

conditions are issued as part of the type certification basis for the Raytheon A36 airplane modified by Garmin AT, Inc. to add the G1000 EFIS system.

1. *Protection of Electrical and Electronic Systems from High Intensity Radiated Fields (HIRF)*. Each system that performs critical functions must be designed and installed to ensure that the operations, and operational capabilities 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 Kansas City, Missouri on November 7, 2005.

**William J. Timberlake,**

*Acting Manager, Small Airplane Directorate, Aircraft Certification Service.*

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 23

[Docket No. CE233, Special Condition 23-173-SC]

#### Special Conditions; Garmin AT, Inc.; EFIS on the Raytheon Model B58; Protection of Systems for High Intensity Radiated Fields (HIRF)

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final special conditions; request for comments.

**SUMMARY:** These special conditions are issued to Garmin AT, Inc., 2345 Turner Rd., SE., Salem, Oregon 97302, for a Supplemental Type Certificate for the Raytheon Model B58. The airplane will have novel and unusual design features when compared to the state of technology envisaged in the applicable airworthiness standards. These novel and unusual design features include the installation of an electronic flight instrument system (EFIS) display, Model G-1000, manufactured by Garmin International Inc., for which the applicable regulations do not contain adequate or appropriate airworthiness 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 the airworthiness standards applicable to these airplanes.

**DATES:** The effective date of these special conditions is November 3, 2005. Comments must be received on or before December 19, 2005.

**ADDRESSES:** Comments may be mailed in duplicate to: Federal Aviation Administration, Regional Counsel, ACE-7, Attention: Rules Docket Clerk, Docket No. CE233, Room 506, 901 Locust, Kansas City, Missouri 64106. All comments must be marked: Docket No. CE233. 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:** Wes Ryan, Aerospace Engineer, Standards Office (ACE-110), Small Airplane Directorate, Aircraft Certification Service, Federal Aviation Administration, 901 Locust, Room 301, Kansas City, Missouri 64106; telephone (816) 329-4127.

**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 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 No. CE233." The postcard will be date stamped and returned to the commenter.

#### Background

On March 8, 2004, Garmin AT, Inc., 2345 Turner Rd., SE., Salem, Oregon 97302, made an application to the FAA for a new Supplemental Type Certificate for the Raytheon Model 58. The Raytheon Model 58 is currently approved under TC No. 3A16. The proposed modification incorporates a novel or unusual design feature, such as digital avionics consisting of an EFIS that is vulnerable to HIRF external to the airplane.

#### Type Certification Basis

Under the provisions of 14 CFR part 21, § 21.101, Garmin AT, Inc. must show that the Raytheon Model 58 meets its original certification basis, as listed on Type Data Sheet 3A16, the additional certification requirements added for the G1000 system, exemptions, if any; and the special conditions adopted by this rulemaking action. The additional certification requirements for the G1000 system include § 23.1301, § 23.1309, § 23.1311, § 23.1322, § 23.1353 and other rules at the amendment appropriate for the date of application. Further details of the certification basis for the installation of the G1000 EFIS are available on request.

#### Discussion

If the Administrator finds that the applicable airworthiness standards do not contain adequate or appropriate safety standards because of novel or unusual design features of an airplane, special conditions are prescribed under the provisions of § 21.16.

Special conditions, as appropriate, are defined in § 11.19, are issued in accordance with § 11.38 after public notice and become part of the type certification basis in accordance with § 21.101.

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

#### Novel or Unusual Design Features

Garmin AT, Inc. plans to incorporate certain novel and unusual design features into the Raytheon Model 58 for

which the airworthiness standards do not contain adequate or appropriate safety standards for protection from the effects of HIRF. These features include EFIS, which are susceptible to the HIRF environment, that were not envisaged by the existing regulations for this type of airplane.

*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 the HIRF. The HIRF can degrade electronic systems performance by damaging components or 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 is also 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 by the design and installation of these systems. The accepted maximum energy levels in which civilian airplane system installations must be capable of operating safely are based on surveys and analysis 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 previous required values, are believed to represent the worst case to which an airplane would be exposed in the operating environment.

These special conditions require qualification of systems that perform critical functions, as installed in aircraft, to the defined HIRF environment in paragraph 1 or, as an option to a fixed

value using laboratory tests, in paragraph 2, as follows:

(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 aircraft 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
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,

(2) The applicant may demonstrate by a system test and analysis that the electrical and electronic systems that perform critical functions can withstand a minimum threat of 100 volts per meter, electrical field strength, from 10 kHz to 18 GHz. When using this test to show compliance with the HIRF requirements, no credit is given for signal attenuation due to installation.

A preliminary hazard analysis must be performed by the applicant for approval by the FAA to identify either electrical or electronic systems that perform critical functions. The term “critical” means those functions, whose failure would contribute to, or cause, a failure condition that would prevent the continued safe flight and landing of the airplane. The systems identified by the hazard analysis that perform critical functions are candidates for the application of HIRF requirements. 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 indication. The HIRF requirements apply only to critical functions.

Compliance with HIRF requirements may be demonstrated by tests, analysis, models, similarity with existing systems, or any combination of these.

Service experience alone is not acceptable since normal flight operations may not include an exposure to the HIRF environment. Reliance on a system with similar design features for redundancy as a means of protection against the effects of external HIRF is generally insufficient since all elements of a redundant system are likely to be exposed to the fields concurrently.

### Applicability

As discussed above, these special conditions are applicable to the Raytheon Model 58. Should Garmin AT, Inc. apply at a later date for a supplemental type certificate to modify any other model on the same type certificate to incorporate the same novel or unusual design feature, the special conditions would apply to that model as well under the provisions of § 21.101.

### Conclusion

This action affects only certain novel or unusual design features on one model of airplane. 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 23

Aircraft, Aviation safety, Signs and symbols.

### Citation

The authority citation for these special conditions is as follows:

**Authority:** 49 U.S.C. 106(g), 40113 and 44701; 14 CFR 21.16 and 21.101; and 14 CFR 11.38 and 11.19.

### 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 the Raytheon Model 58 airplane modified by Garmin AT, Inc. to add the G1000 EFIS system.

1. *Protection of Electrical and Electronic Systems from High Intensity Radiated Fields (HIRF)*. Each system that performs critical functions must be designed and installed to ensure that the operations, and operational capabilities 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 Kansas City, Missouri on November 3, 2005.

**William J. Timberlake,**

*Acting Manager, Small Airplane Directorate, Aircraft Certification Service.*

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2005-21951; Directorate Identifier 2005-CE-39-AD; Amendment 39-14381; AD 2005-24-01]

RIN 2120-AA64

#### Airworthiness Directives; CENTRAIR 101 Series Gliders

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** The FAA adopts a new airworthiness directive (AD) for all CENTRAIR 101 series gliders. This AD requires you to make pen and ink changes to the Limitations Section of the glider maintenance manual to eliminate contradictory information concerning the structural life limit. This AD results from a review by FAA of the Limitations Section of the CENTRAIR Model 101AP glider maintenance manual that revealed conflicting information concerning the structural

life limit. We are issuing this AD to assure that the published life limit is adhered to and to prevent structural failure of the glider once this life limit is reached.

**DATES:** This AD becomes effective on January 3, 2006.

**ADDRESSES:** To get the service information identified in this AD, contact CENTRAIR, Aerodome B.P.N. 44, 36300 Le Blanc, France; telephone: 02.54.37.07.96; facsimile: 02.54.37.48.64.

To view the AD docket, go to the Docket Management Facility; U.S. Department of Transportation, 400 Seventh Street, SW., Nassif Building, Room PL-401, Washington, DC 20590-001 or on the Internet at <http://dms.dot.gov>. The docket number is FAA-2005-21951; Directorate Identifier 2005-CE-39-AD.

**FOR FURTHER INFORMATION CONTACT:** Greg Davison, Aerospace Engineer, FAA, Small Directorate, 901 Locust, Room 301, Kansas City, Missouri 64106; telephone: (816) 329-4130; facsimile: (816) 329-4090.

#### SUPPLEMENTARY INFORMATION:

##### Discussion

*What events have caused this AD?* A review by FAA of the Limitations Section of the CENTRAIR Model 101AP glider maintenance manual revealed conflicting information concerning the structural life limit. Page 5.1 of this manual specifies inspection criteria upon accumulating 3,000 hour time-in-service (TIS). However, page 5.01 of the manual identifies a structural life limit of 3,000-hour TIS. CENTRAIR has verified that all the 101 series gliders delivered to the United States have a 3,000-hour life limit with no current extension.

Cumulative fatigue damage and fatigue cracking damage would sufficiently reduce residual strength of the airframe and result in failure of the airframe.

*What is the potential impact if FAA took no action?* If this situation is not corrected, the published life limit may not be adhered to and the structural integrity of the glider could be compromised.

*Has FAA taken any action to this point?* We issued a proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include

an AD that would apply to all CENTRAIR 101 series gliders. This proposal was published in the **Federal Register** as a notice of proposed rulemaking (NPRM) on August 22, 2005 (70 FR 48918). The NPRM proposed to require you to make pen and ink changes to the Limitations Section of the glider maintenance manual to eliminate contradictory information concerning the structural life limit.

#### Comments

*Was the public invited to comment?* We provided the public the opportunity to participate in developing this AD. We received no comments on the proposal or on the determination of the cost to the public.

#### Conclusion

*What is FAA's final determination on this issue?* We have carefully reviewed the available data and determined that air safety and the public interest require adopting the AD as proposed except for minor editorial corrections. We have determined that these minor corrections:

- Are consistent with the intent that was proposed in the NPRM for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

#### Changes to 14 CFR Part 39—Effect on the AD

*How does the revision to 14 CFR part 39 affect this AD?* On July 10, 2002, the FAA published a new version of 14 CFR part 39 (67 FR 47997, July 22, 2002), which governs the FAA's AD system. This regulation now includes material that relates to altered products, special flight permits, and alternative methods of compliance. This material previously was included in each individual AD. Since this material is included in 14 CFR part 39, we will not include it in future AD actions.

#### Costs of Compliance

*How many gliders does this AD impact?* We estimate that this AD affects 51 gliders in the U.S. registry.

*What is the cost impact of this AD on owners/operators of the affected gliders?* We estimate the following costs to do this change of the maintenance manual:

Labor cost	Parts cost	Total cost per glider	Total cost on U.S. operators
1 work hour × \$65 = \$65 .....	Not Applicable.	\$65	\$3,315