

## **Propulsion Noise Laboratory**

Another important historical research operation in Building 643 was a sound laboratory used in studies of the generation and suppression of propeller noise. The sound lab was located in the front of the building on the right near the staff offices. (See document entitled "[1942-Use of Full Scale Wind Tunnel](#)" at this site for the location of the Sound Lab in 1942). The lab combined experimental and theoretical analyses of propulsion noise and was involved in research on how to suppress noise generated by propeller-driven aircraft. Noise generators were used to simulate various levels and tones of noise during typical studies and virtually all testing was done outside the FST test section or wind-tunnel operation.

The most famous project conducted by the sound lab group was the highly successful modification of a propeller-driven military liaison-type aircraft (Stinson L-5) in the late 1940s. During that time the rapid post-war expansion of interest in personal-owner aircraft stimulated the NACA to develop methods to reduce the noise of airplanes. In the opinion of regulatory agencies, the threat of excessive noise from propeller aircraft was one of the most significant threats to the growth of civil aviation. Theories had been developed for the prediction of propeller noise in the late 1930s, but the NACA focused on an effort to reduce noise from all sources—propeller, engine, and exhaust system. A coordinated effort among several Langley organizations to demonstrate the ability of technology to reduce the noise of a typical personal-owner aircraft was conceived and included the sound lab contingent from the FST.

A five-bladed propeller was chosen for the experiment so as to reduce the required tip speed of the propeller blades, thereby reducing propeller-generated noise. Existing muffler design methods for aircraft were inadequate, forcing the FST staff to conduct experiments to arrive at a suitable muffler for the experiment. With propeller, engine, and muffler modifications, the noise pressure levels of the airplane were reduced an astounding 90 percent.

The modified airplane was flown and demonstrated as a “quiet airplane” at the Sixteenth Annual Inspection at Langley in May 1947. Many in attendance did hear the airplane as it flew over the assembled crowd at an altitude of a few hundred feet during a break at the inspection. Following the demonstration, additional flights generated detailed engineering data on noise levels for the basic and modified airplane.

Reports, documents, photographs, and video of the "[Quiet Airplane Project](#)" are included with the "[Aircraft Noise Reduction Facility](#)."