

incorporates 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

The Model 500 will incorporate the following novel or unusual design features:

Digital electronic engine control systems. This notice proposes a special condition for a digital electronic engine control system on the Eclipse Model 500 airplane.

Discussion of Comments

Notice of proposed special conditions No. 23-01-05-SC for the Eclipse Model 500 airplanes was published on March 11, 2002 (67 FR 10857). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the Eclipse Model 500 airplane. Should Eclipse Aviation Corporation 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 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 airplanes. It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

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 21.17; 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 Eclipse Aviation Corporation Model 500, airplane.

1. Electronic Engine Control System

The installation of the electronic engine control system must comply with the requirements of § 23.1309(a) through (e) at Amendment 23-49. The

intent of this requirement is not to re-evaluate the inherent hardware reliability of the control itself, but rather determine the effects, including environmental effects addressed in § 23.1309(e), on the airplane systems and engine control system when installing the control on the airplane. When appropriate, engine certification data may be used when showing compliance with this requirement.

Issued in Kansas City, Missouri, on May 28, 2002.

Michael Gallagher,

Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. 02-14353 Filed 6-6-02; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE175; Special Conditions No. 23-120-SC]

Special Conditions: The Lancair Company, Model LC40-550FG-E Airplane; Installation of Full Authority Digital Engine Control (FADEC) System and the Protection of the System From the Effects of High Intensity Radiated Fields (HIRF)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for The Lancair Company Model LC40-550FG-E airplane. This airplane will have a novel or unusual design feature(s) associated with the installation of an engine that uses an electronic engine control system in place of the engine's mechanical system. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. 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.

EFFECTIVE DATE: July 8, 2002.

FOR FURTHER INFORMATION CONTACT:

Ervin Dvorak, Federal Aviation Administration, Aircraft Certification Service, Small Airplane Directorate, ACE-111, 901 Locust, Room 301, Kansas City, Missouri 64106; 816-329-4123, fax 816-329-4090.

SUPPLEMENTARY INFORMATION:

Background

On November 8, 2001, The Lancair Company applied to amend Type Certificate A0003SE for the addition of the Model LC40-550FG-E airplane. The Model LC40-550FG-E is a small, utility category airplane. The airplane is powered by one reciprocating engine equipped with an electronic engine control system with full authority capability in place of the hydromechanical control system.

Type Certification Basis

Under the provisions of 14 CFR 21.101(c), The Lancair Company must show that the Model LC40-550FG-E meets the applicable provisions of the certification basis specified in Amendment 6 to TCDS A00003SE except as follows:

- FAR 23.1305 as of Amendment 52
- FAR 23.1359 as of Amendment 49
- Special conditions will be applied to the FADEC installation for protection against high intensity radiated fields (HIRF) and for installed system reliability (FAR 23.1309 applicability).

If the Administrator finds that the applicable airworthiness regulations (*i.e.*, 14 CFR part 23) do not contain adequate or appropriate safety standards for the LC40-550FG-E 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, the Model LC40-550FG-E airplane must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36.

Special conditions, as appropriate, as defined in 11.19, are issued in accordance with § 11.38, 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 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 § 21.101.

Novel or Unusual Design Features

The Model LC40-550FG-E airplane will incorporate the following novel or unusual design features:

The Lancair Company, Model LC40-550FG-E airplane will use an engine

that includes an electronic control system with full engine authority capability.

Many advanced electronic systems are prone to either upsets or damage, or both, at energy levels lower than analog systems. The increasing use of high power radio frequency emitters mandates requirements for improved high intensity radiated fields (HIRF) protection for electrical and electronic equipment. Since the electronic engine control system used on The Lancair Company, Model LC40-550FG-E will perform critical functions, provisions for protection from the effects of HIRF fields should be considered and, if necessary, incorporated into the airplane design data. The FAA policy contained in Notice 8110.71, dated April 2, 1998, establishes the HIRF energy levels that airplanes will be exposed to in service. The guidelines set forth in this Notice are the result of an Aircraft Certification Service review of existing policy on HIRF, in light of the ongoing work of the ARAC Electromagnetic Effects Harmonization Working Group (EEHWG). The EEHWG adopted a set of HIRF environment levels in November 1997 that were agreed upon by the FAA, JAA, and industry participants. As a result, the HIRF environments in this notice reflect the environment levels recommended by this working group. This notice states that a full authority digital engine control is an example of a system that should address the HIRF environments.

Even though the control system will be certificated as part of the engine, the installation of an engine with an electronic control system requires evaluation due to the possible effects on or by other airplane systems (e.g., radio interference with other airplane electronic systems, shared engine and airplane power sources). The regulatory requirements in 14 CFR part 23 for evaluating the installation of complex systems, including electronic systems, are contained in § 23.1309. However, when § 23.1309 was developed, the use of electronic control systems for engines was not envisioned; therefore, the § 23.1309 requirements were not applicable to systems certificated as part of the engine (reference § 23.1309(f)(1)). Also, electronic control systems often require inputs from airplane data and power sources and outputs to other airplane systems (e.g., automated cockpit powerplant controls such as mixture setting). Although the parts of the system that are not certificated with the engine could be evaluated using the criteria of § 23.1309, the integral nature of systems such as these makes it unfeasible to evaluate the airplane

portion of the system without including the engine portion of the system. However, § 23.1309(f)(1) again prevents complete evaluation of the installed airplane system since evaluation of the engine system's effects is not required.

Therefore, these special conditions for The Lancair Company, Model LC40-550FG-E will provide HIRF protection and evaluate the installation of the electronic engine control system for compliance with the requirements of § 23.1309(a) through (e) at Amendment 23-46.

Discussion of Comments

Notice of proposed special conditions No. 23-02-02-SC for The Lancair Company Model LC40-550FG-E airplane was published on March 28, 2002 (67 FR 14884). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the Model LC40-550FG-E. Should The Lancair Company 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 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 LC40-550FG-E airplane. It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

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 Lancair Company Model LC40-550FG-E airplane.

1. *High Intensity Radiated Fields (HIRF) Protection.* In showing compliance with 14 CFR part 21 and the airworthiness requirements of 14 CFR part 23, protection against hazards

caused by exposure to HIRF fields for the full authority digital engine control system, which performs critical functions, must be considered. To prevent this occurrence, the electronic engine control system must be designed and installed to ensure that the operation and operational capabilities of this critical system are not adversely affected when the airplane is exposed to high energy radio fields.

At this time, the FAA and other airworthiness authorities are unable to precisely define or control the HIRF energy level to which the airplane will be exposed in service; therefore, the FAA hereby defines two acceptable interim methods for complying with the requirement for protection of systems that perform critical functions.

(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 external HIRF threat environment defined in the following table:

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 peak electrical strength, without the benefit of airplane structural shielding, in the frequency range of 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. Data used for engine certification may be used, when appropriate, for airplane certification.

2. Electronic Engine Control System.
The installation of the electronic engine control system must comply with the requirements of § 23.1309(a) through (e) at Amendment 23–46. The intent of this requirement is not to re-evaluate the inherent hardware reliability of the control itself, but rather determine the effects, including environmental effects addressed in § 23.1309(e), on the airplane systems and engine control system when installing the control on the airplane. When appropriate, engine certification data may be used when showing compliance with this requirement.

Issued in Kansas City, Missouri, on May 30, 2002.

Michael Gallagher,

Manager, Small Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE174; Special Conditions No. 23–119–SC]

Special Conditions: Liberty Aerospace, Model XL–2 Airplane, Installation of Full Authority Digital Engine Control (FADEC) System and the Protection of the System From the Effects of High Intensity Radiated Fields (HIRF)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Liberty Aerospace Model XL–2 airplane. This airplane will have a novel or unusual design feature(s) associated with the installation of an engine that uses an electronic engine control system in place of the engine's mechanical system. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. 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.

EFFECTIVE DATE: July 8, 2002.

FOR FURTHER INFORMATION CONTACT:

Ervin Dvorak, Federal Aviation Administration, Aircraft Certification Service, Small Airplane Directorate, ACE–111, 901 Locust, Room 301, Kansas City, Missouri 64106; 816–329–4123, fax 816–329–4090.

SUPPLEMENTARY INFORMATION:

Background

On October 26, 2000, Liberty Aerospace applied for a type certificate for their new Model XL–2. The Model XL–2 is powered by one reciprocating engine equipped with an electronic engine control system with full authority capability in place of the hydromechanical control system.

Type Certification Basis

Under the provisions of 14 CFR 21.17, Liberty Aerospace must show that the Model XL–2 meets the applicable provisions of 14 CFR part 23, as amended by Amendments 23–1 through 23–53 thereto.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the Model XL–2 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, the Model XL–2 must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36, and the FAA must issue a finding of regulatory adequacy pursuant to section 611 of Public Law 92–574, the “Noise Control Act of 1972.”

Special conditions, as appropriate, as defined in 11.19, are issued in accordance with § 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 Model XL–2 will incorporate the following novel or unusual design features:

Liberty Aerospace, Model XL–2 airplane will use an engine that includes an electronic control system with full engine authority capability.

Many advanced electronic systems are prone to either upsets or damage, or both, at energy levels lower than analog systems. The increasing use of high power radio frequency emitters mandates requirements for improved high intensity radiated fields (HIRF) protection for electrical and electronic

equipment. Since the electronic engine control system used on the Liberty Aerospace, Model XL–2 will perform critical functions, provisions for protection from the effects of HIRF fields should be considered and, if necessary, incorporated into the airplane design data. The FAA policy contained in Notice 8110.71, dated April 2, 1998, establishes the HIRF energy levels that airplanes will be exposed to in service. The guidelines set forth in this Notice are the result of an Aircraft Certification Service review of existing policy on HIRF, in light of the ongoing work of the ARAC Electromagnetic Effects Harmonization Working Group (EEHWG). The EEHWG adopted a set of HIRF environment levels in November 1997 that were agreed upon by the FAA, JAA, and industry participants. As a result, the HIRF environments in this notice reflect the environment levels recommended by this working group. This notice states that a full authority digital engine control is an example of a system that should address the HIRF environments.

Even though the control system will be certificated as part of the engine, the installation of an engine with an electronic control system requires evaluation due to the possible effects on or by other airplane systems (e.g., radio interference with other airplane electronic systems, shared engine and airplane power sources). The regulatory requirements in 14 CFR part 23 for evaluating the installation of complex systems, including electronic systems, are contained in § 23.1309. However, when § 23.1309 was developed, the use of electronic control systems for engines was not envisioned; therefore, the § 23.1309 requirements were not applicable to systems certificated as part of the engine (reference § 23.1309(f)(1)). Also, electronic control systems often require inputs from airplane data and power sources and outputs to other airplane systems (e.g., automated cockpit powerplant controls such as mixture setting). Although the parts of the system that are not certificated with the engine could be evaluated using the criteria of § 23.1309, the integral nature of systems such as these makes it unfeasible to evaluate the airplane portion of the system without including the engine portion of the system. However, § 23.1309(f)(1) again prevents complete evaluation of the installed airplane system since evaluation of the engine system's effects is not required.

Therefore, special conditions are proposed for the Liberty Aerospace, Model XL–2 to provide HIRF protection and to evaluate the installation of the electronic engine control system for