

NOTE: For CDFA view the precision approach SOP

Approaching IAF	
PF	Minimum Airspeed — 180 kts
Radar Vector Base Leg, or IAF Outbound	
PF	Minimum Airspeed — 160 kts ***FLAPS 10***
PM	Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ***FLAPS 10 SELECTED*** ***FLAPS 10 INDICATED***
Vector to Intercept or Procedure Turn Inbound	
PM	***COURSE ALIVE***
[No Greater Than 3] NM Prior to Final Approach Fix	
PF	Minimum Airspeed — 140 kts ***GEAR DOWN, FLAPS 20***
PM	Select gear down, then verify indication ***GEAR DOWN*** ***THREE GREEN*** Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ****FLAPS 20 SELECTED*** ***FLAPS 20 INDICATED*** **2 Eng Only*
1500 ft Above TDZE	
PF	Minimum Airspeed — Vref ***FLAPS 30, BEFORE LANDING CHECKLIST*** ***If Single Engine, "Single Engine Approach and Landing Checklist"***
PM	Verify below flap setting speed. Move flap selector to requested position. Verify selection of flap lever and flap position indicator. ****FLAPS 30 SELECTED*** ***FLAPS 30 INDICATED*** **2 Eng Only* Complete Before Landing Checklist (or SE Appr/Ldg Checklist Below the Line)
Final Approach Fix	
PF	Begin descent.
PM	Start timing, if required. Verify next altitude is set in Altitude Preselector.
1000 ft Above TDZE	
PM	***1000 FEET, STABLE***

100 ft Above MDA	
PM	***APPROACHING MINIMUMS*** Look outside for runway environment.
Capturing MDA	
PF PM	***MINIMUMS, SET MISSED APPROACH ALTITUDE*** *Setting missed approach altitude*
(1) Runway in Sight	
PM	***RUNWAY ___ O'CLOCK***
PF	***LANDING***
(2) Runway Not in Sight — Accomplish Missed Approach Profile	
PM	***GO-AROUND***
PF	Initiate Go Around

8.18 Circling Approach

NOTE: While maneuvering during a circling approach, fly a minimum of adjusted V_{REF} + 10 . When established on final in the landing configuration, fly at V_{REF} + wind factor until reducing power slightly to cross the runway threshold at V_{REF} + wind factor.

Airport Environment in Sight and within Circling Radius	
PM	Advise airport environment in sight.
PF	***CIRCLING***
PM	Announce any deviations to altitude or airspeed.
Leaving MDA	
PF	***LEAVING MINIMUMS***
Aligned with Landing Runway	
PF	Be less than 15° of bank by 300 feet aligned with runway centerline. ***LANDING***

8.19 Missed Approach – All Engine (Single Engine)

Go-around Callout	
PF	***GO-AROUND, THRUST SET, FLAPS 10*** TOGA button — Press. AT – Disengage, if applicable. Thrust Levers — TO Detent. Pitch — Increase Pitch into command bars. Minimum Airspeed — V_{GA}.
PM	Confirm minimum altitude and speed for flap retraction has been met. Move flap selector to requested position. Once flaps are indicating in that position, announce: ***FLAPS 10***
Positive Rate of Climb	
PM	***POSITIVE RATE***

PF	***GEAR UP*** Minimum Airspeed — V_{GA}. Request desired FD modes.
PM	Retract landing gear. Select requested FD modes. Verify missed approach altitude is set.
Reaching Briefed Acceleration Altitude	
PM	At minimum acceleration altitude or minimum of 400 feet Minimum Airspeed – V_{GA} +15 ***ACCELERATION ALTITUDE*** ***V_{GA} + 15***
PF	***FLAPS UP, Go Around Checklist*** Resume normal climb profile to MAA.
PM	Confirm minimum altitude and speed for flap retraction has been met. Move flap selector to requested position. Once flaps are indicating in that position, announce: ***FLAPS UP*** Accomplish the Go Around Checklist. ***GO-AROUND CHECKLIST COMPLETE***

8.20 In-Flight Powerplant Shutdown and Restart

Engine Shutdown	
PF	***ENGINE SHUTDOWN IN FLIGHT CHECKLIST***
PM	***ENGINE SHUTDOWN IN FLIGHT CHECKLIST***
Crew	Accomplish Checklist as a crew
PM	***ENGINE SHUTDOWN IN FLIGHT CHECKLIST COMPLETE***
Crew	*Crew to evaluate restart and decide next steps*
Engine Restart	
PF	***ENGINE AIR START CHECKLIST***
PM	***ENGINE AIR START CHECKLIST***
Crew	Complete Checklist as a crew
PM	***ENGINE AIR START CHECKLIST COMPLETE***
Crew	*Crew to discuss and decide next steps*

8.21 Descent

Initiating Descent	
PF	Establishes descent speed and thrust setting ***DESCENT CHECKLIST***
PM	Initiates Descent Checklist ***DESCENT CHECKLIST (to transition level)***

Cleared through Transition Altitude	
Crew	Sets altimeters to local setting
PM	Confirms primary and standby altimeters set ***ALTIMETERS SET ___.___ THREE TIMES*** Continues Descent Checklist ***DESCENT CHECKLIST COMPLETE***

8.22 Landing (Normal, Crosswind, Flap Malfunction, OEI, or from Instrument Approach)

After touchdown	
PF	Lowers nose wheel to runway and maintains directional control Applies Wheel Brakes Deploys Thrust Reverser(s) Maintains forward pressure on control column
PM	***SPOILERS DEPLOYED***
60 knots	
PM	***60 KNOTS***
PF	Return to Reverse Idle by 40 KIAS
Clear of Runway	
PF	***AFTER LANDING CHECKLIST***
PM	Initiates After Landing Checklist ***AFTER LANDING CHECKLIST COMPLETE***

8.23 Emergency Evacuation

After PIC Determines Evacuation Required	
PIC	Brings aircraft to a stop Sets Parking Brake Calls for Evacuation Checklist Initiates and completes memory items Commands evacuation
SIC	Reports evacuation to ATC Upon evacuation command, departs cockpit and leads evacuation of passengers
PIC	Activates ELT (if required) Last to exit aircraft; ensure passengers have evacuated

Sample Cabin Evacuation Command (ICAO Verbiage): "Open Seatbelts, Get Out, Leave Everything"

8.24 Ice Accumulation on Airframe

PF	Confirms ice protection activated
PM	Reports icing conditions to ATC and any equipment malfunction Requests climb, descent, or course change, as required.

PF	Initiates altitude or course change, as required Calls for appropriate ice protection malfunction checklist, as required Remains clear of known or forecast icing conditions if malfunction has occurred.

8.25 Holding

Holding instructions received	
Crew	Confirms holding instructions & EFC time Establishes clean configuration
PM	Inputs holding definition into FMS Confirms holding definition with PF ***THE HOLD IS PROGRAMMED***
PF	Confirms holding pattern entry heading(s) Slows to holding speed within 3 minutes
PM	Reports established in the hold to ATC Confirms holding speed

9 Expanded Normal Procedures and Abbreviated Checklists

The TSWG recommends use of the following abbreviated and modified checklists. In all other instances, operators shall use the manufacturer recommended checklists. Sample checklists are included below for reference.

9.1 Abbreviated Checklists

BEFORE STARTING ENGINES		
1. CIRCUIT BREAKERS	PF OR PM	SET
2. ◊SEATS/HARNESSES	PF OR PM	SECURE
3. O2 MASKS/GOGGLES	PF OR PM	CHECK
4. ◊LANDING GEAR	PF OR PM	DOWN
5. ◊L, R, AUX HYD PUMP SWITCHES	PF OR PM	OFF
6. ◊AIR SOURCE	PF OR PM	OFF
7. ◊L & R PROBES	PF OR PM	OFF
8. ◊BATTERIES (R, THEN L)	PF OR PM	ON
9. L & R COCKPIT LTS	PF OR PM	AS DESIRED
10. ◊APU START	PF OR PM	COMPLETE
11. ◊FUEL QUANTITY	PF OR PM	CHECK
12. ◊STANDBY INSTRUMENT	PF OR PM	CHECK
13. CLOCK	PF OR PM	ZEROED/FLT TIME
14. ◊NWS	PF OR PM	OFF
15. ◊L & R FUEL PUMP	PF OR PM	AUTO
16. FMS	PF OR PM	PROGRAM
17. REVERSION PANEL	PF OR PM	NORM
18. AIR COND/BLEED PANEL	PF OR PM	CHECK

19. ◊ANTI-ICE PANEL	PF OR PM	CHECK
20. PRESURIZATION PANEL	PF OR PM	CHECK
21. LIGHTING PANEL	PF OR PM	AS DESIRED
22. ◊GUST LOCK	PF OR PM	STOWED/DOWN
23. HYDRAULIC PANEL	PF OR PM	SET
24. PARKING BRAKE	PF OR PM	SET
25. TRIM SYSTEM	PF OR PM	CHECK AND SET
26. ELT	PF OR PM	ARM
27. CABIN DC & AC POWER	PF OR PM	ON
28. PAX O2	PF OR PM	AUTO
29. THERAPEUTIC O2	PF OR PM	ON/CHECK
30. ALTIMETERS (3)	PF OR PM	SET
31. AVIONICS	PF OR PM	SET FOR DEPARTURE
32. TAKEOFF DATA	PF OR PM	COMPUTED, SET, & CHECKED FOR ENV'T

BEFORE STARTING ENGINES - Continued		
CHECKS REQUIRE TWO PILOTS		
33. SYSTEMS TEST*	PF **AND** PM	COMPLETE
34. L & R RUDDER PEDALS*	PF **AND** PM	ADJUST
35. L & R AUDIO PANELS*	PF **AND** PM	SET
36. ECIAS MESSAGES*	PF **AND** PM	CHECK

*Check requires two pilots

STARTING ENGINES		
1. CHOCKS & PINS	PF & PM	REMOVED
2. MAIN CABIN DOOR	PF OR PM	CLOSED
3. PARK/EMER BRAKE HANDLE	PF & PM	CONFIRMED SET
4. THRUST LEVERS		SET
5. STROBE SWITCH	PM	ON
6. ENGINE START		COMPLETE
7. GENERATORS	PF & PM	CHECK ONLINE
8. GUST LOCK		REMOVED & STOWED

BEFORE TAXI		
1. WING ANTI-ICE SWITCH	PM	ON
2. FLAPS	PF & PM	10* OR 20*
3. AUX PUMP SWITCH	PM	AUTO
4. FLIGHT CONTROLS	PF & PM	CHECK
5. FLIGHT SPOILERS	PF & PM	CHECK
6. GND SPOILERS	PF & PM	CHECK
7. YAW DAMPENER	PM	ON
8. EICAS	PF & PM	CHECK
9. PAX BRIEF	PM	COMPLETE

10. ANTI-ICE PANEL	PM	CHECK
11. CABIN CHECK	PM	COMPLETE
12. AIRPLANE LIGHTING	PM	AS REQUIRED
13. SMKG/BELTS SWITCH	PM	SMKG/BELTS
14. NWS SWITCH		ON
15. PARK/EMER BRAKE		RELEASE

TAXI AND BEFORE TAKEOFF		
1. XPDR/TCAS	PM	SET
2. BRAKES/NOSE WHEEL STEERING	PF & PM	CHECK
3. FLT INSTRUMENTS	PF & PM	CHECK
4. THRUST REVERSERS		CHECK
5. ENGINE INST/N1 BUGS	PF & PM	CHECK
6. TAKEOFF DATA	PF & PM	CONFIRM DISPLAYED
7. NAV EQUIPMENT	PF & PM	CHECK
8. CREW TAKEOFF BRIEF		COMPLETE
9. RADAR/TERRAIN	PF & PM	AS REQUIRED
10. ANTI-ICE PANEL	PF & PM	AS REQUIRED

RUNWAY LINEUP		
1. CORRECT RUNWAY	PF & PM	CONFIRM
2. L & R PROBE SWITCHES	PM	ON
3. L/R LANDING, N LDG/TAXI LIGHTS	PM	ON
4. STROBE SWITCH	PM	STROBE
5. EICAS	PF & PM	CHECK

TAKEOFF		
1. THRUST LEVERS		TO
2. AT VR		ROTATE

AFTER TAKEOFF		
1. LANDING GEAR	PM	UP
2. FLAPS	PM	UP
3. N LDG/TAXI LIGHT SWITCH	PM	OFF
4. ANTI-ICE PANEL	PF & PM	AS REQUIRED
5. L & R HYD PUMP SWITCHES	PM	AUTO

CLIMB		
1. THRUST LEVERS	PF & PM	CLIMB
10,000 FT CHECKS		

2. SMKG/SEAT BELT SWITCH	PM	AS REQUIRED
3. BLEED TRANSFER	PM	CHECK
4. APU SHUTDOWN	PF & PM	COMPLETE
5. PRESURIZATION	PM	CHECK
TRANSITION LEVEL		
6. ALTIMETERS	PF & PM	SET
7. L/R LANDING LIGHT SWITCHES	PM	OFF

CRUISE		
1. FUEL BALANCE	PF & PM	CHECK
2. CRUISE POWER		SET

DESCENT		
1. APPROACH SET UP/CREW BRIEF	PF & PM	COMPLETE
2. PRESURIZATION	PM	LNDG ALT SET
3. WING ANT-ICE	PM	AS REQUIRED
4. L/R ENG ANTI-ICE SWITCHES	PM	AS REQUIRED
TRANSITION LEVEL		
5. ALTIMETERS	PF & PM	SET
6. L/R LANDING LIGHT SWITCHES	PM	AS REQUIRED
7. CABIN CHECK	PM	COMPLETE
8. SMKG/BELTS SWITCH	PM	SMKG/BELTS
9. FUEL QUANTITY AND BALANCE	PF & PM	CHECK

APPROACH		
1. APU START		COMPLETE
2. LANDING DATA	PF & PM	REVIEW
3. RA MIN	PF & PM	IF REQUIRED
4. BARO MIN	PF & PM	SET
5. MIN ALERT		SET
6. L/R HYD PUMPS		AUTO

BEFORE LANDING		
1. LANDING GEAR	PF & PM	DOWN
2. L/R LANDING LIGHTS		ON
3. FLAPS	PF & PM	30*

GO AROUND		
1. GO AROUND IMMEDIATE ACTIONS		COMPLETED

2. FLAPS		10*
3. LANDING GEAR		UP
4. CLIMB IAS		V2 OR ABOVE
5. CLEAR OF OBSTACLES, IAS		V2 + 15, RETRACT FLAPS

AFTER LANDING/CLEARING RUNWAY		
1. L/R PROBES		OFF
2. WING ANTI-ICE		AS REQUIRED
3. L/R ENGINE ANTI-ICE		AS REQUIRED
4. LIGHTING		AS REQUIRED
5. FLAPS		AS REQUIRED
6. XPDR/TCAS		AS REQUIRED

SHUTDOWN		
1. PARK/EMER BRAKE	PM	SET
2. CHOCKS	PM	INSERT
3. NWS SWITCH	PM	OFF
4. L/R WINDSHIELD/WINDOW SWITCHES	PM	OFF
5. EMER LIGHTS SWITCH	PM	OFF
6. ENGINE RUN SWITCHES	PM	OFF
7. XPDR	PM	STBY
8. STROBE SWITCH	PM	OFF
9. GEAR PINS	PM	INSERT
10. HYD PANEL	PM	OFF
11. GUST LOCK	PM	SET
12. L/R COCKPIT LIGHTS	PM	AS DESIRED
13. CABIN AC/DC POWER SWITCHES	PM	OFF
14. APU	PM	OFF
15. NAV LIGHTS	PM	OFF
16. STBY INST	PM	OFF
17. ATN	PM	OFF
18. L/R BATT	PM	OFF

9.2 Expanded Procedures and Flows

The manufacturer's checklists describe the expanded normal procedures used in this curriculum. The abbreviated checklists are an additional feature to this curriculum and utilized as cockpit checklists per 135.83 to verify accomplishment of critical items contained in the normal procedures. Unless specified, these checklists are used in a challenge-response format to verify that normal procedures have been previously accomplished.

The manufacturer's normal procedures (MNP) are further categorized by this curriculum as 1) Flow Patterns, and 2) Abbreviated Checklist items. Operators utilizing the standardized curriculum are required to use the abbreviated checklists provided in this curriculum, and train with the use of the flow patterns given in this curriculum. Additional operator-specific items may be added to the following abbreviated checklist segments that do not occur in critical phases of flight when FAA-accepted by the operator's POI: Cockpit preparation, before start, climb (transition up), cruise, descent (transition down), after-landing, and shutdown provided the order of checklist items remains fixed. Abbreviated checklist modifications are also permissible for aircraft variations/STC modifications. Additionally, operators may incorporate additional flow procedures in their company-specific SOPs, so as long as they do not conflict with, remove, or re-order any normal procedures described herein.

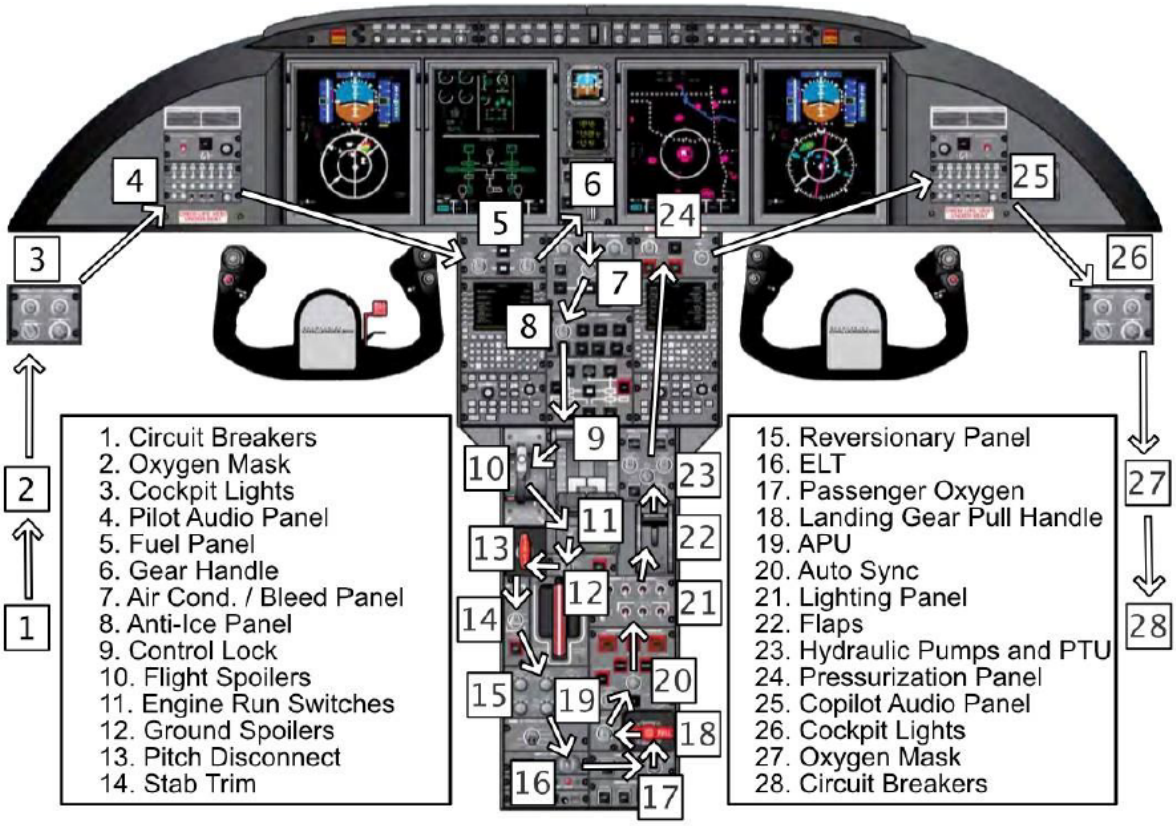
Abbreviations:
MNP: Manufacturer's Normal Procedures
PIC: Pilot In Command
SIC: Second In Command
LP: Left Pilot
RP: Right Pilot
PF: Pilot Flying
PM: Pilot Monitoring

9.3 Before Start – Expanded Procedures and Flows

LP: Accomplishes cockpit items in the *Before Starting Engines* Procedure *(MNP)*

RP: Accomplishes exterior and cabin items in the *Before Starting Engines* Procedure *(MNP).* This includes checking the status of wheel chocks, closing and verifying the status of the main cabin door, and providing the passenger briefing.

After the *Before Starting Engines Procedure (MNP)* in the manufacturer's checklist is performed with LP and RP seated, the PIC/LP calls for the BEFORE START CHECKLIST. After completed, the SIC verbalizes "BEFORE START CHECKLIST COMPLETE".

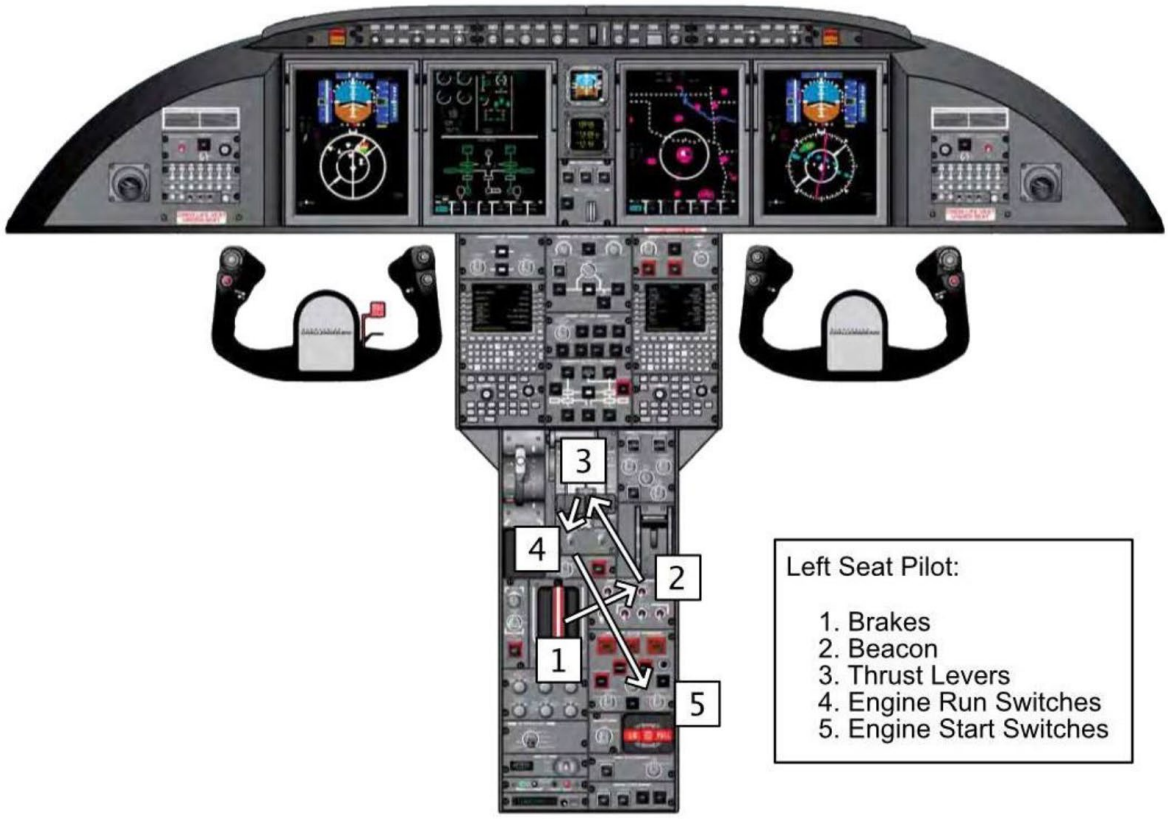


9.4 Starting Engines – Expanded Procedures and Flows

LP: Verbalizes a "**Clear Left**" and await a "**Clear Right**" response from RP prior to starting. LP announces which engine will be started, and signals to line personnel before engaging the starter.

LP Action	Check	LP Callout
Start and Release	R STARTER	
Check	Engine Instruments	
Start and Release	L STARTER	
Check	Engine Instruments	
Verify Connected	External air Source	
	Bleed Pressure	***32 PSI***
Run	ENGINE RUN Switch	
Start and Release	STARTER	
Check	Engine Instruments	
	Repeat steps 3-5 to start other engine	
Disconnect	External air source	
Closed	XBLEED Switch	
On	L and R BLEED Switches	

Disconnect	EXT PWR Switch	***AVAILABLE***
	Cross Bleed Source (refer to QRH Supplement)	
OFF	APU BLEED Switch	
ON	Operating Engine BLEED Switch	
Advance	Operating engine thrust level	
	Bleed Pressure Starting with a tailwind may require bleed pressure greater than 32 PSI	***32 PSI***
Run	ENGINE RUN Switch	
Start and Release	STARTER	
Check Normal	Engine Instruments	
Closed	XBLEED Switch	
On	L and R Bleed Switch	
Disconnect	EXT PWR Switch	***AVAILABLE***



RP's role during the engine start is to monitor engine instruments, ITT, and scan outside the aircraft for any abnormalities (including additional line personnel signals).

AFTER START: LP – Performs the DC Amps & Volts Check specified in the MNP. If the APU was used during the start, command ***APU GENERATOR OFF*** from RP before the generator check is performed, and ***APU GENERATOR ON*** from RP after the check is complete, while verifying proper voltage.

9.5 Before Taxi – Expanded Procedures and Flows

The items in the MNP *Before Taxi* procedure are completed as a flow pattern. After the Avionic Switch is activated by the LP, the division of tasks are normally as follows:

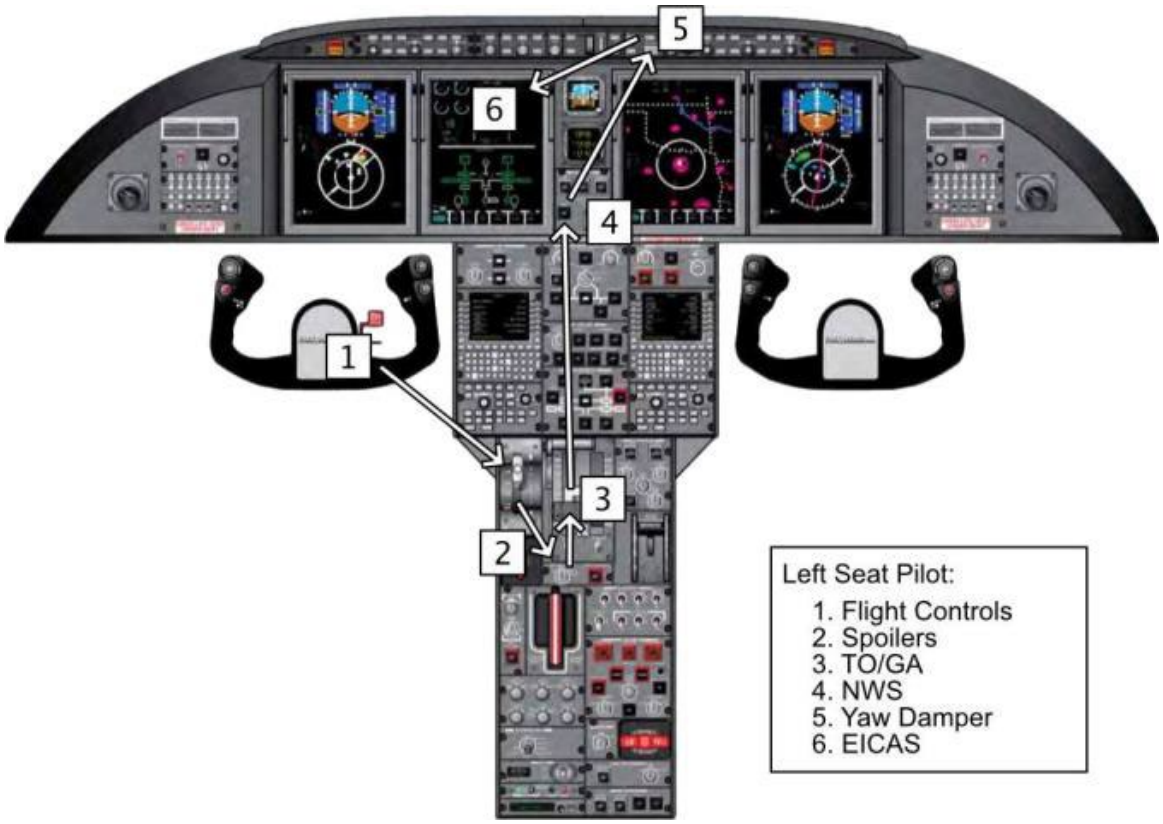
LP –

- Checks flight controls, spoilers, trims, and sets flaps
- Checks yaw damper
- Checks Nosewheel Steering
- Sets the pressurization controller and EICAS.
- Sets the anti-ice, as required
- EFIS and autopilot checks
- Sets Left PFD – TOGA/FD, source and course

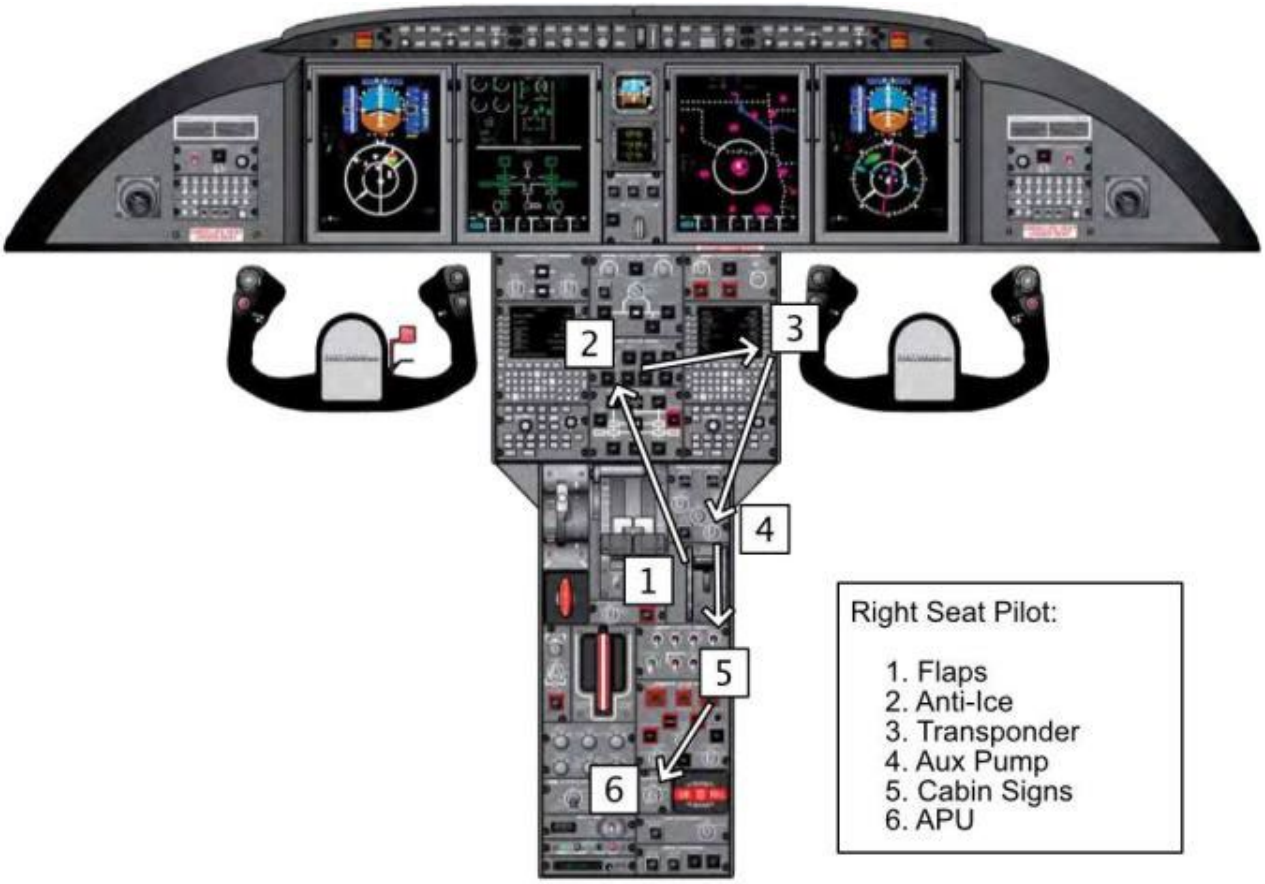
RP –

- Completes electric pitch trim functionality test with LP
- Obtains weather and clearance, if not obtained during cockpit preparation.
- Powers and programs the FMS
- Sets the altitude selector to the initial altitude and verbalizes the altitude.
- Sets V-speeds for takeoff and emergency return
- Sets Communication frequencies, navigation frequencies, and transponder.
- Sets Right PFD source and course
- Sets Aux Pump
- Checks Cabin Signs
- Checks APU

Left Pilot Before Taxi Set-up - Basic Flow Pattern (after generator checks complete)



Right Pilot Before Taxi Set-up - Basic Flow Pattern (after generator checks complete)



After all flows are completed and avionics are programmed, PIC/LP calls for the **BEFORE TAXI CHECKLIST**. After completed, the SIC verbalizes **"BEFORE TAXI CHECKLIST COMPLETE".**

After completing before taxi flows, the LP calls for the ***BEFORE TAXI CHECKLIST***. RP initiates and completes the checklist in a challenge-response format, and calls ***BEFORE TAXI CHECKLIST COMPLETE***.

9.6 Taxi and Before Takeoff – Expanded Procedures and Flows

LP: Normally taxis the aircraft unless delegated to RP. Accomplishes the *Taxi Procedures (MNP).* Verbalizes the taxi clearance with the RP and reviews route and hotspots prior to movement. Performs rudder bias check while stationary if unable to accomplish while on the ramp. After completing MNP taxi checks, calls for the ***TAXI CHECKLIST***.

RP: Monitors LP taxi items and responds to LP callouts. Stows thrust reversers and verifies proper lights and annunciators. After completing MNP taxi checks, completes the abbreviated Taxi checklist (unless performing taxi as delegated by LP) and verbalizes ***TAXI CHECKLIST COMPLETE*** upon completion.

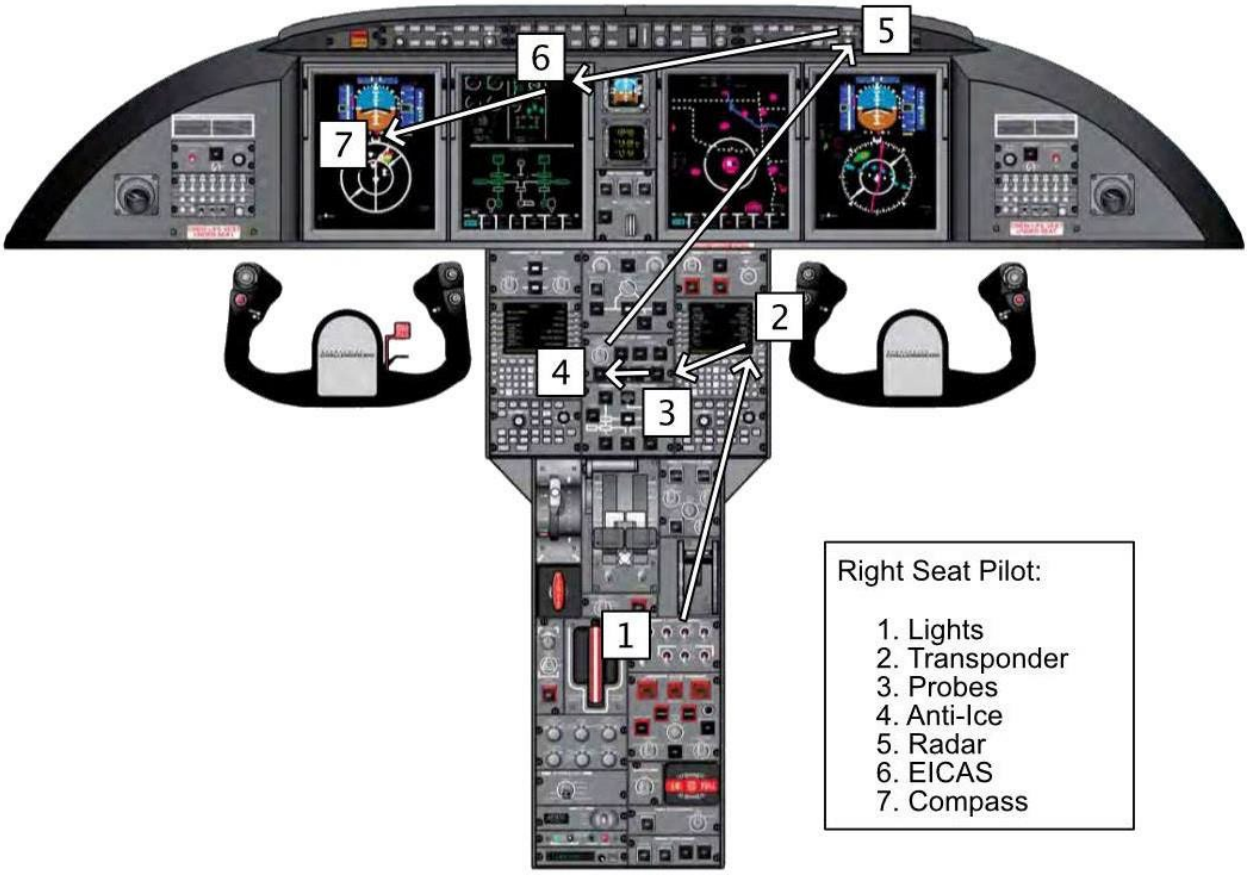
9.7 Before Takeoff – Expanded Procedures and Flows

The before takeoff checklist is normally performed at any point where the aircraft is stationary prior to departure after taxi items have been completed, with the LP calls for the takeoff checklist and the RP completes the checklist and verbalizes its completion "to the line". For short taxis, this may be performed while on the ramp after completion of the Before Taxi Checklist.

Takeoff Briefing: The pre-departure takeoff briefing is normally conducted prior to initiating the Before Takeoff Checklist. This may be accomplished prior to taxi, if runway and departure procedures are known. This includes the following, at a minimum, plus any additional operator-specific items required to be briefed:

- Runway
- Initial course/heading (normal and emergency)
- Acceleration height/flap Retraction
- Initial altitude
- Speed restrictions
- Emergency return plan (including airport, approach, and runway)

- Threats & mitigation



9.8 After Takeoff-Climb – Expanded Procedures and Flows

Takeoff and Initial Climb: See published profiles. After gear retraction at 400 AGL, the PF normally commands desired flight director modes.

After flap retraction:

PF: While flying the published aircraft takeoff and climb profile, PF normally commands the following items contained in the After Takeoff/Climb MNP (ex. “FLC 180 knots, Yaw, Lights, and Fans”, or “FLC 180, Autopilot, Lights, and Fans”)

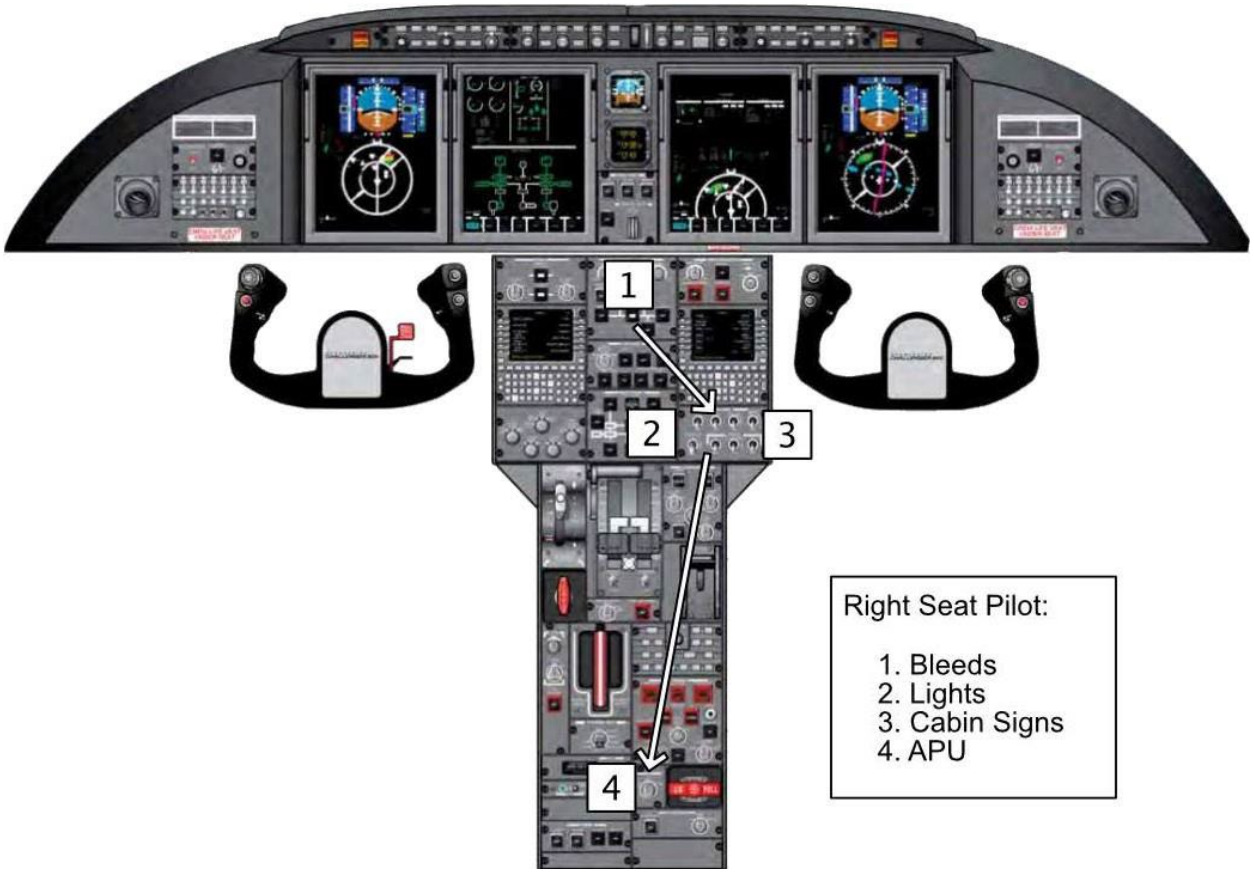
PM: Sets the following items on the After Takeoff/Climb MNP after PF command

- Autopilot modes – Adjust FLC airspeed if directed by PF
- Autopilot and/or Yaw Damper – Engage (verbalize “Autopilot Engaged” or “Yaw Damper Engaged”)
- Landing Lights – to REC position
- Engine Sync – Engaged (FAN)

- Confirm flap position indicator and annunciators

Additionally, PM will monitor annunciators after flap retraction and confirm when annunciators are clear prior to acceleration in order to ensure correct horizontal stabilizer position. After acceleration and any high workload periods, the PF calls for the ***AFTER TAKEOFF CHECKLIST*** per published standardizations.

Climb Flow Items performed by PM after flap retraction (and FLC mode set)



Transition Altitude: Upon reaching transition altitude the PF sets his/her altimeter to 29.92 and PM sets his/her altimeter and the standby altimeter, and completes the abbreviated ***CLIMB – Transition Up*** Checklist.

9.9 Descent – Expanded Procedures and Flows

Prior to transition altitude, passenger service items should be completed prior to checklist initiation. The PM will check and brief passengers at a safe altitude above transition level, as required, on the following items (as a flow):

- Lavatory Door – Ensure latched open
- Passenger Seatbelts/shoulder harnesses – Ensure secure
- Passenger Seats – Ensure upright, outboard, with tray tables stowed prior to landing.

The ***DESCENT Checklist*** is performed to the Transition Level hold line. Upon passing through FL180, complete the DESCENT Checklist below the line.

9.9 Approach – Expanded Procedures and Flows

Prior to completing the approach checklist, the following is performed:

PM:

- Obtains destination weather (ATIS, AWOS/ASOS)
- Builds the approach in the FMS when commanded by the PIC
- Sets NAV radios to appropriate frequencies for the approach with appropriate green needle course, when applicable
- Bugs approach minimums (DA/MDA) on PFD
- Bugs approach and landing speeds (VREF and VAPP)

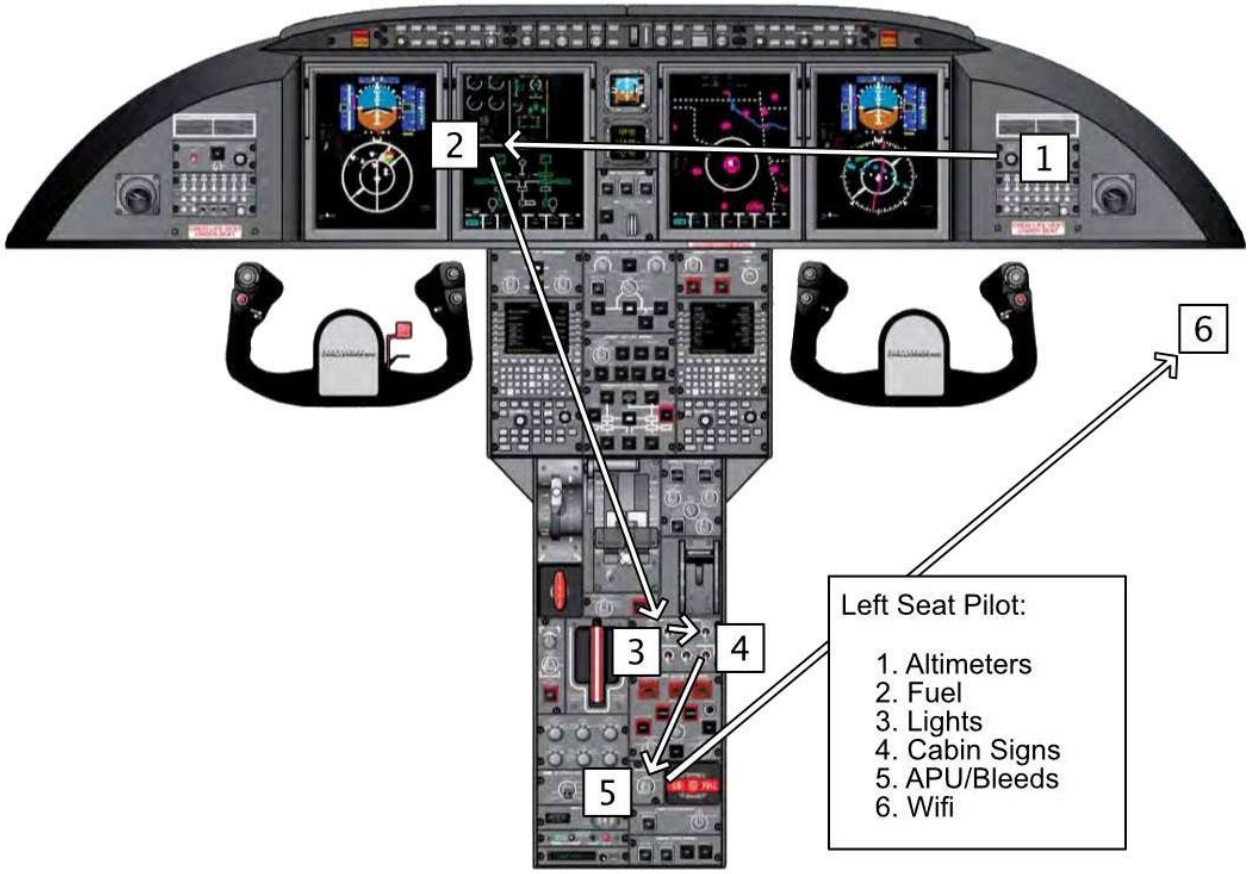
PF:

- Command PM to build approach on PFD, or builds approach using a positive exchange of flight controls.
- Sets PFD "green needle" course (if approach is not coupled to FMS).
- Bugs approach minimums (DA/MDA) on PFD
- Briefs approach, using positive exchange of flight controls

Per the MNP and published standardizations, flaps are extended (normally to 10 degrees) in the approach phase below 200 KIAS, prior to the FAF.

If PF is hand-flying the aircraft, PM performs all PF items above at direction of PF. The abbreviated ***APPROACH CHECKLIST*** is performed after runway assignment and approaches are set-up and briefed per MNP, with the exception of passenger items, which are normally performed at or above transition altitude when possible. For shorter segments at lower altitudes, the passenger items are briefed prior to departure and the Passenger Safety Switch normally remains on for the duration of the flight.

Approach Flow Items performed by PF when cleared to descend below transition level



9.10 Before Landing – Expanded Procedures and Flows

Per the MNP, and aircraft limitations the autopilot and yaw must be disengaged before the published minimum altitudes, and spoilers must be retracted by 50'. The other required configuration items are checked and verbalized using the abbreviated ***BEFORE LANDING CHECKLIST.***

9.11 After Landing – Expanded Procedures and Flows

After landing, avoid making any configuration changes on the runway. After the following flows are performed, the abbreviated ***AFTER LANDING CHECKLIST*** is performed by the PM (normally RP) to verify items are accomplished.

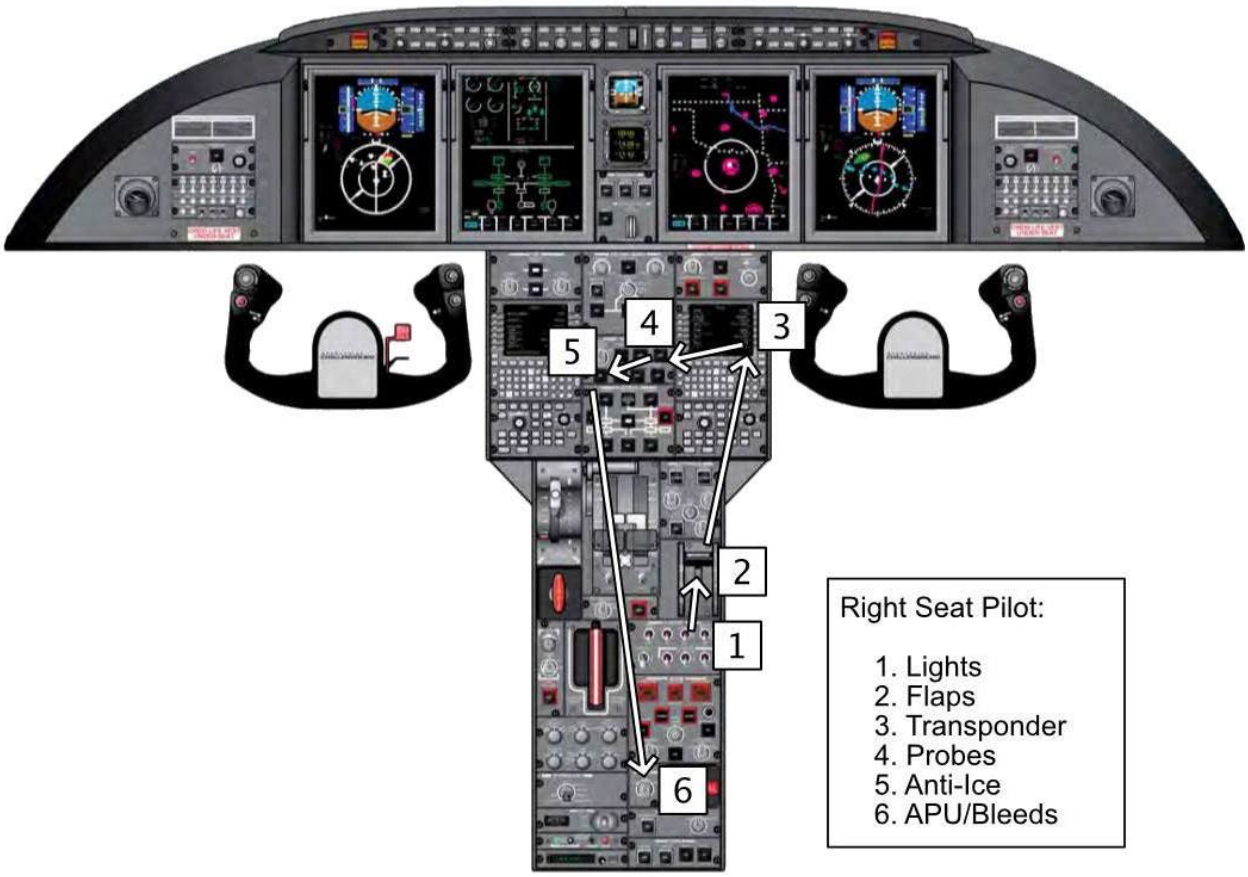
LP:

- Sets ignitions to NORM
- Switches pitot-static heat to OFF

PM:

- Performs all other items per MNP

After Landing Flow Items performed by PM when clear of the hold short line of the active runway and familiar with the required and cleared taxi route



9.12 Go Around (2 Engine) – Expanded Procedures and Flows

The MNP and SOPs describe the normal procedure for the go-around. The Missed Approach (2 eng) abbreviated checklist is performed after the MNP items are complete, including the flows described below. After the initial climb is established with gear retracted (and flaps retracted to 10 degrees), the following actions are taken:

PF:

- Ensures correct PFD Source - NAV or FMS
- Commands “Engage NAV” or “Engage HDG” as required for lateral guidance (and FLC, if desired)
- Commands Autopilot Engagement, if desired.
- Per SOPs at acceleration altitude, commands “flaps up”.

PM:

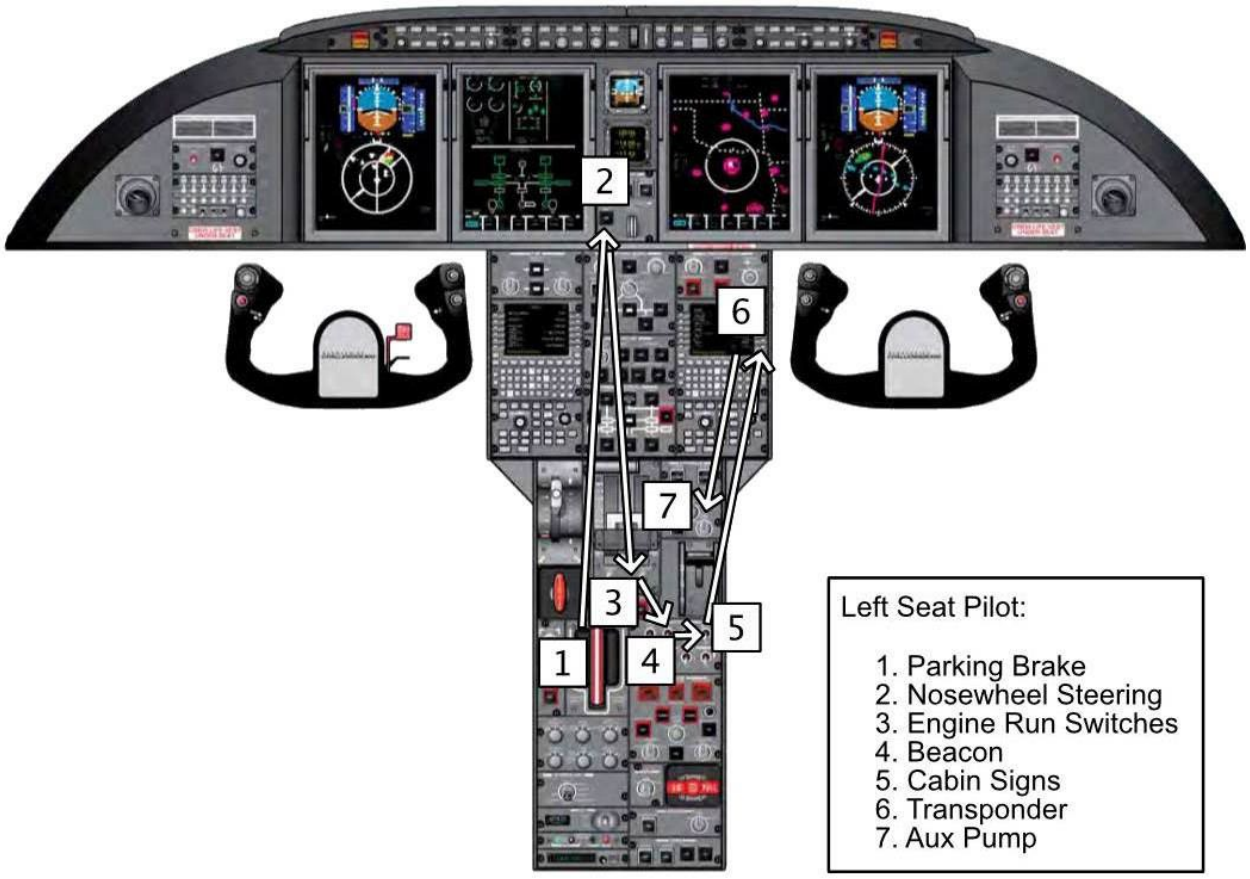
- Confirms autopilot missed approach altitude
- Sets PFD Source – NAV or FMS

- Engages NAV or HDG flight director modes
- Engages Autopilot/Yaw Damper per PF
- Calls acceleration altitude and retracts flaps at PF command, and monitor annunciators
- Reports the missed approach to ATC

9.13 Shutdown – Expanded Procedures and Flows

Engine shutdown is performed per MNP. The parking brake is first set by the LP. After challenge-response items are accomplished in the abbreviated checklist, the LP performs the MNP as a flow, then verifies the remaining abbreviated checklist items in a read-verify format.

Shutdown Flow Items performed by PF and PM stopped at the parking position with the parking brake on



Appendix 1. Briefings

1 General

Briefings enhance standardization and open communication channels between Crewmembers by setting expectations and encouraging all Crewmembers to participate and act as a team. Effective communication requires both input and feedback. The ultimate objective is for the Crew to know and understand the operation, not just cover bullet items of the briefings. It is up the Crew to decide, in your professional judgement, what needs to be discussed in any given situation.

Briefings also conduct relevant information in an interactive and collaborative manner, providing each crewmember the opportunity to give input. Broader perspective and items are included below; however, the following format will be followed when conducting a TPC briefing:

- **Threats.** Reference the Threat table (in the TPC (EXPANDED POLICY), below). This list is not all inclusive, but it is directed towards the most common Safety needs, and Operational Risks These will change as threats change and are to be used as a starting point.
- **Plans.** Brief relevant Plan items. These are listed on Normal Procedures Checklist as they are more likely to be relevant.
- **Considerations.** Considerations are how the crew will close the loop and pick up anything that did not fit in the aforementioned "Threats and Plans."

Re-brief as necessary any changes to items previously briefed and encourage other Crewmembers to verbalize deviations from the briefed plan.

2 TPC (Expanded Policy)

2.1 Threats

A general list of common threats applicable to flight operations is listed in Figure 1-1. This list is not all inclusive but is comprised of common industry safety and operational risks. These risks may change as threats are identified, reported, and analyzed by the TSWG through operator's voluntary ASAP and SMS reporting.

THREATS		
AIRPORT/RUNWAY	**ATC**	**OPS/DISPATCH/MX**
□ Contamination	□ Clearance changes	□ Schedule pressure
□ Construction	□ Departure/arrival	□ Open squawks
□ Hotspots	□ Runway changes	□ Release changes
ADVERSE WX	**AIRCRAFT**	**ENVIRONMENT**
□ Visibility	□ Systems	□ Terrain (GPWS)
□ Cold/hot	□ MELs	□ Night operations
□ Winds	□Automation	□Traffic (TCAS)
□ Turbulence/precip	□ Performance	□ Uncontrolled airport

GROUND/FBO	**PHYSIOLOGY**	**CABIN/SERVICE**
□ Catering	□ Fatigue	□ Passengers
□Wing walkers	□ Situational awareness	□Technology (WiFi)
□ Delays	□ Nutrition	□Stock/cleaning

2.2 Plan

The PF should collaborate with the PM on designing a plan to mitigate each identified threat. Briefings will then include any relevant Plan strategies.

2.3 Considerations

Considerations are discussed to close the loop between identified Threats and expected Plan(s) of action to either:

- Identify any items that were not previously included in the Threats and Plan discussion
- Identify any new threats introduced with the plan strategy(ies)

Re-brief as necessary any changes to items previously briefed and encourage other non-flying flight crewmembers (when available) to verbalize deviations from the briefed plan.

Appendix C – CL-30 Training Hours Summary

CL-30 Standardized Curriculum

1 Overview – CL-30 Course 1

1.1 Course 1 Training Hours Summary

CL-30 COURSE 1	
Day 1	**Planned Hours**
Aircraft General	1.0
Aircraft Manuals	1.0
Auxiliary Power Unit	1.0
Electrical	3.0
Powerplant	2.0
Day 2	**Planned Hours**
Oil System	0.5
Fuel System	1.5
Hydraulic System	1.0
Landing Gear and Brakes	1.5
Thrust Reverse	1.0
Pneumatic and Environmental Systems	2.5
Day 3	**Planned Hours**
Avionics	8.0
Day 4	**Planned Hours**
Ice Protection	1.7
Oxygen	1.0
Pitot-static System	0.8
Flight Controls	3.0
Fire and Smoke Detection Protection and Suppression	1.5
Day 5	**Planned Hours**
Lighting	0.8
Flight Profiles and Maneuvers	2.0
CRM	4.0
Windshear	1.0
Day 6	**Planned Hours**
Weight and Balance	1.0
Flight Planning and Performance	3.0
MEL and CDL	0.5
Preflight	2.5
Ground School Completion Exam	1.0
Day 7	**Planned Hours**
SIT 1*	3.0

1.2 Course 2 Training Hours Summary

CL-30 COURSE 2	
Day 1	**Planned Hours**
Aircraft Manuals	0.25
MEL and CDL	0.25
CRM	1.00
Aircraft General	0.75
Weight and Balance	1.00
Flight Planning and Performance	1.00
Flight Profiles and Maneuvers	0.50
Avionics and Communications	1.50
Windshear	0.25
Lighting	0.25
Auxiliary Power Unit	0.25
Electrical System	1.00
Day 2	**Planned Hours**
Avionics and Communications	0.50
Powerplant	1.00
Oil System	0.25
Thrust Reverse	0.50
Fuel System	0.50
Hydraulic System	0.50
Landing Gear and Brakes	0.50
Fire and Smoke Detection, Protection and Suppression	0.50
Flight Controls	0.75
Pneumatic and Environmental Systems	1.50
Pitot-static System	0.25
Ice Protection	0.50
Oxygen	0.25
Ground School Completion Exam	0.50

5 Overview – Course 2

Course 2		
Day 1	**Ground**	**Systems Integration**
Aircraft Manuals	8.0	0.0
MEL and CDL		
CRM		
Aircraft General		
Weight and Balance		
Flight Planning and Performance		
Flight Profiles and Maneuvers		

Avionics and Communications		
Windshear		
Lighting		
Auxiliary Power Unit		
Electrical System		

Course 2		
Day 2	**Ground**	**Systems Integration**
Avionics and Communications	8.0	0.0
Powerplant		
Oil System		
Thrust Reverse		
Fuel System		
Hydraulic System		
Landing Gear and Brakes		
Fire and Smoke Detection, Protection and Suppression		
Flight Controls		
Pneumatic and Environmental Systems		
Pitot-static System		
Ice Protection		
Oxygen		
Ground School Completion Exam		

Simulator Session 1	Brief	Crew	Single
Interior preflight and prestart procedures	2.0	4.0	4.0
Powerplant Start			
Taxi			
Before Takeoff Checks			
Normal Takeoff and Climb with Crosswind			
Departure Procedures			
Steep Turns			
Recovery From Unusual Flight Attitudes			
Clean configuration stall prevention			
Partial Flap Configuration Stall Prevention			
Landing Configuration Stall Prevention			
Arrival Procedures			
Precision Approach			
Missed Approach			
Go-Around/Rejected Landing			
Approach and landing with pitch mistrim			
Landing From a Precision Approach			
Normal Approach and Landing with Crosswind			

After landing, parking and securing			

Simulator Session 2	Brief	Crew	Single
Taxi	2.0	4.0	4.0
Instrument takeoff			
Windshear escape maneuver during take off			
Stall Prevention and Recovery			
EGPWS escape maneuver			
TCAS Traffic Advisory (TA)			
TCAS Resolution Advisory (RA)			
Decompression			
Emergency Descent			
Nonprecision Approach			
Missed Approach			
Holding			
Inflight Powerplant Failure and Restart			
Circling Approach			
Go-Around/Rejected Landing			
Landing From a Circling Approach			
Visual Approach (VFR Procedures)			
Windshear escape maneuver during landing			
Landing from a No Flap or Nonstandard Flap Approach			

Simulator Session 3	Brief	Crew	Single
Taxi	2.0	4.0	4.0
Rejected Takeoff			
Instrument Takeoff			
Powerplant Failure During Takeoff at V1			
Airframe icing			
Precision Approach with Powerplant Failure (manual control)			
Missed Approach - OEI			
Precision Approach			
Landing From a Precision Approach			
Lower than Standard Minimum Takeoff			
Powerplant Failure During Second Segment			
OEI Climb to En Route Altitude			
Nonprecision Approach			
Approach and Landing with a Powerplant Failure			
Inflight fire and smoke			

Flight by reference to standby flight instruments, backup instrumentation, or partial panel			
Emergency evacuation			

Appendix D – CL-30 Differences Courses Learning Objectives

CL-30 Standardized Curriculum

None.