

Issued in Renton, Washington, on May 8, 1995.

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14 CFR Part 25

[Docket No. NM-109; Notice No. SC-95-3-NM]

Special Condition: Gulfstream Aerospace Corporation, Model Gulfstream V, High-Intensity Radiated Fields

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This notice proposes special conditions for the Gulfstream Model Gulfstream V airplane. This new airplane will utilize new avionics/electronic systems that provide critical data to the flightcrew. The applicable regulations do not contain adequate or appropriate safety standards for the protection of these systems from the effects of high-intensity radiated fields. 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: Comments must be received on or before July 17, 1995.

ADDRESSES: Comments on this proposal may be mailed in duplicate to: Federal Aviation Administration, Office of the Assistant Chief Counsel, Attn: Rules Docket (ANM-7), Docket No. NM-109, 1601 Lind Avenue SW., Renton, Washington 98055-4056; or delivered in duplicate to the Office of the Assistant Chief Counsel at the above address. Comments must be marked: Docket No. NM-109. Comments may be inspected in the Rules Docket weekdays, except Federal holidays, between 7:30 a.m. and 4:00 p.m.

FOR FURTHER INFORMATION CONTACT: Standardized Branch, ANM-113, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98055-4056.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of these proposed special conditions by submitting such written data, views, or arguments as they may desire.

Communications should identify the regulatory docket or notice number and be submitted in duplicate to the address specified above. All communications received on or before the closing date for comments will be considered by the Administrator before further rulemaking action is taken on these proposals. The proposals contained in this notice may be changed in light of comments received. All comments submitted will be available in the Rules Docket for examination by interested persons, both before and after the closing date for comments. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Persons wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must submit with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. NM-109." The postcard will be date stamped and returned to the commenter.

Background

On February 26, 1992, Gulfstream Aerospace Corporation, P.O. Box 2206, Savannah, GA 31402-2206, applied for an amended type certificate in the transport airplane category for the Model Gulfstream V airplane. The Gulfstream V is a T-tail, low swept wing, business jet airplane powered by two Rolls-Royce BR710-48 turbofan engines mounted on pylons extending from the aft fuselage. Each engine will be capable of delivering 14,750 pounds thrust. The flight controls will be powered and capable of manual reversion. The airplane has a seating capacity of up to nineteen passengers, and a maximum takeoff weight of 89,000 pounds.

Type Certification Basis

Under the provisions of § 21.17 of the FAR, Gulfstream must show, except as provided in § 25.2, that the Model Gulfstream V meets the applicable provisions of part 25, effective February 1, 1965, as amended by Amendments 25-1 through 25-75. In addition, the proposed certification basis for the Model Gulfstream V includes part 34, effective September 10, 1990, plus any amendments in effect at the time of certification; and part 36, effective December 1, 1969, as amended by Amendment 36-1 through the amendment in effect at the time of certification. No exemptions are anticipated. The special conditions that may be developed as a result of this notice will form an additional part of the type certification basis. In addition,

the certification basis may include other special conditions that are not relevant to these proposed special conditions.

If the Administrator finds that the applicable airworthiness regulations (i.e., part 25, as amended) do not contain adequate or appropriate safety standards for the Gulfstream V because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16 to establish a level of safety equivalent to that established in the regulations.

Special conditions, as appropriate, are issued in accordance with § 11.49 of the FAR after public notice, as required by §§ 11.28 and 11.29, and become part of the type certification basis in accordance with § 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 incorporated the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

Novel or Unusual Design Features

The Model Gulfstream V incorporates new avionic/electronic installations, including a digital Electronic Flight Instrument System (EFIS), Air Data System, Attitude and Heading Reference System (AHRS), Navigation and Communication System, Autopilot System, and a Full Authority Digital Engine Control (FADEC) system that controls critical engine parameters. These systems may be vulnerable to high-intensity radiated fields external to the airplane.

Discussion

There is no specific regulation that addresses protection requirements for electrical and electronic systems from HIRF. Increased power levels from ground based radio transmitters and the growing use of sensitive electrical and electronic systems to command and control airplanes have made it necessary to provide adequate protection.

To ensure that a level of safety is achieved equivalent to that intended by the regulations incorporated by reference, special conditions are proposed for the Gulfstream V which would require that new technology electrical and electronic systems, such as the EFIS, FADEC, AHRS, etc., be designed and installed to preclude component damage and interruption of

function due to both the direct and indirect effects of HIRF.

High-Intensity Radiated Fields (HIRF)

With the trend toward increased power levels from ground based transmitters, plus the advent of space and satellite communications, coupled with electronic command and control of the airplane, the immunity of critical digital avionics systems to HIRF must be established.

It is not possible to precisely define the HIRF to which the airplane will be exposed in service. There is also uncertainty concerning the effectiveness of airframe shielding for HIRF.

Furthermore, coupling of electromagnetic energy to cockpit-installed equipment through the cockpit window apertures is undefined. Based on surveys and analysis of existing HIRF emitters, an adequate level of protection exists when compliance with the HIRF protection special condition is shown with either paragraphs 1 or 2 below:

1. A minimum threat of 100 volts per meter peak electric field strength from 10 KHz to 18 GHz.

a. The threat must be applied to the system elements and their associated wiring harnesses without the benefit of airframe shielding.

b. Demonstration of this level of protection is established through system tests and analysis.

2. A threat external to the airframe of the following field strengths for the frequency ranges indicated.

Frequency	Peak (V/M)	Average (V/M)
10 KHz–100 KHz	50	50
100 KHz–500 KHz	60	60
500 KHz–2000 KHz	70	70
2 MHz–30 MHz	200	200
30 MHz–70 MHz	30	30
70 MHz–100 MHz	30	30
100 MHz–200 MHz	150	33
200 MHz–400 MHz	70	70
400 MHz–700 MHz	4,020	935
700 MHz–1000 MHz	1,700	170
1 GHz–2 GHz	5,000	990
2 GHz–4 GHz	6,680	840
4 GHz–6 GHz	6,850	310
6 GHz–8 GHz	3,600	670
8 GHz–12 GHz	3,500	1,270
12 GHz–18 GHz	3,500	360
18 GHz–40 GHz	2,100	750

As discussed above, the proposed special conditions would be applicable initially to the Model Gulfstream V. 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 feature, the special conditions would apply to that model as well, under the provisions of § 21.101(a)(1).

Conclusion

This action affects certain design features only on the Gulfstream V airplane. It is not a rule of general applicability and affects only the manufacturer who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Federal Aviation Administration, Reporting and recordkeeping requirements.

The authority citation for these proposed special conditions is as follows:

Authority: 49 U.S.C. app. 1344, 1348(c), 1352, 1354(a), 1355, 1421 through 1431, 1502, 1651(b)(2), 42 U.S.C. 1857f–10, 4321 et seq.; E.O. 11514; and 49 U.S.C. 106(g).

The Proposed Special Condition

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for the Gulfstream Model Gulfstream V series airplanes.

1. *Protection from Unwanted Effects of High-Intensity Radiated Fields (HIRF).* Each electrical and electronic system that performs critical functions must be designed and installed to ensure that the operation and operational capability of these systems to perform critical functions are not adversely affected when the airplane is exposed to high-intensity radiated fields.

2. For the purpose of this special conditions, the following definition applies: *Critical Functions.* Functions whose failure would contribute to or cause a failure condition that would prevent the continued safe flight and landing of the airplane.

Issued in Renton, Washington, on May 17, 1995.

Darrell M. Pederson,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service, ANM-100.

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14 CFR Part 71

[Airspace Docket No. 95-ANM-2]

Proposed Realignment of VOR Federal Airway V-86; Montana

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This proposed rule would extend Federal Airway V-86 from the

Coppertown, MT, Very High Frequency Omnidirectional Range/Distance Measuring Equipment (VOR/DME) to the Missoula, MT, VOR/DME. This action would improve the efficiency of air traffic operations between the Coppertown, MT, VOR/DME and Missoula, MT, VOR/DME facilities, and would reduce pilot/controller workload.

DATES: Comments must be received on or before July 17, 1995.

ADDRESSES: Send comments on the proposal in triplicate to: Manager, Air Traffic Division, ANM-500, Docket No. 95-ANM-2, Federal Aviation Administration, 1601 Lind Avenue SW., Renton, WA 98055-4056.

The official docket may be examined in the Rules Docket, Office of the Chief Counsel, Room 916, 800 Independence Avenue SW., Washington, DC, weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m.

An informal docket may also be examined during normal business hours at the office of the Regional Air Traffic Division.

FOR FURTHER INFORMATION CONTACT:

Norman W. Thomas, Airspace and Obstruction Evaluation Branch (ATP-240), Airspace-Rules and Aeronautical Information Division, Air Traffic Rules and Procedures Service, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone: (202) 267-9230.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested parties are invited to participate in this proposed rulemaking by submitting such written data, views, or arguments as they may desire. Comments that provide the factual basis supporting the views and suggestions presented are particularly helpful in developing reasoned regulatory decisions on the proposal. Comments are specifically invited on the overall regulatory, aeronautical, economic, environmental, and energy-related aspects of the proposal. Communications should identify the airspace docket number and be submitted in triplicate to the address listed above. Commenters wishing the FAA to acknowledge receipt of their comments on this notice must submit with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Airspace Docket No. 95-ANM-2." The postcard will be date/time stamped and returned to the commenter. All communications received on or before the specified closing date for comments will be