| SBIR 06.2 PHASE I - AWARD DETAILS | |
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| **ORGANIZATION** | CERDEC |
| **TOPIC NUMBER** | A06-122 |
| **CONTRACT NUMBER** | |
| **YEAR OF AWARD** | |
| **AWARD START DATE** | |
| **AWARD COMPLETION DATE** | |
| **PROPOSAL NUMBER** | A062-122-0085 |
| **TITLE** | Type II Focal Plane Arrays on Strained Layer Superlattices (SLS) Material |
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| **COMPANY** | Advanced Device Technology, Inc<br>4 Raymond Ave, Suite #4B<br>Salem NH 03079<br><br>Minority Owned: Yes<br>Veteran Owned: No<br>Number of Employees: 8 |
| **KEYWORDS** | Type II Superlattices, Uncooled FPA, Low Cost FPA, Snapshot ROIC, High Reliability Passivation |
| **ABSTRACT** | We propose to develop “Type II Focal Plane Arrays on Strained Layer Superlattices (SLS) Material The Innovative Features of the project are: • Detector Arrays on Type II Strained Layer Superlattice (SLS) Material. High Performance Detector Arrays are designed on SLS material. The main advantages of SLS detectors are 1) higher performance and longer minority carrier life time 2) higher operating temperature 3) very fast time response and 4) lower cost and higher array uniformity. • Large Format LWIR FPAs. 320 x 256 element (30 um pitch) Detector arrays are designed for LWIR (8-12 um) waveband. The detector arrays are integrated with an existing ROICs with snapshot integration capability. • Uncooled Focal Plane Arrays. Superlattice Technology is capable of producing uncooled FPAs. The room temperature operation of the FPAs eliminates the need for cryo-cooling, which improves sensor reliability while reducing the sensor power and cost. • High Reliability Passivation Scheme. The detector array is fabricated with high reliability radiation-hard passivation scheme. • Cost-Effective Product Development. The proposed product can be developed cost-effectively with reduced risk due to: 1) feasibility of fabricating of high performance, Uncooled SLS detectors have already been demonstrated during the ongoing Navy contract, 2) snap-shot 320 x 256 element ROICs have already been developed and are available on the commercial market, and 3) ADT is presently developing Uncooled SLS FPAs and Cameras under another ongoing Army/SMDC contract . Several of the tasks that are being conducted under these two ongoing contracts are directly applicable to the proposed project. During Phase I, the feasibility of fabricating Uncooled SLS detectors for LWIR waveband will be demonstrated. During Phase II, 320 x 256 Element Uncooled LWIR Detector Arrays will be fabricated |

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| | and integrated with an existing ROIC. The characteristics of the FPA will be compared with that of HgCdTe FPA to demonstrate the advantages of SLS focal plane arrays in cost and performance. During Phase III, Uncooled LWIR Camera will be built and its application for various DoD projects will be demonstrated. |
| **BENEFITS** | The proposed approaches will give state-of-the-art Type II SLS detectors for tactical applications High performance, Uncooled focal plane arrays (FPA) on low cost, large area substrates is a basic requirement for several programs in the commercial and military sectors. The growth of SLS structures on GaSb substrates allows the development of Uncooled FPAs with mature fabrication methods and well-controlled material growth techniques. The large size (3”) of the substrate will allow the development of very large format focal plane arrays (320 x 256 , 640 x 512 and 1024 x 1024). The main military applications are: 1) missile seekers, 2) airborne remote sensing 3) the combined threat warning and reconnaissance applications, 4) target discrimination, 5) counter-measure rejection and 6) clutter rejection. The principal commercial applications of the IR thermal imaging system are: 1) medical imaging 2) night vision equipment for law enforcement agencies and for navigation, 3) environmental monitoring and 4) process control for manufacturing. |