

1. Research Title: Advanced Measurement Technology for Aerospace Propulsion Systems

2. Individual Sponsor:

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3. Academic Area/Field and Education Level

Mechanical/Aerospace/Electrical Engineering (MS and/or PhD level - PhD preferred)

4. Objectives: Contribute research and development of High-Speed Thermal Imaging Systems with optical probes that can penetrate and survive the conditions inside various power and propulsion systems. Additional opportunities exist in developing high frequency flexible thin film instrumentation and sensors for measuring surface heat flux, unsteady boundary layer characteristics. RF Sputtering and Photolithography capabilities are available locally, along with collaboration opportunities with the nearby AFRL Materials and Manufacturing Directorate. Opportunities exist for research in high temperature optical probe design, materials, and fabrication, multispectral thermography, high speed IR camera image acquisition, digital image processing, and large dataset analysis and interpretation. Expertise is sought in high temperature optics design and modelling, thermal radiometry, infrared or multispectral pyrometry, or novel techniques addressing varying material and viewpath absorption, emissivity and reflectivity, with addition interest in methods of processing, reduction, and analysis of the large datasets these instruments produce. Knowledge of propulsion systems or turbomachinery is useful but not a pre-requisite. This opportunity provides an optical or thermal imaging researcher with aerospace propulsion knowledge that will broaden their application experience.

5. Description: Air Force Propulsion Systems push engine hot section components close to their thermomechanical limits to increase power and efficiency. Advanced measurement technology is desired to resolve high frequency temperature and/or surface heat flux in high temperature, turbulent, and potentially rotating flows. Opportunities exist to perform work in multiple laboratories or test sites.

6. Research Classification/Restrictions: Open to U.S. citizens only. Some aspects of this research may include ITAR restrictions.

7. Research Institutions: DAGSI Universities