

certification basis for Gulfstream GVI airplanes.

1. The applicant must ensure electronic system security protection for the aircraft control domain and airline information domain from access by unauthorized sources external to the airplane, including those possibly caused by maintenance activity.

2. The applicant must ensure that electronic system security threats from external sources are identified and assessed, and that effective electronic system security protection strategies are implemented to protect the airplane from all adverse impacts on safety, functionality, and continued airworthiness.

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

Ali Bahrami,

*Manager, Transport Airplane Directorate,
Aircraft Certification Service.*

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM444; Special Conditions No. 25-435-SC]

Special Conditions: Gulfstream Model GVI Airplane; Operation Without Normal Electric Power

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: The Gulfstream GVI airplane will have numerous electrically operated systems whose function is needed for continued safe flight and landing of the airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. These proposed 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:* July 25, 2011.

FOR FURTHER INFORMATION CONTACT: Nazih Khaouly, FAA, Airplane and Flight Crew Interface Branch, ANM-111, Transport Standards Staff, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue, SW., Renton, Washington 98057-3356; telephone (425) 227-2432; facsimile (425) 227-1320.

SUPPLEMENTARY INFORMATION:

Background

On March 29, 2005, Gulfstream Aerospace Corporation (hereafter referred to as "Gulfstream") applied for an FAA type certificate for its new Gulfstream Model GVI passenger airplane. Gulfstream later applied for, and was granted, an extension of time for the type certificate, which changed the effective application date to September 28, 2006. The Gulfstream Model GVI airplane will be an all-new, two-engine jet transport airplane. The maximum takeoff weight will be 99,600 pounds, with a maximum passenger count of 19 passengers.

Type Certification Basis

Under provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Gulfstream must show that the Gulfstream Model GVI airplane (hereafter referred to as "the GVI") meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-119, 25-122, and 25-124. 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 GVI 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 features, the special conditions would also apply to the other model under provisions of § 21.101.

In addition to complying with the applicable airworthiness regulations and special conditions, the GVI 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 also issue a finding of regulatory adequacy pursuant to section 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 GVI incorporates an electronic flight control system that requires a continuous source of electrical power in order to keep the system operable. Due to rapid improvements in airplane technology, the applicable airworthiness regulations do not contain adequate or

appropriate safety standards for these design features.

Discussion

The GVI incorporates an electronic flight control system that requires a continuous source of electrical power in order to keep the system operable. The criticality of this system is such that their failure will either reduce the capability of the airplane or the ability of the crew to cope with adverse operating conditions, or prevent continued safe flight and landing of the airplane. The airworthiness standards of part 25 do not contain adequate or appropriate standards for protection of these systems from the adverse effects of operation without normal electrical power.

The current rule, § 25.1351(d), Amendment 25-72, requires safe operation under visual flight rules (VFR) conditions for at least five minutes after loss of all normal electrical power. This rule was structured around traditional airplane designs that used mechanical control cables and linkages for flight control. These manual controls allowed the crew to maintain aerodynamic control of the airplane for an indefinite period of time after loss of all electrical power. Under these conditions, the mechanical flight control system provided the crew with the ability to fly the airplane while attempting to identify the cause of the electrical failure, start the engine(s) if necessary, and reestablish some of the electrical power generation capability, if possible.

To maintain the same level of safety associated with traditional designs, the GVI must be designed for operation with the normal sources of engine and auxiliary power unit (APU) generated electrical power inoperative. Service experience has shown that loss of all electrical power from the airplane's engine and APU driven generators is not extremely improbable. Thus, Gulfstream must demonstrate that the airplane is capable of recovering adequate primary electrical power generation for safe flight and landing.

For compliance purposes, a test demonstration of the loss of normal engine generator must be established such that:

1. The failure condition should be assumed to occur during night instrument meteorological conditions (IMC) at the most critical phase of the flight relative to the electrical power system design and distribution of equipment loads on the system.

2. After the unrestorable loss of normal engine generator power, the airplane engine restart capability must

be provided and operations continued in IMC.

3. The airplane should be demonstrated to be capable of continuous safe flight and landing. The length of time must be computed based on the maximum diversion time capability for which the airplane is being certified. Consideration for speed reductions resulting from the associated failure must be made.

4. Availability of APU operation should not be considered in establishing emergency power system adequacy.

Discussion of Comments

Notice of proposed special conditions No. 25–11–03–SC for Gulfstream GVI airplanes was published in the **Federal Register** on February 14, 2011 (76 FR 8314). Only one comment was received, which was supportive, so these special conditions are adopted as proposed.

Applicability

As discussed above, this special condition is applicable to the Gulfstream Model GVI airplane. Should Gulfstream apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design features, this special condition would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features of the GVI. 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 Condition

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special condition is issued as part of the type certification basis for the Gulfstream GVI airplanes.

Since the total loss of normal generated electrical power in two-engine airplanes has not achieved the extremely improbable level, and since the loss of all electrical power may be catastrophic to airplanes utilizing an electronic flight control system, the following special condition is in lieu of 14 CFR 25.1351(d):

It must be demonstrated by test or a combination of test and analysis that the airplane can continue safe flight and landing with inoperative normal engine and APU generator electrical power (electrical power

sources excluding the battery and any other standby electrical sources). The airplane operation should be considered at the critical phase of flight and include the ability to restart the engines and maintain flight for the maximum diversion time capability being certified.

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

Ali Bahrami,

Manager, Transport Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM442; Special Conditions No. 25–434–SC]

Special Conditions: Gulfstream Model GVI Airplane; Interaction of Systems and Structures

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Gulfstream GVI airplane. This airplane will have novel or unusual design features when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. These design features include systems that affect the structural capability of the airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. 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:* July 25, 2011.

FOR FURTHER INFORMATION CONTACT: Carl Niedermeyer, FAA, Airframe/Cabin Safety Branch, ANM–115, Transport Standards Staff, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue, SW., Renton, Washington 98057–3356; telephone (425) 227–2279; electronic mail carl.niedermeyer@faa.gov.

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Type Certification Basis

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In addition to complying with the applicable airworthiness regulations and special conditions, the GVI 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 also issue a finding of regulatory adequacy pursuant to section 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).

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 features, the special conditions would also apply to the other model under provisions of § 21.101.

Novel or Unusual Design Features

The Gulfstream Model GVI airplane will incorporate novel or unusual design features. These features are systems that may affect the airplane’s structural performance, either directly or as a result of failure or malfunction. That is, the airplane’s systems affect how it responds in maneuver and gust conditions, and thereby affect its structural capability. These systems may also affect the aeroelastic stability of the airplane. These systems include the GVI’s flight control systems, autopilots, stability augmentation systems, load alleviation systems, and fuel