NASA SBIR/STTR Technologies

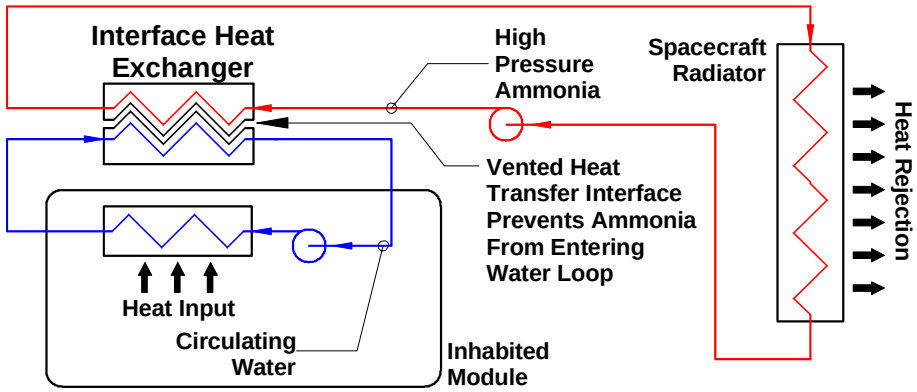
Liquid-Liquid Heat Exchanger with Zero Interpath Leakage

PI: Dr. Michael G. Izenson / Creare Inc., Hanover, NH

Proposal No. 05-1 X12.01-9563

Identification and Significance of the Innovation

- Interface heat exchanger for thermal control
  - For future manned spacecraft or space station upgrades
  - Transfers heat from circulating water to ammonia radiator loop
- Innovation: Novel core design and materials
  - No metal connection between water and ammonia channels
  - A leak vents ammonia to space without entering water channels
  - Corrosion cannot extend from water to ammonia channels
  - Applicable to any thermal control system with two fluids
- Builds on established fabrication processes
  - Metal forming and blanking
  - Vacuum brazing
  - Materials resistant to pitting corrosion



Interface Heat Exchanger with Zero Interpath Leakage

Technical Objectives and Work Plan

- Improve safety of manned spacecraft
  - Single-point failures in interface HX cannot inject ammonia into circulating water system
- Technical objectives for heat exchanger
  - Compact and light weight
  - High thermal effectiveness and low pressure losses
  - Suitable for future manned spacecraft and space station upgrades
- Phase I work plan
  - Determine heat exchanger specifications
  - Demonstrate thermal performance of key materials
  - Design Phase II prototype

NASA and Non-NASA Applications

- NASA Applications
  - Manned spacecraft for lunar and/or planetary exploration
  - Thermal control for lunar/planetary bases
  - Space station upgrades to replace existing interface heat exchanger
- Non NASA applications
  - Solar water heaters
  - Reformers for fuel cell power systems
  - Compact energy and process systems

Contact: Mike Izenson, mgi@creare.com