

## The Development of 3rd Gen IR Detectors at AIM

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(310 words)

AIMs production of 2<sup>nd</sup> Gen infrared detectors is based on LPE MCT layers and n on p planar technique covering the spectral range from VIS-NIR to VLWIR and delivering high performance state-of-the art IR devices. 3<sup>rd</sup> Gen IR modules – dual-color (DC), dual-band (DB), and large format 2-dimensional arrays – require a more sophisticated production technique such as MBE and mesa technique, which can satisfy the rising demand for increasingly complex device structures and low cost detectors, respectively.

The DC devices of AIM are based on MBE-grown InAs/GaSb type II superlattices which have been developed by the Fraunhofer Institute, IAF. The 384x288 DC detector with 40 µm pitch combines the simultaneous integration of two colors (3-4 µm, 4-5 µm) in the MWIR range in one pixel. In accordance with the AIM roadmap, the qualification of production is currently in progress, the start of production is scheduled for mid 2011.

For DB MW/LW detectors, MCT MBE on CdZnTe substrates is the technology of choice for AIM. The basic MBE growth of MCT multilayer structures was developed in cooperation with IAF. Dedicated for production of DB devices, AIM has installed an additional growth chamber connected to the existing MBE system. The basic approach for the mesa structured 640x512 DB FPA at 20 µm pitch is backside illumination with extrinsic Indium doping for the MW layer and Boron implantation for the LW layer.

Another benefit of MBE technology is the growth of MCT layers on alternate substrates which permits cost-effective production of large format arrays in the MWIR, due to its high homogeneity and yield. Currently, AIM develops the MBE growth of MWIR MCT on GaAs for megapixel detectors (1280x1024, 15 µm pitch). Promising first results were achieved for 640x512, 15 µm pitch PV arrays.

The paper will present the development status and latest results of the above-mentioned 3<sup>rd</sup> Gen Focal Plane Arrays and IDCAs.

Short Version (143):

For 3<sup>rd</sup> Gen IR modules (dual-color, dual-band, large 2-dim. arrays) AIM will extend its future portfolio by high performance devices, grown by MBE layers and performed by new

array processing techniques . The DC MW/MW detectors are based on antimonide type II SLs (produced by Fraunhofer IAF, Freiburg) in the 384x288 format with a 40  $\mu\text{m}$  pitch. For AIM, the technology of choice for MW/LW DB FPAs is MCT MBE on CdZnTe substrates, which has been developed in cooperation with IAF, Freiburg. 640x512, 20  $\mu\text{m}$  pitch FPAs have been processed at AIM .

The growth of MW MCT MBE layers on alternate substrates is challenging but essential for competitive fabrication of large 2dim. arrays such as megapixel (MW 1280x1024, 15  $\mu\text{m}$  pitch) FPAs.

The paper will present the development status and latest results of the above-mentioned 3<sup>d</sup> Gen Focal Plane Arrays and IDCAs.