Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Defense Logistics Agency										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	70.558	26.878	91.132	-	91.132	81.651	82.750	83.779	80.278	Continuing	Continuing
1: *Technology Development*	26.271	26.878	26.593	-	26.593	26.832	27.425	28.026	28.499	Continuing	Continuing
2: *90nm Next Generation Foundry*	-	-	30.000	-	30.000	20.000	20.000	20.000	15.000	Continuing	Continuing
3: *Trusted Foundry*	-	-	34.539	-	34.539	34.819	35.325	35.753	36.779	Continuing	Continuing
4: *Other Congressional Adds (OCAs)*	44.287	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Microelectronics Activity (DMEA) provides a vital service as the joint Department of Defense (DoD) Center for microelectronics acquisition, adaptive operations and support - advancing future microelectronics research, development, technologies and applications to achieve the Department's strategic and national security objectives. An important part of the DMEA mission is to research current and emerging microelectronics issues with a focus on warfighters' needs. To this end, DMEA is integrally involved in the development of capabilities and resultant products based on technologies whose feasibility has been demonstrated but which have yet to be applied to real-world and military applications.

DMEA resolves microelectronics technology issues in weapon systems by quickly developing and executing appropriate solutions to not only keep a system operational but elevate it to the next level of sophistication or to meet new threats. DMEA provides critical microelectronics design and fabrication skills to ensure that the DoD is provided with systems capable of ensuring technological superiority over potential adversaries. DMEA provides critical, quick turn solutions for DoD, intelligence, special operations, cyber and combat missions as well as microelectronic parts that are unobtainable in the commercial market. DMEA's knowledge of varying military requirements across a broad and diverse range of combatant environments and missions—along with its unique technical perspective—allows it to develop, manage and implement novel microelectronic solutions to enhance mission capability. DMEA can then utilize these cutting-edge technology capabilities and products in the solutions it develops for its military clientele. After many years of performing analogous efforts, the technical experience, mission knowledge, and practical judgment that are gained from preceding efforts are often incorporated into subsequent technology maturation projects.

Microelectronics technology is clearly a vital and essential technology for all operations within the DoD. Yet, as critical as this technology is to DoD operations, the defense microelectronics market share is now less than 0.1% because the use of microelectronics has exploded in the commercial world. This commercial pressure is driving the semiconductor industry to supersede successive generations of microelectronics technologies with new technologies every 18 months or sooner. Due to intense business pressures, the semiconductor industry does not respond to the DoD's particular needs of ultra-low volumes, extended availability timeframes, or substantial security concerns. This has caused many commercial semiconductor facilities to close their doors or move off-shore to unsecure locations. Such intense commercial pressures make it impossible to assure that the current DoD suppliers will be available to satisfy the future DoD requirements. Therefore, DMEA has established a unique-in-the-world flexible integrated circuit manufacturing capability that provides microelectronics design, development, and manufacturing support on demand. DMEA produces limited quantities of components to meet the DoD's unique weapon system needs for a trusted, assured, and secure supply of

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Defense Logistics Agency	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*

microelectronics. This unique capability is essential to all major weapon systems, combat operations, and support needs. As such, DMEA serves the DoD, other US Agencies, industry and Allied nations.

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	26.271	26.878	27.400	-	27.400
Current President's Budget	70.558	26.878	91.132	-	91.132
Total Adjustments	44.287	-	63.732	-	63.732
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• FY 2010 Congressional Adds	44.287	-	-	-	-
• FY 2012 Departmental Fiscal Guidance	-	-	-0.024	-	-0.024
• FY2012 Defense Efficiency - Civilian Pay Raise Reduction	-	-	-0.757	-	-0.757
• FY2012 Defense Efficiency - Service Support Contractors Reduction	-	-	-0.026	-	-0.026
• FY 2012 Enhancements 90nm Next Generation Foundry Program	-	-	30.000	-	30.000
• FY 2012 Enhancements Trusted Foundry Program	-	-	34.539	-	34.539

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Project: 4: *Other Congressional Adds (OCAs)*		
Congressional Add: *3-D Electronics and Power*	4.775	-
Congressional Add: *AESA Technology Insertion Program*	2.387	-
Congressional Add: *Carbon Nanotube Thin Film Near Infrared Detector*	1.592	-
Congressional Add: *Electronics and Materials for Flexible Sensors and Transponders (EMFST)*	4.775	-
Congressional Add: *End to End Semi Fab Alpha Tool*	1.592	-
Congressional Add: *Feature Size Migration at DMEA Advanced Reconfigurable Manufacturing of Semiconductors (ARMS) Foundry*	2.387	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Defense Logistics Agency	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Congressional Add: *Heterogeneous Gallium Nitride/Silicon Microcircuit Technology*	1.592	-
Congressional Add: *High Performance Tunable Materials*	3.581	-
Congressional Add: *Semiconductor Photomask Technology Infrastructure Initiative*	1.592	-
Congressional Add: *Shipping Container Security System Field Evaluation*	3.581	-
Congressional Add: *Smart Bomb Millimeter Wave Radar Guidance System*	2.308	-
Congressional Add: *Spintronics Memory Storage Technology*	2.785	-
Congressional Add: *Superconducting Quantum Information Technology*	0.796	-
Congressional Add: *Tunable Micro Radio for Military Systems*	5.570	-
Congressional Add: *Vehicle and Dismount Exploitation Radar (VADER)*	3.979	-
Congressional Add: *X-Band/W-Band Solid State Power Amplifier*	0.995	-
Congressional Add Subtotals for Project: 4	44.287	-
Congressional Add Totals for all Projects	44.287	-

Change Summary Explanation

FY 2010 Congressional Adds: $44.287M

FY 2012 Departmental Fiscal Guidance Reduction: $ .024M

FY2012 Defense Efficiency - Civilian Pay Raise Reduction: $ .757M

FY2012 Defense Efficiency - Service Support Contractors Reduction: $ .026M

FY 2012 Enhancements 90nm Next Generation Foundry Program: 30.000M

FY 2012 Enhancements Trusted Foundry Program: 34.539M

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Defense Logistics Agency	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*

The increase to the FY 2012-2016 Research, Development, Test and Evaluation (RDT&E) budget for PE0603720S is due to the 90nm Next Generation Foundry program, a newly-approved Program issue, as well as the Trusted Foundry program transfer of OSD PE 0605140D8Z.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 1: *Technology Development*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
1: *Technology Development*	26.271	26.878	26.593	-	26.593	26.832	27.425	28.026	28.499	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Microelectronics Technology Development and Support funds are necessary to design, develop, and demonstrate microelectronics concepts, technologies and applications to extend the life of weapon systems and solve operational problems (e.g., reliability, maintainability, performance, and assured supply). This includes researching current and emerging microelectronics issues with a focus on warfighters' needs and providing for the development and long-term support structure necessary to ensure rapid prototyping, insertion, and support of microelectronics technologies into fielded systems, particularly as the technologies advance. DMEA maintains critical microelectronics design and fabrication skills to ensure that the DoD is provided with systems capable of ensuring technological superiority over potential adversaries. These funds provide an in-house technical staff of skilled and experienced microelectronics personnel working in state-of-the-practice facilities providing technical and application engineering support for the implementation of advanced microelectronics research technologies from reverse engineering through design, fabrication, test, assembly, integration and installation. DMEA provides an in-house capability to support these strategically important microelectronics technologies within the DoD with distinctive resources to meet DoD's requirements across the entire spectrum of technology development, acquisition, and long-term support. This includes producing components to meet the DoD's ultra-low volume, extended availability timeframe, needs for a trusted, assured, and secure supply of microelectronics. DMEA's capabilities make it a key resource in the intelligent and rapid application of advanced technologies to add needed performance enhancements in response to the newest asymmetric threats and to modernize aging weapon systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Technology Development Accomplishments/Plans	26.271	26.878	26.593
FY 2010 Accomplishments: DMEA designed, developed, and demonstrated microelectronics concepts, advanced technologies, and applications to solve operational problems. DMEA applied advanced technologies to add performance enhancements in response to the newest asymmetric threats and to modernize aging weapon systems. DMEA accredited trusted sources and the Advanced Reconfigurable Manufacturing of Semiconductors (ARMS) foundry provided a contingency means to ensure DoD can acquire critical trusted integrated circuits in a variety of process technologies and geometry node-sizes.			
FY 2011 Plans: DMEA will continue to design, develop, and demonstrate microelectronics concepts, advanced technologies, and applications to solve operational problems. DMEA will apply advanced technologies to add performance enhancements in response to the newest asymmetric threats and to modernize aging weapon systems. DMEA will accredit trusted sources and the ARMS foundry will provide a contingency means to ensure DoD can acquire critical trusted integrated circuits in a variety of process technologies and geometry node-sizes.			
FY 2012 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 1: *Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
DMEA will continue to design, develop, and demonstrate microelectronics concepts, advanced technologies, and applications to solve operational problems. DMEA will apply advanced technologies to add performance enhancements in response to the newest asymmetric threats and to modernize aging weapon systems.			
Accomplishments/Planned Programs Subtotals	26.271	26.878	26.593

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 2: *90nm Next Generation Foundry*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
2: *90nm Next Generation Foundry*	-	-	30.000	-	30.000	20.000	20.000	20.000	15.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) requires an upgrade to support 90nm semiconductor technology at the low-volume production-capable foundry at the Defense Microelectronics Activity (DMEA). This is a critical, time-sensitive requirement to support the DoD's strategy to provide an assured (always available) and trusted source of semiconductors (microelectronic devices) for critical weapon systems, sensors, and specialized electronic equipment. This upgrade will enhance DMEA's ability to provide one-of-a-kind advanced reconfigurable manufacturing for semiconductors to meet the time-sensitive, trusted, and low-volume operational needs of DOD, Special Ops, Cyber, Intelligence, and the Rad-Hard communities. The 90nm foundry at DMEA will be the only assured supply in the world to satisfy a multitude of critical DOD and US Government program issues for the foreseeable future.

The risk of DOD not having an assured supply of 90nm technology semiconductors is increasing because there is an accelerating migration of existing domestic foundries and new foundry investments toward unsecure geographic locations due to cheap labor and favorable tax and equipment depreciation laws. The DOD must eliminate the risks inherent in producing critical DOD components in unsecure locations utilizing foreign personnel. Most domestic semiconductor foundries, other than the very largest, will not recapitalize to 90nm thereby making this technology even more difficult for the DOD to obtain in the future. The 90nm DMEA foundry is absolutely necessary to provide assured and secure microelectronics design and fabrication for trusted microelectronics systems and semiconductor components to ensure DOD technological superiority over potential adversaries.

The DMEA Advanced Reconfigurable Manufacturing of Semiconductors (ARMS) foundry can be “flexed” when demand requires fabricating integrated circuit (IC) devices on different manufacturing processes with different feature sizes and technologies. The business model for DMEA’s foundry involves the acquisition of process intellectual property (IP) (i.e., specific process technology recipes) of multiple commercial processes to host in the ARMS foundry at much reduced cost in both dollars and time from that of inventing or re-developing such recipes. The ARMS foundry’s unique on-demand flexibility satisfies the DMEA mission to provide microelectronics solutions and results in "just enough, just in time” support for the low volume requirements of DoD program managers. The current DMEA ARMS foundry will accommodate technology process geometries down to 180nm (i.e., 0.18 microns). Due to physical limitations in the current DMEA lithography and fabrication equipment, the 90nm state-of-the-practice processes that need to be incorporated in the ARMS foundry require a “step function” upgrade in equipment and facilities to handle the smaller geometry feature sizes and much larger wafer starting material. Therefore, DMEA must upgrade the DMEA ARMS foundry capability to produce the next necessary generations of semiconductor process technologies down to feature sizes of 90nm. This Project will fund expenses associated with planning and implementing the 90nm facility. Initial costs will include design and trade studies, costs associated with implementing force protection standards, floor plan layout and planning activities. Further, it will fund the outfitting of the selected property with the required force protection standards, infrastructure, tenant improvements, furniture, and equipment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: DMEA 90nm Next Generation Foundry	-	-	30.000

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 2: *90nm Next Generation Foundry*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: DMEA 90nm Next Generation Foundry was not yet approved in FY 2010. ***FY 2011 Plans:*** DMEA 90nm Next Generation Foundry POM issue was not yet approved in FY 2011. As part of the FY 2012 - FY 2016 POM, DMEA has started efforts to secure a 90nm Next Generation Foundry facility through the General Services Administration (GSA). ***FY 2012 Plans:*** DMEA will complete the 90nm Next Generation Foundry facility acquisition, acquire much of the equipment necessary for initial operation, and begin installation of the acquired equipment.			
Accomplishments/Planned Programs Subtotals	-	-	30.000

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 3: *Trusted Foundry*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3: *Trusted Foundry*	-	-	34.539	-	34.539	34.819	35.325	35.753	36.779	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) and National Security Agency (NSA) require uninterruptible access to state-of-the-art design and manufacturing processes to produce custom integrated circuits designed specifically for military purposes. Under DODI 5200.39, Application Specific Integrated Circuits (ASICs) in critical/essential systems need to be procured from trusted sources in order to avoid counterfeit, tampered, or sabotaged parts. Worldwide competition from foreign, state-subsidized manufacturing facilities (foundries) is making fabless semiconductor companies the norm in the U.S. Sophisticated off-shore design and manufacturing facilities with economic incentives of state subsidies and engineering labor rates vastly less than engineering rates in the U.S. have resulted in outsourcing of electronics components and integrated circuits. These trends threaten the integrity and worldwide leadership of the U.S. semiconductor industry by eliminating many domestic on-shore suppliers and reducing access to trusted fabrication sources for advanced technology. These trends are of acute concern to the defense and intelligence community. Secure communications and cryptographic applications depend heavily upon high performance semiconductors where a generation of improvement can translate into a significant force multiplier and capability advantage. Important defense technology investments and demonstrations carry size, weight, power, and performance goals that can only be met through the use of the most sophisticated semiconductors.

The Trusted Foundry program provides DoD and NSA with trusted state-of-the-art microelectronics design and manufacturing capabilities necessary to meet the performance and delivery needs of their customers. The program will also provide the Services with a competitive cadre of trusted suppliers that will meet the needs of their mission critical/essential systems for trusted integrated circuit components. NSA, in their role as the Trusted Access Program Office, has successfully looked to commercial sources to satisfy their requirements. Access to trusted suppliers is imperative to ongoing and future DoD/NSA systems, and most centrally, Trusted Foundry access is absolutely necessary to meet secure communication and cryptographic needs for state-of-the-art semiconductor technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Trusted Foundry	-	-	34.539
FY 2010 Accomplishments: The Trusted Foundry project was not assigned to DMEA in FY 2010. Under OSD PE 0605140D8Z, the program's accomplishments were as follows: Additional integrated circuits were provided to the U.S. Army, U.S. Navy, U.S. Air Force, and DARPA to satisfy new and on-going program requirements. ASIC design efforts were initiated to encompass leading-edge designs in state-of-the-art process technologies for military applications and the trusted design flow was enhanced for defense designers. New circuit cores were converted to trusted format and made available to the customers (programs, contractors, etc.) that use the Trusted Foundry. New equipment paradigms were furthered for low volume but leading-edge processes. New process paradigms at 32/22nm for trusted fabrication technologies were evaluated for implementation. New commercial and non-			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 3: *Trusted Foundry*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
commercial sources and methodologies for trusted components and services within the complete supply chain were developed and made available to the defense community. The program was funded in FY 2010 at $50.808M. ***FY 2011 Plans:*** The Trusted Foundry project was not assigned to DMEA in FY 2011. Under OSD PE 0605140D8Z, the program's plans are as follows: Establish a cadre of trusted suppliers for the critical trusted components and services needed for appropriate defense systems. Enhance Trusted Foundry products to include key specialty processes requested by DoD programs, such as high voltage, extreme environments, and embedded non-volatile memory. Enhance trusted design activities to encompass new processing capabilities. Establish a line of trusted catalog components that can be purchased by Defense contractors. The program was funded in FY 2011 at $34.512M. ***FY 2012 Plans:*** Begin to develop a capability for the reverse engineering of application-specific integrated circuits (ASICs) and continuously refine the utilized methods for efficiency, accuracy, and applicability to multiple processes. Enhance the cadre of trusted suppliers for the critical trusted components and services needed for appropriate defense systems. Enhance Trusted Foundry products to include key specialty processes requested by DoD programs, such as high voltage, extreme environments, and embedded non-volatile memory. Enhance trusted design activities to encompass new processing capabilities. Establish a line of trusted catalog components that can be purchased by Defense contractors.			
Accomplishments/Planned Programs Subtotals	-	-	34.539

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 4: *Other Congressional Adds (OCAs)*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
4: *Other Congressional Adds (OCAs)*	44.287	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

An important part of the mission of the Defense Microelectronics Activity (DMEA) is to research current and emerging microelectronics issues with a focus on warfighters' needs. To this end, DMEA is integrally involved in the development of capabilities and resultant products based on technologies whose feasibility has been demonstrated but which have yet to be applied to real-world and military applications. DMEA's knowledge of varying military requirements across a broad and diverse range of combatant environments and missions-along with its unique technical perspective-allow it to develop, manage and implement novel microelectronic solutions to enhance mission capability. DMEA can then utilize these cutting-edge technology capabilities and products in the solutions it develops for its military clientele. After many years of performing analogous efforts, the technical experience, mission knowledge, and practical judgment that are gained from preceding efforts are often incorporated into subsequent technology maturation projects. In agreement with this mission, the following Congressionally directed programs are opportunities that have sufficient potential to merit development by DMEA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
Congressional Add: 3-D Electronics and Power ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to UC Riverside. Started on execution of requirements, including technology development in three fundamental problem areas: new materials for electrical interconnects, electromagnetic shielding, and heat removal. ***FY 2011 Plans:*** Continue executing requirements with a planned completion date of 31-Dec-2011.	4.775	-
Congressional Add: AESA Technology Insertion Program ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to Northrop Grumman Electronic Systems. Started work toward adapting Active Electronic Scanned Array (AESA) antenna technology and subsystems developed for airborne fire control systems so that they may be used in Navy tactical surface radars. ***FY 2011 Plans:*** Continue executing requirements with a planned completion date of 31-Mar-2011.	2.387	-
Congressional Add: Carbon Nanotube Thin Film Near Infrared Detector	1.592	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 4: *Other Congressional Adds (OCAs)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
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. ***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.		
Congressional Add: Electronics and Materials for Flexible Sensors and Transponders (EMFST) ***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. ***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.	4.775	-
Congressional Add: End to End Semi Fab Alpha Tool ***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. ***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	1.592	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 4: *Other Congressional Adds (OCAs)*

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 ***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.	2.387	-
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.	1.592	-
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	3.581	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Defense Logistics Agency		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603720S: *Microelectronics Technology Development and Support (DMEA)*	PROJECT 4: *Other Congressional Adds (OCAs)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
are still in the process of being defined. The NDSU requirements have been developed, and a proposal is anticipated soon. ***FY 2011 Plans:*** Finish developing the requirements for the NCSU effort, award the efforts and begin to conduct research and develop improved tunable materials using the combinatorial development method. The planned completion dates for the NCSU and NDSU efforts are 31-Mar-2012 and 31-Jan-2012, respectively.		
Congressional Add: Semiconductor Photomask Technology Infrastructure Initiative ***FY 2010 Accomplishments:*** Continued development of commercial tooling, materials and process technology needed to fabricate masks used for manufacturing critical components at a feature sizes of 32nm and below for defense and security systems using leading edge integrated circuits and other components. This effort focused on developing a sustaining source of a trusted domestic mask making capability.	1.592	-
Congressional Add: Shipping Container Security System Field Evaluation ***FY 2010 Accomplishments:*** The requirements are in the process of being defined. A PMR was held on 9-Dec-2010 for the previous phase of this effort that is scheduled to end 30-Apr-2011. Results are good. ***FY 2011 Plans:*** Requirements will be developed in time to award the follow-on SBIR Phase III effort to Nevada Nanotech or Reno, NV before 30-Apr-2011.	3.581	-
Congressional Add: Smart Bomb Millimeter Wave Radar Guidance System ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to Global Technical Systems of Virginia Beach, VA. ***FY 2011 Plans:*** Begin executing requirements, including a spiral design and development effort for the Phase 1 Smart Bomb Microwave RADAR Targeting System to operate on-board a Tiger Shark unmanned aerial vehicle (UAV); and development, integration, test and demonstration of the proof of concept using a manned aircraft. The planned completion date is 30-Nov-2011.	2.308	-
Congressional Add: Spintronics Memory Storage Technology ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to UC Riverside. ***FY 2011 Plans:*** Begin executing requirements, including the research of the use of oxide films for the electrical and optical control of magnetism; electrical field control of magnetic anisotropy; multilevel 3D magnetic information storage concepts; developing improved diluted magnetic ZnO semiconductors for use in Spin Torque	2.785	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
Transfer RAM; and exploring the role of bond line thickness (BLT) in the use of carbon-based nanomaterials. The planned completion date is 31-Mar-2012.		
Congressional Add: Superconducting Quantum Information Technology ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to Northrop Grumman Electronic Systems. Started on execution of requirements, including the investigation of new Josephson junction materials including the electrodes and junction barriers; the design, fabrication, test, and evaluation of sample materials and Josephson junction based circuits; and modeling and simulation to aid the design process and evaluate the test data. ***FY 2011 Plans:*** Continue executing requirements with a planned completion date of 31-May-2011.	0.796	-
Congressional Add: Tunable Micro Radio for Military Systems ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to North Dakota State University. ***FY 2011 Plans:*** Begin executing requirements, including the investigation of advanced RF device packaging technology for integrated RF systems; advanced power amplifier power and mode control schemes and radio integration concepts; advanced tunable filter and nulling concepts; expanded RF test systems and nonlinear modeling techniques; and the investigation and development of a multi-band, multi-mode power amplifier. The planned completion date is 30-Jun-2012.	5.570	-
Congressional Add: Vehicle and Dismount Exploitation Radar (VADER) ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to Northrop Grumman Electronic Systems. Started on execution of requirements, including evaluation and demonstration of design and manufacturing improvements that will enhance the operational utility of the current and future systems as well as reduction of system delivery time. These efforts include investigating software and processor changes that increase system throughput and support operation at higher platform speeds associated with MQ-9 and C-12 aircraft as well as the evaluation of hardware and design drivers that lengthen system delivery times and the initiation of design approaches to implement delivery time reductions. ***FY 2011 Plans:*** Continue executing requirements with a planned completion date of 31-May-2011.	3.979	-
Congressional Add: X-Band/W-Band Solid State Power Amplifier ***FY 2010 Accomplishments:*** Completed the requirements development and awarded the effort to Global Technical Systems of Virginia Beach, VA. Started on execution of requirements, including development, test	0.995	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
and demonstration of RADAR system and subsystem applications for the Phase 1 solid state power amplifier modules, based upon the modules and requirements developed under Phase 1; development of a W-band transmitter subsystem using solid state amplifier modules as the enabling technology; development and integration of an X-band transmitter (solid state amplifier-based design) subsystem into the AN/APS-151 RADAR system; Engineering development testing of the subsystems; and demonstration of solid state amplifier-based technologies in RADAR system applications. ***FY 2011 Plans:*** Continue executing requirements with a planned completion date of 31-Dec-2011.		
Congressional Adds Subtotals	44.287	-

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A