

GAS TURBINE RESEARCH

Support Capabilities & Facilities - Propulsion

Within the Gas Turbine Laboratory (GTL) of the NRC Institute for Aerospace Research (NRC Aerospace), test and evaluation work for clients is backed by extensive facilities and supported by comprehensive design, fabrication and operational capabilities. Projects and facilities are operated and developed following formal project management and quality management processes under ISO 9000:2001. Support capabilities include instrumentation, data acquisition and FADEC interface, mechanical design and analysis tools, and an onsite machine shop.



The GTL management system has been registered to ISO 9001:2000



Machine shop

Instrumentation and controls support

The following parameters are typically measured in steady-state, transient or dynamic modes in varying numbers depending on specific customer needs:

- rotational speeds
- pressures
- temperatures
- vibrations
- thrust/torque
- positions
- FADEC outputs via ARINC, or MIL 1553 interface.

Design/fabrication support

The following software is available for mechanical design and analysis:

- Autodesk Inventor Series 10.0
- SolidWorks 2006
- ALGOR FEMPRO (FEA software for static stress analysis using linear materials models). An extensive suite of non-linear FEA capabilities is available through partnerships with the NRC Aerospace Structures & Materials Performance Laboratory to address both static and dynamic problems.

The machine shop has the following machining capabilities:

- CNC turning, Fagor 8055TC control (up to 21" swing x 36" between centers)
- CNC milling, Fanuc 20-F control (12" x 40" table 700-lb maximum workpiece weight), 3-axis simultaneous contouring
- conventional turning 14" swing x 42" between centers, equipped with Accurite DRO
- conventional milling 10" x 42" table, equipped with 3-axis Newall C80 DRO
- radial drill press
- vertical contour band saw
- 2 horizontal cut-off saws
- Linde UCC305 universal power supply for TIG and SMAW
- Lincoln Power MIG 255 for GMAW
- 10 Ga hydraulic shears
- 10 Ga box & pan brake
- ESAB portable plasma cutter
- 36" x 16 Ga slip rolls.

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Propulsion facilities

- a calibrated gas turbine test cell referenced to internationally accepted standards (up to 360 kg/s air flow and 260 kN thrust)
- turboshaft test cells (up to 7 MW)
- two seasonally-operated engine/inlet facilities capable of icing and snow ingestion tests (up to 360 kg/s air flow and 260 kN thrust)
- a hailstorm simulation rig
- two air cannons for bird and hailstone ingestion testing
- a large aviation fuel handling facility (400,000 litres available at a flow rate up to 8 kg/s).

Tribology facilities

We offer full-scale instrumented test facilities with dedicated data-acquisition systems, including:

- 150 mm Journal Bearing Static Test Facility
- 100 mm Journal Bearing Dynamic Test Facility
- 200 mm Journal Bearing Static Test Facility
- Abradable and Honeycomb Seals Test Facility.

Standard tribological testers such as Falex Block-on-Ring and Pin-on-Disk are also available.

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