NASA SBIR 2014 Phase I Solicitation

A3.02 Quiet Performance

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. In support of several Aeronautics Research Mission Directorate projects, developments/ improvements in noise reduction technology, noise prediction tools, and flow & noise diagnostic methods are needed for subsonic and supersonic aircraft. In this call, innovations with an emphasis on aircraft propulsion 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), and low-frequency liners (i.e., liners with optimum absorption frequencies half of the current ones but without increasing the liner depth).
- Low-noise propulsor concepts that is quieter than 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 fan noise.

Noise Prediction

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

Noise Diagnostics

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