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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2012–1199; Special Conditions No. 25–476–SC]

Special Conditions: Embraer S.A., Model EMB–550 Airplanes; Flight Envelope Protection: Performance Credit for Automatic Takeoff Thrust Control System (ATTCS) During Go-Around

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Embraer S.A. Model EMB–550 airplane. This airplane will have a novel or unusual design feature associated with the use of an Automatic Takeoff Thrust Control System (ATTCS) during go-around. 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 Date:* March 1, 2013.

FOR FURTHER INFORMATION CONTACT: Joe Jacobsen, FAA, Airplane and Flight Crew Interface Branch, ANM–111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98057–3356; telephone 425–227–2011; facsimile 425–227–1149.

SUPPLEMENTARY INFORMATION:

Background

On May 14, 2009, Embraer S.A. applied for a type certificate for their new Model EMB–550 airplane. The Model EMB–550 airplane is the first of a new family of jet airplanes designed for corporate flight, fractional, charter, and private owner operations. The aircraft has a conventional configuration with low wing and T-tail empennage. The primary structure is metal with composite empennage and control surfaces. The Model EMB–550 airplane is designed for 8 passengers, with a maximum of 12 passengers. It is equipped with two Honeywell HTF7500–E medium bypass ratio turbofan engines mounted on aft fuselage pylons. Each engine produces approximately 6,540 pounds of thrust for normal takeoff. The primary flight controls consist of hydraulically powered fly-by-wire elevators, ailerons and rudder, controlled by the pilot or copilot sidestick.

Embraer S.A. has incorporated an ATTCS function into the engine of the Model EMB–550 airplane. It has a full authority digital electronic control system architecture. Embraer S.A. proposed allowing performance credit for this function during go-arounds to show compliance with the requirements of § 25.121(d) for approach climb performance. Since the airworthiness requirements do not contain appropriate safety standards for approach climb performance using ATTCS, special conditions are required to establish a level of safety equivalent to that of the regulations.

Part 25 appendix I contains standards for use of ATTCS during takeoff. These special conditions establish standards to extend the use of ATTCS to the go-around phase.

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Embraer S.A. must show that the Model EMB–550 airplane meets the applicable provisions of part 25, as amended by Amendments 25–1 through 25–127 thereto.

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 EMB–550 airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 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 EMB–550 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 and 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, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The Embraer S.A. Model EMB–550 airplane has an ATTCS that is used for both takeoff and go-around functions.

Section 25.904 and part 25 appendix I refer to operations of ATTCS only during takeoff. The Embraer S.A. Model EMB–550 airplane also provides for use of ATTCS for go-arounds. As a result, if an engine failure occurs during a go-around, the remaining engine automatically applies maximum go-around thrust. In addition, in the case of an approach with one engine already inoperative, if it is necessary to perform a go-around, the operating engine automatically applies maximum go-around thrust.

These special conditions are intended to ensure that the ATTCS functions correctly and meets expected performance requirements during go-arounds when the airplane is limited by weight, altitude, and/or temperature during an approach.

Discussion

Since current airworthiness requirements do not contain safety standards to allow credit for ATTCS in determining approach climb performance, these special conditions are required to establish a level of safety equivalent to that of the regulations. The definition of a critical time interval for the approach climb case similar to the critical time interval for takeoff defined in part 25 appendix I is of primary importance. During an approach climb, it must be extremely improbable to violate a flight path based on the climb gradient requirement of § 25.121(d).

This climb gradient requirement implies a minimum one-engine-inoperative flight path capability with the airplane in the approach configuration. The engine may have been inoperative before initiating the go-around, or it may become inoperative during the go-around. The definition of the critical time interval must consider both possibilities.

The propulsive thrust used to determine compliance with the approach climb requirements of § 25.121(d) is limited to the lesser of:

- The thrust provided by the ATTCS, or
- 111% of the thrust resulting from the initial thrust setting with the ATTCS failing to perform its uptrim function and without action by the flightcrew to reset thrust.

This requirement serves to limit the adverse performance effects of a combined engine and ATTCS failure, and ensures adequate performance of an all-engines-operating go-around.

Discussion of Comments

Notice of proposed special conditions No. 25–12–06–SC for the Embraer S.A. Model EMB–550 airplanes was published in the **Federal Register** on November 9, 2012, (77 FR 67309). No substantitve comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the Embraer S.A. Model EMB–550 airplane. Should Embraer S.A. apply at a later date 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.

Conclusion

This action affects only certain novel or unusual design features on one model of airplanes. 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 Embraer S.A. Model EMB–550 airplanes.

1. The Model EMB–550 airplane must comply with the requirements of 14 CFR 25.904 and appendix I to 14 CFR part 25 and the following requirements pertaining to the go-around phase of flight:

2. Definitions

a. Takeoff/go-around (TOGA): Throttle lever in takeoff or go-around position.

b. Automatic takeoff thrust control system (ATTCS): The ATTCS in Model EMB–550 airplanes is defined as the entire automatic system available during takeoff and in go-around mode, including all devices, both mechanical and electrical, that sense engine failure, transmit signals, actuate fuel controls or power levers (or increase engine power by other means on operating engines to achieve scheduled thrust or power increase), and furnish cockpit information on system operation.

c. Critical time interval: The definition of the critical time interval in 14 CFR appendix I 25.2(b) must be expanded to include the following:

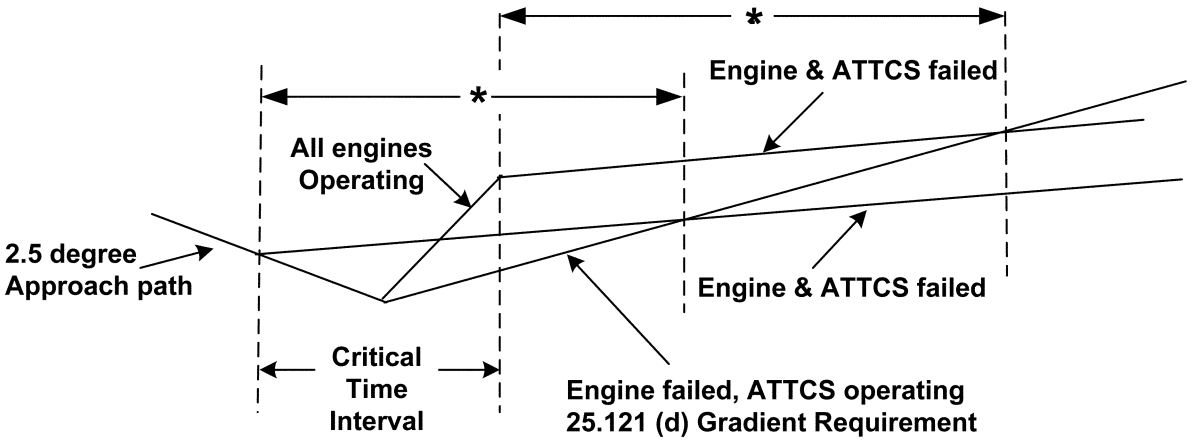
(1) When conducting an approach for landing using ATTCS, the critical time interval is defined as follows:

(i) The critical time interval *begins* at a point on a 2.5 degree approach glide path from which, assuming a simultaneous engine and ATTCS failure, the resulting approach climb flight path intersects a flight path originating at a later point on the same approach path corresponding that corresponds to the 14 CFR part 25 one-engine-inoperative approach climb gradient. The period of time from the point of simultaneous engine and ATTCS failure to the intersection of these flight paths must be no shorter than the time interval used in evaluating the critical time interval for takeoff beginning from the point of simultaneous engine and ATTCS failure and ending upon reaching a height of 400 feet.

(ii) The critical time interval *ends* at the point on a minimum performance, all-engines-operating go-around flight path from which, assuming a simultaneous engine and ATTCS failure, the resulting minimum approach climb flight path intersects a flight path corresponding to the 14 CFR part 25 minimum one-engine-inoperative approach climb gradient. The all-engines-operating go-around flight path and the 14 CFR part 25 one-engine-inoperative approach climb gradient flight path originate from a common point on a 2.5 degree approach path. The period of time from the point of simultaneous engine and ATTCS failure to the intersection of these flight paths must be no shorter than the time interval used in evaluating the critical time interval for the takeoff beginning from the point of simultaneous engine and ATTCS failure and ending upon reaching a height of 400 feet.

(2) The critical time interval must be determined at the altitude resulting in the longest critical time interval for which one-engine-inoperative approach climb performance data are presented in the airplane flight manual (AFM).

(3) The critical time interval is illustrated in the following figure:



*** The engine and ATTCS failed time interval must be no shorter than the time interval from the point of simultaneous engine and ATTCS failure to a height of 400 feet used to comply with I25.2(b) for ATTCS use during takeoff.**

3. Performance and system reliability requirements: The applicant must comply with the performance and ATTCS reliability requirements as follows:

a. An ATTCS failure or a combination of failures in the ATTCS during the critical time interval:

(1) Must not prevent the insertion of the maximum approved go-around thrust or power, or must be shown to be a remote event.

(2) Must not result in a significant loss or reduction in thrust or power, or must be shown to be an extremely improbable event.

b. The concurrent existence of an ATTCS failure and an engine failure during the critical time interval must be shown to be extremely improbable.

c. All applicable performance requirements of 14 CFR part 25 must be met with an engine failure occurring at the most critical point during go-around with the ATTCS functioning.

d. The probability analysis must include consideration of ATTCS failure occurring after the time at which the flightcrew last verifies that the ATTCS is in a condition to operate until the beginning of the critical time interval.

e. The propulsive thrust obtained from the operating engine after failure of the critical engine during a go-around used to show compliance with the one-engine-inoperative climb requirements of § 25.121(d) may not be greater than the lesser of:

(1) The actual propulsive thrust resulting from the initial setting of power or thrust controls with the ATTCS functioning; or

(2) 111% of the propulsive thrust resulting from the initial setting of power or thrust controls with the ATTCS failing to reset thrust or power and without any action by the flightcrew to reset thrust or power.

4. Thrust setting

a. The initial go-around thrust setting on each engine at the beginning of the go-around phase may not be less than any of the following:

(1) That required to permit normal operation of all safety-related systems and equipment dependent upon engine thrust or power lever position; or

(2) That shown to be free of hazardous engine response characteristics and not to result in any unsafe aircraft operating or handling characteristics when thrust or power is advanced from the initial go-around position to the maximum approved power setting.

b. For approval to use an ATTCS for go-arounds, the thrust setting procedure must be the same for go-arounds initiated with all engines operating as for go-around initiated with one engine inoperative.

5. Powerplant controls

a. In addition to the requirements of § 25.1141, no single failure or malfunction, or probable combination thereof, of the ATTCS, including associated systems, may cause the failure of any powerplant function necessary for safety.

b. The ATTCS must be designed to:

(1) Apply thrust or power on the operating engine(s), following any one-engine failure during a go-around, to achieve the maximum approved go-around thrust without exceeding the engine operating limits;

(2) Permit manual decrease or increase in thrust or power up to the maximum go-around thrust approved for the airplane under the existing conditions through the use of the power lever. For airplanes equipped with limiters that automatically prevent the engine operating limits from being exceeded under existing ambient conditions, other means may be used to increase the thrust in the event of an ATTCS failure, provided that the means:

(i) Is located on or forward of the power levers;

(ii) Is easily identified and operated under all operating conditions by a single action of either pilot with the hand that is normally used to actuate the power levers; and

(iii) Meets the requirements of § 25.777(a), (b), and (c).

(3) Provide a means to verify to the flightcrew before beginning an approach for landing that the ATTCS is in a condition to operate (unless it can be demonstrated that an ATTCS failure combined with an engine failure during an entire flight is extremely improbable); and

(4) Provide a means for the flightcrew to deactivate the automatic function. This means must be designed to prevent inadvertent deactivation.

6. Powerplant instruments: In addition to the requirements of § 25.1305:

a. A means must be provided to indicate when the ATTCS is in the armed or ready condition; and

b. If the inherent flight characteristics of the airplane do not provide adequate warning that an engine has failed, a warning system that is independent of the ATTCS must be provided to give the pilot a clear warning of any engine failure during a go-around.

Issued in Renton, Washington, on January 24, 2013.

Ali Bahrami,

Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2013–01928 Filed 1–29–13; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2012–0699; Special Conditions No. 25–474–SC]

Special Conditions: Airbus, Model A318–112 Airplane (S/N 3238); Certification of Cooktops

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Airbus Model A318–112 airplane, serial number (S/N) 3238. This airplane, as modified by Fokker Services B.V., will have a novel or unusual design feature associated with a cooktop installation. 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 Date:* January 24, 2013.

FOR FURTHER INFORMATION CONTACT: Dan Jacquet, FAA, Airframe and Cabin Safety Branch, ANM–115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98057–3356; telephone 425–227–2676; facsimile 425–227–1100; email *daniel.jacquet@faa.gov.*

SUPPLEMENTARY INFORMATION:

Background

On January 12, 2010, Fokker Services B.V. applied for a supplemental type certificate for an interior conversion on an Airbus Model A318–112 airplane, S/N 3238. The Airbus Model A318–112 airplane is a large, transport-category airplane powered by two CFM56–5B9/P engines, with a basic maximum takeoff weight of 130,071 pounds.

At the time of the notice of proposed special conditions No. 25–12–02–SC, Fokker Services B.V. requested certification to convert an Airbus Model A318–112 (S/N 3238) to a corporate jet, operating for both common carriage and private use. As of this publication, Fokker Services B.V. requested certification for common carriage only. The aircraft will now be certified for a maximum of 8 crew and 19 passengers and limited to common carriage only. The aircraft will be subdivided into an entrance way, executive lounge, two private lounges, and a private bathroom. The entry will include the installation of two wet galleys. One of the galleys will include the installation of two combined cooktop pan units. The addition of a cooktop to this interior conversion can lead to hazards to both the occupants and the aircraft. Special consideration is needed to address the safety standards associated with this installation.

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.101, Fokker Services B.V. must show that the Airbus Model A318–112 (S/N 3238) airplane, as changed, continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. A28NM or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the ''original type certification basis.'' The regulations incorporated by reference in Type Certificate No. A28NM are 14 CFR part 25, as amended by Amendments 25–1 through 25–56, with reversions to earlier amendments, voluntary compliance to later amendments, special conditions, equivalent safety findings, and exemptions listed in the type certificate data sheet.

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 Airbus Model A318–112 (S/N 3238) because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same 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 Airbus Model A318–112 (S/N 3238) 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 issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.101.

Novel or Unusual Design Features

The Airbus Model A318–112 airplane, S/N 3238, will incorporate the following novel or unusual design feature: Cooktops in the passenger cabin. Cooktops introduce high heat, smoke, and the possibility of fire into the passenger cabin environment. The current airworthiness standards of part 25 do not contain adequate or appropriate safety standards to protect the airplane and its occupants from these potential hazards. The applicant's proposed system is considered to be a novel or unusual design feature.

Discussion

Currently, ovens are the prevailing means of heating food on airplanes. Ovens are characterized by an enclosure that contains both the heat source and the food being heated. The hazards presented by ovens are thus inherently limited and are well understood through years of service experience. Cooktops, on the other hand, are characterized by exposed heat sources and the presence of relatively unrestrained hot cookware and heated food. These may represent unprecedented hazards to both the occupants and the airplane.

Cooktops could have serious passenger and aircraft safety implications if appropriate requirements are not established for their installation and use. The requirements identified in these proposed special conditions are in addition to those considerations identified in Advisory Circular (AC) 20–168, *Certification Guidance for Installation of Non-Essential, Non-Required Aircraft Cabin Systems and Equipment (CS&E),* and those in AC 25–17A, *Transport Airplane Cabin Interiors Crashworthiness Handbook.* The intent of these proposed special conditions is to provide a level of safety that is consistent with that on similar aircraft without cooktops.

In similar cooktop installations, the FAA has required a deployable cover and a means to automatically shut off the power when the cover was in use. In lieu of these requirements, the cooktop installation in this Airbus A318–112 (S/N 3238) will have a lid and a timer that is not covered by the lid. The timer switches the heating elements on and off, has a maximum time of 20 minutes, and is still accessible when the lid is closed. The