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High operating temperature IR-modules with reduced pitch for SWaP sensitive applications

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Low Size, Weight and Power (SWaP) are the most critical requirements for portable thermal imagers like weapon sights or handheld observations devices. On the other hand due to current asymmetrical conflicts there are high requirements for the e/o performance of these devices providing the ability to distinguish between combatants and non-combatants or identify persons from a photo ID in adequate ranges. Despite of all the success with uncooled technology, such requirements usually still require cooled detectors.

AIM has developed a family of thermal weapon sights called HuntIR and RangIR based on high performance cooled IR-modules which are used e.g. in the infantryman of the future program of the German army (IdZ). The specific capability of these devices is a high ID range >1500m for tank targets being suitable in use as thermal sights for .50 cal rifles like the G82, fire control units for the 40mm AGL or for night observation. While such ranges sound far beyond the operational needs in urban operations, the a.m. specific needs of asymmetric warfare require sometimes even more range performance.

As a key component to keep performance while reducing SWaP AIM is developing for a follow-on sight family a new cooled MCT IR-module with reduced pitch of 12 μ m operating at a temperature >120K. The module will provide full TV format with 640x480 elements sensitive in the MWIR spectral band. A low power electronics provides the additional functions like image correction and dynamic reduction as well as power management of the components. In a modular approach the sight can be used as a high performance clip-on for snipers with additional modules for laser range finding and oculars for observation or stand-alone targeting.

The paper will show recent results of AIM IR-modules operating a higher operation temperature and the impact of design regarding the IR-module itself and the thermal sight making use of it.

Keywords: MCT, IR-module, MWIR, high operating temperature, thermal weapon sight

Short version:

Low Size, Weight and Power (SWaP) are the most critical requirements for portable thermal imagers like weapon sights or handheld observations devices. On the other hand due to current asymmetrical conflicts there are high requirements for the e/o performance of these devices providing the ability to distinguish between combatants and non-combatants. AIM has developed a family of thermal weapon sights called HuntIR and RangIR based on high performance cooled IR-modules. The specific capability of these devices is a high ID range >1500m for tank targets being suitable in use as thermal sights for .50 cal rifles like the G82, fire control units for the 40mm AGL or for night observation. As a key component to keep performance while reducing SWaP AIM is developing for a follow-on sight family a new cooled MCT IR-module with reduced pitch of 12 μ m operating at a temperature >120K. The module will provide full TV format with 640x480 elements sensitive in the MWIR spectral band.