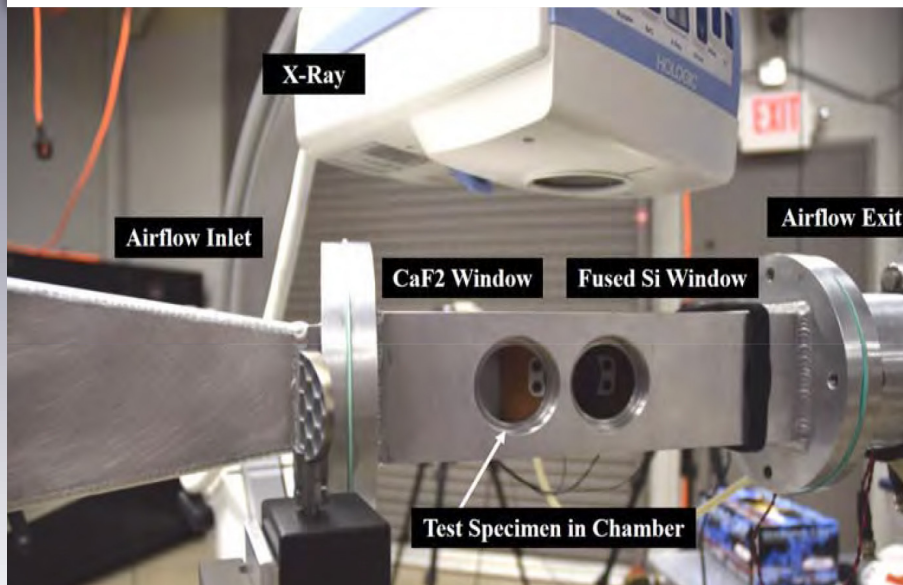


With increased emphasis on hypersonic systems development, understanding of the oxidation characteristics of materials must be obtained. Experimental materials must be tested in an environment that is representative of the anticipated flight conditions in order to support model validation.

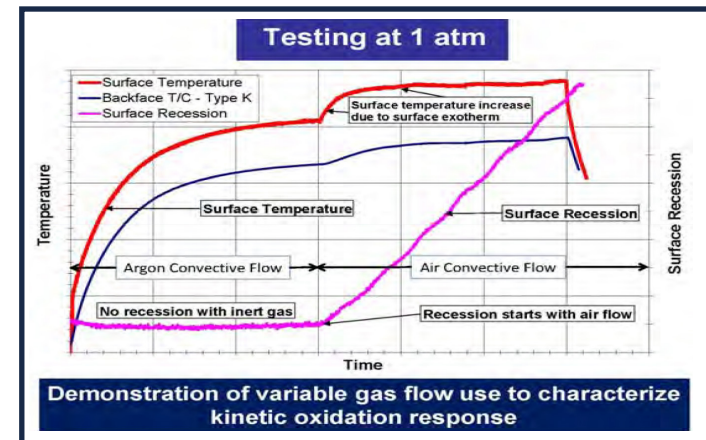
The Air Force Research Laboratory's LHMEF Facility has become a vital part of the DoD and NASA materials development programs. Designed specifically to support materials response testing in high heating environments, LHMEF has been used extensively to ensure hypersonic flight success. The facility's reliable performance, uniform beam profile, advanced diagnostics and high testing throughput have proven invaluable to producing the statistically significant data needed to advance materials development and modeling/simulation programs.

Leveraging existing LHMEF capabilities, the Army Aviation and Missile Research, Development and Engineering Center (AMRDEC) and the AFRL Materials and Manufacturing Directorate (AFRL/RX) joined together to install a closed section wind tunnel designed to satisfy the need for improved simulation of hypersonic aerothermal effects on the kinetic oxidation response for materials. This capability is now available to all LHMEF users.



## CAPABILITIES

- Ability to test materials in a high altitude hypersonic shear flow environment with inert, oxidizing, or a combination of both environments at temperatures up to 3500oF and pressures ranging from 0.01 to 5 atmospheres.
- Test parameters can be obtained independently from each other allowing for critical M&S validation.
- Flow Control System has the capability to alternate the supply to the test section with inert or oxidizing flow medium while the sample is being exposed and heated to temperature.
- LHMEF's fiber lasers offer virtually limitless exposure time for the sample being tested.



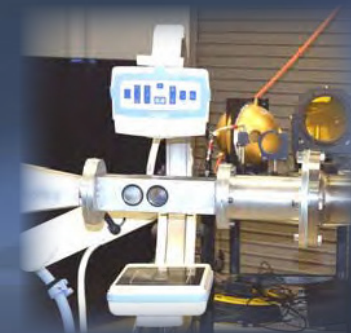
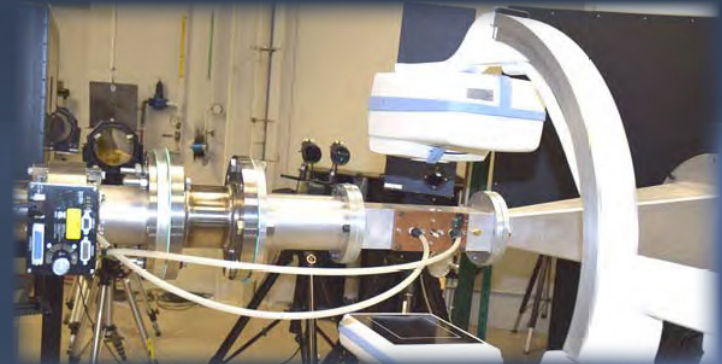
## AVAILABLE DATA

- Variable gas flow use to characterize kinetic oxidation response.
- Material surface temperature as a function of location on the test sample.
- The surface position and associated recession/swell rates.
- Convective flow pressure, mass transfer coefficient and surface temperature.
- Extensive diagnostics including real time radiography, high speed video and backside surface temperature.
- Complete temperature map ranging from room temperature to 3000oC at frame rates up to 1100 frames/sec.



# LHMEL Low Pressure Kinetic Ablation Test Capability

Supporting the DoD and NASA in Hypersonic and Thermal Protection System Technology Development



For more information contact:

**Mr. Jared Petry**

937.255.6636 x3054

[jared.petry@us.af.mil](mailto:jared.petry@us.af.mil)

**MR. ROB HULL**

UES, Inc.

937.252.3132 x3009

[robert.hull.1.ctr@us.af.mil](mailto:robert.hull.1.ctr@us.af.mil)

Wright-Patterson Air Force Base • Dayton, Ohio

Air Force Research Laboratory, Materials and  
Manufacturing Directorate, Wright-Patterson AFB,  
OH 45433, USA



MATERIALS AND MANUFACTURING DIRECTORATE