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Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy									DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603114N: Power Projection Advanced 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	96.837	116.191	117.908	0.000	117.908	91.301	76.054	79.589	80.425	Continuing	Continuing
2911: Power Proj Adv Tech	75.096	97.549	117.908	0.000	117.908	91.301	76.054	79.589	80.425	Continuing	Continuing
9999: Congressional Adds	21.741	18.642	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	163.299
A. Mission Description and Budget Item Justification											
<p>The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval S&T Strategic Plan approved by the S&T Corporate Board (Feb 2009). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential science and technology efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.</p>											
<p>This program develops and demonstrates advanced technologies, including Em Rail Gun for naval weapon systems. This Program Element (PE) includes elements of the following Future Naval Capabilities (FNCs); Time Critical Strike, and ForceNet. Within the Naval Transformation Roadmap, this investment will achieve one of four key transformational capabilities required by Sea Strike as well as technically enable elements of both Sea Shield and Force Net.</p>											
<p>Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.</p>											

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APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE			
1319: Research, Development, Test & Evaluation, Navy		PE 0603114N: Power Projection Advanced Technology			
BA 3: Advanced Technology Development (ATD)					
B. Program Change Summary (\$ in Millions)					
	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	81.675	107.969	0.000	0.000	0.000
Current President's Budget	96.837	116.191	117.908	0.000	117.908
Total Adjustments	15.162	8.222	117.908	0.000	117.908
• Congressional General Reductions		-0.484			
• Congressional Directed Reductions		-10.000			
• Congressional Rescissions	0.000	-0.014			
• Congressional Adds		18.720			
• Congressional Directed Transfers		0.000			
• Reprogrammings	20.375	0.000			
• SBIR/STTR Transfer	-5.213	0.000			
• Program Adjustments	0.000	0.000	117.908	0.000	117.908
Congressional Add Details (\$ in Millions, and Includes General Reductions)					
Project: 9999: Congressional Adds					
Congressional Add: AARGM Counter Air Defense Future Capabilities				0.000	1.992
Congressional Add: Countermine LIDAR UAV-Based System (10)				0.000	1.593
Congressional Add: Mobile and Asymmetric Target ID, Detect, Track				0.000	1.992
Congressional Add: Flow Path Analysis Tool				0.000	1.593
Congressional Add: Moving Target Indicator Scout Radar				0.000	0.797
Congressional Add: Tactical High Speed Anti-Radiation Missile Propulsion Demonstration				0.000	1.514
Congressional Add: X-49A Envelope Expansion Modifications				0.000	3.585
Congressional Add: HIGH SPEED ANTI-RADITATION DEMONSTRATION (HSAD)				0.798	0.000
Congressional Add: INFORMATION SHARING FOR ISR TARGETING & ENGAGEMENT				1.596	0.000
Congressional Add: LONG WAVELENGTH ARRAY				2.792	0.000
Congressional Add: SMART INSTRUMENT DEVELOPMENT FOR THE MAGDALENA RID				6.980	3.983

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<u>Congressional Add Details (\$ in Millions, and Includes General Reductions)</u>		FY 2009	FY 2010
Congressional Add: <i>Advanced Ship Self Defense Technology Testing</i>		3.989	0.000
Congressional Add: <i>Countermining LIDAR UAV-based System</i>		1.197	0.000
Congressional Add: <i>Quiet Drive Advanced Rotary Actuator</i>		1.995	1.593
Congressional Add: <i>Realtime Hyperspectral Targeting Sensor</i>		2.394	0.000
Congressional Add Subtotals for Project: 9999		21.741	18.642
Congressional Add Totals for all Projects		21.741	18.642
<u>Change Summary Explanation</u>			
Technical: Not applicable.			
Schedule: Not applicable.			
FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.			

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APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603114N: <i>Power Projection Advanced Technology</i>				PROJECT 2911: <i>Power Proj Adv Tech</i>			
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
2911: <i>Power Proj Adv Tech</i>	75.096	97.549	117.908	0.000	117.908	91.301	76.054	79.589	80.425	Continuing	Continuing
Note Includes new start - cooperative Navy/DARPA Program for the Long Range Anti-Ship Missile (LRASM) Program.											
A. Mission Description and Budget Item Justification This project supports the Time Critical Strike (TCS) and ForceNet FNC components which address technological issues associated with the development of strike weapons to significantly decrease the launch to engagement timeline; provide the Navy of the future the ability to quickly locate, target, and strike critical targets; and enhance mission capabilities and operational utility of Naval forces by dramatically increasing the autonomy, performance, and affordability of Naval organic Unmanned Vehicle systems.											
B. Accomplishments/Planned Program (\$ in Millions)											
							FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
PRECISION STRIKE TECHNOLOGY							39.963	83.389	100.503	0.000	100.503
This activity focuses on the development of high speed (Mach 3 to Mach 4+) strike technologies which significantly decrease the engagement timeline from multiple sea surface and air launched platforms.											
The increase in funding between FY 2009 and FY 2010 is due to the significant increase in the 6.3 demonstration portion of the Electromagnetic (EM) Railgun Program and cooperative Navy/DARPA Program for the Long Range Anti-Ship Missile (LRASM) Program.											
FY 2009 Accomplishments: EM Gun: - Continued development and testing of barrel life components with EM lab launcher expanding to 16 Mega-Joule (MJ) of muzzle energy.											

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010			
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 3: Advanced Technology Development (ATD)		R-1 ITEM NOMENCLATURE PE 0603114N: Power Projection Advanced Technology		PROJECT 2911: Power Proj Adv Tech		
B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">- Continued development of industry advanced launcher prototypes, completing the preliminary design review and initiating detail design activities and component hardware testing.- Continued development and testing of projectile component concepts, completing unitary lethality demo and initiating a dispense lethality demo.- Continued ship integration study efforts.- Completed INP Phase I program mid-way assessment.- Completed fabrication and installation of pulsed power modules for the Electromagnetic Launch Facility (EMLF). <p>RATTLRS:</p> <ul style="list-style-type: none">- Completed RATTLRS flight test demonstration.- Completed data reduction of flight demonstration. <p>Acquisition Workforce Fund</p> <ul style="list-style-type: none">- Funded DoD Acquisition Workforce Fund. <p>FY 2010 Plans:</p> <p>EM Gun:</p> <ul style="list-style-type: none">- Continue development and testing of barrel life components with EM lab launcher expanding to 32 MJ of muzzle energy.- Continue development of industry advanced launcher prototypes, completing detail design activities and initiating detail design fabrication.- Continue development and testing of projectile component concepts, completing the dispense lethality demo and initiating 32 MJ muzzle energy tests.- Continue ship integration study efforts.- Initiate planning for FY 2011 final INP Phase I assessment.- Initiate next generation pulsed power concept design.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
LRASM: - New Start: DARPA initiated effort for development of missile preliminary designs and perform analysis demonstrating designs compliant with program requirements and that subsystem technologies development plans have acceptable risk, schedule and cost. - Initiate detailed hardware design. FY 2011 Base Plans: EM Gun: - Continue ship integration study efforts. - Complete next generation pulsed power concept design. - Complete development and testing of single shot barrel life components with EM lab launcher at 32 MJ of muzzle energy including a 100 shot demo. - Complete development of industry advanced launcher prototypes including delivery and installation at EMLF facility for government test and evaluation with 100 shot demo and 3 shot burst assessment. - Complete development and testing of projectile component at 32 MJ muzzle energy. - Complete final INP Phase I assessment. LRASM: - Complete detailed hardware design. - Initiate/Complete component and subsystem functionality and fit are demonstrated. - Initiate flight hardware fabrication. Weapons System Improvement: - Initiate kill-chain studies to identify and recommend engineering trades to enable weapon system interoperability and data fusion alternatives. These studies will assess engineering feasibility of various kill-chain options and assess the capability provided.						
STRIKE AND LITTORAL COMBAT TECHNOLOGIES		35.133	14.160	17.405	0.000	17.405

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>The focus of this activity is on those technologies that will support the Naval Precision Strike Operations and provide the Navy of the future the ability to quickly locate, target, and strike critical targets. This activity includes support to the following FNC Enabling Capabilities (ECs): Advanced Naval Fires Technology, Hostile Fire Detection and Response, Dynamic Target Engagement & Enhanced Sensor Capabilities, and Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets.</p> <p>The fluctuations in the funding profile from FY 2009 through FY 2010 are a combination of funding additional FNC projects while other FNC projects are completing. This Activity reflects the alignment of investments for the following ECs: Dynamic Target Engagement & Enhanced Sensor Capabilities, Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets and Enhanced Weapons Technologies. Increased Capability Against Moving and Stationary Targets, Counter Air Mid-Range Air-to-Air Missile (AMRAAM)/Defense/High Speed Improvements, Multi-Target Laser Designator and Selectable Output Components.</p> <p><i>FY 2009 Accomplishments:</i> FY 2009 Accomplishments: Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets: - Continued Weapons Data Link (WDL) hardware and software demonstration of a weapons data link terminal that will allow robust in-flight control of strike weapons at greater standoff ranges with reduced power/space/weight requirements, and improved protection against Electronic Counter Measures (ECM). - Completed Long Cost Imaging Terminal Seeker (LCITS) project, including captive carry of the weapon integrated seeker and upgraded launcher and firing two guided rounds within a tactically relevant environment.</p> <p>Dynamic Target Engagement & Enhanced Sensor Capabilities:</p>						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">- Continued effort to provide a low-cost, single board radar system suitable for use on a long endurance Unmanned Air Vehicle (UAV).- Continued effort to provide affordable, high endurance platform/propulsion with Commercial Off the Shelf (COTS) and modified COTS components for persistent Intelligence, Surveillance and Reconnaissance (ISR), targeting, Bomb Damage Assessment/Bomb Damage Indication (BDA/BDI),and weapon delivery.- Continued development of Electro Optic/Infrared (EO/IR) sensors and foliage penetration radars suitable for high resolution imaging of ground threats through rain, fog, and camouflage from smallUAVs.- Completed Decision Support for Dynamic Target Engagement, and Ultra Endurance UAV efforts. <p>Increased Capability Against Moving and Stationary Targets:</p> <ul style="list-style-type: none">- Continued the Direct Attack Seeker Head (DASH) project to drive down seeker cost during the procurement and test of the infrared imaging seeker components.- Continued Multi-Mode Sensor/Seeker (MMSS) project to conduct a Concept Design Review (CDR) and initiate the build of a common aperture Laser Radar (LADAR) and infrared sensor system. <p>Enhanced Weapons Technologies:</p> <p>Maintain development of advanced technologies that support delivery of Navy approved FNC ECs structured to close operational capability gaps in power projection. Package advanced power projection technologies into deliverable FNC products and ECs that can be integrated into acquisition programs within a five year period. Mature power projection technologies that support naval requirements identified within the Sea Strike and FORCEnet naval capability pillars.</p> <ul style="list-style-type: none">- Initiated three new products to address short-falls in current Counter Air (CA) and Counter Air Defense (CAD) capabilities by providing improved range and end-game maneuverability while decreasing Time-of-Flight.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">- Initiated definition and documentation of system level requirements for airframe, thrust level,insensitive-munitions and safety/reliability for CA Advanced Mid-Range Air-to-Air Missile (AMRAAM)Improvements.- Initiated definition and documentation of system level requirements for CAD.- Initiated definition and documentation of system level requirements for High Speed Components. <p><i>FY 2010 Plans:</i> Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets:</p> <ul style="list-style-type: none">- Continue Weapon Data Link project by demonstrate the performance capability of the system and the architecture develop under the project. <p>Increased Capability Against Moving and Stationary Targets:</p> <ul style="list-style-type: none">- Continue all efforts of FY 2009. <p>Enhanced Weapon Technologies:</p> <ul style="list-style-type: none">- Continue all efforts of FY 2009.- Completed Ultra Endurance UAV efforts. <p><i>FY 2011 Base Plans:</i> Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets:</p> <ul style="list-style-type: none">- Complete Weapon Data Link project by demonstrating the performance capability of the system and the architecture develop under the project. <p>Increased Capability Against Moving and Stationary Targets:</p> <ul style="list-style-type: none">- Continue all efforts of FY 2010.- Initiate research for advanced optical techniques to enable multiple simultaneous target designation in order to defeat multiple simultaneous targets or SWARM attacks.						

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B. Accomplishments/Planned Program (\$ in Millions)											
						FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	
<p>- Initiate Strike Accelerator program. This effort will provide an advanced airborne capability to accurately identify targets using Advanced Target Recognition (ATR). These capabilities utilizing the F/A-18 E/F, AESA (Active Electronically Scanned Array) Radar and ATFLIR (Advanced Targeting Forward Looking Infrared) sensors will enable Strike Aircraft to quickly ID and Target maritime threats.</p> <p>Selectable Output Weapon:</p> <p>- Initiate Selectable Output Weapon Sea Strike Project. This project will develop and integrate new technologies to enable real-time selection of a munitions energetic output.</p> <p>Enhanced Weapon Technologies:</p> <p>- Continue all efforts of FY 2010.</p> <p>- Initiate development of advanced technologies that support delivery of Navy approved FNC enabling capabilities structured to close operational capability gaps in power projection.</p> <p>- Initiate package advanced power projection technologies into deliverable FNC products and ECs that can be integrated into acquisition programs within a five year period.</p> <p>- Initiate mature power projection technologies that support naval requirements identified within the Sea Strike and FORCEnet naval capability pillars.</p>											
Accomplishments/Planned Programs Subtotals						75.096	97.549	117.908	0.000	117.908	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 0602114N: <i>POWER PROJECTION APPLIED RESEARCH</i>	7.923	6.765	10.651	0.000	10.651	14.433	10.088	5.248	1.458	0.000	56.566
D. Acquisition Strategy											
N/A											

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E. Performance Metrics The metrics used are programmatic milestones and technical milestones such as flight test and testing of projectile concepts for technical demonstration programs; Technology Transition Agreements (TTAs) which are agreements between the Office of Naval Research and an acquisition program office to transition FNC 6.3 technologies into an acquisition program.		

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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
9999: <i>Congressional Adds</i>	21.741	18.642	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	163.299
A. Mission Description and Budget Item Justification Congressional Interest Items not included in other Projects.											
B. Accomplishments/Planned Program (\$ in Millions)											
							FY 2009	FY 2010			
Congressional Add: AARGM Counter Air Defense Future Capabilities <i>FY 2010 Plans:</i> This effort supports AARGM Counter Air Defense Future Capabilities research.							0.000	1.992			
Congressional Add: Countermine LIDAR UAV-Based System (10) <i>FY 2010 Plans:</i> This effort supports the Countermine Lidar UAV-Based System (CLUBS) research.							0.000	1.593			
Congressional Add: Mobile and Asymmetric Target ID, Detect, Track <i>FY 2010 Plans:</i> This effort supports Detection, Tracking, and Identification for ISRTE of Mobile Asymmetric Targets research.							0.000	1.992			
Congressional Add: Flow Path Analysis Tool							0.000	1.593			

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B. Accomplishments/Planned Program (\$ in Millions)		
	FY 2009	FY 2010
<i>FY 2010 Plans:</i> This effort supports Flow Path Analysis Tool research.		
Congressional Add: Moving Target Indicator Scout Radar <i>FY 2010 Plans:</i> This effort supports Moving Target Indicator Scout Radar research.	0.000	0.797
Congressional Add: Tactical High Speed Anti-Radiation Missile Propulsion Demonstration <i>FY 2010 Plans:</i> This effort supports Tactical High Speed Anti-Radiation Missile Propulsion Demonstration research.	0.000	1.514
Congressional Add: X-49A Envelope Expansion Modifications <i>FY 2010 Plans:</i> This effort supports X-49A Envelope Expansion Modifications research.	0.000	3.585
Congressional Add: HIGH SPEED ANTI-RADITATION DEMONSTRATION (HSAD) <i>FY 2009 Accomplishments:</i> This effort supported the Variable Flow Ducted Rocket Ramjet propulsion concept during the HSAD Project, by investigating the application of this propulsion concept to meet evolving requirements for a near term, reactive, long range weapon system.	0.798	0.000
Congressional Add: INFORMATION SHARING FOR ISR TARGETING & ENGAGEMENT	1.596	0.000

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B. Accomplishments/Planned Program (\$ in Millions)		
	FY 2009	FY 2010
<i>FY 2009 Accomplishments:</i> This effort supported the development of algorithms to identify and track the highest threat targets among multiple targets for Joint Direct Attack Munition (JDAM) systems.		
Congressional Add: LONG WAVELENGTH ARRAY <i>FY 2009 Accomplishments:</i> This effort supported the completion of the design of the long wavelength array through CDR. 256 antenna and receiver pairs were fabricated and deployed into an array. The array was tested for the ability to form and steer the low frequency beam.	2.792	0.000
Congressional Add: SMART INSTRUMENT DEVELOPMENT FOR THE MAGDALENA RID <i>FY 2009 Accomplishments:</i> This effort supported Smart Instrument Development for Magdalena Ridge Observatory (MRO) research. <i>FY 2010 Plans:</i> Continues support of Smart Instrument Development for the Magdalena Ridge Observatory research.	6.980	3.983
Congressional Add: Advanced Ship Self Defense Technology Testing <i>FY 2009 Accomplishments:</i> This effort supported the development and testing of new era of self-defense capabilities for U. S. Naval vessels.	3.989	0.000
Congressional Add: Countermine LIDAR UAV-based System	1.197	0.000

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B. Accomplishments/Planned Program (\$ in Millions)		
	FY 2009	FY 2010
<i>FY 2009 Accomplishments:</i> This effort supported development of the Rapid Environmental Assessment (REA) software for estimating seafloor type and water column optical properties from LIDAR and passive hyperspectral reflectance data. The REA software was tested in turbid, shallow waters, and the algorithms and software have been modified to produce improved seafloor images and seafloor classifications.		
Congressional Add: Quiet Drive Advanced Rotary Actuator <i>FY 2009 Accomplishments:</i> This effort supported performance improvement and lifecycle cost advantage of the quiet drive advanced rotary actuator over the hydraulic rotary actuator. <i>FY 2010 Plans:</i> Continues support of Quiet Drive Advanced Rotary Actuator research.	1.995	1.593
Congressional Add: Realtime Hyperspectral Targeting Sensor <i>FY 2009 Accomplishments:</i> This effort supported the implementation of the Real-Time Hyper-Spectral Targeting Sensor Program designed to address High-Threat Time Critical Strike, Rapid Movement of Mobile/Emergent Target Data to Shooters, Persistent ISR and TTTL for Accurate Target Discrimination and Location, and Situational Awareness and Understanding.	2.394	0.000
Congressional Adds Subtotals	21.741	18.642

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C. Other Program Funding Summary (\$ in Millions) N/A		
D. Acquisition Strategy N/A		
E. Performance Metrics Congressional Interest Items not included in other Projects.		

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