



NASA SBIR/STTR Technologies
 Intercooled Turbo-Brayton Power Converter for Spaceflight Applications
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 Proposal No. 10-X8.03-8690

Identification and Significance of Innovation

Future NASA space missions require advanced systems to convert thermal energy into electric power. These systems must be reliable, efficient, and lightweight. In response, we propose to develop an intercooled turbo-Brayton power converter with high efficiency and specific power. The converter will use gas bearings to provide reliable, maintenance-free, long-life operation. It will also consist of discrete components that can be packaged to fit optimally with other subsystems, and its continuous gas flow can communicate directly with remote heat sources and heat rejection surfaces without ancillary heat transfer components and intermediate flow loops.

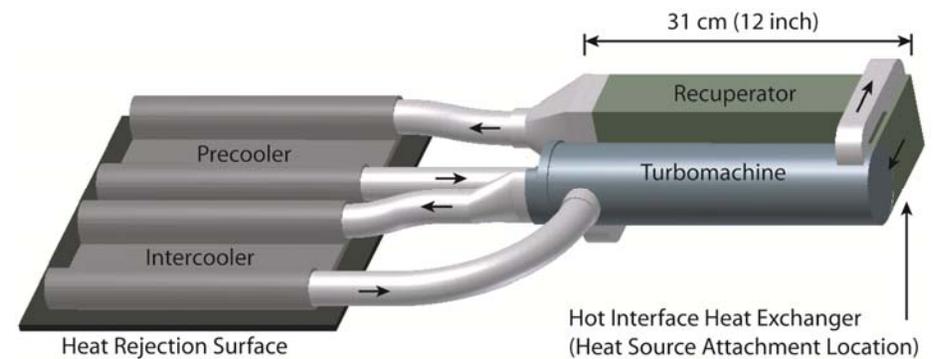
Expected TRL Range at the beginning and end of Contract: 3 and 3

Technical Objectives

1. Optimize conceptual design
2. Develop preliminary design
3. Quantify thermodynamic performance
4. Determine mass and size
5. Fabricate two-stage compressor impeller
6. Assess technical risks

Work Plan

1. Trade Studies
2. Component Design
3. Converter Assembly Design
4. Fabrication Trials
5. Management and Reporting



1 kW_e Conceptual Design

NASA Applications

1. Space exploration probes
2. Unmanned surface rovers
3. Fission surface power
4. Nuclear electric propulsion
5. Space station power systems
6. Concentrated solar heat sources

Non-NASA Applications

1. Mobile electric generators
2. Single-person portable electric generators
3. Electric generators for aggressive environments (sand, sea water, etc.)
4. Fossil fuel combustion, biofuel combustion, refuse burning, and concentrated solar energy

Contact

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