

High Operating Temperature and Multi-Band Focal Plane Arrays Manufacturing Technology

PROBLEM / OBJECTIVE

Due to the U.S. infrared focal plane array (IR FPA) technology's declining competitive edge, two programs were established to develop the technology and enhance its manufacturability. The first program is the OSD-funded, Tri-Service Vital Infrared Sensor Technology Acceleration (VISTA) program which focused on the development of III-V antimony (Sb)-based IR FPA technology. The second program was the High Operating Temperature Multi-Band (HOT MB) FPA ManTech program, which focused on the establishment of a domestic industry base to support improved III-V Sb-based IR FPA manufacturing and production of HOT mid wavelength (MW) and smaller format dual-band FPAs.

ACCOMPLISHMENTS / PAYOFF

Process Improvement: As an alternative to current technology, the ManTech effort reduced cost while increasing yield and operability of these IR FPAs.

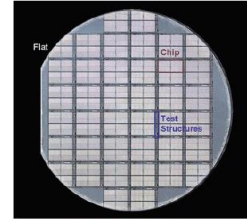
- Demonstrated improved wafer production capability and increased the size of gallium antimonide substrates from 2 to 6 inches.
- Established and matured new production capability of nine die per wafer for HOT MW (2cm x 2cm) and 32 die per wafer for dual-band (1.5cm x 1cm) in 4" wafer processing.
- Demonstrated batch versus single wafer processing and improved detector array fabrication yield to 90 percent.

Implementation and Technology Transfer:

Transitioned the new III-V SLS array capability to the domestic industrial base, which includes two domestic substrate foundries, two domestic epitaxial material growers, and five IR FPA producers. This transition has enabled industry to develop affordable wide-area high-resolution persistent surveillance, plume and gun flash detection solutions. The VISTA technology is transitioning to 3rd Gen FLIR, Javelin/CLU, F-35 EODAS/EOTS and Degraded Visual Environment (DVE).



Apache



GaSb/GaAs Substrate



FGM-148 Javelin



M1A2 Abrams

Expected Benefits and Warfighter Impact:

- Significantly reduced the dual band MW/LW FPA cost to make 3rd Gen FLIR production affordable.
- Increased range to search, identify, and track targets in all weather and obscured battlefield conditions.
- For urban environments, this technology provides the warfighters with wide area persistent surveillance capability, both high altitude and below clouds (e.g., UAV).

TIME LINE / MILESTONE

Start Date	October 2011
End Date	November 2016

FUNDING

U.S. Army ManTech	\$27.4M
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PARTICIPANTS

U.S. Army RDECOM Communications-Electronics Research Development and Engineering Center (CERDEC) Night Vision and Electronics Sensors Directorate (NVESD)
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