



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2017-0484; Special Conditions No. 25-700-SC]

Special Conditions: Textron Aviation Inc. Model 700 Airplanes; Use of Automatic Power Reserve for Go-Around Performance Credit

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Textron Aviation Inc. (Textron) Model 700 airplane. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is an Automatic Takeoff Thrust Control System (ATTCS), referred to as an Automatic Power Reserve (APR), to set the performance level for approach-climb operation after an engine failure. 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: This action is effective on Textron on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Send your comments by **[INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Send comments identified by docket number FAA-2017-0484 using any of the following methods:

- *Federal eRegulations Portal:* Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket Web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the **Federal Register** published on April 11, 2000 (65 FR 19477-19478).

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

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:

The substance of these special conditions has been subject to the notice and comment period in several prior instances and has been derived without substantive change from those previously issued. It is unlikely that prior public comment would result in a significant change from the substance contained herein. Therefore, because a delay would significantly affect the certification of the airplane, the FAA has determined that prior public notice and comment are unnecessary and impracticable.

In addition, since the substance of these special conditions has been subject to the public comment process in several prior instances with no substantive comments received, the FAA finds it unnecessary to delay the effective date and finds that good cause exists for adopting these special conditions upon publication in the **Federal Register**.

The FAA is requesting comments to allow interested persons to submit views that may not have been submitted in response to the prior opportunities for comment described above.

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On November 20, 2014, Textron applied for a type certificate for their new Model 700 airplane. The Model 700 airplane is a turbofan-powered executive-jet airplane with seating for two crewmembers and 12 passengers. This airplane will have a maximum takeoff weight of 38,514 pounds.

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Textron must show that the Model 700 airplane meets the applicable provisions of part 25, as amended by Amendments 25-1 through 25-139, 25-141, and 25-143.

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 Textron Model 700 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 novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model 700 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 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 Model 700 airplane will incorporate the following novel or unusual design feature:
An Automatic Takeoff Thrust Control System, referred to as an Automatic Power Reserve, to set the performance level for approach-climb operation after an engine failure.

Discussion

Textron proposes using the ATTCS function of the Model 700 airplane during go-around and requests approach-climb performance credit for the use of the additional power. The Model 700 powerplant control system comprises a Full Authority Digital Electronic Control (FADEC) for the AS907-2-1S engine. The control system includes an ATTCS feature, referred to as Maximum Takeoff Thrust (MTO), and in the airplane flight manual (AFM), Automatic Power Reserve.

Section 25.904 and part 25, appendix I, limit the application of performance credit for ATTCS to takeoff only. Because the airworthiness regulations do not contain appropriate safety standards for approach-climb performance using ATTCS, special conditions are required to ensure a level of safety equivalent to that established in the regulations.

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.

Applicability

As discussed above, these special conditions are applicable to the Textron Model 700 airplane. Should Textron apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on one model of 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

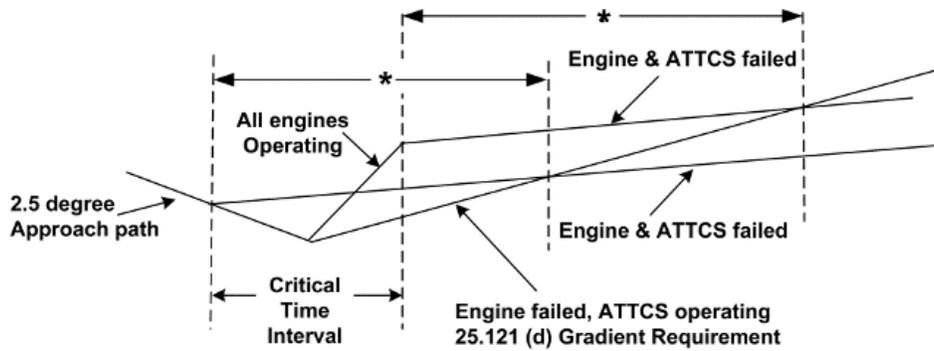
The Textron Model 700 airplane must comply with the requirements of 14 CFR 25.904, and appendix I, and the following requirements for the go-around phase of flight:

1. Definitions

- a. Takeoff/go-around (TOGA): Throttle lever in takeoff or go-around position.
- b. Automatic Takeoff Thrust Control System: The ATTCS in Model 700 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:
 - (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 that corresponds to the 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 part 25 minimum one-engine-inoperative approach-climb gradient. The all-engines-operating go-around flight path, and the 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.
- (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.

2. 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 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 percent 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.

3. 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 are shown to be free of hazardous engine-response characteristics, and not to result in any unsafe airplane 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.

4. 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 to 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.

5. Powerplant instruments: In addition to the requirements of § 25.1305:
- a. A means must be provided to indicate when the ATTCS is in the OFF or FAILED 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 August 8, 2017.

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Aircraft Certification Service
[FR Doc. 2017-17073 Filed: 8/11/2017 8:45 am; Publication Date: 8/14/2017]