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Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency

DATE: February 2011

APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	PROJECT	DATE: February 2011	
0400: Research, Development, Test & Evaluation, Defense-Wide BA 3: Advanced Technology Development (ATD)	PE 0603720S: Microelectronics Technology Development and Support (DMEA)	4: Other Congressional Adds (OCAs)		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011
<p>FY 2010 Accomplishments: Completed the requirements development and issued a SBIR Phase III RFP to Carbon Solutions of Riverside, CA. A proposal has been received and the effort is currently in the fact-finding phase with an award anticipated in January 2011.</p> <p>FY 2011 Plans: Award the effort and begin to optimize the performance of individual bolometric detectors based on SWNT thin films; fully characterize the parameters of their performance and integrate the optimized individual elements in a prototype of a linear 10-pixel array; and increase the temperature coefficient of resistance (TCR) of single-walled carbon nanotubes (SWNTs) bolometer sensitive element by utilization of pure semiconducting SWNTs, their chemical functionalization and optimized processing in order to improve the responsiveness and detectability of the SWNT bolometric detector and evaluate the limit of the detector performance. The planned completion date is 30-Jun-2012.</p>			4.775	-
<p>Congressional Add: Electronics and Materials for Flexible Sensors and Transponders (EMFST)</p> <p>FY 2010 Accomplishments: Completed the requirements development and received a proposal from North Dakota State University. The effort is currently in the fact-finding phase with an award anticipated in January 2011.</p> <p>FY 2011 Plans: Award the effort and begin to integrate advanced manufacturing technologies that have been investigated in prior program phases and demonstrate an end to end assembly process for flexible sensors; determine how to effectively integrate roll to roll assembly processes; continue development of materials that optimize critical properties, reduce costs, and simplify fabrication of flexible sensors and transponders; optimize selected deposition technologies from various direct-write and conventional-printing options to demonstrate feasibility to scale-up to a production type system; further develop system level implementations of sensor arrays and passive transducer based RFID sensors; demonstrate a functional large area array that can conform to an irregular shape; integrate energy harvesting solutions into sensor systems; and develop sensor technology for health monitoring. The planned completion date is 30-Jun-2012.</p>			1.592	-
<p>Congressional Add: End to End Semi-Fab Alpha Tool</p> <p>FY 2010 Accomplishments: Provided additional funding to finish the design of the Alpha High-Speed Ion Optics (HSIO) and installation of the Alpha HSIO Demonstration Platform equipment. Completed the requirements development for the next phase and received a proposal from Digibeam. The effort is currently in the fact-finding phase with an award anticipated in January 2011.</p> <p>FY 2011 Plans: Award the effort and begin to upgrade the column electrode assembly to improve bunching performance, integrate and test the improved buncher, provide a preliminary model and design of the beta</p>				

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2010	FY 2011
HSIO Column, which supports exposure speeds to the low Gpixel/second. The planned completion date is 31-Jan-2012.		
Congressional Add: Feature Size Migration at DMEA Advanced Reconfigurable Manufacturing of Semiconductors (ARMS) Foundry	2.387	-
FY 2010 Accomplishments: DMEA has established a comprehensive growth path for increasing functional density of its existing digital, analog and mixed signal processes. A study was updated to provide a migratory path for the current ARMS foundry to technology nodes less than 0.25um and identify processes and/or toolings for multi-layer interconnect development activities at different technology nodes. This project ensures that ARMS fabrication technology is able to handle the increased functional density of components on microchips that commercial manufacturers are continuing to develop and install in each new product that they produce, and to ensure that the foundry is able to convert from one process to another in a short period of time with a high yield of acceptable microcircuits during the first manufacturing run after process changeover. The ability to switch from one process to another is becoming more important as DMEA acquires an increasing number of processes to support the more complex integrated circuits used in each new weapon system. Various pieces of equipment were acquired to enhance feature size migration in the ARMS Foundry and its associated processes.	1.592	-
Congressional Add: Heterogeneous Gallium Nitride/Silicon Microcircuit Technology		
FY 2010 Accomplishments: This project has enhanced DMEA's design and test capabilities in preparation for the design and test of heterogeneous GaN/Si technology microcircuits. GaN-on-silicon is a low-cost alternative to growth on sapphire or SiC. Today epitaxial growth is usually performed on Si(111), which has threefold symmetry. The growth of single crystalline GaN on Si(001), the material of the complementary metal oxide semiconductor (CMOS) industry, is more difficult due to the fourfold symmetry of this Si surface leading to two differently aligned domains. Mastery of this low-cost alternative can benefit the DoD and its need for robust microcircuits that operate in rugged, harsh environments of severe temperature and vibration.	3.581	-
Congressional Add: High Performance Tunable Materials		
FY 2010 Accomplishments: Funding is being utilized to further advances made in previous phases at both North Carolina State University (NCSU) and North Dakota State University (NDSU). The NCSU requirements		