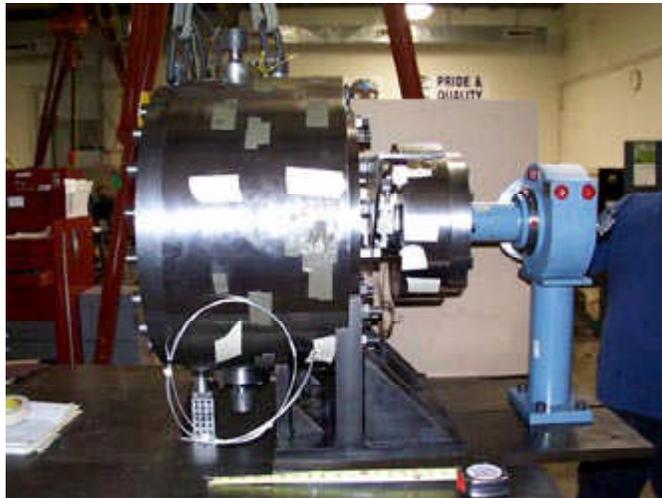


# New High-Temperature Turbine Seal Rig Fabricated

Current NASA program goals for aircraft engines and vehicle performance include reducing direct operating costs for commercial aircraft by 3 percent in large engines and 5 percent in regional engines, reducing engine fuel burn up to 10 percent, and reducing engine oxides of nitrogen emissions by more than 50 percent. Significant advancements in current gas turbine engines and engine components, such as seals, are required to meet these goals. Specifically, advanced seals have been identified as critical in meeting engine goals for specific fuel consumption, thrust-to-weight ratio, emissions, durability, and operating costs.



*High-Temperature Seal Rig fabrication complete.*

In a direct effort to address and make progress toward these goals, researchers at the NASA Glenn Research Center at Lewis Field have developed a unique high-temperature, high-speed engine seal test rig to evaluate seals under the temperature, speed, and pressure conditions anticipated for next generation turbine engines. This new seal test rig has capabilities beyond those of any existing seal rigs. It can test air seals (i.e., labyrinth, brush, and new seal concepts) at temperatures of up to 1500 °F and pressures up to 100 psid (even higher pressures are possible at lower temperatures), and at all surface speeds anticipated in future NASA (Ultra Efficient Engine Technology, UEET, and Integrated High-Performance Turbine Engine Technology, IHPTET) engine programs. In addition, seals can be tested offset from the rotor centerline, in the rotor runout condition,<sup>1</sup> and with simulated mission profiles. Support for this new rig was provided by NASA Glenn, the U.S. Air Force, and the U.S. Army.

The turbine seal test facility is planned to be installed at Glenn by October of 2000. Installation will include upgrading airflow systems, heating systems, instrumentation and measurement systems, and data acquisition systems. The operational envelope of the test

rig will be verified through its full operating capabilities prior to actual seal tests.

**For more information about turbine seal work at Glenn, visit the Mechanical Components Branch <http://www.grc.nasa.gov/WWW/5900/5950/> and the Turbine Seal Web Page <http://www.grc.nasa.gov/WWW/TurbineSeal/TurbineSeal.html>.**

## **References**

1. Steinetz, B.M.; Hendricks, R.C.; and Munson, J.: Advanced Seal Technology Role in Meeting Next Generation Turbine Engine Goals. NASA/TM—1998-206961, 1998.

**U.S. Army Research Laboratory at Glenn contact:** Irebert R. Delgado, (216) 433–3935, Irebert.R.Delgado@grc.nasa.gov

**Glenn contacts:** Margaret P. Proctor, (216) 977–7526, Margaret.P.Proctor@grc.nasa.gov; and Dr. Bruce M. Steinetz, (216) 433–3302, Bruce.M.Steinetz@grc.nasa.gov

**Author:** Irebert R. Delgado

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<sup>1</sup>With the rotor outer diameter eccentric to the rotor inner diameter.