

AIM Cryocoolers for Harsh Environments

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State-of-the-art high performance IR-sensors still require cooling by means of cryocoolers to achieve their electro-optical performance. In many applications such as guided missiles, rifle and gunner sights, fighter aircrafts, helicopters or launch vibrations for space applications, the system including cryocooler has to withstand Harsh Environments. Depending on requirements like heat load, operating temperature, size weight and power constraints (SWaP) as well as exported vibrations different types and sizes of coolers are used. Several aspects of compressor and coldfinger design like moving magnet driving mechanism, flexure bearing design, transferline or stiffness of coldfinger/dewar will be discussed. Design features to meet such requirements will be presented for different single and dual piston linear compressors. This includes compact single piston cryocoolers for high operating temperature (HOT), low SWaP coolers like SX020 and long life flexure bearing coolers like SF400 pulse tube cryocoolers for space applications. Specific modifications, vibration profiles and testing results will be discussed.