

1. Research Title:

Novel Power Generation and Thermal Management Concepts for High-Speed Vehicles

2. Individual Sponsor:

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3. Academic Area/Field and Education Level

Aerospace Engineering, Electrical Engineering, or Mechanical Engineering (MS or PhD)

4. Objectives: Design/model/develop/test integrated power generation and/or thermal management subsystem technologies applicable to high-speed aircraft.

5. Description: *The Air Force Research Laboratory is seeking innovative technical and integrated system approaches to power generation and/or subsystem thermal management for high-speed vehicles, which may use novel propulsion systems that present unique opportunities to reduce subsystem size/weight. Technologies that convert/harvest energy and can operate in a challenging thermal/mechanical environment are of interest, and the AF seeks to evaluate their performance, reusability, scalability, and integration impacts. Technology areas include, but are not limited to:*

- *Integrated power and thermal cycles using novel working fluids (e.g., transcritical/supercritical Rankine/Brayton cycles)*
- *High temperature energy harvesting (e.g., thermionic, thermophotovoltaic, thermoelectric generators and associated integration technologies)*
- *Dynamic modeling and MBSE approaches (e.g. MATLAB Simulink-based modeling and simulation, including custom component model development, subsystem design, and performance analysis)*

6. Research Classification/Restrictions: Unclassified/U.S. Citizens only

7. Eligible Research Institutions: All DAGSI