Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Defense Advanced Research Projects Agency	**Date:** March 2014
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
Total Program Element	-	221.490	259.006	386.926	-	386.926	390.744	356.083	318.096	294.181	-	-
NET-01: *JOINT WARFARE SYSTEMS*	-	69.610	36.745	63.144	-	63.144	82.067	94.266	134.741	150.029	-	-
NET-02: *MARITIME SYSTEMS*	-	41.464	50.853	80.882	-	80.882	100.877	117.817	140.355	144.152	-	-
NET-06: *NETWORK-CENTRIC WARFARE TECHNOLOGY*	-	110.416	171.408	242.900	-	242.900	207.800	144.000	43.000	-	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

The Network-Centric Warfare Technology program element is budgeted in the Advanced Technology Development budget activity because it addresses high payoff opportunities to develop and rapidly mature advanced technologies and systems required for today's network-centric warfare concepts. It is imperative for the future of the U.S. forces to operate flawlessly with each other, regardless of which services and systems are involved in any particular mission. The overarching goal of this program element is to enable technologies at all levels, regardless of service component, to operate as one system.

The objective of the Joint Warfare Systems project is to create enabling technologies for seamless joint operations, from strategic planning to tactical and urban operations. Joint Warfare Systems leverage current and emerging network, robotic, and information technology and provide next generation U.S. forces with greatly expanded capability, lethality, and rapid responsiveness. Critical issues facing this project are: (1) U.S. opponents utilizing systems that are flexible, robust, and difficult to neutralize; and (2) U.S. doctrine that limits the use of firepower to lessen the impact of operations on noncombatants. These problems are magnified in urban and semi-urban areas where combatants and civilians are often collocated, and in peacekeeping operations where combatants and civilians are often indistinguishable. Meeting these challenges places a heavy burden on joint war planning. Understanding opponent networks is essential so that creative options can be developed to counter their strategies. Synchronization of air and ground operations to apply force only where needed and with specific effects is required.

The Maritime Systems project will identify, develop and rapidly mature critical advanced technologies and system concepts for the naval forces role in today's network centric warfare concept. Naval forces play an ever-increasing role in network centric warfare because of their forward deployed nature, their unique capability to operate simultaneously in the air, on the sea and under the sea and their versatile ability to provide both rapid strike and project sustained force. The technologies developed under this project will capitalize on these attributes, improve them and enable them to operate with other network centric forces.

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Defense Advanced Research Projects Agency	Date: March 2014
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	236.883	259.006	258.106	-	258.106
Current President's Budget	221.490	259.006	386.926	-	386.926
Total Adjustments	-15.393	-	128.820	-	128.820
• Congressional General Reductions	-0.309	-			
• Congressional Directed Reductions	-24.925	-			
• Congressional Rescissions	-	-			
• Congressional Adds	7.500	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	8.515	-			
• SBIR/STTR Transfer	-6.174	-			
• TotalOtherAdjustments	-	-	128.820	-	128.820

Change Summary Explanation

FY 2013: Decrease reflects Congressional reductions for Sections 3001 & 3004 and directed reductions, sequestration adjustments, the SBIR/STTR transfer offset by Congressional adds and reprogrammings.

FY 2015: Increase reflects new efforts for a system of systems architecture, technical development and demonstration program, expanded maritime efforts, and an increase in classified programs.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency												Date: March 2014
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*				Project (Number/Name) NET-01 / *JOINT WARFARE SYSTEMS*			
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
NET-01: *JOINT WARFARE SYSTEMS*	-	69.610	36.745	63.144	-	63.144	82.067	94.266	134.741	150.029	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

The objective of the Joint Warfare Systems project is to create enabling technologies for seamless joint operations, from strategic planning to tactical and urban operations. Joint Warfare Systems leverage current and emerging network, robotic, and information technology and provide next generation U.S. forces with greatly increased capability, lethality, and rapid responsiveness. Critical issues facing this project are: (1) U.S. opponents using systems that are flexible, robust, and difficult to neutralize; and (2) U.S. doctrine that limits the use of firepower to lessen the impact of operations on noncombatants. These problems are magnified in urban and semi-urban areas where combatants and civilians are often co-located and in peacekeeping operations where combatants and civilians are often indistinguishable. Meeting these challenges places a heavy burden on joint war planning. Understanding opponent networks is essential so that creative options can be developed to counter their strategies. Synchronization of air and ground operations to apply force only where needed and with specific effects is required. This project supports all levels of the force structure including: (1) the strategic/operational level by generating targeting options against opponents' centers of gravity that have complex networked relationships; (2) the tactical/operational level by managing highly automated forces with tight coupling between air and ground platforms; and (3) the focused tactical level by developing platforms and tools, which acquire targets of opportunity and cue network-based analysis of likely enemy operations thus maximizing the effectiveness of ground forces in stability and support operations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: High Energy Liquid Laser Area Defense System (HELLADS)	41.641	25.045	24.144
Description: This program builds upon the past achievements of the High Energy Liquid Laser Area Defense System (HELLADS) development program and the Aero-Adaptive Aero-Optic Beam Control (ABC) program that were budgeted in DARPA PE 0602702E, Project TT-06. The goal of the HELLADS program is to develop a high-energy laser weapon system that will provide an order of magnitude reduction in weight compared to existing laser systems. HELLADS will enable high-energy lasers (HELs) to be integrated onto tactical aircraft and will significantly increase engagement ranges compared to ground-based systems, in addition to enabling high precision/low collateral damage and rapid engagement of fleeting targets for both offensive and defensive missions. Advancements in beam control and other subsystems that are required for the practical integration of a laser weapon into existing tactical platforms will be explored. With the assistance of the Services, the HELLADS program will pursue the necessary analysis, coordination, and design activity for a prototype laser weapon system incorporating the HELLADS laser system and the ABC turret into air-, ground-, or sea-based tactical vehicles. While the prototype laser weapon system module is in design and development, the HELLADS 150 kilowatt (kW) laser will be made available for demonstration opportunities and transition to the Army, Navy, or Air Force.			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency		Date: March 2014
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
FY 2013 Accomplishments: - Continued risk reduction tests of tracking systems for dynamic targets, demonstrated aim point accuracy to support lethal power delivery to test targets in representative battlefield environments. - Completed laboratory checkout and government acceptance of 150 kW laser module; packaged laser and shipped for integration into the high power laser demonstrator system. - Completed high power optics insertion, safety system check-outs, range communications protocol check, and initial high power static operation of laser weapon demonstrator to verify that the laser and its subsystems can safely demonstrate lethal effects on mortars and rockets. - Completed system requirements review of broad utility laser weapon module subsystems including integrating structure, platform interfaces, beam control, and battle management subsystems for integration on air-, ground-, or sea-based tactical vehicles. - Initiated preliminary design phase of laser weapon system module prototype for tri-Service employment. - Completed the fabrication of the 150 kW laser and started field test system integration. - Completed 150 kW laser integration and subsystem testing of the ground-based demonstrator laser weapon system. - Developed novel beam control alternative concepts designed to enhance lethal power delivery to target through severe atmospheric turbulence. ***FY 2014 Plans:*** - Complete live fire tests against rocket and mortar fly-outs to demonstrate lethal laser power at mission-relevant ranges. - Transport demonstrator laser from Army mission (rocket/mortar) relevant ground test site to mountain peak test site to mimic Air Force missions for precision air-to-ground and airborne self-defense demonstrations. - Prosecute live fire targets from mountain peak test site to demonstrate performance of laser weapon system in airborne missions to include targeting of ground vehicles and self-defense against surface to air missiles. - Complete preliminary design and detailed design of laser weapon module prototype's subsystems for integration on a specific air-, ground-, or sea-based tactical vehicle. - Plan for fabrication of the laser weapons system module prototype tailored for the selected Service environment (air, ground, or sea) tactical platform. - Initiate preparations for field testing of prototype against the appropriate target set on the selected Service platform. ***FY 2015 Plans:*** - Conclude live fire target prosecution from mountain peak test site to demonstrate performance of laser weapon system in airborne missions, to include targeting of ground vehicles and self-defense against surface to air missiles. - Commence fabrication of the laser weapons system module prototype in collaboration with selected Service partners. - Refurbish field test 150 kW laser and ready for installation into prototype laser weapon system module.			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency		Date: March 2014
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Integrate laser and support subsystems to ready prototype laser weapon system module for field testing.			
Title: Legged Squad Support System (LS3) ***Description:*** The Legged Squad Support System (LS3) program will explore the development of a mission-relevant quadruped platform scaled to unburden the infantry squad and hence unburden the soldier. In current operations, soldiers carry upwards of 50lbs of equipment, in some cases over 100lbs, over long distances in terrain not always accessible by wheeled platforms that support infantry. As a result, the soldier's combat effectiveness can be compromised. The LS3 program will design and develop prototypes capable of carrying 400lbs of payload for 20 miles in 24 hours, negotiating terrain at endurance levels expected of typical squad maneuvers. LS3 will leverage technical breakthroughs of prior biologically inspired legged platform development efforts. It will develop system designs to the scale and performance adequate for infantry squad mission applications, focusing on platform, control, and human-machine interaction capabilities, as well as secondary design considerations, such as acoustic signature. Anticipated service users include the Army, Marines, and Special Forces. ***FY 2013 Accomplishments:*** - Completed build of prototype systems resulting in two standard systems and one that utilizes a heavy fueled engine option. - Performed experiments to assess the mobility and perception capabilities of the platform from a technology standpoint. - Began technical and operational assessments with the U.S. Marine Corps to evaluate the abilities of the LS3 platform within mission objectives as applied to the LS3 mission profile. ***FY 2014 Plans:*** - Support and refine system prototypes as necessary. - Design and build additional LS3 prototype to address novel approaches to energy consumption, increased survivability and reduced noise. - Participate in final demonstration activities in coordination with the U.S. Marine Corps. - Complete production of final LS3 prototype addressing enhancements to system reliability, energy consumption, survivability and noise reduction. - Conduct endurance, reliability, survivability and signature (noise reduction) testing of final LS3 system.	13.331	3.000	-
Title: Robotics Challenge ***Description:*** Advancements are being made in land-capable, high degree-of-freedom unmanned platforms to enable mobility over complex terrain. Many current prototypes are inspired by biological systems and while proof-of-principle systems have or are demonstrating unprecedented mobility, limitations have emerged. Advanced capabilities in perception, control, and physical capability/coordination are needed to work autonomously in human environments. These are critical enablers for performing mission-relevant tasks in austere and remote regions, partially-destroyed roads, high-threat anti-access/area denied environments, rubble-filled areas, and providing greater range/endurance for soldiers, platforms, and personnel.	14.638	8.700	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*	**Project (Number/Name)** NET-01 / *JOINT WARFARE SYSTEMS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
The Robotics Challenge program will boost innovation in autonomous systems and expand platform utility through enhanced actuation, energy density, perception, locomotion, agile reconfiguration, and design efficiency. Program thrusts are centered on a progressive regimen of physical problem solving, real-time team oriented tasks, and dynamic adaptation designed to build "machine trust", especially when integrated with humans in a variety of operational environments. The Robotics Challenge program consists of a series of obstacle course style challenge events that will focus on technology solutions to demonstrate and test robot capabilities for disaster response. Robotics Challenge events will drive advances in power systems, agility and speed, precision in perception tied to platform coordination, dexterity, and impulsive power. Program objectives focus on technologies to expand mobility and extend endurance of unmanned platforms, advanced tactile and manipulation capabilities, and tools for cost effective design, validation, and construction of autonomous technology, and human-robot interaction. The 6.2 portion of this program is budgeted in PE 0602702E Project TT-04. Anticipated Service users include the Army, Marines, and Special Forces. ***FY 2013 Accomplishments:*** - Completed development of humanoid robot platform for algorithm testing during DARPA Robotics Challenge Trials. - Developed and validated robot simulation system. ***FY 2014 Plans:*** - Coordinate Service participation in Robotics Challenge and apply simulation system to Service areas of interest. - Conduct DARPA Robotics Challenge Trials. - Extrapolate on and conduct further modeling and simulation of techniques and approaches for application to a larger system of systems applications.			
Title: Integrated Planning for Strike, ISR, and Spectrum (IPSIS) ***Description:*** To counter peer threats, the military is increasingly turning to networked weapons and sensors on-board a heterogeneous mix of multi-purpose manned and unmanned systems. Traditionally, Command and Control (C2) systems and planning have operated independently across domains and are optimized for a permissive environment where communications are assured. However, to address the challenges faced in today's increasingly contested environments, the Integrated Planning for Strike, ISR, and Spectrum Planning (IPSIS) program will develop tools to tightly synchronize strike, Intelligence Surveillance and Reconnaissance (ISR), and communications spectrum management planning and maximize the contribution of all assets through increased utilization, exploiting synergies, and defending against network disruption. The program will develop tools supporting a mixed initiative planning approach, maximizing automation according to operator's choice, and enabling human-in-the-loop intervention and modification. The tools will provide a decomposition of the commander's intent into targeting and information needs, and develop plans to satisfy the identified synchronization needs across multiple domains. During execution, the tools will provide lifecycle tracking of targeting and information needs and sophisticated plans, and real-time execution visualization capabilities. The tools will dynamically respond as directed to ad hoc requests and significant plan deviations via a	-	-	12.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
real-time dynamic re-planning capability, and easily adapt to technology refreshes. The IPSIS tools will transition to the Air Force and the Navy. ***FY 2015 Plans:*** - Develop concept of operations for an integrated strike, ISR, and spectrum management capability operating in an Air Operations Center and/or Maritime Operations Center. - Develop system architecture for integrated strike, ISR, and spectrum management to include planning, assessment, and dynamic replanning. - Develop models and simulation capability for test, analysis, and validation of integrated planning capability. - Develop a plan representation for integrated strike, ISR, and spectrum planning. - Develop algorithms for the decomposition of commander's intent and the construction of integration plans.			
Title: System of Systems Architecture, Technology Development, and Demonstration ***Description:*** The System of Systems Architecture, Technology Development, and Demonstration program seeks to implement an architecture framework capable of assessing and demonstrating potential operational benefits of integrating various system capabilities to improve mission success in contested environments. Such assessments would optimize system-level trades of requirements and architectures to properly leverage an integrated set of system characteristics and capabilities. The demonstration assessment metrics will measure individual and combined system performance to further streamline resource allocation to maximize operational impact. In addition, providing a modeling and simulation (M&S) environment to assess complex systems will enable greater utility of emerging system technologies, since they can be assessed in near-real-world simulations without the real-world costs of testing fully integrated systems. The program will also develop system synthesis and integration technologies that enable rapid assimilation of new and off-the-shelf technologies into the system of systems architecture. These technologies will break down current barriers to entry that new technologies face in system of systems using formal methods, compositional reasoning, and automated design space exploration. Technologies from this program will be transitioned to the Services. ***FY 2015 Plans:*** - Develop reference objective system of systems architecture. - Complete the architecture development and integration design. - Develop architecture demonstration plan, including range and platform options. - Implement M&S capabilities for architecture design analysis and validation. - Complete the development of system of systems synthesis and integration tools and protocols. - Commence development of engineering tools to validate system of system architecture designs.	-	-	16.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Commence development of formal verification techniques to validate integration of constituent systems into a system of systems.			
Title: Secure Distributed Dynamic Computing (SDDC)	-	-	11.000
Description: The Secure Distributed Dynamic Computing (SDDC) program will create distributed computing architectures for mobile military environments. Commercial computing services are enabled by massive data centers and high-capacity terrestrial networks, but this level of infrastructure is not available to forward-deployed military forces that operate in mobile, disrupted/disadvantaged, intermittent, high-latency environments. SDDC will make the cyber environment as maneuverable as the troops it supports by creating computing architectures that combine aspects of multi-computing and cloud computing with dynamic monitoring and adaptation of distributed computing environments. These maneuverable architectures will be cognizant of bandwidth-limited data links that operate in contested environments and lack quality-of-service guarantees. An additional requirement arises from the need to ensure access to critical data even when requisite data services are temporarily down or when the data is stored in a format that is no longer supported. An even more stressing case arises when the entire network goes down: restoring the network and reinitiating service to all users is an urgent requirement. SDDC technologies will automatically and dynamically adjust policies and allocate bandwidth, computational resources, and cyber-defense assets to provide reliable, energy-aware, large-scale data processing to forward-deployed tactical users, without dependence upon external non-military resources. ***FY 2015 Plans:*** - Develop distributed computing architectures for mobile, disrupted/disadvantaged, intermittent, high-latency military environments. - Create dynamic computing architectures suitable for use with bandwidth-limited data links that lack quality-of-service guarantees. - Develop techniques to automatically adjust policies and allocate available bandwidth and compute cycles to provide reliable, energy-aware, large-scale data processing.			
Accomplishments/Planned Programs Subtotals	69.610	36.745	63.144

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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E. Performance Metrics

Specific programmatic performance metrics are listed above in the program accomplishments and plans section.

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COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
NET-02: *MARITIME SYSTEMS*	-	41.464	50.853	80.882	-	80.882	100.877	117.817	140.355	144.152	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

The objective of the Maritime Systems project is to identify, develop and rapidly mature critical advanced technologies and system concepts for the naval forces' role in today's network centric warfare concept. Improvements in communications between and among submarines, surface ships and naval aircraft have allowed these forces to operate seamlessly with each other and with other Service's network centric systems. Naval forces will play an ever-increasing role in network centric warfare because of their forward deployed nature, their unique capability to operate simultaneously in the air, on the sea and under the sea and their versatile ability to provide both rapid strike and project-sustained force. The technologies developed under this project will capitalize on these attributes, improve them and enable them to operate with other network centric forces.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Distributed Agile Submarine Hunting (DASH)	30.464	28.943	8.474

Description: The diesel-electric submarine is an asymmetric threat in terms of its cost and consequential growth in numbers relative to our legacy maritime platforms. In addition, these submarines have trended toward lower acoustic signature levels, and have grown in lethality. The Distributed Agile Submarine Hunting (DASH) program intends to reverse the asymmetric advantage of this threat through the development of advanced standoff sensing from unmanned systems. Deep ocean sonar nodes will operate at significant depths in open ocean areas to achieve large fields of view to detect submarines overhead. Each deep node is the maritime equivalent of a satellite, and is referred to as a subullite. The significant field of view, along with the advantage of low-noise phenomena at extreme depths will permit a scalable number of collaborative sensor platforms to detect and track submarines over large areas. For the vast shallow continental shelf areas, the program similarly adopts distributed mobile sensors, but instead leverages insights in non-acoustic sensing from above. The effort is highly focused on achieving new detection modalities with sufficient low power, weight, and size (SWaP), to enable UAV implementations. Initial efforts will focus on identifying the best detection methods leveraged from state-of-the-art sensors and new physical and operational insights. Provided compelling detection capability is achievable, prototype systems will evolve through at-sea testing and sensor integration. The program seeks to achieve breakthrough technology for long-range detection and classification, communications, energy management, sensor and platform integration, and robust semiautonomous processing and control for distributed sensing platforms. This program will transition to the Navy.

FY 2013 Accomplishments:

- Demonstrated passive and active sonar prototypes scalable to large deep-ocean areas for wide area surveillance and maneuver warfare.

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Demonstrated the ability to detect U.S. submarines with both passive and active sonar, showing scalability to detect the quietest of diesel-electric threat submarines. - Commenced testing of initial multi-node communication network for persistent connectivity from seafloor-to-shore. - Initiated planning for the demonstration of multi-node systems. - Completed non-acoustic signature discovery and assessment. ***FY 2014 Plans:*** - Complete development of deep sea prototypes system of distributed sonar nodes, both passive and active. - Complete development of distributed multi-node communication network for connectivity between seafloor, surface, and shore or ship. - Demonstrate extended remote monitoring capability of a passive sonar barrier network at sea. - Demonstrate Unmanned Undersea Vehicle (UUV)-based active sonar in a deep sea test showing target detection and tracking. - Integrate technologies for autonomous, reliable, and secure undersea energy and date transfers to fixed and mobile undersea systems. ***FY 2015 Plans:*** - Design and develop longer-duration passive and active sonar nodes. - Conduct extended-duration sonar demonstrations at sea against a target. - Demonstrate connectivity from seafloor node to remote shore station. - Integrate distributed communications with Navy systems for data transfer and Command, Control, Communications, Computers, and Intelligence (C4I). - Initiate test planning for passive and active sonar sea test.			
Title: Structural Logic ***Description:*** The Structural Logic program is developing platform structures and frames that can adapt to varying loads and simultaneously exhibit both high stiffness and high damping. This program will demonstrate the utility of negative stiffness structural elements developed under the Multifunctional Materials and Structures program, budgeted in PE 0602715E, Project MBT-01, in the ridged support frames of real world DoD platforms. As the demands on military platforms increase, so does the need for structures to mitigate the shock and vibrations applied by dynamic environments. Today's structures exhibit limited adaptability and typically achieve either extreme stiffness or damping. In military platforms, extremely stiff structures provide high strength, but readily transfer loads to passengers often resulting in serious injury. Conversely, existing damping structures can reduce the load transferred to passengers, but only at the expense of structural strength and integrity. By demonstrating the ability to combine stiffness, damping, and dynamic range in a single structure, the Structural Logic program will enable the design of military platforms with the ability to continually adapt their properties to match the demands of a dynamic environment. Technology from this program will transition to the Navy.	9.000	7.000	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
FY 2013 Accomplishments: - Initiated the design and construction of a sub-scale high-speed planing boat structure that incorporates arrays of adaptive structural subassemblies made up of mechanical programs of tiered negative stiffness structural elements. ***FY 2014 Plans:*** - Complete construction of sub-scale high-speed planing boat incorporating negative stiffness elements; perform system testing and evaluation with Navy partners, demonstrating the technology in a realistic environment.			
Title: Hydra ***Description:*** The Hydra program will develop and demonstrate advanced capabilities for the undersea deployment and employment of unique payloads. Hydra integrates existing and emerging technologies and the ability to be positioned in the littoral undersea battlespace to create a disruptive capability. The system consists of a modular enclosure with communications, command and control, energy storage, and standard interfaces for payload systems. It will leverage concepts developed under the TEMP program, PE 0602702E, Project, TT-03. The modular enclosures are deployed by various means, depending on the need for speed and stealth and remain deployed until awakened for employment. Hydra will develop critical enabling technologies for energy storage and recharging, communications, command and control, deployment, and autonomous operations. Technologies from this program will transition to the Navy. ***FY 2014 Plans:*** - Conduct studies to refine the operational trade space, define limits of current technology, and develop new technical approaches. - Initiate concept designs for the modular enclosure and potential payloads. - Explore innovative approaches for key enabling technologies such as energy storage, communications, and deployment. - Conduct risk reduction of key enabling technologies. - Investigate deployment options and initiate system conceptual design. ***FY 2015 Plans:*** - Complete concept designs for the modular enclosure and potential payloads. - Begin development of a prototype modular enclosure. - Begin development of one or more potential payloads. - Demonstrate enabling technologies and subsystems.	-	14.910	29.898
Title: Hybrid Multi Material Rotor Full Scale Demonstration ***Description:*** The goal of the Hybrid Multi Material Rotor Full-Scale Demonstration (HyDem) program is to dramatically improve U.S. Navy submarine superiority. HyDem will apply breakthroughs in materials, material system technologies, developed	-	-	16.500

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
under the Hybrid Multi Material Rotor (HMMR) program budgeted in PE 0602715E, Project MBT-01, and multi-disciplinary design methods to a Virginia Class Submarine propulsor, a critical component in submarine performance. The U.S. Navy's ability to operate their submarine fleet with improved capability allows for the creation of strategic surprise. Submarines could exploit expanded areas which were previously unattainable for the purpose of submarine warfare, including within missions of antisubmarine warfare (ASW), antisurface warfare (ASuW), intelligence, surveillance and reconnaissance (ISR) gathering, strike, Special Forces operations, and strategic deterrence. The HyDem program will design, manufacture, and supply the Navy with a novel component for integration into a new construction Virginia Class Submarine. The Navy will evaluate this component in sea trials. It is envisioned that the Navy will integrate this design change into the future development of the Virginia Class and Ohio Replacement Submarines, and back-fit previously constructed Virginia Class Submarines. This program will transition to the Navy. ***FY 2015 Plans:*** - Complete manufacturing drawings and tooling. - Complete structural building block testing. - Complete manufacturing of the first component to be installed on a Virginia Class submarine.			
Title: Undersea Architecture: Adaptive Infrastructure ***Description:*** All undersea systems eventually require a resupply of energy, offload of data, updates to system information, and maintenance and repair, depending upon their operational use profiles, usage and collection rates. These factors inhibit their use in collaborative networks and prevent the full exploitation of the potential of undersea systems. Building upon challenges identified under the Distributed Agile Submarine Hunting (DASH) program within Project NET-02, the Undersea Architecture program will overcome these limitations by developing the technologies necessary for autonomous, reliable, and secure undersea energy and data transfers to manned and unmanned fixed and mobile undersea systems; true plug, play, and operate standards; and rapid, cost effective deployment and sustainment technologies. The Undersea Architecture program will focus on orders of magnitude reductions in the cost and complexity of sustained undersea operations compared to conventional undersea systems, and will explore the trade-offs between manned, unmanned, and fixed infrastructure systems. The program will emphasize at-sea integrated demonstrations of increasing complexity. Undersea Architecture technologies will transition to the Navy. ***FY 2015 Plans:*** - Commence prototype energy and data distribution module system design and fabrication. - Commence autonomous undersea data transfer system experiments. - Assess system deployment sustainment options; develop cost model.	-	-	12.100

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*	**Project (Number/Name)** NET-02 / *MARITIME SYSTEMS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Conduct component-level and initial system-level performance testing.			
Title: Blue Wolf ***Description:*** Undersea platforms have inherent operational and tactical advantages such as stealth and surprise. Platform drag due to fluid viscosity and platform powering requirements varies with the speed through the water. Platform energy and power density limitations create two distinct operational usage profiles: one for unmanned undersea vehicles (low speed, long endurance) and another for undersea weapons (high speed, short endurance). Designers have historically solved this with hybrid systems such as the Navy's Vertical Launch Anti-Submarine Rocket, or by increasing the size of undersea systems. However, hybrid systems can be vulnerable to air and undersea defensive systems and larger undersea systems can result in significant launch platform modifications. The Blue Wolf program seeks to provide a radically different solution by leveraging the powering and performance results from the previously funded Super-Fast Submerged Transport program, PE 0602702E, Project TT-03, to develop and demonstrate an undersea vehicle with endurance and speed capabilities beyond conventional undersea systems within the weight and volume envelopes of current Navy undersea systems. Significant technical challenges to be addressed include: reliable undersea connectivity, autonomy, guidance, and navigation; obstacle avoidance; and propulsion and energy systems compatible with existing manned platform safety requirements. The program will culminate in a series of at-sea demonstrations and will transition to the Navy. ***FY 2015 Plans:*** - Commence platform design and technology assessments and system safety and effectiveness modeling. - Establish baseline test platform architecture and conduct check-out testing.	-	-	13.910
Title: Unmanned/Minimally-manned Underwater Vehicle (UMUV) ***Description:*** The Unmanned/Minimally-manned Underwater Vehicle (UMUV) program sought to develop a vehicle specifically designed to operate in the littoral battlespace with the capability of performing littoral missions that span a wide range of complexity and could be performed with a small manned crew or autonomously (i.e., unmanned) depending upon mission requirements. The UMUV sought to have the autonomy, range and endurance to drive to the fight from a safe basing location, and be capable of carrying the full range of payloads that are needed to support operational needs in littoral waters, and will provide the capability to perform missions where risk to personnel limits our willingness to execute these missions. The program explored low-cost derivatives of commercial underwater vehicles, the integration of advanced communication and sensor technologies, and the teaming of the UMUV with manned systems. Technologies from the UMUV program will be made available to the Navy.	2.000	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*	**Project (Number/Name)** NET-02 / *MARITIME SYSTEMS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
FY 2013 Accomplishments: - Explored and evaluated the conceptual design of alternative approaches to the UMUV system.			
Accomplishments/Planned Programs Subtotals	41.464	50.853	80.882

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Specific programmatic performance metrics are listed above in the program accomplishments and plans section.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Defense Advanced Research Projects Agency			Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603766E / *NETWORK-CENTRIC WARFARE TECHNOLOGY*	**Project (Number/Name)** NET-06 / *NETWORK-CENTRIC WARFARE TECHNOLOGY*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
NET-06: *NETWORK-CENTRIC WARFARE TECHNOLOGY*	-	110.416	171.408	242.900	-	242.900	207.800	144.000	43.000	-	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

This project funds classified DARPA programs that are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Classified DARPA Program	110.416	171.408	242.900
Description: This project funds Classified DARPA Programs. Details of this submission are classified.			
FY 2013 Accomplishments: Details will be provided under separate cover.			
FY 2014 Plans: Details will be provided under separate cover.			
FY 2015 Plans: Details will be provided under separate cover.			
Accomplishments/Planned Programs Subtotals	110.416	171.408	242.900

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Details will be provided under separate cover.