



Federal Aviation Administration

Memorandum

Date: January 15, 2013

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

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Todd Martin, ANM-115

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Continuous Turbulence Loads and Rough Air Speed on Airbus Model A350 series airplanes, FAA Project Number TC0544IB-T.

ELOS Memo#: TC0544IB-T-A-10

Reg. Ref.: §§ 25.341, 25.343, 25.345, 25.371, 25.373, 25.391, and 25.1517

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 Airbus Model A350 aircraft.

Background

Title 14, Code of Federal Regulations (14 CFR) section 25.341 prescribes gust and turbulence load conditions. Sections 25.343, 25.345, 25.371, 25.373, 25.391 address certain components of the airplane and refer to the gust requirements in § 25.341. Section 25.1517 specifies requirements for rough air speed. A proposal to harmonize the requirements of § 25.341 and the related requirements of European Aviation Safety Agency (EASA) Certification Specification (CS) 25 was developed by the Aviation Rulemaking Advisory Committee (ARAC). This activity is part of a general FAA program to harmonize FAA and EASA requirements.

EASA has adopted these ARAC recommendations into their CS, and they are included in the EASA A350 certification basis.

Airbus has requested an equivalent safety finding to the existing requirements of § 25.341 and the related requirements. Airbus has proposed to use the design criteria for the

continuous turbulence loads requirements recommended by ARAC and adopted in CS-25. FAA accepts the Airbus proposal as equivalently safe.

Applicable regulations

§§ 25.341, 25.343, 25.345, 25.371, 25.373, 25.391, 25.1517

Regulations requiring an ELOS finding

§§ 25.341, 25.343, 25.345, 25.371, 25.373, 25.391, 25.1517

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

Airbus proposes to use the ARAC proposal (as incorporated in CS-25) in its entirety in lieu of the referenced regulations.

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

The ARAC proposal (as incorporated in CS-25) includes a revision to the gust intensity model used in the design envelope method for continuous turbulence, elimination of the mission analysis method, provisions for treating non-linearities, and reorganization and clarification of the requirement.

The design envelope criterion is retained with a revised gust intensity distribution with altitude. The proposed gust intensities are based on analysis of gust measurements from the Civil Aircraft Airworthiness Data Recording Program (CAADRP). The CAADRP data is the most recent gust information available and it represents measurements of gusts and turbulence on transport airplanes in actual operation.

The ARAC proposal would require that any significant non-linearity be considered in a realistic or conservative manner, and it would provide additional criteria that can be used with other rational approaches that can account for non-linearities (e.g., time domain solutions).

The FAA considers the ARAC proposal as adopted in CS-25 to be equivalently safe to the currently effective § 25.341 and its related requirements.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in project issue paper A-10, titled Continuous Turbulence. 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:

ELOS Findings have been made for the following regulations:

§§ 25.341, Gust and turbulence loads; 25.343, Design fuel and oil loads; 25.345, High lift devices; 25.371, Gyroscopic loads; 25.373, Speed control devices; 25.391, Control surface loads: general; and 25.1517, Rough air speed, VRA (documented in TAD ELOS Memo TC0544IB-T-A-10).

Original signed by

Suzanne Masterson

Transport Airplane Directorate,
Aircraft Certification Service

January 17, 2013

Date

ELOS Originated by Transport Standards Staff:	Project Engineer Todd Martin	Routing Symbol ANM-115
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