

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM459; Special Conditions No. 25-432-SC]

Special Conditions: Gulfstream Aerospace LP (GALP) Model G250 airplane Automatic Power Reserve (APR), an Automatic Takeoff Thrust Control System (ATTCS)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Gulfstream Aerospace LP (GALP) Model G250 airplane. This airplane will have a novel or unusual design feature associated with go-around performance credit for use of Automatic Power Reserve (APR), an Automatic Takeoff Thrust Control System (ATTCS). 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: The effective date of these special conditions is June 13, 2011. We must receive your comments by August 4, 2011.

ADDRESSES: You must mail two copies of your comments to: Federal Aviation Administration, Transport Airplane Directorate, Attn: Rules Docket (ANM-113), Docket No. NM459, 1601 Lind Avenue SW., Renton, Washington, 98057-3356. You may deliver two copies to the Transport Airplane Directorate at the above address. You must mark your comments:

Docket No. NM459. You can inspect comments in the Rules Docket weekdays, except Federal holidays, between 7:30 a.m. and 4:00 p.m.

FOR FURTHER INFORMATION CONTACT: Joe Jacobsen, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98057-3356; telephone (425) 227-2011; facsimile (425) 227-1149.

SUPPLEMENTARY INFORMATION:

The FAA has determined that notice of, and opportunity for prior public comment on, these special conditions are impracticable because the substance of these special conditions has been subjected 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. The FAA therefore finds that good cause exists for making these special conditions effective upon issuance.

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 ask that you send us two copies of written comments.

We will file in the docket all comments we receive, as well as a report summarizing each substantive public contact with FAA personnel about these special conditions. You can inspect the docket before and after the comment closing date. If you wish to review the docket in person, go to the address in the ADDRESSES section of this preamble between 7:30 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays.

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.

If you want us to acknowledge receipt of your comments on these special conditions, include with your comments a self-addressed, stamped postcard on which you have written the docket number. We will stamp the date on the postcard and mail it back to you.

Background

On March 30, 2006, GALP applied for a type certificate for their new Model G250 airplane. The G250 is an 8-10 passenger (19 maximum), twin-engine airplane with a maximum operating altitude of 45,000 feet and a range of approximately 3,400 nautical miles. Airplane dimensions are 61.69-foot wing span, 66.6-foot overall length, and 20.8-foot tail height. Maximum takeoff weight is 39,600 pounds and maximum landing weight 32,700 pounds. Maximum cruise speed is mach 0.85, dive speed is mach 0.92. The avionics suite will be the Rockwell Collins Pro Line Fusion.

Type Certification Basis

Under the provisions of 14 CFR 21.17, GALP must show that the Model G250 airplane meets the applicable provisions of part 25 as amended by Amendments 25-1 through 25-117.

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 G250 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, the special conditions would also apply to the other model.

In addition to the applicable airworthiness regulations and special conditions, the Model G250 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 Model G250 will incorporate the following novel or unusual design feature:

GALP has requested approval to use an Automatic Takeoff Thrust Control System (ATTCS; referred to by GALP as Automatic Power Reserve (APR)) as the performance level in showing compliance with the approach climb requirements of 14 CFR 25.121(d). Section 25.904 and Appendix I to part 25 of 14 CFR limit the application of performance credit for ATTCS to takeoff only. Since 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.

Discussion

GALP is proposing to use the APR function of the Model G250 airplane during go-around and is requesting approach climb performance credit for the use of the additional power provided by the uptrim. The GALP powerplant control system comprises a Full Authority

Digital Electronic Control (FADEC) for the Honeywell AS907-2-1G engine. The control system includes an ATTCS feature referred to as APR.

The ATTCS (APR) function is integrated into the FADEC such that there is no separate circuitry for the APR function. Both FADECs are connected via a communications bus. Each FADEC sends information to the other. When the FADEC of any engine detects either the loss of communication or an indication of significant thrust loss from the opposite engine, the FADEC of the healthy (or both) engine will increase the power to the APR rating and the “APR” (activated) icon will appear on the EICAS inside the N1 gauge for the engine with its Throttle Lever Angle (TLA) set at takeoff (TO) power. In addition, APR is always available to the flightcrew for each engine, with its TLA set at TO power by pushing the “APR manual” pushbutton. If the TRA is not set to the TO power setting, this just arms both engines for APR. Once manually armed, whenever either TLA is advanced to the TO power setting, that engine increases power to APR rating regardless of the condition of the other engine.

The APR feature is always armed unless the flight crew selects to disarm it for single-engine-operation training purposes. When this disarmed condition is active, an amber caution message is provided. The normal operating procedure will be to leave APR armed at all times. The APR function will be checked as part of the normal FADEC continuous self-test feature. The engine, by virtue of the integrated power schedule imbedded in the FADEC software, cannot continue running if uptrim fails. This function is retained even in the case of a FADEC single-channel failure.

The above description highlights the fact that the APR power is available at all times for any TO operational segment without any additional action from the pilot. This applies during

takeoff and go-around (TOGA). The aircraft performance data is based on the availability of the uptrim power during takeoff and approach climb.

The ATTCS, as incorporated on the Model G250 airplane, allows the pilot to use the “Auto APR” procedure for the one-engine-inoperative (OEI) case and the “Manual APR” procedure while both engines are operative; in either case, the pilot obtains the additional go-around power by moving the power levers to the TO power setting. Full APR thrust is provided up to 20,000 ft. MSL.

The part 25 standards for ATTCS, contained in § 25.904 and Appendix I, specifically restrict performance credit for ATTCS to takeoff. Expanding the scope of the standards to include other phases of flight, including go-around, was considered at the time the standards were issued, but flightcrew-workload issues precluded further consideration. As the preamble of amendment 62 to part 25 states:

“In regard to ATTCS credit for approach climb and go-around maneuvers, current regulations preclude a higher power for the approach climb (Sec. 25.121(d)) than for the landing climb (Sec. 25.119). The workload required for the flightcrew to monitor and select from multiple in-flight power settings in the event of an engine failure during a critical point in the approach, landing, or go-around operations is excessive. Therefore, the FAA does not agree that the scope of the amendment should be changed to include the use of ATTCS for anything except the takeoff phase.”

The ATTCS incorporated on the Model G250 airplane allows the pilot to use the same power-setting procedure during a go-around regardless of whether or not an engine fails. In either case, the pilot obtains go-around power by moving the power levers to the TOGA detent.

Since the ATTCS is always armed, it will function automatically following an engine failure, and advance the remaining engine to the APR power level.

Because the airworthiness regulations do not contain appropriate safety standards to allow approach climb performance credit for ATTCS, special conditions are required to ensure a level of safety equivalent to that established in the regulations. The definition of a critical time interval for the approach climb case, during which time it must be extremely improbable to violate a flight path based on the § 25.121(d) gradient requirement, is of primary importance. In the event of a simultaneous failure of an engine and the APR function, falling below the minimum flight path defined by the 2.5-degree approach, decision height, and climb gradient required by § 25.121(d) must be shown to be an extremely improbable event during this critical time interval. The § 25.121(d) gradient requirement implies a minimum OEI 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.

Applicability

As discussed above, these special conditions are applicable to the GALP Model G250 airplane. Should GALP 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 the GALP Model G250 airplane. It is not a rule of general applicability and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

The FAA has determined that prior public notice and comment are unnecessary and impracticable, and good cause exists for adopting these special conditions upon issuance.

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 the GALP Model G250 airplane.

For approval to use the power provided by the ATTCS to determine the approach climb performance limitations, the GALP Model G250 airplane must comply with the requirements of § 25.904 and Appendix I to Part 25, including the following requirements pertaining to the go-around phase of flight:

1. General. An Automatic Takeoff Thrust Control System (ATTCS) is defined as the entire automatic system, 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 increases, and to furnish cockpit information regarding system operation.

2. ATTCS. The engine-power control system that automatically resets the power or thrust on the operating engine (following engine failure during the approach for landing) must comply with the following requirements stated in paragraphs 2.a, 2.b, and 2.c:

a. Performance and System Reliability Requirements. 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.

b. Thrust or Power Setting.

(1) The initial thrust or power setting on each engine at the beginning of the takeoff roll or go-around may not be less than:

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

(ii) 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 increased from the initial takeoff or go-around thrust or power to the maximum approved takeoff thrust or power.

(2) For approval of an ATTCS system for go-around, the thrust or power setting procedure must be the same for go-arounds initiated with all engines operating as for go-arounds initiated with one engine inoperative.

c. Powerplant Controls. 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. The ATTCS must be designed to:

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

(2) Provide a means to verify to the flightcrew, before takeoff and before beginning an approach for landing, that the ATTCS is in a condition to operate.

3. Critical Time Interval. The definition of the Critical Time Interval in appendix I, § I25.2(b) will be expanded to include the following:

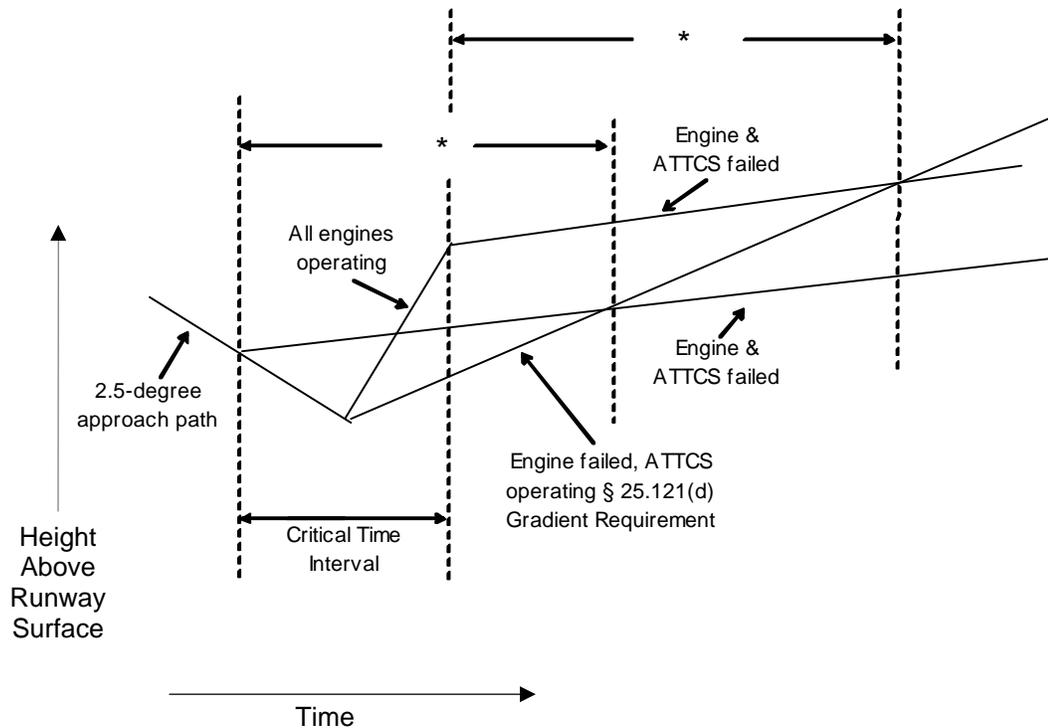
a. When conducting an approach for landing using ATTCS, the critical time interval is defined as follows:

(1) 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 to the part 25 OEI 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.

(2) The critical time interval ends at the point on a minimum-performance, all-engines-operating, go-around flight path from which, assuming simultaneous engine and ATTCS failure, the resulting minimum approach climb flight path intersects a flight path corresponding to the part 25 minimum, OEI approach climb gradient. The all-engines-operating, go-around flight path, and the part 25 OEI approach climb gradient flight path, both 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.

b. The critical time interval must be determined at the altitude resulting in the longest critical time interval for which OEI approach climb performance data are presented in the Airplane Flight Manual.

c. 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.

Issued in Renton, Washington, on June 13, 2011.

/s/ Ali Bahrami

Ali Bahrami
 Manager, Transport Airplane Directorate
 Aircraft Certification Service