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Langley researchers working on a plane you might not hear

By Susana E. Acosta, Special to the Daily Press

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If you've ever lived close to an airport, you understand the frustration of going about your day with aircraft constantly flying above you.

The noise is difficult to tune out.

At NASA Langley Research Center, a team of engineers is working on making airport communities more pleasant by reducing the amount of aircraft noise that reaches them.

Taylor Spalt, a graduate research assistant at the National Institute of Aerospace and a Ph.D. candidate at Virginia Tech, and Dr. Thomas Brooks in NASA Langley's aeroacoustics branch are testing a new model in Langley's 14-by-22 Foot Subsonic Wind Tunnel.

The model may be the shape of aircraft to come. The design is called a hybrid wing Body — a shape that looks like the wings and fuselage are blended together. The concept is part of NASA's green aviation research, which includes developing technologies and techniques to reduce aircraft noise on the ground.

Brooks said this work is a chance to apply many things NASA has already developed to a big project.

"This project is aligned with the mission of building environmentally responsible aviation... We want to see if this aircraft is something that would be worthwhile for industry to build. This noise mapping will help us figure that out."

Microphones in the ceiling of the wind tunnel, safely out of the airflow, pick up noise in the test section. These microphones "hear" not only the noise created by the aircraft engines and structure, but also the noise produced by the wind tunnel environment itself.

Separating all that noise is a challenge. To help solve the problem, researchers use an array of 97 microphones so sounds can be better isolated.

"Using many microphones as a group, it is possible to tell where the noise is coming from," Spalt said. "These spatial characteristics are crucial in determining how much noise each component of the aircraft makes."

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The main idea of the hybrid wing body is to keep the engine noise shielded from people on the ground. Changing the jet noise flow so it can be deflected by the body of the aircraft should reduce jet noise on the ground.

If it's as quiet as they hope, planes using the design could start appearing commercially as soon as 2025.

"The aircraft model in our tunnel is very much futuristic — a quieter version of the Boeing 777. You'll probably see a freighter first, something an air freight company might use, before you see it as a passenger plane," said aeroacoustic research engineer and project director Michael Doty.

Susana Acosta is pursuing a master's degree in mechanical engineering with Virginia Tech at the National Institute of Aerospace in Hampton, Virginia.

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