CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION						DATE February 2008	
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**			R-1 ITEM NOMENCLATURE **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEMS**				
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	26.641	1.987	0.000	0.000	0.000	0.000	0.000
9183C / Electromagnetic launcher (rail gun)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9357C / Transportable laser induced plasma channel	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9531C / Lasers for Navy applications	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9579C / Deployable Ultra-Short Pulse Laser Development	2.439	0.000	0.000	0.000	0.000	0.000	0.000
9823C / Lasers For Navy Applications	3.124	0.000	0.000	0.000	0.000	0.000	0.000
9824C / Optical Line Replcble Units (O-LRUs)-Hi Energy Las	0.976	0.000	0.000	0.000	0.000	0.000	0.000
9824N / Optical line replaceable units	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9A01N / Prototype Instrumentation System For MUTC	1.075	0.000	0.000	0.000	0.000	0.000	0.000
9A28N / Directed Energy Research	19.027	0.000	0.000	0.000	0.000	0.000	0.000
9999 / Congressional Add	0.000	1.987	0.000	0.000	0.000	0.000	0.000

A. MISSION DESCRIPTION:

In accordance with NAVSEA Notice 5400, Ser 09B/240, Subj: ESTABLISHMENT OF THE NAVY DIRECTED ENERGY WEAPONS PROGRAM OFFICE (PMS 405), dated 4 Jan 02 and NAVSEA Instruction 5400.101, Ser SEA 06/058, Subj: DIRECTED ENERGY AND ELECTRIC WEAPONS PROGRAM OFFICE (PMS 405) CHARTER, dated 21 Jul 04 - COMNAVSEASYSCOM (PMS 405) was assigned as the Point of Contact for matters related to Directed Energy and Electric Weapons development and acquisition initiation for the Navy and for those matters being coordinated with other Federal agencies and military services. The Naval Directed Energy and Electric Weapon Systems Program Office's (PMS 405) mission is to change the way the Navy fights in the 21st century by transitioning Directed Energy and Electric weapon technology, providing the war fighter with additional tools to fight today's and tomorrow's wars. In order to meet Navy requirements, we must effectively manage the transition of 6.3 advanced technology development initiatives through early 6.4 development, demonstration, and validation. PMS 405 will manage development of Directed Energy and Electric Weapon Systems onboard future naval surface ships that incorporate: Weapons Grade High Energy Lasers, Free Electron Lasers (Megawatt class), Electromagnetic Rail Gun (EMRG), High Power Microwave Weapons and Sensor Systems, and other systems.

In FY07, Congressional Adds were provided for Lasers for Navy Applications; Optical Line Replaceable Units (OLRUs); Deployable Ultra-Short Pulse Laser Development; Prototype Instrumentation System for Muscatatuck Urban Training Center (MUTC); and Directed Energy Research.

In FY08, Project Unit 9999 provides a Congressional Add for Lasers for Navy Applications.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION (CONTINUATION)		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	R-1 ITEM NOMENCLATURE **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEMS**	

B. PROGRAM CHANGE SUMMARY:

Funding:	FY 2007	FY 2008	FY 2009
Previous President's Budget: (FY 08 Pres Controls	27.197	0.000	0.000
Current BES/President's Budget (FY 09 Pres Controls	26.641	1.987	0.000
Total Adjustments	-0.556	1.987	0.000
Summary of Adjustments	-0.556	1.987	0.000
Congressional Increases	0.000	1.987	0.000
Miscellaneous Changes	0.000	0.000	0.000
SBIR Reduction	-0.556	0.000	0.000
Subtotal	-0.556	1.987	0.000

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEM**				PROJECT NUMBER AND NAME **579C/Deployable Ultra-Short Pulse Laser Developr**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	2.439	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Joint Vision 2020 requires the assessment and demonstration of the complementary nature of High Energy Laser (HEL) Weapon Systems, coupled with missiles/guns for ship self-defense. This funding supported the accomplishment of the requisite engineering, design, assessment, test, and demonstration of a deployable Ultra-Short Pulse Laser.

Low to moderate power HEL systems offer the potential for complementing ship self-defensive weapon systems at tactically significant ranges. The ability to damage or disable electronic and optical components has been demonstrated. Critical to employment of this capability is the accomplishment of the system engineering and design, and the analysis of the resultant engagement effects. This effort is vital to the Navy's effort to develop and field a deployable laser that will meet near and mid term Navy requirements.

The current world threat environment mandates an urgency in providing the most up-to-date technology based solutions to counter littoral and asymmetric threats. Funds are required to engineer, design, test, and demonstrate weapon-grade laser capabilities that can be deployed in the near and mid term that will counter the requisite threats.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SY**	PROJECT NUMBER AND NAME **9579C/Deployable Ultra-Short Pulse Laser Development**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	2.439	0.000	0.000
RDT&E Articles Quantity	0	0	0

FY 07 funding was provided for the system engineering, system design, and prototype development/demonstration of a deployable ultra-short pulse laser.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:

Raydiance/Penn State

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEM**				PROJECT NUMBER AND NAME **823C/Lasers For Navy Applications**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	3.124	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This funding supported the accomplishment of the requisite engineering, assessment, test, and demonstration of a near term High Energy Laser (HEL) Weapon Systems (HELWS) capability against littoral and asymmetric threats. Joint Vision 2020 requires the assessment and demonstration of the complementary nature of HELWS, coupled with defensive missiles/guns for ship self-defense. Mission survivability is required of our surface ships. High Energy Lasers offer the potential for complementing ship self-defensive weapon systems at tactically significant ranges. Critical to demonstrating this capability are accomplishment of the system engineering and analyses associated with laser development and analysis of engagement effects. This effort is vital to the Navy's plan to develop and field a naval laser to meet future Navy requirements.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SY**	PROJECT NUMBER AND NAME **9823C/Lasers For Navy Applications**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	3.124	0.000	0.000
RDT&E Articles Quantity	0	0	0

FY 07 funding was provided for the system engineering and application of the beam conversion technology, procured and developed with FY 05/06 funding, to accomplish beam combining of the two lasers to provide and demonstrate a 30kW laser weapon capability at significantly longer ranges.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:

Northrop Grumman/Penn State

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEM**				PROJECT NUMBER AND NAME **824C/Optical Line Replcble Units (O-LRUs)-Hi Ener**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	0.976	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The FY 07 Plus up supported the detailed design and development of a prototype, and tested multifunction, low power laser OLRUs. This prototype is referred to as the Integrated Reconnaissance/targeting and Intervention Sensor (IRIS) OLRU.

Current operational environments dictate that precision micromachining technology, which does not introduce residual thermal or mechanical stress in materials, e.g., circuit boards, semiconductor materials, fuel injectors, be developed and utilized to increase reliability in deployed tactical equipment/systems. Optical Line Replaceable Units (OLRUs) will minimize equipment/system volume, weight, cooling, and electrical requirements, in addition to increasing reliability. The potential for advanced electronics and semiconductor manufacturing improvements in accuracy and efficiency drives the urgency to deploy ultra short pulse laser micromachining into the entire Department of Defense (DoD) industrial base in support of ongoing operations.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SY**	PROJECT NUMBER AND NAME **9824C/Optical Line Replcble Units (O-LRUs)-Hi Energy Las**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.976	0.000	0.000
RDT&E Articles Quantity	0	0	0

This funding allowed for the continuing implementation of ultra short pulse laser micromachining processes for ceramic circuit board development and continued development of advanced processing techniques in support of semiconductor and dialectric processing.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:
BOEING

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEM**				PROJECT NUMBER AND NAME **A01N/Prototype Instrumentation System For MUTC**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.075	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

FY 07 funding was provided for the design and build of a prototype capability for Multi-Service and Special Operations Forces to train in an urban environment. This project meets the need for a computer enhanced urban training site that allows for live/virtual/constructive training to be integrated with advanced technology. The project identified deficiencies in the existing infrastructure at Muscatatuck and identified the respective solutions that could be solved through a phased installation approach of equipment, instrumentation, wireless-connectivity, and enhanced computer capabilities. The site was then able to provide the urban training environment necessary to all services.

The Joint Forces Command has established the need for sites that have the capability to conduct mission rehearsals, planning, and exercises within an urban environment. These sites need to provide a venue for joint intergovernmental, interagency, and special operations training. More specifically, training infrastructures need to be put in place that will allow today's armed forces to meet the need for Military Operations on Urban Terrain (MOUT) and the Military Utility Assessment Range (MUAR). This project will allow such capabilities to be put in place at the Muscatatuck Urban Training Center. Urban training comprises one of the most actively studied issues in the armed forces today, with a substantial amount of investment for range infrastructure being planned in the near to midterm to improve MOUT. This push towards urban training is based on the changing demographics in world population towards major urban centers vice rural areas. Current military operations show that it is increasingly likely that forces will engage in the midst of urban populations as opposed to the open field.

The current world threat situation mandates an urgency in providing the most up-to-date technology-based solutions. It is imperative that our forces train in similar environments to what they will actually face. The training strategy being developed by U.S. Forces focuses on progressively more complex training, beginning with individual and team training on an Urban Assault Course, more advanced training in a live-fire shoot house, and finally company, battalion, and brigade training in a Combined Arms Collective Training Facility. Crowd control and separation of antagonists from civilians is another area that requires specialized training and equipment. The Indiana National Guard is developing the Muscatatuck Urban Training Center to become a full-immersion contemporary urban operating environment for doctrinal training events that can be used as a MUAR for advanced technology.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SY**	PROJECT NUMBER AND NAME **9A01N/Prototype Instrumentation System For MUTC**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	1.075	0.000	0.000
RDT&E Articles Quantity	0	0	0

FY 07 funding was provided to design and build a prototype capability for Multi-Service and Special Operations Forces to train in an urban environment.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:
SAIC

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SYSTEM**				PROJECT NUMBER AND NAME **A28N/Directed Energy Research**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	19.027	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This funding was utilized to accelerate development of Directed Energy and Electric Weapon Systems for the U.S. Navy. Funding was used for advanced component and prototype development of the following technology areas associated with Directed Energy and Electric Weapon Systems research:

o Lethality/Vulnerability research, analysis, and engineering
o Electromagnetic Rail Gun Weapon System (EMRG WS) research and engineering
o Free Electron Laser (FEL) research and analysis
o High Energy Laser (HEL) research, engineering, analysis, and design.

Joint Vision 2020 highlights the emerging asymmetric threat facing the United States today and in the future. This includes conflict involving conventional weapons against traditional threats, it also includes those "ambiguous situations residing between peace and war, such as peacekeeping and peace enforcement operations, as well as noncombatant humanitarian relief operations and support to domestic authorities."

The current world threat situation mandates an urgency in providing the most up-to-date technology-based solutions to our war fighters. It is imperative that our forces maintain technical superiority. With the Navy's programmed introduction of ship integrated power systems, the foundation has been established for fielding shipboard directed energy and electric weapon systems. Laser systems provide for the speed of light engagements, with cost savings realized through the reduction or elimination of defensive missiles and guns/magazines required by current self protection missile and gun systems. Lasers also provide a force protection capability that has low collateral damage with graded lethality. The rail gun will provide the Navy with persistent fire power that will accelerate projectiles to hypervelocity without the aid of propellant charges to provide higher velocity warheads, reduced flight times, and increased range while eliminating the hazards of propellant charges and unexploded munitions.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SY**	PROJECT NUMBER AND NAME **9A28N/Directed Energy Research**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	19.027	0.000	0.000
RDT&E Articles Quantity	0	0	0

This funding was utilized to accelerate development of Directed Energy and Electric Weapon Systems for the U.S. Navy. Funding was used for advanced component and prototype development of the following technology areas associated with Directed Energy and Electric Weapon Systems research:

o Lethality/Vulnerability research, analysis, and engineering
o Electromagnetic Rail Gun Weapon System (EMRG WS) research and engineering
o Free Electron Laser (FEL) research and analysis
o High Energy Laser (HEL) research, engineering, analysis, and design.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:

NSWC Dahlgren; JLAB; JHU/APL; William & Mary

CLASSIFICATION:	UNCLASSIFIED		
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION			DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603925N/DIRECTED ENERGY AND ELECTRIC WEAPONS SY**	PROJECT NUMBER AND NAME **9999/Congressional Add**	

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.000	1.987	0.000
RDT&E Articles Quantity	0	0	0

FY 08 funding will provide the system engineering and application of laser beam conversion technology, procured and developed with FY 05/06/07 funding, to accomplish beam combining of the two lasers, procured previously, to provide and demonstrate a 30kW laser weapon capability at significantly longer ranges.