Advancing Global Standards for Aircraft Noise: Developments from CAEP/13 and Outlook to CAEP/14

By ICAO Secretariat

Overview

ICAO plays a central role in shaping the international legal framework for aircraft noise regulation. As a specialized agency of the United Nations, ICAO is instrumental in establishing global noise standards. The organization has been assessing trends in global exposure to aircraft noise, which provide a basis for sound discussion and decision-making on aircraft noise policies.

During the CAEP/13 cycle (2022–2025), significant developments have been achieved on aircraft noise mitigation, mostly through the work of the ICAO Secretariat, the Committee on Aviation Environmental Protection (CAEP), and its Working Groups—WG1 (Aircraft Noise Technical) and WG2 (Airports and Operations). This article outlines the main developments from the past triennium and highlights key areas of work planned for CAEP/14 (2025–2028). The following articles in this Chapter will further elaborate on the main outcomes of the CAEP/13 cycle highlighted in this ICAO Secretariat article.

Annex 16 Proposed Revisions and Dual Stringency Standard

One of the most important accomplishments of CAEP/13 is the development of a **dual stringency standard** that accounts for the interdependence of aircraft noise and CO_2 emissions (this work is further detailed in Chapter 3 – Climate Change Mitigation: Aircraft Technologies of this Report). After evaluating 32 scenarios in terms of cost-effectiveness and environmental benefit, CAEP/13 agreed to recommend the adoption of a new Chapter 16 to Annex 16, Volume I. This Chapter, subject to Council's approval, introduces a more stringent Landing and Take-Off (LTO) noise Standard for new subsonic aeroplane types, applicable as of 1 January 2029.

As a pivotal milestone of ICAO's environmental protection work stream, Annex 16, Volume I (Aircraft Noise) has been regularly updated through key amendments. Following its role of keeping ICAO noise certification standards up to date and effective, while ensuring that the certification procedures are as simple and inexpensive as possible, the Committee's WG1 proposed revisions to Annex 16, Volume I. These updates include both guidance material and recommended text revisions to strengthen the certification framework.

Supersonic Aircraft Noise

Regarding Supersonics, the industry is moving towards the development of a new generation of supersonic transport aircraft (SSTs). However, there are environmental concerns that need to be addressed.

In support of these developments, work was continued in ICAO to develop environmental standards for supersonic aeroplanes. On noise provisions in that regard, CAEP WG1 developed a set of reference day atmosphere and humidity standards for sonic boom, as detailed further in the article provided in Chapter 2. Work has also occurred

in the context of further analyses that demonstrated two viable schemes and six noise metrics for defining boom noise certification levels. WG1 is also working to develop provisional content for acoustical measurements and data acquisition equipment specifications.

From these efforts, CAEP/13 agreed to recommend the adoption of a new **Chapter 15** of Annex 16, Volume I, which introduces a new LTO noise standard for supersonic aircraft, subject to Council's approval, also applicable from **1 January 2029**.

In addition, ICAO is closely following the research led by NASA which supports scientific data needs to establish a compatible, human response, low boom limit for the en-route SARPs. These NASA developments include a Low Boom Flight Demonstration (LBFD) aircraft which will perform community noise testing.

Operational Noise Mitigation

Based on the work of the CAEP Working Group 2 (WG2), CAEP recommended the publication of a new report titled "Good Practices on Noise Monitoring Systems*". This report* outlines how noise monitoring systems can be used efficiently and effectively in conjunction with the ICAO Balanced Approach (BA) to support the management of noise impacts at airports.

A second report, "Environmental Interdependencies in Various Operating Scenarios" was also endorsed for publication. This report analyzes different operating scenarios to support aviation stakeholders in better understanding the trade-offs between noise and fuel burn/CO_2 while optimizing their operational performance. The information in this report will enable Air Traffic Controllers (ATCOs) to shift from making decisions based on educated guesses to relying on informed insights, which will be useful for ATCO training.

Emerging Technology Aircraft

As the aviation sector evolves, ICAO is actively monitoring the development of **Emerging Technology Aircraft (ETA)—** including unmanned aircraft systems (UAS), remotely piloted aircraft, and urban air mobility (UAM) concepts in order to make sure prepare for timely environmental certification, as appropriate, with considerations for the noise aspects in the development of these Emerging Technology Aircraft (ETA).

To support this, ICAO developed an online tracker webpage, providing a curated collection of recent material related to aircraft noise from new technologies. Topics include low-noise eVTOL flight tests, drone noise emissions, UAS -related challenges, and experiences from ICAO Member States. The webpage also includes content from industry, academia, and regulatory bodies.

ICAO encourages Member States and stakeholders to share their experiences with ETA-related noise challenges, which may inform the development of future good practice guidance. Contributions may be submitted to officeenv@icao.int.

Research and Global Collaboration

A report entitled "Noise Technology Research for Fixed Wing Aircraft Status" on the status of ongoing research into noise reduction for subsonic aircraft has been finalized by CAEP WG1 and will soon be published on the ICAO website. Also, a White Paper on Supersonic Climate, Air Quality and Noise Impacts developed by CAEP Impacts and Science Group (ISG) is recommended to be published on the ICAO website.

The Noise dB database[1]—which hosts certified aircraft noise levels under ICAO SARPs—has been upgraded with a more user-friendly interface. It serves as a valuable resource for aircraft control authorities, airport operators, local stakeholders, and supports future revisions of certification standards.

Additionally, during the CAEP/14 cycle, WG2 will coordinate with WG1 on a supplement to guide the **consistent**

1 https://noisedb.stac.aviation-civile.gouv.fr/

application of the ICAO Balanced Approach, with a focus on transparent, practical, and harmonized implementation by States.

Next Steps

Aircraft noise will remain a **priority area** in ICAO's ongoing efforts under its Strategic Objective of **Environmental Protection**. In this context, the four pillars of the **ICAO Balanced Approach to Aircraft Noise Management** continue to serve as the foundation for coordinated global action.

Looking ahead to the CAEP/14 cycle (2025–2028), ICAO will maintain its focus on advancing both **aircraft noise standards** and **broader noise management strategies**.

As part of its work programme, **Working Group 1 (WG1)** will undertake the following activities:

- **Continue the development of new Standards and Recommended Practices (SARPs)** for en-route noise and sonic boom certification applicable to supersonic flight;
- **Continue the development of new Standards and Recommended Practices (SARPs)** for Emerging Technology Aircraft (ETA), **and** provide interim noise measurement guidelines for smaller ETA as an ICAO circular.

These efforts aim to ensure that ICAO's noise-related provisions remain scientifically sound, operationally practical, and responsive to evolving aviation technologies.