# 8- by 6-Foot Supersonic Wind Tunnel Compressor Inspected

The NASA Glenn Research Center's 8- by 6-Foot Supersonic Wind Tunnel (8×6 SWT) is NASA's only transonic propulsion wind tunnel. The test section speed range is between Mach 0.25 and 2.0. The 9- by 15-Foot Low-Speed Wind Tunnel (9×15 LWST), which has a speed range from 0 to 175 mph, is housed in the return leg of the 8×6 SWT and uses the same compressor. The 8×6 SWT uses a large, seven-stage axial flow compressor to drive the air through the tunnel. The compressor is 17 ft in diameter and is rated at 1600 m^3 (56,600 ft^3) of air/sec. It is driven by three electric motors with a combined horsepower of 87,000. A close examination of this compressor was performed in 2001, the first time since February of 1966.

The examination focused on inspections that would define the condition of the six major compressor components: the compressor rotor and stator blades, the shaft flange bolts, the rotor spacer rings, the rotor tie rods, and the casing. The kind of inspections performed were visual, dye penetrant, hardness, tightness, and ultrasonic. The visual, dye penetrant, hardness (not completed on all blades), and tightness inspections were completed on the rotor and stator blades. A hardness test was also completed on a sampling of the spacer rings. Tightness checks were completed on the shaft flange bolts and rotor tie rods. An ultrasonic inspection was completed on the rotor tie rods.

These inspections are very important because they can catch potential problems before they become significant. This inspection revealed that the compressor is in excellent condition and should give Glenn many more years of faithful service.
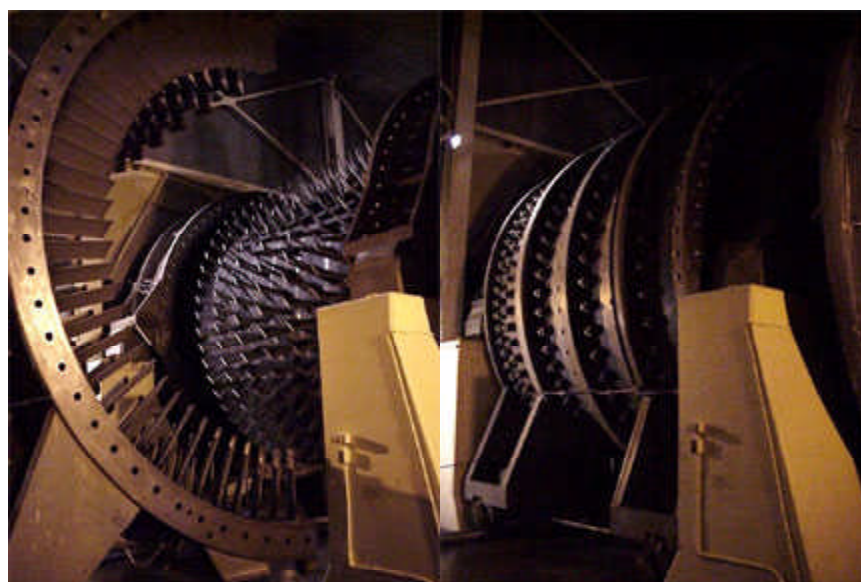
Left: 8×6 SWT compressor. Right: 8×6 SWT rotor and stator blades.

Glenn contacts: Martin J. Krupar, 216-433-5660, Martin.J.Krupar@grc.nasa.gov; and

Alan A. Linne, 216-433-6751, Alan.A.Linne@grc.nasa.gov
Authors: Martin J. Krupar and Alan A. Linne
Headquarters program office: OAT
Programs/Projects: UEET, QAT, JSF, HSR, Aeropropulsion Base R&T