NASA SBIR 2018 Phase I Solicitation

A1.02 Quiet Performance - Propulsion Noise Reduction Technology

Lead Center: GRC

Participating Center(s): LaRC

Technology Area: TA15 Aeronautics

Aircraft noise reduction in general, and propulsion noise in particular, are areas of active research under the Advanced Air Transport Technology (AATT) Project and Commercial Supersonic Technology (CST) Project. In support of these projects environmental goals, innovations are sought inÂ the following areas:**Â**

Noise Reduction:Â

- 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), low-drag liner concepts that provide the same or better acoustic performance compared to those in use today, and high-temperature liners for reducing engine core noise.
- Low-noise propulsor concepts that are significantly quieter than the current generation turbofans and open rotors.
- Concepts for active control of broadband noise sources including fan, open rotor, jet, compressor, combustor, and turbine.
- Adaptive flow and noise control technologies for reducing propulsion noise including smart structures for inlets and nozzles.
- Concepts to mitigate the effects of distorted inflow on propulsor noise.Â

Noise Prediction:Â

- High-fidelity fan, compressor and turbine broadband noise prediction models, 3D fan and turbine acoustic transmission models for tone and broadband noise.
- Low-order, efficient and robustÂ 3D noise models for engine noise sources (i.e., fan, jet, and core).
- Accurate models for prediction of installed noise for jet surface interaction, fan inlet distortion, and open rotors.Â

Noise Diagnostics:Â

- Tools/Technologies for quantitative characterization of fan in-duct broadband noise in terms of its spatial and temporal content.
- Techniques for measuring realistic propulsion noise sources in low-signal-to-noise ratioÂ wind tunnel

environments.

- Characterization of fundamental jet noise sources and structures.
- Innovative measurement of radiated acoustic fields from aeroacoustic sources.