



Federal Aviation Administration

Memorandum

Date: March 5, 2014

To: Manager, New York ACO, ANE-170

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Kent Fredrickson, ANE-173

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for APU Certification Requirements on BD-500-1A10 and 1A11, FAA Project *TC4948NY-T*

ELOS Memo#: TC4948NY-T-P-08

Regulatory Ref: § 21.21(b)(1), 14CFR part 25 subpart E, F, and G, § 25.1103(e)1, § 25.1105, § 25.1305

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Bombardier BD-500-1A10 and 1A11.

Background

Bombardier Aerospace (BA) is proposing an Equivalent Level of Safety Finding (ELOS) using the Draft Harmonized APU Installation Requirements, dated April 2001, in lieu of applying the 14CFR part 25 subpart E, F, and G, § 25.1103(e)1, § 25.1105, § 25.1305 regulations.

Since the introduction of auxiliary power units into transport category commercial aircraft, the FAA has applied the pertinent part 25 engine installation requirements of subpart E to APU installations under the provisions of § 25.901(d). The FAA has also applied pertinent sections of other subparts of part 25 to APU installations either directly or indirectly by reference to the corresponding applicable subpart E engine installation requirement. 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 hydro-mechanical hardware has become common. Aircraft interface with the APU control system has also evolved with the advances in APU technology. This situation resulted in an increased number of equivalent safety findings for certain part 25 engine installation requirements using the provisions of § 21.21(b)(1).

In order to better address these unique APU installation issues, the FAA tasked the Aviation Rulemaking Advisory Committee (ARAC) Transport Aircraft and Engine Issues Group (TAEIG) to recommend specific APU installation requirements. This task was accomplished under a joint FAA and European airworthiness standard harmonization program initially begun in 1988. The FAA and the European Joint Aviation Authorities (JAA) began the harmonization program in order to develop a common set of airworthiness standards in order to accomplish the same safety intent with a reduced burden on manufacturers. ARAC submitted its recommended APU installation airworthiness standard to the FAA in January of 2000.

Applicable regulation(s)

§ 21.21(b)(1), 14CFR part 25 subpart E, F, and G, § 25.1103(e)(1), § 25.1105, § 25.1305

Regulation(s) requiring an ELOS finding

14CFR part 25 subpart E, F, and G, § 25.1103(e)(1), § 25.1105, § 25.1305

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 developed a draft NPRM dated April 2001 from the ARAC recommended APU installation requirements. However, the FAA stopped work on this rulemaking project before publishing the NPRM for public review and comment. The draft NPRM proposed adding the harmonized APU installation requirements into a new Appendix K. Since then, however, Appendix K has been used for a different purpose in part 25. The section numbering system in the existing Appendix K begins with a “K” prefix, which is similar to the numbering system used in the draft NPRM for APU installation requirements. In order to avoid confusion with the existing part 25 Appendix K, the sections of the draft NPRM for APU installation requirements have been relabeled using an “APU” prefix.

Although the harmonized APU installation requirements were never adopted into part 25, the FAA has allowed use of the draft FAA NPRM in certification of several APU installations using the provisions of § 21.21(b)(1) as providing an equivalent level of safety to that provided by the existing part 25 airworthiness requirements.

In addition to the general APU installation requirements, the provisions corresponding to §§ 25.1103(e), 25.1105, and 25.1305 differ from their engine installation counterparts in ways consistent with past equivalent level of safety findings the FAA has made in lieu of direct compliance with these provisions. Since these past findings of equivalent safety are built into the draft APU installation requirements, there is no need for separate findings with respect to these requirements and they are incorporated into this single finding of equivalent safety. However these three sections of part 25 have been added into the regulatory references for completeness.

APU installation requirements (based on the Draft Harmonized APU Requirements NPRM dated April 2001) provided in Transport Canada Issue Paper P-10 Edition 5, dated Dec 3, 2013, provide an equivalent level of safety to those corresponding Part 25 regulations as they are applied to APU installations.

Sections in the attachment where amendments to the corresponding part 25 regulations were adopted after 14 CFR part 25 was at Amendment 25-101 on the date of the draft APU installation requirements NPRM in April 2001 have been evaluated to determine applicability. As a result of the evaluation, these later rules have been included in Transport Canada Issue Paper P-10, Edition 5, dated Dec 3, 2013, as well. Those sections are shown below:

- §§ 25.1141, 25.1181, and 25.1305: Amendment 25-115 effective August 2, 2004
- § 25.1203: Amendment 25-123 effective December 10, 2007

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

See Background Section, above.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in project Issue Paper P-08. 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. This ELOS memorandum number should be listed in the type certificate data sheet under the certification basis section (TC's & ATC's).

Equivalent Level of Safety Findings have been made for the following regulation(s): 14CFR part 25 subpart E, F, and G, § 25.1103(e)(1), § 25.1105, and § 25.1305 (documented in TAD ELOS Memo TC4948NY-T-P-08)

<SIGNED> Victor Wicklund

March 5, 2014

Transport Airplane Directorate,
Aircraft Certification Service

Date

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