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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM161, Special Conditions No. 25-146-SC]

Special Conditions: GEC-Marconi; Boeing Model 737-800 Airplane; 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 the Boeing Model 737-800 airplane, as modified by GEC-Marconi. The Model 737-800 is equipped with a high-technology digital avionics system that performs critical functions. The applicable type certification regulations do not contain adequate or appropriate safety standards for the protection of this system from the effects of high-intensity radiated fields (HIRF). These special conditions provide the additional safety standards that the Administrator considers necessary to ensure that the critical functions this system performs are maintained when the airplane is exposed to HIRF.

DATES: The effective date of these special conditions is July 29, 1999. Comments must be received on or before October 4, 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. NM161, 1601 Lind Avenue SW., Renton, Washington, 98055-4056; or delivered in duplicate to the Transport Airplane Directorate at the above address. Comments must be marked: Docket No. NM161. Comments may be inspected in the Rules Docket

weekdays, except Federal holidays, between 7:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT:

Gerry Lakin, FAA, Transport Airplane Directorate, Aircraft Certification Service, Standardization Branch, ANM-113, 1601 Lind Avenue SW., Renton, Washington, 98055-4056; telephone (425) 227-1187; 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 issuance of the approval design and thus 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. 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 regulatory docket and special conditions 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 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 request must submit with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. NM161." The postcard will be date stamped and returned to the commenter.

Background

On September 28, 1998, the Los Angeles Aircraft Certification Office received an application from GEC-Marconi Avionics (GMA) Ltd., Airport Works, Rochester, Kent, England, for a

supplemental type certificate to modify Type Certificate No. A16WE for the Boeing Model 737-800.

The Boeing Model 737-800 is a low-wing, pressurized airplane with twin, wing-mounted, jet engines that is configured for approximately 162 passengers. The airplane has a maximum standard takeoff weight of 155,500 pounds, a maximum landing weight of 146,300 pounds, a maximum operating altitude of 41,000 feet, and a range of 3370 nautical miles. The overall length of the Boeing Model 737-800 is 129 feet, 6 inches, the height is 41 feet, 2 inches, and the wing span is 112 feet, 7 inches. The modification incorporates a head up display (HUD) system for display of critical flight parameters (altitude, airspeed, and attitude) to the crew. The display can be susceptible to disruption to both command/response signals as a result of electrical and magnetic interference. This disruption of signals could result in loss of all critical flight displays and annunciations or present misleading information to the pilot.

Type Certification Basis

Under the provisions of 14 CFR 21.101, GEC-Marconi must show that the Model 737-800 airplane, as changed, continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. A16WE 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 certifications basis." The certification basis for the modified Boeing Model 737-800 airplanes is as follows:

For airworthiness and environmental standards for components and areas not affected by the change, the original certification basis for the Model 737-800 is shown on Type Certificate Data Sheet (TCDS) No. A15WE, revision 25, dated September 9, 1998. The Model 737-800 was certified to part 25, as amended by Amendments 25-1 through 25-77, with reversions to earlier Amendments, voluntary compliance to later Amendments, special conditions, equivalent safety findings and exemptions listed in the TCDS.

For airworthiness and environmental standards for components and areas affected by the change, the certification basis for the Model 737-800 is 14 CFR

part 25, effective February 1, 1965, including Amendments 25-1 through 25-97, which is the amendment level in effect on the date of application.

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 Boeing Model 737-800 airplane because of novel or unusual design features, special conditions are prescribed under the provisions of § 21.16.

In addition to the applicable airworthiness regulations and special conditions, the Model 737-800 must comply with the part 25 fuel and exhaust emission requirements of 14 CFR part 34 and the part 25 noise certification requirements of 14 CFR part 36.

Special conditions, as appropriate, are issued in accordance with § 11.49, as required by §§ 11.28 and 11.29, and become part of the type certification basis in accordance with § 21.101(b)(2).

Special conditions are initially applicable to the model for which they are issued. Should GEC-Marconi 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

Boeing Model 737-800 will incorporate a head up display (HUD) system that performs critical functions. This system may be vulnerable to HIRF 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 applicable regulations incorporated by reference, special conditions are needed for the Boeing Model 737-800, which require that new electrical and electronic systems, such as the HUD, 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 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 paragraph 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	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 root-mean-square (rms) values.

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. In general, these standards are less critical

than the threat level that was previously used as the basis for some earlier special conditions.

Applicability

As discussed above, these special conditions are applicable to Boeing Model 737-800 airplanes modified by GEC-Marconi. Should GEC-Marconi 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 design features on Boeing Model 737-800 airplanes modified by GEC-Marconi. 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 the special conditions for this airplane has been subjected to the notice and comment procedure 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 immediately. Therefore, these special conditions are being made effective 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 type certification basis for Boeing Model 737-800 airplanes modified by GEC-Marconi.

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 external to the airplane.

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 29, 1999.

Donald L. Riggin,

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

[FR Doc. 99-20858 Filed 8-17-99; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 98-NM-233-AD; Amendment 39-11253; AD 99-17-04]

RIN 2120-AA64

Airworthiness Directives; Empresa Brasileira de Aeronautica S.A. (EMBRAER) Model EMB-120 Series Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment adopts a new airworthiness directive (AD), applicable to certain EMBRAER Model EMB-120 series airplanes, that requires replacement of the fairlead support assemblies of the aileron control cable located in the nacelle outboard fittings with new, improved assemblies; and replacement of certain attachment screws with new screws. This amendment also provides an option for performing repetitive inspections until accomplishment of the replacement. This amendment is prompted by reports of aileron cable wear due to chafing found between the aileron control cables and nylon grommets. The actions specified by this AD are intended to prevent such chafing, which could result in failure of the aileron cables, and consequent reduced controllability of the airplane.

DATES: Effective September 22, 1999.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of September 22, 1999.

ADDRESSES: The service information referenced in this AD may be obtained from Empresa Brasileira de Aeronautica S.A. (EMBRAER), P.O. Box 343—CEP 12.225, Sao Jose dos Campos—SP, Brazil. This information may be examined at the Federal Aviation Administration (FAA), Transport Airplane Directorate, Rules Docket, 1601 Lind Avenue, SW., Renton, Washington; or at the FAA, Small Airplane Directorate, Atlanta Aircraft Certification Office, One Crown Center, 1895 Phoenix Boulevard, suite 450, Atlanta, Georgia; or at the Office of the Federal Register, 800 North Capitol Street, NW, suite 700, Washington, DC.

FOR FURTHER INFORMATION CONTACT: Rob Capezutto, Aerospace Engineer, Systems and Flight Test Branch, ACE-116A, FAA, Small Airplane Directorate, Atlanta Aircraft Certification Office, One Crown Center, 1895 Phoenix Boulevard, suite 450, Atlanta, Georgia 30349; telephone (770) 703-6071; fax (770) 703-6097.

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include an airworthiness directive (AD) that is applicable to certain EMBRAER Model EMB-120 series airplanes was published in the **Federal Register** on September 3, 1998 (63 FR 46932). That action proposed to require replacement of the fairlead support assemblies of the aileron control cable located in the nacelle outboard fittings with new, improved assemblies; and replacement of certain attachment screws with new screws.

Comments

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

Support for the Proposal

One commenter supports the proposed rule.

Request To Withdraw Proposed Rule

Two commenters state that the proposed rule is not warranted and cannot be justified. One commenter, an operator, does not agree that this is a safety of flight issue and states that the proposed AD does not specify the amount of wear found on the cables, or that the cables were in danger of, or close to, failure. In support of

withdrawal of the proposed rule, the commenter references two instances, one in 1991 and one in 1997, in which the Brazilian Centro Técnico Aeroespacial (CTA) documented that if a single cable failed during flight, the airplane would be able to land safely. The commenter also states that the EMB-120 Maintenance Review Board (MRB) inspection interval for the aileron cables is sufficient to ensure continued airworthiness in lieu of issuance of the final rule.

Another commenter, the manufacturer, states that inspections of certain airplanes conducted at its facility revealed cables with polished areas, but no indication of wear or rupture was detected. The commenter states also that operators that have not incorporated Revision 2 of the service bulletin have a rigorous inspection interval of every 400 flight hours, per the MRB. For operators that have incorporated Revision 2 of the service bulletin, the cable inspections are to be accomplished at each "5A" check (2,000 flight hours). The commenter states that during the past 10 years it has performed 25 "C" checks with no record of aileron cable replacement due to broken wires.

The FAA does not concur with the commenters' requests. The FAA does consider this a safety issue based on the determination that if the aileron cable were to break during a critical portion of the flight, such as during a steep turn or on approach for landing, it would result in reduced controllability of the airplane.

In addition, an investigation of service difficulties conducted by the FAA revealed over 200 reports of aileron cable wear. Although most of these occurred in the early 1990's, several cases were reported in 1997 and two through mid-1998. This suggests that not all operators are incorporating the service bulletin.

Based on this information, the FAA finds that issuance of the final rule is necessary to ensure an adequate level of safety for the affected fleet.

Request To Revise Inspection Intervals

One commenter states that Parts I, II, and III of EMBRAER Service Bulletin 120-27-0068, Change 02, dated March 20, 1998, include a statement referring to MRB Tasks 27-07 and 27-65 [the correct reference as stated in the service bulletin is Maintenance Planning Guide (MPG) Tasks 27-07 and 27-64] for inspection intervals of the specified areas, both pre- and post-mod. The commenter requests that the inspection interval of the post-mod installation be based on an analysis of inspection