Federal Aviation Administration

Memorandum

Date: December 9, 2010

To: Manager, Seattle Aircraft Certification Office, ANM-100S

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Susan Letcher

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for the Israel Aerospace Industries Ltd. (IAI) 737-400 Special Freighter for Inadvertent Detection of Smoke in Aft Lower Lobe Class C Cargo Compartment (FAA Project Number ST10131SE-T)

ELOS Memo #: ST10131SE-T-ES-1

Reg. Ref.: §§ 21.16, 25.855(i)

The purpose of this memorandum is to inform the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate on the establishment of an equivalent level of safety (ELOS) finding for Israel Aerospace Industries Ltd. (IAI) 737-400 passenger to special freighter conversions.

Background

IAI submitted a request for an ELOS finding to Title 14, Code of Federal Regulations (14 CFR) 25.855(i) for Model 737-400 airplanes modified from the passenger to special freighter configurations. Section 25.855(i) requires that during cargo smoke penetration flight tests, "... it must be shown that no inadvertent operation of smoke or fire detectors in any compartment would occur as the result of a fire contained in any other compartment, either during or after extinguishment, unless the extinguishing system floods each such compartment simultaneously."

The IAI 737-400 passenger to freighter conversion has a main deck Class E cargo compartment, and forward and aft lower lobe Class C cargo compartments. The primary method of controlling a fire in the Class E cargo compartment is to depressurize the airplane and maintain flight at an altitude intended to deprive the fire of oxygen. The primary method of controlling a fire in a Class C cargo compartment is to flood the compartment with

extinguishing agent. An inadvertent aft lower lobe cargo compartment alarm would not comply with § 25.855(i) unless the airplane was equipped with a fire extinguishing system that floods both cargo compartments simultaneously, which it does not.

Applicable regulation(s)

§ 25.855(i)

Regulation(s) requiring an ELOS finding

§ 25.855(i)

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

The FAA considered the 737-400 special freighter cargo compartment fire protection system design, and determined that an ELOS for § 25.855(i) can be granted to allow inadvertent alarm of the aft lower lobe cargo compartment smoke detection system, provided IAI:

- Provides to the FAA a description of activities accomplished to preclude migration of smoke from the main deck cargo compartment into the aft lower lobe cargo compartment.

- Confirms that accomplishing the procedure for controlling a main deck Class E cargo compartment fire depressurizes the complete airplane, including the aft lower lobe cargo compartment.

- Incorporates instructions and explanatory text in the airplane flight manual supplement acceptable to the FAA regarding the possibility of inadvertent smoke detection in the aft lower lobe cargo compartment following a main deck alarm and required actions to be taken by the crew.

- Submits to the FAA the test report/data related to Class E cargo compartment firefighting flight tests showing the actual time the airplane took during the flight tests to depressurize to a cabin altitude intended to deprive the fire of oxygen.

Explanation of how design features or alternative standards provide an equivalent level of safety to the level of safety intended by the regulation

The FAA considered the overall cargo compartment fire protection system design, and determined that the compensating design features allow granting of an ELOS for § 25.855(i) to allow inadvertent alarm of the aft lower lobe cargo compartment smoke detection system based on the following:

- The inadvertent alarm from the aft lower lobe Class C compartment would not be expected to distract the crew from accomplishing the procedures associated with controlling the fire in the main deck Class E cargo compartment because the inadvertent alarm would occur at a point well after the initial main deck cargo compartment alarm.

- The Class E cargo compartment fire suppression procedures, including depressurizing the airplane to an altitude intended to deprive the fire of oxygen, would be completed before the inadvertent alarm would likely occur.

- The flight crew has a specific separate procedure for responding to an alarm from the aft lower lobe Class C cargo compartment.

- The airplane is not configured for long over-water routes.

FAA approval and documentation of the ELOS finding

The FAA approved the aforementioned ELOS finding in project issue paper ES-1. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Transport Airplane Directorate (TAD) has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Limitations and Conditions Section of the STC Certificate. An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation(s):
§ 25.855(i) (documented in TAD ELOS Memo ST10131SE-T-ES-1).

Manager, Transport Airplane Directorate,
Aircraft Certification Service

FEBRUARY 11, 2011

Date

ELOS Originated by Seattle ACO:	Project Engineer Susan Letcher	Routing Symbol ANM-150S