DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 21 and 29

[Docket No. SW012; Special Condition No. 29–012–SC]

Special Conditions: ST 2017RC–R, Installation of Pratt & Whitney Canada PT6–67D on Global Helicopter Technology, Inc. (GHTI), Restricted Category Model UH–1H, TC R00002RC, With Full Authority Digital Engine Control (FADEC)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special condition; request for comments.

SUMMARY: This special condition is issued for Supplemental Type Certificate (STC), Project # ST2017RC–R, the installation of a Pratt and Whitney PT6–67D Turbine Engine on Global Helicopter Technology Inc. (GHTI), Restricted Category, U.S. Army military surplus helicopter, Model UH–1H, type certificated under TC R00002RC. The installation of the PT6–67D on the Restricted Category UH–1H will have a novel or unusual design feature associated with the installation of the Full Authority Digital Engine Control (FADEC). The applicable airworthiness regulations do not contain adequate or appropriate safety standards to protect systems that perform critical functions from the effects of a high-intensity radiated field (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 January 8, 2003. Comments must be received on or before March 17, 2003.

ADDRESSES: Comments on this special condition may be mailed in duplicate to: Federal Aviation Administration (FAA), Office of the Regional Counsel, Attention: Rules Docket No. SW012, Fort Worth, Texas 76193–0007, or delivered in duplicate to the Office of the Regional Counsel at 2601 Meacham Blvd., Fort Worth, Texas 76137. Comments must be marked: Docket No. SW012. Comments may be inspected in the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 4 p.m. The Rules Docket for special conditions is maintained at the Federal Aviation Administration, Rotorcraft Directorate, 2601 Meacham Blvd., Room 448, Fort Worth, Texas 76137.

FOR FURTHER INFORMATION CONTACT: Bob McCallister, FAA, Rotorcraft Directorate, Rotorcraft Standards Staff, Fort Worth, Texas 76193–0110; telephone 817–222–5121, fax 817–222–5961.

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 this special condition 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 this special condition effective upon issuance.

Comments Invited

The FAA invites interested persons to participate in this rulemaking by submitting written comments, views, or data. Communications should identify the regulatory docket or special condition number and be submitted in duplicate to the address specified above. We will consider all comments we receive on or before the closing date for comments. We may change this special condition in light of the comments we receive. 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. If you want the FAA to acknowledge receipt of your mailed comments on this special condition, include a self-addressed, stamped postcard on which the docket number appears. We will stamp the date on the postcard and mail it back to you.

Background

On November 29, 2000, Global Helicopter Technology, Inc. (GHTI) applied for an STC for the installation of a Pratt & Whitney PT6–67D Turbine Engine on the GHTI, U.S. Army UH–1H, Restricted Category Helicopter, type certificated under Type Certificate R00002RC. The UH–1H Restricted Category helicopter is a utility/heavy lift helicopter with a two-bladed teetering main rotor system. It is to be powered by a single Pratt and Whitney PT6–67D engine that incorporates a full authority digital engine control (FADEC). The maximum gross weight of the aircraft is 9,500 pounds.

Type Certification Basis

Under the provisions of 14 CFR 21.101, GHTI must show that the Engine Installation meets the applicable provisions of the regulations as listed below:

- 14 CFR part 29 as amended through and including Amendment 29–1, effective August 12, 1965.
- 14 CFR 29.1529, Instructions for Continued Airworthiness, Amendment Number 20, effective September 11, 1980.

In accordance with 14 CFR 36.1(a)(4), compliance with the noise requirements was not shown for the aircraft. Therefore, the engine installations under this supplemental type certificate are only eligible for external load operations excepted by 14 CFR 36.1(a)(4) and defined under section 133.1(b). Any alteration to the aircraft for Special Purpose not identified above will require further FAA approval and in addition, may require noise and/or flight testing.

In addition, the certification basis includes certain 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 this STC because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions, as appropriate, are defined in § 11.19 and issued in accordance with § 11.38 and become part of the STC certification basis in accordance with § 21.17(a)(2).

Special conditions are initially applicable to the model and/or modification for which they are issued. Should the type certificate or supplemental type certificate (STC) for that model or installation respectively, 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 or modification under the provisions of § 21.101(a)(1).

Novel or Unusual Design Features

The GHTI UH–1H Restricted Category Helicopter with a Pratt & Whitney PT6–67D engine installed will incorporate the following novel or unusual design features: Electrical, electronic, or a combination of electrical electronic (electrical/electronic) systems such as FADEC that will be performing functions critical to the continued safe flight and landing of the helicopter. FADEC is an electronic device that performs the functions of engine control during flight operations.

Discussion

The GHTI installation of the PT–6–67D in the UH–1H helicopter, at the time of application, was identified as incorporating one and possibly more electrical/electronic systems, such as a FADEC. After the design is finalized, GHTI will provide the FAA with a preliminary hazard analysis that will identify any other critical functions that are performed by the electrical/electronic systems required for safe flight and landing.

Recent advances in technology have given rise to the application in aircraft designs of advanced electrical/electronic systems that perform critical functions. These advanced systems respond to the transient effects of induced electrical current and voltage caused by HIRF incidents 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 or alteration 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.

The FAA recognizes the need for aircraft certification standards to keep pace with the developments in technology and environment and, in 1986, 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.

The FAA 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 a level of HIRF environment that a helicopter could be exposed to during visual flight rules (VFR) operations. While the HIRF rulemaking requirements are being finalized, the FAA is adopting a special condition for the certification of aircraft that employ electrical/electronic systems that perform critical functions. 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 engine installation's electrical/electronic systems and associated wiring to be protected from these energy levels. These external threat levels are believed to represent the worst-case exposure for a helicopter operating under VFR conditions.

These special conditions will require the systems that perform critical functions, as installed in the aircraft, meet certain standards based on either a defined HIRF environment or a fixed value using laboratory tests.

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. The FAA has determined that the test environment defined in Table 1 is acceptable for critical functions in helicopters.

The applicant may also demonstrate by a laboratory test that the electrical/electronic systems that perform critical functions can withstand a peak electromagnetic field strength in a frequency range of 10 KH_z to 18 GH_z. 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) and other considerations, such as alternate or backup technology that is immune to HIRF, are appropriate for critical functions during instrument flight rules (IFR) operations. A level of 200 v/m is more appropriate for critical functions during VFR operations. 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 H_z square wave modulation while the video signals for electronic display systems may be susceptible to 400 H_z sinusoidal modulation. If the worst-case modulation is unknown or cannot be determined, default modulations may be used. Suggested default values are a 1 KH_z sine wave with 80 percent depth of modulation in the frequency range from 10 KH_z to 400 MH_z and 1 KH_z square wave with greater than 90 percent depth of modulation from 400 MH_z to 18 GH_z. 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 noncritical 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.

Compliance with HIRF requirements will be demonstrated by tests, analysis models, similarity with existing systems, or a combination of these methods. The two basic options of either testing the rotorcraft to the defined environment or laboratory testing may not be combined. The laboratory test allows some frequency

areas to be under tested and requires other areas to have some safety margin when compared to the defined environment. The areas required to have some safety margin are those shown, by past testing, to exhibit greater susceptibility to adverse effects from HIRF; and laboratory tests, in general, do not accurately represent the aircraft installation. 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.

The modulation that represents the signal most likely to disrupt the operation of the system under test, based on its design characteristics should be selected. For example, flight control systems may be susceptible to 3 Hz square wave 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.

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.—FIELD STRENGTH VOLTS/METER

Frequency	Peak	Average
10–100 KHz	150	150
100–500	200	200
500–2000	200	200
2–30 MHz	200	200
30–100	200	200
100–200	200	200
200–400	200	200
400–700	730	200
700–1000	1400	240
1–2 GHz	5000	250
2–4	6000	490
4–6	7200	400
6–8	1100	170
8–12	5000	330
12–18	2000	330
18–40	1000	420

Applicability

As discussed above, this special condition is applicable to Supplemental Type Certificate (STC) Project Number ST2017RC–R, for the installation of a Pratt & Whitney PT6–67D turbine engine in GHTI UH–1H military surplus helicopters type certificated under TC R00002RC. Should GHTI apply at a later date for a change to the STC to include another model incorporating the same novel or unusual design feature, the special condition would apply to that STC modification as well under the provisions of § 21.101(a)(1).

Conclusion

This action affects only certain novel or unusual design features associated with the STC project listed above. 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 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 helicopter modification which is imminent, the FAA has determined that prior public notice and comment are unnecessary and impracticable, 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 this special condition is as follows:

Authority: 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 STC Project ST2017RC–R, installation of PT6–67D on Global Helicopter Technology, Inc (GHTI), Model UH–1H, Restricted Category Helicopters, type certificated under TC R00002RC.

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 January 8, 2003.

Eric Bries,

Acting Manager, Aircraft Certification Service, Rotorcraft Directorate.

[FR Doc. 03–1010 Filed 1–15–03; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 71

[Docket No. FAA–2002–13997; Airspace Docket No. 02–AEA–20]

Amendment of Class D Airspace; White Plains, NY

AGENCY: Federal Aviation Administration (FAA). DOT.

ACTION: Final rule.

SUMMARY: This action amends Class D airspace at Westchester County Airport, White Plains, NY. this action is necessary to insure continuous altitude coverage for Instrument Flight Rules (IFR) operations to the airport. The area would be depicted on aeronautical charts for pilot reference.

EFFECTIVE DATE: 0901 UTC May 15, 2003.

FOR FURTHER INFORMATION CONTACT: Mr. Francis Jordan, Airspace Specialist, Airspace Branch, AEA–520, Air Traffic Division, Eastern Region, Federal Aviation Administration, 1 Aviation Plaza, Jamaica, New York 11434–4809, telephone: (718) 553–4521.

SUPPLEMENTARY INFORMATION: