

**GPM Avionics Module Heat Pipes
Design and Performance Test Results
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Laura Ottenstein
NASA/Goddard Space Flight Center
Greenbelt, MD
Laura.Ottenstein-1@nasa.gov
Phone: 301-286-4141

Mike DeChristopher
Advanced Cooling Technologies, Inc.
Lancaster, PA
Mike.Dechristopher@1-ACT.com
Phone: 717-295-6108

The Global Precipitation Measurement (GPM) mission is an international network of satellites that provide the next-generation global observations of rain and snow. The GPM core satellite carries an advanced radar / radiometer system to measure precipitation from space and serve as a reference standard to unify precipitation measurements from a constellation of research and operational satellites. Through improved measurements of precipitation globally, the GPM mission will help to advance our understanding of Earth's water and energy cycle, improve forecasting of extreme events that cause natural hazards and disasters, and extend current capabilities in using accurate and timely information of precipitation to directly benefit society. The avionics module on the core satellite contains a number of electronics boxes which are cooled by a network of aluminum/ammonia heat pipes and a honeycomb radiator which contains thirteen embedded aluminum/ammonia heat pipes. All heat pipes were individually tested by the vendor (Advanced Cooling Technologies, Inc.) prior to delivery. Following delivery to NASA, the flight avionics radiator and the flight spare transport heat pipes were mounted to flight-like test structure and a system level thermal vacuum test was performed. This test, which used simulators in place of all electronics boxes, was done to verify the operation of the thermal control system as a whole. This presentation will discuss the design of the avionics module heat pipes, and then discuss performance test results for the individual heat pipes prior to delivery and for the system level thermal vacuum test. All heat pipes met their performance requirements. However, it was found that the power was too low in some instances to start all of the smaller radiator spreader heat pipes when they were tested in a reflux configuration (which is the nominal test configuration). Although this lowered the efficiency of the radiator somewhat, it did not impact the operating temperatures of the electronics boxes.