Maintenance
Joint Safety Implementation Team
as Modified by JIMDAT

Implementation Plan
For
Safety Enhancement 101 (Revision 1)
Aircraft Design –Advanced Circuit Protection

Statement of Work: (SE-101)
Develop and install advanced circuit protection technology for use in commercial airplanes where appropriate in new type designs, current production, and retrofit. This work includes research for product development, development of industry standards, qualification, airplane maintenance practices and certification. This work may require in-service evaluation of development hardware and should include research and development of tools to isolate the location arc source once an arc fault breaker has tripped.
(Intervention 101)

Lead Organization for Overall Safety Enhancement Completion (LOOSEC):
AIA

Safety Enhancement:
Develop and install advanced circuit protection / arc fault breaker technology in commercial airplanes (new type designs, current production airplanes, and retrofit).

JIMDAT Score:

DIP Stand Alone Fatality Risk Reduction::
2020 - (0.10) 100% - (0.80)

Differential beyond original 46 SE CAST plan:
2020 - (0.05) 100% - (0.50)

Resource Requirements:

- Output 1 – estimated at 12 man-years
- Output 2 – estimated at 3 man-years
- Output 3 – resource dependent on Outputs 1& 2
- Output 4 – resource dependent on Outputs 1& 2
- Total Cost – $3,000,000 + Unknown amount for procurement and installation (expected to reach stage where new breakers are LRUs at near the same cost as current equipment)

Completion Date: 48 months

Output 1:

FAA-AIR, airframe manufacturers and circuit breaker manufacturers should continue to support general development and qualification activities of advanced circuit protection technology for use on commercial airplanes. This support includes but is not limited to development of arc fault

circuit breaker technology and technology to determine the location of the fault source on commercial airplanes for maintenance.

Resources: AIA (LOOC), airframe manufacturers, breaker manufacturers and FAA Tech Center. FAA would incur most of the cost to continue development work that is underway and to continue further research into fault isolation. Costs would be 12 man-years.

Timeline: 24 months for SAE standard on breakers, >48 months for technology to identify the locations of fault sources on commercial airplanes.

Actions:

FAA, airframe manufacturers, Society of Automotive Engineers (SAE), operators and circuit breaker manufacturers will develop advance circuit protection. Airframe manufacturers, test equipment manufacturers and the FAA Tech Center will continue research into the development of circuit protection and fault isolation technology.

Output 2:

FAA and airframe manufacturers to work with circuit breaker manufacturers to develop and certify the technology for installation into new type designs where appropriate and feasible.

Resources: AIA (LOOC),FAA AIR/ACO, airframe manufacturers and breaker manufacturers. The cost of this output would be associated with the specific develop of advanced circuit protection hardware and certification process for new type designs.

Timeline: 12 months from CAST approval.

Actions:

1. AIA issues letter to manufactures to encourage them to incorporate advanced circuit protection. (6 months from CAST approval)
2. Airframe manufacturers agree to incorporate advanced circuit protection technologies in new type designs as appropriate and feasible. (6 months)
3. AIR, airframe manufacturers and breaker manufacturers would complete the development and certification of advanced circuit protection on new type designs. (continuing)

Output 3:

FAA and airframe manufacturers to work with circuit breaker manufacturers to develop and certify the technology for installation into current production commercial airplanes where appropriate and feasible.

Resources: FAA AIR/ACO (LOOC), airframe manufacturers and breaker manufacturers. The cost of this output would be associated with the specific development of advanced circuit protection hardware and alteration of the type certificate for current production airplanes.

Timeline: 24 months from Output 1

Actions:

AIR airframe manufacturers and breaker manufacturers would complete the development process and certification of advanced circuit protection on current production airplanes.

Output 4:

FAA and airframe manufacturers to work with circuit breaker manufacturers to develop/certify the technology for retrofit where appropriate and feasible.

Resources: FAA AIR/ACO (LOOC), airframe manufacturers and breaker manufacturers. The cost of this output would be associated with the specific development of advanced circuit protection hardware and certification process for in-service airplanes.

Timeline: 12 months from Output 3

Actions:

AIR airframe manufacturers and breaker manufacturers would complete the development process and certification of advanced circuit protection where appropriate and feasible on in-service airplanes.

Relationship to Current Aviation Community Initiatives:

- Development work underway on basic arc fault breaker technology.
- Industry/government working group

Impact on Non-FAR Part 121 or International Applications:
Successful outputs likely would be incorporated into all aerospace vehicles throughout the world.