

Ball Klondike Cryocooler System Design, Development, Qualification and Performance

***R. Taylor, B. Buchholtz, A. Brown, D. Glaister, Y. Kim,
A. Contreras, and D. Oenes, Ball Aerospace, Boulder, CO; C.
Fralick and D. Mansfield, Sunpower, Athens, OH; and K.
Frohling, Iris Technology, Irvine, CA***

Current and future cryogenic space payloads are pushing the limits of current space rated cryocooler systems. Industry expectations for future cryocooler systems include shorter lead time, >5x cost reduction, and higher efficiency/capacity. Ball has developed a productized, turn-key cryogenic cooling system called Klondike that meets and exceeds these expectations. The Ball Klondike Cryocooler System includes a TRL9 Low Exported Vibration Cryocooler Assembly (CCA) mated to a TRL8 Sunpower DS-30 cryocooler, TRL8 Iris Technology HP-LCCE2 Cryocooler Control Electronics (CCE), flight harnesses, cold-tip thermal strap, and standard heat rejection interface. The Klondike system successfully passed qualification and has been delivered to a government customer for a flight program of record. This paper discusses the design, development, qualification and Thermodynamic and EFT (Exported Force and Torque) performance of the Klondike Cryocooler System.