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.

[FR Doc. 2011–15707 Filed 6–22–11; 8:45 am]

BILLING CODE 4910–13–P

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.*

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.

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

management systems. Such systems represent a novel and unusual feature when compared to the technology envisioned in the current airworthiness standards.

Discussion

Special conditions are needed to require consideration of the effects of systems on the structural capability and aeroelastic stability of the airplane, both in the normal and in the failed state, because these effects are not covered by current regulations.

These special conditions are identical or nearly identical to those previously required for type certification of other transport airplane models. These special conditions were derived initially from standardized requirements developed by the Aviation Rulemaking Advisory Committee (ARAC), comprised of representatives of the FAA, Europe's Joint Aviation Authorities (now replaced by the European Aviation Safety Agency), and industry.

These special conditions require that the airplane meets the structural requirements of Subparts C and D of 14 CFR part 25 when the airplane systems are fully operative. These special conditions also require that the airplane meet these requirements considering failure conditions. In some cases, reduced margins are allowed for failure conditions based on system reliability.

These special conditions establish a level of safety that neither raises nor lowers the standard set forth in the applicable regulations.

In these special conditions and in the current standards and regulations, the term ''any'' is used. Use of this term has traditionally been understood to require that all items covered by the term are addressed, rather than addressing only a portion of the items. The use of the term ''any'' in these special conditions continues this traditional understanding.

Discussion of Comments

Notice of proposed special conditions No. 25–11–02–SC for Gulfstream GVI airplanes was published in the **Federal Register** on February 14, 2011 (76 FR 8316). Only one comment was received.

Clarification of GVI Fuel Management System

The commenter, Gulfstream, agreed with the content of the special conditions, but provided a clarification regarding the GVI airplane's fuel management system. The *Novel or Unusual Design Features* section of the proposed special conditions referenced the fuel management system as an example of a system or function that could affect the airplane's structural performance. Gulfstream stated that the GVI airplane has a simple and conventional two-tank fuel system design so no unusual consideration is required for the fuel management system. Gulfstream did not propose any changes to the special conditions.

We agree with Gulfstream's statement regarding the fuel management system. No change is required and these special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are 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, these special conditions 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 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 Gulfstream GVI airplanes.

A. General

The GVI is equipped with systems that affect structural performance, either directly or as a result of a failure or malfunction. The influence of these systems and their failure conditions on structural performance must be taken into account when showing compliance with the requirements of Title 14, Code of Federal Regulations (14 CFR), part 25, Subparts C and D.

1. The following criteria must be used for showing compliance with these special conditions for airplanes equipped with flight control systems, autopilots, stability augmentation systems, load alleviation systems, fuel management systems, and other systems that either directly or as a result of failure or malfunction affect structural performance.

2. The criteria defined herein only address the direct structural consequences of the system responses and performance. They cannot be considered in isolation but should be included in the overall safety evaluation of the airplane. These criteria may in some instances duplicate standards already established for this evaluation. These criteria are only applicable to structure whose failure could prevent continued safe flight and landing. Specific criteria that define acceptable limits on handling characteristics or stability requirements when operating in the system degraded or inoperative mode are not provided in these special conditions.

3. Depending upon the specific characteristics of the airplane, additional studies may be required that go beyond the criteria provided in this special condition in order to demonstrate the capability of the airplane to meet other realistic conditions such as alternative gust or maneuver descriptions for an airplane equipped with a load alleviation system.

4. The following definitions are applicable to these special conditions.

(a) Structural performance: Capability of the airplane to meet the structural requirements of 14 CFR part 25.

(b) Flight limitations: Limitations that can be applied to the airplane flight conditions following an in-flight occurrence and that are included in the flight manual (*e.g.,* speed limitations, avoidance of severe weather conditions, *etc.*).

(c) Operational limitations: Limitations, including flight limitations that can be applied to the airplane operating conditions before dispatch (*e.g.,* fuel, payload, and master minimum equipment list limitations).

(d) Probabilistic terms: The probabilistic terms (probable, improbable, extremely improbable) used in these special conditions are the same as those used in § 25.1309.

(e) Failure condition: The term failure condition is the same as that used in § 25.1309; however, these special conditions apply only to system failure conditions that affect the structural performance of the airplane (*e.g.,* system failure conditions that induce loads, change the response of the airplane to inputs such as gusts or pilot actions, or lower flutter margins).

B. Effects of Systems on Structures

1. *General.* The following criteria will be used in determining the influence of a system and its failure conditions on the airplane structure.

2. *System fully operative.* With the system fully operative, the following apply:

(a) Limit loads must be derived in all normal operating configurations of the

system from all the limit conditions specified in Subpart C (or used in lieu of those specified in Subpart C), taking into account any special behavior of such a system or associated functions or any effect on the structural performance of the airplane that may occur up to the limit loads. In particular, any significant nonlinearity (rate of displacement of control surface, thresholds or any other system nonlinearities) must be accounted for in a realistic or conservative way when deriving limit loads from limit conditions.

(b) The airplane must meet the strength requirements of 14 CFR part 25 (static strength, residual strength), using the specified factors to derive ultimate loads from the limit loads defined above. The effect of nonlinearities must be investigated beyond limit conditions to ensure the behavior of the system presents no anomaly compared to the behavior below limit conditions. However, conditions beyond limit conditions need not be considered when it can be shown that the airplane has design features that will not allow it to exceed those limit conditions.

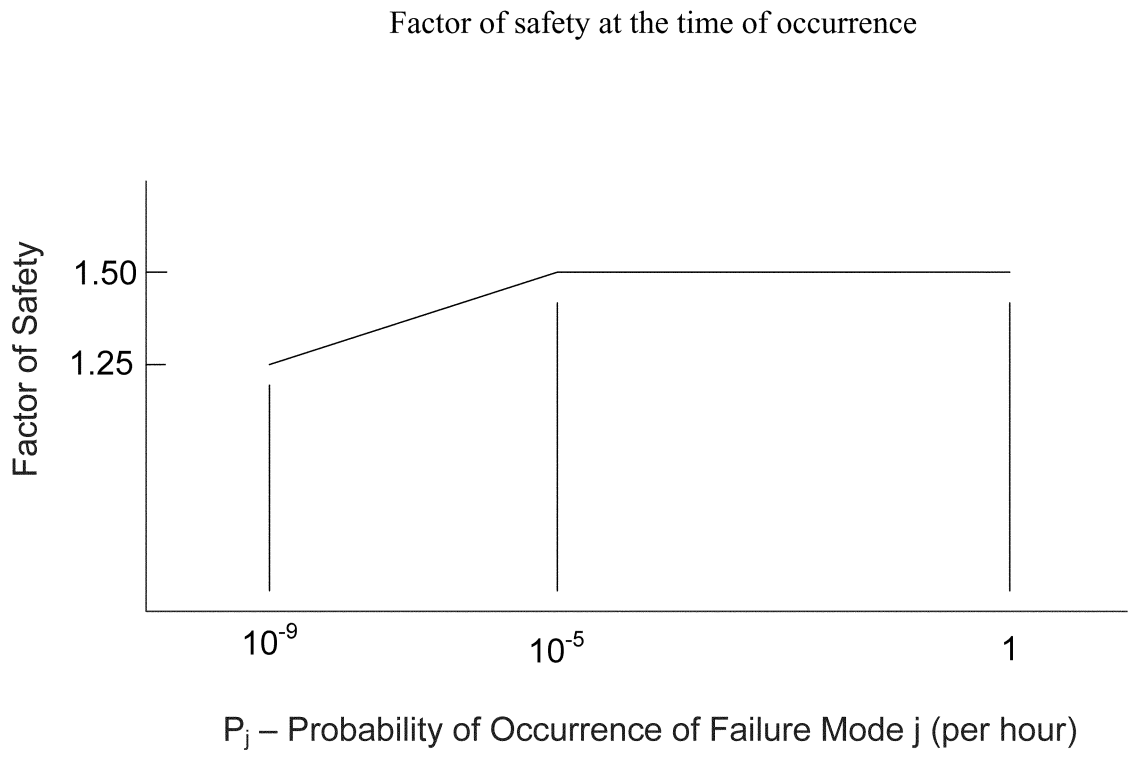
(c) The airplane must meet the aeroelastic stability requirements of § 25.629.

3. *System in the failure condition.* For any system failure condition not shown to be extremely improbable, the following apply:

(a) At the time of occurrence. Starting from 1–g level flight conditions, a realistic scenario, including pilot corrective actions, must be established to determine the loads occurring at the time of failure and immediately after the failure.

(1) For static strength substantiation, these loads multiplied by an appropriate factor of safety that is related to the probability of occurrence of the failure are ultimate loads to be considered for design. The factor of safety (FS) is defined in Figure 1.

Figure 1



(2) For residual strength substantiation, the airplane must be able to withstand two thirds of the ultimate loads defined in subparagraph B.3(a)(1) of these special conditions. For pressurized cabins, these loads must be combined with the normal operating differential pressure.

(3) Freedom from aeroelastic instability must be shown up to the speeds defined in § 25.629(b)(2). For failure conditions that result in speeds beyond V_C/M_C, freedom from aeroelastic instability must be shown to increased speeds, so that the margins intended by § 25.629(b)(2) are maintained.

(4) Failures of the system that result in forced structural vibrations (oscillatory failures) must not produce loads that could result in detrimental deformation of primary structure.

(b) For the continuation of the flight. For the airplane in the system failed state, and considering any appropriate reconfiguration and flight limitations, the following apply:

(1) The loads derived from the following conditions (or used in lieu of the following conditions) at speeds up to V_C/M_C (or the speed limitation prescribed for the remainder of the flight) must be determined:

(i) The limit symmetrical maneuvering conditions specified in § 25.331 and in § 25.345.

(ii) The limit gust and turbulence conditions specified in § 25.341 and in § 25.345.

(iii) The limit rolling conditions specified in § 25.349 and the limit unsymmetrical conditions specified in § 25.367 and § 25.427(b) and (c).

(iii) The limit yaw maneuvering conditions specified in § 25.351.

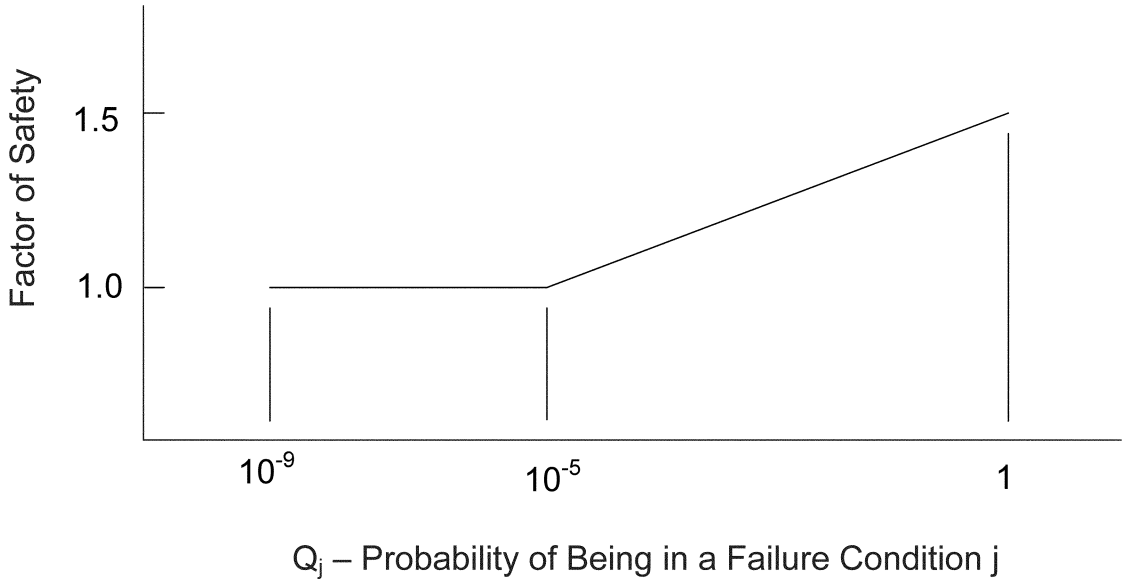
(iv) The limit ground loading conditions specified in § 25.473 and § 25.491.

(2) For static strength substantiation, each part of the structure must be able

to withstand the loads in paragraph B.3(b)(1) of these special conditions, multiplied by a factor of safety depending on the probability of being in this failure state. The factor of safety is defined in Figure 2.

Figure 2

Factor of safety for continuation of flight



$Q_j = (T_j)(P_j)$

Where:

Q_j = Probability of being in failure condition j

T_j = Average time spent in failure condition j (in hours)

P_j = Probability of occurrence of failure mode j (per hour)

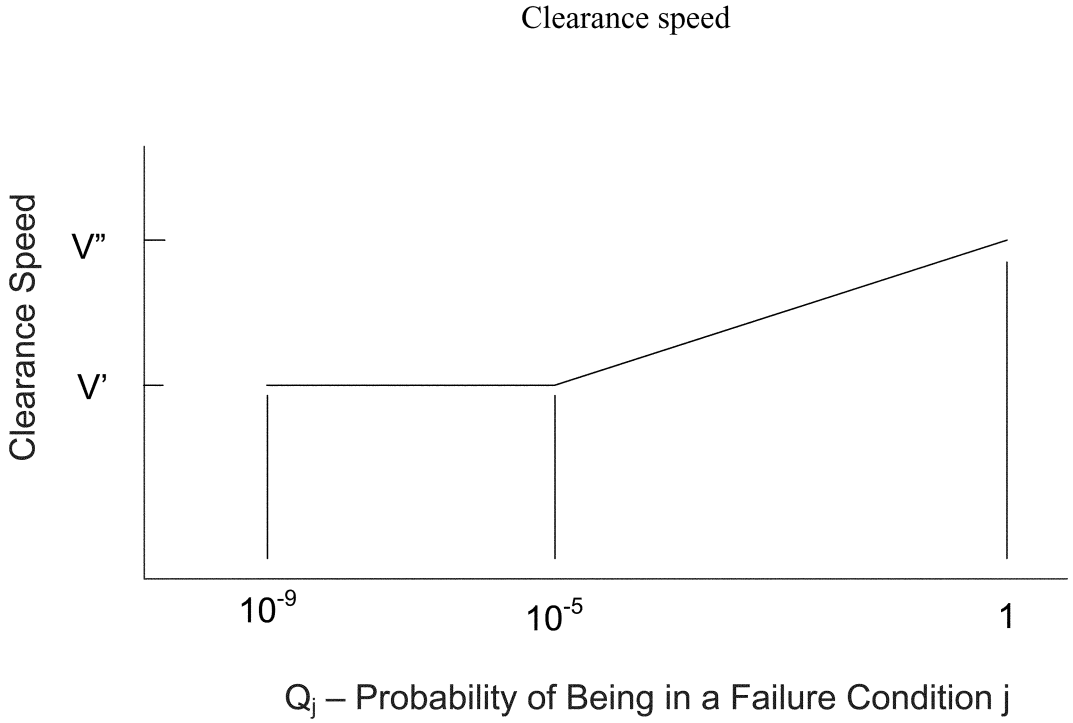
Note: If P_j is greater than 10^{-3} per flight hour then a 1.5 factor of safety must be applied to all limit load conditions specified in Subpart C.

(3) For residual strength substantiation, the airplane must be able to withstand two thirds of the ultimate loads defined in paragraph B.3(b)(2) of this special condition. For pressurized cabins, these loads must be combined with the normal operating differential pressure.

(4) If the loads induced by the failure condition have a significant effect on fatigue or damage tolerance then their effects must be taken into account.

(5) Freedom from aeroelastic instability must be shown up to a speed determined from Figure 3. Flutter clearance speeds V′ and V″ may be based on the speed limitation specified for the remainder of the flight using the margins defined by § 25.629(b).

Figure 3



V″ = Clearance speed as defined by § 25.629(b)(1).
V′ = Clearance speed as defined by § 25.629(b)(2).
Qj = (Tj)(Pj) where:
Qj = Probability of being in failure condition j
Tj = Average time spent in failure condition j (in hours)
Pj = Probability of occurrence of failure mode j (per hour)

Note: If Pj is greater than 10^{-3} per flight hour, then the flutter clearance speed must not be less than V″.

(6) Freedom from aeroelastic instability must also be shown up to V′ in Figure 3 above, for any probable system failure condition combined with any damage required or selected for investigation by § 25.571(b).

(c) Consideration of certain failure conditions may be required by other sections of 14 CFR part 25 regardless of calculated system reliability. Where analysis shows the probability of these failure conditions to be less than 10^{-9}, criteria other than those specified in this paragraph may be used for structural substantiation to show continued safe flight and landing.

4. *Failure indications.* For system failure detection and indication, the following apply:

(a) The system must be checked for failure conditions, not extremely improbable, that degrade the structural capability below the level required by 14 CFR part 25 or significantly reduce the reliability of the remaining system. As far as reasonably practicable, the flight crew must be made aware of these failures before flight. Certain elements of the control system, such as mechanical and hydraulic components, may use special periodic inspections, and electronic components may use daily checks, in lieu of detection and indication systems, to achieve the objective of this requirement. These certification maintenance requirements must be limited to components that are not readily detectable by normal detection and indication systems, and where service history shows that inspections will provide an adequate level of safety.

(b) The existence of any failure condition, not extremely improbable, during flight that could significantly affect the structural capability of the airplane and for which the associated reduction in airworthiness can be minimized by suitable flight limitations, must be signaled to the flight crew. For example, failure conditions that result in a factor of safety between the airplane strength and the loads of Subpart C below 1.25, or flutter margins below V″, must be signaled to the crew during flight.

5. *Dispatch with known failure conditions.* If the airplane is to be dispatched in a known system failure condition that affects structural performance, or that affects the reliability of the remaining system to maintain structural performance, then the provisions of these special conditions must be met, including the provisions of paragraph B.2 for the dispatched condition and paragraph B.3 for subsequent failures. Expected operational limitations may be taken into account in establishing Pj as the probability of failure occurrence for determining the safety margin in Figure 1. Flight limitations and expected operational limitations may be taken into account in establishing Qj as the combined probability of being in the dispatched failure condition and the subsequent failure condition for the safety margins in Figures 2 and 3. These limitations must be such that the probability of being in this combined failure state and then subsequently encountering limit load conditions is extremely improbable. No reduction in these safety margins is allowed if the subsequent system failure rate is greater than 1E–3 per hour.

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

Ali Bahrami,

Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2011–15704 Filed 6–22–11; 8:45 am]

BILLING CODE 4910–13–P