Federal Aviation Administration

Memorandum

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To: Executive Director, Office of Environment and Energy, AEE-1

From: Assistant Chief Counsel for Regulations, AGC-200

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Subject: Applicability of part 36 to new supersonic aircraft

My staff was recently asked whether 14 CFR part 36, Noise Standards: Aircraft Type and Airworthiness Certification, would apply to an application for type certification of a new supersonic aircraft. Our interpretation is that it does not apply. A different means of noise certification of a supersonic aircraft would be required.

The applicability of part 36, as listed in §36.1(a)(1) is limited to "*subsonic* transport category large airplanes, and for *subsonic* jet airplanes regardless of type" (emphasis added). Section 36.1(a)(3) adds "Concorde airplanes." No supersonic airplane other than the Concorde is included in the applicability for the part.

Regulatory history related to noise from supersonics

Historically, the FAA has never had the data to support promulgation of actual noise levels for supersonic aircraft, and thus never took an opportunity to broaden the applicability section to supersonic aircraft other than the Concorde.

In the 1970s, the FAA chose to call out the Concorde specifically for regulation as that airplane was beginning worldwide operations. The Concorde is specifically addressed in part 36 subpart D (including the Noise Control Act standard of §36.301(b)) concerning the lowest noise levels that were practicable and appropriate for the Concorde type design. The FAA would have to promulgate a change to part 36 applicability and new regulations on noise levels in Subpart D to account for any other supersonic aircraft design.

As early as 1986, the FAA expressed its interest in amending its regulations to account for the development of supersonic aircraft other than the Concorde. In an Advance Notice of Proposed Rulemaking (ANPRM), the FAA published notice of its intent to amend parts 36 and 91 to account for noise type certification and civil operation of supersonic aircraft (other than the Concorde, which was already covered).[1] The disposition of comments to that ANPRM[2] notes that commenters stated that there could be no focus on noise reduction technology until an aircraft manufacturer selects a propulsion system and the characteristics are known. Similarly, commenters said that the method of noise type certification could not be determined without knowledge of the aircraft design.

As noted in our subsequent proposed rule (NPRM) in 1990, commenters to the ANPRM also stated that Stage 3 (the certification standard then) should be a minimum requirement, and that anything less would be regressive. The 1990 NPRM proposed to remove the subsonic designation from §36.1, and to require future supersonic aircraft to meet (the then-current) Stage 3 noise levels. It also proposed an amendment to part 91 to require that any supersonic aircraft operating to or from a U.S. airport comply with Stage 3 noise levels, so as to preclude the operation of any future Stage 2 supersonic aircraft produced outside the United States. This proposal for mandatory operation at Stage 3 predated the Airport Noise and Capacity Act (1990), which required Stage 3 as an operational minimum for subsonic aircraft as of January 1, 2000.

In 1994, the FAA withdrew the 1990 NPRM.[3] The withdrawal document stated only that further investigation and research was necessary before developing a final rule. On the same day the proposal was withdrawn, however, the FAA published a policy statement indicating that despite withdrawing the proposed rule, "the FAA has not changed its policy on noise issues involving the development of future-generation civil supersonic airplanes." The published policy included a statement that any future supersonic aircraft would be expected to "produce no greater noise impact on a community than a subsonic airplane certified to Stage 3 noise limits." (59 FR 39679, August 4, 1994). The FAA reiterated this expectation in a similar 2008 policy statement when the subsonic noise certification standard was Stage 4: "The latest noise limit in Part 36 is Stage 4, which applies to the development of future supersonic airplanes operating at subsonic speeds" (73 FR 62871, October 22, 2008). The same historic lack of data to establish full supersonic noise standards continues today.

New supersonic type certification today

If a person applies for a type certificate for a supersonic aircraft today, we are of the opinion that part 36 does not apply based on the language of §36.1. However, that lack

[1] ANPRM: 51 FR 39663 (October 30, 1986)
[2] Comment disposition in the NPRM preamble, 55 FR 22020 (May 30, 1990)
[3] Withdrawal: 59 FR 39711 (August 4, 1994)

of regulation in part 36 does not mean that the applicant is free of noise requirements at certification.

The FAA has a statutory mandate to "protect the public health and welfare from aircraft noise and sonic boom" in 49 USC 44715. That language came from 49 USC App 1431 (the former codification of the Federal Aviation Act) and the Noise Control Act of 1972.

§44715(a) states that the Administrator "shall prescribe" –

> i) standards to measure aircraft noise and sonic boom, and
> ii) regulations to control and abate aircraft noise and sonic boom.

This duty continues to apply even in the absence of current regulations that would cover a particular type of aircraft. Accordingly, if a manufacturer applies for a type certificate for a supersonic aircraft before the FAA adopts noise standards for the aircraft type, that application would trigger the need for the FAA to do rulemaking to describe the noise standards that would apply to the aircraft. This is reinforced by the statute in §44715(a)(3) that states:

> (3) An original type certificate may be issued under section 44704(a) of this title for an aircraft for which substantial noise abatement can be achieved only after the Administrator of the [FAA] prescribes standards and regulations under this section that apply to that aircraft.

Section 44715 also specifies that when prescribing such standards and regulations, the FAA "shall consider relevant information related to aircraft noise and sonic boom" (§44715(b)(1)), consult with other government authorities (§44715(b)(2)), and consider safety (§44715(b)(3)). Section 44715(b)(4) states that the Administrator must "consider whether the standard or regulation is economically reasonable, technologically practicable, and appropriate for the applicable aircraft." This latter language comes from the Noise Control Act[4] (1970), under which the FAA must make a determination at the time of each new type certification. The FAA had specifically incorporated the core of the Noise Control Act language in §36.301(b) that applied to the Concorde, requiring that:

> ...the noise levels of the airplane are reduced to the lowest levels that are economically reasonable, technologically practicable, and appropriate for the Concorde type design.

The FAA has a statutory duty to conduct rulemaking for any requirement that the Administrator finds appropriate for carrying out the purpose of §44715, and we would be

[4] Most of the recodification of FAA authority in 1991 broke up pieces of older authorizing legislation, including the Noise Control Act standards, into new sections.

required to publish any proposed standards for public comment, even if the standards eventually apply only to one aircraft. The Administrative Procedure Act states that a --

> "rule" means the whole or part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy.... 5 USC 551 (4).

A new type certification application for a supersonic aircraft might well require adoption of standards that end up applying solely to that applicant for that aircraft (though it could form the basis for general rules that apply to future applicants). Legally, it would function as a rule of particular applicability rather than a rule of general applicability.

In forming an initial matrix of what noise requirements would apply to a supersonic aircraft design, we may first want to determine what current regulations may be appropriate rather than start from scratch. For example, the noise measurement standards of part 36 Appendix B were found to be appropriate for the Concorde, and could serve as the starting point for noise certification of a supersonic aircraft unless demonstrated by an applicant that the standards are not appropriate. Further, our policy history states that a new supersonic aircraft, when operating subsonically, would be expected to comply with the noise limits for subsonic aircraft unless the applicant can show that subsonic operation of its aircraft will differ so significantly from operation of subsonic aircraft of similar size and weight that different standards should apply. It would be up to the applicant both to suggest such a requirement and justify why it is appropriate for the FAA to consider. The special condition process defined in 14 CFR §§21.16, 11.19, and 11.38, including the development of issue papers to define the appropriate standards, may serve as a useful model for adopting other specific parts of a new set of noise standards. All of these processes are data driven.

The question of how a supersonic aircraft might be tested or its noise limits determined when operating at supersonic speed are still to be solved as a matter of certification. The operating rules of part 91 applicable to supersonic aircraft are discussed below. Operating rules neither drive nor limit certification standards under our regulatory scheme, since by definition operating rules apply to aircraft that were previously certificated and already in service.

Current supersonic operating rules

While this memo was intended to address the state of our certification rules, we are briefly addressing the operating rules in part 91 subpart I that have been the subject of recent questions.

The operating rule in §91.817(a) prohibits supersonic flight over land in the United States; it has no effect on the development of appropriate noise requirements under part 36. In fact, development of such requirements would be necessary before §91.817

could be changed to allow such flights if the FAA is to comply with its statutory duty to protect the public health and welfare.[5] Similarly, §91.817(b) places limits on operations that might cause a sonic boom created outside U.S. airspace to reach the U.S. coastline. In order to determine how far out the supersonic signature (sonic boom) of an aircraft can be detected, there must be some kind of testing of the aircraft under those conditions to know what flight limitations would be appropriate; the FAA did this with the Concorde on approach to the east coast in the 1970s as its basis for this regulation. Other noise parameters that can only be created at supersonic speed may well be suggested and described by other entities of the U.S. government such as NASA, with whom the FAA has a significant historical working relationship regarding aircraft noise, and with whom the FAA is required to consult under §44715(b)(2).

Section 91.819 states that it applies to "supersonic airplanes that have not been shown to comply with the stage 2 noise limits of part 36 in effect" in 1977.

Read with historical context, this section placed limits on aircraft that met only Stage 1 noise limits.[6] Since a reference to part 36 noise levels is made, there has been question whether part 36 actually applies to supersonic aircraft (other than the Concorde). We do not infer that an operating rule can, by historical reference, act to change the stated applicability of part 36. Further, any reference to the Stage 2 noise levels of part 36 suggests that the application is only to the subsonic operation of supersonic aircraft since no other noise levels exist in part 36.

Finally, concern has been raised about the effect of §91.821, an operating rule, which states that no one may operate a civil supersonic airplane unless it complies with the Stage 2 noise levels of part 36. Similar to the applicability of §91.819, the presence of this regulation raises the question whether new supersonic aircraft would have to be any quieter than Stage 2 to operate (the current *operational* minimum for subsonic airplanes is Stage 3).

The regulation was promulgated in 1978 (as an operating rule applicable to then-certificated, operational aircraft) and it remains in effect until the FAA changes it. When the regulation was adopted, the FAA stated in the final rule preamble that it was intended to apply to then-current supersonic airplane designs, and not to define requirements for future designs -

> The rules do not establish certification noise limits for future design SST's, since the technological feasibility of such standards is at present unknown. The FAA's

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[5] The development of supersonic aircraft was foreseen and a method of authorizing developmental flights was adopted as Appendix B to part 91 at the same time the operational limits were put in place. The procedure remains available to all operators flying supersonic aircraft for development.

[6] The FAA amended part 36 to include the Stage 3 noise limit in 1977 for new subsonic type certification. When the term "does not meet" is used, it means an aircraft does not meet the minimum, not that an airplane that "does not meet Stage 2" might actually refer to Stage 3. All aircraft that meet stage 3 are presumed to meet Stage 2 since the levels are progressively quieter.

> goal is not to certificate, or permit to operate in the United States, any future design SST that does not meet standards then applicable to subsonic airplanes....
>
> Accordingly, consistent with technological developments, the noise limits in this rule are expected to be made more stringent before a future design SST is either type certificated or permitted to operate in the U.S.
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> 43 FR 28406 (June 29, 1978)

As an operating rule, §91.821 addressed the airplanes existing at the time of its adoption that would be operated in the United States, and was aimed at distinguishing the first Concordes produced from those produced later, and from other supersonic aircraft that were in development. Noise operating rules historically and necessarily lag significantly behind the certification standards because they apply to aircraft certificated to earlier standards. Although the FAA took the next step toward more stringent supersonic airplane operating requirements in 1990 when it proposed to increase the Stage 2 limit to Stage 3, that proposed rule was withdrawn.

For reference, we also note our legal interpretation provided to your office on February 29, 2016, that addresses §91.817 in greater detail.