a. The Nij (calculated in accordance with 49 CFR 571.208) must be below 1.0, where Nij = Fz/Fzc + My/Myc, and Nij critical values are:

i. Fzc = 1530 lbs. for tension
ii. Fzc = 1385 lbs. for compression
iii. Myc = 229 lb-ft in flexion
iv. Myc = 100 lb-ft in extension

b. In addition, peak Fz must be below 937 lbs. in tension and 899 lbs. in compression.

c. Rotation of the head about its vertical axis relative to the torso is limited to 105 degrees in either direction from forward facing.

d. The neck must not impact any surface that would produce concentrated loading on the neck.

4. Spine and Torso Injury Criteria

a. The lumbar spine tension (Fz) cannot exceed 1200 lbs.

b. Significant concentrated loading on the occupant's spine, in the area between the pelvis and shoulders during impact, including rebound, is not acceptable. During this type of contact, the interval for any rearward (X direction) acceleration exceeding 20g must be less than 3 milliseconds as measured by the thoracic instrumentation specified in 49 CFR part 572, subpart E filtered in accordance with SAE International (SAE) recommended practice J211/1, ''Instrumentation for Impact Test—Part 1—Electronic Instrumentation.''

c. The occupant must not interact with the armrest or other seat components in any manner significantly different than would be expected for a forward-facing seat installation.

5. Pelvis Criteria

Any part of the load-bearing portion of the bottom of the ATD pelvis must not translate beyond the edges of the seat bottom seat-cushion supporting structure.

6. Femur Criteria

Axial rotation of the upper leg (about the z-axis of the femur per SAE Recommended Practice J211/1) must be limited to 35 degrees from the nominal seated position. Evaluation during rebound does not need to be considered.

7. ATD and Test Conditions

Longitudinal tests conducted to measure the injury criteria above must be performed with the FAA Hybrid III ATD, as described in SAE 1999–01–1609, ''A Lumbar Spine Modification to the Hybrid III ATD for Aircraft Seat Tests.'' The tests must be conducted with an undeformed floor, at the most-critical yaw cases for injury, and with all lateral structural supports (*e.g.,* armrests or walls) installed.

Note: Jet Aviation AG must demonstrate that the installation of seats via plinths or pallets meets all applicable requirements. Compliance with the guidance contained in Policy Memorandum PS–ANM–100–2000–00123, ''Guidance for Demonstrating Compliance with Seat Dynamic Testing for Plinths and Pallets,'' dated February 2, 2000, is acceptable to the FAA.

8. Inflatable Airbag Restraint Systems Special Conditions

If inflatable airbag restraint systems are installed, the airbag systems must meet the requirements in Special Conditions 25–386–SC, or other airbag system special conditions which are applicable to the Boeing Model 737 series airplanes.

Issued in Kansas City, Missouri, on March 22, 2024.

Patrick R. Mullen,

Manager, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service.

[FR Doc. 2024–06894 Filed 4–3–24; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2021–1034; Special Conditions No. 25–857–SC]

Special Conditions: Airbus Model A321neo XLR Airplane; Electronic Flight-Control System: Lateral-Directional and Longitudinal Stability, and Low-Energy Awareness

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Airbus Model A321neo XLR airplane. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the applicable airworthiness standards. This design feature is an electronic flight-control system (EFCS) associated with lateral-directional and longitudinal stability, and low-energy awareness. 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 April 4, 2024.

FOR FURTHER INFORMATION CONTACT: Troy Brown, Performance and Environment Unit, AIR–621A, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service, Federal Aviation Administration, 1801 S Airport Rd., Wichita, KS 67209–2190; telephone and fax 405–666–1050; email *troy.a.brown@faa.gov.*

SUPPLEMENTARY INFORMATION:

Background

On September 16, 2019, Airbus applied for an amendment to Type Certificate No. A28NM to include the new Model A321neo XLR airplane. This airplane is a twin-engine, transport-category airplane, with seating for 244 passengers, and a maximum takeoff weight of 222,000 pounds.

Type Certification Basis

Under the provisions of 14 CFR 21.101, Airbus must show that the Model A321neo XLR airplane meets the applicable provisions of the regulations listed in Type Certificate No. A28NM, 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 (*e.g.,* 14 CFR part 25) do not contain adequate or appropriate safety standards for the Airbus Model A321neo XLR 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 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, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Airbus Model A321neo XLR 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 § 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Feature

The Airbus Model A321neo XLR airplane will incorporate the following novel or unusual design feature:

An EFCS associated with lateral-directional and longitudinal stability, and low-energy awareness.

Proposed Special Conditions

The FAA issued Notice of Proposed Special Conditions No. FAA–2021–1034, which was published in the **Federal Register** on November 3, 2023 (88 FR 75517).

In that document, the FAA explained that the Airbus' proposed A321neo XLR includes an EFCS, and that the control laws of that system can result in neutral static lateral-directional stability and neutral static longitudinal stability, insufficient feedback to the flightcrew from the pitching moment, and insufficient awareness that the airplane is in a low-energy state. The FAA therefore proposed that the applicable airworthiness regulations are inadequate or inappropriate to address these issues and proposed special conditions to address them.

The FAA proposed that in the absence of positive lateral stability, the curve of lateral control-surface deflections against sideslip angle should be, in a conventional sense and reasonably in harmony with, rudder deflection during steady-heading sideslip maneuvers.

The FAA further proposed that because conventional relationships between stick forces and control-surface displacements do not apply to the ''load-factor command'' flight-control system on the Airbus Model A321neo XLR airplane, longitudinal stability characteristics should be evaluated by assessing the airplane's handling qualities during simulator and flight-test maneuvers appropriate to operation of the airplane. Additionally, under icing and non-icing conditions there may be a difference in full pedal deflection. This difference may result in changes to testing before reaching full pedal deflection, and these special conditions account for these differences.

The airplane must provide adequate awareness cues to the pilot of a low-energy (low-speed/low-thrust/low-height) state to ensure that the airplane retains sufficient energy to recover when flight-control laws provide neutral longitudinal stability significantly below the normal operating speeds. ''Adequate awareness'' means that information must be provided to alert the crew of unsafe operating conditions and to enable them to take appropriate corrective action. Testing of these awareness cues should occur by simulator and flight test in the operational flight envelope for which certification is requested. Testing should include a sufficient number of tests to allow the level of energy awareness, and the effects of energy-management errors, to be assessed.

Discussion of Comments and Final Special Conditions

Airbus Commercial Aircraft (Airbus) and The Boeing Company (Boeing) submitted comments on the same provision of the proposed special conditions.

The Static Lateral-Directional Stability section of the proposed special conditions required the applicant to conduct, in icing conditions, steady heading sideslip maneuvers in several configurations. The proposed conditions would have required these sideslip maneuvers to be conducted ''over the range of sideslip angles appropriate to the operation of the airplane, but not less than those obtained with one half of available rudder control input.''

Airbus and Boeing each recommended that these maneuvers be conducted with full pedal deflection but recommended different approaches to implement that change.

Airbus requested that the FAA add a note stating that these maneuvers will be continued beyond the sideslip angles appropriate for normal operation of the airplane and demonstrate that full pedal travel can be safely applied. Airbus stated that deflecting the pedals as much as practicable in icing conditions would provide a better coverage of the intent of § 25.21(g) regarding § 25.177. Further, Airbus stated that the addition of this note would align FAA and EASA standards.

Boeing recommended that the FAA revise the special conditions to require Airbus to conduct these sideslips ''up to the angle at which full rudder control is used or a rudder control force of 180 pounds is obtained.'' Boeing said this change would be consistent with the language of paragraph 4.15.2.3 of AC 25–25A, Performance and Handling Characteristics in Icing Conditions.

AC 25–25A provides an acceptable means of showing compliance with certain requirements of part 25 of 14 CFR related to airplane performance and handling characteristics in icing conditions. To address static lateral directional stability, the AC provides, as examples of an acceptable test program, that the applicant may conduct steady heading sideslips, in certain configurations, including ''to full rudder authority, 180 pounds of rudder pedal force, or full lateral control authority.'' Paragraph 4.15.2.3.

The FAA agrees with the commenters that full-pedal deflection meets the intent of § 25.21(g) and aligns with guidance in the referenced AC. The FAA also agrees that this approach is harmonized with EASA's certification approach [2] to this issue. The FAA finds that it is unnecessary to revise the condition as suggested by Boeing, and that the language provided by Airbus, with minor revision by the FAA,[3] is sufficient to address this issue.

These final special conditions correct minor discrepancies in the numbering of the proposed special conditions. Also, the proposed special conditions related to low energy awareness contained three instances of ''should.'' The FAA has revised these to ''must'' in these final special conditions, for enforceability and for consistency with the expectations of the FAA and the applicant.

Other than these foregoing changes, these special conditions are adopted as proposed. The 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 Airbus Model A321neo XLR airplane. Should Airbus 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.

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 Airbus Model A321neo XLR is imminent, the FAA finds that good cause exists to make these special conditions effective upon publication.

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.

[2] EASA Certification Review Item (CRI) B–06, ''Flight in Icing Conditions'', issue 2, April 11, 2013.

[3] Under the U.S. regulatory system, notes are explanatory rather than mandatory. See, *e.g.,* section 7.5 of the Document Drafting Handbook (Aug. 2018 Edition, Rev. 2.1, dated Oct. 2023). Therefore, in the final special conditions, the recommended language is no longer a ''note,'' and the commenter's ''will'' is a ''must.''

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 the Airbus Model A321neo XLR airplane.

Static Lateral-Directional Stability

(a) In lieu of compliance with § 25.171, the airplane must have lateral and directional stability characteristics in accordance with § 25.177. In addition, both suitable stability and suitable control feel are required in any condition normally encountered in service.

(b) In lieu of compliance with § 25.177(c), the following requirement must be met for the configurations and speed specified in § 25.177(a):

(1) In straight, steady sideslips over the range of sideslip angles appropriate to the operation of the airplane, the directional control movements and forces must be substantially proportional to the angle of sideslip in a stable sense. The factor of proportionality must lie between limits found necessary for safe operation. During these straight, steady sideslips, necessary lateral control movements and forces must not be in the unstable sense with the exception of speeds above V_{mo}/M_{mo} per § 25.177(b)(2). The range of sideslip angles evaluated must include those sideslip angles resulting from the lesser of:

(i) One-half of the available directional (pedal) control input; and

(ii) A directional (pedal) control force of 180 pounds.

(c) In lieu of compliance with § 25.177(d), the following requirements must be met:

(1) In non-icing conditions, for sideslip angles greater than those prescribed by § 25.177(a), up to the angle at which full rudder control is used or a rudder control force of 180 pounds is obtained, the rudder control forces may not reverse, and increased rudder deflection must be needed for increased angles of sideslip. Compliance with this requirement must be shown using straight, steady sideslips, unless full lateral control input is achieved before reaching either full rudder control input or a rudder control force of 180 pounds; a straight, steady sideslip need not be maintained after achieving full lateral control input. This requirement must be met at all approved landing gear and flap positions for the range of operating speeds and power conditions appropriate to each landing gear and flap position with all engines operating.

(2) In icing conditions, in the configurations listed below, trim the airplane at the specified speed and conduct steady heading sideslips over the range of sideslip angles appropriate to the operation of the airplane but not less than those obtained with one-half of available rudder control input.

(i) High lift devices retracted configuration: trim at best rate of climb speed but not less than minimum all engines operating climb speed defined for icing conditions.

(ii) Lowest lift take-off configuration: trim at the all-engines operating initial climb speed defined for icing conditions.

(iii) Landing configurations: trim at minimum landing speed defined for icing conditions.

The steady heading sideslip maneuver must be continued beyond sideslip angles appropriate for normal operation of the airplane to demonstrate full pedal can be safely applied unless justification for smaller input is provided (*e.g.,* heavy buffet that would deter the pilot from further deflecting the pedals and would make investigations to full pedal a potential flight test safety concern, or pedal input required for normal operations significantly smaller than full pedal).

Longitudinal Stability

In lieu of compliance with the requirements of §§ 25.171, 25.173, and 25.175, the airplane must be shown to have longitudinal stability characteristics in accordance with the following conditions. In addition, both suitable stability and suitable control feel are required in any condition normally encountered in service, including the effects of atmospheric disturbance.

(a) Strong positive static longitudinal stability (1 pound per 6 knots applied through the sidestick) must be present which provides adequate awareness cues to the crew that the speed is above V_{mo}/M_{mo} or below the minimum speed for hands-free stabilized flight. Static longitudinal characteristics must be shown to be suitable based on the airplane handling qualities, including an evaluation of pilot workload and pilot compensation, for specific test procedures during the flight-test evaluations. These characteristics must be shown for appropriate combinations of airplane configuration (*i.e.,* flaps extended or retracted, gear deployed or stowed) and thrust for climb, cruise, approach, landing, and go-around.

(1) Release of the controller at speeds above V_{mo}/M_{mo}, or below the minimum speed for hands-free stabilized flight, must produce a prompt recovery towards normal operating speeds without resulting in a hazardous condition.

(2) The design must not allow a pilot to re-trim the controller forces resulting from this stability.

Low Energy Awareness

The airplane must provide adequate awareness cues to the pilot of a low-energy (low-speed/low-thrust/low-height) state to ensure that the airplane retains sufficient energy to recover when flight-control laws provide neutral longitudinal stability significantly below the normal operating speeds. This must be accomplished as follows:

(a) Adequate low speed/low thrust cues at low altitude should be provided by a strong positive static stability force gradient (1 pound per 6 knots applied through the sidestick), or

(b) The low energy awareness must be provided by an appropriate warning with the following characteristics. The low-energy awareness must:

(1) Be unique, unambiguous, and unmistakable.

(2) Be active at appropriate altitudes and in appropriate configurations (*i.e.,* at low altitude, in the approach and landing configurations).

(3) Be sufficiently timely to allow recovery to a stabilized flight condition inside the normal flight envelope while maintaining the desired flight path and without entering the flight controls angle-of-attack protection mode.

(4) Not be triggered during normal operation, including operation in moderate turbulence for recommended maneuvers at recommended speeds.

(5) Not be cancelable by the pilot other than by achieving a higher energy state.

(6) Have an adequate hierarchy among the various warnings so that the pilot is not confused and led to take inappropriate recovery action if multiple warnings occur.

Global energy awareness and non-nuisance on low-energy cues must be evaluated by simulator and flight tests in the whole take-off and landing altitude range for which certification is requested. This includes all relevant combinations of weight, center-of-gravity position, configuration, airbrakes position, and available thrust, including

reduced and derated take-off thrust operations and engine-failure cases. The tests must assess the level of energy awareness, and the effects of energy-management errors.

Issued in Kansas City, Missouri, on March 28, 2024.

Patrick R. Mullen,

Manager, Technical Innovation Policy Branch, Policy and Innovation Division, Aircraft Certification Service.

[FR Doc. 2024–07139 Filed 4–3–24; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 71

[Docket No. FAA–2023–1906; Airspace Docket No. 22–AWA–3]

RIN 2120–AA66

Amendment of Class C Airspace; San Juan Luis Munoz Marin International Airport, PR

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This action modifies the San Juan Luis Munoz Marin International Airport, PR (SJU), Class C airspace by adding a cutout to the surface area near the Fernando Luis Ribas Dominicci Airport, PR (SIG). The FAA is taking this action to enhance safety and enable more efficient operations at SJU and SIG.

DATES: Effective date 0901 UTC, July 11, 2024. The Director of the Federal Register approves this incorporation by reference action under 1 CFR part 51, subject to the annual revision of FAA Order 7400.11 and publication of conforming amendments.

ADDRESSES: A copy of the Notice of Proposed Rulemaking (NPRM), all comments received, this final rule, and all background material may be viewed online at *www.regulations.gov* using the FAA Docket number. Electronic retrieval help and guidelines are available on the website. It is available 24 hours each day, 365 days each year.

FAA Order JO 7400.11H, Airspace Designations and Reporting Points, and subsequent amendments can be viewed online at *www.faa.gov/air_traffic/publications/.* You may also contact the Rules and Regulations Group, Office of Policy, Federal Aviation Administration, 800 Independence Avenue SW, Washington, DC 20591; telephone: (202) 267–8783.

FOR FURTHER INFORMATION CONTACT: Brian Vidis, Rules and Regulations Group, Office of Policy, Federal Aviation Administration, 800 Independence Avenue SW, Washington DC 20591; telephone: (202) 267–8783.

SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

The FAA's authority to issue rules regarding aviation safety is found in Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority. This rulemaking is promulgated under the authority described in Subtitle VII, Part A, Subpart I, Section 40103. Under that section, the FAA is charged with prescribing regulations to assign the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace. This regulation is within the scope of that authority as it modifies terminal airspace as required to preserve the safe and efficient flow of air traffic in the San Juan, PR, area.

History

The FAA published a NPRM for Docket No. FAA–2023–1906 in the **Federal Register** (88 FR 68509; October 4, 2023) proposing to modify the Class C airspace area surrounding SJU. Interested parties were invited to participate in this rulemaking effort by submitting written comments on the proposal. One comment was received from the Air Line Pilots Association International in support of the new SJU Class C airspace design.

Differences From the NPRM

Subsequent to publication of the NPRM, the FAA identified that the SJU Airport Reference Point (ARP) geographic coordinates listed in the Class C airspace description had been rounded in error and published as ''lat. 18°26′22″ N, long. 66°00′07″ W''. The correct ARP for SJU is ''lat. 18°26′22″ N, long. 066°00′08″ W''. The ARP for SJU is changed from ''lat. 18°26′22″ N, long. 66°00′07″ W'' to ''lat. 18°26′22″ N, long. 066°00′08″W''. This final rule corrects the error.

Incorporation by Reference

Class C airspace designations are published in paragraph 4000 of FAA Order JO 7400.11, Airspace Designations and Reporting Points, which is incorporated by reference in 14 CFR 71.1 on an annual basis. This document amends the current version of that order, FAA Order JO 7400.11H, dated August 11, 2023, and effective September 15, 2023. FAA Order JO 7400.11H is publicly available as listed in the **ADDRESSES** section of this document. This amendment will be published in the next update to FAA Order JO 7400.11.

FAA Order JO 7400.11H lists Class A, B, C, D, and E airspace areas, air traffic service routes, and reporting points.

The Rule

This action amends 14 CFR part 71 by modifying the San Juan Luis Munoz Marin International Airport (SJU), PR, Class C airspace description by adding a cutout to the Class C surface area northwest of SJU from the surface to but not including 1,200 feet above mean sea level (MSL). This amendment enhances flight safety by allowing aircraft departing runway 9 at Fernando Luis Ribas Dominicci Airport, PR (SIG), when the SIG air traffic control tower is closed, the ability to either remain outside of the San Juan, PR, Class C airspace by turning to the north and west or to have additional time to establish two-way radio communication with the San Juan air traffic control tower prior to entering the San Juan, PR, (SJU) Class C airspace.

Additionally, the FAA corrects the first line of the Class C airspace description header information by only listing the city and territory location of the airport. This change follows the FAA's current airspace description format guidance.

Regulatory Notices and Analyses

The FAA considers the impacts of regulatory actions under a variety of executive orders and other requirements. First, Executive Order 12866 and Executive Order 13563 direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify the costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100,000,000 or more (adjusted annually for inflation) in any one year. The current threshold after