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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM201; Special Conditions No. 25-190-SC]

Special Conditions: Gulfstream Aerospace Corporation Model G-1159B; High-Intensity Radiated Fields (HIRF)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics. These modified airplanes will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. The modification incorporates the installation of a Honeywell Dual Airdata Computer System that performs critical functions. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for the protection of these systems from the effects of high-intensity-radiated fields (HIRF). 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 October 24, 2001. Comments must be received on or before December 7, 2001.

ADDRESSES: Comments on these special conditions may be mailed in duplicate to: Federal Aviation Administration, Transport Airplane Directorate, Attention: Rules Docket (ANM-113), Docket No. NM201, 1601 Lind Avenue

SW., Renton, Washington 98055-4056; or delivered in duplicate to the Transport Airplane Directorate at the above address. All comments must be marked: *Docket No. NM201*. 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:

Meghan Gordon, FAA, Standardization Branch, ANM-113, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98055-4056; telephone (425) 227-2138; facsimile (425) 227-1149.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA has determined that good cause exists for making these special conditions effective upon issuance; however, interested persons are invited to submit such written data, views, or arguments, as they may desire. Communications should identify the regulatory docket 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. These special conditions may be changed in light of the comments received. All comments received 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. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to these special conditions must include a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. NM201." The postcard will be date stamped and returned to the commenter.

Background

On April 4, 2001, ElectroSonics, 4391 International Gateway, Columbus, Ohio, applied for a Supplemental Type Certificate (STC) to modify Gulfstream Aerospace Corporation Model G-1159B airplanes. The Gulfstream Aerospace Corporation Model G-1159B is a small transport category airplane. These airplanes are powered by two Rolls Royce Spey RB (163-25) 511-8 engines,

with a maximum takeoff weight of 69,700 pounds. This airplane operates with a 2-pilot crew and can hold up to 19 passengers. The modification incorporates the installation of a Honeywell Dual Airdata Computer System. The Honeywell Dual Airdata Computer System is a replacement for the existing Analog Flight Instrumentation, while also providing additional functional capability and redundancy in the system. The avionics/electronics and electrical systems installed in this airplane have the potential to be vulnerable to high-intensity radiated fields (HIRF) external to the airplane.

Type Certification Basis

Under the provisions of 14 CFR 21.101, ElectroSonics must show that the Gulfstream Aerospace Corporation Model G-1159B airplanes, as changed, continue to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. A12EA, or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The regulations in the certification basis for the Gulfstream Aerospace Corporation G-1159B airplanes include:

- Civil Air Regulations (CAR) 4b, dated December 31, 1953, including Amendments 4b-1 thru 4b-14.
- Special Regulation SR450A.
- Special Conditions in "Attachment A" of FAA letter to Grumman dated September 27, 1965.
- 14 CFR (Code of Federal Regulations) 25.1325 (effective February 1, 1965).
- Section 25.175 (effective March 1, 1965), in lieu of CAR 4b.155(b).
- Section 36.7(d)(3)(ii).
- CAR 4b.450, cooling systems.
- Part 25, dated February 1, 1965, as amended by Amendments No. 25-2 through 25-8, 25-10, 25-12, 25-16 thru 25-22, 25-24, and 25-26.

If the Administrator finds that the applicable airworthiness regulations (part 25, as amended) do not contain adequate or appropriate safety standards for the Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics, because of a novel or unusual design feature, special

conditions are prescribed under the provisions of 21.16.

In addition to the applicable airworthiness regulations and special conditions, these Gulfstream Aerospace Corporation Model G-1159B airplanes must comply with the fuel vent and exhaust emission requirements of part 34 and the noise certification requirements of part 36.

Special conditions, as defined in § 11.19, are issued in accordance with § 11.38, and become part of the airplane's type certification basis in accordance with § 21.101(b)(2).

Special conditions are initially applicable to the model for which they are issued. Should ElectroSonics apply at a later date for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

Novel or Unusual Design Features

As noted earlier, the Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics will incorporate the Honeywell Dual Airdata Computer System that will perform critical functions. This system may be vulnerable to high-intensity radiated fields external to the airplane. The current airworthiness standards of part 25 do not contain adequate or

appropriate safety standards for the protection of this equipment from the adverse effects of HIRF. Accordingly, this system is considered to be a novel or unusual design feature.

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 avionics/electronics and electrical systems to command and control airplanes have made it necessary to provide adequate protection.

To ensure that a level of safety is achieved that is equivalent to that intended by the regulations incorporated by reference, special conditions are needed for the Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics. These special conditions require that new avionics/electronics and electrical systems that perform critical functions 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 avionics/electronics and electrical 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 in accordance with either paragraph 1 or 2 below:

1. A minimum threat of 100 volts rms (root-mean-square) per meter 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. Both peak and average field strength components from the Table are to be demonstrated.

Frequency	Field strength (volts per meter)	
	Peak	Average
10 kHz–100 kHz	50	50
100 kHz–500 kHz	50	50
500 kHz–2 MHz	50	50
2 MHz–30 MHz	100	100
30 MHz–70 MHz	50	50
70 MHz–100 MHz	50	50
100 MHz–200 MHz	100	100
200 MHz–400 MHz	100	100
400 MHz–700 MHz	700	50
700 MHz–1 GHz	700	100
1 GHz–2 GHz	2000	200
2 GHz–4 GHz	3000	200
4 GHz–6 GHz	3000	200
6 GHz–8 GHz	1000	200
8 GHz–12 GHz	3000	300
12 GHz–18 GHz	2000	200
18 GHz–40 GHz	600	200

The field strengths are expressed in terms of peak of the root-mean-square (rms) over the complete modulation period.

The threat levels identified above are the result of an FAA review of existing studies on the subject of HIRF, in light of the ongoing work of the Electromagnetic Effects Harmonization Working Group of the Aviation Rulemaking Advisory Committee.

Applicability

As discussed above, these special conditions are applicable to Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics. Should ElectroSonics apply at a later date for a supplemental type certificate to modify any other model included on

the same type certificate to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well under the provisions of § 21.101(a)(1).

Conclusion

This action affects only certain novel or unusual design features on Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

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. For this reason, and because a delay would significantly affect the certification of the airplane, which is imminent, 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. 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.

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 supplemental type certification basis for Gulfstream Aerospace Corporation Model G-1159B airplanes modified by ElectroSonics.

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 these 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 October 24, 2001.

Kalene C. Yanamura,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 01-27987 Filed 11-6-01; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM199; Special Conditions No. 25-188-SC]

Special Conditions: Boeing 747-200/-300 Series Airplanes; High-Intensity Radiated Fields (HIRF)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for Boeing Model 747-200/-300 series airplanes modified by Hollingsead International, Inc. These modified airplanes will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. The modification incorporates the installation of new Liquid Crystal Flight Instruments as Attitude Directional Indicators (ADI), the Horizontal Situation Indicators (HSI) and Engine Display Interface System (EDIS). The liquid crystal flight instruments will utilize electrical and electronic systems that perform critical functions. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for the protection of these systems from the effects of high-intensity-radiated fields (HIRF). 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 October 25, 2001. Comments must be received on or before December 24, 2001.

ADDRESSES: Comments on these special conditions may be mailed in duplicate to: Federal Aviation Administration, Transport Airplane Directorate, Attention: Rules Docket (ANM-113), Docket No. NM199, 1601 Lind Avenue SW., Renton, Washington 98055-4056; or delivered in duplicate to the Transport Airplane Directorate at the above address. All comments must be

marked: Docket No. NM199. 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: Greg Dunn, FAA, Airplane and Flight Crew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98055-4056; telephone (425) 227-2799; facsimile (425) 227-1149.

SUPPLEMENTARY INFORMATION: The FAA has determined that notice and opportunity for prior public comment hereon are impracticable because these procedures would significantly delay certification of the airplane and thus delivery of the affected aircraft. The FAA therefore finds that good cause exists for making these special conditions effective upon issuance.

Comments Invited

Interested persons are invited to submit such written data, views, or arguments as they may desire. Communications should identify the rules docket number and be submitted in duplicate to the address specified above. The Administrator will consider all communications received on or before the closing date for comments. The special conditions may be changed in light of the comments received. All comments received 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 these special conditions must include with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. NM199." The postcard will be date stamped and returned to the commenter.

Background

On October 13, 1997, Hollingsead International, Inc., 7416 Hollister Avenue, Goleta, California 93117-2538, applied for a Supplemental Type Certificate (STC) for the Boeing Model 747-200/-300 series airplanes. The Boeing Model 747-200/-300 series airplanes are equipped with four CF650E2 turbofan engines. The aircraft have a crew of three with additional seating for one, consisting of a jump seat in the cockpit. The aircraft are operated by KLM Royal Dutch airlines in "freighter," "combi," and "full