Part 142 Training Program Specialty Curriculum – ATP CTP Course

Original

CAE SimuFlite

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RECORD OF REVISION

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1 ATP CTP Course

In accordance with Title 14 Code of Federal Regulations (14 CFR) Part 61 § 61.156, this course has been developed by CAE SimuFlite to deliver an Airline Transport Pilot (ATP) Certification Training Program (CTP) under 14 CFR Part 142 for clients (students) seeking ATP certification. This course addresses the modification to ATP certification requirements for transition from commercial pilot certification to an airline transport operational environment. Successful completion of this course will provide students with the necessary background, in terms of knowledge and experience, toward effective integration to the ATP realm.

1.1 Course Objective

The intent of the academic training portion of the ATP CTP is to bridge the gap between the knowledge of a commercial pilot and the knowledge expected of an ATP certificate holder. This knowledge is the academic foundation for ATP applicants to begin understanding the complexities they face in the next phase of their professional development.

The intent of the FSTD training portion of the ATP CTP is to reinforce air carrier concepts and principles taught in the academic portion of the course. Although somewhat different from typical FSTD training courses, the applicant will not be expected to perform maneuvers to proficiency with psychomotor skills. The objective is to demonstrate and allow the student to experience the high-level concepts of larger, faster, and more complex transport category aircraft. Since the student is not being trained how to fly a specific aircraft type, the expectation is that the applicant will learn the expected outcomes and understand concepts shown to be true to all transport category aircraft.

1.2 Course Prerequisites

Pilot-in-Command (PIC) and Second-in-Command (SIC) trainees must meet the minimum eligibility requirements of Part 61 § 61.153(b) and (d).

1.3 Delivery Method

Course delivery encompasses traditional classroom instruction and simulated operational training via the following means:

- Lecture
- Discussion
- FTD & FFS – Simulator lessons are limited to two students maximum
    - Flight Training Device (FTD)
    - Full Flight Simulator (FFS)

1.4 Instructor Requirements

The assigned instructor(s) will be specifically authorized to provide instruction and to certify the completion of the ground and/or FSTD training modules required by this specialty curriculum. All instructors assigned to the CAE ATP CTP will meet the eligibility, training and testing requirements listed below. For instructors who will only provide instruction and certification under this specialty curriculum, these requirements are in lieu of the general ground and simulator instructor requirements as set out in the CAE Part 142 Training Program Operations Manual (TPOM). However, those instructors that provide other Part 142 training in addition to the ATP CTP must also meet the applicable eligibility, training and testing requirements of the CAE Part 142 TPOM.

1.4.1 Prerequisite Qualifications

To meet the eligibility requirements of §142.54, ATP CTP instructors will:

Hold a U.S. ATP certificate with an airplane category multiengine class rating,

Have at least two years of air carrier experience as a pilot in command under §91.1053(a)(2)(i) or §135.243(a)(1) or as a pilot in command or second in command under part 121, and

In the case of instructors who provide training in an FSTD, hold an aircraft type rating (i.e. is qualified, but not necessarily current) for the aircraft represented by the FSTD utilized in the training program

1.4.2 Training Requirements

To meet the training and testing requirements of §142.54, ATP CTP instructors will:

- Except for the holder of a flight instructor certificate, receive initial training on:
  - The fundamental principles of the learning process,
  - Elements of effective teaching, instruction methods and techniques,
  - Instructor duties, privileges, responsibilities and limitations,
  - Training policies and procedures, and
  - Evaluation; and
- In the case of instructors who provide training in an FSTD, receive initial and annual training and evaluation on:
  - Proper operation of FSTD controls and systems,
  - Proper operation of environmental and fault panels,
  - Data and motion limitations of simulation,

  - Minimum equipment requirements for the curriculum, and
  - The tasks and maneuvers that will be demonstrated in the FSTD

As a means to comply with the above initial and annual training and testing requirements, the following ATP CTP instructor training footprints will be utilized, as applicable:

1.4.2.1 Initial Ground Instructor (New Hire)

- Attend the ATP CTP course as a client
  - Must attend all ground school modules
  - Must take and pass the required ground school written test
  - Must participate in (or, at a minimum, observe) all FSTD modules
- Attend the CAE Initial Ground Instructor Training Course
- Course modules are as set out in the CAE Part 142 TPOM Appendix 10.4.3
- Must take and pass the written test on the training module subjects

  (Note: The above items may be completed in either order)

- Team teach the ATP CTP ground modules with an authorized coach until the coach is satisfied with the instructor candidate's mastery of the content and delivery and recommends for an Instructor Demonstration (QA)
- Successfully complete a Ground Instructor Demonstration (QA) with an authorized ATP CTP coach or FAA Inspector

1.4.2.2 Initial FSTD Instructor (New Hire)

- Attend the ATP CTP course as a client
  - Must attend all ground school modules
  - Must take and pass the required ground school written test
  - Must participate in (or, at a minimum, observe) all FSTD modules
- Attend the CAE Initial Simulator Instructor / Evaluator Training Course
- Course modules are as set out in the CAE Part 142 TPOM Appendix 10.4.3
- Must take and pass the written test on the training module subjects

  (Note: The above items may be completed in either order)

- Team teach the ATP CTP FSTD modules with an authorized mentor until the mentor is satisfied with the instructor candidate's mastery of the

content and delivery (minimum of two modules) and recommends for an Instructor Demonstration (QA)
- Successfully complete a Simulator Instructor Demonstration (QA) with an authorized ATP CTP mentor or FAA Inspector

1.4.2.3 Initial Ground Instructor (Existing CAE Instructor)

- Attend the ATP CTP course as a client
  - Must attend all ground school modules
  - Must take and pass the required ground school written test
  - Must participate in (or, at a minimum, observe) all FSTD modules
- Team teach the ATP CTP ground modules with an authorized coach until the coach is satisfied with the instructor candidate's mastery of the content and delivery and recommends for an Instructor Demonstration (QA)
- Successfully complete a Ground Instructor Demonstration (QA) with an authorized ATP CTP coach or FAA Inspector

1.4.2.4 Initial FSTD Instructor (Existing CAE Instructor)

- Attend the ATP CTP course as a client
  - Must attend all ground school modules
  - Must take and pass the required ground school written test
  - Must participate in (or, at a minimum, observe) all FSTD modules
- Team teach the ATP CTP FSTD modules with an authorized mentor until the mentor is satisfied with the instructor candidate's mastery of the content and delivery (minimum of two modules) and recommends for an Instructor Demonstration (QA)
- Successfully complete a Simulator Instructor Demonstration (QA) with an authorized ATP CTP mentor or FAA Inspector

1.4.2.5 Annual Recurrent - Ground Instructor

- Attend the CAE Recurrent Instructor Training Course as set out in the CAE Part 142 TPOM Appendix 10.4.3
- Take and pass the written test required to complete the ground portion of the ATP CTP course
- Successfully complete a Ground Instructor Demonstration (QA) with an authorized ATP CTP coach or FAA Inspector

1.4.2.6 Annual Recurrent - FSTD Instructor

- Attend the CAE Recurrent Instructor Training Course as set out in the CAE Part 142 TPOM Appendix 10.4.3
- Take and pass the written test required to complete the ground portion of the ATP CTP course
- Successfully complete a Simulator Instructor Demonstration (QA) with an authorized ATP CTP mentor or FAA Inspector

All records of eligibility, training and testing (initial and annual) will be placed in the instructor's record. Upon completion of all initial training and testing requirements, the instructor will be designated as an ATP CTP ground and/or FSTD instructor (to include authorized aircraft type(s) in the case of an FSTD instructor). A record of this designation will be placed in the instructor's record, and the scheduling system (STARS) will be updated to reflect the appropriate authorization(s).

1.5 Completion Standard

Completion of this course must be documented by an instructor or supervisor certifying that the student has successfully completed the course.

At the end of each academic day, the attendee will answer a series of multiple choice "Self-Check" review questions related to the topics presented that day. The "Self-Check" quizzes will be in printed form and handed to the student for completion. These exercises will be reviewed with the students by the instructor and corrected as required.

The student will complete a final written test consisting of thirty questions at the end of the program covering the entire academic course material.

Students who fail to achieve the minimum score detailed below will receive additional training and retake the exam on the topics failed.

The results of each exam will be recorded in the student's training folder.

In order to successfully complete the ATP CTP course a student must complete the following:

- Achieve a minimum score of 80% on the final written test
- Demonstrate conceptual proficiency in the FSTD – Conceptual Proficiency is defined as the state of performing a given skill with satisfactory and consistent correctness

Students who successfully pass the academic evaluation and complete the ATP CTP course will be issued a graduation certificate by CAE.

1.6 Courseware Document Summary

- Manuals and Handouts
  - Training Guide
  - ATP CTP Training Manual
  - ATP CTP Training Checklists and SOPs
  - Flight Profiles
  - Cockpit Panel Art
  - CRM Briefing Card
  - Self-Checks
  - ATP CTP Program AC 61-138
  - CRM Training AC 120-51E
  - Crew Procedures during Taxi AC 120-74
  - Stall Stick Pusher Training AC 120-109
  - Appropriate Jeppesen Material
    - Airport Diagrams – Departures
    - Approaches – Arrivals
  - Instructor Whiteboard Setups and Plans of Action
    - FTD1 – FSS1 – FSS2
- Classroom Media
  - ATP CTP PowerPoints
  - APS Program and Videos

1.7 Course Overview

1.7.1 Objective

This course objective is to meet the requirements of 14 CFR 61.156.

1.7.2 Training Hours Summary

COURSE SEGMENTS	PROGRAMMED HOURS
Ground Training	
Aircraft Systems (AC SYS)	32.0
Systems Integration (SYS INT)	*
Examination **	(1.0)
Total	32.0
Flight Training	
One Pilot – Simulator (Single)	12.0
Two Pilots – Simulator (Crew)	12.0

* *Systems Integration training will be conducted as a simulator session in Motion – Off mode.*

** *Examination not included with Ground Hours Total.*

1.7.3 Module Scheduling

Day	TRAINING MODULES Normal Font = Ground / GOS / Review and Testing Modules *Italic Font = Systems Integration Modules* **Bold Font = Flight Modules**	AC SYS	SYS INT	Brief	Simulator	
					Crew	Single
Day 1	▪ Introduction and Administration ▪ Aerodynamics – High Altitude Operations – Air Carrier ▪ Stall Prevention and Recovery Training – Air Carrier ▪ Aerodynamics – R/P Techniques & Philosophy – Air Carrier ▪ Aerodynamics – Upset Recognition & Prevention – Air Carrier ▪ Self-Check # 1	8.0				
Day 2	▪ Turbine Engines Overview – Air Carrier ▪ Transport Aircraft Performance – Air Carrier ▪ Automation Overview – Air Carrier ▪ Navigation and Flight Path Warning Systems – Air Carrier ▪ Safety Culture / Voluntary Safety Programs Overview – Air Carrier ▪ Self-Check # 2	8.0				
Day 3	▪ Crew Resource Management ▪ Checklist Philosophy – Air Carrier ▪ Self-Check # 3	8.0				
Day 4	▪ Ground Operations – Air Carrier ▪ Meteorology – Low Visibility Operations – Air Carrier ▪ *FTD Navigation and Automation – Air Carrier* ▪ Self-Check # 4	3.0	*	2.5	4.0	4.0
Day 5	▪ Operational Control Overview – Air Carrier ▪ MEL & CDL Operations – Air Carrier ▪ Communications & Briefings – Air Carrier ▪ Self-Check # 5 ▪ **High Altitude Operations**	3.0		2.5	4.0	4.0
Day 6	▪ Meteorology – Aircraft Weather Detection Systems – Air Carrier ▪ Written Exam # 3 ** ▪ **Runway Safety and Adverse Weather**	2.0 (1.0)		2.5	4.0	4.0
Total	**TRAINING TOTALS**	**32.0**	*****	**7.5**	**12.0**	**12.0**

Note: * Systems Integration training will be conducted as a simulator session in Motion – Off mode.
** Examination not included with Ground Training Total.

2 Course Modules

2.1 Ground Training Modules

Ground training modules, as listed in the module scheduling, are presented in this section detailing the elements that are covered per each module.

Definitions:

- R/P – Recognition and Prevention

2.1.1 Aerodynamics – High Altitude Operations – Air Carrier

Elements:

- Basic principles of energy management (kinetic and potential)
- Relationship between Mach Number, indicated airspeed, true airspeed, and change over altitudes
- Bank angles at high altitude and its effect on high and low speed operating margins
- Relationship between altitude capability, weight, and temperature
- Convergence of VMO / MMO and stall angle of attack (AOA), including turbulence considerations
- High Altitude / Low Energy Recovery; speed reductions at high altitude; excursions behind the power curve at high altitudes and associated recovery techniques (high altitude slowdowns, emphasize no jeopardy events needing to vacate altitudes for operational considerations)
- Maximum Lift over Drag Ratio (L/D Max), best range, best endurance
- Flight characteristics of swept wing aircraft, use of a yaw damper, and phenomena such as Dutch roll
- Hypoxia: signs, symptoms, and effects; times of useful consciousness
- Aircraft Decompression – Causes and recognition of cabin pressure loss
- Altitudes / Conditions which require the use of oxygen masks

2.1.2 Aerodynamics – Upset Recognition and Prevention – Air Carrier

Elements:

- Factors which contribute to aircraft upsets
    - Environmental: including clear air turbulence, mountain wave, wind-shear, thunderstorms, microbursts, wake turbulence, and aircraft icing

  - System malfunctions or failures: including flight instrument, auto flight, flight control, and other system anomalies which could contribute to upsets
  - Pilot-induced: including misinterpretation or slow instrument cross check, improper adjustment of attitude and power, improper pilot input, inattention, distractions, spatial disorientation, pilot incapacitation, and improper use of aircraft automation
  - Avoiding cyclical or oscillatory control inputs to prevent exceeding the structural limits of the aircraft
- Overview of significant accidents and incidents involving transport category aircrafts
- The use of the Aircraft Upset Recovery Training Aid (AURTA), Revision 2 should be used for expanded guidance in order to train the following recovery techniques:
  - Nose High/ Wings level recovery
  - Nose Low/ Wings level recovery
  - High-Bank-Angle Recovery Techniques
  - Consolidated Summary of Aircraft Recovery Techniques

2.1.3 Aerodynamics – R/P Techniques & Philosophy – Air Carrier

Elements:

- Students should understand that any time the aircraft begins to diverge from the intended flight-path or speed; they must identify what, if any, action must be taken
- Timely and appropriate intervention: It should be emphasized that recovery to a stabilized flight-path should be initiated as soon as a developing upset condition is recognized. The amount and rate of control input to counter a developing upset must be proportional to the amount and rate of pitch, roll and/or yaw experienced. This action may prevent what might become a more serious event
- Examples of instrumentation during developing and developed upset: A key aspect to upset awareness, prevention, and recovery training is for students to recognize and prevent developing upsets and recover from developed upsets
- Effective scanning: An effective scan is essential for pilots to identify the precursors and the initial development of the upset, and using recognition, to make timely and appropriate responses to return the aircraft back to the desired path

- Pitch / Power / Roll / Yaw: Students should understand how to recognize developing and developed upset conditions so they can make control inputs based on desired aircraft reaction. Control deflections at one point in the flight envelope might not be appropriate in another part of the flight envelope. Pilots should have a fundamental understanding of instrumentation and flight dynamics in Pitch / Power / Roll / Yaw in order to recognize the current state of the aircraft and make the correct control inputs to arrest the divergence or recovery from the upset. The Air Data Instrument (ADI) is the primary control instrument for recovery from an upset. Due to varying visibility conditions, one cannot depend on having adequate outside visual references
- Recovery: An overview of actions to take to recover from an upset encompasses three basic activities, which should be part of every upset recovery:
    - Manage the energy,
    - Arrest the flight-path divergence; and
    - Recover to a stabilized flight-path

2.1.4 Automation Overview – Air Carrier

Elements:

- Introduction to computer-assisted piloting (pilot/system interface)
- Automation philosophies/architecture and envelope protections
- Flight director/autopilot (FD/AP): modes of operation, properly interpreting mode annunciation, and recovery techniques from automation input errors.
- Managing automation anomalies: mitigation strategies, including control inputs, (e.g., managing the aircraft with pitch and power with the loss of airspeed indications)
- Automatic Dependent Surveillance – Broadcast (ADS-B)
- Automatic Dependent Surveillance – Contract (ADS-C)
- Controller-Pilot Data Link Communications (CPDLC)

2.1.5 Checklist Philosophy – Air Carrier

Elements:

- Checklist philosophies (read/do, do/verify, memory items, and flows) manufacturer vs. operator developed checklist
- Use of normal checklists
- Use of quick reference handbook/emergency checklists

2.1.6 Communications & Briefings – Air Carrier

Elements:

- Sterile flight deck rules
- Briefings: Discuss advantages of proper briefings and how to properly accomplish professional briefings for all phases of ground and flight operations
- Briefings between flight crew and cabin crew
- Passenger briefings (Overview)
- Clearance delivery including pre-departure clearance (PDC)

2.1.7 Crew Resource Management

Elements:

- Leadership – Leadership Philosophy and Mentoring
- Authority and Responsibility of the Pilot-in-Command
- Team Building
- Sound Decision Making
- Adherence to Standard Operating Procedures and Regulatory Directives
- Professional Development and Technical Competence
- Monitoring and Intervention Strategies
- Fatigue Management
- Crewmember Communications
- Threat and Error Management
- Workload and Time Management
- Stress Management
- Situational Awareness
- Reference AC 120-51 – Crew Resource Management Training

2.1.8 Ground Operations – Air Carrier

Elements:

- Runway incursion prevention
- Professionalism during taxi operations, including sterile flight deck and standard operating procedures
- Airport situational awareness
- Taxi route planning and briefings including hot spot identification and runway crossings
- Technology (electronic flight bag, moving maps)

- Practical knowledge of airport surface operations- Airport movement areas
- Practical knowledge of airport surface operations- Ramp procedures and communications
- Practical knowledge of airport surface operations- Coded taxi routes and complex taxi procedures
- Ground de-icing/anti-icing: aircraft de-ice/anti-ice procedures, use of holdover tables, calculating hold-over times, and pre-takeoff contamination checks

2.1.9 Introduction and Administration

Elements:

- Facility Tour and Training Center Staff Introduction
- Distribution and Collection of Course Enrollment Forms
- Distribution of Course Syllabus and Training Schedule
- Distribution of Course Training Materials
- Introduction to Course Material

2.1.10 Meteorology – Aircraft Weather Detection Systems – Air Carrier

Elements:

- Equipment limitations
- Use of weather detection systems to navigate around hazardous weather
- Wind-shear detection systems (predictive and reactive) and avoidance strategies
- Turbulence avoidance, considerations, and mitigation strategies
- In flight icing detection, avoidance, considerations, and mitigation strategies
- Crosswind operating techniques and cautions and limitations
- Air carrier meteorology products which assist in the avoidance of adverse weather
- Reference AC 120-58 – Pilot Guide Large Aircraft Ground Deicing

2.1.11 Meteorology – Low Visibility Operations – Air Carrier

Elements:

- Air carrier low-visibility surface movement
- Low visibility take-off and category (CAT) II and CAT III approaches

2.1.12 MEL & CDL Operations – Air Carrier

Elements:

- Minimum Equipment List (MEL)
- Configuration Deviation List (CDL)
- Introduction to MEL and CDL as dispatch documents (Refer to FAA Order
- 8900.1, MEL/CDL for Operators
- Repair intervals of deferred equipment—Categories A, B, C, D
- Maintenance and operations procedures, responsibilities, and cautions
- Additional air carrier maintenance procedures, operational procedures, and
- Operational limitations (i.e., speed restrictions) required in order to dispatch with components or items of equipment deferred or removed in accordance with the MEL or CDL

2.1.13 Navigation and Flight Path Warning Systems – Air Carrier

Elements:

- Basic principles of flight management systems (FMS)
- Introduction to the concepts of area navigation, Global Positioning System/Area
    - Navigation (GPS/RNAV) capabilities, lateral navigation (LNAV), vertical navigation (VNAV), Required Navigation Performance (RNP), and required authorizations (operations specifications OpSpecs)) and training.
- Traffic Alert and Collision Avoidance System (TCAS)
- Terrain Awareness and Warning System (TAWS)

2.1.14 Operational Control Overview – Air Carrier

Elements:

- Air carrier operational control concept (Refer to AC 120-101, Part 121 Air Carrier Operational Control)
- Dispatch and flight following differences and responsibilities
- Emergencies and decision making with joint pilot/dispatcher responsibilities

2.1.15 Self-Check # 1 – 5

Elements:

- Completion of self-check exercises
- Instructor review of exercises
- Discussion as necessary of the selected aircraft systems

2.1.16 Safety Culture / Voluntary Safety Program Overview – Air Carrier

Elements:

- Aviation Safety Reporting System (ASRS) (refer to ASRS Program Briefing)
- Aviation Safety Action Program (ASAP) (refer to the current edition of AC 120-66, Aviation Safety Action Program ASAP))
- Flight Operational Quality Assurance (FOQA) (refer to AC 120-82, Flight Operational Quality Assurance)
- Line Operations Safety Audits (LOSA) (refer to AC 120-90, Line Operations Safety Audits)
- Safety Management Systems (SMS) (refer to the current edition of AC 120-92, Safety Management Systems for Aviation Service Providers).PM Intervention Strategies

2.1.17 Stall Prevention and Recovery Training – Air Carrier

Elements:

- Understanding that a reduction of AOA is required to initiate recovery of all stall events (approach-to-stall and aerodynamic stall)
- Awareness of the factors that may lead to a stall event during automated and manual flight operations, including:
    - AOA versus pitch angle
    - Bank angle and G-loading
    - Weight and center of gravity (CG)
    - Autothrottle or AOA protection
    - Overreliance on automation/complacency
    - Lack of situational awareness
    - Contamination (Ice)
- Differences between transport category aircraft certification and general aviation aircraft certification regarding the use of flight controls at high

AOA. For example, transport category aircrafts are certified to provide roll authority to the pilot all the way up to full stall identification

- The necessity for smooth, deliberate, and positive control inputs to avoid unacceptable load factors and secondary stalls
- For aircrafts equipped with a stick pusher, recommended recovery actions which include allowing stick pusher activation as a stall recovery
- Differences in aircraft performance (thrust available) during high versus low altitude operations, the effects of those differences on stall recovery, and the anticipated altitude loss during a recovery
- Overview of stall-related accidents and incidents in transport category aircrafts

2.1.18 Transport Aircraft Performance – Air Carrier

Elements:

- Weight, altitude, and V-speed relationship
- Flight operations performance considerations of minimum control speed with the critical engine inoperative during takeoff roll (VMCG), minimum control speed with the critical engine inoperative out of ground effect-red radial line (VMCA), V1 and V2
- Proper use of rudder in a transport category aircraft and discuss the limitations associated with its use to include aircraft certification standards
- Weight and Balance (W&B). Introduction to air carrier W&B systems (average weight program; indexing) (Refer to the current edition of AC 120-27, Aircraft Weight and Balance Control)

  (Overview)

- Performance calculations: Air carrier performance requirements including: balanced field length, accelerate-go, accelerated-stop, VMCG, and second segment climb performance
- Performance calculations required for takeoff: effect of variable flap settings on runway distance used and second segment climb performance, packs on/off, engine anti-ice on/off (Refer to AC 120-91, Airport Obstacle Analysis)
- Air carrier in route performance requirements and calculations (maximum altitude, step climb, crossing restrictions)
- Performance calculations required for landing
- Contaminated runway considerations for takeoff and landing

2.1.19 Turbine Engine Overview – Air Carrier

Elements:

- Turbine engine theory
- Differences in thrust application of a turbine engine vs. a reciprocating engine
- Turbine engine malfunctions (start malfunctions, surge, compressor stalls, roll-back)
- Engine restart considerations, internal damage, starting altitude, and speed envelopes
- Knowledge of turbine-powered engine monitoring systems, including: engine indication and crew alerting system (engine indicating and crew alerting system (EICAS) or electronic centralized aircraft monitor (ECAM)
- EPR, N1, N2, exhaust gas temperature (EGT) indications

2.1.20 Written Exam # 3

Elements:

- High Altitude Aerodynamics
- Stall Prevention and Recovery
- Upset Prevention and Recovery
- Turbine Engines
- Aircraft Performance
- Automation
- Navigation & Flight Path Warning Systems
- Safety Culture
- Crew Resource Management
- Checklist Philosophy
- Ground Operations
- Operational Control
- MEL & CDL Programs
- Radio Communications and Briefings
- Meteorology Weather Detection Systems

2.2 Flight Training Modules

Flight training modules, as listed in the module scheduling, are presented in this section detailing the events that are covered per each module.

The instructor will utilize the briefing period to explain fully each required “Demonstration” task including entry, recovery, and outcome of the desired maneuver. While in the FTD/FSTD, this could include:

- Over the shoulder instruction for demonstrating the maneuvers and / or FMS Flight Guidance Panel
- The instructor could also occupy the pilot flying seat for the demonstration phase appropriate to the students level of experience

Definitions:

- (D) – Demonstration-Based Training – The purpose of demonstration-based training is to develop the knowledge necessary to complete the desired outcome during the experience phase. The demonstration phase should include an instructor-led demonstration of the entry/application of skills and desired outcome of a specific maneuver including an explanation on the limitations of the airframe and the simulator. (Reference: AC 61-138)
- (E) – Experienced-Based Training – The purpose of experience-based training is to allow the student to reinforce the basic aircraft characteristics witnessed in the demonstration phase. Experience-based training allows the pilot to obtain repetitive handling experience and motion sensations when operating the aircraft in both dynamic and difficult operating conditions. Experience-based training maneuvers should be practiced to the point of conceptual proficiency. For example, repetitive practice during the entire approach-to-stall regime in various aircraft configurations and bank angles should be accomplished until the ATP applicant successfully achieves the conceptual knowledge or demonstrates competency in the maneuver. (Reference: AC 61-138)

NOTE: All instructors must be knowledgeable of the limitations of both the simulator motion and approved flight envelope. Particular care should be used when conducting maneuvers to stay within both envelopes, excursions outside of either must include an instructor debrief emphasizing that the flight handling characteristics in that region may not be representative of the actual aircraft.

2.2.1 FTD Sessions

2.2.1.1 FTD Navigation and Automation – Air Carrier

Events:

- Interpret
  - Navigation Display (ND) **(D&E)**
  - Primary Flight Display (PFD) **(D&E)**
  - Multi-Function Display (MFD) **(D&E)**
- Perform FMS Route Input **(D&E)**
- Perform FMS Route Modifications **(D&E)**
- Receive and Understand Air Traffic Control (ATC) Instructions
- Use of Area Navigation Systems in Flight **(D&E)**
- Interact with the Mode Control Panel **(D&E)**
- Verify Mode Control Panel Inputs **(D&E)**
- Interpret Flight Mode Annunciations
- Use of Autopilot / Auto-Throttle Automation – Pilot Flying Duties **(D&E)**
- Use of Autopilot / Auto-Throttle Automation – Pilot Monitoring Duties **(D&E)**
- Use of the FD / Flight Guidance Systems **(D&E)**
- Use of Automation **(D&E)**
  - Climb Mode
  - Cruise Mode
  - Descent Mode
  - Approach Mode
- Use of TCAS **(D&E)**
- Use of TAWS **(D&E)**

2.2.2 FFS Sessions

2.2.2.1 High Altitude Operations

Events:

- High Altitude Operations
  - Speed / Mach changeover **(D)**
  - Effects of weight on maximum altitude (high and low speed convergence) **(D)**
  - Effects of high altitude turbulence with limited performance **(D)**
  - Relationship between weight, thrust, and altitude **(D&E)**
- Low Energy State / Stall Prevention Training

  - High altitude / low energy recovery demonstrating limited thrust capability and necessity to exchange altitude for airspeed **(D)**
  - Acceleration performance from speed regime (back side of the power curve) at low altitude and high altitude
  - Demonstration of stall recovery without application of thrust **(D)**
  - Stall prevention training **(E)**. Emphasis on reduction of AOA for recovery (Refer to AC 120-109 Stall and Stick Pusher Training)
  - For each student one of the three tasks listed below should be experienced using a realistic scenario and auto-flight (Refer to Appendix 2 of AC 120-109 for sample training scenarios)
    - Takeoff or Maneuvering configuration approach to stalls
    - Clean configuration approach to stalls
    - Landing configuration approach to stalls
- Stick Pusher **(D&E)**. Refer to AC 120-109 for proper recovery from stick pusher activation
- Upset Prevention and Recovery Training (UPRT)
  - Manual handling. Flying the aircraft with sole reference to pitch and power emphasizing handling skills in the event of a system failure (e.g. loss of airspeed or unreliable airspeed indications) **(D&E)**
  - Upset Recovery Techniques. To mitigate loss of control in flight, each of these maneuvers has the following objective:
    - Manage the energy **(D&E)**
    - Arrest the flight-path divergence **(D&E)**
    - Recover to a stabilized flight-path **(D&E)**
  - Refer to Appendix 1 of AC 61-138 for sample training scenarios on:
    - Nose High / Wings level recovery
    - Nose Low / Wings level recovery

Considerations for UPRT:

CRM:

Techniques for working as a crew to return the aircraft to normal flight and communicating aircraft state between pilots, including CRM callouts to improve situational awareness should be integrated into FSTD training.

Availability of Visual References:

In the past, unusual attitude training was commonly conducted in visual meteorological conditions (VMC), giving the pilot considerable advantage in determining the appropriate recovery. UPRT should include scenarios where visual references are not available.

Pilot Monitoring:

Evidence shows in many loss of control incidents and accidents, the PM may have been more aware of the aircraft stat than the pilot flying. Training should emphasize crew interaction to vocalize the divergence conditions, use CRM to stop the divergence, and return the aircraft to stabilized flight.

Startle:

Startle has been a factor in upset incidents and accidents. Although it may be difficult to create the physiological response of startle in the training environment, if achieved, startle events may provide a powerful lesson for the crew. The goal of using startle in training is to provide the crew with a startle experience that allows for the effective recovery of the aircraft. Considerable care should be used in startle training to avoid negative learning.

2.2.2.2 Runway Safety and Adverse Weather

Events:

- Taxi
  - Adherence to SOPs and best practices used to maintain situational awareness with complex taxi instructions **(D&E)**
  - Be sure crew reviews taxi charts prior to taxi and has taxi diagram out and available during taxi
  - Recognition of hot spots, line up and wait terminology, runway incursion prevention techniques, procedures for ensuring correct departure runway **(D&E)**
  - Low visibility taxi procedures including the use of Hold Position spots (pink dots)
- Takeoff
  - Low visibility takeoff (2400 RVR)
  - Normal takeoff, PF (outside scan) and PM (engine monitoring) duties and responsibilities **(D&E)**
  - VMCG demonstration to show the effects of differential power with limited rudder aerodynamic authority **(D)**
  - V1: Application of V1 decision speed concepts and how they relate to accelerate-go and accelerate stop distances with and without effects of a contaminated runway **(D&E)**
  - Rejected takeoffs with aircraft weight, runway length, and contamination considerations **(D&E)**

  - Ability to apply appropriate precautions for adverse weather during takeoff to include:
    - Wind-shear **(D&E)**
    - Contaminated runway surfaces **(D&E)**
    - Crosswinds with gusts **(D&E)**
- V2 Climb Performance
  - Climb at V2 **(D&E)**
  - Effects of speeds less than V2 and greater than V2 **(D)**
  - Automation during departure **(D&E)**
- Approach / Landing
  - Icing conditions in flight and its effects on performance and decision making **(D&E)**
  - Achieve a stabilized approach using energy management concepts **(D)**
  - Landing in crosswinds with and without gusts with emphasis on aircraft performance limitations in crosswinds **(D&E)**
  - Landing technique and stopping distances on contaminated runways **(D&E)**
  - Operations in low visibility conditions:
    - Taxi **(D)**
    - Takeoff **(D)**
    - Landing **(D)**