Federal Aviation Administration

Memorandum

Date: August 25, 2015

To: Manager, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Margaret Langsted, ANM-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Engine Fire Detectors in Tailpipe on Embraer Model EMB-550 and EMB-545 airplanes, FAA Project # TC0717IB-T and AT10256IB-T

ELOS Memo #: TC0717IB-T-P-9

Regulatory Ref: §§ 21.21(b)(1), 25.1203(a)

Revision Description: The FAA revised the memo to add the Embraer Model EMB-545.

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an ELOS finding for the Embraer Model EMB-550 and EMB-545 airplanes.

Background

Embraer requested an ELOS to the requirements in Title 14, Code of Federal Regulations (14 CFR) 25.1203(a), which requires fire detection within turbine engine tailpipe sections. The Embraer Model EMB-550 and EMB-545 airplanes includes the installation of thrust reversers, which are hydraulically operated and electrically controlled. The thrust reversers are built by the Aircelle reverser manufacturer. The Aircelle thrust reverser assembly also acts as a tailpipe for the Honeywell AS 907-3-1E engines. The proposed engine installation does not incorporate fire detection within the tailpipe section.

Applicable regulation(s)

§§ 21.21(b)(1), 25.1203(a)

Regulation(s) requiring an ELOS finding

§ 25.1203(a)

Description of compensating design features or alternative standards which allow the granting of the ELOS finding (including design changes, limitations or equipment need for equivalency)

The engine tailpipe configuration must either comply to § 25.1203(a) by incorporating fire detection within the tailpipe zone or compensating design features should be presented and analyzed to support a finding of equivalent safety under the provisions of § 21.21(b)(1). The design installation of the Embraer Model EMB-550 and EMB-545 thrust reverser includes the following:

1. Embraer will demonstrate that the exhaust pipe surface (within this tailpipe zone) will not be an ignition source for hydraulic fluid.
2. Embraer will demonstrate that risk of fire from hydraulic fluid coming into contact with electrical wiring or components has been minimized. There is no electrical power in the thrust reverser during the stowed condition.
3. Embraer will demonstrate a minimum amount of hydraulic fluid can leak into the tailpipe zone.
4. Review of in-service data has confirmed that there have been no occurrences of tailpipe fires due to hydraulic fluid leakage / ignition on similar, previously certified engine / thrust reverser installations, nor are there any airworthiness directives (AD).

Explanation of how design features or alternative standards provide an ELOS to that intended by the regulation

Compliance with the criteria stated above will minimize the potential for a fire in the tailpipe of the engine to such an extent that fire detection is unnecessary. The resulting configuration will be equivalently safe to the level of safety intended by the regulation.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in project Issue Paper P-9, titled Engine Fire Detectors in Tailpipe. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS finding. This ELOS memorandum number should be listed in the type certificate data sheet under the Certification Basis section in accordance with the statement below:

Equivalent Level of Safety Findings has been made for the following regulation:
§ 25.1203(a) Fire Detector System (documented in TAD ELOS Memo TC0717IB-T-P-9)

Original Signed by

Christopher Parker August 25, 2015

Transport Airplane Directorate, Date
Aircraft Certification Service

ELOS Originated by: Propulsion & Mechanical Systems Branch	Project Engineer: Margaret Langsted	Routing Symbol: ANM-112