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Small pixel pitch MCT IR-modules

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It is only some years ago, since VGA format detectors in 15µm pitch, manufactured with AIM's MCT n-on-p LPE standard technology, have been introduced to replace TV/4 format detector arrays as a system upgrade.
In recent years a rapid increase in the demand for higher resolution, while preserving high thermal resolution, compactness and low power budget is observed. To satisfy these needs AIM has realized first prototypes of MWIR XGA format (1024x768) detector arrays in 10µm pitch. They fit in the same compact dewar as 640x512, 15µm pitch detector arrays. Therefore, they are best suited for system upgrade purposes to benefit from higher spatial resolution and keep cost on system level low.
By combining pitch size reduction with recent development progress in the fields of miniature cryocoolers, short dewars and high operating temperatures the way ahead to ultra-compact high performance MWIR-modules is prepared.
For cost reduction MBE grown MCT on commercially available GaAs substrates is introduced at AIM. Recently, 640x512, 15µm pitch FPAs, grown with MBE have successfully passed long-term high temperature storage tests as a crucial step towards serial production readiness level for use in future products.
Pitch size reduction is not limited to arrays sensitive in the MWIR, but is of great interest for high performance LWIR or 3rd Gen solutions. Some applications such as rotorcraft pilotage require superior spatial resolution in a compact design to master severe weather conditions or degraded visual environment such as brown-out. For these applications AIM is developing both LWIR as well as dual band detector arrays in HD-format (1280x720) with 12µm pitch.
This paper will present latest results in the development of detector arrays with small pitch sizes of 10µm and 12µm at AIM, together with their usage to realize compact cooled IR-modules.

Keywords: MCT, IR-module, small pitch size, XGA 1024x768, HD-format, MWIR, LWIR, MBE