SE 31

Loss of Control
Joint Safety Implementation Team

Implementation Plan
for
Training - Advanced Maneuvers

Statement of Work

Advanced Maneuvers Training (AMT) refers to training to prevent and recover from hazardous flight conditions outside of the normal flight envelope, such as, inflight upsets, stalls, ground proximity and wind shear escape maneuvers, and inappropriate energy state management conditions.

The purpose of this project is to collect and provide advanced maneuver training material and to encourage Part 121 operators to use these materials to implement advanced maneuver ground training and flight training using appropriate flight training equipment. Emphasis should be given to stall onset recognition and recovery, unusual attitudes, upset recoveries, effects of icing, energy awareness and management, and causal factors that can lead to loss of control.

Additionally, research should be conducted to determine how existing flight simulation devices can be used effectively in AMT.

Safety Enhancement: (SE-31)

Pilots will be better trained to avoid and recover from excursions from normal flight and loss of control.

Lead Organization for Overall Project Coordination (LOOPC):

FAA, Flight Standards (AFS)

Score: 2007-(13.0) 2020-(13.0) 100%-(13.0)

Resource Requirements:

FAA AFS-400, Air Transport Association Training Committee, National Air Carrier Association (NACA), Regional Airline Association, manufacturers, pilot associations, Principal Operations Inspectors (POI's), Directors of Safety, flight operations and training departments, NASA, aircraft manufacturers, flight simulation device manufacturers, training centers, existing training aids, and other materials.

The total cost estimate for the project is about 3 person-years and $500,000, which could be shared by the operators, manufacturers, pilot associations and government.

Completion Date: G + 36 Months.

Note: FAA, in agreement with ATA, CAST, and AFS-200, will complete the measurement portion of this plan (Outputs 2 & 3) utilizing their POI's/ PMI's during normal work program functions.

Output 1:

- A survey of existing training material from regulators, industry, operators, academia and other resources and a set of advanced maneuvers training material produced by a joint industry working group.

Resources: Air Transport Association Training Committee (LOOC); National Air Carrier Association (NACA), Regional Airline Association, manufacturers, pilot associations, Principal Operations Inspectors (POI's), FAA/AFS-200 existing training aids, and other materials. Initial cost estimate would be one man-year and $250,000, which would be shared by the operators, manufacturers, pilot associations and government.

Timeline: 24 Months

Actions:

1. FAA should post the Airplane Upset Recovery Training Aid on its public web site.
2. FAA should distribute the Airplane Upset Recovery Training Aid to all appropriate FAA field offices and to all Part 121 certificate holders.
3. Non-swept wing operators and manufacturers should develop a similar upset recovery training aid.
4. The ATA Training Committee should gather currently used and available training aids and other materials and evaluate them for completeness.
5. ATA should charter and industry should sponsor a task force to develop remaining elements for a complete set of AMT materials.
6. FAA should make the set of training materials available to operators via its public web site.
7. FAA, ATA, and other interested parties should develop a strategy to maintain AMT training materials.

Output 2:

- AMT ground training provided by all operators.

Resources: ATA Training Committee (LOOC), Directors of Safety, flight operations and training departments, POI's, AFS-200, pilot associations and AMT materials. The cost would vary depending on the number of aircraft types, the number of aircraft and the number of flight crews.

Timeline: 12 months after completion of Output 1.

Actions:

1. FAA should issue a Handbook Bulletin for Air Transportation (HBAT) to announce and recommend the use of the AMT training materials.
2. ATA should report the level commitment by the operator's flight operations and training departments.
3. Operators should implement AMT ground training
4. FAA should revise policy and rules in 14 CFR Part 121to require AMT ground training and to promote AMT flight training in suitable flight simulation devices.

Output 3:

- AMT flight training provided by all operators. The expectation is that this training will be accomplished via ground and simulator instruction within the certified flight envelope, with emphasis on recognition, prevention and recovery techniques.

Resources: ATA Training Committee (LOOC), operator flight operations and training departments, Directors of Safety, and pilot associations. The cost would vary depending on the number of aircraft types, the number of aircraft and the number of flight crews.

Timeline: 12 months after completion of Output 1.

Actions:

1. ATA, to include RAA, NACA should promote a high level of commitment to AMT by operator flight operations and training departments. A check airman will administer AMT flight training.

2. The Loss of Control JSAT identified that a number of accidents involved the crew not recognizing or preventing entry into an unusual attitude and, when upsets occurred, were unable to effect recovery. Operators should implement AMT flight training emphasizing energy state management and early recognition and recovery from flight outside the certified aircraft-operating envelope within the limitations of the training device being utilized. The expectation is that this training will be accomplished via ground and simulator instruction within the certified flight envelope, with emphasis on recognition, prevention and recovery techniques. Operation outside of the normal flight envelope must be discouraged to avoid negative training. Advanced Maneuvers Training (AMT) refers to training to prevent and recover from hazardous flight conditions outside of the certified flight envelope, such as inflight upsets, stalls, ground proximity and wind shear escape maneuvers, and inappropriate energy state management conditions.

Output 4 (Changed to SE 86 and moved to R&D):

- Research should be conducted to determine how existing flight simulation devices can be used effectively in AMT.

Resources: FAA AFS-400 (LOOC), NASA, flight simulation device manufacturers, aircraft manufacturers, pilot associations, operators and training centers. Initial cost estimate would be 1.5

person-years and $240,000, which would be shared by the operators, manufacturers, training centers, pilot associations and government.

Timeline: 36 Months

Actions:

1. FAA should coordinate research into identifying the most effective methods for AMT to include the suitability and use of existing flight simulation devices.
2. Aircraft and flight simulation device manufacturers should cooperate in order to determine the feasibility of providing additional aircraft performance data to support modeling outside the normal aircraft operating envelope with the objective of increasing the effectiveness of AMT.

Relationship to Current Aviation Community Initiatives:

- Voluntary training currently being done – both ground and flight
- Wind shear training required since 1988
- FSAT 95-10 issued 1995, Selected Event Training
- Airplane Upset Recovery Training Aid, distributed 1998
- Continuing debate over simulator realism, adequacy of data, and "negative training" effects
- CFIT training endorsed by CAST, 2000
- Competent committee work underway, e.g., NASA, ATA Training Committee
- Manufacturers conducting research in energy management
- Commercial training products becoming available
- Rulemaking in Part 121, Subparts N and O, NPRM by December 31, 2001
- NPRM Part 60 – 2001, Simulator qualification rules

Performance Goals & Indicators for Outcomes/outputs:

- Goal: Reduce occurrence of LOC accidents.
    - Indicator: A measurable reduction of loss of control incidents and accidents related to excursion from normal flight.
- Goal: Develop and make available AMT material for use in Part 121 approved training programs
    - Indicator: Availability of the AMT material within 24 months of CAST " G" approval.
- Goal: All Part 121 operators incorporate AMT in their approved training programs
    - Indicator: Operators incorporate AMT material within 24 months of CAST G approval.
- Goal: Research will identify methods to improve use of flight simulation devices in AMT
    - Indicator: Industry acceptance and implementation of research results.

Programmatic Approach:

Organizational Strategy

The LOC JSIT has identified FAA AFS as the LOOPC organization. The LOOC are identified in each output of this Implementation Plan. The roles and responsibilities of the LOOPC and LOOC are described in the CAST approved JSIT Process Document.
The LOOPC will provide the project lead for the Advanced Maneuver Training Project. The project lead will work with the Air Transport Association Training Committee, manufacturers, Regional Airline Association, pilot associations, Principle Operations Inspectors (POI's), and others to create a comprehensive set of AMT materials. The project lead will coordinate the activities outlined in the implementation plan, and will provide progress reports, when requested, to the CAST.
Implementation of this product is a shared responsibility between the FAA, air carriers, manufacturers and pilot associations.

Implementation Activities

The LOOPC will establish a working group to coordinate the collection, creation, and distribution of appropriate AMT materials. It will encourage air carriers to establish appropriate AMT components in ground and flight training. It will have oversight into the research outputs of this project.

AFS-200 will prepare a Handbook Bulletin, in collaboration with industry partners, recommending the scope of the training with respect to specific hazards associated with loss of control. The LOOPC should monitor the progress of implementing AMT through the Directors of Safety.

Key Products and Milestones:

The following milestones are based on the date of CAST "G" approval (months):

- Distribute currently available
- Airplane Upset Recovery Training Aid — ASY-200 — G + 6
- AMT material on WWW — AFS-20 — G + 24
- Publish HBAT — AFS-200 — G + 24
- Track adoption of AMT — ATA — G + 27, 30, 33, 36
- Publish research results — AFS-400 — G + 36

Risk Description:

- Some special interests might discredit AMT simulator training
- POI's might ignore AMT materials and/or Handbook Bulletin
- Operators might ignore AMT materials and/or Handbook Bulletin
- Operators of non-swept wing aircraft and the manufacturers might be reluctant to develop AMT material specific to these type of aircraft
- Operators might not accept the potential costs of this training

Risk Mitigation Plan:

Many of the air carriers presently provide AMT. Cooperation between FAA and industry organizations to obtain widespread implementation of the AMT would result in a substantial reduction or elimination of the causes of loss of control accidents.

Impact on Non - Part 121 or International Applications:

This project would have a positive impact on commercial and corporate operators using smaller aircraft because it would improve flight training standards for all operators. The project would also have international applications because the JAA and ICAO are both represented on the CAST and the information is routinely exchanged between those organizations and CAST.