

A Variable View Factor Two-Phase Radiator Manufactured Via Ultrasonic Welding

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In order to provide adequate cooling in the most challenging thermal environments, radiators for manned spacecraft, satellites, planetary rovers and unmanned spacecraft are typically oversized for moderate thermal environments and prone to freezing at low sink temperatures. In order to address the need for light-weight and efficient radiators capable of a significant heat rejection turndown ratio, Advanced Cooling Technologies, Inc. (ACT) has developed a novel vapor-pressure-driven variable-view-factor and deployable radiator that passively operates with variable geometry (i.e., view factor). The device utilizes two-phase heat transfer and novel geometric features that passively (and reversibly) adjust the view factor in response to internal pressure in the radiator. The focus of the current paper is to provide an update on ACT's progress manufacturing the variable view factor two phase radiator (VVFTPR). ACT in collaboration with Edison Welding Institute is developing a manufacturing process for the VVFTPR. This presentation describes the ultrasonic welding technique chosen for manufacturing as well as material choices and progress on manufacturing.

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