Billing Code 4910-13

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2019-0424; Special Conditions No. 25-748-SC]

Special Conditions: Mitsubishi Aircraft Corporation, Model MRJ-200 Airplane; Operation without Normal Electrical Power

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Mitsubishi Aircraft Corporation (MITAC), Model MRJ-200 airplanes. These airplanes will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. These design features are electrical and electronic systems that perform critical functions, the loss of which could be catastrophic to the airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this 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 MITAC on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Send comments on or before [INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Send comments identified by Docket No. FAA-2019-0424 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, DC, 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, DC, 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).

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 Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Dean Thompson, Airplane and Flight Crew Interface Section, AIR-671, Transport Standards Branch, Policy and Innovation Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street, Des Moines, Washington 98198; telephone and fax 206-231-3165; e-mail Dean.R.Thompson@faa.gov.

SUPPLEMENTARY INFORMATION: The substance of these special conditions has been published in the *Federal Register* for public comment in several prior instances with no substantive comments received. Therefore, the FAA has determined that prior public notice and comment are unnecessary, and finds that, for the same reason, good cause exists for adopting these special conditions 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 by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On March 3, 2015, MITAC applied for a type certificate for their new Model MRJ-200 airplanes. The MITAC Model MRJ-200 airplane is a low-wing, conventional-tail design with two wing-mounted turbofan engines. The airplane has seating for 92 passengers and a maximum takeoff weight of 95,000 lbs.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.17, MITAC must show that the Model MRJ-200 airplanes meet the applicable provisions of part 25, as amended by amendments 25-1 through 25-141; and part 26 continued airworthiness certification requirements, as amended by Amendments 26-1 through 26-6.

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 MITAC MRJ-200 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 novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the MITAC MRJ-200 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.

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 MITAC Model MRJ-200 airplanes will incorporate the following novel or unusual design features:

Electrical and electronic systems that perform critical functions, the loss of which may result in the loss of flight controls and other critical systems and may be catastrophic to the airplane.

Discussion

The MITAC Model MRJ-200 airplane has a fly-by-wire flight control system that requires a continuous source of electrical power to maintain an operable flight-control system. Section 25.1351(d), Operation without normal electrical power, requires safe operation in visual flight rule (VFR) conditions for at least 5 minutes after loss of normal electrical power, excluding the battery. This rule was structured around a traditional design using mechanical control cables and linkages for flight control. These manual controls allow the crew to maintain aerodynamic control of the airplane for an indefinite time after loss of all electrical power. Under these conditions, a mechanical flight control system provided the crew with the ability to fly the airplane while attempting to identify the cause of the electrical failure, restart engine(s) if necessary, and attempt to re-establish some of the electrical power generation capability.

A critical assumption in § 25.1351(d) is that the airplane is in VFR conditions at the time of an electrical failure. This is not a valid assumption in today's airline operating environment, where airplanes fly much of the time in instrument meteorological conditions on air traffic control defined flight paths. Another assumption in the existing rule is that the loss of all normal electrical power is the result of the loss of all engines. The 5-minute period in the rule is to allow at least one engine to be restarted following an all-engine power loss in order to continue the flight to a safe landing. However, service experience on airplanes with similar electrical power system architecture as the MITAC

Model MRJ-200 airplanes have shown that at least the temporary loss of all electrical power for causes other than all-engine failure is not extremely improbable.

To maintain the same level of safety envisioned by the existing rule with traditional mechanical flight controls, the MITAC Model MRJ-200 airplane design must not be time-limited in its operation under all reasonably foreseeable conditions, including loss of all normal sources of engine or auxiliary power unit (APU)-generated electrical power. Unless MITAC can show that the non-restorable loss of the engine and APU power sources is extremely improbable, MITAC must demonstrate that the airplane can maintain safe flight and landing (including steering and braking on the ground for airplanes using steer/brake-by-wire or fly-by-wire speed brake panels) with the use of its emergency/alternate electrical-power systems. These electrical-power systems, or the minimum restorable electrical-power sources, must be able to power loads that are essential for continued safe flight and landing, including those required for the maximum length of approved flight diversion.

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 MITAC Model MRJ-200 airplanes. Should MITAC apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

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

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 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 MITAC Model MRJ-200 airplanes.

In lieu of 14 CFR 25.1351(d), the following special conditions apply:

1. The applicant must show by test or a combination of test and analysis that the airplane is capable of continued safe flight and landing with all normal electrical power sources inoperative, as prescribed by paragraphs 1.a. and 1.b., below. For purposes of these special conditions, normal sources of electrical power generation do not include any alternate power sources such as the battery, ram air turbine, or independent power systems such as the flight control permanent magnet generating system. In showing capability for continued safe flight and landing, the applicant must account for systems capability, effects on crew workload and operating conditions, and the physiological needs of the flightcrew

and passengers for the longest diversion time for which the applicant is seeking approval.

a. In showing compliance with this requirement, the applicant must account for common-cause failures, cascading failures, and zonal physical threats.

b. The applicant may consider the ability to restore operation of portions of the electrical power generation and distribution system if it can be shown that unrecoverable loss of those portions of the system is extremely improbable. The design must provide an alternative source of electrical power for the time required to restore the minimum electrical power generation capability required for safe flight and landing. The applicant may exclude unrecoverable loss of all engines when showing compliance with this requirement.

2. Regardless of any electrical generation and distribution system recovery capability shown under paragraph 1 of these special conditions, sufficient electrical system capability must be provided to:

a. Allow time to descend, with all engines inoperative, at the speed that provides the best glide distance, from the maximum operating altitude to the top of the engine restart envelope, and

b. Subsequently allow multiple start attempts of the engines and auxiliary power unit (APU). The design must provide this capability in addition to the electrical capability required by existing part 25 requirements related to operation with all engines inoperative.

3. The airplane emergency electrical power system must be designed to supply:

a. Electrical power required for immediate safety, which must continue to operate without the need for crew action following the loss of the normal electrical power, for a duration sufficient to allow reconfiguration to provide a non-time-limited source of electrical power.

b. Electrical power required for continued safe flight and landing for the maximum diversion time.

4. If the applicant uses APU-generated electrical power to satisfy the requirements of these special conditions, and if reaching a suitable runway for landing is beyond the capacity of the battery systems, then the APU must be able to be started under any foreseeable flight condition prior to the depletion of the battery or the restoration of normal electrical power, whichever occurs first. Flight test must demonstrate this capability at the most critical condition.

   a. The applicant must show that the APU will provide adequate electrical power for continued safe flight and landing.

   b. The operating limitations section of the airplane flight manual (AFM) must incorporate non-normal procedures that direct the pilot to take appropriate actions to activate the APU after loss of normal engine-driven generated electrical power.

5. As part of showing compliance with these special conditions, the tests to demonstrate loss of all normal electrical power must also take into account the following:

   a. The assumption that the failure condition occurs during night instrument meteorological conditions (IMC) at the most critical phase of the flight,

relative to the worst possible electrical power distribution and equipment-loads-demand condition.

b. After the un-restorable loss of normal engine generator power, the airplane engine restart capability is provided and operations continued in IMC.

c. The airplane is demonstrated to be capable of continued safe flight and landing. The length of time must be computed based on the maximum diversion time capability for which the airplane is being certified. The applicant must account for airspeed reductions resulting from the associated failure or failures.

d. The airplane must provide adequate indication of loss of normal electrical power to direct the pilot to the non-normal procedures, and the operating limitations section of the AFM must incorporate non-normal procedures that will direct the pilot to take appropriate actions.

Issued in Des Moines, Washington, on June 4, 2019.

Paul Siegmund,
Acting Manager, Transport Standards Branch,
Policy and Innovation Division,
Aircraft Certification Service.
[FR Doc. 2019-12120 Filed: 6/7/2019 8:45 am; Publication Date: 6/10/2019]