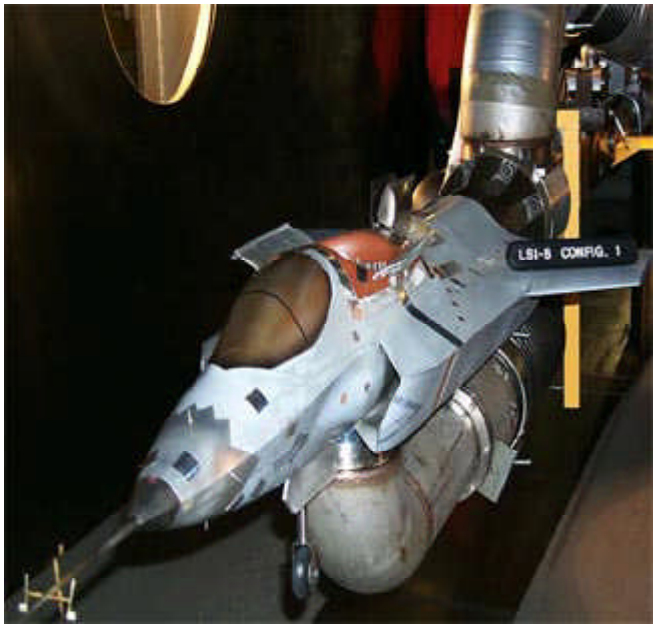
Abe Silverstein 10- by 10-Foot Supersonic Wind Tunnel Validated for Low-Speed (Subsonic) Operation



Lockheed Martin Joint Strike Fighter concept demonstration aircraft model installed at Glenn's 10- by 10-Foot Supersonic Wind Tunnel.

The NASA Glenn Research Center and Lockheed Martin Corporation tested an aircraft model in two wind tunnels to compare low-speed (subsonic) flow characteristics. Objectives of the test were to determine and document the similarities and uniqueness of the tunnels and to validate that Glenn's 10- by 10-Foot Supersonic Wind Tunnel (10×10 SWT) is a viable low-speed test facility. Results from two of Glenn's wind tunnels compare very favorably and show that the 10×10 SWT is a viable low-speed wind tunnel.

The Subsonic Comparison Test was a joint effort by NASA and Lockheed Martin using the Lockheed Martin's Joint Strike Fighter Concept Demonstration Aircraft model. Although Glenn's 10310 and 836 SWT's have many similarities, they also have unique characteristics. Therefore, test data were collected for multiple model configurations at various vertical locations in the test section, starting at the test section centerline and extending into the ceiling and floor boundary layers.

The stated test objectives are as follows:

- Verify that the 10×10 SWT is a viable subsonic test facility.
- Compare and validate model data of the 10×10 SWT versus the 836 SWT at multiple low-speed conditions and model positions.

In conclusion,

1. The 10×10 SWT is a viable low-speed test facility (from the standpoint of data quality), allowing flight speed to be varied from 0 to 250 knots.

2. The maneuver range is similar to that for the 8×6 SWT because of existing boundary layers in the 10×10 SWT test section.

3. A comparison of data from the 8×6 and 10×10 SWT's shows that the data are within an acceptable range. Most data are within a 0.5-percent range, with some data in a range up to 1 percent that may have resulted from adding unmatched parameters, such as angle of attack, angle of slip, and exhaust flow.

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