Federal Aviation Administration

# Memorandum

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| Date: | August 31, 2010 |
| To: | Manager, Transport Standards Staff, International Branch, ANM-116 |
| From: | Manager, Transport Standards Staff, Propulsion & Mechanical Systems Branch, ANM-112 |
| Prepared by: | Douglas Bryant, Aerospace Engineer, ANM-112 |
| Subject: | INFORMATION: Equivalent Level of Safety (ELOS) Finding for Airbus Model A380 airplane, FAA Project # CP101-T |
| ELOS Memo#: | CP101-T-P-17 |
| Regulatory Ref: | §§ 25.997(d) and 25.1305(c)(6) |

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate on the establishment of an equivalent level of safety finding for the Airbus Model A380 airplane.

**Background**

Title 14 Code of Federal Regulations 25.1305(c)(6) requires an indicator for the fuel strainer or filter required by § 25.997, to indicate the occurrence of contamination of the strainer or filter before it reaches the capacity established in accordance with § 25.997(d). Section 25.997 requires a fuel strainer or filter between the fuel tank outlet and the inlet of either the fuel metering device or an engine driven positive displacement pump, whichever is nearer the fuel tank outlet.

The engine fuel filtration system of the Engine Alliance (EA) GP7200 equipped Airbus Model A380-800 airplane incorporates a two-filter system. A screen (low-pressure filter) with a bypass is located downstream of the centrifugal low-pressure (LP) pump and fuel-oil heat exchanger, and upstream of the high-pressure (HP) positive displacement pump. Impending bypass of the LP filter is not indicated on the airplane flight deck display system. The main filter (HP fuel filter), located downstream of the positive displacement pump, has a bypass means and an indication to the flight crew of impending bypass.

The fuel filtration system does not directly comply with the provisions of § 25.997(d) because the filter upstream of the positive displacement pump does not meet the required capacity. The fuel filtration system also does not directly comply with § 25.1305(c)(6) because the filter upstream of the positive displacement pump does not have an indication to the flight crew of impending bypass.

**Applicable regulation(s)**
§§ 21.21(b)(1), 25.997, 25.1305(c)(6)

**Regulation(s) requiring an ELOS**
§§ 25.997(d), 25.1305(c)(6)

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

The fuel filtration system has two fuel strainer/filters: (1) a LP filter between the fuel tank outlet and inlet of the HP positive displacement pump, referred to as the "engine fuel pump inter-stage strainer," (2) a HP filter downstream of the HP positive displacement pump, referred to as the "main fuel filter."

The airplane incorporates an engine fuel pump strainer with a differential pressure, or delta P (DP) transducer. This delta P transducer provides cockpit indications and associated master minium equipment list (MMEL) dispatch relief.

There are caution level cockpit indications and associated flight crew procedures for impending bypass of the strainer or combination of strainer and main filter.

These indications are in addition to the caution level cockpit indication and associated flight crew procedures for impending bypass of the main fuel filter.

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

The two filter system, each with a bypass and associated indication in the cockpit as described above, is considered to provide adequate compensation for the lack of a single filter at the location specified by § 25.997 that meets the capacity requirements of § 25.997(d).

The design change to the engine fuel pump strainer to add a bypass and associated caution level indication to the cockpit, as described above, in combination with the existing design of the main fuel filter with a bypass and assocaited caution level cockpit indication on dual engines provides an equivalent level of safety to the requirement for indication of impending bypass on a single engine per § 25.1305(c)(6) because it will provide the necessary indication to the flight crew of impending bypass of the fuel filtration system.

The indication system logic reduces the potential for false warnings to the flight crew and minimizes diversions while providing heightened crew awareness and flight crew procedures to prompt crew action when a common cause dual impending bypass condition occurs.

**FAA approval and documentation of the ELOS**

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper (IP) P-17 titled "Warning Means for Engine Fuel Strainer/Filter Contamination on GP7200 Engine Installation." 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 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 Type Certificate Data Sheet under the Certification Basis section (TCs & ATCs) or in the Limitations and Conditions Section of the STC Certificate in accordance with the statement below:

Equivalent Level of Safety Findings have been made for the following regulation(s):
14 CFR 25.997(d), Fuel strainer or filter, and § 25.1305(c)(6), Powerplant instruments,
(documented in TAD ELOS Memo CP101-T-P-17).

*Victor Wicklund, for* — *September 20, 2010*

Manager, Transport Airplane Directorate, — Date
Aircraft Certification Service

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| ELOS Originated by TAD: | Project Engineer: Douglas Bryant | Routing Symbol ANM-112 |