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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 21 and 29

[Docket No. SW0010; Special Condition No. 29–0010–SC]

Special Condition: Agusta S.p.A. Model AB139 Helicopters, High Intensity Radiated Fields

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special condition; request for comments.

SUMMARY: This special condition is issued for the Agusta S.p.A. Model AB139 helicopter. This helicopter will have novel or unusual design features associated with installing electrical and electronic systems that perform critical functions. The applicable airworthiness regulations do not contain adequate or appropriate safety standards to protect systems that perform critical control functions, or provide critical displays, from the effects of high-intensity radiated fields (HIRF). This special condition contains the additional safety standards that the Administrator considers necessary to ensure that critical functions of systems will be maintained when exposed to HIRF.

DATES: The effective date of this special condition is February 19, 2004. Comments must be received on or before May 4, 2004.

ADDRESSES: Send comments on this special condition in duplicate to: Federal Aviation Administration, Office of the Regional Counsel, Attention: Docket No. SW0010, Fort Worth, Texas 76193–0007, or deliver them in duplicate to the Office of the Regional Counsel at 2601 Meacham Blvd., Fort Worth, Texas 76137. Comments must be marked: Docket No. SW0010. You may inspect comments in the Docket that is maintained in Room 448 in the Rotorcraft Directorate offices at 2601 Meacham Blvd., Fort Worth, Texas, on weekdays, except Federal holidays, between 8:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT: Jorge Castillo, Aviation Safety Engineer, FAA, Rotorcraft Directorate, Rotorcraft Standards, 2601 Meacham Blvd., Fort Worth, Texas 76193–0110; telephone (817) 222–5127, FAX (817) 222–5961.

SUPPLEMENTARY INFORMATION: We have determined that notice and opportunity for prior public comment are unnecessary since the substance of this special condition has been subject to the public comment process in several prior instances with no substantive comments received. Therefore, we determined that good cause exists for making this special condition effective upon issuance.

Comments Invited

You are invited to submit written data, views, or arguments. Your communications should include the regulatory docket or special condition number and be sent in duplicate to the address stated above. We will consider all communications received on or before the closing date and may change the special condition in light of the comments received. Interested persons may examine the Docket. We will file a report summarizing each substantive public contact with FAA personnel concerning this special condition in the docket. If you wish us to acknowledge receipt of your comments, you must include a self-addressed, stamped postcard on which the following statement is made: ''Comments to Docket No. SW0010.'' We will date stamp the postcard and mail it to you.

Background

On January 18, 2000, Agusta S.p.A. submitted an application for type validation of the Model AB139 helicopter through the Italian civil aviation authority—Ente Nazionale per L'Aviazione Civile (ENAC). The Model AB139 helicopter is a Part 29 transport category A, twin-engine conventional helicopter designed for civil operation. The fuselage structure will be manufactured principally of aluminum alloy with a secondary structure manufactured partly of composite materials. The helicopter will be capable of carrying 15 passengers with 2 crewmembers, and will have a maximum gross weight of approximately 13,100 pounds. Two Pratt and Whitney PT6C–67C gas turbine engines will power the helicopter. The major design features include a 5-blade, fully articulated main rotor, a 4-blade anti-torque tail rotor, a retractable tricycle landing gear, visual flight rule (VFR) basic avionics configuration with a three-axis automatic flight control system (AFCS), and dual pilot instrument flight rule (IFR) avionics configurations.

Type Certification Basis

Under the provisions of 14 CFR 21.17, Agusta S.p.A. must show that the Model AB139 helicopter meets the applicable provisions of the regulations as listed below:

- 14 CFR 21.29;
- 14 CFR part 29, Amendment 29–1 through Amendment 29–42, with the following exceptions:
  - 14 CFR 29.602 at Amendment 29–45; and
  - 14 CFR 29.25 and 29.865 at Amendment 29–43;
- 14 CFR part 29, Appendix B, Amendment 29–40;
- 14 CFR part 36, Appendix H, Amendment 36–1 through the latest amendment in effect at the time that the noise tests are conducted; and
- Any special conditions, exemptions, and equivalent safety findings deemed necessary.

In addition, the certification basis includes certain special conditions and equivalent safety findings that are not relevant to this special condition.

If the Administrator finds that the applicable airworthiness regulations do not contain adequate or appropriate safety standards for these helicopters 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, Agusta S.p.A. Model AB139 helicopters must comply with the noise certification requirements of 14 CFR part 36; and the FAA must issue a finding of regulatory adequacy pursuant to § 611 of Public Law 92–574, the ''Noise Control Act of 1972.''

Special conditions, as appropriate, are defined in § 11.19, and issued by following the procedures in § 11.38, 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 incorporates 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 Agusta S.p.A. Model AB139 helicopter will incorporate the following novel or unusual design features: Electrical, electronic, or combination of electrical electronic (electrical/electronic) systems that perform critical control functions or provide critical displays, such as electronic flight instruments that will be providing displays critical to the continued safe flight and landing of the helicopter during operation in Instrument Meteorological Conditions (IMC), and Full Authority Digital Engine Control (FADEC) that will be performing engine control functions that are critical to the continued safe flight and landing of the helicopter during VFR and IFR operations.

Discussion

The Agusta S.p.A. Model AB139 helicopter, at the time of application, was identified as incorporating one and possibly more electrical/electronic systems, such as electronic flight instruments and FADEC. After the design is finalized, Agusta S.p.A. will provide the FAA with a preliminary hazard analysis that will identify any other critical functions, required for safe flight and landing, that are performed by the electrical/electronic systems.

Recent advances in technology have led to the application in aircraft designs of advanced electrical/electronic systems that perform critical control functions or provide critical displays. These advanced systems respond to the transient effects of induced electrical current and voltage caused by HIRF incident on the external surface of the helicopter. These induced transient currents and voltages can degrade the performance of the electrical/electronic systems by damaging the components or by upsetting the systems' functions.

Furthermore, the electromagnetic environment has undergone a transformation not envisioned by the current application of § 29.1309(a). Higher energy levels radiate from operational transmitters currently used for radar, radio, and television. Also, the number of transmitters has increased significantly.

Existing aircraft certification requirements are inappropriate in view of these technological advances. In addition, the FAA has received reports of some significant safety incidents and accidents involving military aircraft equipped with advanced electrical/electronic systems when they were exposed to electromagnetic radiation.

The combined effects of the technological advances in helicopter design and the changing environment have resulted in an increased level of vulnerability of the electrical/electronic systems required for the continued safe flight and landing of the helicopter. Effective measures to protect these helicopters against the adverse effects of exposure to HIRF will be provided by the design and installation of these systems. The following primary factors contributed to the current conditions: (1) Increased use of sensitive electronics that perform critical functions; (2) reduced electromagnetic shielding afforded helicopter systems by advanced technology airframe materials; (3) adverse service experience of military aircraft using these technologies; and (4) an increase in the number and power of radio frequency emitters and the expected increase in the future.

We recognize the need for aircraft certification standards to keep pace with the developments in technology and environment, and in 1986 we initiated a high-priority program to: (1) Determine and define electromagnetic energy levels; (2) develop and describe guidance material for design, test, and analysis; and (3) prescribe and promulgate regulatory standards.

We participated with industry and airworthiness authorities of other countries to develop internationally recognized standards for certification.

The FAA and airworthiness authorities of other countries have identified two levels of the HIRF environment that a helicopter could be exposed to—one environment for VFR operations and a different environment for IFR operations. While the HIRF rulemaking requirements are being finalized, we are adopting a special condition for the certification of aircraft that employ electrical/electronic systems that perform critical control functions, or provide critical displays. The accepted maximum energy levels that civilian helicopter system installations must withstand for safe operation are based on surveys and analysis of existing radio frequency emitters. This special condition will require the helicopters' electrical/electronic systems and associated wiring to be protected from these energy levels. These external threat levels are believed to represent the exposure for a helicopter operating under VFR or IFR.

Compliance with HIRF requirements will be demonstrated by tests, analysis, models' similarity with existing systems, or a combination of these methods. Service experience alone will not be acceptable since such experience in normal flight operations may not include an exposure to HIRF. Reliance on a system with similar design features for redundancy as a means of protection against the effects of external HIRF is generally insufficient because all elements of a redundant system are likely to be concurrently exposed to the radiated fields.

This special condition will require aircraft installed systems that perform critical control functions or provide critical displays to meet certain standards based on either a defined HIRF environment or a fixed value using laboratory tests. Control system failures and malfunctions can more directly and abruptly contribute to a catastrophic event than display system failures and malfunctions. Therefore, it is considered appropriate to require more rigorous HIRF verification methods for critical control systems than for critical display systems.

The applicant may demonstrate that the operation and operational capabilities of the installed electrical/electronic systems that perform critical functions are not adversely affected when the aircraft is exposed to the defined HIRF test environment. We have determined that the test environment defined in Table 1 is acceptable for critical control functions in helicopters. The test environment defined in Table 2 is acceptable for critical display systems in helicopters.

The applicant may also demonstrate, by a laboratory test, that the electrical/electronic systems that perform critical control functions or provide critical displays can withstand a peak electromagnetic field strength in a frequency range of 10 KHz to 18 GHz. If a laboratory test is used to show compliance with the defined HIRF environment, no credit will be given for signal attenuation due to installation. A level of 100 volts per meter (v/m) is appropriate for critical display systems. A level of 200 v/m is appropriate for critical control functions. Laboratory test levels are defined according to RTCA/DO–160D Section 20 Category W (100 v/m and 150 mA) and Category Y (200 v/m and 300 mA). As defined in DO–160D Section 20, the test levels are defined as the peak of the root means squared (rms) envelope. As a minimum, the modulations required for RTCA/DO–160D Section 20 Categories W and

Y will be used. Other modulations should be selected as the signal most likely to disrupt the operation of the system under test, based on its design characteristics. For example, flight control systems may be susceptible to 3 Hz square wave modulation while the video signals for electronic display systems may be susceptible to 400 Hz sinusoidal modulation. If the worst-case modulation is unknown or cannot be determined, default modulations may be used. Suggested default values are a 1 KHz sine wave with 80 percent depth of modulation in the frequency range from 10 KHz to 400 MHz, and 1 KHz square wave with greater than 90 percent depth of modulation from 400 MHz to 18 GHz. For frequencies where the unmodulated signal would cause deviations from normal operation, several different modulating signals with various waveforms and frequencies should be applied.

Applicants must perform a preliminary hazard analysis to identify electrical/electronic systems that perform critical functions. The term ''critical'' means those functions whose failure would contribute to or cause an unsafe condition that would prevent the continued safe flight and landing of the helicopter. The systems identified by the hazard analysis as performing critical functions are required to have HIRF protection. A system may perform both critical and non-critical functions. Primary electronic flight display systems and their associated components perform critical functions such as attitude, altitude, and airspeed indications. HIRF requirements would apply only to the systems that perform critical functions, including control and display.

Acceptable system performance would be attained by demonstrating that the critical function components of the system under consideration continue to perform their intended function during and after exposure to required electromagnetic fields. Deviations from system specifications may be acceptable, but must be independently assessed by the FAA on a case-by-case basis.

TABLE 1.—ROTORCRAFT CRITICAL CONTROL FUNCTIONS FIELD STRENGTH VOLTS/METER

Frequency	Peak	Average
10 kHz–100 kHz	150	150
100 kHz–500 kHz	200	200
500 kHz–2 MHz	200	200
2 MHz–30 MHz	200	200
30 MHz–70 MHz	200	200
70 MHz–100 MHz	200	200

TABLE 1.—ROTORCRAFT CRITICAL CONTROL FUNCTIONS FIELD STRENGTH VOLTS/METER—Continued

Frequency	Peak	Average
100 MHz–200 MHz ...	200	200
200 MHz–400 MHz ...	200	200
400 MHz–700 MHz ...	730	200
700 MHz–1 GHz	1400	240
1 GHz–2 GHz	5000	250
2 GHz–4 GHz	6000	490
4 GHz–6 GHz	7200	400
6 GHz–8 GHz	1100	170
8 GHz–12 GHz	5000	330
12 GHz–18 GHz	2000	330
18 GHz–40 GHz	1000	420

TABLE 2.—ROTORCRAFT CRITICAL CONTROL FUNCTIONS FIELD STRENGTH VOLTS/METER

Frequency	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

Applicability

As previously discussed, this special condition is applicable to the Agusta S.p.A. Model AB139 helicopter. Should Agusta S.p.A. 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 condition 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 one model series of helicopters. 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 helicopter.

The substance of this special condition has been subjected to the notice and comment period previously and is written 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 special condition. For this reason, we have determined that prior public notice and comment are unnecessary, and good cause exists for adopting this special condition 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 Parts 21 and 29

Aircraft, Air transportation, Aviation safety, Rotorcraft, Safety.

The authority citation for these special conditions is as follows: 42 U.S.C. 7572; 49 U.S.C. 106(g), 40105, 40113, 44701–44702, 44704, 44709, 44711, 44713, 44715, 45303.

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 Agusta S.p.A. Model AB139 helicopters.

Protection for Electrical and Electronic Systems from High Intensity Radiated Fields

Each system that performs critical functions must be designed and installed to ensure that the operation and operational capabilities of these critical functions are not adversely affected when the helicopter is exposed to high intensity radiated fields external to the helicopter.

Issued in Fort Worth, Texas, on February 19, 2004.

David Downey,

Manager, Rotorcraft Directorate, Aircraft Certification Service.

[FR Doc. 04–5028 Filed 3–4–04; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 2001–NM–301–AD; Amendment 39–13498; AD 2004–05–04]

RIN 2120–AA64

Airworthiness Directives; Airbus Model A319 and A320 Series Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment adopts a new airworthiness directive (AD),