

Rules and Regulations

Federal Register

Vol. 64, No. 139

Wednesday, July 21, 1999

This section of the FEDERAL REGISTER contains regulatory documents having general applicability and legal effect, most of which are keyed to and codified in the Code of Federal Regulations, which is published under 50 titles pursuant to 44 U.S.C. 1510.

The Code of Federal Regulations is sold by the Superintendent of Documents. Prices of new books are listed in the first FEDERAL REGISTER issue of each week.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM159; Special Conditions No. 25-145-SC]

Special Conditions: Boeing Model 707-353B (USAF C-137) Airplanes; High Intensity Radiated Fields (HIRF) Protection

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for Boeing Model 707-353B (USAF C-137) airplanes. These airplanes will have novel and unusual design features when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. These design features include the installation of an inertial navigation system (INS) for which the current applicable airworthiness regulations do not contain adequate or appropriate safety standards with regard to protection of the system from the effects of high-intensity radiated fields. 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 July 13, 1999. Comments must be received on or before August 20, 1999.

ADDRESSES: Comments on these special conditions may be mailed in duplicate to: Federal Aviation Administration, Transport Airplane Directorate, Attention: Rules Docket (ANM-114), Docket No. NM159, 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. NM159. 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:

Mark Quam, FAA, Standardization Branch, ANM-113, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98055-4056; telephone (425) 227-2799; facsimile (425) 227-1149.

SUPPLEMENTARY INFORMATION:

FAA's Determination as to Need for Public Process

The FAA has determined that notice and opportunity for prior public comment hereon are impracticable because those procedures would significantly delay issuance of the approval design and, thus, the delivery of the affected aircraft.

In addition, the substance of these special conditions has been subject to the public comment process in several prior instances with no substantive comments received. Thus, the FAA has previously provided the public with a number of opportunities to comment on proposed special conditions that are substantively identical to those at issue; and the FAA is reasonably assured that all interested members of the public have had an opportunity to comment and that their comments have been fully considered. The FAA, therefore, finds that additional redundant notices are unnecessary, and good cause exists for making these special conditions effective upon issuance.

Comments Invited

Although this action is in the form of final special conditions and, for the reasons stated above, is not preceded by notice and an opportunity for public comment, comments are invited on this rule. Interested persons are invited to submit 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. 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. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must include a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket NM159." The postcard will be date stamped and returned to the commenter.

Background

On August 7, 1998, Boeing Commercial Airplane Group, P.O. Box 7730, Wichita, Kansas 67277, made application to the FAA for a Supplemental Type Certificate (STC) for the Boeing Model B-707-353B airplane [known as the U.S. Air Force (USAF) C-137]. The proposed configuration of this model will incorporate an upgrade of the inertial navigation system (INS) from the Litton LTN-72 model to the LTN-92 model.

The INS provides attitude, heading, and navigation data to the flight crew. Display of attitude information is considered a critical function. Critical functions must be designed and installed to ensure that their operations are not adversely affected by high intensity radiated fields (HIRF). The existing airworthiness regulations do not contain adequate or appropriate safety standards for protection from the effects of HIRF external to the airplane; therefore, a special condition is proposed.

Supplemental Type Certification Basis

Under the provisions of 14 CFR § 21.101 ("Designation of applicable regulations"), Boeing must show that the Model 707-353B (USAF C-137) airplanes meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. 4A26, or the applicable regulations in effect on the date of application for the change to the Model 707-353B. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The certification basis for the Model 707-353B airplanes includes Civil Air Regulations (CAR) 4b, as amended by Amendments 4b-1, 4b-2, and 4b-3; and

additional requirements identified in Type Certificate Data Sheet 4A26.

Purpose of Special Conditions

If the Administrator finds that the applicable airworthiness regulations do not contain adequate or appropriate safety standards for an airplane because of a novel or unusual design feature of that airplane, the FAA may then prescribe special conditions to establish a level of safety equivalent to that established in the regulations. Special conditions are authorized under the provisions of 14 CFR 21.16 ("Special conditions").

Special conditions, as appropriate, are issued in accordance with 14 CFR 11.49, as required by §§ 11.28 and 11.29, 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 the type certificate for that model be amended later to include any other model that incorporates 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 14 CFR 21.101(a)(1).

Novel or Unusual Design Features

The Boeing STC for the Model 707-353B (USAF C-137) airplanes includes the upgrade of the INS system from the Litton LTN-72 model to the LTN-92 model. This INS contains electronic equipment for which the current airworthiness standards (14 CFR part 25) do not contain adequate or appropriate safety standards that address protecting this equipment from the adverse effects of HIRF. Accordingly, this system is considered to be a "novel or unusual design feature."

Discussion

As stated previously, there is no specific regulation that addresses requirements for protection of electrical and electronic systems from HIRF external to the airplane. 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, the FAA has determined that special conditions are needed for the Boeing Model 707-353B (USAF C-137) modified to include the upgraded INS. These special conditions will require that this system, which performs critical functions, must be designed and installed to preclude component damage and interruption of function due to both the direct and indirect effects of HIRF.

Protection of Systems from High-Intensity Radiated Fields (HIRF)

Recent advances in technology have given rise to the application in aircraft designs of advanced electrical and electronic systems that perform functions required for continued safe flight and landing. Due to the use of sensitive solid-state advanced components in analog and digital electronics circuits, these advanced systems are readily responsive to the transient effects of induced electrical current and voltage caused by HIRF. Such HIRF can degrade electronic systems performance by damaging components or by upsetting system functions.

Furthermore, the HIRF environment has undergone a transformation that was not foreseen when the current requirements were developed: Higher energy levels are radiated from transmitters that are used for radar,

radio, and television. Also, the number of transmitters has increased significantly. There also is uncertainty concerning the effectiveness of airframe shielding for HIRF. Furthermore, coupling to cockpit-installed equipment through the cockpit window apertures is undefined.

The combined effect of the technological advances in airplane design and the changing environment has resulted in an increased level of vulnerability of electrical and electronic systems required for the continued safe flight and landing of the airplane. Effective measures against the effects of exposure to HIRF must be provided during the design and installation of these systems.

Actions Required by Special Conditions

The accepted maximum energy levels in which airplane system installations must be capable of operating safely are based on surveys and analyses of existing radio frequency emitters. These special conditions require that the airplane be evaluated under these energy levels for the protection of the electronic system and its associated wiring harness. These external threat levels, which are lower than previously required values, are believed to represent the worst case to which an airplane would be exposed in the operating environment.

These special conditions require that the systems installed in aircraft that perform critical functions must be qualified to the HIRF environment defined in paragraph 1., below, or (as an option to a fixed value using laboratory tests) that defined in paragraph 2, below:

1. The applicant may demonstrate that the operation and operational capability of the installed electrical and electronic systems that perform critical functions are not adversely affected when the airplane is exposed to the HIRF environment defined below:

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

Frequency	Field Strength (volts per meter)	
	Peak	Average
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 root-mean-square (rms) values.

Or

b. The applicant may demonstrate by a system laboratory test that the electrical and electronic systems that perform critical functions withstand an electromagnetic field strength of 100 volts per meter, without the benefit of airplane structural shielding, over a frequency range of 10 kHz to 18 GHz.

Note: The field strength values for the HIRF environment and laboratory test levels are expressed in root-mean-square units measured during the peak of the modulation cycle, as many laboratory instruments indicate amplitude. These are commonly called "peak-rms" values. The true peak field strength values will be higher by a factor of the square root of two.

Applicability

As discussed above, these special conditions are applicable to the Boeing Model 707–353B (USAF C–137) airplanes modified to include the upgraded INS. Should Boeing Commercial Airplane Group apply at a later date for a design change approval to the type certificate to include any other model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well, under the provisions of 14 CFR 21.101(a)(1).

Conclusion

This action affects only certain novel or unusual design features on the Boeing 707–353B (USAF C–137) airplanes. 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.

Further, 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 in this document. 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. However, 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 the Boeing Model 707–353B (USAF C–137) airplanes.

1. *Protection of Electrical and Electronic Systems 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 operations and operational capability of these systems to perform critical functions are not adversely affected when the airplane is exposed to high-intensity radiated electromagnetic fields external to the airplane.

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 July 13, 1999.

Donald L. Riggin,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 99–18566 Filed 7–20–99; 8:45 am]

BILLING CODE 4910–13–U

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 99–CE–05–AD; Amendment 39–11226; AD 99–15–07]

RIN 2120–AA64

Airworthiness Directives; deHavilland Inc. Models DHC–2 Mk. I, DHC–2 Mk. II, and DHC–2 Mk. III Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment adopts a new airworthiness directive (AD) that applies to all deHavilland Inc. (deHavilland) Models DHC–2 Mk. I, DHC–2 Mk. II, and DHC–2 Mk. III airplanes. This AD requires repetitively inspecting the rear fuselage bulkhead at Station 228 for cracks. This AD also requires repairing any crack found or replacing any cracked rear fuselage bulkhead in accordance with a repair or replacement scheme obtained from the manufacturer through the Federal Aviation Administration (FAA). This AD is the result of mandatory continuing airworthiness information (MCAI) issued by the airworthiness authority for Canada. The actions specified by this AD are intended to detect and correct cracking of the rear fuselage bulkhead at Station 228, which could result in structural damage of the fuselage to the point of failure with consequent loss of airplane control.

DATES: Effective September 10, 1999.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of September 10, 1999.

ADDRESSES: Service information that applies to this AD may be obtained from Bombardier Inc., Bombardier Regional Aircraft Division, Garratt Boulevard, Downsview, Ontario, Canada M3K 1Y5; telephone: (416) 633–7310. This information may also be examined at the Federal Aviation Administration (FAA), Central Region, Office of the Regional Counsel, Attention: Rules