Exhibit R-2, RDT&E Budget Item Justification						Date: February 2006	
Appropriation/Budget Activity RDT&E, Defense-wide Budget Activity (BA): 3			R-1 Item Nomenclature: Microelectronics Technology Development and Support Program Element: 0603720S				
Cost ($ in millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	0.000	115.037	0.000	0.000	0.000	0.000	0.000
Defense Microelectronics Activity (DMEA)	0.000	115.037	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification: The Microelectronics Technology Development and Support efforts are to design, develop, and demonstrate microelectronics concepts, technologies, and applications to extend the life of weapon systems and to solve operational problems (e.g., reliability, maintainability, and performance) while addressing diminishing manufacturing sources. This includes providing for the development and long-term support structure necessary to ensure rapid prototyping, insertion, and support of microelectronics technologies into fielded systems. The Defense Microelectronics Activity **(**DMEA) provides technical and application engineering support for the implementation of advanced microelectronics research technologies from design through assembly and installation. The DMEA provides an organic capability to support these strategically important technologies within the DoD. These advanced technologies are translated into solutions for military needs. DMEA's RDT&E program is comprised of a mix of studies, investigations, planning efforts, developments, fabrications, and the insertions of solutions. This effort applies to all DoD systems using electronics e.g., F-22, B-2, Airborne Warning And Control System, F-16, F-15, F-14, Global Positioning System, USQ-113, Joint Strike Fighter, EA-6B, M-65, AN/TSC-93B, and AN/GSC-49 (V). Funds are required for technical and analytical support, equipment, supplies, travel, and publications.

B. Program Change Summary:

	FY 05	FY 06	FY 07
Previous PB 06	0.000	0.000	0.000
Current PB 07	0.000	115.037	0.000
Total Adjustment	0.000	115.037	0.000
Congressional Increase		116.550	
Program Adjustments		-1.513	

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Total PE Cost	0.000	115.037	0.000	0.000	0.000	0.000	0.000
Defense Microelectronics Activity (DMEA)	0.000	115.037	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation:
FY 06: Program Adjustments: Federally Funded Research and Development Centers (-$0.198), Section 8301 - 1% Congressional Withhold (-$0.916) and Section 8125 - Economic Assumptions (-$0.399). Congressional Increase: Congressional additions

C. Other Program Funding Summary: Provided at the Project Level.

D. Acquisition Strategy: N/A

E. Performance Metrics: Not required for this budget activity.

Exhibit R-2a, RDT&E Project Justification							Date: February2006
Appropriation/Budget Activity RDT&E, Defense-wide Budget Activity (BA): 3				Microelectronics Technology Development and Support Program Element: 0603720S			
Cost ($ in millions)	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11
Defense Microelectronics Activities (DMEA)	0.000	115.037	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Quantity - N/A							

A. Mission Description and Budget Item Justification: The Microelectronics Technology Development and Support efforts are to design, develop, and demonstrate microelectronics concepts, technologies, and applications to extend the life of weapon systems and to solve operational problems (e.g., reliability, maintainability, and performance) while addressing diminishing manufacturing sources. This includes providing for the development and long-term support structure necessary to ensure rapid prototyping, insertion, and support of microelectronics technologies into fielded systems. The Defense Microelectronics Activity **(**DMEA) provides technical and application engineering support for the implementation of advanced microelectronics research technologies from design through assembly and installation. The DMEA provides an organic capability to support these strategically important technologies within the DoD. These advanced technologies are translated into solutions for military needs. DMEA's RDT&E program is comprised of a mix of studies, investigations, planning efforts, developments, fabrications, and the insertions of solutions. This effort applies to all DoD systems using electronics e.g., F-22, B-2, Airborne Warning And Control System, F-16, F-15, F-14, Global Positioning System, USQ-113, Joint Strike Fighter, EA-6B, M-65, AN/TSC-93B, and AN/GSC-49 (V). Funds are required for technical and analytical support, equipment, supplies, travel, and publications.

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Defense Microelectronics Activities (DMEA)	0.000	115.037	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Quantity - N/A							

B. Accomplishments/Planned Program:

FY 2006 Plans:

- Ferrite Diminishing Manufacturing Program efforts will be the identification, assessment, and demonstration of advanced technologies to facilitate improved electronics and microwave subsystems for size, weight and power (SWaP) improvements in the electronics required to support the ferrite devices for future satellite and weapon system programs ($1.034)

- University Materials Characterization and Metrology Center efforts are to identify the chemical and structural elements of materials and devices, as well as chemical, optical, electrical, and physical principles in measurement science and to be an enabler to the nanotechnology industry by providing expertise, training, and making available shared diagnostics equipment. ($0.987)

- DMEA Core Research efforts are to design, develop, and demonstrate microelectronics concepts, technologies, and applications to extend the life of weapon systems and to solve operational problems (e.g., reliability, maintainability, and performance).and to ensure rapid insertion of transformational technologies into fielded weapon systems by providing the necessary development, manufacturing engineering, and long-term support structure. ($19.741)

- Spintronics Memory Storage Technology efforts are to achieve a breakthrough in magnetic random access memory (MRAM) technologies together with companion programs in electronics packaging and advanced materials in order to develop a technology that will be produced domestically and will transition from the lab to the battlefield in a timely and cost effective manner (10.068)

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RDT&E Articles Quantity - N/A							

B. Accomplishments/Planned Program: (continued)

- Center for Nanoscience Innovation efforts are to systematically clarify the feasibility of applying nanoscience and technology to defense requirements. ($8.390)

- Ruggedized Smart/Secure Radio Frequency Identification (RFID) efforts are to develop rugged, adaptive and reconfigurable reader technology using intelligent sensing and signal processing, and to develop rugged single chip RFID transceivers integrated with anti-tamper and tripwire systems to enable the use of RFID to secure critical assets. ($5.034)

- Optimizing Electronics for Advanced Controlled Environment Systems (ACES) efforts are to resolve thermal issues regarding electronics densification & advanced electronics packaging in military high-performance computing applications by designing components, chip-scale packaging, stacked structures, and electronic environmental systems that can withstand the demanding military thermal environments. ($4.195)

- Spray Cooling Migration Program efforts develop standardized spray cooling technology products, demonstrate them in cross-platform migrations and develop an automated process for integration of spray cooling products into military systems. ($5.034)

- Low Voltage Tunable Material efforts are to develop doped Barium Strontium Titanate (BST) thin film material to create reliable 3 to 4 volt tunable components. These components will have the high tunability, high reliability and good RF power handling capability required in critical military and Homeland Security communications systems. ($1.974)

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RDT&E Articles Quantity - N/A							

B. Accomplishments/Planned Program: (continued)

- Tunable Monolithic Integrated Circuit efforts are to monolithically integrate tunable radio frequency dielectric devices with high performance digital processing circuits, high voltage generation circuits and control electronics on a common substrate. ($1.974)

- Short Cycle Radio Frequency (RF) System on a Chip (RFSoC) Design efforts are to develop an approach to seamlessly integrate all RF and digital subsystem and chip-level design tools which could shorten design time by up to 90% and result in single-chip RFSoC. with parts count, assembly steps, size, and costs reduced by 50-90% as compared to existing RF solutions based on non-integrated discrete components. ($1.480)

- Development for Low Cost High Temp Superconductor (HTS) Receiver Manufacturing efforts are to develop and demonstrate the key low cost fabrication techniques to reduce the manufacturing cost of the HTS receiver dramatically, more than a factor of ten, which will enable very pure, linear, efficient, cost-effective wireless signal reception, not possible with any other technology. ($2.517)

- Advanced Power Management for Wireless Systems efforts are to demonstrate autonomous on-demand power (ODP) systems, where an ODP system automatically determines an application's need and delivers energy appropriately, this includes creating electrical and mechanical designs, algorithms, and embedded software development. ($4.195)

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RDT&E Articles Quantity - N/A							

B. Accomplishments/Planned Program: (continued)

- Molecular Electronics efforts are to engineer and synthesize new materials (molecules) for applications in silicon devices by applying advancements in molecular engineering, materials science and polymer chemistry to address challenges with integrated circuit integration and developing high-reliability semiconductor solutions. ($0.987)

- The Advanced Beam Steering Program efforts are to begin development of next generation beam steering technology. By combining existing technology with novel smart materials, a faster more robust technology will be available for insertion into numerous platforms for increased Warfighter capability. ($0.987)

- Advanced Dynamic Technology Optics Program efforts will begin to develop a new class of smart materials that will provide nanosecond switching speed shutter devices and variable index of refraction devices. These devices will be operated with a microelectronics controller system to ensure that delay in signal processing within the microelectronics will not delay or hamper speed of the device operation. ($0.987)

- Advanced Filter Program efforts are to begin combining new materials with existing optic technology for a nanosecond speed switchable band block/band pass technology over a wide wavelength range. This will provide instantaneous band blocking of damaging radiation of rapidly varying intensity and rapidly varying wavelength to provide an enhanced level of protection for numerous DoD and Homeland defense systems. ($0.987)

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RDT&E Articles Quantity - N/A							

B. Accomplishments/Planned Program: (continued)

- Foliage-penetrating Aoustically Cued Imagery Sensor efforts are to develop miniature digital acoustic array subsystem, imaging subsystem, sensor controller, Line Of Sight (LOS) and Non-LOS communications subsystem, Global Positioning System, chute and payout subsystem, and power subsystems that can be cued to take pictures automatically, compress, encrypt, and infiltrate the image for further analysis and situational awareness at a remote location. ($3.355)

- Semiconductor Photomask Technology Initiative efforts are to accelerate the development of state-of-the-art mask making tools and the formation of a domestic mask blank source. ($4.195)

- Ruggedized Integrated Battlefield Server efforts are to develop and field test, in the Operation Enduring Freedon area of operations, a spray-cooled ruggedized battlefield server collection management toolset. ($9.870)

- Superlattice Nanotechnology efforts are to develop and characterize Silicon Carbide (SiC) wafers grown from SiC templates using low-temperature processes and molecular beam epitaxy with minimum defects that will form the basis for the next generation of radio frequency and radiation-hardened microelectronics. ($2.963)

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RDT&E Articles Quantity - N/A							

B. Accomplishments/Planned Program: (continued)

- Secure Digital Coherent Optical Communications efforts are to develop secure optical/radio frequency architecture and operational concepts, study key performance-enhancing algorithms and protocols, and demonstrate key components leading to a secure, high-performance optical communications in fiber, air, and space. ($1.678)

- Advanced Power Management for Wireless Systems efforts are to demonstrate autonomous on-demand power (ODP) systems, where an ODP system automatically determines an application's need and delivers energy appropriately, this includes creating electrical and mechanical designs, algorithms, and embedded software development. $1.382)

- Miniaturized Wireless Communications System (Chameleon) efforts are to develop a covert self-contained microsensor package with on-board real-time mission critical information processing and an ultra-sensitive high temperature super-conducting transceiver. ($6.217)

- Ultra-low Power Battlefield Sensor Communication System (ULBPSCS) efforts are to develop a netted battlefield sensor system with a combination of ultra-sensitive receivers, ultra-low power miniature sensors, advanced manufacturing processes, and a real-time mission critical distributed information system. ($14.806)

C. Other Program Funding Summary: N/A
D. Acquisition Strategy: N/A