[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. FAA-2019-0304; Special Conditions No. 23-292-SC]

Special Conditions: Costruzioni Aeronautiche Tecnam S.P.A., Model P2012 Airplane; Electronic Engine Control System Installation

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Costruzioni Aeronautiche Tecnam S.P.A., Model P2012 airplane. This airplane will have a novel or unusual design feature associated with installation of an engine that includes an electronic engine 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 **[INSERT DATE OF PUBLICATION IN FEDERAL REGISTER]**.

We must receive your comments by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**

ADDRESSES: Send comments identified by docket number FAA-2019-0304 using any of the following methods:

- Federal eRegulations Portal: Go to http://www.regulations.gov and follow the online instructions for sending your comments electronically.
- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery of Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, S.E., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to http://regulations.gov, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478).

Docket: Background documents or comments received may be read at http://www.regulations.gov at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Jeff Pretz, Federal Aviation Administration, Aircraft Certification Service, Policy & Innovation Division, Small Airplane Standards Branch, AIR-691, 901 Locust, Room 301, Kansas City, MO, 64106; telephone (816) 329-3239; facsimile (816) 329-4090.

SUPPLEMENTARY INFORMATION:

Reason for No Prior Notice and Comment Before Adoption

The FAA has determined, in accordance with 5 U.S. Code §§ 553(b)(3)(B) and 553(d)(3), that notice and opportunity for prior public comment hereon are unnecessary because substantially identical special conditions have been subject to the public comment process in several prior instances such that the FAA is satisfied that new comments are unlikely. For the same reason, the FAA finds that good cause exists for making these special conditions effective 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.

Special Conditions Number	Company/Airplane Model
23-253-SC[1]	Diamond Aircraft Industries/Model DA-40NG
23-267-SC[2]	Cirrus Design Corporation/Model SF50
23-282-SC[3]	Pilatus Aircraft Ltd./Model PC-24

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

[1]http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSC.nsf/0/1A102658468C62D386257950004D7183?OpenDocument
[2]https://www.govinfo.gov/app/details/FR-2015-09-23/2015-24156/summary
[3]https://www.govinfo.gov/app/details/FR-2017-07-17/2017-14936

We will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change these special conditions based on the comments we receive.

Background

On February 28, 2018, Costruzioni Aeronautiche Tecnam S.P.A. (Tecnam) applied for FAA validation of its type certificate for its new Model P2012 airplane. The Model P2012 is a normal category, metallic, non-pressurized, high wing, monoplane that will seat nine passengers and two flightcrew. Two wing mounted Lycoming piston engines driving four bladed variable pitch constant speed MT-Propeller Entwicklung GmbH Model MTV-14-B-C-F/CF195-30b propellers power the airplane. The airplane has fixed tricycle landing gear, a Garmin G1000 NXi avionics suite, and a maximum takeoff weight of 7,937 pounds.

The Model P2012 is equipped with two Lycoming Model TEO-540-C1A engines, each using an electronic engine control (EEC) system, commonly referred to as a full authority digital engine control (FADEC), instead of a traditional mechanical control system. Although the EEC is certificated with the engine, the installation of an EEC requires evaluation due to critical environmental effects and possible effects on or by other airplane systems such as; indirect effects of lightning, radio interference with other airplane electronic systems, and shared engine, airplane data, and power sources.

The regulatory requirements in Title 14, Code of Federal Regulations (CFR) part 23 for evaluating the installation of complex systems, including electronic systems and critical environmental effects, are contained in §§ 23.1306, 23.1308, and 23.1309. However, when § 23.1309 was published, the use of EECs for engines was not envisioned. The integral nature of these systems makes it necessary to ensure proper evaluation of the airplane functions, which

may be included in the EEC, and that the installation does not degrade the EEC reliability approved under part 33 during engine type certification. Sections 23.1306(a) and 23.1308(a) apply to the EEC to ensure it remains equivalent to a mechanical only system, which is not generally susceptible to the High Intensity Radiated Fields (HIRF) and lightning environments.

In some cases, the airplane in which the engine is installed determines a higher classification than the engine controls are certificated for, requiring the EEC systems be analyzed at a higher classification. As of November 2005, EEC special conditions mandated the § 23.1309 classification for loss of EEC control as catastrophic for any airplane. This is not to imply an engine failure is classified as catastrophic, but that the EEC must provide an equivalent reliability to mechanical engine controls. In addition, §§ 23.1141(e) and 25.901(b)(2) provide the fault tolerant design requirements of turbine engine mechanical controls to the EEC and ensure adequate inspection and maintenance interval for the EEC.

Part 23 did not envision the use of full authority EECs and lacks the specific regulatory requirements necessary to provide an adequate level of safety. Therefore, special conditions are necessary.

Type Certification Basis

Under the provisions of 14 CFR 21.17, Tecnam must show that the Model P2012 airplane meets the applicable provisions of part 23, as amended by amendment 23-1 through 23-62 thereto.

If the Administrator finds that the applicable airworthiness regulations in part 23 do not contain adequate or appropriate safety standards for the Model P2012 airplane 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 P2012 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 under § 611 of Public Law 92-574, the "Noise Control Act of 1972."

The FAA issues special conditions, as defined in § 11.19, under § 11.38 and they become part of the type certification basis under § 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 FAA would apply these special conditions to the other model.

Novel or Unusual Design Features

The Model P2012 airplane will incorporate the following novel or unusual design features: The installation of an Electronic Engine Control (EEC) system. The EEC system is the generic family of electrical/electronic engine control systems, including full authority digital engine controls, supervisory controls, and derivatives of these.

Discussion

This airplane makes use of an electronic engine control system in addition to a traditional mechanical control system, which is a novel design for this type of airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. Mandating a structured assessment to determine potential installation issues mitigate the concerns that the addition of an electronic engine control does not produce a failure condition not previously considered.

Applicability

These special conditions are applicable to the Model P2012 airplane. Should Tecnam 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 FAA would apply these special conditions to that model as well.

Conclusion

This action affects only a certain novel or unusual design feature on the Model P2012 airplane. It is not a rule of general applicability. .

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(f), 106(g), 40113, 44701-44702; Pub. L. 113-53, 127 Stat 584 (49 U.S.C. 44704) note.

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 Tecnam Model P2012 airplane.

1**. Installation of Electronic Engine Control System**

a. For electronic engine control (EEC) system installations, it must be established that no single failure or malfunction or probable combinations of failures of EEC system components will have an effect on the system, as installed in the airplane, that causes the Loss of Power Control (LOPC) probability of the system to exceed those allowed in part 33

certification.

b. Electronic engine control system installations must be evaluated for environmental and atmospheric conditions, including lightning and High Intensity Radiated Fields (HIRF). The EEC system lightning and HIRF effects that result in LOPC should be considered catastrophic.

c. The components of the installation must be constructed, arranged, and installed to ensure their continued safe operation between normal inspections or overhauls.

d. Functions incorporated into any electronic engine control that make it part of any equipment, systems or installation whose functions are beyond that of basic engine control, and which may also introduce system failures and malfunctions, are not exempt from § 23.1309 and must be shown to meet part 23 levels of safety as derived from § 23.1309. Part 33 certification data, if applicable, may be used to show compliance with any part 23 requirements. If part 33 data is used to substantiate compliance with part 23 requirements, then the part 23 applicant must be able to provide this data for its showing of compliance.

Note: The term "probable" in the context of "probable combination of failures" does not have the same meaning as used for a safety assessment process. The term “probable" in "probable combination of failures" means “foreseeable,” or those failure conditions anticipated to occur one or more times during the operational life of each airplane.

Issued in Kansas City, Missouri on April 22, 2019.

William Schinstock
Acting Manager, Small Airplane Standards Branch
Policy and Innovation Division
Aircraft Certification Service

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