



## U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND

# MANUFACTURING TECHNOLOGY SUCCESS STORY

## III-V Dual-Band Infrared Focal Plane Arrays

### PROBLEM / OBJECTIVE

The Infrared focal plane array (IRFPA) is a technically challenging and expensive component of the 3<sup>rd</sup> Generation Forward Looking Infrared (FLIR) sensor.

The objective of this ManTech project was to mature manufacturing readiness for a lower-cost, high-performance Infrared focal plane array that can serve as a drop-in replacement for current technology. The III-V strained layer superlattice (SLS) detector material system, an epitaxial product of commercial compound semiconductor foundries, was selected.

### ACCOMPLISHMENTS / PAYOFF

This project matured manufacturing capability at three IRFPA fabrication facilities while multi-wafer production run capability for starting material was matured at commercial domestic compound semiconductor foundries. Accomplishments includes:

- Matured multi-wafer growth run capability significantly improving the supply chain for high-quality epitaxial wafers for IRFPA production
- Matured sensor batch processing allowing 32 detectors to be simultaneously fabricated on each wafer, up to 25 wafers at a time - a 300X improvement over current technology
- Matured production of a high performance dual-band form-fit-function drop-in replacement sensor.

Manufacturing knowledge will lead to significant cost savings for defense programs using advanced infrared sensor systems in addition to 3GEN FLIR by using a more affordable material for focal plane arrays.

***“This ManTech project played a pivotal role, improving production capability at numerous fabrication houses and epitaxial material growth foundries around the Nation...”*** Mr. John Notte, Deputy PM Ground Sensors, PEO IEW&S.

The III-V SLS IRFPA project will provide a drop-in replacement for the 3<sup>rd</sup> Generation FLIR, an upgrade to FLIR capability on current Abram tanks, to provide Soldiers an all-weather reconnaissance, targeting, surveillance, and acquisition system for day/night and degraded visual environments.



(Photo credit: U.S. Army)

This ManTech project supports the Army Futures Command Next Generation Combat Vehicle modernization priority by improving lethality and situational awareness in day, night, and obscured conditions ensuring overmatch.

### PARTICIPANTS

This project was executed by the Combat Capabilities Development Command (CCDC) - Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) center in collaboration with industry partners.

CCDC C5ISR, Night Vision and Electronic Sensors Directorate, Fort Belvoir, VA

- Raytheon Vision Systems, Goleta, CA
- L3 Cincinnati Electronics, Mason, OH
- HRL Laboratories, Malibu, CA
- IQE, Inc., Bethlehem, PA
- Intelligent Epitaxy Technology, Richardson, TX