



U.S. ARMY
RDECOM

Spray Combustion Research Laboratory



open
campus

S&T Campaign: Sciences for Maneuver Energy and Propulsion

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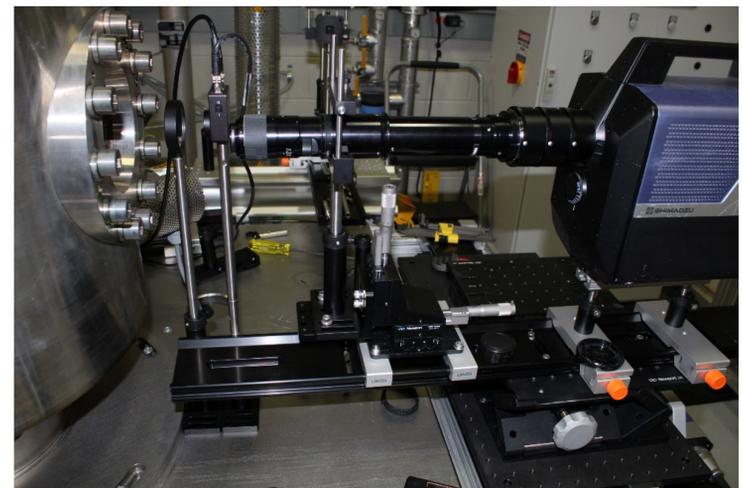
Research Facilities

The Spray Combustion Research Laboratory facilitates the development of new combustion systems or improves the operation of existing systems to meet the Army's mission for single-fuel (JP-8 or F-24) to achieve higher-efficiency, higher-powered unmanned aircraft systems and ground vehicles. It contains a high-temperature and high-pressure flow-through type combustion chamber; fuel injection analyzer; fuel benches; and various laser optical diagnostic tools. This facility is the only combustion laboratory with these capabilities within the Department of Defense (DOD). Research conducted in this laboratory supports the U.S. Army Aviation and Missile Research, Development and Engineering Center (AMRDEC), U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC), and collaborations with others in the DOD, Department of Energy, academia, and industry.

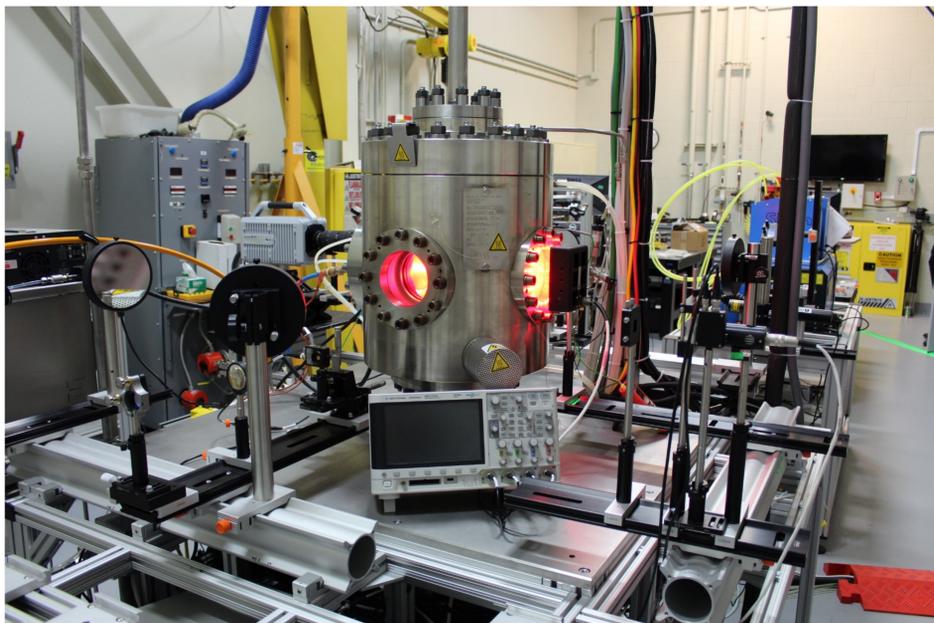
- Shot-to-shot rate of injection, injection quantity, and hydraulic delay
- Near nozzle high-speed imaging
- Near simultaneous Mie scattering/Schlieren imaging
- Droplet sizing and velocity using shadowgraphy technique
- Exciplex for liquid and vapor measurement
- Planar laser-induced fluorescence (PLIF) for OH/CN/NO/CH₂O
- Rayleigh thermometry
- LIF spectral analysis/Raman spectrograph
- Laser-induced incandescence (LII)



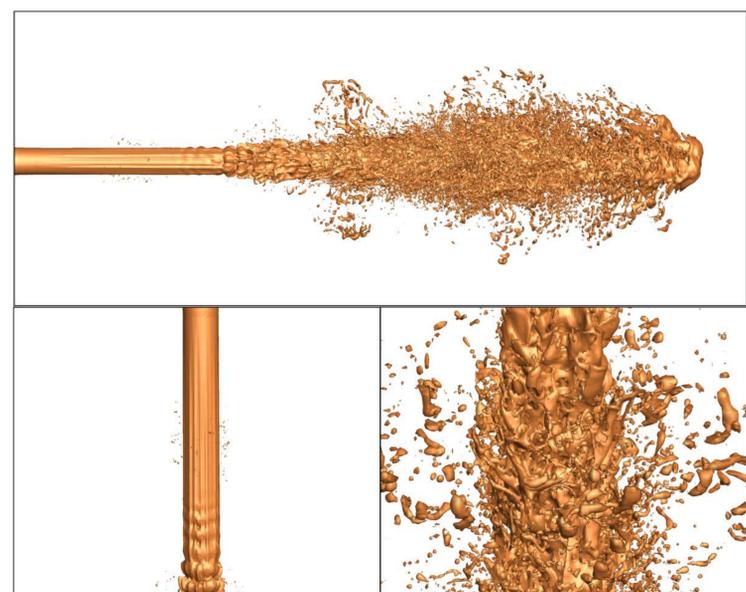
High-Temperature Pressure Vessel
(1000°K at 150 bar, 0–21% O₂)



Shimadzu CMOS (10M fps)



High-Speed Simultaneous Mie/Schlieren Setup



Detailed Numerical Simulation (DNS)