



Commercial Aviation

A faint, dark silhouette of a commercial jet aircraft is visible in the background, centered behind the main text box.

Advancing FTD technologies and the opportunity to the pilot training journey

L3 Proprietary

Aviation Training Innovation

Over the past decade the airline training industry has pursued technology to improve efficiencies and enhance training

- Shift training earlier in the training continuum
- Allow students to better learn at their own pace, with options to use simulation

Regulatory authorities have been willing to explore use of such technology, techniques and capabilities

Although there has been substantial innovation, opportunities exist

Example Type Rating

Past Training Journey

GROUND
SCHOOL

FLIGHT
TRAINING

Classroom based
instruction

FMS Simulation

Review of Flow
Patterns

Systems
Integration
Training

Static Briefing

Full Flight
Simulator



Example Type Rating

Current Training Journey

SYSTEMS
KNOWLEDGE

PROCEDURE
TRAINING

FLIGHT
TRAINING

LEARNING MANAGEMENT SYSTEM



Computer Based Training Tools



Computer Based Training Tools



Comprehensive Aircraft Simulation



Procedure Training Lessons and Tools



Flat Panel Device



Flight Training Device



Briefing / Debriefing Station



Full Flight Simulator

Total Training Solution Type Rating Program

Utilizing L3 Products

SYSTEMS
KNOWLEDGE

PROCEDURE
TRAINING

MANEUVERS
VALIDATION

LINE ORIENTED
SCENARIOS

LOE /
CHECKRIDE

Mobile Applications

Flat Panel Devices

FFS

FFS

FFS

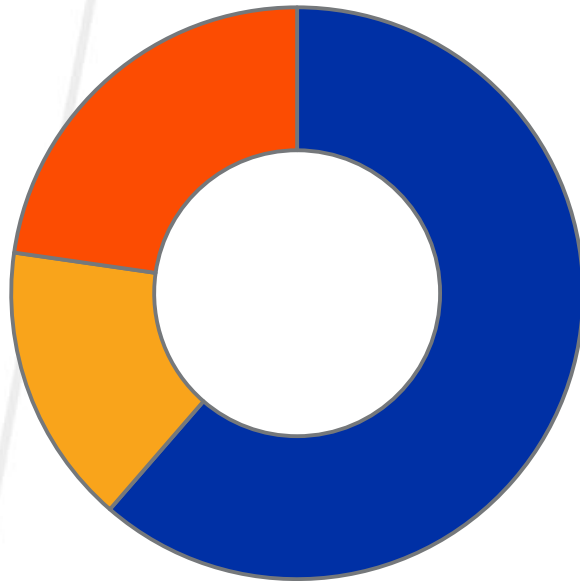


FAA Type Rating

Synopsis Using Advanced Training Simulation And Technology

Although there has been substantial innovation, opportunities exist...

Traditional Type Rating Curriculum



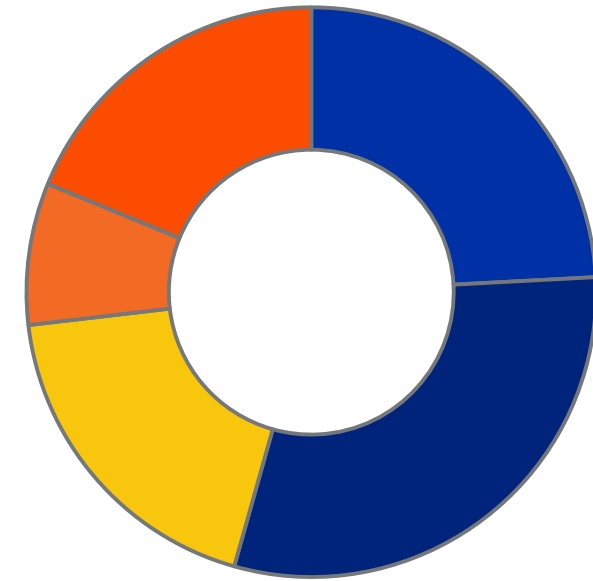
- Ground Instructor Guided Training
- Flight Simulator (Non-Motion)
- Full Flight Simulator (Motion)

Current Type Rating Curriculum



- Ground Instructor Guided Training
- Computer Based Training
- Lower Level Device
- Full Flight Simulator (Motion)

Future Type Rating Curriculum



- Ground Instructor Guided Training
- Computer Based Training
- Lower Level Device
- FTD FAA Level 7
- Full Flight Simulator (Motion)

Areas Of Innovation

2

PROCEDURE TRAINING



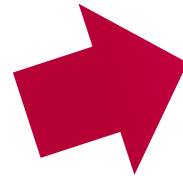
Use of Distance Learning tools to enable early learning of procedures

- Leverage technology earlier in training
- Flows, standard operating procedures, flight profile activities and callouts
- Provide training in a way 'familiar' with the next generation

Areas Of Innovation

2

PROCEDURE
TRAINING



Augmented Reality/Virtual Reality



Areas Of Innovation

2

PROCEDURE TRAINING

Leverage Distance Learning Content on Lower Level Training Devices

Content Guided Lessons

- Build upon the procedures knowledge gained through distance learning
- Incorporate Evidence Based Training and Competency Based Training concepts
- Empower students to obtain more training, and access to review content if desired

Procedure Training Lessons and Tools



Areas Of Innovation

2

PROCEDURE
TRAINING

Leverage Distance Learning Content on
Lower Level Training Devices

Content Guided Lessons

- Integrate within a Training Management System
 - Track and record student actions for instructor review and analysis
- Improve Ground Instructor efficiency

The screenshot displays a training management system interface. At the top, it shows 'Group Reports By: Station' and 'Exercise' selected. The main title is 'IR Data Invalid' with 'FIM 34-21 Task 806' below it. The 'START TIME' is 2:30 PM 1/24/2018 and the 'END TIME' is 2:42 PM 1/24/2018. A sidebar on the left lists dates from 1/24/2018 to 3/31/2017, with '1/24/2018' selected and 'IR Data Invalid' highlighted. The main area shows a 'STARTED' log with a list of actions: 'ADIRS L CURRENT STATUS accessed', 'Left IRS Mode Sel switch value changed', 'FSEU EXISTING FAULTS Test started', 'ADIRU removed', 'Left Pitot ADM removed', 'Continuity Check between connector D', and 'Left Pitot ADM installed'. A 'TOTAL TIME' box at the bottom indicates '11 Minutes 44 Seconds'. A 'REFRESH' button is located at the bottom left.

Another Step Forward

World's First Level 7 FAA Device

FAA Level 7 increased fidelity and functionality including:

FFS comparable visual scenes

Reduced latency or transport delay – 100ms for instrument systems and 120ms for visual

FFS software load

Validation for First Officer controls

Improved aural cues matching that of FFS

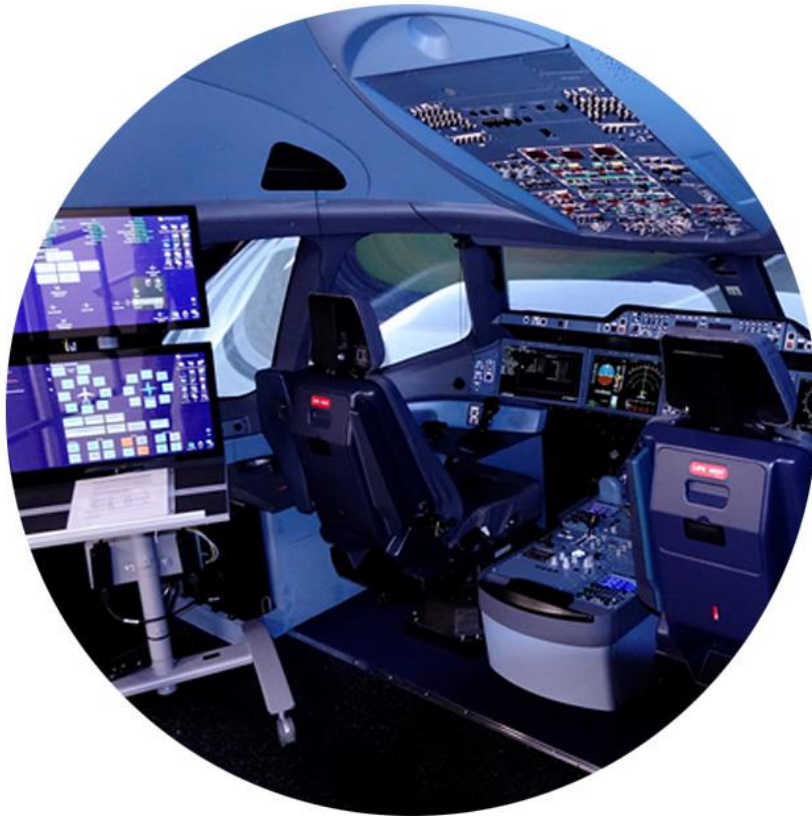
Increased control feel dynamics to replicate aircraft

Fidelity meets the FFS reduced infrastructure requirements, reducing initial and operating costs compared to a FFS



Areas Of Innovation

FAA Level 7 FTD



Part 60 outlines Tasks vs FTD Level – Subjective Requirements

- Increased subjective requirements for FAA FTD Level 7
- FAA will be incorporating additional Part 60 defined FSTD levels into the pilot training and checking requirements
- Assuming the FAA updates similar to Subjective Requirements, these will have a strong impact on FTD utilization for initial training

Utilization as part of recurrent training

- Field Study for use in recurrent training (US AQP Airline)

Areas Of Innovation

FAA Level 7 FTD



Potential additional task credit for a Level 7 FTD include (majority qualified for introductory initial or recurrent qualification training):

- Taxiing
- Takeoff (normal, crosswind, instrument, engine failure)
- Windshear recovery
- Precision Approach (One engine inoperative)
- Circling Approach
- Missed Approach (One engine inoperative)
- Landings and Approach to Landing

Additional tasks acceptable for Level 7 FTD and lower (not currently noted for training credit):

- Takeoff and Departure Phase – Rejected Takeoff
- Engine Failure (Inflight Maneuver)
- Circling Approach
- Missed Approach (Normal)
- Flight Control Systems (Normal / Abnormal Procedures)

Just-In-Time

Training and operations innovation



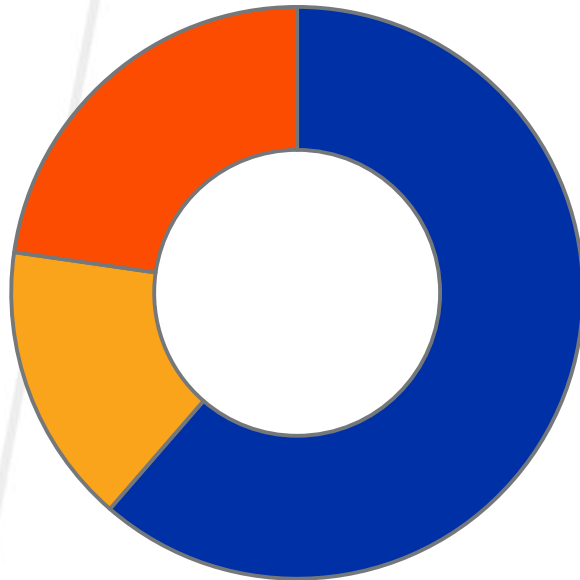
Just-in-Time Training Capabilities

- Maintenance and Pilot Departments
- Ensure minimum level of competency during training events
- Relevance to the operations environment as well
- Why not provide tools to prepare and/or augment a crew for unique operational requirements?
 - Interactive Computer Based Training
 - Simulations
 - Videos
 - Augmented Reality

Cost Benefits

Summary

Traditional Type Rating Curriculum

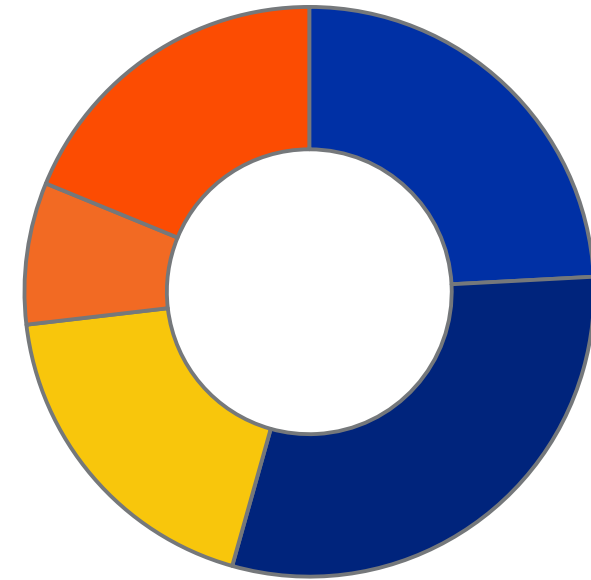


- Ground Instructor Guided Training
- Flight Simulator (Non-Motion)
- Full Flight Simulator (Motion)

With the improved training efficiencies, cost reductions can be recognized:

- Improved utilization of instructors and devices
- Efficiencies in reporting and assessment
- Reduction of training center footprint due to increased distance learning and small infrastructure requirements

Future Type Rating Curriculum



- Ground Instructor Guided Training
- Computer Based Training
- Lower Level Device
- FTD FAA Level 7
- Full Flight Simulator (Motion)



Commercial Aviation

A photograph of an airport runway, viewed from a low angle looking down the center. The runway has white markings and is flanked by grass. The image is overlaid with a semi-transparent teal filter.

Thank you

L3 Proprietary