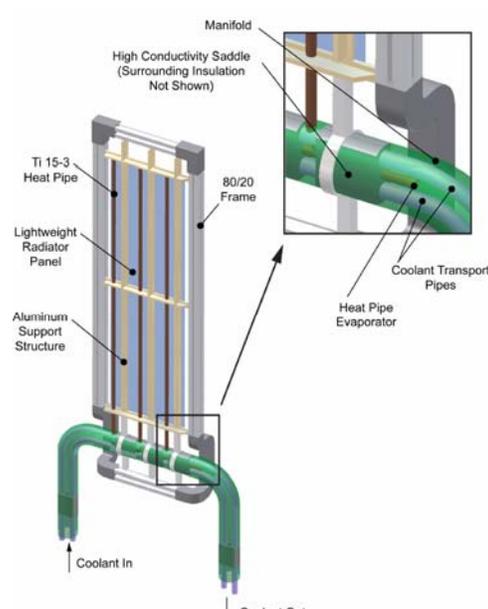


Briefing Chart

NASA SBIR/STTR Technologies A Novel, Ultra-Light Heat Rejection System for Nuclear Power Generation Jay C. Rozzi, Ph.D./Creare Incorporated, Hanover, NH Proposal No. X8.02-9409	
<p>Identification and Significance of Innovation:</p> <ul style="list-style-type: none"> • Lunar-based fission power system to support IRSU or Mars missions generate large amounts of waste heat • Lightweight, high-temperature heat rejection systems are needed to reject this waste heat to space • Current systems are heavy and other alternatives, such as a titanium sheathed heat pipe with a carbon composite over-wrap, combined with a carbon composite radiator are high risk • Our innovation is the Ultra-Light Heat Rejection System (ULHRS) that uses of highly conductive, lightweight panel materials with a Ti 15-3 heat pipe resulting in a high efficiency, lightweight HRS • Our ULHRS will reduce the mass per unit heat rejection by 32% compared to our previous generation lightweight HRS • During the Phase I project, we demonstrated the feasibility of our approach by designing, fabricating, testing, and delivering a prototype to NASA GRC • During Phase II, we will design, fabricate, test, and deliver a ULHRS demonstrator that incorporates our innovation with other subsystems (e.g. cooling loop manifold) needed for the eventual application 	 <p>The ULHRS Demonstrator. Our innovative ULHRS will combine Creare's advances in ultra-light radiator panels and brazing techniques with Thermacore's innovative titanium/water heat pipes based on lightweight, high strength, titanium 15-3 alloy. During Phase II, we will design, fabricate, test, and deliver a ULHRS demonstrator that will be approximately 0.3 m wide by 1 m long. The demonstrator has an aluminum support frame to withstand launch loads. The 80/20 frame pictured is for the support of test article in our Thermal Vacuum Chamber and is not part of the support for launch.</p>
<p>Technical Objectives: Design and Optimize a ULHRS Demonstrator Demonstrate and Evaluate the Performance Deliver the ULHRS Demonstrator to NASA</p> <p>Work Plan: Set Specifications Design ULHRS Demonstrator Fabricate Test, Evaluate, and Deliver</p> <p>Subcontractors/Partners: Thermacore, Inc. for Ti 15-3 Heat Pipe Design and Fabrication</p>	<p>Schedule and Deliverables: MAC 9 Demonstrator Design Complete MAC 15 Demonstrator Fabrication Complete MAC 24 Deliver ULHRS Demonstrator to NASA Other Deliverables Include Reports and Meeting Materials</p> <p>NASA & Commercial Applications: Space-based heat rejection systems Commercial thermal management systems that are severely weight constrained including radar, aerospace, large-scale power systems and energy recovery applications</p>