[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No.FAA-2017-0651; Special Conditions No. 23-285-SC]

Special Conditions: Game Composites Ltd, GB1 airplane; Acrobatic Category Aerodynamic Stability.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Game Composites Ltd. GB1 airplane. This airplane will have a novel or unusual design feature(s) associated with static stability. This airplane can perform at the highest level of aerobatic competition. To be competitive, the airplane is designed with its lateral and directional axes being decoupled from each other; providing more precise maneuvering. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: These special conditions are effective **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and are applicable on August 22, 2017.

FOR FURTHER INFORMATION CONTACT: Mr. Ross Schaller, AIR-714, Federal Aviation Administration, Compliance and Airworthiness Division, Flight Test Branch, Aircraft Certification Service, 901 Locust; Kansas City, Missouri 64106; telephone (816) 329-4162; facsimile (816) 329-4090**.**

SUPPLEMENTARY INFORMATION:

Background

On March 10, 2014, Game Composite Ltd. applied for a type certificate for their new GB1 airplane. The GB1 is a single-engine airplane with a two-place tandem canopy cockpit. It features conventional landing gear, conventional low-wing planform, and is mostly constructed of carbon composite materials. The engine is a Lycoming AEIO-580-B1A, fitted with a model MTV-14-B-C/C190-130 4-blade MT-propeller. The airplane will be approved for Day-VFR operations (non-icing). The maximum takeoff weight is 2,200 pounds in acrobatic category with a maximum operating altitude of 15,000 feet. The never exceed speed (V_{NE}) is 230 knots, the design cruise speed (V_C) is 200 knots, and the design maneuvering speed (V_A) is 175 knots.

Acrobatic airplanes previously type certified by the FAA did comply with the stability provisions of part 23, subpart B. However, airplanes like the GB1 are considered as "unlimited" acrobatic airplanes because these airplanes can perform all the maneuvers listed in the Aresti Catalog. Generally, the evolution of the "unlimited" types of acrobatic airplanes, with very low mass, exceptional roll rates, and very high G capabilities—in addition to power to mass ratios—are unique to this type of airplane and have led to airplanes that cannot comply with the stability provisions of the regulations. These airplanes can be type certified in the acrobatic category only with an appropriate set of special conditions and associated limitations.

Type Certification Basis

Under the provisions of 14 CFR § 21.17, Game Composites Ltd. must show the GB 1 meets the applicable provisions of part 23**,** as amended by amendments 23-1 through 23-62 thereto**.**

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the GB1 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 feature, the FAA would apply these special conditions to the other model under § 21.17(a)(2).

In addition to the applicable airworthiness regulations and special conditions, the GB1 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 GB1 airplane will incorporate the following novel or unusual design features:

For acrobatic category airplanes with unlimited acrobatic capability:

Relaxed longitudinal and decoupled lateral static stability characteristics

Discussion

Sections 23.173 and 23.177 provide static stability criteria for longitudinal, lateral, and directional axes requirements for an airplane. However, these requirements are not adequate to address the specific issues raised in the flight characteristics of an unlimited aerobatic airplane. Therefore, the FAA has determined special conditions are needed—after a flight-test

evaluation—to address the static stability characteristics of the GB1. Accordingly, these special conditions are for the Game Composites Ltd. GB1 airplane's static stability characteristics.

Discussion of Comments

Notice of proposed special conditions No. 23-17-02-SC for the Game Composites Ltd GB1 airplane was published in the Federal Register on July 3, 2017 (82 FR 30798). The FAA received one comment. The commenter suggested the FAA makes this special condition a standard for all unlimited aerobatic airplanes. The FAA agrees and published amendment 23-64 in the Federal Register (81 FR 96572, December 30, 2016) with an effective date of August 30, 2017; moving from a prescriptive-based to a performance-based regulation. A goal of amendment 23-64 is to reduce the need for special conditions through the use of industry standards that can be applied—as the commenter suggests—to airplanes that meet the criteria for that standard. Until an industry standard is developed by an industry standards organization such as ASTM International, SAE International, etc. these special conditions are required and adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the GB1. Should Game Composites Ltd. 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.

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 Game Composites Ltd. GB1 airplane is imminent, pursuant to 5 U.S.C. 553(d) the FAA finds that good cause exists to make these special conditions effective upon issuance.

Conclusion

This action affects only certain novel or unusual design features on one model of airplane. 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.

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, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special condition are issued as part of the type certification basis for Game Composites GB1 airplanes**.**

1. Acrobatic Only Category Static Stability Requirements.

a. In place of 14 CFR 23.173, "Static longitudinal stability," comply with the following:

SC23.173 Static longitudinal stability

Under the conditions in 14 CFR 23.175 and with the airplane trimmed as indicated, the characteristics of the elevator control forces and the friction within the control system must be as follows:

(a) A pull must be required to obtain and maintain speeds below the specified trim speed and a push required to obtain and maintain speeds above the specified trim speed. This must be shown at any speed that can be obtained, except that speeds requiring a control force in

excess of 40 pounds or speeds above the maximum allowable speed or below the minimum speed for steady unstalled flight need not be considered.

(b) The stick force or position must vary with speed so any substantial speed change results in a stick force or position clearly perceptible to the pilot.

b. In place of 14 CFR 23.177, "Static directional and lateral stability," comply with the following:

SC23.177 Static directional and lateral stability:

(a) The static directional stability, as shown by the tendency to recover from a wings level sideslip with the rudder free, must be positive for any landing gear and flap position appropriate to the takeoff, climb, cruise, approach, and landing configurations. This must be shown with symmetrical power up to maximum continuous power and at speeds from 1.2 V_{S1} to V_O (maximum operating maneuvering speed); the rudder pedal force must not reverse.

(b) In straight, steady slips at 1.2 V_{S1} for any landing gear and flap positions and for any symmetrical power conditions up to 50 percent of maximum continuous power, the rudder control movements and forces must increase steadily—but not necessarily in constant proportion—as the angle of sideslip is increased up to the maximum appropriate for the type of airplane. The aileron control movements and forces may increase steadily, but not necessarily in constant proportion, as the angle of sideslip is increased up to the maximum appropriate for the type of airplane. At larger slip angles, up to the angle at which full rudder or aileron control is used or a control force limit contained in 14 CFR 23.143 is reached, the aileron and rudder control movements and forces must not reverse as the angle of sideslip is increased.

Rapid entry into—and recovery from—a maximum sideslip considered appropriate for the airplane must not result in uncontrollable flight characteristics.

Issued in Kansas City, Missouri, on August 22, 2017.

Pat Mullen
Manager, Small Airplane Standards Branch
Aircraft Certification Service
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