



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. FAA-2019-0617; Special Conditions No. 23-294-SC]

Special Conditions: Pilatus Aircraft Ltd. Model PC-12/47E Airplanes; Autothrust System

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Pilatus Aircraft Ltd. Model PC-12/47E airplane. This airplane will have a novel or unusual design feature associated with the use of an autothrust 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 THE FEDERAL REGISTER].

The FAA 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-2019-0617 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), as well as at <http://DocketsInfo.dot.gov>.

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, AIR-691, Small Airplane Standards Branch, Policy & Innovation Division, Aircraft Certification Service, Federal Aviation

Administration, 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
23-291-SC ¹	Innovation Solutions & Support, Inc.; Textron Aviation, Inc. / Model B200
23-283-SC ²	Pilatus Aircraft Ltd. / Model PC-24
23-272-SC ³	Cirrus Aircraft Corporation / Model SF-50

Comments Invited

The FAA invites 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. The FAA asks that you send two copies of written comments.

¹ <https://www.federalregister.gov/d/2018-28116>

² <https://www.federalregister.gov/d/2017-14938>

³ <https://federalregister.gov/a/2015-31058>

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

Background

On March 9, 2017, Pilatus Aircraft Ltd. (Pilatus) applied for FAA validation of its change to Type Certificate No. A78EU⁴ for installation of an autothrust system (ATS)—also known as an autothrottle system—in the Model PC-12/47E airplane. The Model PC-12/47E is a normal category, metallic, pressurized, low-wing, monoplane that seats nine passengers and two flightcrew. A single Pratt & Whitney PT6E-67XP⁵ engine driving a five bladed variable pitch constant speed Hartzell propeller powers the airplane. The airplane has retractable tricycle landing gear, a Honeywell APEX avionics suite, and a maximum takeoff weight of 10,450 pounds.

The installation of an ATS in the Model PC-12/47E is intended to reduce pilot workload. The ATS is useable in all phases from takeoff to approach. The system includes torque and airspeed management capability along with monitors to prevent the system from exceeding critical engine or airspeed limits. Throttle movement is provided by a servo, which moves the throttle lever. The servo can be overridden by pilot movement of the throttle and disengages upon selection of the A/T disconnect switch on the throttle.

Section 23.1329, amendment 23-49, only contained requirements for automatic pilot systems that act on the airplane flight controls. Autothrust systems are automatic systems that act

⁴ See http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgMakeModel.nsf/0/019EED2BA802A848862583360061A683?OpenDocument&Highlight=a78eu

⁵ As of this special condition publishing date, engine approval is in process. The final engine model number will be updated on Type Certification Data Sheet A78EU upon engine approval completion.

on the thrust controls. These systems provide enhanced automation and safety, but may also introduce pilot confusion, countering the safety benefit. 14 CFR 25.1329, amendment 25-119, addresses these concerns for transport airplanes. Therefore, these special conditions are based on § 25.1329 and provide additional requirements to standardize the pilot interface and system behavior and enhance pilot awareness of system active and armed modes.

Type Certification Basis

Under the provisions of 14 CFR 21.101, Pilatus must show that the Model PC-12/47E airplane, as changed, continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. A78EU or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the “original type certification basis.” In addition to the original type certification basis, the FAA has determined that the Model PC-12/47E must also comply with § 23.905(d) as amended by amendment 23-59, § 23.1306 as amended by amendment 23-61, § 23.1308 as amended by amendment 23-57, and §§ 23.1309 and 23.1310 as amended by amendment 23-62.

If the Administrator finds that the applicable airworthiness regulations in part 23 do not contain adequate or appropriate safety standards for the Model PC-12/47E airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

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

In addition to the applicable airworthiness regulations and special conditions, the Model PC-12/47E 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."

Novel or Unusual Design Features

The Model PC-12/47E airplane will incorporate the following novel or unusual design features:

An ATS, which provides commands to a servo attached to the throttle lever that automatically controls engine thrust. The ATS can be operated to control torque or airspeed.

Discussion

The part 23 airworthiness regulations in the type certification basis do not contain appropriate safety standards for this design feature. However, part 25 regulations contain appropriate airworthiness standards; therefore, these special conditions are derived from 14 CFR 25.1329, "Flight guidance system," applicable to autothrust systems.

Applicability

These special conditions are applicable to the Model PC-12/47E airplane. Should Pilatus 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 PC-12/47E 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 Pilatus Aircraft Ltd. Model PC-12/47E airplanes.

Autothrust System

In addition to the requirements of §§ 23.143, 23.1309, and 23.1329, the following apply:

(a) Quick disengagement controls for the autothrust function must be provided for each pilot. The autothrust quick disengagement controls must be located on the thrust control levers. Quick disengagement controls must be readily accessible to each pilot while operating the thrust control levers.

(b) The effects of a failure of the system to disengage the autothrust function when manually commanded by the pilot must be assessed in accordance with the requirements of § 23.1309.

(c) Engagement or switching of the flight guidance system, a mode, or a sensor may not cause the autothrust system to affect a transient response that alters the airplane's flight path any greater than a minor transient, as defined in paragraph (l)(1) of these special conditions.

(d) Under normal conditions, the disengagement of any automatic control function of a flight guidance system may not cause a transient response of the airplane's flight path any greater than a minor transient.

(e) Under rare normal and non-normal conditions, disengagement of any automatic control function of a flight guidance system may not result in a transient any greater than a significant transient, as defined in paragraph (l)(2) of these special conditions.

(f) The function and direction of motion of each command reference control, such as heading select or vertical speed, must be plainly indicated on—or adjacent to—each control if necessary to prevent inappropriate use or confusion.

(g) Under any condition of flight appropriate to its use, the flight guidance system may not produce hazardous loads on the airplane, nor create hazardous deviations in the flight path. This applies to both fault-free operation and in the event of a malfunction, and assumes that the pilot begins corrective action within a reasonable period of time.

(h) When the flight guidance system is in use, a means must be provided to avoid excursions beyond an acceptable margin from the speed range of the normal flight envelope. If the airplane experiences an excursion outside this range, a means must be provided to prevent the flight guidance system from providing guidance or control to an unsafe speed.

(i) The flight guidance system functions, controls, indications, and alerts must be designed to minimize flightcrew errors and confusion concerning the behavior and operation of the flight guidance system. Means must be provided to indicate the current mode of operation, including

any armed modes, transitions, and reversions. Selector switch position is not an acceptable means of indication. The controls and indications must be grouped and presented in a logical and consistent manner. The indications must be visible to each pilot under all expected lighting conditions.

(j) Following disengagement of the autothrust function, a caution must be provided to each pilot.

(k) During autothrust operation, it must be possible for the flightcrew to move the thrust levers without requiring excessive force. The autothrust may not create a potential hazard when the flightcrew applies an override force to the thrust levers.

(l) For purposes of these special conditions, a transient is a disturbance in the control or flight path of the airplane that is not consistent with response to flightcrew inputs or environmental conditions.

(1) A minor transient would not significantly reduce safety margins and would involve flightcrew actions that are well within their capabilities. A minor transient may involve a slight increase in flightcrew workload or some physical discomfort to passengers or cabin crew.

(2) A significant transient may lead to a significant reduction in safety margins, an increase in flightcrew workload, discomfort to the flightcrew, or physical distress to the passengers or cabin crew, possibly including non-fatal injuries. Significant transients do not require, in order to remain within or recover to the normal flight envelope, any of the following:

(i) Exceptional piloting skill, alertness, or strength.

(ii) Forces applied by the pilot which are greater than those specified in

§ 23.143(c).

(iii) Accelerations or attitudes in the airplane that might result in further hazard to secured or non-secured occupants.

Issued in Kansas City, Missouri on August 1, 2019.

Pat Mullen
Manager, Small Airplane Standards Branch
Policy and Innovation Division
Aircraft Certification Service

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