## NATIONAL CREDIT UNION ADMINISTRATION

**12 CFR Part 704**

**RIN 3133–AF13**

## Corporate Credit Unions; Extension of Comment Period

*Correction*

In proposed rule document 2020–07159 on page 19908 in the issue of Thursday, April 9, 2020, make the following correction:

On page 19908, in the first column, in the ''**DATES**'' section, in the fifth line, ''June 8, 2020'' should read ''July 27, 2020''.

[FR Doc. C1–2020–07159 Filed 4–10–20; 8:45 am]

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## DEPARTMENT OF TRANSPORTATION

**Federal Aviation Administration**

**14 CFR Parts 21 and 36**

**[Docket No.: FAA–2020–0316; Notice No. 20–06]**

**RIN 2120–AL29**

## Noise Certification of Supersonic Airplanes

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** This action proposes to add new supersonic airplanes to the applicability of noise certification regulations, and proposes landing and takeoff noise standards for a certain class of new supersonic airplanes. There is renewed interest in the development of supersonic aircraft, and the proposed regulations would facilitate the continued development of airplanes by specifying the noise limits for the designs, providing the means to certificate the airplanes for subsonic operation in the United States.

**DATES:** Send comments on or before July 13, 2020.

**ADDRESSES:** Send comments identified by docket number FAA–2020–0316 using any of the following methods:

- *Federal eRulemaking 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:* In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, including any personal information the commenter provides, to *http://www.regulations.gov,* as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at *http://www.dot.gov/privacy.*

*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. If you are submitting confidential business information as part of a comment, please consult section VI. A. of this document for the proper submission procedure.

**FOR FURTHER INFORMATION CONTACT:** For technical questions concerning this action, contact Sandy R. Liu, Office of Policy, International Affairs, & Environment, Noise Division (AEE–100), Federal Aviation Administration, 800 Independence Avenue SW, Washington, DC 20591; telephone 202–267–4748; email *sandy.liu@faa.gov.*

**SUPPLEMENTARY INFORMATION:**

### I. Executive Summary

Current noise certification regulations do not include standards for supersonic airplanes other than the Concorde. In its 2018 reauthorization,[1] the FAA was directed to exercise leadership in the creation of Federal and international policies, regulations, and standards relating to the certification and the safe and efficient operation of civil supersonic aircraft. This rulemaking is a step in that process. The agency is proposing to amend the noise certification regulations in Title 14, Code of Federal Regulations (14 CFR) parts 21 and 36 to provide for new supersonic airplanes, and to add subsonic landing and takeoff (LTO) cycle standards for supersonic airplanes that have a maximum takeoff weight no greater than 150,000 pounds and a maximum operating cruise speed up to Mach 1.8. This proposal is based in part on the Supersonic Transport Concept Airplane (STCA) studies performed by the National Aeronautics and Space Administration (NASA), information provided to the FAA by U.S. industry, and the continuing work of the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP). These proposed certification standards would provide a means to certificate these airplanes for noise for subsonic operation domestically, but would not affect the prohibition in 14 CFR 91.817 on the creation of sonic booms (*i.e.,* supersonic operations over land in the United States would remain prohibited).

This proposed rule would (1) amend the applicability of part 36 to include new supersonic airplanes for which type certification is requested after a final rule takes effect, (2) revise the definition of *supersonic airplane* to include newly certificated airplanes but exclude the Concorde,[2] (3) provide noise certification reference procedures to be used for all supersonic airplanes, and (4) establish noise limits for takeoff and landing that would apply to Supersonic Level 1 (SSL1) airplanes, as defined in the proposed regulation. The proposed standards include noise limits that are quieter than the Stage 4 limits at which most of the current subsonic jet fleet operates, though louder than the current certification level of Stage 5 for the same aircraft weights. The proposed standards would allow Variable Noise Reduction Systems (VNRS) to be used for noise certification testing, and if used for certification, would require the system to be activated during normal operations.

### II. Authority

The FAA's authority to issue rules on 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 III, Section 44715, Controlling aircraft noise and

[1] Section 181, Public Law 115–254, FAA Reauthorization Act of 2018 (October 5, 2018).

[2] The Concorde type certificate remains valid, even though none are currently operating. The certification regulations in part 36 that apply to the Concorde are limited to the Concorde model and need to remain in place. The FAA seeks to segregate the Concorde as a historical matter to prevent any confusion; the certification regulations proposed here would apply only to new supersonic airplanes. None of the proposed certification regulations affect the Concorde operating regulations already in place.

sonic boom. Under that section, the FAA is charged with prescribing regulations to measure and abate aircraft noise. This rulemaking is also promulgated under the authority of Section 181 of the FAA Reauthorization Act of 2018, Public Law 115–254, which directs the FAA Administrator to exercise leadership in the creation of Federal policies, regulations, and standards related to the certification of and to the safe and efficient operation of civil supersonic aircraft. This regulation is within the scope of those authorities because it provides for the applicability of the regulations to a new class of supersonic airplanes, and sets the noise limits described in § 44715(a)(3) that are required to be in place before the FAA may issue a new type certificate.

## III. Background

Current noise certification regulations do not include standards for supersonic airplanes other than the Concorde. In 1978, the FAA promulgated its first rule addressing civil supersonic aircraft noise, establishing takeoff and landing noise standards in 14 CFR part 36 specific to the Concorde airplane.[3] That rule did ''not establish certification noise limits for future design [supersonic aircraft] since the technological feasibility of such standards is at present unknown.'' [4] In addition, the FAA established operational noise limits applicable to civil supersonic airplanes.

However, the FAA anticipated that there would be future supersonic aircraft designs that could be economically viable and environmentally acceptable. In 1978, such an idea was only theoretical, but it was known that major advancements would need to be made. These advancements included improvements to noise reduction features, flexible performance requirements, and environmental acceptability.

As technology continued to advance, the FAA expressed interest in amending its regulations to account for the development of supersonic aircraft other than the Concorde. In 1986, the FAA published an advance notice of proposed rulemaking (ANPRM) addressing the possibility of amending parts 36 and 91 to provide for noise type certification and civil operation of newer supersonic aircraft.[5] The FAA subsequently published an NPRM in 1990 that would have required future supersonic aircraft to meet Stage 3 noise limits, which were then the maximum noise limits for subsonic airplanes.[6] In 1994, the FAA withdrew the NPRM, stating that further research was necessary before developing a final rule.[7]

In February 2018, the FAA Office of the Chief Counsel published an interpretation that addressed 14 CFR part 36, and whether it would apply to an application for type certification of a new supersonic airplane. The interpretation concluded that part 36 applies only to subsonic aircraft by its own terms (except for the Concorde, which was included by name in regulations from the 1970s). The interpretation also found that if no noise standards for a supersonic aircraft were in place at the time of an application for type certification, the FAA's statutory mandate would require the agency to create noise certification standards applicable to the aircraft before a type certificate could be issued, even if that set of noise standards only applied to one aircraft model. The full interpretation is available online [8] and a copy has been placed in the docket for this rulemaking.

Currently, FAA regulations prohibit civil aircraft from operating at speeds exceeding Mach I over land in the United States. (14 CFR 91.817). The FAA does not propose to change that prohibition with this rule. This proposal is limited to establishing procedures and noise levels for subsonic operation of supersonic aircraft during landing and takeoff.

For a brief history of supersonic airplane operations in the United States, please consult the background section of the FAA's NPRM titled *Special Flight Authorizations for Supersonic Aircraft,* published in the **Federal Register** on June 28, 2019, at 84 FR 30961.

### *A. Statement of the Problem*

Several U.S. manufacturers have begun developing the next generation of supersonic airplanes. Current regulations do not include noise standards applicable to new supersonic airplanes, and the FAA's statutory authority requires that noise regulations be in place before a new aircraft type certificate may be issued.[9] Accordingly, the FAA is proposing to amend its noise certification regulations to apply to supersonic airplanes, and to adopt noise certification procedures and noise limits that would apply during the LTO cycle of certain new supersonic airplanes. Manufacturers have indicated that they expect new supersonic-capable designs to enter service in the mid- to late-2020s. The FAA has a statutory duty to both protect the public health and welfare from aircraft noise and sonic boom,[10] and when proposing noise standards, to consider whether the standard is economically reasonable, technologically practicable, and appropriate for the aircraft to which the standards apply.[11] For more than a decade, aircraft developers have indicated their need for the FAA to establish reasonable, achievable supersonic LTO cycle noise limits in order to complete their designs with reasonable certainty that the aircraft will qualify for type certification in the United States.

### *B. Scope of This Proposal*

All airplanes, including supersonic airplanes, operate at subsonic speed during the LTO cycle. Under part 36, the amount of noise allowed to be produced during these phases of flight is determined by aircraft weight.[12] This rule proposes LTO cycle noise limits for supersonic airplanes that have a maximum takeoff weight of 150,000 pounds and a maximum operating cruise speed of Mach 1.8, defining this class of airplanes as SSL1. The primary reason for proposing a separate supersonic category and SSL1 airplane class is to account for the distinct design of the aircraft (discussed below in paragraph C.) and the resulting known source noise effects on certain noise measurements. As industry continues to develop supersonic capable airplane designs and can provide more data on airplane noise and performance, the FAA expects to adopt LTO cycle standards for aircraft of greater maximum takeoff weight and higher operational speeds.

This proposed rule does not address any noise associated with normal flight at cruise altitudes or supersonic speeds. The FAA has not promulgated cruise altitude noise regulations for subsonic airplanes, and sufficient data are not currently available that would support rulemaking to develop such standards for supersonic airplanes. Before any changes to the operating rules could be proposed, more research is needed on the production of noise at supersonic

[3] Noise and Sonic Boom Requirements, 43 FR 28406 (Jun. 29, 1978).

[4] *Id.*

[5] 51 FR 39663 (Oct. 30, 1986).

[6] Aircraft noise limits have varied over time from Stage 1 in the 1970s to current Stage 5 certification limits.

[7] Withdrawal: 59 FR 39711 (August 4, 1994).

[8] The interpretation is titled ''Applicability of part 36 to new supersonic aircraft.''

[9] 49 U.S.C. 44715(a)(3).

[10] 49 U.S.C. 44715(a).

[11] 49 U.S.C. 44715(b)(4).

[12] Heavier aircraft require more lift, require more thrust, create more drag, and have larger aerodynamic surfaces that result in more noise, relative to smaller aircraft.

cruise speeds and the regulatory approaches that would be appropriate. Allowing civil airplane operation at speeds in excess of Mach 1 over land in the U.S. may become possible in the future, but it is not expected before the development of new technologies reducing the impact of sonic boom generation or eliminating sonic boom exposure. Accordingly, nothing about this proposal may be interpreted as affecting the existing prohibition on exceeding Mach 1 speed (thus producing a sonic boom) over land in the United States.[13] The FAA, NASA, ICAO, and aviation stakeholders worldwide continue to study and evaluate the methods that would support the next phases of supersonic development, including the measurement of sonic boom noise and the effect on people on the ground.

As a part of the process to develop this proposed rule, the FAA has consulted with NASA and other interested parties in the aviation industry, and has continued its leadership roles at ICAO to assess the needs of the industry and the public, and the costs and benefits of introducing these new aircraft.

When the FAA began to develop this rulemaking in 2018, the agency asked several entities whether they were developing supersonic airplane projects and whether they were interested in sharing data regarding the probable noise characteristics associated with those projects. The FAA is placing in the docket for this rulemaking the list of questions we sent interested entities, and a list of those who responded. The FAA has determined that the information we received in response to our questions is considered proprietary and subject to the Trade Secrets Act,[14] and would be protected from release pursuant to the Freedom of Information Act (FOIA) under FOIA Exemption 4.[15] The information we received was combined with the data from the NASA studies and ongoing ICAO efforts as part of the overall data set that informed this proposed rule.

### *C. Establishing Distinct Supersonic Standards*

The FAA is proposing noise certification levels specific to supersonic aircraft, as well as certain changes to existing reference procedures for measuring aircraft noise during certification. These proposed noise levels are different than the current Stage 5 noise levels for subsonic aircraft. This difference reflects the need to take into account the unique technological and design requirements for supersonic aircraft to maintain long-distance supersonic flight. As will be discussed below, the FAA has found that the technological differences between subsonic and supersonic airplanes require that a separate set of noise certification levels be established for supersonics since noise is an intrinsic function of these differences. This rule proposes standards for the use of airplane-specific noise abatement technical equipment and procedures (such as VNRS) that are central to establishing LTO cycle noise levels at certification. The traditional regulatory framework and the use of the well-understood, efficient subsonic airplane testing requirements are maintained in this proposed rule, including the existing means of acoustical measurements, data evaluation, reference (test) procedures, reference (atmospheric) conditions, and adjustment analyses for noise certification. The FAA expects that these proposed regulations would result in noise tests of new supersonic airplanes being conducted in much the same manner and under the same conditions as current subsonic airplanes.

In order to achieve and maintain supersonic flight over long distances, different technologies need to be incorporated. They are most evident in the design and performance of (1) the fuselage and wing shape, and (2) the engine design. Each of those design characteristics has effects on airplane noise during subsonic operation. The FAA collected and reviewed data from U.S. manufacturers regarding their conceptual designs for new supersonic aircraft in an effort to identify appropriate subsonic LTO cycle noise limits for these airplanes. These data were also used to support the FAA's efforts to protect the public from noise and to propose standards that are reasonable. The noise limits proposed in this rule take into account the technological advancements that have been made since the Concorde was first flown commercially in the 1970s. The FAA anticipates that new supersonic airplane designs will produce LTO cycle noise similar to the fleet of subsonic airplanes currently in operation.

#### 1. Wing and Fuselage Design

The recognizable design of the Concorde, with its long, narrow fuselage and swept-back wings, is not simply about aesthetics. All aircraft experience drag, the resistance to moving air that requires power to overcome, similar to putting one's hand out the window of a moving car. When traveling at supersonic speeds, the amount of drag increases significantly due to wave drag attributed to shock wave formation when operating at speeds faster than Mach 1 (the speed of sound). As a consequence of the large increase in drag at supersonic speed, supersonic aircraft must have a relatively small cross-section to minimize the drag effect on the airframe. In practice, supersonic aircraft designs tend to look more like a dart with a smaller diameter fuselage than a traditional tube and wing shaped subsonic aircraft.

Supersonic speeds also require a different wing design than the typical subsonic airplane. Wave drag, which also burdens subsonic airplanes, is a more significant contributor to total drag on supersonic designs because of shock waves that form at speeds greater than Mach 1. In order to minimize wave drag, the wings of a supersonic airplane are thinner (in cross-sectional thickness) and have a shorter swept wingspan (delta shaped) than a subsonic airplane. This wing design helps minimize wave drag at supersonic speeds; however, it does not generate lift as well as subsonic airplane wings at lower speeds. This difference is important when the airplane is taking off and landing. This difference in wing design requires supersonic airplanes to operate at higher speeds during takeoff and landing as compared to subsonic aircraft, requiring more thrust than subsonic airplanes to generate enough aerodynamic lift to take off and land safely. More thrust and speed at takeoff and landing results in more noise compared to a subsonic airplane of a similar weight.

#### 2. Engine Design

To take off and land safely, jet engines for supersonic aircraft require relatively greater thrust than subsonic aircraft of a similar weight, as well as a lower engine bypass ratio to reach and maintain supersonic speeds in excess of Mach 1. In addition, as discussed above, the aircraft and wing design are optimized to reduce drag, and the aircraft require increased thrust during takeoff and landing. An engine's bypass ratio is a measurement of the relationship between the diameter of the engine opening and the amount of air that flows through the fan of the engine and bypasses the core, compared to the amount of air that flows through the core. Over time, the bypass ratios for subsonic aircraft have greatly increased as a result of technology and materials improvements that also led to significant fuel efficiency improvements and noise reductions. There is limited

[13] 14 CFR 91.817.

[14] 18 U.S.C. 1905.

[15] 5 U.S.C. 552(b)(4).

opportunity to incorporate increased bypass ratios on engines that power supersonic aircraft. To reduce the increased drag already noted, the diameter of the engine inlet must be relatively small and well-integrated into the airframe/wing design, making the high bypass ratios (and pod-on-wing design) of engines on modern subsonic aircraft not technologically feasible. As a result, new supersonic aircraft will need to utilize integrated lower bypass ratio engines, which are relatively louder than high bypass ratio engines.

3. A New Noise Category

As part of its statutory duty to adopt standards that are economically reasonable, technologically practicable, and appropriate for a particular aircraft,[16] the FAA first took into account the physical and technological differences between subsonic and supersonic airplanes described above. The FAA studied NASA's modeling efforts for modern supersonic design technologies, as well as data that manufacturers developing supersonic products provided to the FAA.[17] Based on the available information, the FAA concluded that, to comply with Congress's statutory direction to enable a new generation of supersonic airplanes, the FAA needed to create a new category for purposes of noise certification.

The new category would account for the unique technology and design characteristics of supersonic airplanes. These unique characteristics fundamentally affect the way the noise is generated and measured, which makes comparison to subsonic airplanes neither appropriate nor helpful. In addition, the data available to the FAA indicate that a modern supersonic airplane would have little in common with the noise of the Concorde, and can be expected to incorporate developing technologies that would lessen the effect on the public of its expected landing and takeoff noise impacts.

Based on the data available, the FAA proposes a new noise category for matters of supersonic noise certification in Part 36, and defines a first class of supersonic airplanes (defined by weight and maximum speed) that is expected to encompass most of the projects currently under design.[18]

The FAA proposes the first class, Supersonic Level 1 (SSL1), for airplanes capable of supersonic flight that have a maximum takeoff weight of 150,000 pounds and a maximum operating cruise speed of Mach 1.8. The FAA chose this class definition because the agency anticipates that most of the designs currently under development will fit within these parameters. Because this regulatory structure is tailored to supersonic designs and technology currently under development, it will foster innovation in this new emerging class of airplanes. In addition, it will serve as a launching point for adopting appropriate standards for future classes that could encompass for example, heavier maximum takeoff weights and faster operating cruise speeds. The FAA does not intend for today's proposal to be a one-size fits all approach to emerging supersonic technology. To the contrary, today's proposal seeks to provide the regulatory certainty necessary to enable the generation currently under development. Current research suggests that supersonic airplanes with speeds above Mach 1.8 would have different design characteristics. These characteristics would affect aircraft noise and are expected to require different noise standards and different noise measurements.

4. Reference Procedure Changes

The FAA's approach to reference procedures in this proposed rule is based in its long-established paradigm of noise certification that is broadly applicable. The proposed new supersonic category and proposed SSL 1 class reflect the FAA's need to accommodate the unique characteristics of supersonic airplanes. Consistent with the FAA's long-standing approach to noise certification, the FAA would evaluate supersonic airplanes under this proposed rule using a standard weight-to-noise correlation, with the separate noise limits (the curve) needed to properly account for the inherent design differences and allow comparison of like products.

In gathering noise data, an airplane is flown using Part 36 takeoff and approach reference procedures, which represent specific, repeatable conditions that ensure accurate noise measurement. This NPRM proposes using the same measurement locations contained in the existing part 36. However, to account for all of the differences between supersonic and subsonic airplanes described in this section, different reference procedures are proposed for takeoff speed and thrust.

New supersonic designs are also expected to incorporate advanced technologies that control the engines and aerodynamic control surfaces automatically to reduce noise at takeoff and landing to the greatest extent possible, while still allowing the airplane to operate safely. The higher thrust needed for takeoff and the lower engine bypass ratio for supersonic airplanes both contribute to higher lateral noise levels. This proposed rule would allow for the use of Variable Noise Reduction Systems (VNRS), as part of the takeoff reference procedure. Inclusion of VNRS in the proposed standards is designed to allow maximum flexibility for manufacturers to present VNRS design options to the FAA that are appropriate for their airplanes. The FAA seeks to allow the maximum latitude for these designs while they are still in their infancy. The FAA seeks comment on whether there are other performance-based standards that could be included that would allow even greater design flexibilities.

*D. International Standard Setting Activity*

The development of international supersonic noise standards for modern aircraft began in the early 2000s and continues today in ICAO. Since 1983, the ICAO CAEP has developed environmental standards and policies for international aviation. The United States is an active member of the CAEP. Work conducted by the CAEP Noise Technical Working Group was considered in many of the aspects of this proposed rule. The FAA continues to work with ICAO to develop an international civil supersonic LTO cycle noise standard that will allow supersonic airplanes to be certificated and accepted worldwide. This first proposal of supersonic noise certification regulations represents an exercise of the FAA's statutory direction to enable the safe commercial deployment of civil supersonic aircraft technology and the safe and efficient operation of civil supersonic aircraft. The United States understands the need for globally harmonized supersonic LTO cycle noise standards. The FAA is undertaking this rulemaking to respond to the demand from U.S. manufacturers to provide regulatory certainty while it continues to work with the international community to move forward with the international standard setting process for supersonic LTO cycle noise.

[16] 49 U.S.C. 44715(b)(4).

[17] Manufacturers submitted confidential or proprietary data.

[18] If the FAA receives an application for an airplane that falls outside this class, both the agency and the airplane developer could use the first class (SSL 1) as a starting point for establishing an individual certification basis. Establishing this first class will inform the industry as to the agency's direction and serve as a foundation for future specific standards once the distinguishing characteristics of the next class (whatever they may be) emerge and can be taken into account.

*E. Analysis of Proposed Rule Text*

The following section contains a discussion of select portions of rule text. It does not repeat the rule text, but is designed to be read as a companion to the proposed rule language presented at the end of this document.

Part 21, § 21.93 Classification of changes in type design. The FAA is proposing to add supersonic airplanes to the list of aircraft in § 21.93(b). That section provides that any voluntary change in the aircraft's type design that may increase noise levels (defined as an ''acoustical change'') must meet the applicable requirements in part 36 for design changes. Supersonic airplanes would be subject to acoustical change requirements equivalent to other aircraft types. None of the exceptions set forth in paragraphs (b)(2), (3), and (4) for subsonic jet airplanes, certain propeller-driven commuter or small airplanes, and helicopters, respectively, are appropriate for new supersonic airplanes. As discussed in subsequent sections, this proposed rule seeks to distinguish new supersonic airplanes from the Concorde model. As a result, this rule proposes to add the Concorde to § 21.93 to preserve its place in the regulations.

Part 36, § 36.1 Applicability and definitions. The FAA is proposing to add supersonic airplanes, as defined in this NPRM, to the applicability of part 36. As discussed earlier in this preamble, the current applicability of part 36 is limited by its terms to subsonic aircraft. Expanding the applicability is necessary to include the noise limits for supersonic airplanes that the FAA is proposing in new subpart E and new appendix C to part 36.

Throughout part 36, this proposed rule would add the term ''subsonic'' before ''jet airplane'' when needed to distinguish between the part 36 requirements that are not applicable to both subsonic and supersonic jet airplanes.

The FAA is proposing to amend the title of subpart B by inserting the word ''Subsonic'' before the word ''Jet'' to indicate that the regulations in that subpart do not apply to supersonic airplanes.

The FAA is proposing to revise the definition of supersonic airplane in § 36.1 and move it from paragraph (f) to new paragraph (j). The move will allow the definitions related to new supersonic airplanes to be grouped in one paragraph of § 36.1. The revised definition would exclude the Concorde from the definition of supersonic airplane. The part 36 regulations that apply to the Concorde are specific to the Concorde and the FAA seeks to segregate them as a historical matter to prevent any confusion as to which standards apply to the Concorde as opposed to those for new supersonic airplanes being proposed here.

The FAA is proposing a definition of SSL1 airplane that refers to proposed Appendix C, which would apply to supersonic airplanes with a maximum certificated takeoff weight of 150,000 pounds and a maximum operating speed of Mach 1.8 or less. This definition would include most of the proposed supersonic airplane design concepts that U.S. manufacturers have described to the FAA. The FAA anticipates that when data is available to establish LTO cycle noise standards for other weight and speed supersonic airplanes, other similar classes of airplane and noise level would be added to § 36.1(j) with separate definitions.

The FAA is proposing a definition of LTO cycle to specify that the proposed supersonic noise standards are associated with the departure and arrival of supersonic airplanes at subsonic speeds at airports. The LTO cycle noise levels consist of the flyover, lateral, and approach noise levels as specified in proposed Appendix C to part 36. The definition is necessary to distinguish that the noise limits proposed in Appendix C are not applicable to noise created during flight at supersonic speeds.

The FAA is proposing a definition of VNRS and of Programmed Lapse Rate (PLR) to describe the function of various configuration controls that are intended to limit noise during the LTO cycle. Since these are new aircraft systems, the FAA specifically requests comment on the scope of these definitions and any suggested additions or changes that might be common to all developers of such systems.

Part 36, Subpart D. The FAA is proposing to change the title only of Subpart D to indicate that the regulations presented in that subpart apply only to Concorde airplanes, removing the term supersonic from the subpart title. Although no Concorde airplanes are currently operational, the regulations on the Concorde would not be removed because the aircraft type certificate remains valid. Regulations that apply to new supersonic airplanes would be placed in a new Subpart E.

Part 36, Subpart E. The FAA is proposing to add Subpart E to establish the noise measurement and evaluation requirements applicable to new supersonic airplanes. This new subpart would retain the familiar structure of other subparts in part 36, but apply only to new supersonic airplanes in accordance with the definition proposed in this rule. As discussed elsewhere in this rulemaking, the applicability of the regulations proposed for new subpart E is limited to SSL1 airplanes.

As a corollary to other aircraft types to which part 36 is applicable, the FAA is proposing a new § 36.15 to add acoustical change requirements for supersonic airplanes. This is the companion regulation to the proposed change made in § 21.93 that adds supersonic airplanes to the applicability of that section. As with other types of aircraft, a certificated supersonic airplane, after a change in the type design, would still be required to meet at least the noise level that was applicable to the design prior to the change.

Section 36.1581, Manuals, markings, and placards. Several changes to this section are being proposed to address noise level information for new supersonic airplanes that must be made part of the Aircraft Flight Manual (AFM). Proposed paragraph (a)(4) establishes the general AFM requirements involving noise certification for supersonic airplanes.

Paragraph (h) would restrict the maximum weight of the airplane to be the weight at which an LTO cycle noise level that complies with part 36 was established.

The proposed rule would also establish operating limitations in § 36.1581(i) for supersonic airplanes. If applicable, the limitations must be included in the AFM. The FAA seeks comment specifically on §§ 36.1581(i)(2) and (3). Proposed paragraph (i)(2) would require an operating limitation if a VNRS is used to show compliance with the proposed noise limits. The limitation would require the flight crew to verify that the VNRS is functioning properly before each takeoff. This verification of functionality prior to each takeoff is necessary because a malfunctioning or inoperable VNRS would present an immediate noise issue and indicate that the aircraft is not in compliance with part 36 as certificated.

While a VNRS is not required, if a manufacturer chooses to incorporate a VNRS, the FAA proposes a requirement to verify that the VNRS is functioning properly. This requirement is a performance based standard: The FAA does not propose to prescribe the method or technology that a flight crew would use to conduct that verification. To the contrary, how a flight crew is able to verify that any VNRS system is functioning properly is dependent on its design. One way, but not the only way, to verify might be to require it to be part

of a flight crew checklist. Another way could include equipment or technology that would verify functionality prior to takeoff. The FAA intentionally declines to specify design standards to allow manufacturers flexibility and to allow for innovation.

The FAA requests comment on whether developers have an equivalent means for flight crews to ensure the functionality of any certificated VNRS.

The other proposed operating limitation on which the FAA seeks specific comment is in § 36.1581(i)(3) regarding airplanes that incorporate PLR to limit thrust to a programmed level and decrease noise. To exceed PLR thrust after takeoff, the applicant must have demonstrated during testing that ending the programmed thrust does not produce a noise impact on the ground that exceeds the levels measured at the certification measurement points. Until the point at which no effect from increased thrust is determined, the PLR would need to remain in active operation. This point is not specified in these regulations because it is expected to be unique to each airplane design. The point determined for an individual PLR system would become an operating limitation for that airplane.

The intent of the proposed limitation is to account for any noise issues that are unique to the design of a particular supersonic airplane model that may be caused by an increase in thrust when PLR use is completed.

Appendix A to part 36, Aircraft Noise Measurement and Evaluation: Appendix A would be revised to make its procedures applicable to supersonic airplanes. Current Appendix A applies to transport category airplanes, subsonic jet airplanes, and the Concorde. Except as described below, the FAA proposes to require new supersonic airplanes to use the same noise measurement and evaluation conditions and procedures as these other aircraft. Based on the information provided by developers, new supersonic airplanes are expected to be sufficiently similar in design to other jet-powered fixed-wing aircraft such that the requirements in Appendix A remain appropriate for noise certification testing. The FAA seeks comment on whether any of the provisions in Appendix A would not be appropriate for new supersonic airplanes, including what alternative procedures would be appropriate.

One proposed change to Appendix A for supersonic airplanes addresses VNRS reference procedures. When a VNRS (included in new Appendix C) is used to demonstrate compliance with part 36, § A36.9.1.3 would require use of the integrated method of adjustment described in existing § A36.9.4. Rarely are certification flight test conditions ever identical to the reference atmospheric conditions prescribed. Appendix A requires that appropriate adjustments be made to the measured noise data using either a simplified or an integrated method of adjustment, as described in § A36.9. These methods adjust the noise results to account for differences in both the airplane to microphone distance, and the variations in atmospheric conditions between the actual test day and the prescribed reference day. Under current regulations that apply to all aircraft, if the simplified method results in either adjustments that exceed specified decibel levels or a final effective perceived noise evaluation metric level (EPNL) that falls within one decibel of the applicable noise limit, the integrated method of adjustment must instead be used to ensure accuracy. The simplified method adjusts noise only once, at the maximum peak, while the integrated method adjusts at each half-second of the entire noise segment of flight. The integrated method computes EPNL directly by recalculating, under reference conditions, the data points of the tone-corrected perceived noise level time history that corresponds to measured points obtained during testing. The FAA has found that the integrated method of adjustment accounts for the dynamic aspects of VNRS procedures more accurately than the simplified method of adjustment. For that reason, the FAA proposes that the integrated method always be used for supersonics that use VNRS. The simplified method is unable to provide sufficient data processing fidelity of the measured noise signal that is the expected result of VNRS influence in flight.

Appendix C to part 36, ''Noise Levels for Supersonic Airplanes.'' This is a new appendix applicable to supersonic airplanes as defined in this proposed rule. The proposed appendix corresponds to existing Appendix B, which prescribes procedures for determining noise levels for transport category large airplanes, subsonic jet airplanes, and the Concorde. The FAA is proposing to incorporate into the new Appendix C many of the same technical requirements currently in Appendix B for subsonic airplanes, including the EPNL and the reference noise measurement points (lateral, flyover, and approach) because both the metric and reference measurement locations are appropriate in the demonstration of noise certification compliance. Except as noted before, new supersonic airplane designs are anticipated to be similar in their takeoff and landing characteristics as airplanes subject to Appendix B. The FAA seeks comment on whether any of the provisions from Appendix B that are being proposed for inclusion in new Appendix C are inappropriate for new supersonic airplanes, including what alternatives would be appropriate. The primary differences between the appendix requirements are as follows:

Proposed § C36.5 sets the LTO cycle noise limits for SSL1 airplanes. As noted previously in this preamble, the proposed limits are based primarily on NASA's Supersonic Transport Concept Airplanes (STCA) studies. The models and methodologies used in the STCA studies for estimating noise certification levels were developed by NASA using the most advanced physics-based scientific and engineering methods, and were supplemented with 2- and 3-engine supersonic design concepts and data from industry developers.

In seeking to design a supersonic transport based on ''near-term technologies,'' the models produced by NASA researchers generally assumed design elements the researchers perceived as being economically viable and technologically practicable. For example, the notional engines equipped on each modeled aircraft is based on an ''off-the-shelf'' subsonic turbofan. However, there are also a number of design and performance elements assumed into the notional aircrafts that were specifically or secondarily incorporated because of their noise-abatement benefits. The research did not discuss the impacts to noise if these technologies were not included, nor did researchers discuss the cost impacts to design or operation if any of these processes or technologies were excluded.

Relatedly, NASA researchers also explored alternative engine designs that included noise abatement mechanisms not ultimately included in their main noise impact projections. For example, NASA ran one alternative projection for an engine with a higher bypass ratio and second alternative projection for incorporating nozzle chevrons as a noise reduction technology to the original, lower bypass ratio engine. In both cases, NASA found the alternative technologies reduced the effective perceived noise level but came with a reduction in the flight range of the aircraft.

Therefore, while the noise data sets generated by the NASA research indicates a range of potential noise outputs by these modeled aircraft, these noise assumptions are already

constrained by optional design elements the researchers did or did not choose to model as inputs for their final noise projections.

Additional data provided to the FAA by U.S. industry and the ongoing work by the ICAO CAEP were also used to inform the agency's decision on noise limits. All of this technical information served as the basis for noise limits proposed in § C36.5. That section contains the noise limits for 2- or 3-engine supersonic airplanes with a maximum certificated takeoff weights of 150,000 pounds and a maximum operating speed of Mach 1.8 or less.

The FAA proposes SSL1 noise limits and an applicability range using its established noise standard-setting process. The FAA based its proposal on the noise data sets from the NASA STCA program for that agency's 100,000 and 120,000 pound (45- and 55-metric ton) airplanes with two or three engines installed, as well as additional proprietary information from manufacturers developing supersonic airplanes. The FAA plotted these data sets, including associated design and modeling uncertainties, on a coordinate graph based on weight (in pounds) and noise (in EPNdB) for each airplane.

Using this information plotted on the graph, the FAA developed a series of potential limit lines for airplanes of different weights and numbers of engines. The FAA evaluated these potential limit lines taking into account the FAA's statutory considerations of technological feasibility, economic reasonableness, and appropriateness for the aircraft type. This evaluation process relied on the FAA's expertise in noise evaluation of supersonic technologies and their qualitative assessment of the economic and social costs that weigh on the process to determine the intersection of elements that would result in a proposed noise limit line that addressed both industry design needs and agency statutory obligations. The novelty of the technology and the limited data sets result in an inherent uncertainty regarding whether these proposed noise standards fully optimize available noise reduction while considering what is economically reasonable and technologically practicable for modern supersonic aircraft. The FAA's intent in its approach is to set a standard that could require adoption of most or all known noise-abatement technologies to meet the noise limits, including ones that may cause marginal reductions in aircraft performance (*e.g.* reduce flight range), or marginal increases in the cost of manufacturing.

This process resulted in the noise limits proposed in § C36.5. The proposed noise limits represent a range of applicability that takes into account the spectrum of information provided, while also addressing the FAA's statutory responsibilities regarding noise regulation.

As the industry develops and more information becomes available, the FAA will consider whether to broaden the applicability of this proposed rule or establish a separate class for larger or faster supersonic airplanes.[19] The proposed noise limits are consistent with the agency's statutory duty to control and abate aircraft noise while ''consider[ing] whether the standard or regulation is economically reasonable, technologically practicable, and appropriate for the applicable aircraft, aircraft engine, appliance, or certificate.'' [20]

As discussed above, the FAA does not propose to change the fundamental approach to setting noise levels in its existing paradigm. Accordingly, in proposing the SSL1 noise limits, FAA relies on its existing approach, which uses weight as a correlating factor for noise levels. This means that noise limits are applied on a curve taking into account the fact that heavier aircraft will be louder, as weight is a fundamental component of aircraft noise generation. Consistent with the FAA's existing paradigm, the allowance for weight is not unlimited; the noise limits set for various aircraft categories take into account the entire range of aircraft in each category. The FAA does not propose to deviate from this paradigm for supersonic aircraft. Weight remains the correlating factor, without reference to the shape or thrust or other capacity of an individual model. The noise limits proposed in this rulemaking may be summarized as follows:

A three-engine SSL1 airplane that has a maximum takeoff weight of 150,000 pounds may not exceed 94.0 effective perceived noise decibel (EPNdB) at the flyover measurement point, 96.5 EPNdB at the lateral measurement point, and 100.2 EPNdB at the approach measurement point.

A two-engine SSL1 airplane that has a maximum takeoff weight of 150,000 pounds may not exceed 91.0 EPNdB at flyover, 96.5 EPNdB at the lateral measurement point, and 100.2 EPNdB at the approach measurement point.

For SSL1 airplanes that seek certification at a lower maximum takeoff weight, the noise limit would decrease linearly with the logarithm of the airplane weight, at the rates set forth in proposed §§ C36.5(a), (b), and (c), and remain constant for airplanes at or below certain specified weights. This logarithmic decrease mirrors the current requirements applied to subsonic airplanes under Appendix B.

As described above, the FAA does not propose to alter its fundamental paradigm for noise certification as a part of this rule. Accordingly, the FAA sets a proposed cumulative noise limit. The proposed cumulative noise limit is presented in § C36.5(e), which provides that the sum of the differences (*i.e.,* the difference between the limits and maximum levels) at all three measurements points (*i.e.,* flyover, lateral, and approach) may not be less than 13.5 EPNdB.

Proposed § C36.6 specifies the requirements when a VNRS is included in an applicant's design and is used to show compliance with the LTO cycle requirements of part 36. The inclusion of VNRS is intended to enable the incorporation of advanced concepts and systems technologies that reduce noise using fully automated changeable properties or features. The two best known of the VNRS concepts are automated configuration changes, and Programmed Lapse Rate (PLR), as defined in proposed in § 36.1. The FAA does not intend to limit the development of automated noise reduction systems, and under this regulatory provision will consider any design features presented at certification that seek to lessen the LTO cycle noise impacts of supersonic airplanes. When a VNRS is presented as part of an airplane design at certification, it must be accounted for in any reference procedures requested by the applicant, demonstrated, and approved by the FAA before the certification tests are conducted.

Section C36.7 specifies the noise certification reference procedures and conditions that apply to supersonic airplanes, and includes alternative provisions when a VNRS is used. Reference procedures are required conditions and procedures for the measurement of noise at the three reference measurement points (lateral, flyover, and approach). For example, proposed § C36.7(b) specifies takeoff reference procedures that include the minimum height that an airplane must achieve and the engine thrust level that

[19] As noted previously, the FAA anticipates that the parameters for SSL1 noise standards will serve as the foundation for future generations of supersonic airplanes that may exceed the weight and speed limits set in this rule. That said, If the FAA receives an application for an airplane that exceeds the weight or speed limits for SSL1, both the agency and the airplane developer could use the SSL 1 standards as a starting point for establishing an individual certification basis.

[20] 49 U.S.C. 44715(b)(4).

must be used for the noise data to qualify for certification. Use of a VNRS allows the applicant to develop individual reference takeoff and approach procedures that must be approved by the FAA before noise certification testing if the VNRS is used to show compliance with part 36. Each VNRS will likely be different, and the FAA does not yet know how these systems will be implemented in individual supersonic type designs. This proposed rule provides flexibility for the applicant to request alternative takeoff and approach procedures to accommodate varying VNRS designs. Applicants using VNRS must still comply with proposed §§ C36.7(d) *VNRS Takeoff reference procedure* and (e) *VNRS Approach Reference Procedure* when developing any alternative takeoff and approach procedures. Takeoff and approach reference profiles must be defined by applicants in accordance with these requirements so that the measured test data can be properly adjusted for deviations relative to the reference profile and recomputed for reference meteorological conditions. These requirements are intended to ensure that the procedures establish a common reference noise certification basis of standard adjustments and specified reference conditions that each applicant follows when using a VNRS. Such level-setting procedures maintain fairness for all noise certification applicants in demonstrating compliance. As noted previously, use of VNRS to demonstrate compliance with part 36 will require its use during normal operations in accordance with § 36.1581(i).

Section C36.7(b) proposes the minimum cutback height and thrust requirements that are required for subsonic jet airplanes as a standard takeoff reference procedure. When VNRS (including PLR) is used, the takeoff reference procedure to be used prior to reaching minimum cutback height is presented in § C36.7(d).

Section C36.7(c)(5) addresses the weight and configuration of the airplane during standard approach reference procedures. Weight and configuration for approach reference procedures using VNRS are addressed in § C36.7(e)(5). The FAA seeks specific comments regarding any additional considerations that would be appropriate for VNRS approach reference procedures, such as when and how VNRS is triggered on approach, and what indication will be used to show that it is functional and active on approach if used for noise certification. All suggested changes should be supported by additional data as appropriate.

Section C36.8 addresses noise certification test procedures. Noise adjustments for speed and thrust from test to reference conditions follow the same methods of Appendix A, unless VNRS procedures and data adjustments are approved by the FAA.

Interested persons are encouraged to review all of the proposed rule text in detail and submit comments regarding the organization and substance of the requirements for the LTO cycle noise certification of SSL1 airplanes.

## IV. Regulatory Notices and Analyses

Changes to Federal regulations must undergo several economic analyses. First, Executive Orders 12866 and 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 its costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354), as codified in 5 U.S.C. 603 *et seq.,* requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act of 1979 (Pub. L. 96–39), 19 U.S.C. Chapter 13, prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, the Trade Agreements Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4), as codified in 2 U.S.C. Chapter 25, requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). The FAA has provided a more detailed Preliminary Regulatory Impact Analysis of this proposed rule in the docket of this rulemaking. This portion of the preamble summarizes this analysis.

In conducting its analyses, FAA has determined that this proposed rule has benefits that justify its costs. This proposed rule is a significant regulatory action, as defined in section 3(f) of Executive Order 12866, as it raises novel policy issues contemplated under that Executive Order. This proposed rule is also significant under DOT's Regulatory Policies and Procedures for the same reason. The proposed rule would not have a significant economic impact on a substantial number of small entities, would not create unnecessary obstacles to the foreign commerce of the United States, and would not impose an unfunded mandate on State, local, or tribal governments, or on the private sector by exceeding the threshold.

### *A. Regulatory Evaluation*

#### i. Baseline Problem and Statement of Need

Without this proposal, aircraft developers would not be certain that their aircraft could qualify for type certification in the United States. As previously discussed, some U.S. manufacturers have begun developing the next generation of supersonic airplanes. Current regulations do not include noise standards applicable to supersonic airplanes, and the FAA's statutory authority requires that noise regulations be in place before a new aircraft type certificate may be issued. The FAA is proposing to amend its noise certification regulations to apply to new supersonic airplanes, and to adopt noise certification procedures and noise limits that would apply during the takeoff and landing (LTO) cycle of certain new supersonic airplanes. Aircraft developers have indicated their need for the FAA to establish noise limits in order to complete their designs with reasonable certainty that the aircraft will qualify for type certification in the United States.

#### ii. Enabled Supersonic Aircraft Potentially Qualifying for Type Certification

As previously discussed, aircraft developers provided FAA with information and indicated that new supersonic-capable designs could enter service in the mid- to late-2020s. Based on this data and the proposed range of applicability, the FAA estimates two supersonic airplanes, one 2-engine and one 3-engine, with maximum certificated takeoff weight of 150,000 pounds and a maximum operating speed of Mach 1.8, would qualify for type certification as a result of this proposal and potentially begin production by 2025.

Based on data provided by aircraft developers and supersonic airplane studies, the FAA estimates a production of 25 airplanes per certificate for 50 total airplanes per year, a production period of ten years, and airplane life of 20 years. Aircraft developers indicate that 50 percent or more of production would be sold to foreign operators. Therefore, the potential life cycle of the first U.S. civil supersonic fleet results in deliveries to U.S. operators of 25 airplanes per year (same to foreign operators) until the U.S. operating fleet reaches a potential peak of 250 airplanes

in 2034.[21] We use these estimates to frame our analysis of future impacts. The FAA seeks comment on its estimate of the expected timing for development of supersonic aircraft and on its estimate of production volumes.

There is uncertainty with estimating a future U.S. civil supersonic fleet. The FAA acknowledges that data from current and future research and development of supersonic aircraft along with additional regulatory changes may expand the size of the future U.S. civil supersonic fleet. In addition, this proposal only provides a standard for potentially qualifying for type certification—it does not guarantee certification and does not fully enable or guarantee future production or domestic operation. The effect of current U.S. regulations may limit future operations. The existing prohibition on exceeding Mach 1 over land in the United States would limit any supersonic airplane to subsonic speeds while operated in the United States; the proposed regulations would cover only subsonic operation during departure and arrival at airports.

iii. Incremental Change of Proposed LTO Cycle Noise Limits

The impact of the incremental change in the certificated noise level resulting from the proposed LTO cycle noise limits is low. The FAA looked at the average cumulative noise level of airplanes in the 2034 subsonic fleet and the cumulative noise levels of the 2- and 3-engine supersonic airplanes that would be covered under this proposed rule.

The 2034 subsonic fleet has a median certificated noise level, expressed in EPNdB level, of 267.1 and a mean certificated noise level of almost the same at 267.0 with a standard deviation of 11.3.[22] The anticipated certification noise levels of the 2-engine supersonic airplane is 269.3, a noise level at the 57th percentile of the subsonic fleet, meaning that 57 percent of the airplanes in the subsonic fleet in 2034 would have overall lower certification noise levels and 43 percent have overall higher certification noise levels than the 2-engine supersonic airplane. The anticipated certification noise level of the 3-engine supersonic airplane is 274.5, a noise level at the 74th percentile of the subsonic fleet. The noise level of the 2-engine supersonic is just one-fifth of a standard deviation above the mean of the airplanes in the subsonic fleet and the 3-engine supersonic airplane is just two-thirds of a standard deviation above the mean of the airplanes in the subsonic fleet. In addition, the number of supersonic airplanes potentially enabled by the proposal (*i.e.,* those supersonic airplane models expected to be certificated as SSL1) is small and would represent less than three percent of the combined subsonic and supersonic U.S. fleet in 2034. Therefore, while the anticipated certification noise levels of the supersonic airplanes are higher than the average certificated level of airplanes in the subsonic fleet, the difference is moderate.

iv. Benefits and Costs

For more than a decade, airplane producers interested in developing the next generation of supersonic airplanes have sought standards in the form of regulatory noise limits. Without such limits, potential producers are reluctant to expend millions of dollars on airplane designs that might ultimately fail to meet a future noise standard. The FAA has been unable to set such standards without knowing what is possible by way of noise mitigation for new designs.

This proposed rule is the first step in bridging that gap. Aircraft developers have shared data on their designs and a range of expected noise levels. In turn, the FAA has used that information along with the work conducted by NASA to propose these LTO cycle noise limits for a certain size supersonic-capable airplane. Accordingly, the primary benefit of this proposed certification rule is that it reduces a current barrier to the development of the next generation of supersonic aircraft. This is accomplished through the establishment of a design and noise standard for developers and producers, providing them some reasonable certainty that their investments will result in airplanes that meet noise regulations that have been adopted by the FAA.

The proposed rule supports future innovation in new supersonic designs that incorporate advanced technologies, such as VNRS, that reduce the noise at takeoff and landing to the greatest extent possible while allowing the airplane to operate safely. The proposed standards are designed to allow maximum flexibility for the manufacturers to enhance designs using advances in technology. The FAA seeks to allow the maximum latitude for these designs while they are still in their infancy.

The FAA seeks comment on the following issues related to the impacts of the proposal:

- The potential noise effects of the proposed standard and how these might be analyzed;
- The expected time savings or other benefits to the travelling public from the ability to travel via supersonic airplane instead of subsonic airplane;
- The manufacturing costs of possible technologies that manufacturers are likely to use to meet the standard and their effects on performance, weight and safety; and
- The costs and benefits of alternative noise limits or reference procedures and their impacts on costs and benefits to manufacturers, airlines and the public, including the likely choice of alternative compliance technologies.

The proposed rule has a positive effect on the development of U.S. standards and industry for both domestic and international markets. The proposal provides an initial benchmark for the international development of standards for supersonic LTO cycle noise that would have a positive effect on the innovation and expansion of the U.S. supersonic airplane and transport industry. As previously discussed, aircraft developers indicate that 50 percent or more of production would be delivered to foreign operators.

The establishment of certification LTO cycle noise standards for subsonic operations of supersonic-capable airplanes allows industry and FAA to look at the impact of subsonic operations on noise with more certainty. When these aircraft are designed, certificated, and placed in service, knowledge of these noise limits will make it easier to determine the subsonic impacts at individual airports, which is necessary for approval of operations specifications within the United States.

This proposal does not result in additional required regulatory costs. Issuance of a type certificate requires compliance with the applicable noise requirements of part 36. Full noise certification testing is required for each new aircraft type and for certain voluntary changes to type design that are classified as an acoustical change under § 21.93(b). The noise certification costs occur for new type certification, or when a change to a type design results from an acoustical change. Because the requirements for noise certification already exist, any associated costs are not incremental costs of this proposal.[23]

[21] By 2034, U.S. aircraft developers could potentially produce 500 supersonic airplanes operating domestically and abroad.

[22] When the mean and median are the same, it may imply a standard normal distribution and symmetry of the database distribution without significant outliers.

[23] In the Paperwork Reduction Act section of this proposal, the FAA provides estimates of changes to the paperwork related burden and the cost to

Continued

As previously discussed, this proposal would allow the use of VNRS during noise certification testing and during normal operation of certificated airplanes. Based on industry information, these systems are being developed without this rulemaking as part of the designs themselves to reduce the noise produced by these supersonic airplanes. Because no VNRS are currently certificated on airplanes, this proposal adds VNRS to part 36 as an option for producers to use in their designs. Because VNRS is not a requirement, it is not an additional cost of the proposal. Rather, the addition of VNRS incorporates current industry innovation, and the failure to allow this technology would result in costs to industry.

v. Alternatives Considered

*No Action.* The alternative of ''no action'' would entail the foregone opportunity to develop civil supersonic airplanes with a subsonic LTO cycle noise certification that reduces noise at takeoff and landing to the greatest extent possible while allowing the airplane to operate safely. In addition, Congress directed the FAA to exercise leadership in the creation of policies, regulations, and standards relating to the certification and safe and efficient operation of civil supersonic aircraft.[24] The FAA was directed to take action to advance the deployment of supersonic aircraft, both domestically and internationally, through the development of proposed noise certification standards to address the constraints of noise and enable supersonic flight. This proposed rule responds to this Congressional direction.

*No constraint on maximum certificated take-off weight and speed.* The proposed rule applies only to supersonic airplanes with maximum certificated take-off weight of 150,000 pounds and maximum operating cruise speed of Mach 1.8. The FAA considered, but rejected, a proposed rule with no limit on maximum certificated take-off weight or Mach speed. Neither the NASA STCA analyses nor the aircraft data provided by industry were sufficient to provide a technically feasible basis to allow a reasonable estimate of certification noise limits for an open-ended set of aircraft weights and Mach speeds; the goal remains a set of certification standards that would reduce noise to the greatest extent possible while allowing the airplane to operate safely.

*B. Regulatory Flexibility Determination*

The Regulatory Flexibility Act of 1980 (Pub. L. 96–354) (RFA) establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.'' The RFA covers a wide range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA. However, if an agency determines that a rule is not expected to have a significant economic impact on a substantial number of small entities, § 605(b) of the RFA provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

Based on industry information, the FAA estimates two U.S. aircraft developers to apply for part 36 LTO cycle noise certification under this proposed rule. These developers are large entities that have a variety of private and public partnerships and high levels of investment capable of designing and producing the next generation of technically advanced and high value supersonic aircraft.

As discussed in the Regulatory Evaluation section, the FAA expects this proposed rule would have small certification costs on affected entities developing supersonic airplanes. In addition, this proposed rule would result in positive business impacts since it would establish a design and noise standard for entities developing and producing supersonic airplanes, providing them some reasonable certainty that their investments will result in airplanes that meet noise regulations.

Therefore, as provided in § 605(b), the head of the FAA certifies that this rulemaking will not have a significant economic impact on a substantial number of small entities.

*C. International Trade Impact Assessment*

The Trade Agreements Act of 1979 (Pub. L. 96–39) prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to this Act, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such as the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

The FAA has assessed the effect of this proposed rule and determined that its purpose would be to allow supersonic-capable aircraft to be noise certificated in the United States, which will permit domestic subsonic LTO cycle operations and supersonic operations outside U.S. airspace and would not pose an unnecessary obstacle to the foreign commerce of the United States. Therefore, the rule would comply with the Trade Agreements Act.

*D. Unfunded Mandate Assessment*

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (in 1995 dollars) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a ''significant regulatory action.'' The FAA currently uses an inflation-adjusted value of $155.0 million in lieu of $100 million.

This final rule does not contain such a mandate. Therefore, the requirements of Title II of the Act do not apply.

*E. Paperwork Reduction Act*

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. According to the 1995 amendments to the Paperwork Reduction Act (5 CFR

comply with the existing information collection as required by the Paperwork Reduction Act and related Office of Management and Budget (OMB) guidance. These costs are not a result of a new collection requirement.

[24] Section 181 of the Federal Aviation Administration Reauthorization Act of 2018 (*https://www.congress.gov/115/bills/hr302/BILLS-115hr302enr.pdf*).

1320.8(b)(2)(vi)), an agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid OMB control number.

This action contains the following proposed amendments to the existing information collection requirements previously approved under OMB Control Number 2120–0659. As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA has submitted these proposed information collection amendments to OMB for its review.

In accordance with the Paperwork Reduction Act of 1995, FAA invites public comments about our intent to request OMB approval to revise an existing information collection. The information is collected when an applicant seeking noise certification of aircraft demonstrates noise compliance in accordance with 14 CFR part 36. The demonstration of compliance by submitting noise test data was originally implemented under the Aircraft Noise Abatement Act of 1968, and is now part of the overall codification of aircraft noise authority in 49 U.S.C. 44715.

You are asked to comment on any aspect of this information collection, including (a) whether the proposed collection of information is necessary for FAA's performance; (b) the accuracy of the estimated burden; (c) ways for FAA to enhance the quality, utility, and clarity of the information collection; and (d) ways that the burden could be minimized without reducing the quality of the collected information. The FAA will summarize and/or include your comments in the request for OMB's clearance of this information collection.

*Background:* The aircraft noise certification regulations of 14 CFR part 36 currently include information collection requirements for the certification of subsonic airplanes (jet airplanes and subsonic transport category large airplanes). The information collected are the results of noise certification tests that demonstrate compliance with 14 CFR part 36. The original information collection was implemented to show compliance in accordance with the Aircraft Noise Abatement Act of 1968; that statute is now part of the overall codification of the FAA's regulatory authority over aircraft noise in 49 U.S.C. 44715.

Appendix A to part 36, § A36.5.2, requires applicants to include test results in their noise certification compliance report. Aircraft certification applicants typically certificate an airplane model once. The current information collection estimate includes 14 noise certification projects involving flight tests undertaken each year. For this NPRM, the FAA proposes to revise this PRA collection to include noise tests on supersonic aircraft, for an increased estimate of 16 total noise certification projects per year. The FAA estimates that there are two entities that would submit applications for certification of supersonic airplanes under this proposal. Each applicant's collected information is incorporated into a noise compliance report that is provided to and approved by the FAA. The noise compliance report is used by the FAA in making a finding that the airplane is in compliance with the regulations. These compliance reports are required only once when an applicant wants to certificate an aircraft type. Without this data collection, the FAA would be unable to make the required noise certification compliance finding. The proposed PRA data collection revisions are as follows:

*Respondents:* Aircraft manufacturer/applicant seeking type certification;

*Frequency:* Estimated 16 total applicants per year, which includes a proposed increase of 2 new supersonic airplane applications;

*Estimated Average Burden per Response:* Estimated 200 hours per applicant for the compliance report; and

*Estimated Total Annual Burden:* $25,000 per applicant or cumulative total $400,000 per year for 16 applicants.

### *F. International Compatibility*

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no differences with these regulations; ICAO does not currently have standards for subsonic LTO cycle of supersonic capable airplanes.

### *G. Environmental Analysis*

In accordance with the provisions of regulations issued by the Council on Environmental Quality (40 CFR parts 1500–1508), FAA Order 1050.1F identifies certain FAA actions that may be categorically excluded from the preparation of an Environmental Assessment or an Environmental Impact Statement. The FAA has determined that this NPRM is covered by the CATEX described in paragraph 5–6.6(d) of FAA Order 1050.1F. Pursuant to FAA Order 1050.1F, paragraph 5–5.6(d), this rulemaking action qualifies for a categorical exclusion because no significant impacts to the environment are expected from publication of this NPRM. This CATEX finding applies only to this proposed rule. The FAA will initiate a separate review of any final rule, including the adoption of any supersonic airplane noise certification standards that would permit the subsonic operation of such airplanes in the United States.

## V. Executive Order Determinations

### *A. Executive Order 13132, Federalism*

The FAA has analyzed this proposed rule under the principles and criteria of Executive Order 13132, Federalism (64 FR 43255, August 10, 1999). The agency has determined that this action would not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of Government, and, therefore, would not have federalism implications.

### *B. Executive Order 13211, Regulations That Significantly Affect Energy Supply, Distribution, or Use*

The FAA analyzed this proposed rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (66 FR 28355, May 18, 2001). The agency has determined that it would not be a ''significant energy action'' under the executive order and would not be likely to have a significant adverse effect on the supply, distribution, or use of energy.

### *C. Executive Order 13609, Promoting International Regulatory Cooperation*

Executive Order 13609, Promoting International Regulatory Cooperation (77 FR 26413, May 4, 2012) promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and to reduce, eliminate, or prevent unnecessary differences in regulatory requirements. The FAA has analyzed this action under the policies and agency responsibilities of Executive Order 13609, and has determined that this action would have no effect on international regulatory cooperation.

### *D. Executive Order 13771, Reducing Regulation and Controlling Regulatory Costs*

This proposed rule is a deregulatory action under Executive Order 13771, Reducing Regulation and Controlling Regulatory Costs (82 FR 9339, February 3, 2017). Details on the enabling aspects

of this proposed rule that expand production and consumption options can be found in the Regulatory Evaluation.

## VI. Additional Information

*A. Comments Invited*

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. The agency also invites comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should send only one copy of written comments, or if comments are filed electronically, commenters should submit only one time.

The FAA will file in the docket all comments it receives, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. Before acting on this proposal, the FAA will consider all comments it receives on or before the closing date for comments. The agency may change this proposal in light of the comments it receives.

Confidential Business Information

Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as ''PROPIN.'' FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to the person identified in the **FOR FURTHER INFORMATION CONTACT** section of this document. Any information the FAA receives that is not specifically designated as CBI will be placed in the public docket for this rulemaking.

*B. Availability of Rulemaking Documents*

An electronic copy of rulemaking documents may be obtained from the internet by—

- Searching the Federal eRulemaking Portal (*http://www.regulations.gov*);
- Visiting the FAA's Regulations and Policies web page at *http://www.faa.gov/regulations_policies;* or
- Accessing the Government Publishing Office's web page at *http://www.gpo.gov/fdsys/.*

Copies may also be obtained by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue SW, Washington, DC 20591, or by calling (202) 267–9677. Commenters must identify the docket or notice number of this rulemaking.

All documents the FAA considered in developing this proposed rule, including economic analyses and technical reports, may be accessed from the internet through the Federal eRulemaking Portal referenced above.

*C. Small Business Regulatory Enforcement Fairness Act*

The Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document may contact its local FAA official, or the person identified in the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. To find out more about SBREFA on the internet, visit *http://www.faa.gov/regulations_policies/rulemaking/sbre_act/.*

## List of Subjects

*14 CFR Part 21*

Aircraft, Aviation safety, Exports, Imports, Reporting and recordkeeping requirements.

*14 CFR Part 36*

Aircraft, Noise control.

## The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend chapter I of Title 14, Code of Federal Regulations as follows:

## PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND ARTICLES

■ 1. The authority citation for part 21 is revised to read as follows:

**Authority:** 42 U.S.C. 7572; 49 U.S.C. 106(f), 106(g), 40105, 40113, 44701–44702, 44704, 44707, 44709, 44711, 44713, 44715, 45303; Pub. L. 115–254.

■ 2. Amend § 21.93 by revising paragraph (b)(2) and adding paragraph (b)(6) to read as follows:

**§ 21.93 Classification of changes in type design.**

* * * * *

(b) * * *

(2) Subsonic jet (Turbojet powered) airplanes (regardless of category) and Concorde airplanes. For airplanes to which this paragraph applies, ''acoustical changes'' do not include changes in type design that are limited to one of the following—

* * *

(6) Supersonic airplanes.

* * * * *

## PART 36—NOISE STANDARDS: AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

■ 3. The authority citation for part 36 is revised to read as follows:

**Authority:** 42 U.S.C. 4321 *et seq.;* 49 U.S.C. 106(g), 40113, 44701–44702, 44704, 44715; sec. 305, Pub. L. 96–193, 94 Stat. 50, 57; E.O. 11514, 35 FR 4247, 3 CFR, 1966–1970 Comp., p. 902; Pub. L. 115–254.

■ 4. Amend § 36.1 by
■ a. Adding paragraph (a)(6);
b. Revising paragraph (c);
■ c. Revising the introductory text of paragraph (d);
■ d. Revising the introductory text of paragraph (f);
■ e. Revising paragraph (g);
■ f. Removing and reserving paragraph (f)(8); and
■ e. Adding paragraph (j).

The additions and revisions read as follows:

**§ 36.1 Applicability and definitions.**

(a) * * *

(6) Type certificates, changes to those certificates, and standard airworthiness certificates, for supersonic airplanes.

* * * * *

(c) Each person who applies under part 21 of this chapter for approval of an acoustical change described in § 21.93(b) of this chapter must show that the aircraft complies with the applicable provisions of §§ 36.7, 36.9, 36.11, 36.13, or 36.15 of this part in addition to the applicable airworthiness requirements of this chapter.

(d) Each person who applies for the original issue of a standard airworthiness certificate for a transport category large airplane or for a subsonic jet airplane under § 21.183 must, regardless of date of application, show compliance with the following

provisions of this part (including appendix B):

* * * * *

(f) For the purpose of showing compliance with this part for transport category large airplanes and subsonic jet airplanes regardless of category, the following terms have the following meanings:

* * * * *

(g) For the purpose of showing compliance with this part for transport category large airplanes and subsonic jet airplanes regardless of category, each airplane may not be identified as complying with more than one stage or configuration simultaneously.

* * * * *

(j) For the purpose of showing compliance with this part, for supersonic airplanes regardless of category, the following terms have the meanings specified:

*Landing and Takeoff (LTO) cycle,* as used in reference to a supersonic airplane, means the segments of subsonic flight that include flyover, lateral and approach noise levels prescribed in appendix C of this part.

*Programmed Lapse Rate (PLR)* is a fully automated feature incorporated into the engine controls as part of the engine thrust rating structure as a means of reducing noise.

*Supersonic airplane* means—

(i) An airplane:

(A) For which the maximum operating limit speed, $M_{mo}$, exceeds a Mach number of 1; and

(B) That receives an original type certificate after [EFFECTIVE DATE OF FINAL RULE].

(ii) Does not include any Concorde model airplane. No regulation in this part that references the Concorde applies to any non-Concorde supersonic airplane.

*Supersonic Level 1 (SSL1) noise level* means a noise level at or below the noise limit prescribed in § C36.5 of appendix C to this part.

*Variable Noise Reduction System* (VNRS) is a dynamic system integrated into the design of an aircraft that functions automatically to produce a change in the configuration of the aircraft to reduce noise. Such systems may include:

(i) Hardware or software components that control engine parameters or airframe configuration; or

(ii) Controls initiated through a flight management system as a means of noise reduction during normal operation.

■ 5. Amend § 36.7 by revising the section heading and paragraph (a) to read as follows:

**§ 36.7 Acoustical change: Transport category large airplanes and subsonic jet airplanes.**

(a) *Applicability.* This section applies to all transport category large airplanes and subsonic jet airplanes for which an acoustical change approval is applied for under § 21.93(b) of this chapter.

* * * * *

■ 6. Add § 36.15 to subpart A to read as follows:

**§ 36.15 Acoustical change: Supersonic airplanes.**

(a) *Applicability.* This section applies to all supersonic airplanes for which an acoustical change approval is applied for under § 21.93(b) of this chapter.

(b) *General requirements.* For supersonic airplanes, the acoustical change approval requirements are as follows:

(1) In showing compliance, noise levels must be measured and evaluated in accordance with the applicable procedures and conditions prescribed in appendix A of this part.

(2) Compliance with the SSL1 noise limits prescribed in § C36.5 of appendix C of this part must be shown in accordance with the applicable provisions of §§ C36.7 and C36.8 of appendix C of this part.

(c) If a supersonic airplane is an SSL1 airplane prior to a change in type design, after a change in type design it must remain an SSL1 airplane as specified in § C36.5 of appendix C of this part.

■ 7. Revise the heading of subpart B to read as follows.

## Subpart B—Transport Category Large Airplanes and Subsonic Jet Airplanes

■ 8. Amend § 36.101 to read as follows:

For subsonic transport category large airplanes and subsonic jet powered airplanes the noise generated by the airplane must be measured under appendix A of this part or under an approved equivalent procedure.

■ 9. Revise the heading of subpart D to read as follows.

## Subpart D—Noise Limits for Concorde Airplanes

■ 10. Add subpart E to read as follows:

## Subpart E —Noise Limits for Supersonic Airplanes

Sec.



**§ 36.401 Noise measurement and evaluation.**

For supersonic airplanes, the noise generated by the airplane must be measured and evaluated in accordance with appendix A of this part or an approved equivalent procedure.

**§ 36.403 Noise limits.**

For supersonic airplanes, compliance with this section is determined by:

(a) Tests conducted in accordance with § 36.401 of this part.

(b) Demonstration of the noise levels produced using the reference procedures and conditions in § C36.7, and the test procedures of § C36.8 of appendix C of this part or an approved equivalent procedure.

(c) For an airplane for which type certification application is made after [EFFECTIVE DATE OF FINAL RULE], the noise levels demonstrated may not exceed the SSL1 noise limits prescribed in § C36.5(c) of appendix C of this part.

■ 11. Amend § 36.1581 by:

■ a. Revising paragraph (a)(1);

■ b. Adding paragraph (a)(4);

■ c. Revising paragraph (d);

■ d. Removing and reserving paragraph (g); and

■ e. Adding paragraph (h) and (i).

The additions and revisions read as follows:

**§ 36.1581 Manuals, markings, and placards.**

(a) * * *

(1) For transport category large airplanes, subsonic jet airplanes, and the Concorde, the noise level information must be one value for each flyover, lateral, and approach as defined and required by appendix B of this part, along with the maximum takeoff weight, maximum landing weight, and configuration.

* * * * *

(4) For supersonic airplanes, LTO cycle noise level information must:

(i) Be determined in accordance with appendix C of this part;

(ii) Be one value for each flyover, lateral, and approach condition as defined; and

(iii) Correspond to the maximum takeoff weight, the maximum landing weight, and the configuration for each of these conditions.

* * * * *

(d) For transport category large airplanes and subsonic jet airplanes, for which the weight used in meeting the takeoff or landing noise requirements of this part is less than the maximum weight established under the applicable airworthiness requirements, those lesser weights must be furnished, as operating limitations in the operating limitations section of the Airplane Flight Manual. Further, the maximum takeoff weight must not exceed the takeoff weight that

is most critical from a takeoff noise standpoint.

* * * * *

(h) For supersonic airplanes, no maximum landing or takeoff weight may exceed the weight used to establish an LTO cycle noise level that shows compliance with this part.

(i) The following conditions each require an operating limitation that must be included in the operating limitations section of the Airplane Flight Manual.

(1) When any weight used in showing compliance with an LTO cycle noise requirement of this part is less than the maximum weight established under the applicable airworthiness requirements, the weight used to show compliance with a noise requirement of this part becomes an operating limitation.

(2) When a VNRS has been used to show compliance with the SSL1 noise limits of § C36.5 of appendix C of this part, or with the reference procedures of §§ C36.7(d) and C36.7(e) of appendix C of this part, the flight crew must ensure that the VNRS is functioning properly prior to takeoff;

(3) When PLR has been used to show compliance with the SSL1 noise limits of § C36.5 of appendix C of this part, or with the reference procedures of §§ C36.7(d) and C36.7(e) of appendix C of this part, the airplane may not be programmed to exceed PLR thrust during normal operations except at specified thrust levels for which the airplane has been shown not to cause any significant noise impact on the ground.

■ 12. In appendix A to part 36 revise the heading and § A.36.1.1 to read as follows:

**Appendix A to Part 36—Aircraft Noise Measurement and Evaluation**

* * * * *

A36.1.1 This appendix prescribes the conditions under which airplane noise certification tests must be conducted and states the measurement procedures that must be used to measure airplane noise. This appendix also describes the procedures that must be used to determine the noise evaluation quantity designated as effective perceived noise level, EPNL, as referenced in §§ 36.101, 36.401 and 36.803.

* * * * *

■ c. Revise the note to § A36.2.1.1 to read as follows:

* * * * *

**Note:** Many noise certifications involve only minor changes to the airplane type design. The resulting changes in noise can often be established reliably without resorting to a complete test as outlined in this appendix. For this reason, the FAA permits the use of approved equivalent procedures. There are also equivalent procedures that may be used in full certification tests, in the interest of reducing costs and providing reliable results. Guidance material on the use of equivalent procedures in the noise certification of subsonic jet, propeller-driven large airplanes, and supersonic airplanes is provided in the current advisory circular for this part.

* * * * *

■ d. Revise paragraph A36.5.2(h)(1) to read as follows:

* * * * *

A36.5.2.5 * * *

(h) * * *

(1) For subsonic jet airplanes and supersonic airplanes: engine performance in terms of net thrust, engine pressure ratios, jet exhaust temperatures and fan or compressor shaft rotational speeds as determined from airplane instruments and manufacturer's data for each test run;

* * * * *

■ e. Revise paragraph A36.9.1.3 to read as follows:

* * * * *

A36.9.1.3 For supersonic airplanes, the integrated method of adjustment, described in § A36.9.4, must be used when VNRS reference procedures in C36.7(d) and C36.7(e) are used to demonstrate compliance with this part.

* * * * *

■ 13. Revise the heading of appendix B to part 36, to read as follows.

**Appendix B to Part 36—Noise Levels for Transport Category and Subsonic Jet Airplanes Under § 36.103 and Concorde Airplanes Under § 36.301**

■ 14. Add appendix C to part 36 to read as follows:

**Appendix C to Part 36—Noise Levels for Supersonic Airplanes**

Sec.



Section C36.1 Noise Measurement and Evaluation

The procedures of appendix A of this part, or approved equivalent procedures, must be used to determine the noise levels of a supersonic airplane. The noise levels determined using these procedures must be used to show compliance with the requirements of this appendix.

Section C36.2 Noise Evaluation Metric

The noise evaluation metric is the effective perceived noise level expressed in EPNdB, as calculated using the procedures of appendix A of this part.

Section C36.3 Reference Noise Measurement Points

When tested using the procedures of this part, an airplane may not exceed the noise levels specified in § C36.5 at the following points on level terrain:

(a) *Lateral full-power reference noise measurement point:* The point on a line parallel to and 1,476 feet (450 meters) from the runway centerline, or extended centerline, where the noise level after lift-off is at a maximum during takeoff. When approved by the FAA, the maximum lateral noise at takeoff thrust may be assumed to occur at the point (or its approved equivalent) along the extended centerline of the runway where the airplane reaches 985 feet (300 meters) altitude above ground level. The altitude of the airplane as it passes the noise measurement points must be within + 328 to −164 feet (+100 to −50 meters) of the target altitude.

(b) *Flyover reference noise measurement point:* The point on the extended centerline of the runway that is 21,325 feet (6,500 meters) from the start of the takeoff roll;

(c) *Approach reference noise measurement point:* The point on the extended centerline of the runway that is 6,562 feet (2,000 meters) from the runway threshold. On level ground, this corresponds to a position that is 394 feet (120 meters) vertically below the 3-degree descent path, which originates at a point on the runway 984 feet (300 meters) beyond the threshold.

Section C36.4 Test Noise Measurement Points

(a) If the test noise measurement points are not located at the reference noise measurement points, any corrections for the difference in position are to be made using the same adjustment procedures as for the differences between test and reference flight paths.

(b) The applicant must use a sufficient number of lateral test noise measurement points to demonstrate to the FAA that the maximum noise level on the appropriate lateral line has been determined. For supersonic airplanes, simultaneous measurements must be made at one test noise measurement point at its symmetrical point on the other side of the runway. The measurement points are considered to be symmetrical if they are

longitudinally within 33 feet (±10 meters) of each other.

Section C36.5 Noise Limits

When determined in accordance with the noise evaluation methods of appendix A of this part, the noise levels of a Supersonic Level 1 airplane may not exceed the following:

(a) *Flyover.*

(1) For an airplane with three engines:

(i) For which noise certification is requested at a maximum certificated takeoff weight (mass) of 150,000 pounds (68,039 kilograms (kg)), the noise limit is 94.0 EPNdB.

(ii) For which noise certification is requested at a maximum certificated takeoff weight of less than 150,000 pounds (68,039 kg), the noise limit begins at 94.0 EPNdB and decreases linearly with the logarithm of the airplane weight (mass) at the rate of 4 EPNdB per halving of weight (mass) down to 89 EPNdB at 63,052 pounds (28,600 kg) after which the limit is constant.

(2) For an airplane with two engines or fewer:

(i) For which noise certification is requested at a maximum certificated takeoff weight (mass) of 150,000 pounds (68,039 kg), the noise limit is 91.0 EPNdB.

(ii) For which noise certification is requested at a maximum certificated takeoff weight (mass) of less than 150,000 pounds (68,039 kg), the noise limit begins at 91.0 EPNdB and decreases linearly with the logarithm of the airplane weight (mass) at the rate of 4 EPNdB per halving of weight (mass) down to 89 EPNdB at 106,042 pounds (48,100 kg), after which the limit is constant.

(b) *Lateral.* Regardless of the number of engines, for an airplane at the reference noise measurement point:

(1) For which noise certification is requested at a maximum certificated takeoff weight (mass) of 150,000 pounds (68,039 kg) the noise limit is 96.5 EPNdB.

(2) For which noise certification is requested at a maximum certificated take-off weight (mass) of less than 150,000 pounds (68,039 kg), the noise limit begins at 96.5 EPNdB and decreases linearly with the logarithm of the weight (mass) down to 94 EPNdB at 77,162 pounds (35,000 kg), after which the limit remains constant.

(c) *Approach.* Regardless of the number of engines, for an airplane:

(1) For which noise certification is requested at a maximum certificated takeoff weight (mass) of 150,000 pounds (68,039 kg) the noise limit is 100.2 EPNdB.

(2) For which noise certification is requested at a maximum certificated takeoff weight (mass) of less than 150,000 pounds (68,039 kg), the noise limit begins at 100.2 EPNdB and decreases linearly with the logarithm of the mass down to 98 EPNdB at 77,162 pounds (35.0k kg), after which the limit remains constant.

(d) No airplane may exceed the noise limits described in this section at any measurement point.

(e) The sum of the differences at all three measurement points between the maximum noise levels and the noise limits specified in §§ C36.5(a), C36.5(b) and C36.5(c) may not be less than *13.5* EPNdB.

Section C36.6 Use of a Variable Noise Reduction System (VNRS)

For any airplane that includes a VNRS as part of an airplane design for noise certification, the applicant must—

(a) Submit reference procedures to be approved by the FAA as part of its noise certification test plan.

(b) Demonstrate the approved VNRS reference procedures for takeoff as defined in § C36.7(d), or for approach as defined in C36.7(e), when conducting certification tests.

Section C36.7 Noise Certification Reference Procedures and Conditions

(a) *General conditions:*

(1) All reference procedures must meet the requirements of § 36.3 of this part.

(2) Calculations of airplane performance and flight path must be made using the reference procedures and must be approved by the FAA.

(3) Standard reference procedures—When using standard reference procedures, the following apply—

(i) For takeoff, § C36.7(b);

(ii) For lateral, § C 36.7(b)(3); and

(iii) For approach, § C36.7(c).

(4) VNRS reference procedures—For airplanes that use a VNRS, the following reference procedures apply—

(i) For takeoff and lateral, § C36.7(d); and

(ii) For approach, § C36.7(e).

(5) The following reference conditions must be specified in the reference procedures. When used for the calculation of atmospheric absorption coefficients, the reference atmosphere is homogeneous in terms of temperature and relative humidity.

(i) Sea level atmospheric pressure of 2,116 pounds per square foot (psf) (1013.25 hPa);

(ii) Ambient sea-level air temperature of 77 °F (25 °C, *i.e.,* ISA + 10 °C);

(iii) Relative humidity of 70 percent;

(iv) Zero wind.

(v) In defining the reference takeoff flight path(s) for the takeoff and lateral noise measurements, the runway gradient is zero.

(b) *Standard takeoff reference procedure:*

The takeoff reference flight path must be calculated using the following:

(1) The takeoff thrust/power used must be the maximum specified by the applicant for normal takeoff operations (and is presumed to be less than maximum thrust/power for supersonic cruise speed) as listed in the performance section of the airplane flight manual under the reference atmospheric conditions given in § C36.7(a)(5). Average engine takeoff thrust or power must be used from brake release to the point where the minimum height above runway level is reached, as follows—

The minimum height to be used—

(i) For airplanes with three engines: 853 feet (260 meters).

(ii) For airplanes with two engines or fewer: 984 feet (300 meters).

(2) Upon reaching the height specified in paragraph (b)(1) of this section, airplane thrust or power must not be reduced below that required to maintain the greater of—

(i) A climb gradient of 4 percent; or

(ii) For multi-engine airplanes, level flight with one engine inoperative.

(3) To determine the lateral noise level, the reference flight path must be calculated using full takeoff power throughout the test run without a reduction in thrust or power.

(4) The takeoff reference true airspeed is the all-engine operating takeoff climb speed using the procedures approved by the FAA—

(i) For the shortest runway on which the airplane is approved to operate;

(ii) When the aircraft reaches the measurement location distance from brake release.

(iii) That is determined by the applicant when calculating the reference profile using the reference conditions stated in § C36.7(5).

(iv) The reference speed may not exceed 250 knots.

(5) The takeoff configuration selected by the applicant and approved by the FAA must be maintained constantly throughout the takeoff reference procedure, except that the landing gear may be retracted.

(6) The weight of the airplane at the brake release must be the maximum takeoff weight at which the noise certification is requested. This weight may be required as an operating limitation in accordance with § 36.1581(i) of this part; and

(7) The average engine is defined as the average of all the certification

compliant engines used during the airplane flight tests, up to and during certification, when operating within the limitations, and according to the procedures given in the Flight Manual. This will determine the relationship of thrust/power to control parameters (*e.g.,* N1 or EPR). Noise measurements made during certification tests must be corrected using this relationship.

(c) *Standard approach reference procedure:*

The approach reference flight path must be calculated using the following:

(1) The airplane is stabilized and following a 3-degree glide path;

(2) A steady approach speed of Vref + 10 kts (Vref + 19 km/h) with thrust and power stabilized must be established and maintained over the approach measuring point.

(3) The constant approach configuration used in the airworthiness certification tests, but with the landing gear down, must be maintained throughout the approach reference procedure;

(4) The weight of the airplane at touchdown must be the maximum landing weight permitted in the approach configuration defined in paragraph (c)(3) of this section at which noise certification is requested. This weight may be required as an operating limitation in accordance with § 36.1581(i) of this part; and

(5) The weight at which certification is requested, with the airplane in the most critical configuration, defined as—

(i) That which produces the highest noise level with normal deployment of aerodynamic control surfaces including lift and drag producing devices, and

(ii) All equipment listed in § A36.5.2.5 of appendix A of this part that can be operated during normal flight.

(d) *VNRS Takeoff reference procedure:*

(1) The VNRS takeoff reference flight path is to be specified by the applicant using the following—

(i) Maximum engine takeoff thrust or power (of an average engine) used to determine takeoff true airspeed from brake release to the activation of VNRS using the reference atmospheric conditions of § C36.7(a)(5).

(ii) The segment of the flight path from the activation of VNRS to the point at which VNRS is no longer active;

(iii) The applicant must maintain climb power throughout the remaining segment of the reference flight path;

(iv) The following minimum heights must be reached before engine cutback is initiated:

(A) For airplanes with three engines: 853 feet (260 meters);

(B) For airplanes with two engines or fewer: 984 feet (300 meters); and

(v) Upon reaching the height specified in paragraph (d)(4) of this section, airplane thrust or power must not be reduced below that required to maintain either of the following, whichever is greater:

(A) A climb gradient of 4 percent; or

(B) In the case of multi-engine airplanes, level flight with one engine inoperative.

(2) The VNRS reference flight path determined under paragraph (d)(1) of this section must be used when demonstrating and measuring the lateral noise level to show compliance with § C36.5 of this appendix.

(3) The takeoff reference true airspeed to be used is calculated using the all engine operating takeoff climb speed, as determined using—

(i) The shortest approved runway length;

(ii) Maximum certificated takeoff weight at which the noise certification is requested, which may result in an operating limitation as specified in § 36.1581(d);

(iii) The reference conditions stated in § C36.7(5);

(iv) The calculated true airspeed at the overhead measurement point, defined in § C36.3(b);

(v) The takeoff reference true airspeed must be attained as soon as practicable after lift-off; and

(vi) The takeoff reference true airspeed may not exceed 250 knots;

(4) For all airplanes, noise values measured during testing must be corrected to the reference acoustic day takeoff speed.

(5) The takeoff configuration selected by the applicant and approved by the FAA must be maintained throughout the takeoff reference procedure, except that the landing gear may be retracted; and

(6) The weight of the airplane at brake release must be the maximum takeoff weight at which noise certification is requested. This weight may be required as an operating limitation in accordance with § 36.1581(i) of this part; and

(7) As used in paragraph (d)(1)(i) of this section, average engine means the average of all the certification compliant engines used during the airplane flight tests, up to and during certification, when operating within the limitations and according to the procedures given in the Flight Manual. The average engine must be used to determine the relationship of thrust/power to control parameters (*e.g.,* N1 or EPR).

(e) *VNRS Approach reference procedure:*

The VNRS approach reference flight path must be calculated using the following:

(1) The airplane is stabilized and following a 3-degree glide path;

(2) The approach reference speed is Vref + 10 kts (Vref + 19 km/h);

(3) The applicant must use the approach configuration (landing gear down) established for normal operations as part of the airworthiness certification.

(4) The weight of the airplane at touchdown, at which noise certification is requested, must be the maximum landing weight permitted in the approach configuration defined in paragraph (e)(3) of this section, in accordance with § 36.1581(h) of this part; an

(5) The weight at which certification is requested, with the airplane in the most critical configuration, defined as—

(i) The configuration that produces the highest noise level with normal deployment of aerodynamic control surfaces including lift and drag producing devices; and

(ii) All equipment listed in § A36.5.2.5 of appendix A of this part that can be operated during normal flight.

Section C36.8 Noise Certification Test Procedures

(a) All test procedures must be approved by the FAA before certification tests are conducted.

(b) The test procedures and noise measurements must be conducted and processed in an approved manner to yield the noise evaluation metric EPNL, in units of EPNdB, as described in appendix A of this part.

(c) Acoustic data must be adjusted to the reference conditions specified in this appendix using the methods described in appendix A of this part. Adjustments for speed and thrust must be made as described in § A36.9 of this part, unless separate VNRS procedures and the data adjustments are approved.

(d) If the airplane's weight during the test is different from the weight at which noise certification is requested, the required EPNL adjustment may not exceed 2 EPNdB for each takeoff and 1 EPNdB for each approach. Data approved by the FAA must be used to determine the variation of EPNL with weight for both takeoff and approach test conditions. The necessary EPNL adjustment for variations in approach flight path from the reference flight path must not exceed 2 EPNdB.

(e) For approach, a steady glide path angle of 3 degrees ±0.5 degree is acceptable.

(f) If equivalent test procedures different from the reference procedures are used, the test procedures and all methods for adjusting the results to the reference procedures must be approved

by the FAA. The adjustments may not exceed 16 EPNdB on takeoff and 8 EPNdB on approach. If the adjustment is more than 8 EPNdB on takeoff, or more than 4 EPNdB on approach, the resulting numbers must be more than 2 EPNdB below the noise limit specified in § C36.5.

(g) During takeoff, lateral, and approach tests, the airplane variation in instantaneous indicated airspeed must be maintained within ±3% of the average airspeed between the 10 dB-down points. This airspeed is determined by the pilot's airspeed indicator. However, if the instantaneous indicated airspeed exceeds ±3 kt (±5.5 km/h) of the average airspeed over the 10 dB-down points, and is determined by the FAA representative on the flight deck to be due to atmospheric turbulence, then the flight so affected may not be used for noise certification purposes.

Issued in Washington, DC, under the authority of 49 U.S.C. 106(f), 44701(a)(5), 44715, and § 181 of the FAA Reauthorization Act of 2018, on March 30, 2020.

**Kevin W. Welsh,**

*Executive Director, Office of Environment & Energy.*

[FR Doc. 2020–07039 Filed 4–10–20; 8:45 am]

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## DEPARTMENT OF TRANSPORTATION

## Federal Aviation Administration

## 14 CFR Part 39

**[Docket No. FAA–2020–0378; Product Identifier 2018–SW–060–AD]**

**RIN 2120–AA64**

## Airworthiness Directives; Airbus Helicopters

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to adopt a new airworthiness directive (AD) for Airbus Helicopters Model AS350B, AS350B1, AS350B2, AS350B3, AS350BA, AS350C, AS350D, AS350D1, AS355E, AS355F, AS355F1, AS355F2, AS355N, AS355NP, EC130B4, and EC130T2 helicopters. This proposed AD would require visually inspecting each main rotor gearbox (MGB) suspension bar attachment bracket bolt for missing bolt heads. Depending on the outcome of the visual inspection, measuring the tightening torque, removing certain parts, sending photos and reporting information to Airbus Helicopters, and completing an FAA-approved repair would be required. This proposed AD is prompted by a report of a missing MGB suspension bar attachment bolt head. The actions of this proposed AD are intended to address an unsafe condition on these products.

**DATES:** The FAA must receive comments on this proposed AD by June 12, 2020.

**ADDRESSES:** You may send comments by any of the following methods:

- *Federal eRulemaking Docket:* Go to *https://www.regulations.gov.* Follow the online instructions for sending your comments electronically.
- *Fax:* 202–493–2251.
- *Mail:* Send comments to the U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE, Washington, DC 20590–0001.
- *Hand Delivery:* Deliver to the ''Mail'' address between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**Examining the AD Docket**

You may examine the AD docket on the internet at *https://www.regulations.gov* by searching for and locating Docket No. FAA–2020–0378; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the European Union Aviation Safety Agency (previously European Aviation Safety Agency) (EASA) AD, any comments received, and other information. The street address for Docket Operations is listed above. Comments will be available in the AD docket shortly after receipt.

For service information identified in this proposed rule, contact Airbus Helicopters, 2701 N. Forum Drive, Grand Prairie, TX 75052; telephone 972–641–0000 or 800–232–0323; fax 972–641–3775; or at *https://www.airbus.com/helicopters/services/technical-support.html.* You may view the referenced service information at the FAA, Office of the Regional Counsel, Southwest Region, 10101 Hillwood Pkwy, Room 6N–321, Fort Worth, TX 76177.

**FOR FURTHER INFORMATION CONTACT:** Kristi Bradley, Aerospace Engineer, Safety Management Section, Rotorcraft Standards Branch, FAA, 10101 Hillwood Pkwy., Fort Worth, TX 76177; telephone 817–222–5110; email *kristin.bradley@faa.gov.*

**SUPPLEMENTARY INFORMATION:**

**Comments Invited**

The FAA invites you to participate in this rulemaking by submitting written comments, data, or views. The FAA also invites comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should send only one copy of written comments, or if comments are filed electronically, commenters should submit only one time.

The FAA will file in the docket all comments received, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. Before acting on this proposal, the FAA will consider all comments received on or before the closing date for comments. The FAA will consider comments filed after the comment period has closed if it is possible to do so without incurring expense or delay. The FAA may change this proposal in light of the comments received.

**Discussion**

EASA, which is the Technical Agent for the Member States of the European Union, has issued EASA AD No. 2018–0152, dated July 18, 2018 (EASA AD 2018–0152), to correct an unsafe condition for Airbus Helicopters (formerly Eurocopter, Eurocopter France) Model AS 350 B, AS 350 D, AS 350 B1, AS 350 B2, AS 350 BA, AS 350 BB, AS 350 B3, EC 130 B4, EC 130 T2, AS 355 E, AS355 F, AS355 F1, AS 355 F2, AS 355 N, and AS355 NP helicopters.

EASA advises of a reported occurrence of a missing MGB suspension bar attachment bolt head. EASA advises that investigations are ongoing to determine the root cause of this event. According to Airbus Helicopters, the missing MGB suspension bar attachment bolt head was discovered during scheduled maintenance of a Model EC 130 T2 helicopter. EASA states this condition could lead to fatigue failure of other affected bolts of the same MGB bracket, possibly resulting in loss of the MGB suspension bar and consequently loss of helicopter control. As an interim measure to address this potential unsafe condition, the EASA AD also includes Model AS 350 B, AS 350 D, AS 350 B1, AS 350 B2, AS 350 BA, AS 350 BB, AS 350 B3, EC 130 B4, AS 355 E, AS355 F,