Miniature Linear Cryocoolers for HOT Applications

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ABSTRACT

Mid Wave IR HOT detectors today allow operating temperatures as high as 130K - 150K and current developments predict even higher temperatures for the near future. To achieve improvements in size, weight, power and cost (SWaP,C) improved miniature, long life cryocoolers are demanded.
Since many years developments at AIM are focused to compact, lightweight linear cryocoolers to also achieve highest MTTF targets. The most compact linear compressors are featuring single piston moving magnet driving mechanisms and passive balancer technology.
Linear coolers provide key advantages vs. rotary cooler technology like low audible noise and vibration, high flexibility in IDCA concepts due to split design and finally outstanding MTTF life. The high MTTF significantly reduces total cost of ownership as cooler replacements due to wear-out are completely eliminated for most applications.
In 2014 AIM presented SX020 model which is lightweight (<200g) and compact (< 60mm compressor length) and high efficient (~2W typical power consumption).
In this paper AIM will give an update on qualification and production status for SX020. Status of development of the next smaller cooler SX010 and of a miniature coldfinger (<40mm overall length) including predicted performance data will be presented.

KEYWORD LIST

Cryocooler, Moving Magnet, IDCA, single piston, long life