



Design and Manufacturing of Microporous Acoustic Liners for Engine Noise Reduction

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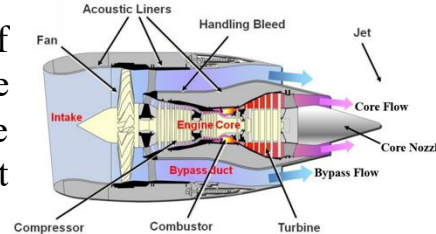
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Problem

Graded Micro-Porous Acoustic Liner

ARIS Inc. offers design and manufacturing of lightweight acoustic liners for aircraft engines. The technology offers both broadband and tonal noise reduction. The proof of concept was tested on inlet section of NASA's subsonic engine.



Challenge

Traditional honeycomb acoustic liners are limited to tonal and narrow frequency range and ineffective in broadband frequencies. A lightweight, bulk material concept is needed to absorb both broadband and tonal, engine noises.

Impact and Technical Approach

Technology Readiness Level (TRL): 4 - 6

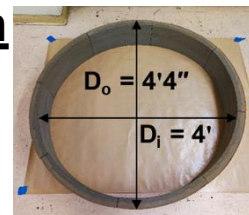
Manufacturing Readiness Level (MRL): 3 - 4

What is the Impact of your Solution?

- A systematic design and manufacturing of lightweight microporous acoustic liners that mitigates both broadband and tonal noises.
- Scalable and adaptable technology to any aircraft engines.

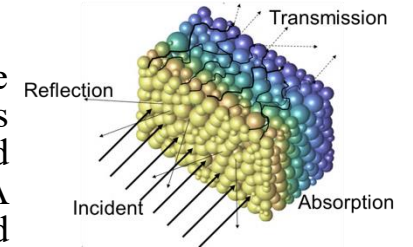
What is the Technical Approach?

- High-performance ceramic microbubbles were resin-coated and press-molded as per the designed graded porous layers. Acoustic performance was validated using NASA ANCF field test.



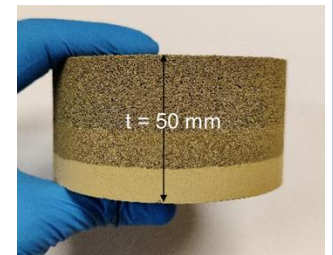
Solution Specifics

- Graded micro-porous liner shown in the figure was designed using resin-coated ceramic bubbles having good sound energy absorption and dissipation. Liner was validated using NASA ANCF engine, results showed 2–13 dB tonal and ~3 dB broadband noise reduction.



Unique Selling Proposition

- Lightweight, modular, and 3D flow properties can be designed by microbubble size and combinations.
- Acoustic liners outperform honeycomb liners.



Performance

End-user payoff:

- Superior noise mitigation over traditional liners across a wider frequency range.
- Customizable for aircraft platforms with varying engine geometries.

Dual-Use applications:

- Military and commercial aircraft engines.
- UAS / drone noise mitigation
- Ship and submarine engine noise reduction
- HVAC systems, and industrial acoustic panels

