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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2019–0470; Special Conditions No. 25–754–SC]

Special Conditions: Gulfstream Aerospace Corporation Model GVII Series Airplane; Electro-Hydraulically Actuated Seats Equipped With Backup Power Supply

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Gulfstream Aerospace Corporation (Gulfstream) Model GVII series airplane. These airplanes, as modified by Gulfstream, will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is electro-hydraulically actuated seats equipped with backup power supply. 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: Effective August 13, 2019.

FOR FURTHER INFORMATION CONTACT: Alan Sinclair, AIR–675, Airframe and Cabin Safety Section, Transport Standards Branch, Policy and Innovation Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street, Des Moines, Washington 98198; telephone and fax 206–231–3215; email *alan.sinclair@faa.gov.*

SUPPLEMENTARY INFORMATION:

Background

On October 12, 2018, Gulfstream applied for a supplemental type certificate for electro-hydraulically actuated seats equipped with backup power supply in the Model GVII series airplane. The Gulfstream Model GVII series airplane, currently approved under Type Certificate No. T00021AT, is twin-engine, transport-category airplane with seating for 19 passengers and a maximum takeoff weight of 79,600 pounds.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.101, Gulfstream must show that the Model GVII series airplane, as changed, continues to meet the applicable provisions of the regulations listed in Type Certificate No. T00021AT or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

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 Gulfstream Model GVII series airplane 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 applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate 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 Gulfstream Model GVII series airplane 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 § 21.101.

Novel or Unusual Design Features

The Gulfstream Model GVII series airplane will incorporate the following novel or unusual design features:

Hydraulically actuated components on airplane seats, including hydraulic reservoir, pump, actuators, and backup power systems.

Discussion

Hydraulically actuated components and backup power systems on airplane seats are considered novel or unusual by the FAA. Therefore, we developed special conditions that contain the additional standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

The FAA has considered the installation of seats with these features to have four primary safety concerns:

1. Reliability of the backup power supply;
2. Safety hazards to the occupants from the hydraulically actuated components of the seat;
3. Structural integrity of the hydraulic components; and
4. Flammability.

Emergency exits must be accessible to the passengers, and the effectiveness of evacuation must be maintained. Typical airplane seats can be positioned manually to the lateral (track) and directional (swivel) taxi, takeoff, and landing (TT&L) position by mechanical means, so that the seats can be positioned accordingly in the event of a loss of cabin power. For this electro-hydraulically operated seat design, in lieu of a manual means to re-position the hydraulically operated seat features (backrest, seat pan, and leg-rest deployment) for TT&L, a backup power supply (BPS) temporarily powers the hydraulic system in the event of loss of cabin power. The BPS is deployed, and intended only for use, in the event of a loss of cabin power. If the seats are installed in the path of the emergency over-wing exits, failure to return the seat to a TT&L position may have an adverse effect on evacuation. Substantiation of 14 CFR 25.809(b) and 25.813(c)(2)(ii) must be shown with the seats in their most adverse positions.

It must be shown that the hydraulically actuated components of the seat pose no safety hazard to the occupants or airplane. This includes injuries caused by crushing of airplane occupants who are between the hydraulically actuated components and any part of the passenger cabin when seat features (*e.g.,* leg rest or backrest)

are actuated. Additionally, the risk of loss of function of a control or proximity switch, resulting in the pump motor commanded to remain pumping after the hydraulic actuator(s) have reached their minimum or maximum limit, must not cause the overloaded motor to overheat, a condition that could result in fire.

The FAA has also considered the emergency-landing dynamic conditions for the installation of electro-hydraulically actuated seats. The applicant must show that the hydraulic system (actuators, reservoir, lines, etc.) remains intact and free from leakage under the conditions specified in § 25.562. Testing of each seat's hydraulic system per § 25.1435(c) may be conducted off of the airplane.

Flammability of hydraulic fluid used in the seat-movement mechanism must be considered. If the fluid is flammable, it could contribute to a post-crash or in-flight fire. Any failure modes that would result in release of the flammable hydraulic fluid during a post-crash or in-flight fire, causing such fluid to materially increase an existing fire, must be examined. Examples of this could be flex lines burning through and releasing the flammable hydraulic fluid, or the fluid reservoir could be heated in a fire, resulting in a boiling-liquid, expanding-vapor explosion. The potential for spontaneous ignition of the fluid coming into contact with hot surfaces or other ignition sources should also be addressed. The applicant should examine any possible failure mode in which the flammable hydraulic fluid could be absorbed into materials, such as the seat foam and fabric, carpeting, etc. The applicant must show that any fluid-soaked seat parts remain self-extinguishing. The applicant must also show that flammability of dry residue, which may be present from a slow leak or fluid seepage, does not degrade the flammability characteristics of any materials the fluid contacts, to a level below the requirements specified in § 25.853.

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.

Discussion of Comments

The FAA issued Notice of Proposed Special Conditions No. 25–19–10–SC for the Gulfstream Model GVII series airplane, which was published in the **Federal Register** on July 2, 2019 (84 FR 31522). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the Gulfstream Model GVII series airplane. Should Gulfstream apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. T00021AT to incorporate 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 series of airplane. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

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 Gulfstream Aerospace Corporation Model GVII series airplanes.

1. It must be shown that the probability of failure of the backup power supply to return seat components to the required taxi, takeoff, and landing position is no greater than 10^{-5} per flight hour.

2. It must be shown that the hydraulically actuated components of the seat pose no safety hazard to the occupants. Hazards to be considered, per the latest revision of Advisory Circular 25.1309–1, at a minimum are:

a. Injuries caused by crushing of airplane occupants who are between the hydraulically actuated components and any part of the passenger cabin when the leg rest or backrest is actuated.

b. The risk of loss of function of a control or proximity switch resulting in the pump motor being commanded to stay on after the hydraulic actuator(s) have reached their minimum or maximum limit, creating potential for motor overheating or fire.

c. The potential for a significant contribution to a fire in the event fluid comes into contact with hot surfaces or other ignition sources, and the potential for release of toxic or flammable vapors and gasses.

3. It must be shown that the hydraulic system (actuators, reservoir, lines, etc.) remains intact and free from leakage under the conditions specified in § 25.562. Testing of each seat's hydraulic system per § 25.1435(c) may be conducted off of the airplane.

4. Section 25.863 requires consideration of any effects the hydraulic fluid, including the fluid as a dry residue, could have on combustible or absorbing materials. The characteristics of such flammable fluid in these conditions must be tested to the requirements of § 25.853(a) and (c), or the materials must be shielded in a manner that prevents contact by the fluid. However, as an alternative to such testing or shielding, the applicant may provide, in accordance with § 25.863(c), a quick-acting means that alerts the crew that hydraulic fluid has leaked.

Issued in Des Moines, Washington, on August 7, 2019.

Christopher R. Parker,

Acting Manager, Transport Standards Branch, Policy and Innovation Division, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 73

[Docket No. FAA–2016–9479; Airspace Docket No. 15–AAL–4]

RIN 2120–AA66

Establishment of Restricted Areas R–2205 A, B, C, D, E, F, G, H, J, K; Fairbanks, AK and Revocation of Restricted Area R–2205; Stuart Creek, AK

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This action establishes restricted areas R–2205 A, B, C, D, E, F, G, H, J, K; Fairbanks, AK, and revokes restricted area R–2205; Stuart Creek, AK, over the Digital Multipurpose Training Range (DMPTR) and the Yukon Training Area (YTA), which provides a more realistic protective airspace required for hazardous activities within the Joint Pacific Alaska Range Complex (JPARC).

DATES: Effective date 0901 UTC, October 10, 2019.

FOR FURTHER INFORMATION CONTACT: Kenneth Ready, Airspace Policy and Regulations Group, Office of Airspace Services, Federal Aviation