

Feb 03

SE 40

Loss of Control Joint Safety Implementation Team

Implementation Plan for Flight Envelope Protection in New Airplane Designs

Statement of Work:

To reduce fatal accidents due to loss of control, new airplane designs should include angle-of-attack / low speed protection, thrust asymmetry compensation, and bank angle protection, using hard or soft limits.

Fly-by-wire active flight envelope protection technology does not exist for turboprop airplanes, turbo-prop manufacturers should strive, to the fullest extent, to provide the protection benefits of these systems in their new airplane designs.

Lead Organization for Overall Project Coordination (LOOPC):

AIA

Safety Enhancement:

New airplane designs include angle-of-attack/low speed protection, thrust asymmetry compensation, and bank angle protection, using hard or soft limits.

Score: 2007-(0.0) 2020-(4.2) 100%-(21.0)

Outputs:

Output 1:

Applicants for new airplane designs agree to incorporate angle-of-attack/low speed protection, thrust asymmetry compensation, and bank angle protection.

Resources: AIA (LOOC), manufacturers

Total government/industry resources: \$0.07M (see separate worksheet for details)

Timeline: 60 days for AIA to issue communication, 180 days for manufacturers to respond to AIA letter

Actions:

1. CAST requests that the AIA communicate with manufacturers, encouraging them to incorporate angle-of-attack/low speed protection, thrust asymmetry compensation, and bank angle protection into all new airplane designs as defined by published guidance material.
2. Manufacturers respond by indicating their intentions regarding incorporation of flight envelope protection into future airplane designs.

Relationship to Current Aviation Community Initiatives:

ARAC Flight Guidance System Harmonization Working Group
NASA LARC Control Upset Prevention and Recovery technology development research

Performance Goals & Indicators for Outcomes/outputs:

Goal: Inclusion of angle-of-attack / low speed protection, thrust asymmetry compensation, and bank angle protection, using hard or soft limits in new airplane designs.

- Indicator: Letters received from manufacturers indicating their intentions

Programmatic Approach:

Organizational Strategy

The LOC JSIT identified Bob Robeson, AIA, as the JSIT project lead for Flight Envelope Protection – New Airplane Designs. The project lead will assist with the implementation of the activities outlined in this Implementation Plan and will, when requested, provide progress reports to the CAST. Implementation of this project is viewed as a shared responsibility and tasks will be divided between the FAA and organizations/persons in industry. The Lead Organization for Overall project Coordination (LOOPC) is AIA. The Lead Organizations for Output Coordination (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.

Implementation Activities

The LOC JSAT/JSIT activity has identified flight envelope protection as the most effective intervention strategy for the prevention of future loss-of-control accidents. CAST will then request that the AIA communicate with manufacturers, encouraging them to incorporate angle-of-attack / low speed protection, thrust asymmetry compensation, and bank angle protection into all new airplane designs as defined by the guidance material. The Manufacturers should respond by indicating their intentions regarding the incorporation of flight envelope protection into their new airplane designs. FAA/JAA should work with the manufacturers and operators per business as usual to determine the acceptable characteristics of flight envelope protection systems for new airplane designs.

Key Products and Milestones:

- AIA communication to manufacturers encouraging implementation of flight envelop protection capabilities into new airplane designs and requesting response regarding intentions – 60 days from issuance of FEP guidance material
- Manufacturers' response to AIA letter – 180 days from receipt of letter

Plan and Execution Requirements:

Changes to certification guidance materials only affect new airplane designs. Design changes, by nature, take a long time and require significant resources. Incorporating new safety features into new airplane designs is technically feasible and desirable. However, it take many years for these changes to have a significant impact on overall fleet safety, given the time it takes to develop a new airplane and for these airplanes to become a significant part of the fleet.

Risk Description:

- New airplanes will represent a minuscule part of fleet in 2007
- Potential economic burden on manufacturers and operators
- Potential inadequate resource availability for manufacturers
- Potential unwillingness to voluntarily implement project outputs
- Technical feasibility of incorporating active flight envelope protection on turbo-prop airplanes

Risk Mitigation Plan:

The risks are relatively small and the technology is well understood, except for turbo-prop airplanes where additional technology development is required.

Impact on Non - Part 121 or International Applications:

All operators of affected airplanes will be impacted by changes to the design.