



## ECAC Aircraft Noise Modelling Task Group (AIRMOD)

### Interview with Darren Rhodes

*Head, Environmental Research and Consultancy, United Kingdom Civil Aviation Authority, and Chair of AIRMOD*

**The ECAC Aircraft Noise Modelling Task Group (AIRMOD) is the technical subgroup of the European Aviation and Environment Working Group (EAEG) tasked with maintaining and developing ECAC Doc 29 “Report on Standard Method of Computing Noise Contours Around Civil Airports”. Below, Darren Rhodes, chair of AIRMOD, answers a few questions on the group’s recent achievements, current activities and foreseeable challenges.**

#### **What are the ECAC AIRMOD group’s aims ?**

For the past 20 years, AIRMOD has driven the development of an international consensus on the calculation of aircraft noise and led to the development of harmonised guidance which ICAO published as ICAO Doc 9911, alongside Doc 29, 3<sup>rd</sup> edition published in 2005. Existing guidance in Doc 29 covers fixed-wing aeroplanes.

The Doc 29 guidance is supported by an ICAO-endorsed Aircraft Noise and Performance (ANP) database, with AIRMOD making an active contribution to the development, verification and validation of the ANP database. AIRMOD is also working to develop consensus guidance for helicopter noise calculation, where there is currently no internationally agreed guidance.

#### **How does the AIRMOD group relate overall to the other group(s) or entities working on this topic (European Commission, ICAO/CAEP)?**

AIRMOD works closely with technical groups within ICAO’s Committee for Aviation Environmental Protection (CAEP) to develop common methods and reach consensus at a global level beyond ECAC. It also supports the European Commission’s work to develop harmonised methods in support of the Environmental Noise Directive. Examples of this coordination and collaboration include past joint ECAC/ICAO working group meetings to facilitate consensus agreement.

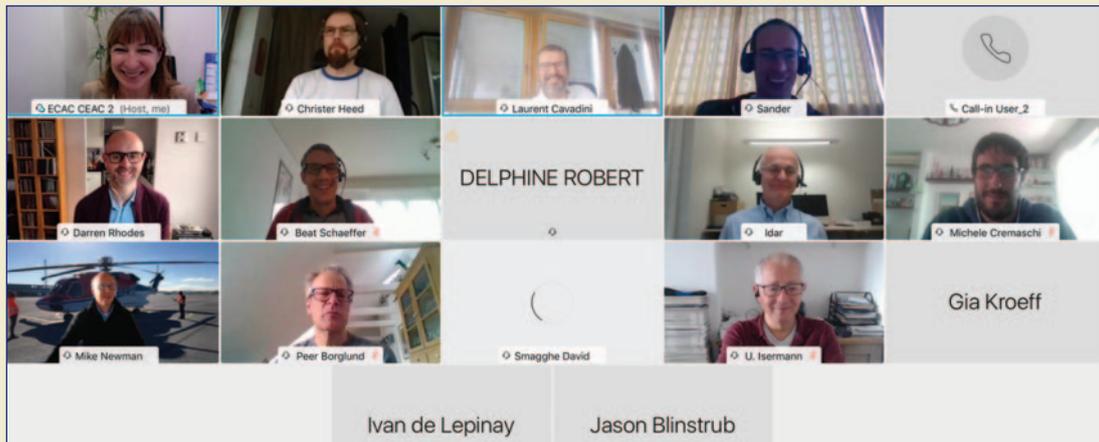
#### **What are the group’s main achievements in 2019/2020?**

AIRMOD’s key achievement has been the development of up-to-date consensus guidance on aircraft noise calculation to update Annex II of Directive 2015/996/EC “CNOSSOS-EU”, that will bring the Commission’s own guidance into alignment with Doc 29, 4<sup>th</sup> edition (2016) and ICAO Doc 9911, 2<sup>nd</sup> edition (2018). AIRMOD also continues to work on the development of helicopter noise calculation guidance, where there is currently no international consensus.

#### **Is there any particular initiative you are proud of having achieved in AIRMOD?**

There are two things in particular that stand out. First, the publication of the 4<sup>th</sup> edition in 2016. This included the first part of a new third volume that included a series of detailed test case acoustic calculations for the first time, which supports the development of software harmonised with the guidance, and also provides test cases for users to replicate. The work was a multi-year effort. It involved benchmarking four different models that had implemented Doc 29, working through differences to reach consensus on the final calculation results to be published, and then revising the guidance to reflect the consensus calculations. This actually turned out to be a really good way of eliminating ambiguity in the guidance by seeing first-hand how different organisations implemented it, sometimes in different ways leading to different results. It required a lot of iteration to identify and resolve all the differences.

Second was the workshop held in 2018 to highlight the 4<sup>th</sup> edition of Doc 29 and explain the differences from the 3<sup>rd</sup> edition to a broader range of stakeholders, introduce Volume 3 Part 1 and set out the roadmap for further development of Doc 29. The workshop was so popular it was also streamed online.



33<sup>rd</sup> meeting of the Aircraft Noise Modelling Task Group, videoconference, 27-28 October 2020

### What topics is the group currently focusing on?

As already mentioned, the group is currently working on the development of helicopter noise calculation guidance, where there is currently no international guidance, and on updating the aircraft performance calculation method for fixed-wing aeroplanes in Doc 29 Vol. 2 in order to check consensus results over a wide range of meteorological conditions and to develop more flexible ways of defining flight procedures that are key to acoustic calculations. Work also continues on the development of a noise measurement database to support validation of the calculation method and supporting data.

### What challenges do you see arising in the future?

I can see drones presenting a number of challenges. First, there are many more types and configurations of drones, which may make it difficult to categorise the different types and requires a much larger and more detailed database of noise characteristics. Secondly, human reaction to drones may be quite different to that of fixed-wing aircraft due to the way they sound and where they are likely to operate, e.g. close to urban areas. For example, it may be much more important to take into account the effects of noise shielding and reflection from buildings, which are currently ignored for fixed-wing aircraft calculations.

### Would you say there is increasing or decreasing trust from the public in environmental noise modelling over measurements, and to what extent does AIRMOD work at increasing confidence in noise modelling?

In my role, I get to see first-hand the decreasing trust from the public in environmental noise calculations. I am sure this is not just a United Kingdom phenomenon but probably widespread. It is therefore an important aspect of AIRMOD's efforts to develop a noise measurement database and to use this to develop guidance on comparing measurements with calculations. This may sound straightforward (sorry for the pun!), but most airport noise measurements rely on systems that collect unattended measurements, often without an audio recording of the event. This may result in contamination, with non-aircraft noise events or – because of methods applied to screen out non-aircraft noise events – quieter aircraft events being excluded, both of which could significantly affect comparisons with calculations.

### Some final words

After 20 years of being part of AIRMOD, I am especially appreciative of the team effort and collaboration, both within AIRMOD and beyond to its links with ICAO and SAE International technical groups, which has facilitated the development of genuinely global harmonised guidance. I hope this continues. ■

**Darren Rhodes** graduated from Loughborough University in 1993 with an honours degree in aeronautical engineering. Following this, he conducted research work in aircraft design, noise modelling and noise abatement operating procedures and obtained a PhD for aircraft noise research in 1998.

In 1997, he joined the United Kingdom Civil Aviation Authority's environmental research team and subsequently became project manager of aircraft noise model development and international studies. Mr Rhodes acts as a technical advisor on aircraft noise matters for the UK Department for Transport and plays an active role in several international committees including ICAO's Committee for Aviation Environmental Protection. He currently chairs ECAC's EAEG-AIRMOD task group, responsible for the development of aircraft noise models and guidance on their application within ECAC's Member States.

Darren is co-author of the book "Civil Jet Aircraft Design", which is used as a standard aeronautical engineering text at several UK and overseas universities.