Aeroacoustics

Call for Papers: Additional Details

Subtopic Descriptions

Acoustic/Fluid Dynamics Interactions
Analysis, measurements and control of subsonic and supersonic flows, vortex-driven flows, reacting and non-reacting flows, combustion instabilities, flow-acoustic interactions and resonance, and flow receptivity to acoustic disturbances.

Active Control of Noise and Vibration
Active control of noise and vibration; noise cancellation through active acoustic treatments and active source control as related to noise and vibration in the cabin and within engine ducts and jets; development of associated sensors and actuators, and feedback and feed-forward control strategies. This year, topics on active control of unsteady flows relating to aeroacoustics will be presented as joint sessions with the Flow Control discipline.

Advanced Testing Techniques
Development and application of novel testing techniques, advanced diagnostic methods and test facilities. Topics of particular interest are detailed measurements of mean and turbulent flow phenomena that contribute to noise generation and/or affect the radiated sound; source localization including phased arrays; measurement of sound-absorbing material properties; interior-noise test facilities, including source simulation and noise-path identification; and comparison of model and full-scale testing.

Airframe/High-Lift Noise
Noise source mechanisms of flow/surface interaction as related to airframe acoustics. Measurement, analysis and prediction methods for wing, flap, slat and landing gear noise. Noise reduction strategies including devices and methods of circulation and boundary layer control.

Computational Aeroacoustics
Development of innovative numerical techniques for aeroacoustic applications. Emphasis is placed on the ability of algorithms to simulate and/or track accurately acoustics information from flows, and on the development of proper boundary conditions for aeroacoustic applications. Applications are sought in areas of sound generation by turbulence, unsteady flows or moving boundaries; and propagation, transmission, and scattering of sound through non-uniform flows

Duct Acoustics
New and innovative methods to analyze, predict, and control turbomachinery noise propagating through nacelle ducts. A topic of particular interest is lightweight passive and active/adaptive liners to control the noise in ducts.

Emerging Urban Aviation Noise
Noise associated with small/medium UAS physical logistics operations (e.g. package delivery), urban air mobility (e.g. air taxi) and thin/short haul sectors. The primary focus is on the sources of noise from the rotor, propeller, ducted fans or electric motors as well as installation effects, acoustic propagation through complex terrain, human response, community noise and vehicle operations.

General Acoustics
Theoretical, numerical, and experimental research involving all areas of physical acoustics and those involving noise associated with commercial systems.

Integration Effects and Flight Acoustics
Aeroacoustic effects of propulsion and airframe integration. Understanding and prediction of noise source modifications originating from the interaction of flow and/or acoustic propagation mechanisms. Noise reduction approaches based on aspects of propulsion and airframe system integration or aircraft configuration. Integrated test model and flight vehicle acoustic experimental and/or prediction research.

Interior Noise/Structural Acoustics and Metamaterials
Reduction of interior noise and vibration associated with aircraft, launch vehicles, automobiles and trains. Noise transmission through structures, vibro-acoustic testing and prediction methods. Acoustic metamaterials and mechanical metamaterials whose implementation serves to address noise.

Jet Aeroacoustics
Aerodynamics and aeroacoustics of jets focusing on identifying and modeling noise production mechanisms; near-field noise; shock noise; turbulence prediction and characterization for subsonic, supersonic, and circular, non-circular, and multi-stream jets including those associated with launch vehicles; and suppression methods for both subsonic and supersonic jet noise. Of particular interest are new aeroacoustic modeling methods and flow and noise diagnostics techniques; and the effects of jet heating.

Loads/Sonic Fatigue
Prediction, testing, design, and control of sonic fatigue; sources of fluctuating loads on structures; jet/structure interactions; flow-resonance phenomena; structural and material stress-strain responses; and high temperature effects.

Propeller, Rotorcraft and V/STOL Noise
Conventional and advanced single and contra-rotating propellers; tonal and broadband noise, propagation and ground reflection effects, fuselage boundary layer refraction and scattering, noise source control, effects of inflow distortions, and installation effects. Rotorcraft source studies, including rotor harmonic noise, high speed impulsive and blade/vortex interaction noise, blade/turbulence interaction noise, jet/surface interaction noise including both ground and aircraft surfaces. Components and system noise prediction and validation, ground and flight test measurements, and noise control/reduction strategies.

Community Noise from Supersonic Transports and Sonic Boom
Response of individuals and the community to supersonic aircraft noise and sonic boom. Modeling and prediction of noise from supersonic aircrafts. Methods for sonic boom prediction and minimization through design and/or operation. Noise assessment methodologies and metrics/criteria for acceptability, both on cruise and airport operations. Atmospheric effects on sonic boom propagation, including refraction, diffraction, absorption and scattering by turbulence.

Turbomachinery and Core Noise
Generation, propagation and control of noise from fans, compressors and turbines; combustion noise; propagation and interaction with the mean flow field; transmission and reflection from blade and vane rows; control using active or passive techniques; and measurement techniques for source identification.

Special Sessions

Sponsored by the Aeroacoustics Technical Committee

Hybrid Anechoic Wind Tunnel Workshop

The Hybrid Anechoic Tunnel Workshop is a forum that brings together researchers interested in hybrid anechoic aeroacoustic wind tunnels and their application. A major goal is to develop common test cases that can be used to cross validate hybrid anechoic wind tunnels as well as provide data on canonical test cases to the broader aeroacoustics community. The purpose of the special session is (a) for participants to present papers describing measurements on a configuration they would like to propose as a common test case, and (b) for participants to present papers describing and comparing acoustic impulse calibration results for these facilities. Two sessions will be held. A first session will contain paper presentations and a second will be dedicated to discussions.

Session Contact: William Devenport, Virginia Tech

Fan Broadband Noise Prediction Panel Session

Fan broadband noise is a major source of aircraft engine noise, but its accurate prediction remains a challenge. Most existing methods are analytic in nature and rely on simplified descriptions of the flow, turbulence, and the fan stage geometry to predict sound power level spectra. The high-fidelity numerical simulation tools provide a means for direct prediction of the fan turbulence and resulting broadband noise, but these methods require substantial computational resources to tackle realistic fan stage geometries and flow fields. To identify the shortcomings of existing analytic and simulation approaches, and chart the course of the future research in this important area, the *Fan Broadband Noise Prediction Panel Session* serves as a forum for assessing the current state of the art, using a portfolio of benchmark problems for which detailed information on the mean flow, turbulence characteristics, and the sound field exist. Those who are interested in participating in the *panel session*, or to obtain more information about the session, please contact Ed Envia (contact information listed below).

Session Contact: Edmane Envia, NASA Glenn Research Center, Phone: +1 (216) 433-8956