

30- by 60-Foot Wind Tunnel-643

The granddaddy of all Langley's 40-some wind tunnels, the 30- by 60-Foot Wind Tunnel, was shut down in September 1985 to complete its second major modification since its construction more than 50 years ago. Work is expected to be complete in mid-1986.

A new test section turntable and model support system head a long list of improvements designed to increase productivity, allowable model weight and accuracy of data.

When the "Full-Scale Tunnel," as it was originally named, started operation in the spring of 1931, a full-scale model or an actual aircraft was hoisted up to the cavernous test section; there, it was anchored to struts connected to a balance and scale system below the model. One of the important early discoveries: Drag tests revealed surprisingly large performance penalties from external struts and other exposed

items like air scoops and antennas. During World War II, practically every high-performance aircraft used by the United States was checked out in the Full Scale Tunnel. A variety of other vehicles have undergone aerodynamic tests in the large tunnel, including dirigibles, submarines, radar antennas, gliding parachutes and even models of other wind tunnel structures.

Today, the 30- by 60-Foot Tunnel can still test full-scale general aviation airplanes and good-sized models of larger aircraft like supersonic transports; as a result of an earlier modification, it is uniquely equipped for free-flight model tests. The main research of the tunnel is now directed at the study of the low-speed aerodynamics, static

and dynamic stability and control, and associated flow characteristics of military, general aviation and commuter aircraft configurations.

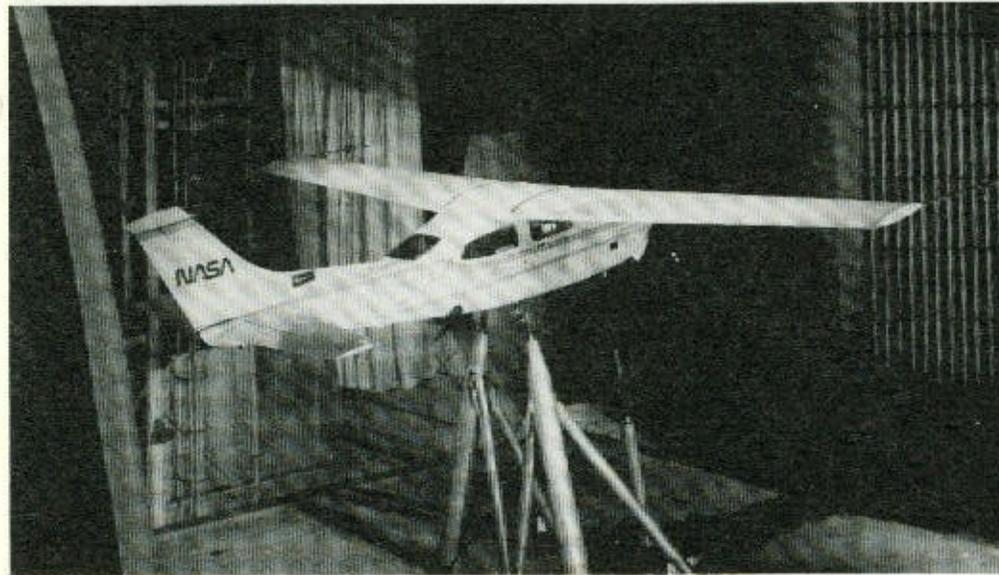
As part of the current modification, top speed of the tunnel will be safely restored to the 100 mph-plus range by aerodynamic improvements ahead of its two 35-foot fan blades, which will eliminate a vibration problem. As with the 4- by 7-Meter Tunnel, model set-up time is being greatly reduced. Other modernization features will reduce tunnel operating time per research program by allowing data to be taken at shorter intervals.

No matter what type of airplane or how fast it flies, it must take off and land, and in some cases maneuver, at relatively slow speeds. This is why - even in 1986 - this venerable workhorse will be reharnessed.

The 30- by 60-Foot Wind Tunnel modifications are budgeted at \$4.4 million.

Incidentally, the newest wind tunnel at Langley, mentioned at the very beginning, recently went fully operational with model tests of the Space Shuttle, an advanced energy-efficient transport and an electronic counter-measures version of the Navy's A-6 fighter. Called the National Transonic Facility, this super-cold "cryogenic" tunnel is giving engineers flight simulations so realistic that its tests of scale models can be correlated directly to full-scale aircraft, eliminating the need for time-consuming and less-accurate extrapolations to account for differences in size.

Wind tunnels - old and new - continue to be an invaluable research tool at Langley and promise to help maintain this country's leadership in aeronautics.



Full-scale aircraft still make good use of the 30- by 60-Foot Wind Tunnel. This light plane, a Cessna 210, was modified to test a new wing airfoil shape that promises greater performance. Improvements to the tunnel will allow more frequent and precise data collection.