

Setting the scene

By ICAO Secretariat

CAEP/12 work developments on aircraft noise

Significant developments have been achieved on aircraft noise over the last triennium, mostly through the work of the ICAO Secretariat and the Working Groups 1 and 2 (WG1 and WG2) of the Committee on Aviation Environmental Protection (CAEP). Besides proposed amendments to Annex 16 Vol I, progress have also occurred on supersonics, Emerging Technology aircraft, operational noise, and noise research. This article summarizes this progress and depicts the developments planned for the CAEP/13 cycle (2022-2025).

Annex 16 proposed revisions by CAEP/12

As a pivotal milestone of ICAO's environmental protection guidance, 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 Working Group 1 (WG1) proposed revisions to Annex 16, Volume I in terms of both guidance and recommended amendments throughout the document.

CAEP developed specific guidelines for helicopter hover noise measurement, for inclusion under Annex 16 Vol I, Attachment H - *Guidelines for Obtaining Helicopter Noise Data for Land-Use Planning Purposes*. The primary objective for these is to achieve sufficient commonality in measurement conditions and locations, including hover heights, radial measurement distance, meteorological conditions, azimuthal directions, and microphone configuration, in order to allow direct comparability between different hover noise datasets.

Following the identification of some limitations of Annex 16 specifications with respect to the adjustments of test-day sound pressure level (SPL) to reference conditions, WG1 proposed the inclusion of appropriate amendments that will not only provide the missing guidance, but also facilitate the future implementation of a layered atmospheric attenuation methodology with the SAE ARP5534 model.

In addition, various amendments were proposed with the intention to improve its adherence to the Air Navigation Commission (ANC) "Guide to The Drafting of SARPs (Standards and Recommended Practices) and PANS (Procedures for Air Navigation Services)" (the "Standard for Standards").

Supersonics

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. For more information on this topic, please refer to the articles provided in Chapter 2 of this Report.

In support of these developments, work is ongoing in ICAO to develop environmental standards for supersonic aeroplanes. 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 specification.

In addition, the group is closely following NASA research which will support scientific data needs to establish a compatible, human response, low boom limit for the en

route SARPs. These NASA developments includes a Low Boom Flight Demonstration (Lbfd) aircraft which will perform community noise testing.

CAEP also approved the final results of an Exploratory Study (E-Study) of the environmental effects associated with the introduction of Supersonic Transport Aircraft (SST), which was recommended for publication after the inclusion of suitable caveats and introductory material, as well as removal of the sensitive information.

Noise from aircraft operations

Based on the work of the CAEP Working Group 2 (WG2), CAEP has recommended the publication of a new ICAO Document “*Operational Opportunities to Reduce Aircraft Noise*”, as detailed further in the article provided in Chapter 6 of this Report. The purpose of this new manual is to identify and review various operational opportunities and techniques for minimizing noise in civil aviation operations. Therefore, it was designed to be used in conjunction with ICAO Doc. 9829, Guidance on the Balanced Approach to Aircraft Noise Management published in 2008 and expands and offers further guidance on one of the principal elements of the Balanced Approach – “Noise Abatement Operational Procedures,” as outlined in Chapter 6 of Doc. 9829.

Emerging Technology Aircraft

New innovative technologies and energy sources for aviation are under development in a fast pace, and ICAO is closely following up these developments to prepare for timely environmental certification, as appropriate. The article provided Chapter 2 provides an overview of how industry is considering noise aspects in the development of these Emerging Technology Aircraft (ETA).

In that regard and specifically on aircraft noise, ICAO is closely following up possible environmental issues from the operation of ETAs, such as unmanned aircraft, remotely piloted aircraft, and urban air mobility concepts. For that, ICAO developed a tracker webpage¹ which contains a collection of relevant and recent information on new aircraft noise concepts and related information, covering

topics such as low noise eVTOL flight tests, drones noise emissions, Unmanned Aerial Vehicles (UAV) noise-related issues, as well as experiences from ICAO member States. The page also provides related material from multiple sector entities and useful references from ICAO material. ICAO encourages Member States and stakeholders to share their experiences in responding to these aircraft noise issues, so this information could be consolidated as a potential best practice guidance for States. These can be shared through the email: officeenv@icao.int.

Updates on noise research

CAEP also approved a review of the situation of noise technology research initiatives worldwide and a summary of the research activities for each region, covering an 18-year period (2006-2023), which provides an evolutionary perspective and clearly shows the renewed commitment of the countries involved. This Review will be published on the ICAO website² following approval by the Council.

Next steps

Aircraft noise-related impacts will keep as a priority topic in ICAO’s continued efforts. In this context, the four pillars of the *ICAO Balanced Approach to Aircraft Noise Management* continue to be of paramount importance. ICAO’s work will be focused on several topics related both to aircraft noise and broader noise management solutions. As examples, the following items are included in the work programme for the CAEP/13 cycle for WG1 and WG2:

- Conduct an integrated standard setting process for subsonic aeroplane CO₂ emissions and landing and take-off (LTO) noise, with the outcome being more stringent regulatory levels of CO₂ emissions and LTO noise.
- Continue to work on a new SARP (Standards and Recommended Practices) for en route noise/sonic boom certification for supersonic flight;
- Development of an Attachment to Annex 16 Volume 1 establishing noise measurement guidelines for use in the acquisition of Emerging Technology Aircraft (ETA) noise data.

1 https://www.icao.int/environmental-protection/Pages/noise_new_concepts.aspx

2 <https://www.icao.int/environmental-protection/pages/noise.aspx>



- Development of an eco-airport toolkit e-publication on the Environmental Impact of Unmanned Aircraft Operations at and around Airports, to be made freely available on the ICAO website

These and several other topics related to aircraft noise are going to be addressed by ICAO mainly through the coming CAEP cycles, in order to reinforce ICAO's role of providing international Standards, guidance material, technical documentation, and fostering their successful implementation.