

Lockheed Martin Remote Cooling for the Cryogenic Demonstration Mission

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This paper summarizes the design and ground testing of a 90K remote cooling system being utilized to intercept heat to one of the NASA/Lockheed Martin Cryogenic Demonstration Mission liquid hydrogen tanks. The system utilizes a cryogenically operating compressor (Lockheed Martin) to circulate cold gas to intercept heat. A cryocooler (Sunpower Ametek) rejects heat via ambient oscillating heat pipes and a spreader (ThermAvant) on a space radiator. Two electronics (Iris Technology) control the cryocooler and the compressor. A fin heat exchanger attached to the cryocooler removes heat from the circulating gas. The gas cools a shield in the thermal protection insulation surrounding the liquid hydrogen tank. The reduction of the thermal load to the tank improves storage time. While the system being presented is used to intercept heat of a cryogenic tank it is very applicable to cooling instruments.