

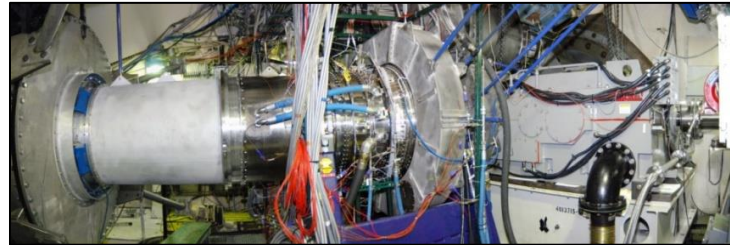


Facility Factsheet

Compressor Research Facility (CRF)

Description:

The CRF supports exploratory and advanced development efforts in compressor technology, independently evaluating full-scale, multi-stage, one or two-spool three-stream fans and compressors operating under simulated flight conditions. It is used to determine the aerodynamic and aeromechanical performance of the most advanced fans and compressors in the world while enhancing the understanding of their complex flow physics. Using CRF research data, design methods and computational models are verified and enhanced. It is automated and computer controlled to study both steady-state and transient performance of either scaled or full-size research components. The facility can handle most fans and compressors from operational engines and is used to update performance maps.



The CRF's performance characteristics include:

Main Drive: Speed/power - 0 to 16,000 rpm at 30,000 HP; Speed/power - 0 to 23,500 rpm at 15,000 HP

Dual Drive: Speed/Power - 0 - 12,500 rpm at 8000 HP

Acceleration rate - 500 RPM/sec

Inlet pressure range - 2 psia to ambient

Inlet air flow rate - 0 - 500 lbm/sec

Inlet temperature capability - atmospheric to 500°F

Core Discharge Conditions:

Pressure: Ambient to 40 psia; Flow: 0-500 lbm/sec; Temperature: Ambient to 1,490°F

Bypass Discharge Conditions:

Pressure: 2-40 psia; Flow: 0-250 lbm/sec; Temperature: Ambient to 1,000°F

3rd Stream Discharge Conditions:

Pressure: 2-40 psia; Flow: 0-125 lbm/sec; Temperature: Ambient to 700°F

Data Acquisition Channels:

Steady-state aero-performance: 1600 channels

High-speed/aeromechanics: 329 channels @ 200 kHz max data-rate per channel

Purpose:

Perform aerodynamic and aeromechanical research on partial and full-scale, multi-stage, one- or two-spool exploratory and advanced development fans and compressors.

Products:

Aero-performance maps for high performance fans and compressors

Aeromechanics characterization across test article speed ranges

Verification of advanced (national) computational fluid dynamics codes

Proof-of-concept and technology maturation data sets for advanced fans and compressors developed under VAATE

Availability:

Primarily in-house and related DoD contractor research. Other U.S. Government agency, DoD contractor and commercial customer programs upon request. Contact: 937-255-4100.