



NASA SBIR 2016 Phase I Solicitation

A1.02 Quiet Performance - Propulsion Noise Reduction Technology

Lead Center: GRC

Participating Center(s): LaRC

To reduce noise emissions from aircraft, tools and technologies are needed to design aircraft that are both efficient and low noise. As such, developments/improvements in noise reduction technology, noise prediction tools, and flow & noise diagnostic methods are necessary to mitigate the environmental impact of aircraft noise. The focus of this call is on aircraft propulsion noise and innovations are solicited in the following areas:

Noise Reduction:

- Advanced liners including broadband liners (i.e., liners capable of appreciable sound absorption over at least two octaves), low-frequency liners (i.e., liners with optimum absorption frequencies half of the current ones but without increasing liner depth), and low-drag liners (i.e., liners that maintain current acoustic performance while reducing aerodynamic impact).
- Low-noise propulsor concepts that are significantly quieter than the current generation fans and open rotors;
- Concepts for active control of propulsion broadband noise sources including fan, open rotor, jet compressor, combustor and turbine.
- Adaptive flow and noise control technologies including smart structures for inlets, nozzles, and low-drag liners.
- Concepts to mitigate the effects of distorted inflow on propulsor noise.

Noise Prediction:

- High-fidelity fan and turbine noise prediction models including Large Eddy Simulation of broadband noise, 3D fan and turbine acoustic transmission models for tone and broadband noise.
- Accurate models for prediction of installed noise for jet surface interaction, fan inlet distortion, and open rotors.

Noise Diagnostics:

- Tools/Technologies for quantitative characterization of fan in-duct broadband noise in terms of its spatial and temporal content.
- Phased array and acoustical holography techniques to measure realistic propulsion noise sources in low-signal-to-noise ratio wind tunnel environments.
- Characterization of fundamental jet noise sources and structures.
- Innovative measurement of radiated acoustic fields from aeroacoustic sources.

