[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2015-2566; Special Conditions No. 25-587-SC]

Special Conditions: Bombardier Inc., Models BD-700-2A12 and BD-700-2A13 Series Airplanes; Electronic Flight Control System: Control Surface Awareness and Mode Annunciation

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Bombardier Inc. Models BD-700-2A12 and BD-700-2A13 series airplanes. These airplanes will have novel or unusual design features when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. These design features are a fly-by-wire electronic flight control system (EFCS) and no direct coupling from the flight deck controller to the control surface. As a result, the pilot is not aware of the actual control surface position. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. 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: This action is effective on Bombardier Inc. on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. We must receive your comments by **[INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Send comments identified by docket number FAA-2015-2566 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 or Courier: Take comments to 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.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to http://www.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: Joe Jacobsen, FAA, Airplane and Flightcrew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-2011; facsimile 425-227-1149.

SUPPLEMENTARY INFORMATION:

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 publication in the Federal Register.

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.

We will consider all comments we receive on or before the closing date for comments. We may change these special conditions based on the comments we receive.

Background

Bombardier Inc. located in Montreal, Canada, applied to Transport Canada Civil Aviation (TCCA) on January 7, 2012, and May 30, 2012, for two amended type certificates in the transport airplane category for two new airplane models designated as the BD-700-2A12 and BD-700-2A13. These airplanes are 19-passenger, twin-engine, ultra long-range large airplanes

targeting the executive interior business jet market. They share an identical supplier base and significant common design elements including a fly-by-wire electronic flight control system (EFCS).

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Bombardier Inc. must show that the BD-700-2A12 and BD-700-2A13 airplanes meet the applicable provisions of 14 CFR part 25 as amended by Amendments 25-1 through 25-138 except for Amendment 25-137.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the BD-700-2A12 and BD-700-2A13 airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

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 or similar novel or unusual design features, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the BD-700-2A12 and BD-700-2A13 airplanes 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 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The BD-700-2A12 and BD-700-2A13 airplanes will incorporate the following novel or unusual design features: A fly-by-wire EFCS and no direct coupling from the flight deck controller to the control surface. As a result, the pilot is not aware of the actual control surface position as envisioned under current airworthiness standards.

Discussion

These special conditions require that the flightcrew receive a suitable flight control position annunciation when a flight condition exists in which nearly full surface authority (not crew-commanded) is being used. Suitability of such a display must take into account that some pilot-demanded maneuvers (e.g., rapid roll) are necessarily associated with intended full performance, which may saturate the surface. Therefore, simple alerting systems function in both intended and unexpected control-limiting situations. As a result, they must be properly balanced between providing necessary crew awareness and being a potential nuisance to the flightcrew. A monitoring system that compares airplane motion and surface deflection with the demand of the pilot side-stick controller could help reduce nuisance alerting.

These special conditions also address flight control system mode annunciation. Suitable mode annunciation must be provided to the flightcrew for events that significantly change the operating mode of the system but do not merit the classic “failure warning.”

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.

Applicability

As discussed above, these special conditions are applicable to the Bombardier Models BD-700-2A12 and BD-700-2A13 series airplanes. Should Bombardier Inc. apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design features, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on two model series of airplanes. It is not a rule of general applicability.

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. Therefore, the FAA has determined that prior public notice and comment are unnecessary, and good cause exists for adopting these special conditions upon publication in the Federal Register. 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 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

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 Bombardier Inc. Models BD-700-2A12 and BD-700-2A13 series airplanes.

1. In addition to the requirements of §§ 25.143, 25.671, and 25.672, the following requirements apply:

a. The system design must ensure that the flightcrew is made suitably aware whenever the primary control means nears the limit of control authority.

Note: The term "suitably aware" indicates annunciations provided to the flightcrew are appropriately balanced between nuisance and that necessary for crew awareness.

b. If the design of the flight control system has multiple modes of operation, a means must be provided to indicate to the flightcrew any mode that significantly changes or degrades the normal handling or operational characteristics of the airplane.

Issued in Renton, Washington, on June 17, 2015.

Jeffrey E. Duven
Manager, Transport Airplane Directorate
Aircraft Certification Service

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