



# Federal Aviation Administration

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## Memorandum

Date: February 3, 2011

To: Manager, Transport Standards Staff, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Douglas Bryant, ANM-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for the Airbus Model A350 airplane (FAA Project Number TC0544IB-T)

ELOS Memo#: TC0544IB-T-P-11

Reg. Ref.: Title 14 Code of Federal Regulations part 25 subpart E, F, and G

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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 A350 airplane.

### Background

Airbus has requested to adopt the proposed Title 14 Code of Federal Regulations part 25 new Appendix K requirements for the Model A350 Auxiliary Power Unit (APU) installation rather than comply with the current part 25 subpart E, F, and G applicable airworthiness regulations. The proposed Appendix K requirements are defined in the draft FAA Notice of Proposed Rulemaking (NPRM), Rulemaking Team Draft, dated April 2001. At the time the draft NPRM was written, the location for the proposed APU installation requirements was identified as Appendix K. When completed, the new requirements will be located in a different Part 25 Appendix since Appendix K has subsequently been used for different requirements.

Since the introduction of APUs into transport category commercial aircraft, part 25 requirements have been applied to both APUs and main engines. When part 25 was originally promulgated, APUs were not common in transport category airplanes. Since that time, APUs have become widely utilized in these aircraft.

Advances in APU technology include electronic control systems which allow unattended APU operation, minimal monitoring by the flight crew during APU operation in-flight, and automatic shutdown features for parameter limit exceedance events. In addition, software control of functions previously handled by hydromechanical hardware has become common. Aircraft interface with the APU control system has also evolved with the advances in APU technology. This situation has resulted in an increased number of equivalent safety findings per the provisions of § 21.21(b)(1). In order to address these issues, several of the proposed part 25 appendix K APU requirements differ from the part 25 main engine installation requirements since they have been updated to reflect existing APU and airplane technology.

**Applicable regulation(s)**

14 CFR part 25 subparts E, F & G

**Regulation(s) requiring an ELOS finding**

14 CFR part 25 subparts E, F & G requirements applicable to APU installations

**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 Transport Aircraft and Engine Issues Group (TAEIG) has forwarded to the FAA an Aviation Rulemaking Advisory Committee (ARAC) formal recommendation to propose the draft 14 CFR part 25 Appendix K as an NPRM. This recommendation was submitted to the FAA in January of 2000, and the proposed rule changes were collectively categorized as category 1 (enveloped). By definition, an “enveloped”, or category 1, rule change accepts the more stringent of the impacted regulations in 14 CFR part 25 and European Aviation Safety Agency (EASA) Certification Specification (CS) 25 (known as the Joint Airworthiness Requirements (JAR) at the time of the ARAC recommendation) subpart J, “Auxiliary Power Unit Installations.” Although the APU harmonization effort resulted in consensus between the FAA and industry, there remains one ongoing 14 CFR part 25 subpart E and draft Appendix K/CS Subpart J significant standards difference (§ 25.901(c)) which is the subject of its own ARAC harmonization effort. Until resolution is achieved harmonizing the §§ 25.901(c) and 25.1309 relationships, § K25.901(d), will continue to follow the § 25.901(c) “no single failure” requirement and associated accepted means of compliance.

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

Although noncompliant with the regulations, the proposed draft FAA NPRM, Rulemaking Team Draft, dated April 2001, which are harmonized with the EASA CS-25 subpart J, “Auxiliary Power Unit Installations,” with § K25.901(d) modified to read the same as § 25.901(c), is considered to provide an equivalent level of safety to

demonstrating that the Model A350 complies with 14 CFR part 25 subparts E, F & G requirements applicable to APU installations. In addition, the proposed Appendix K, as modified by § 25.901(c), inherently represents a more stringent set of APU installation requirements and may improve the level of safety required by direct compliance to the relevant regulations currently applicable to the Model A350 airplane.

**FAA approval and documentation of the ELOS finding**

The FAA has approved the aforementioned equivalent level of safety finding in the Model A350 project issue paper P-11, titled “Adoption of Draft Harmonized Rules for APU Certification.” This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Transport 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 (TC’s & ATC’s) or 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):  
14 CFR part 25 subpart E, F & G requirements applicable to APU installations  
(documented in TAD ELOS Memo TC0544IB-T-P-11)



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Manager, Transport Airplane Directorate,  
Aircraft Certification Service

FEBRUARY 11, 2011

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Date

ELOS Originated by Transport Standards Staff:	Project Engineer Douglas Bryant	Routing Symbol ANM-112
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