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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE250; Special Conditions No. 23-190-SC]

Special Conditions: Aero Propulsion, Inc., Piper Model PA28-236; Installation of Societe de Motorisation Aeronautiques (SMA) Model SR305-230 Aircraft Diesel Engine (ADE) for 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; request for comments.

SUMMARY: These final special conditions are issued to Aero Propulsion, Inc., for Piper Model PA28-236 airplanes with a Societe de Motorisation Aeronautiques (SMA) Model SR305-230 ADE. The supplemental type certificate for these airplanes will have a novel or unusual design feature associated with the installation of an aircraft diesel engine that uses an electronic engine control system instead of a mechanical control 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.

DATES: The effective date of these special conditions is June 9, 2006. Comments must be received on or before July 17, 2006.

ADDRESSES: Comments on these special conditions may be mailed in duplicate to: Federal Aviation Administration (FAA), Regional Counsel, ACE-7,

Attention: Rules Docket, Docket No. CE250, 901 Locust Street, Room 506, Kansas City, Missouri 64106, or delivered in duplicate to the Regional Counsel at the above address. Comments must be marked: Docket No. CE250. 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: Peter L. Rouse, Federal Aviation Administration, Aircraft Certification Service, Small Airplane Directorate, ACE-111, 901 Locust Street, Room 301, Kansas City, Missouri 64106; telephone: 816-329-4135, fax: 816-329-4090.

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 design approval 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 special condition 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. CE250." The postcard will be date stamped and returned to the commenter.

Background

On August 20, 2003, Aero Propulsion, Inc., applied for a Supplemental Type Certification of Piper Model PA28-236 airplanes with the installation of an SMA Model SR305-230 engine. The airplane is powered by an SMA Model SR305-230 engine that is equipped with an electronic engine control system with full authority capability in these airplanes.

Type Certification Basis

Under the provisions of 14 CFR part 21, § 21.101, Aero Propulsion, Inc., must show that the Piper Model PA28-236 airplanes, as changed, continue to meet the applicable provisions of the regulations incorporated by reference in the original type certification basis of the Piper Model PA28-236 airplanes, as listed on Type Certificate No. 2A13 or the applicable regulations in effect on the date of application for the change; exemptions, if any; and the special conditions adopted by this rulemaking action. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The Model PA28-236 airplanes were originally certified under Part 3 of the Civil Air Regulations.

If the Administrator finds that the applicable airworthiness regulations (*i.e.*, CAR 3; 14 CFR part 23) do not contain adequate or appropriate safety standards for the Model PA28-236 airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions, as appropriate, as defined in § 11.19, are issued in accordance with § 11.38, and become part of the certification basis for the supplemental 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 models that are listed on the same type certificate to incorporate the same novel or unusual design features, the special conditions would also apply under the provisions of § 21.101.

Novel or Unusual Design Features

The Aero Propulsion, Inc., modified Piper Model PA28-236 airplanes will incorporate a novel or unusual design

feature, an engine that includes an electronic control system with FADEC 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 HIRF protection for electrical and electronic equipment. Since the electronic engine control system used on the Aero Propulsion, Inc., modified Piper Model PA28–236 airplanes will perform critical functions, provisions for protection from the effects of HIRF 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 Aviation Rulemaking Advisory Committee (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, the Joint Aviation Authorities (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 FADEC 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 Aero Propulsion, Inc., modified Piper Model PA28–236 airplanes to provide HIRF protection and to evaluate the installation of the electronic engine control system for compliance with the requirements of § 23.1309(a) through (e) at Amendment 23–49.

Applicability

As discussed above, these special conditions are applicable to the Aero Propulsion, Inc., modified Piper Model PA28–236 airplanes. Should Aero Propulsion, Inc., apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. 2A13 to incorporate the same novel or unusual design features, 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 Aero Propulsion, Inc., modified Piper Model PA28–236 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.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the **Federal Register**. However, as the certification date for the Piper Model PA28–236 is imminent, the FAA finds that good cause exists to make these special conditions effective upon issuance.

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 supplemental type certification basis for Aero Propulsion, Inc., modified Piper Model PA28–236 airplanes.

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 23–49. 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.

With respect to compliance with § 23.1309(e), the levels required for compliance shall be at the levels for catastrophic failure conditions.

Issued in Kansas City, Missouri on June 9, 2006.

James E. Jackson,

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

[FR Doc. E6–9410 Filed 6–15–06; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE252, Special Conditions No. 23–192–SC]

Special Conditions; Cessna Aircraft Company Model 510 Airplane; Full Authority Digital Engine Control (FADEC) System

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Cessna Aircraft Company, Model 510 airplane. This airplane will have a novel or unusual design feature(s) associated with the use of an electronic engine control system instead of a traditional mechanical control 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.

DATES: The effective date of these special conditions is June 9, 2006. Comments must be received on or before July 17, 2006.

ADDRESSES: Comments may be mailed in duplicate to: Federal Aviation Administration, Regional Counsel, ACE–7, Attention: Rules Docket Clerk, Docket No. CE252, Room 506, 901 Locust Street, Kansas City, Missouri 64106. All comments must be marked: Docket No. CE252. 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: Peter L. Rouse, Aerospace Engineer, Standards Office (ACE–111), Small Airplane Directorate, Aircraft Certification Service, Federal Aviation Administration, Room 301, 901 Locust Street, Kansas City, Missouri 64106; telephone (816) 329–4135, fax 816–329–4090.

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 specified above 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. CE252.” The postcard will

be date stamped and returned to the commenter.

Background

On January 28, 2004, Cessna Aircraft Company; One Cessna Boulevard; Post Office Box 7704; Wichita, KS 67277, applied to the FAA for a new Type Certificate for the Cessna Model 510 Mustang. The Cessna 510 will be approved under TC No. A24CE. The Model 510 is an all new, high performance, low-wing, aft fuselage mounted twin turbofan engine powered aircraft in the Normal Category including flight into known icing conditions and single pilot operations. The Model 510 is to use existing Cessna Citation construction materials and methods. The design criteria includes: 8,480 pounds maximum ramp weight, 8,395 pounds maximum takeoff weight, 250 KCAS/0.63 Mach VMO/MMO, and a 41,000 foot maximum altitude. The Model 510 airplane design includes digital electronic engine control systems, which were not envisaged and are not adequately addressed in 14 CFR part 23. The applicable existing regulations do not address electronic control systems since those were not envisioned at the time. Even though the engine 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 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. 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 not feasible 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.

Type Certification Basis

Under the provisions of 14 CFR part 21, § 21.17, Cessna Aircraft Company must show that the applicant meets the applicable provisions of 14 CFR part 23, effective February 1, 1965, as amended by Amendment 23–1 through Amendment 23–54, effective September 14, 2000; 14 CFR part 36, effective