



# Facility Factsheet

## Supersonic Research Facility (Research Cell 19)

### Description:

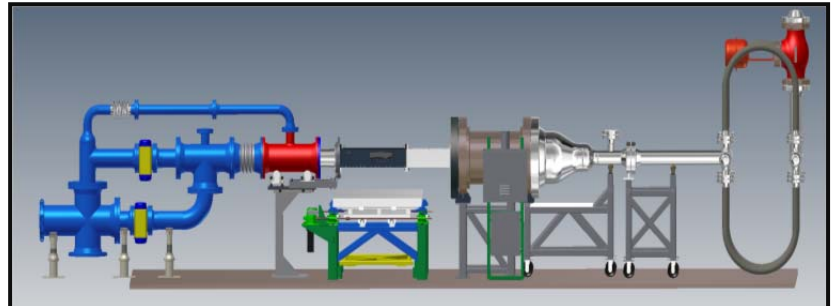
This is a continuous flow supersonic tunnel, specifically designed for optical diagnostics of fuel injection (for mixing and penetration), shock boundary-layer interactions, flameholder operation, and other hypersonic-flow components. The facility is housed in a climatically controlled, clean laboratory and allows continuous flow operation at air mass flow rates up to 30 lbm/sec. A variety of facility nozzles (2-D and axisymmetric) are on hand to generate a range of Mach numbers, from Mach 1.5 to 5; a facility heater allows clean pre-heating of the air up to stagnation temperatures of 1200 F. The tunnel back pressure can be remotely controlled, from a minimum value of 3.5 psia. Side and top walls (for the 2-D configuration) are composed of high-grade fused silica, allowing the application—and when needed development—of a variety of laser/optical diagnostics. Planar laser-induced fluorescence of hydroxyl (OH), nitric oxide (NO), and acetone are routinely applied, and a number of other laser diagnostic techniques have been employed, including vibrational Raman scattering, tunable diode laser absorption spectroscopy, molecular tagging velocimetry, particle image velocimetry, pressure sensitive paint, etc. The facility is also fully instrumented with conventional diagnostics (including aerothermodynamic probes) and is computer controlled.



### Purpose:

Conduct fundamental research on compressible flow necessary to develop high-speed, air-breathing propulsion devices

Develop advanced non-intrusive optical flow diagnostics in a realistic scale flow field at high speed flight conditions



### Products:

Fuel injector test data for a variety of designs  
Micro optical mechanical pressure instrumentation  
Engine isolator design  
Cavity flameholder performance database

### Availability:

Primarily in-house research, U.S. Government agency use, DoD contractors and dual use/defense conversion use-limited on an as available basis.

