[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2013-0900; Special Conditions No. 25-540-SC]

Special Conditions: Airbus Model A350-900 airplane; General Limiting Requirements.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for Airbus Model A350-900 airplanes. These airplanes will have a novel or unusual design feature associated with general limiting requirements of its flight-envelope protection features. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Effective **[Insert date of publication in Federal Register].**

FOR FURTHER INFORMATION CONTACT: Joe Jacobsen, FAA, Airplane and Flightcrew Interface, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone (425) 227-2011; facsimile (425) 227-1320.

SUPPLEMENTARY INFORMATION:

Background

On August 25, 2008, Airbus applied for a type certificate for their new Model A350-900 airplane. Later, Airbus requested, and the FAA approved, an extension to the application for

FAA type certification to November 15, 2009. The Model A350-900 airplane has a conventional layout with twin wing-mounted Rolls-Royce Trent XWB engines. It features a twin aisle, 9-abreast, economy-class layout, and accommodates side-by-side placement of LD-3 containers in the cargo compartment. The basic Model A350-900 airplane configuration will accommodate 315 passengers in a standard two-class arrangement. The design cruise speed is Mach 0.85 with a maximum take-off weight of 602,000 lbs.

Type Certification Basis

Under Title 14, Code of Federal Regulations (14 CFR) 21.17, Airbus must show that the Model A350-900 airplane meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-129.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model A350-900 airplane because of a novel or unusual design feature, special conditions are prescribed under § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model A350-900 airplane must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36. The FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the “Noise Control Act of 1972.”

The FAA issues special conditions, as defined in 14 CFR 11.19, under § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The Airbus Model A350-900 airplane incorporates the following novel or unusual design features: General limiting requirements for the flight-envelope protection system.

Discussion

These special conditions, and the following that pertain to flight-envelope protection, present general limiting requirements for all the unique flight-envelope protection features of the basic Model A350 airplane's electronic flight-control system (EFCS) design. Current regulations do not address these types of protection features. The general limiting requirements are necessary to ensure a smooth transition from normal flight to the protection mode and adequate maneuver capability. The general limiting requirements also ensure that the structural limits of the airplane are not exceeded. Furthermore, failure of the flight-envelope protection feature must not create hazardous flight conditions. Envelope-protection parameters include angle of attack, normal load factor, bank angle, pitch angle, and speed. To accomplish these envelope protections, one or more significant changes occur in the EFCS control laws as the normal flight-envelope limit is approached or exceeded.

Flight-envelope protection is the subject of several special conditions for the A350. Each specific type of envelope protection is addressed individually, but some requirements are common to all limiting systems and are therefore put forth as general limiting requirements.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

Notice of Proposed Special Conditions No. 25-12-08-SC for Airbus Model A350-900 airplanes was published in the *Federal Register* on January 14, 2014 (79 FR 2387).

No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions apply to Airbus Model A350-900 airplane. Should Airbus apply later for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the Federal Register; however, as the certification date for the Airbus Model A350-900 airplane is imminent, the FAA finds that good cause exists to make these special conditions effective upon publication.

Conclusion

This action affects only certain novel or unusual design features on the Airbus Model A350-900 airplane. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type-certification basis for Airbus Model 350-900 airplanes.

General Limiting Requirements

a. Onset characteristics of each flight-envelope protection feature must be smooth, appropriate to the phase of flight and type of maneuver, and not in conflict with the ability of the pilot to satisfactorily change airplane flight path, speed, or attitude as needed.

b. Limit values of protected flight parameters (and, if applicable, associated warning thresholds) must be compatible with the following:

   (1) Airplane structural limits,

   (2) Required safe and controllable maneuvering of the airplane, and

   (3) Margins to critical conditions. Unsafe flight characteristics/conditions must not result if dynamic maneuvering, airframe, and system tolerances (both manufacturing and in-service), and non-steady atmospheric conditions, in any appropriate combination and phase of flight, can produce a limited flight parameter beyond the nominal design limit value.

c. The airplane must be responsive to intentional dynamic maneuvering to within a suitable range of the parameter limit. Dynamic characteristics such as damping and overshoot must also be appropriate for the flight-maneuver and limit parameter in question.

d. When simultaneous envelope limiting is engaged, adverse coupling or adverse priority must not result.

Failure States

EFCS failures (including sensor) must not result in a condition where a parameter is limited to such a reduced value that safe and controllable maneuvering is no longer available. The crew must be alerted by suitable means if any change in envelope limiting or maneuverability is produced by single or multiple failures of the EFCS not shown to be extremely improbable.

Issued in Renton, Washington, on August 27, 2014.

/s/ Jeffrey E. Duven

Jeffrey E. Duven
Manager, Transport Airplane Directorate
Aircraft Certification Service

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