

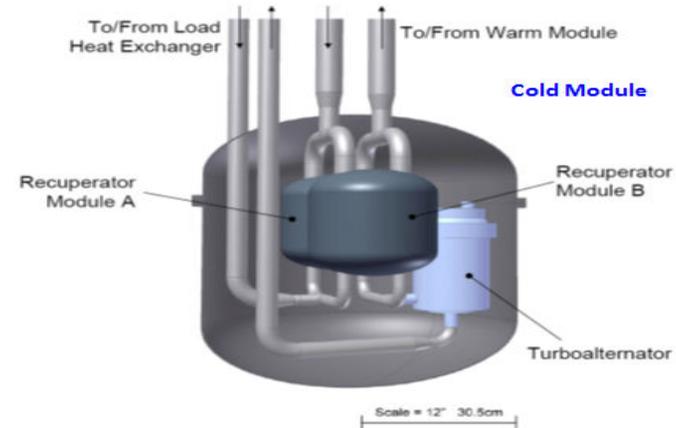
NASA SBIR/STTR Technologies
A2.01-9150 – A Turbo-Brayton Cryocooler for Aircraft
Superconducting Systems
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Identification and Significance of Innovation **Creare's *Cryoflight* cryocooler is an enabling technology for hybrid turboelectric aircraft.**

Decoupling power production from propulsion allows radical new designs; large reductions in emissions, fuel burn, and noise are possible with this approach; and weight targets only achievable with superconducting generators and motors are cooled by compact, lightweight cryocoolers. Advantages of the *Cryoflight* Cryocooler include a high-performance turbo-Brayton cryocooler, efficiency that exceeds others available, and weight that is five times lighter than others. The proposed *Cryoflight* recuperator will be lightweight and high performance and is an innovative new manufacturing technique. This innovation is critical to achieving the cryocooler performance goals.

Expected TRL Range at the end of Contract (1-9): Phase I – 3, Phase II – 4



Technical Objectives

Develop and demonstrate a compact, lightweight recuperator optimized for a turbo-Brayton cryocooler for hybrid turbo-electric aircraft.

Work Plan

Phase I: Demonstrate feasibility of recuperator concept through risk reduction tests

Phase II: Design fabricate and test a prototype recuperator

Phase III: Integrate with cryocooler

Build and test engineering model cryocooler

Transition to production

NASA and Non-NASA Applications

NASA Applications:

Cooler for superconducting aircraft technology demonstrators.

Cooling for cryogen liquefaction and storage for space missions and at spaceports on earth.

Non-NASA Applications:

Cooler for production superconducting aircraft.

Cooling for superconducting machines in power generation (wind turbines).

Cooling for superconducting power transmission systems (data centers).

Firm Contacts

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NON-PROPRIETARY DATA