

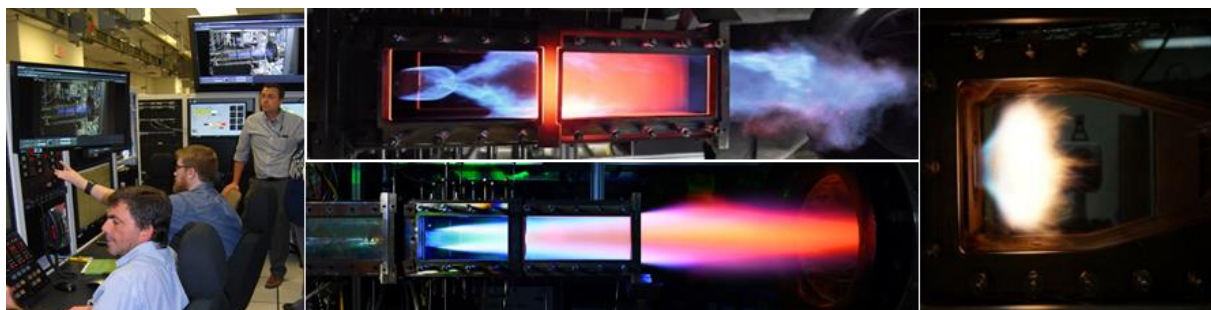


Facility Factsheet

Combustion Research Complex (CRC)

Description:

The Combustion Research Complex (CRC) supports fundamental and applied combustion research for advanced Air Force propulsion applications. This state-of-the-art complex is comprised of three laboratories within the Turbine Engine Research Complex (TERC) and is used for a range of experimental studies from fundamental, bench-scale combustion processes to evaluating gas turbine engine hardware. The available experimental research apparatus include a well-stirred reactor, single-cup combustors, bluff-body flames, and advanced combustor concept hardware. Experiments range from the fundamental science of fuels and combustion chemistry, to component technologies such as nozzle testing, thermal barrier coating testing, combustor aero studies, and ignition systems characterization.



A wide variety of standard instrumentation is available to measure pressure, temperature, flow rates, fluid velocity, exhaust gas species, and particulate matter as well as fuel spray, evaporation, and transport. Additionally, the complex has an extensive suite of laser-based diagnostics and quantitative imaging tools for non-intrusive interrogation of combustion phenomena such as phase Doppler particle anemometry for spray characterization (PDPA), particle imaging velocimetry (PIV) for planar gas velocity, planar laser induced fluorescence (PLIF) for temperature, species concentrations, and flame topology, and time-division-multiplexed hyperspectral absorption spectroscopy for gas temperature and species. The complex can provide up to 3 lbm/sec of air at 800 deg F and 100 psig, and has been modified to permit combustion operation at pressures up to 5 atm.

Purpose:

Perform basic and applied fundamental research in combustion science of relevance to gas turbine combustor and augmentor technologies; evaluate advanced combustion, augmentor, and combustor concepts in a highly accessible, bench-scale environment; research and test propulsion component technologies; provide a test bed for long-term materials testing; deliver high-fidelity data for use in combustion model development, verification, and validation; demonstration and application of advanced laser diagnostics techniques to aid in the development of high performance, low-emissions combustors and augmentors.

Products:

- Bluff-body combustion concepts and demonstration
- Fundamental combustion dynamics research
- Spatiotemporal data for combustion model development, verification, and validation
- Trapped vortex combustion (TVC) technology
- Inter-turbine burner (ITB) concepts
- Ultra-compact combustor (UCC) concepts

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.