Noise News

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Lawmaker Response to FAA Report on Alternative Noise Metrics

In a report published on April 14, 2020, the Federal Aviation Administration (FAA) responded to the requirement outlined in the FAA Reauthorization Act of 2018, Pub. L. 115254, § 188, Congress required the Federal Aviation Administration ("FAA") "evaluate alternative noise metrics to current average day-night level standard, such as the use of actual noise sampling to address community airplane noise concerns." The report gave an overview of the history and purpose of noise evaluation and provided detail on the alternative metrics considered.

The conclusion of the FAA's report was to continue recommending the use of DNL for FAA decision-making regarding noise compatibility. This is a continuation of the decision reached in 1992, in the Federal Interagency Committee on Noise (FICON) report that was reaffirmed in 2018 with the successor to FICON, the Federal Interagency Committee on Aviation Noise (FICAN). The report encouraged the use of supplemental metrics as a "communication tool" but reaffirmed the recommendation of DNL to meet Aviation Safety and Noise Abatement Act (ASNA) requirements that a metric account for noise level, time of day, and number of events.

Reps. Karen Bass (D-Calif.) and Brian Fitzpatrick (R-Pa.), along with 27 others, signed onto a letter to FAA

administrator Stephen Dickson on September 23, 2020 declaring the FAA report "inadequate" and "unacceptable". The 29 lawmakers critiqued the report for failing to provide a thorough evaluation of the 65 DNL standard and instead, merely describing DNL and alternative metrics and offering an incomplete comparison between DNL and alternative metrics.

Lawmakers stated that the report failed to evaluate well-respected and widely used alternatives like CNEL, and the European alternative to DNL, day-evening-night metric (DENL), and that there was a "glaring absence" in analysis of noise complaint data. Additionally, lawmakers cited a 2019 research project at MIT funded by the FAA which found that the Number-Above (NA) metric showed an "effective correlation to aircraft noise impacts on the public," and noted that no mention of this NA metric, nor the findings of that research, occurs in FAA's 2020 report on alternative metrics.

Lawmakers included a list of 11 questions developed by the BOS (Boston) Fair Skies community group for the FAA Administrator. The questions posed levied a harsh criticism of the absence of discussion in FAA's metrics report regarding NextGen and its failure to account for increased complaints and presumably annoyance, due to NextGen implementation, including concentrated flight paths due to Performance Based Navigation (PBN).

Additionally, this list of questions includes a review of FAA's finding in Table 1 of its report that DNL is the recommended measure because it accounts for noise level, time of day, and number of events per ASNA requirements. According to Dr. John Hansman of MIT, who conducted the 2019 project mentioned above, Time-Above (TA) and Number-Above (NA) metrics, can account for time of day by using a lower threshold during nighttime hours. Additionally, these questions suggest that regulations require a single system for measuring noise, but not a single metric. As a result, the group requests that FAA provide the necessary requirements and information to begin using a single system for measuring noise that includes both the Number-Above and DNL metrics.

The letter concluded with a request for formal responses to the 11 questions posed and a statement of the imperative that FAA meet the congressional mandate set forth in Sections 188 and 173 of the FAA Reauthorization Act of 2018, which was "to address the inadequacy of the DNL metric and nudge the FAA towards a more comprehensive measure." To meet this mandate, lawmakers requested that FAA go back to the drawing board and begin a new report with a "thorough and nuanced analysis of the DNL standard and better, more accurate metrics."

Source: FAA, Quiet Skies Caucus

ICCAN Report on Aviation Noise and Public Health

On September 24, 2020, the UK's Independent Commission on Civil Aviation Noise (ICCAN) released a report on Aviation Noise and Public Health. The report served as a rapid evidence assessment that systematically reviewed existing evidence from the WHO and Defra reviews on the relationship between aviation noise and public health. Of the available studies and sources of information, ICCAN found that most of the relational evidence was low or very low quality in terms of level of certainty in predicting health outcomes, indicating that more research needs to be conducted.

As a result, ICCAN identified several high-priority areas for future research into the relationship between public health and aviation noise, including sleep, diabetes, wellbeing, depression, and anxiety. A range of study designs, including reevaluation of existing data, was suggested for future research. ICCAN plans to publish an update to their strategy and work program in April of 2021 which will include the first set of priorities for further research into public health and aviation noise.

Source: ICCAN

Update on Boeing ecoDemonstrator Flight Testing

Boeing began its 2020 ecoDemonstrator flight testing in Glasgow, Montana. Boeing launched the ecoDemonstrator program in 2010 to test new technologies on passenger and cargo jets in flight. NASA has collaborated with Boeing on its ecoDemonstrator program almost every year since 2014. Past research has involved several hardware and software innovations – even non-stick coatings to prevent airflow-disrupting bug residue from building up on a wing.

Each year the company selects a different aircraft to be used as the ecoDemonstrator by partnering with an airline or using a Boeing-owned aircraft. This year, Boeing partnered with NASA, Etihad Airlines, and Safran Landing Systems. Boeing is testing the use of new technologies on a 787-10 Dreamliner that will increase cabin sanitation and en-route airspace efficiency, lessen airframe noise, and use quieter landing gear, all while flying on a mix of sustainable aviation jet fuel.

Many of this year's tests will be focused on aircraft noise and noise mitigation, including a partnership with NASA and Safran Landing Systems. Safran Landing Systems noted that the objective is to reduce noise from landing gear by more than 20 percent. Because modern aircraft engines have been so effective in reducing their noise signature, the landing gear has become one of the largest contributing factors to aircraft noise on approach and landing; it can account for 30 to 40 percent of the external noise upon arrival on modern long-haul aircraft, so a reduction of 20 percent has the potential to make a significant impact in noise reduction.

NASA has long studied aircraft noise. Its Aircraft Noise Prediction Program (ANOPP) software tool is based on years of measuring and understanding how components of an aircraft – the wings, landing gear, the main fuselage – contribute to the noise you hear when an airplane flies overhead.

The ecoDemonstrator testing will allow NASA to measure the whole package of noise impact: the airframe and propulsion, as well as how they interact with each other. The airframe noise tests use about 1,200 microphones that are attached to the outside of the aircraft or positioned on the ground beneath the flight path. The team plans to examine the 787's noise during flight by measuring noise with the aircraft low over the ground and as it passes over an array of microphones placed directly underneath, either side of, and nearby the flight path.

"This is an opportunity we get very rarely," said Russell Thomas, an acoustics expert at NASA's Langley Research Center in Virginia who is leading what is officially called the Propulsion Airframe Aeroacoustics and Aircraft System Noise Flight Test.

Because of the size of a 787, it is not possible to test it in a wind tunnel or wise to rely solely on complex computer simulations because they may not perfectly represent reality.

"Only by flying can we obtain the most realistic conditions for obtaining the measurements we need. And this is really the first time we've ever been able to attempt the kind of research we've planned," Thomas said.

Figure 1. Microphones attached to the 787-10 Dreamliner ecoDemonstrator

Source: Boeing

The test involves placing 960 microphones on the ground immediately next to and around the main runway at Glasgow Industrial Airport in Montana.

Another 31 microphones are located farther away from the runway, and 214 more microphones are temporarily wired into locations on the aircraft itself.

"This is pushing the boundaries of acoustic flight testing. I don't think either NASA or Boeing has ever put so many microphones on the ground or on the aircraft," Thomas said.

Boeing dedicated four days in August to test as many flights as possible over the microphone array during a four- to five-hour window each morning. A total of 23 passes were made over the microphones, with observers saying that the landing gear seemed effective at reducing noise.

Sources: NASA, Boeing, Safran Landing Systems, Aviation International News, Airport Noise Report, Simple Flying

NASA Quiet Supersonic Test Aircraft

Development of NASA's X-59 QueSST (Quiet Supersonic Technology) has continued in 2020 despite challenges imposed by the COVID-19 pandemic. Current plans are for X-59 test flights to occur over select communities to assess public reaction to quiet supersonic flight noise, if any is heard, as soon as 2024. The goal of these testing efforts will be to collect data to share with federal and international regulators to help set new rules that might allow supersonic flight over land and open a new market for air travel at faster-than-sound speeds.

NASA expects the assembly of the X-59 to be complete by summer 2021 to conduct major ground testing, with a target date for the first flight in summer 2022. Toward this goal, NASA expects to reach two milestones with the manufacture of the X-59's wing and its mating to the aircraft's fuselage by the end of 2020. According to David Richardson, the X-59 Program Director for Lockheed Martin Skunk Works, NASA's partner for the X-59, the build of the X-59 is over halfway complete as of September 2020.

Once X-59 begins flight, NASA will need to validate that the aircraft can produce supersonic shock waves that will lead to quiet thumps or low-level sonic booms instead of loud sonic booms. This will require tools for visualizing shock waves, in-flight pressure measurement, and other acoustic validation models and tools. These are currently being prepared and tested by NASA in preparation for the 2024 community overflights.

Figure 2. NASA's X-59 Quiet SuperSonic Technology X-plane

Source: Lockheed Martin

Plans for 2024 test flights are incorporating lessons learned from the series of flight tests that occurred over Galveston, TX in November 2018. The ultimate goal of the program is to provide data from the results of community overflight testing to regulators from the International Civil Aviation Association (ICAO) and FAA by 2027 to inform a decision making process that may open the future to supersonic flight over land by 2028. This would drastically reduce flight times and is the culmination of decades of supersonic research at NASA.

Sources: NASA

Other Noise News

- On Monday, September 21, 2020, Airbus released details about three hydrogen-fueled concept planes, planned for service by 2035. The three designs, named ZEROe, are different sizes and styles and will be less noisy and zero-emissions, using hydrogen as the primary power source.

- The Los Angeles World Airports (LAWA) unveiled two mobile-friendly websites that provide information about noise created by aircraft operations at both Los Angeles International and Van Nuys airports. The interactive noise portals give users access to data and multimedia content to help residents understand how different aircraft operations affect noise levels within neighborhoods throughout Los Angeles and surrounding communities.
- The FY 2021 Defense spending bill recently passed by the House of Representatives includes $50 million to fund, for two years, a new program that will provide noise mitigation grants to communities impacted by military aviation noise. This bill has not been passed by the Senate and therefore not a law at this time.
- The FAA approved an update to the Part 150 Noise Compatibility Program at Burlington International Airport (BTV) on October 1, 2020. This was done to address the noise impact from the F-35 fighter jets now based at BTV, which functions as a joint-use base for the Vermont Air National Guard. The F-35s (115 dBA at 1,000 ft AGL) are considerably louder (21 dB Lmax) than the F-16 (95 dBA at 1,000 ft AGL) aircraft they replaced. The replacement of these aircraft will triple the number of homes located within the 65 DNL contour. As a result, the City of Burlington, VT proposed to shift to sound insulation from land acquisition as the primary noise mitigation measure, along with purchase assurance and sales assistance, to maintain the stock of affordable homes in the area.
- On September 21, 2020, FAA announced the public comment period for the Draft Environmental Assessment (EA) for a proposed new RNAV satellite-based approach procedure for Runway 4-Left at Boston Logan International Airport (BOS). The draft EA indicated a finding of no significant impact in any environmental category, including noise.

Sources: FAA, Washington Post, CNBC, High Point Enterprise News, The San Diego Union-Tribune, CNS News, Airport Noise Report