Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Office of Secretary Of Defense										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	90.467	94.960	97.642	0.000	97.642	99.729	102.392	103.912	105.560	Continuing	Continuing
1: *Advanced Propulsion Test Technology*	17.598	18.519	18.907	0.000	18.907	18.846	19.116	19.400	19.707	Continuing	Continuing
2: *Spectrum Efficient Technology*	4.847	6.210	10.753	0.000	10.753	10.909	11.057	11.227	11.408	Continuing	Continuing
3: *Multi-Spectral Test*	11.421	18.780	16.294	0.000	16.294	12.794	12.836	13.029	13.237	Continuing	Continuing
4: *Advanced Instrumentation Systems Technology*	5.414	6.069	6.672	0.000	6.672	8.680	9.964	10.105	10.259	Continuing	Continuing
5: *Directed Energy Test*	16.542	20.033	21.044	0.000	21.044	19.329	19.660	19.937	20.241	Continuing	Continuing
6: *Netcentric Systems Test*	11.072	12.478	17.672	0.000	17.672	18.095	18.362	18.634	18.930	Continuing	Continuing
7: *Unmanned and Autonomous System Test*	5.073	6.371	6.300	0.000	6.300	6.475	6.489	6.582	6.684	Continuing	Continuing
8: *Common Range Integrated Instrumentation System*	18.500	6.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
9: *Multi-Level Security*	0.000	0.000	0.000	0.000	0.000	4.601	4.908	4.998	5.094	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Test and Evaluation /Science and Technology (T&E/S&T) program seeks out and develops test technologies to pace evolving weapons technology. The program is critical to ensuring that the Department of Defense (DoD) has the capability to adequately test the advanced systems that will be fielded in the future. To meet this objective, the T&E/S&T program:

- Exploits new technologies and processes to meet important Test and Evaluation (T&E) requirements.
- Expedites the transition of new technologies from the laboratory environment to the T&E community.
- Leverages commercial equipment, modeling and simulation, and networking innovations to support T&E.

Additionally, the T&E/S&T program examines emerging T&E requirements derived from joint service initiatives to identify needed technology areas and develop a long-range roadmap for technology insertion. The program leverages and employs applicable 6.2 applied researches from the highly developed technology base in the DoD

laboratories and test centers, other government agencies, industry, and academia to accelerate the development of new test capabilities. This PE also provides travel funds for T&E/S&T program oversight, special studies, analyses, and strategic planning related to test capabilities and infrastructure.

The T&E/S&T program is funded within the Advanced Technology Development Budget Activity because it develops and demonstrates high payoff technologies for current and future DoD test capabilities.

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	94.153	95.734	0.000	0.000	0.000
Current President's Budget	90.467	94.960	97.642	0.000	97.642
Total Adjustments	-3.686	-0.774	97.642	0.000	97.642
• Congressional General Reductions		0.000			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-2.183	0.000			
• SBIR/STTR Transfer	-1.503	0.000			
• Program Adjustments	0.000	-0.774	97.642	0.000	97.642

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 1: *Advanced Propulsion Test Technology*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
1: *Advanced Propulsion Test Technology*	17.598	18.519	18.907	0.000	18.907	18.846	19.116	19.400	19.707	Continuing	Continuing

A. Mission Description and Budget Item Justification

This focus area, formerly known as High Speed/Hypersonic Test, has been renamed Advanced Propulsion Test Technology (APTT) to better reflect emerging test and evaluation (T&E) needs and focus area content. APTT develops technologies to enable robust, accurate, and timely T&E of future DoD weapon systems. Current weapon system demonstration and technology developments include high speed and hypersonic air breathing missiles, maneuvering reentry and boost/glide weapons, advanced gun-launched projectiles, and space access systems. These systems require development of high speed turbine, ramjet, scramjet, and combined cycle engines; high temperature materials; thermal protection systems; and thermal management systems. DoD acquisition regulations require weapon systems to undergo a thorough T&E process in order to provide early detection of deficiencies and ensure system suitability and survivability. However, current national T&E infrastructure and capabilities have deficiencies in data accuracy, flight condition duplication and simulation, test productivity, modeling and simulation (M&S) fidelity, and range safety. The APTT focus area is developing advanced T&E technologies in the areas of ground and flight test environments, M&S, and instrumentation to fulfill T&E requirements.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Advanced Propulsion Test Technology	17.598	18.519	18.907	0.000	18.907
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal years. - Arc Heater Aerothermal: developed technology to improve aerothermal test capabilities for ground test of ballistic reentry vehicles - Clean Air Heater: researched materials for an electrical resistance heating element utilizing advanced materials to provide continuous flow, clean air heat addition up to Mach 7 - In-Flight Combustion Gas Analysis: fabricated and ground-tested a non-intrusive laser spectroscopy diagnostic sensor suitable for in-flight T&E of hypersonic propulsion systems					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 1: *Advanced Propulsion Test Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- High Heat Flux Sensor: developed a heat flux sensor capable of surviving hypersonic conditions, suitable for ground and flight test - High Pressure Arc Heater: developed technologies to extend the operating regime of arc heater facilities to Mach 8 to 12 to support test of reentry and boost/glide thermal protection systems - M&S for Hypersonic T&E: developed a computational fluid dynamics tool with enhanced physical models of transition, turbulence, chemistry, and heat transfer to verify ground and flight tests - Microelectromechanical System Shear Stress Sensor: developed a high temperature, microelectromechanical-based sensor that can be installed on ground or flight test articles and can withstand the hypersonic environments to directly measure shear stress - Micro Fiber Optical Sensor: developed advanced instrumentation for hypersonic flight test utilizing micro heat transfer sensors for leading edges and pressure sensors for laminar-turbulent transition detection - Test Media Effects: developed advanced diagnostic systems and enhanced computational fluid dynamics tools to include models for improved turbulence, reduced chemical kinetics, and flame holding - Variable Mach Number Nozzle: competing technology with Variable Mach Number Test Capability (see next); developed variable geometry test facility nozzles capable of varying Mach number from 5 to 8 while maintaining uniform flow conditions - Variable Mach Number Test Capability: competing technology with Variable Mach Number Nozzle (see previous); developed variable Mach 5 to 8 test technology using energy addition downstream of the plenum. Continued efforts initiated in prior fiscal years. - Hypersonic Engine-Facility Interaction: performing quantitative evaluations of test media effects and test facility types on engine performance and operability - Hypersonic Nozzle Cooling: developing technology to cool test facility nozzle boundary layer to reduce heat flux and expand nozzle Mach range and life - Hypersonic Test Fuel System: developing a modular fuel conditioning system to characterize fuel delivery and simulate endothermic fuel cooling					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 1: *Advanced Propulsion Test Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Magnetohydrodynamic Augmentation Hypersonic Facility: developing technology to test future air-breathing propulsion systems using ceramic heater and non-equilibrium magnetohydrodynamic e-beam velocity augmentation to introduce increased uniform flow-field velocity in a T&E facility - Parameter Identification Maneuvers: developing advanced flight test techniques to enable more efficient and productive flight testing - Revolutionary Approach to Time Critical Long Range Strike Missile-In-a-Tunnel Test: developing technology to demonstrate and verify advanced flow diagnostics technologies and M&S codes - Regenerative Storage Heater: developing a storage heater based on advanced cored brick designs and materials to provide clean air heat addition for up to Mach 8 conditions - Short Duration Propulsion T&E: comparing the hypersonic propulsion data generated by impulse and short-duration facilities at Mach 5 to 7 and analyzing the effects of runtime and vitiation. Initiated new research efforts. - Advanced Nozzle Throat Designs: researching methods to extend facility nozzle life and Mach range through determination of advanced materials properties, improved design methods and development of advanced cooling methods - Autonomous Flight Termination and Decision System: developing an autonomous flight termination technology to enhance range safety for high speed and hypersonic systems testing - Mid-Pressure Arc Heater: developing core enabling technologies for high enthalpy, long duration arc heater test in the flight regime of maneuvering reentry, boost/glide, and space access systems Initiated a Broad Agency Announcement (BAA) in FY 2009 to select efforts for FY 2010 award					
FY 2010 Plans: Complete efforts initiated in prior fiscal years. - Hypersonic Engine-Facility Interaction - Hypersonic Nozzle Cooling - Hypersonic Test Fuel System - Parameter Identification Maneuvers - Revolutionary Approach to Time Critical Long Range Strike Missile-In-a-Tunnel					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 1: *Advanced Propulsion Test Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Regenerative Storage Heater Continue efforts initiated in prior fiscal years. - Advanced Nozzle Throat Design - Autonomous Flight Termination and Decision System - Magnetohydrodynamic Augmentation Hypersonic Facility - Mid-Pressure Arc Heater - Short Duration Propulsion T&E Initiate new research efforts. - Effort(s) to develop advanced regenerative clean air heat addition and variable Mach nozzle technologies to create an integrated system demonstration for transition to a full scale T&E facility - Effort(s) to develop technology to test payload separation from boost/glide and maneuverable reentry vehicles - Effort(s) to develop non-intrusive measurement technology for gas species, thermodynamic properties, and mass flux of high pressure/temperature flows Initiate a BAA in FY 2010 to select efforts for FY 2011 award.					
FY 2011 Base Plans: Complete efforts initiated in prior fiscal years. - Autonomous Flight Termination and Decision System - Magnetohydrodynamic Augmentation Hypersonic Facility - Mid-Pressure Arc Heater - Short Duration Propulsion T&E Continue efforts initiated in prior fiscal years. - Advanced Nozzle Throat Design - Effort(s) to develop advanced regenerative clean air heat addition and variable Mach nozzle technologies to create an integrated system demonstration for transition to a full scale T&E facility - Effort(s) to develop technology to test payload separation from boost/glide and maneuverable reentry vehicles					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 1: *Advanced Propulsion Test Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Effort(s) to develop non-intrusive measurement technology for gas species, thermodynamic properties, and mass flux of high pressure/temperature flows Initiate new research efforts. - Effort(s) to develop test technologies, techniques, and methodologies to determine full-scale propulsion system performance and operability from subscale tests - Effort(s) to develop technology for continuous flow, clean air heat addition up to Mach 6 to enable full-scale, combined cycle, propulsion system test - Effort(s) to develop M&S codes to accurately predict of flow fields, boundary layer transition, and heat transfer in high speed flow - Effort(s) to develop test technologies and methodologies to support long run time, clean air, true temperature testing above Mach 8 - Effort(s) to develop test technology in support of advanced rail guns - Effort(s) to develop test technology in support of supercavitating torpedoes Initiate a BAA in FY 2011 to select efforts for FY 2012 award. *FY 2011 OCO Plans:* N/A					
Accomplishments/Planned Programs Subtotals	17.598	18.519	18.907	0.000	18.907

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 2: *Spectrum Efficient Technology*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
2: *Spectrum Efficient Technology*	4.847	6.210	10.753	0.000	10.753	10.909	11.057	11.227	11.408	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Spectrum Efficient Technology focus area enables test and evaluation (T&E) of technologies for more efficient use of legacy telemetry bands and expansion into non-traditional areas of the radio frequency spectrum and the optical spectrum. The Test Resource Management Center has structured SET to perform risk reduction and advanced technology development for future telemetry systems such as the Integrated Network Enhanced Telemetry (iNET) effort.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Spectrum Efficient Technology	4.847	6.210	10.753	0.000	10.753
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal years. - Spectrally Efficient, High Data Rate Telemetry: developed technology to port and modify the Jet Propulsion Laboratory Advanced Orthogonal Frequency Division Multiplexing baseband processing firmware to carry out packet-based communications - Space-Time Code: developed a verified space-time code data encoding and processing technique and a prototype receiver designed to improve link reliability - Enhanced Forward Error Correction: developed coherent and non-coherent decoders and a detailed design of decoders with a performance table identifying the optimal code/decoder combinations Initiated new research efforts. - Aeronautical Network Transport Protocols: developing aeronautical transport, network, and routing protocols for the iNET Communication Link Standards and for verification of the protocols through simulations and a fielded prototype; efforts will include architectural design of the protocol suite - High-rate, High-speed Forward Error Correction: developing architectures for aeronautical telemetry to apply forward error correction by demodulating and decoding the waveforms					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 2: *Spectrum Efficient Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Dynamic Software Commutation/Decommutation: optimizing network performance by making real-time changes to test article telemetry content and sample rate; will demonstrate the optimization method in the field with a prototype network - Dynamic Spectrum Access: developing a network quality of service management scheme which will use explicit control of both frequency and digital access slot assignments - Low-Cost Orthogonal Frequency Division Multiplexing: developing a transceiver to demonstrate the waveform developed under the T&E/S&T-funded Advanced Orthogonal Frequency Division Multiplexing project (completed FY 2008); innovative modulator and demodulator firmware will be ported into the flight-rated transceiver with a tunable transmit/receive module - Multipath Modeling and Mitigation using Multiple Antennas: constructing empirically validated multipath channel models for flight line and helicopter pad environments, and developing multipath mitigation techniques using the multipath channel models - Transmission Control Protocol/Internet Protocol for Aeronautical Networks: developing a performance-enhancing-proxy for the wired/wireless interface to maximize data throughput by minimizing the latency of individual packets - Disruption-Tolerant Terrestrial iNET: developing wide area wireless network technology in support of unmanned and autonomous systems testbeds for ground vehicles and small unmanned aerial systems; efforts will address poor wireless channel coverage, bandwidth allocation and utilization, and low cost implementation Initiated a Broad Agency Announcement (BAA) in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Complete efforts initiated in prior fiscal years. - Dynamic Spectrum Access - High-rate, High-speed Forward Error Correction - Low-Cost Orthogonal Frequency Division Multiplexing Transceiver - Transmission Control Protocol/Internet Protocol for Aeronautical Networks - Multipath Modeling and Mitigation using Multiple Antennas					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 2: *Spectrum Efficient Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Continue efforts initiated in prior fiscal years. - Aeronautical Network Transport Protocols - Dynamic Software Commutation/Decommutation - Disruption-Tolerant Terrestrial iNET Initiate new research efforts. - Management and Operations with Policy Controls: develop a distributed policy-based network management system - Effort(s) to develop time-frequency management tools to enhance network management by monitoring network activity over time and frequency and by adjusting network resources for improved performance - Effort(s) to develop two-way, packetized, digital radio frequency communication Initiate a BAA in FY 2010 to select efforts for FY 2011 award. *FY 2011 Base Plans:* Complete efforts initiated in prior fiscal years. - Aeronautical Network Transport Protocols - Disruption-Tolerant Terrestrial iNET - Dynamic Software Commutation/Decommutation Continue efforts initiated in prior fiscal years. - Management and Operations with Policy Controls - Effort(s) to develop time-frequency management tools to enhance network management by monitoring network activity over time and frequency and by adjusting network resources for improved performance - Effort(s) to develop two-way, packetized, digital radio frequency communication Initiate new research efforts to address T&E technology challenges in this focus area. - Effort(s) to provide higher data rates through existing available bandwidth - Effort(s) to provide new network telemetry technology for every test vehicle to augment the high speed serial streaming data link					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 2: *Spectrum Efficient Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Effort(s) to enable high performance wireless telemetry over an encrypted network. Initiate a BAA in FY 2011 to select efforts for FY 2012 award. *FY 2011 OCO Plans:* N/A					
Accomplishments/Planned Programs Subtotals	4.847	6.210	10.753	0.000	10.753

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 3: *Multi-Spectral Test*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
3: *Multi-Spectral Test*	11.421	18.780	16.294	0.000	16.294	12.794	12.836	13.029	13.237	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Multi-Spectral Test focus area develops technologies to test multi-spectral and hyperspectral weapon systems and intelligence, surveillance, and reconnaissance systems. Current methods for testing multi- and hyperspectral sensors rely heavily on expensive field test programs that leave several critical gaps. Imagery can be collected and stored to mitigate this deficiency in part, but the process is expensive and cannot cover the full spectrum of environments required for complete test article evaluation and performance analysis. The test and evaluation (T&E) community needs the ability to test these advanced seekers and sensors in a repeatable, objective fashion before and after they are integrated into warfighting systems. Without these new T&E innovations, DoD will be unable to perform adequate test and evaluation of the multi- and hyperspectral weapon systems of the future.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Multi-Spectral Test	11.421	18.780	16.294	0.000	16.294
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal years. - Sub-Array Light-Emitting Diode: developed a new ultraviolet light-emitting diode device to provide variable-intensity ultraviolet radiation to demonstrate full spatial, temporal, and power performance objectives required by open-air range missile warning system stimulators. Continued efforts initiated in prior fiscal years. - Cell-based Hyperspectral Atmospheric Radiation Model: developing software and hardware technology to provide three-dimensional, hyperspectral, atmospheric, radiative transport modeling at real time rates - Hyperspectral Imaging Projector: developing a two-dimensional visible/short wave infrared/ mid-wave infrared hyperspectral projector capable of generating dynamic images for multi- and hyperspectral sensor testing, fiber characterization, and an amplified spontaneous emission source					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 3: *Multi-Spectral Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Hyperspectral Test Suite: developing projector and spectrograph technologies required to achieve synchronized, co-registered, multi-band operation with high temperature, fast frame rate, high resolution, and wide dynamic range - Multispectral Plasma Emitter: developing a family of plasma-based prototype emitters which uses gas mixtures to generate any user-defined mid-wave and long-wave infrared spectral output with selectable emissions, wide dynamic ranges, and fast frame rates - Multi-Spectral and Hyperspectral Polarized Scene Projector: developing technology for polarization mapping assembly and an optical projection engine for testing sensors to project scenes with controlled wavelength and realistic accuracy - Superlattice Light-Emitting Diodes: developing an emitter for large field-of-view scenes to project high apparent scene temperatures at fast frame rates and with selectable wavelengths and thermal management - Fiber-optic Infrared Countermeasures T&E Technology: developing a squared, stacked, 6x6 chalcogenide fiber to test infrared countermeasures and missile warning systems - Multi-Spectral Passive Long-Wave Infrared Polarization: developing technology to generate large area, multi-wave, polarimetric scenes with high spatial resolution, high radiometric fidelity, and realistic infrared signature simulations applicable to multiple platforms - Read-In Integrated Circuit: developing large format scene projectors with wide field-of-view, high apparent temperature, and fast frame rates to support testing of sensors, seekers, and infrared countermeasures systems Initiated new research efforts. - Sky Imaging Mapping System: developing technology to obtain seamless sky background measurements with very high spatial, spectral, and temporal resolution Initiated a Broad Agency Announcement (BAA) in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Complete efforts initiated in prior fiscal years: - Read-in Integrated Circuits for Infrared Scene Projection					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 3: *Multi-Spectral Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Continue efforts initiated in prior fiscal years. - Cell-based Hyperspectral Atmospheric Radiation Model - Multi-Spectral and Hyperspectral Polarized Scene Projector - Multi-Spectral Passive Long-Wave Infrared Polarization - Hyperspectral Imaging Projector - Hyperspectral Test Suite - Sky Imaging Mapping System - Fiber-optic Infrared-Countermeasure T&E Technology - Multispectral Plasma Emitter - Superlattice Light-Emitting Diodes Initiate new research efforts to address T&E technology challenges in this focus area. - Reconfigurable Arbitrary Waveform Scene Projector - Ultra-High Temperature Scene Projector - Effort(s) to develop hyperspectral near infrared/short-wave infrared projector technology to complete the entire spectrum of interest from near infrared to long-wave infrared (when combined with the Hyperspectral Testbed and Hyperspectral Test Suite projects) - Effort(s) to develop a suite of tests designed for systems that detect improvised explosive devices and signatures - Effort(s) to develop multi-spectral/hyperspectral data fusion T&E technology to enable the combination of all scene generation techniques, including all bandwidths from infrared to long-wave infrared, into one highly detailed, information rich battle scene - Effort(s) to develop multi-spectral/hyperspectral field characterization system technology for further characterization and classification of realistic battle scene imagery - Effort(s) to develop multi-spectral/hyperspectral technology to generate ground targets and to alleviate the use of software license costs and associated issues when dealing with third party target generation databases Initiate a BAA in FY 2010 to select efforts for FY 2011 award.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 3: *Multi-Spectral Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: Complete efforts initiated in prior fiscal years: - Fiber-optic Infrared-Countermeasure T&E Technology - Sky Imaging Mapping System - Superlattice Light-Emitting Diodes Continue efforts initiated in prior fiscal years: - Hyperspectral Test Suite - Cell-based Hyperspectral Atmospheric Radiation Model - Multi-Spectral and Hyperspectral Polarized Scene Projector - Multi-Spectral Passive Long-Wave Infrared Polarization - Multispectral Plasma Emitter - Reconfigurable Arbitrary Waveform Scene Projector - Ultra-High Temperature Scene Projector - Sky Imaging Mapping System - Effort(s) to develop hyperspectral near infrared/short-wave infrared projector technology - Effort(s) to develop a suite of tests designed for systems that detect improvised explosive devices and signatures - Effort(s) to develop multi-spectral/hyperspectral data fusion T&E technology - Effort(s) to develop multi-spectral/hyperspectral field characterization system technology - Effort(s) to develop multi-spectral/hyperspectral technology to generate ground targets Initiate new research efforts to address T&E technology challenges in this focus area: - Effort(s) to develop advanced radar stimulator - Effort(s) to develop large area scene projectors - Effort(s) to develop data collection and analysis engine technologies - Effort(s) to develop dynamic targets and surrogates models - Effort(s) to develop whole sky clutter models Initiate a BAA in FY 2011 to select efforts for FY 2012 award.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 3: *Multi-Spectral Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	11.421	18.780	16.294	0.000	16.294

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 4: *Advanced Instrumentation Systems Technology*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
4: *Advanced Instrumentation Systems Technology*	5.414	6.069	6.672	0.000	6.672	8.680	9.964	10.105	10.259	Continuing	Continuing

A. Mission Description and Budget Item Justification

This focus area, formerly Non-Intrusive Instrumentation, has been renamed Advanced Instrumentation Systems Technology (AIST) to better reflect emerging test and evaluation (T&E) needs and focus area content. Instrumentation requirements for systems under test, hardware-in-the-loop testing, and training are increasing exponentially for new weapons systems. On-board/ personnel-borne equipment and instrumentation are required for sensing and collecting critical performance data; determining accurate time, space, position, and attitude information; interfacing with command and control data links; monitoring and reporting system-wide communications; reporting human operator performance; and storing and transmitting data. The AIST focus area addresses the requirements driven by the need to enable technologies for miniaturized, non-intrusive instrumentation suites with increased survivability in harsh environments. Minimal space is available to add instrumentation to new or existing weapon systems subsequent to their development; moreover, additional weight and power draw can adversely affect weapon system signature and performance. Instrumentation for humans-in-the-loop, such as dismounted soldiers, should neither adversely affect soldier performance nor create operational burden. New technologies can be exploited to integrate small, non-intrusive instrumentation into new platforms during design and development, and, in some cases, into existing platforms. This class of instrumentation can provide the data required for T&E, training, and logistics throughout system lifecycle, and can provide the ability to collect critical system performance data during combat missions.

In 2008 the Test Resource Management Center determined that requirements and transition partners must be better defined and understood. Accordingly, this focus area did not initiate any FY 2009 new start projects, but, while continuing ongoing projects, developed a new AIST T&E technology roadmap to determine the best path forward. AIST released a Broad Agency Announcement (BAA) in spring 2009 and will fund new projects in FY 2010 based upon the updated roadmap.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Advanced Instrumentation Systems Technology	5.414	6.069	6.672	0.000	6.672
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal years. - Revised NII Roadmap to refine T&E technology challenges in this focus area					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 4: *Advanced Instrumentation Systems Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- High Speed & Temperature Diagnostics: developed four probes to measure turbine engine gas species, total temperature, total pressure, and Mach/flow angularity - Open Modular Embedded Architecture: developed an open, modular, scalable, embedded systems architecture for military land, air, sea, and space applications; this technology was demonstrated in the Air Force Multi-Megawatt Electric Power System developed for directed energy weapons applications Continued efforts initiated in prior fiscal years. - Chip Scale Atomic Clock: developing technology for high accuracy clocks integrated with acoustic modems on the seafloor for accurate measurement of time, space, position information (TSPI) on submarine and torpedo systems under test - Joint Advanced Missile Instrumentation Multipath Analysis: developing software modifications to the Global Positioning System (GPS) sensor unit to reject multipath signals; will validate software changes through simulation and ground and flight testing - Multi-Species Gas Sensor Array: developing a high temperature, multi-chemical sensor array for analysis of critical constituents in turbine engine exhaust products - Triply-Redundant Integrated Navigation and Asset Visibility System: developing a personnel/asset location system to combine an inertial navigation system, an agile wide-area radio frequency location scheme, and an optional reference GPS receiver for accurate and reliable navigation in GPS-denied or degraded environments - Ultra High Dynamics GPS: developing GPS receivers with high-dynamic, multi-frequency, anti-jamming technology to provide TSPI in GPS-denied environments to support range safety, system analysis, optimization, and end game scoring of highly dynamic objects - Wide Band Location Positioning System: developing technology to locate soldiers and unmanned ground vehicles in GPS-denied or impaired areas, such as inside buildings and complex structures Initiated a BAA in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Complete efforts initiated in prior fiscal years. - Chip Scale Atomic Clock					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 4: *Advanced Instrumentation Systems Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Joint Advanced Missile Instrumentation Multipath Analysis - Multi-Species Gas Sensor Arrays - Triply-Redundant Integrated Navigation and Asset Visibility System - Ultra High Dynamics GPS - Wide Band Location Positioning System Initiate new research efforts. - Effort(s) to develop advanced micro-power sources to power non-intrusive test instrumentation components via advanced chemistry cells and batteries, energy harvesting devices, active power generators, charging devices, and load management devices - Effort(s) to develop advanced sensor transducers to measure high-temperature, electric field strength, and magnetic field strength - Effort(s) to develop data transformation software to support virtual/synthetic instrumentation, adaptive computing for self-configuration, and self-calibration of instrumentation - Effort(s) to develop leading edge electronic component miniaturization technologies (e.g., application-specific integrated circuits and field programmable gate arrays) for advanced sensor electronics - Effort(s) to develop instrumentation attachment technologies that are reliable in extreme temperatures and high dynamic environments - Effort(s) to develop multi-modal transducers capable of measuring two or more phenomena simultaneously (e.g., temperature and pressure) at the same point - Effort(s) to develop small volume data storage technologies capable of withstanding high shock - Effort(s) to develop technologies to tap into an optical data bus non-intrusively without injecting optical noise or modifying or corrupting data carried on the bus - Effort(s) to develop technologies to protect sensor electronics under environmental conditions that significantly exceed ranges specified in military standards - Effort(s) to develop technologies for testing to support dismounted soldiers in GPS-denied environments such as urban, underground, and dense vegetation Initiate a BAA in FY 2010 to select efforts for FY 2011 award.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 4: *Advanced Instrumentation Systems Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: Continue efforts initiated in FY 2010. - Effort(s) to develop advanced micro-power sources to power non-intrusive test instrumentation components via advanced chemistry cells and batteries, energy harvesting devices, active power generators, charging devices, and load management devices - Effort(s) to develop advanced sensor transducers to measure high-temperature, electric field strength, and magnetic field strength - Effort(s) to develop data transformation software to support virtual/synthetic instrumentation, adaptive computing for self-configuration, and self-calibration of instrumentation - Effort(s) to develop leading edge electronic component miniaturization technologies (e.g., application-specific integrated circuits and field programmable gate arrays) for advanced sensor electronics - Effort(s) to develop instrumentation attachment technologies that are reliable in extreme temperatures and high dynamic environments - Effort(s) to develop multi-modal transducers capable of measuring two or more phenomena simultaneously (e.g., temperature and pressure) at the same point - Effort(s) to develop small volume data storage technologies capable of withstanding high shock - Effort(s) to develop technologies to tap into an optical data bus non-intrusively without injecting optical noise or modifying or corrupting data carried on the bus - Effort(s) to develop technologies to protect sensor electronics under environmental conditions that significantly exceed ranges specified in military standards - Effort(s) to develop technologies for testing to support dismounted soldiers in GPS-denied environments such as urban, underground, and dense vegetation Initiate new projects for award based on the AIST Roadmap effort and Broad Agency Announcement process: - Effort(s) to develop advanced sensors for non-intrusive applications - Effort(s) to develop advanced power/energy technologies for non-intrusive applications					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 4: *Advanced Instrumentation Systems Technology*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Effort(s) to develop advanced TSPI technologies for non-intrusive applications - Effort(s) to develop advanced data transformation technologies for non-intrusive applications Initiate a BAA in FY 2011 to select efforts for FY 2012 award. *FY 2011 OCO Plans:* N/A					
Accomplishments/Planned Programs Subtotals	5.414	6.069	6.672	0.000	6.672

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
5: *Directed Energy Test*	16.542	20.033	21.044	0.000	21.044	19.329	19.660	19.937	20.241	Continuing	Continuing

A. Mission Description and Budget Item Justification

Directed energy test technologies are transitioning rapidly into acquisition programs and Joint Concept Technology Demonstrations. These weapon technologies, primarily consisting of High Energy Lasers (HEL) and High Power Microwaves (HPM), are outpacing the supporting test technologies. HEL and HPM advancements have created a new class of weapon systems in which energy is placed on a target instantaneously; traditional test techniques for evaluating conventional munitions (with flight times ranging from seconds to minutes) are not applicable to test and evaluation (T&E) of these types of systems. Consequently, new technology solutions are needed to ensure that adequate developmental, live fire, and operational test capabilities are available when directed energy programs are ready to test.

Directed energy system and component testing requires two principal assessments: weapon performance, and the specific interaction of energy and target. Current assessment of these systems is based on effects testing, i.e., determining if and when a target was destroyed; however, these test capabilities do not provide the detailed data required to understand directed energy system performance. Military utility of these weapons will depend upon the knowledge acquired through T&E to gage how much to trust the technologies under development and how best to use them. The T&E/S&T Directed Energy Test focus area is developing the technologies necessary for quantitative assessment of HEL and HPM performance and target interaction to support thorough testing of directed energy systems.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Directed Energy Test	16.542	20.033	21.044	0.000	21.044
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal years. - Bi-static Optical Imaging Sensor: designed and fabricated a prototype ground-based HEL diagnostics sensor to measure HEL engagement on target through spatial, spectral, and temporal characteristics of laser interaction on target - Multiple Wave Temperature Sensor: developed a four-band infrared imaging camera with detectors sensitive to multiple distinct color bands to measure external surface temperature of stationary ground targets heated by laser beams					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Cine Radiography Imagery Measurement: developed a compact, flash X-ray source for testing of HPM munitions - Microwave Rotary Attenuator: developed technology for direct measurement of radiated power using a vacuum rotary microwave tube with adjustable power density for improved HPM narrow-band threat system testing against friendly systems - Spectrographic Magnetic Field Sensor: developed a non-intrusive, magneto-optical field sensor using magnetic moment coupling material with spectroscopic infrared detection techniques to measure magnetic fields inside a component or system exposed to HPM Continued efforts initiated in prior fiscal years. - Holographic Target Board: designing, fabricating, and testing an HEL target board using photo-thermo-refractive glass to measure HEL irradiance of an incident laser beam - Magneto-Optical Field Sensor: developing fiber-coupled optical sensors using the Faraday effect for non-intrusive capture of magnetic fields during HPM irradiation - Quantum Well Infrared Photodetector: integrating an indium antimonide (InSb) focal plane array with the computed tomographic imaging spectrometer to create a camera system for off-board analysis of HEL beam interaction with a target - Scanning Target Board: developing an HPM target board that uses an array of compact, multi-layered patch antennas to map the power spectrum of an HPM source - T&E Adaptive Optics System: integrating and testing an adaptive optics system to support remote measurement of HEL temperature with high spatial and temporal accuracy - Temperature and Irradiance Sensor Matrix: developing a matrix of conformal, onboard, photoconductive detectors to determine target irradiance and temperature profiles - Advanced Polymer Optical Source: developing a non-intrusive, large dynamic range, high bandwidth sensor to measure incident HPM magnetic field amplitude, internal cavity fields, and circuit board currents - Integrated Atmospheric Characterization System: developing stationary, ground-based measurement of slant path transmission and turbulence effects for ranges of approximately 10 km and at arbitrary slant paths					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Dual Oscillator Microwave Generation: developing technology to extend center frequency of spark gap oscillators from 500 MHz to 2.5 GHz, providing a test source for improved HPM wide-band threat system testing against friendly systems - Heat Flux Sensor Array: integrating a low-cost, high-resolution temperature sensor with an inverse heat conduction model in an instrument that can determine heat placed on a target by an HEL system - Inversion-Derived Resistive Temperature Sensor: developing a non-intrusive, high spatial resolution, advanced sensor technology and visualization tool to determine laser energy deposition on a target Initiated new research efforts. - Precision Radiometric Surface Temperature Sensor: developing a stand-off surface temperature measurement system to account for dynamic surface emissivity - Surface Temperature Estimation Tool: developing a software tool to extract a surface temperature map of the area within and near an HEL spot on target from multi-band irradiance measurements - Beam Irradiance on Target System: developing an HEL target board capable of measuring spatially and temporally resolved temperature and irradiance of a target under HEL illumination - Irradiance Imaging System: developing a high accuracy stand-off sensor that does not interfere with weapon system performance, remotely measures irradiance on an HEL target, and corrects for atmospheric effects with a probe laser - Integrated Electro-Magneto-Optical Sensor: developing a compact, highly sensitive, integrated, non-intrusive, electro- and magneto-optical three-axis sensor for simultaneous measurement of electric and magnetic fields - Skin Heating and Electric Field: developing a multichannel sensor system to measure electric field and temperature on personnel involved in testing of W-band HPM systems - Terahertz Imaging Profiler Array: developing a hyperspectral terahertz beam-profiling sensor with associated optics, readout electronics, and visualization graphics to characterize terahertz sources - Tri-Service Study Update: updating the architecture and roadmap for directed energy test requirements					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Rotary Waveguide Attenuator: designing and building an attenuator for the Narrow Band Threat source used for HPM survivability testing - Resistive Step Twist Polarizer: designing and building a polarizer for insertion into the Narrow Band Threat source used for HPM survivability testing Initiated a Broad Agency Announcement (BAA) in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Complete efforts initiated in prior years. - T&E Adaptive Optics - Quantum Well Infrared Photodetector - Holographic Target Board - Magneto-Optical Field Sensor - Scanning Target Board Continue efforts initiated in prior fiscal years. - Precision Radiometric Surface Temperature Sensor - Surface Temperature Estimation Tool - Beam Irradiance on Target System - Irradiance Imaging System - Integrated Electro-Magneto-Optical Sensor - Skin Heating and Electric Field - Terahertz Imaging Profiler Array - Rotary Waveguide Attenuator - Resistive Step Twist Polarizer - Temperature and Irradiance Sensor Matrix - Integrated Atmospheric Characterization System - Heat Flux Sensor Array - Radiography Imagery Measurement - Advanced Polymer Optical Source					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Dual Oscillator Microwave Generation - Inversion-Derived Resistive Temperature Sensor - Tri-Service Study Update Initiate new research efforts. - Effort(s) to develop soil electromagnetic properties sensor - Effort(s) to develop advanced technology to test HEL irradiance and temperature on target - Effort(s) to perform risk reduction for HEL lethality testing laser - Effort(s) to develop adaptive optics for remote imagery of HEL engagements - Effort(s) to develop advanced technology to measure HPM effects on target Initiate a BAA in FY 2010 to select efforts for FY 2011 award. *FY 2011 Base Plans:* Complete efforts initiated in prior fiscal years - Rotary Waveguide Attenuator - Resistive Step Twist Polarizer - Temperature and Irradiance Sensor Matrix - Integrated Atmospheric Characterization System - Heat Flux Sensor Array - Inversion-Derived Resistive Temperature Sensor - Radiography Imagery Measurement - Advanced Polymer Optical Source - Dual Oscillator Microwave Generation - Tri-Service Study Update Continue efforts initiated in prior fiscal years. - Precision Radiometric Surface Temperature Sensor - Surface Temperature Estimation Tool - Beam Irradiance on Target System - Irradiance Imaging System					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Integrated Electro-Magneto-Optical Sensor - Skin Heating and Electric Field - Terahertz Imaging Profiler Array - Effort(s) to develop soil electromagnetic properties sensor - Effort(s) to develop advanced technology to test HEL irradiance and temperature on target - Effort(s) to perform risk reduction for HEL lethality testing laser - Effort(s) to develop adaptive optics for remote imagery of HEL engagements - Effort(s) to develop advanced technology to measure HPM effects on target Initiate new research efforts. - Effort(s) to generate HEL beam irradiance profile for diagnostics - Effort(s) to measure thermal response of laser weapons to assess effectiveness - Effort(s) to perform HEL lethality tests to determine weapon capabilities - Effort(s) to estimate atmospheric propagation characteristics to determine the effect of surface-to-surface, surface-to-air, and air-to-air HEL engagements - Effort(s) to predict, in real-time, the HPM test hazard effect to improve safety - Effort(s) to develop sensors to measure magnetic, electrical, and thermal fields to assess HPM lethality and support safety - Effort(s) to generate dynamic imaging of HPM explosive during development test - Effort(s) to develop surrogate HPM sources to support vulnerability testing against wideband HPM spectral content above 2.0 GHz Initiate a BAA in FY 2011 to select efforts for FY 2012 award. *FY 2011 OCO Plans:* N/A					
Accomplishments/Planned Programs Subtotals	16.542	20.033	21.044	0.000	21.044

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 5: *Directed Energy Test*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 6: *Netcentric Systems Test*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
6: *Netcentric Systems Test*	11.072	12.478	17.672	0.000	17.672	18.095	18.362	18.634	18.930	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Netcentric Systems Test (NST) focus area is pursuing test and evaluation (T&E) technologies to keep pace with advancements in Joint Net-Centric Operations (JNO). Advanced netcentric systems will address the needs of Joint forces and coalition partners who need rapid access to relevant, accurate, and timely information, as well as the ability to create and share the knowledge required to make superior decisions in an assured environment amid unprecedented quantities of operational data. The JNO needs these abilities to meet the requirement for an integrated global network that will enable parties to share the right information at the right time so that our warfighters can act before the enemy. JNO links a multitude of people, sensors, operating centers, and decision aids. These sources of information produce relevant, up-to-the second, accurate, and credible information to allow informed decisions in routine, planned, or crisis events. The result is faster decision making, increased collaboration, and better decisions based on access to more information. Successful implementation of these transformational capabilities will necessitate a corresponding transformation in DoD test and evaluation (T&E) capabilities for netcentric systems. The NST focus area addresses the T&E scenarios, technologies, and analysis tools required to ensure that operational networked systems delivered to the warfighter provide an assured capability to acquire, verify, protect, and assimilate information necessary for battlefield dominance within a complex netcentric environment.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Netcentric Systems Test	11.072	12.478	17.672	0.000	17.672
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal year. - Executable Architecture Analysis Modeling: developed test technologies and created executable models of netcentric architectures comprised of integrated combat, communications, and process models - Dynamic Utility for Collaborative Architecture-Centric T&E: developed T&E tools for creating test architectures, assigning test measures, and visualizing and testing Joint command and control systems in a service oriented architecture environment					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 6: *Netcentric Systems Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Analyzer for Netcentric Systems Test Confederations: developed and demonstrated web-based technologies to automate netcentric test planning and scenario development - Technologies for Tactical Video: developed a battlespace awareness tool that integrates sensor imagery data with other Joint mission effectiveness test data in a distributed network environment - Flexible Analysis Services: developed generic message protocol translation prototypes (initially Link 16 capability) with a parser rule and profile creation user interface, and a generic message parser - Rapid Reconfiguration Module: developed a prototype rapid reconfigurable control station for individual or simultaneous control of 200 computers to minimize setup time and maximize test time Continued efforts initiated in prior fiscal years. - Dynamic Distributed Networking for T&E: developing tools for dynamic configuration of communications networks within the netcentric systems test infrastructure - Joint Mission Environment Support Using Data Farming: developing models to capture command and control structures, design of experiment, rapid scenario generation, and automated red teaming - Multi-Level Security Cross Layer Scheme: developing multi-level security features into distributed, decentralized, quality of service, medium access control while preserving power and bandwidth - Policy-Based Adaptive Network and Security Management Technology for Network Centric Systems Testing: developing a policy-based management system for controlling cross-domain multi-level security and automated network quality of service controls through recognition of applications based on the Test and Training Enabling Architecture (TENA) Initiated new research efforts. - Middleware Enhancements to Netcentric Simulation Architecture: follow-on effort to refine coding techniques to address testing requirements; techniques will enable dynamic optimization of information delivery, minimize network congestive failures, and overcome unreliable network environments - Netcentric Systems T&E Capability Model: developing technology for effective characterization and replication of JNO mission threads and architectures for T&E - Network Effects Emulation System: developing an enterprise tool capable of simulating a wide range of network and host-based effects that can be centrally managed and controlled					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 6: *Netcentric Systems Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- TENA in a Resource Constrained Environment: developing technologies to recreate the netcentric battlespace with increased bandwidth and to support high throughput users with the flexibility to transmit critical information at higher priorities Initiated a Broad Agency Announcement (BAA) in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Complete efforts initiated in prior fiscal years. - Dynamic Distributed Networking for T&E - Joint Mission Environment Support Using Data Farming - Multi-Level Security Cross Layer Scheme - Middleware Enhancements to Netcentric Simulation Architecture - Netcentric Systems T&E Capability Model Continue efforts initiated in prior fiscal years. - Policy-Based Adaptive Network and Security Management Technology for Network Centric Systems Testing - TENA in a Resource Constrained Environment - Network Effects Emulation System Initiate new research efforts. - Netcentric Environment Instrumentation and Visualization: develop intelligent T&E analytic and visualization tools that will support Joint mission effectiveness, net readiness, and joint interoperability evaluation requirements - Effort(s) to recreate the netcentric battlespace through the simulation of networks and network interfaces - Effort(s) to measure and analyze the netcentric test environment in order to measure and assess Joint mission effectiveness Initiate a BAA in FY 2010 to select efforts for FY 2011 award.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 6: *Netcentric Systems Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: Complete efforts initiated in prior fiscal years. - Policy-Based Adaptive Network and Security Management Technology for Network Centric Systems Testing - Modern Link Manager Protocols - Network Effects Emulation System Continue efforts initiated in prior fiscal years. - TENA in a Resource Constrained Environment - Netcentric Environment Instrumentation and Visualization - Effort(s) to recreate the netcentric battlespace through the simulation of networks and network interfaces - Effort(s) to measure and analyze the netcentric test environment in order to measure and assess Joint mission effectiveness Initiate new research efforts. - Effort(s) to generate high fidelity simulation of the netcentric battlespace and to model systems in a mission environment - Effort(s) to provide automated analysis to support certification of Joint mission effectiveness, interoperability, and net-readiness - Effort(s) to enable dynamic construction, monitoring, and control of a distributed netcentric test environment Initiate a BAA in FY 2011 to select efforts for FY 2012 award. *FY 2011 OCO Plans:* N/A					
Accomplishments/Planned Programs Subtotals	11.072	12.478	17.672	0.000	17.672

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 6: *Netcentric Systems Test*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 7: *Unmanned and Autonomous System Test*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
7: *Unmanned and Autonomous System Test*	5.073	6.371	6.300	0.000	6.300	6.475	6.489	6.582	6.684	Continuing	Continuing

A. Mission Description and Budget Item Justification

The next generation of unmanned warfighting support systems is under development and will transition rapidly from research efforts into acquisition programs. In addition, on-going research into autonomous and semi-autonomous systems indicates that such systems soon will emerge as a new test challenge. The Unmanned and Autonomous Systems Test (UAST) focus area addresses current and emerging challenges associated with test and evaluation (T&E) of these important warfighting assets. As the complexity of unmanned and autonomous systems (UAS) increases, the capability to test these systems also must be developed. UAS T&E technology advancements are required to enable testing of the behavior of learning UAS. Ranges and installed system test facilities must be able to characterize UAS responses to mission priorities in densely-packed battlespaces and to predict from the data how these systems will respond in the future. The Department of Defense must have the capability to test the ability of these systems to interact safely and effectively with large groups of humans and to determine how these systems respond to unscripted scenarios. This capability requires the development of technology to collect and compare accurate situational awareness of autonomous systems with ground truth; to test unmanned systems in a netcentric environment; to maintain non-line-of-sight tracking; and to execute controlled, repetitive, and realistic stimulation of systems under test.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Unmanned and Autonomous System Test	5.073	6.371	6.300	0.000	6.300
FY 2009 Accomplishments: Completed efforts initiated in prior fiscal years: - High Fidelity Communication Modeling and Analysis: developed modeling and simulation tools to provide controlled, repetitive, realistic stimulation of systems under test - Micro-Beacon Tracking of Autonomous Systems: developed time, space, position information instrumentation by building a tracking station architecture consisting of antennae and signal processing					

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APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 7: *Unmanned and Autonomous System Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Reconfigurable Wireless Measurement System: developed a three-board, wireless sensor stack (consisting of a global positioning system, data acquisition, telemetry, and analog-to-digital converter components) for both truth and perceived truth data - Flexible Command and Control System: developed and demonstrated a system for UAS performance assessment - Software and Hardware for Multi-Resolution Maps and Models: developed and demonstrated a system for multi-level situational awareness models - Intelligent Agent Based Framework: developed preplanning techniques for proper characterization of communications links to support UAS operations in complex environments - Remote Embedded Systems Test: developed technology to improve power summing by controlling power distribution and improving extensions to increase connectivity with multiple systems under test Continued efforts initiated in prior fiscal years. - Cognitive Autonomous System Tester: developing a set of cognitive evaluation tools to convert stored knowledge into actions for T&E for unmanned vehicles - Virtual Autonomous Teaming Tool Test Configuration: developing technology to predict the changes produced within UAS as a result of modifications to external stimuli Initiated research efforts. - Prescriptive and Adaptive Testing Analysis Framework: developing a decision support tool to perform risk management analysis on test programs - Simulated Cooperative Unmanned Underwater Laboratory: developing a reduced-order modeling and control environment to analyze the behavior of cooperative unmanned underwater vehicles Initiated a Broad Agency Announcement (BAA) in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Complete efforts initiated in prior fiscal years. - Cognitive Autonomous Systems Tester - Virtual Autonomous Teaming Tool Test Configuration Continue efforts initiated in prior fiscal years.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 7: *Unmanned and Autonomous System Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Prescriptive and Adaptive Testing Analysis Framework - Simulated Cooperative Unmanned Underwater Laboratory Initiate new research efforts. - Effort(s) to develop technology to model semi-autonomous and autonomous systems for prediction of UAS performance to supplement development and operational T&E events - Effort(s) to develop techniques to conduct T&E in deep sea operations, including data rates, telemetry, way points, and off-board sensors for unmanned undersea vehicles Initiate a BAA in FY 2010 to select efforts for FY 2011 award. *FY 2011 Base Plans:* Continue efforts initiated in prior fiscal years. - Prescriptive and Adaptive Testing Analysis Framework - Simulated Cooperative Unmanned Underwater Laboratory - Effort(s) to develop technology to model semi-autonomous and autonomous systems for prediction of UAS performance to supplement development and operational T&E events - Effort(s) to develop techniques to conduct T&E in deep sea operations, including data rates, telemetry, way points, and off-board sensors for unmanned undersea vehicles - Effort(s) to develop methods to test autonomous space systems, including accessibility, latency, and safety/health hazards in an operationally relevant environment - Effort(s) to develop tools to evaluate the cognitive behavior and predict the future performance of learning algorithms in semi-autonomous and autonomous systems Initiate new research efforts to address T&E technology challenges in the focus area. - Effort(s) to develop technology to model semi-autonomous and autonomous systems - Effort(s) to develop techniques to conduct T&E in deep sea operations - Effort(s) to develop methods to test autonomous space systems, including accessibility, latency, and safety/health hazards in an operationally relevant environment - Effort(s) to develop tools to evaluate the cognitive behavior and predict the future performance of learning algorithms in semi-autonomous and autonomous systems					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 7: *Unmanned and Autonomous System Test*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Initiate a BAA in FY 2011 to select efforts for FY 2012 award. *FY 2011 OCO Plans:* N/A					
Accomplishments/Planned Programs Subtotals	5.073	6.371	6.300	0.000	6.300

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 8: *Common Range Integrated Instrumentation System*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
8: *Common Range Integrated Instrumentation System*	18.500	6.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense has a critical need for enhanced T&E instrumentation to support advanced aircraft, avionics, and weapons system testing. The Common Range Integrated Instrumentation System (CRIIS) is a Tri-Service project that provides a family of capabilities to improve time-space-position information (TSPI) accuracy in low- to high-dynamic test environments and data link throughput capabilities using spectrally efficient data links. CRIIS participant packages will be highly miniaturized in both pod-mounted and internally-mounted configurations. CRIIS is highly dependent upon advanced technology development in the areas of high-accuracy TSPI and spectrally efficient, high throughput data transmission. CRIIS will replace the aging Advanced Ranged Data System, developed in the mid-1980s, which suffers from parts obsolescence is unable to provide the accuracy and data throughput required by advanced weapon systems.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Common Range Integrated Instrumentation System	18.500	6.500	0.000	0.000	0.000
FY 2009 Accomplishments: - Initiated Phase I risk reduction and technology maturation for high throughput, spectrally efficient data link - Initiated Phase I risk reduction and technology maturation for high accuracy TSPI - Conducted system requirements reviews, interim baseline review #1, and system functional reviews					
FY 2010 Plans: - Complete Phase I risk reduction and technology maturation for high throughput, spectrally efficient data link - Complete Phase I risk reduction and technology maturation for high accuracy TSPI - Conduct interim baseline review #2 and preliminary design review - Accomplish field test demonstration and technology readiness assessment					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 8: *Common Range Integrated Instrumentation System*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Down-select to a single prime contractor *FY 2011 Base Plans:* N/A					
Accomplishments/Planned Programs Subtotals	18.500	6.500	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 9: *Multi-Level Security*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
9: *Multi-Level Security*	0.000	0.000	0.000	0.000	0.000	4.601	4.908	4.998	5.094	Continuing	Continuing

A. Mission Description and Budget Item Justification

Multilevel security (MLS) has posed a challenge to the computer security community since the 1960s. MLS will allow information to flow freely between recipients in a computing system who have appropriate security clearances while preventing leaks to unauthorized recipients. MLS systems must incorporate two essential features: first, the system must enforce these restrictions regardless of the actions of system users or administrators, and second, MLS systems must enforce these restrictions with incredibly high reliability. This has led developers to implement specialized security mechanisms and to apply sophisticated techniques to review, analyze, and test those mechanisms for correct and reliable behavior.

Despite this, MLS systems have rarely provided the degree of security desired by their most demanding customers in the military services, intelligence organizations, and T&E activities. Incorporating MLS into telemetry for T&E would allow all users of the data to have access to the same data stream and computer network according to their security clearance level and need-to-know. This would significantly increase efficiency and generate cost savings. MLS will also allow more streamlined testing with coalition partners.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Multi-Level Security	0.000	0.000	0.000	0.000	0.000
FY 2009 Accomplishments: N/A *FY 2010 Plans:* N/A *FY 2011 Base Plans:* N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603941D8Z: *Test and Evaluation/Science and Technology*	PROJECT 9: *Multi-Level Security*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A