Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603801N *I (U) Innovative Naval Prototypes (INP) Adv Tech Dev*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	108.285	161.859	-	161.859	86.898	86.858	88.576	90.378	Continuing	Continuing
3400: *Innovative Naval Prototypes (INP) Adv Tech Dev*	0.000	0.000	108.285	161.859	-	161.859	86.898	86.858	88.576	90.378	Continuing	Continuing

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) address the Advanced Technology Development associated with the Innovative Naval Prototypes (INP) Program. These investments represent game changing technologies with the potential to revolutionize operational concepts. They are disruptive in nature as they would dramatically change the way naval forces fight. INPs push the imagination of our nation's technical talent to deliver transformational warfighting capabilities.

The projects in this portfolio are high risk, technically challenging development efforts that offer the potential of high warfighting payoff in the future. The goal of these investments is to develop and demonstrate the viability of new technological capabilities via experimental prototypes that prove the new capability could be implemented if an acquisition program were to be modified or established to support further development. These investments are selected by a process that involves senior leadership in the Department of the Navy.

Developing INPs requires the development of subsystems and components, and efforts to integrate these subsystems and components into system prototypes for field experiments and tests in an appropriate environment. The efforts funded within this PE include concept and technology demonstrations of components and subsystems, which may be form, fit and function prototypes or scaled models that serve the same demonstration purpose. The goal of these development efforts is to prove the technological feasibility and assessment of subsystem and component operability and producibility rather than the development of hardware for service use. By demonstrating the general military utility and direct relevance to identified military needs, the technology becomes available for transition and further development within an emerging or new Program of Record. INPs investments do not necessarily lead to subsequent development or procurement phases, but they do have the goal of moving out of Science and Technology (S&T) and into the acquisition process within the future years defense program (FYDP).

This PE was new for FY 2018 and consolidated all Navy 6.3 investments funding INP investments into a single Navy 6.3 PE. In FY 2017, these investments were spread across 5 separate 6.3 PEs: 0603114N Power Projection Advanced Technology, 0603123N Force Protection Advanced Technology, 0603271N Electromagnetic Systems Advanced Technology, 0603747N Undersea Warfare Advanced Technology, and 0603758N Navy Warfighting Experiments and Demonstrations. Accordingly, the projects in the portfolio are no longer distinguished as INPs or Leap Ahead-Technologies. Rather, they are now referred to simply as INPs.

Due to the nature of these projects, starting in FY19, plans have been written with limited details due to information security concerns. Specific information on each project will be provided separately to the Congressional oversight committees.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603801N *I (U) Innovative Naval Prototypes (INP) Adv Tech Dev*		
B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	0.000	108.285	86.342	-	86.342
Current President's Budget	0.000	108.285	161.859	-	161.859
Total Adjustments	0.000	0.000	75.517	-	75.517
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	76.000	-	76.000
• Rate/Misc Adjustments	0.000	0.000	-0.483	-	-0.483

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 3	R-1 Program Element (Number/Name) PE 0603801N / *(U) Innovative Naval Prototypes (INP) Adv Tech Dev*	Project (Number/Name) 3400 / *Innovative Naval Prototypes (INP) Adv Tech Dev*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3400: *Innovative Naval Prototypes (INP) Adv Tech Dev*	0.000	0.000	108.285	161.859	-	161.859	86.898	86.858	88.576	90.378	Continuing	Continuing

A. Mission Description and Budget Item Justification

INP and LA-Tech investments are typically 4-8 years in duration. They provide a continuance of basic research by maturing technologies from a Technology Readiness Level (TRL) of 2 or 3 to a TRL of 6. It is intended that prototypes developed within this program, requiring both BA2 and BA3 funding, are demonstrated in a relevant environment to prove the feasibility of the new technological capability. The portfolio is periodically refreshed through the selection of new INPs and LA-Tech investments as existing ones are completed. Successful experimentations and demonstrations are intended to present the Department of the Navy with a programmatic challenge as these new capabilities can lead to the obsolescence of existing capabilities and significant decisions as to the path forward for integrating the new technological capabilities into the warfighting systems of the future. INPs and LA-Tech investments have been collectively grouped into R-2 Activities that include Unmanned and Autonomous Systems, Directed Energy / Electric Weapons, Electromagnetic Maneuver Warfare, Cyber and Undersea Warfare.

Due to the nature of these projects, starting in FY19, plans have been written with limited details due to information security concerns. Specific information on each project will be provided separately to the Congressional oversight committees.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Cyber	0.000	5.238	12.692	0.000	12.692
Description: This R-2 Activity contains all BA3 Innovative Prototype (INP) investments that are developing new technologies for cyber warfare. Potential adversaries are investing in advanced technologies that will challenge our advantages in the critical information domain. Nation states and non-state actors seek to degrade our command and control capabilities, networks and computer systems. Cyber threats continue to grow and rapidly proliferate. Technologies developed in this R-2 Activity will enable the warfighter to take immediate, appropriate action at any time against any desired adversary, target or network by assuring that autonomous, continuous analyses of intelligence, persistent surveillance and open information sources have, at all times, optimized the possible courses of action based on commander's guidance. Technologies within this activity will foster operational endurance and enable sustained operations and resiliency for warfighters and platforms through enhanced cyber security/protection. ***FY 2018 Plans:*** Total Platform Cyber Protection (TPCP) Initiate the BA 3 effort for the TPCP project, previously funded in PE 0602123N Force Protection Applied Research, which will develop leap-ahead resilient cybersecurity tools to enable our warfighting platforms to					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603801N / *(U) Innovative Naval Prototypes (INP) Adv Tech Dev*	**Project (Number/Name)** 3400 / *Innovative Naval Prototypes (INP) Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
fight through current and future unauthorized cyber intrusions and ensure command and control of any Naval platform (submarine, surface, and air platforms) by providing an adaptive cyber toolkit and real time cyber sensors. This project develops a prototype and will demonstrate cyber sensors and automated vulnerability assessment cyber tools that deliver comprehensive defense-in-depth cyber capabilities to monitor, detect, mitigate, and recover from cyber threats in near real-time. Relevant naval cyber tools will be developed and tested to verify the technology can autonomously perform cyber vulnerability assessments and implement mitigation strategies that protect naval platforms from unauthorized cyber intrusions. New cyber autonomy tools will be developed to protect critical naval warfighting capabilities supporting multiple missions, including time critical strike, expeditionary warfare, anti-surface warfare, and anti-air warfare. These tools, which rely on cyber components, will be developed and demonstrated over an extended period of time at several integrated hardware in-the-loop facilities across the Naval Research Enterprise. Optimized cyber resiliency warfighting effectiveness will be developed and demonstrated. The technology will be developed to protect common layers of cyber functionality in hardware components, and local, system, and peripheral buses. The protection will be extended into the system BIOS, hypervisor, operating system, middleware, the application space, and the network infrastructure. ***FY 2019 Base Plans:*** Continue developing the Technology to support enhanced Fleet/Force cyber protection and mitigation. Continue the BA3 effort to develop resilient cybersecurity tools that will enable our warfighting platforms to fight through current and future cyber intrusions. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The FY18 to FY19 increase is due to an increase in funding applied to the development of capabilities to provide cyber protection for two of the program's eight identified common layers of cyber platform functionality, in an effort to improve overall naval platform cyber resiliency and warfighting effectiveness.					
Title: Directed Energy / Electric Weapons	0.000	35.529	98.747	0.000	98.747
Description: This R-2 Activity contains all BA3 Innovative Prototype (INP) investments that are developing new technologies for directed energy and electric weapons. Future adversaries will seek to neutralize U.S. conventional advantages by capitalizing on asymmetric capabilities that incorporate mobility, range, speed and deception. Naval platforms will be on the front line of our national integrated defensive capabilities to defeat these emerging threats that are proliferating. At the same time, the fleet/force must be able to effectively strike					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603801N / *(U) Innovative Naval Prototypes (INP) Adv Tech Dev*	**Project (Number/Name)** 3400 / *Innovative Naval Prototypes (INP) Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
targets with survivable, scalable and cost-effective weapons that have sufficient range, speed and accuracy to complete a variety of missions while reducing risk to our warfighters and without creating unnecessary collateral damage or loss of life. Technologies within this activity will provide scalable lethality through enabling multi-domain, integrated, scalable kinetic and non-kinetic systems for offensive of defensive purposes. The FY18 to FY19 increase is due to increased investment for the continued and accelerated development of laser weapon systems, initial sea-based testing of these systems, and research supporting systems integration into naval surface platforms. ***FY 2018 Plans:*** Electro-Magnetic Railgun (EMRG) Continue EMRG, which was previously funded in 0603114N Force Protection Advanced Technology Development and PE 0603123N Force Protection Advanced Technology Development. The EMRG capability will support Naval Surface Fire Support (NSFS), Integrated Air and Missile Defense (IAMD), Fast Attack Craft and Fast Inshore Attack Craft (FAC/FIAC) and Anti-Surface Warfare (ASuW) missions. Design, fabricate and integrate Electro Magnetic (EM) railgun subsystems and components into a system prototype capable of rep-rate operations. Assess the manufacturability of major components such as the railgun launcher and pulsed power modules, which are key to the technology capability. Conduct preliminary prototype system tests and demonstrations to prove the technological feasibility of the EMRG capability and assess sub-system and component operability under stressing rep-rate conditions. Continue developing and testing a prototype rep-rate railgun launcher that is suitable for installation in a prototype railgun gun mount, where the design of the power and energy architecture necessary to support the prototype EMRG system can be assessed. Continue to test and build full-scale electro-magnetic railgun system prototypes that include the battery charging system, the pulsed power subsystem, and the electromagnetic launcher. Perform full-scale testing of long-life railgun launcher material solutions inserted in laboratory launchers. Design, build, test, and evaluate iterative electromagnetic railgun composite launcher prototypes to demonstrate the technological feasibility, performance, multi-shot life, and suitable firing rate of the system. Continue activities to integrate and test a Hyper Velocity Projectile (HVP) for use with the EMRG. Solid State Laser Technology Maturation (SSL TM) Continue SSL TM, which was previously funded in 0603114N Force Protection Advanced Technology Development. Continue development of a maritime laser weapons system prototype and test it on a representative test platform for a naval surface combatant. Conduct the required laser weapon system					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
engineering, design, integration and testing necessary to have a testable, experimental prototype. This system will be capable of supporting missions such as defense against small boat and Unmanned Aerial Vehicle (UAV) swarms and Intelligence, Surveillance and Reconnaissance (ISR) disruption and defeat. The results of scientific and engineering trade studies, including those that measure atmospheric absorption and turbulence, will be used to support the integration and testing of a maritime beam director and a high power, Solid State Laser (SSL) capable of tracking and engaging surface and airborne targets at a relevant stand-off distance in the maritime environment. A Hybrid Predictive Avoidance Safety System (HPASS) will be integrated with a solid state laser weapon system demonstrator to de-conflict laser operations with friendly sensors and platforms. At-sea testing will be conducted on the full laser weapon system demonstrator (i.e., prototype) from a representative test platform for a naval surface combatant. High-power Joint Electromagnetic Non-Kinetic Strike (HIJENKS) Continue HIJENKS, a joint USAF/USN project previously funded as a FY17 jump start effort in PE 0603758N Navy Warfighting Experiments and Demonstrations emergent technology breakthroughs technology. Develop a High Power Radio Frequency (HPRF) technology payload integrated on an air platform capable of engaging multiple electronic targets with a single, scalable effects weapon across a variety of warfighting missions. This effort will culminate in a live fire demonstration of a multi-mission/multi-target HPRF payload integrated into a demonstration platform. The operational impacts include decreased cost exchange ratios, non-kinetic counter electronic effects, reduced collateral damage, and the ability to engage multiple targets with a single weapon. This effort 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. During FY18, the following advanced technology development efforts are planned: conduct system requirements and preliminary design assessments to further mature the development of an HPRF advanced development (prototype) system; perform trade studies to examine different technical approaches for developing the HPRF prototype and assessing the Technology Readiness Level (TRL) of emerging HPRF sources; begin the initial design of HPRF advanced payload activities; refine the prototype system performance requirements with input from operational stakeholders; study platform integration approaches and begin integration design activities; begin developing the hardware and software required to integrate an advanced HPRF payload for a future demonstration; analyze platform modifications; begin testing target classes for the Radio Frequency (RF) waveform specification being developed in BA 6.2; conduct kill-chain studies to identify and recommend design trade-offs to enable weapon					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
system interoperability; begin live fire demonstration planning; and begin conceptually designing the next generation RF source technology. ***FY 2019 Base Plans:*** Continue advanced technology development and studies focused on marinizing an operational laser weapon system, expanded efforts supporting and conducting sea-based developmental testing, and research supporting future systems integration of surface ship laser weapons. Initiate advanced technology development efforts to evaluate the potential performance of an alternative laser source for future Surface Navy Laser Weapons System increments. Continue conducting BA3 development addressing the unique technical challenges inherent in the construction, assembly and operation of a high-power, kinetic energy weapon prototype capable of launching long range projectiles repeatedly. Continue BA3 efforts to develop a radio frequency effects payload (a joint USAF/USN project) with scalable electromagnetic effects. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The FY18 to FY19 increase is due to increased investment for the continued and accelerated development of laser weapon systems, initial sea-based testing of these systems, and research supporting systems integration into naval surface platforms.					
Title: Electromagnetic Maneuver Warfare ***Description:*** This R-2 Activity contains all 6.3 Innovative Prototype (INP) investments that are developing new technologies for Electromagnetic Maneuver Warfare (EMW). The electromagnetic spectrum is a key operational maneuver space enabled by continuous, real-time awareness of all spectrum activity. This R-2 Activity supports spectrum dominance which included efforts that focus on communications, surveillance, EW and electronics to understand and shape the battle space. The ability to assure access to the full spectrum is essential for battle space awareness and threat surveillance/weapon sensor engagement. Technologies within this activity will provide for integrated and distributed forces capable of dynamic synchronized actions through interoperable	0.000	16.839	16.093	0.000	16.093

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
forces by incorporation of autonomous / disaggregated systems to increase flexibility and reach within the electromagnetic spectrum. ***FY 2018 Plans:*** Electromagnetic Maneuver & Control Capability (EMC2) Continue the EMC2 project, which was previously funded in 0603271N Electromagnetic Systems Advanced Technology Development. The EMC2 project will enable a battle group to work cooperatively in the Electromagnetic Spectrum (EMS) by optimizing Electronic Warfare (EW), Information Operations (IO), communications, and radar performance. EMC2 will incorporate the results of its ongoing advanced technology development efforts in Radio Frequency (RF) resource optimization into the Resource Allocation Manager (RAM) construct that was previously developed for single multifunction systems under the InTop program, which optimized spectrum and functional use across a platform and an entire strike group. EMC2 will begin building a Lowband RF Intelligent Distribution Resource (LowRIDR) prototype and continue efforts to develop a multifunction control system for LowRIDR. EMC2 will also begin building the necessary advanced technology components of a wideband, multifunction airborne system that can be integrated with ship-based wideband, multifunction systems. Experimentation and demonstrations will be performed to determine how best to utilize the wideband, multifunction systems that have already been delivered {i.e., Wideband Submarine Satellite Communications (SubSatCom), EW/IO/Communications and Flexible, Distributed Array Radar (FlexDAR)} to enable EMW and provide the ability to dominate the EMS domain. Nemesis Complete the Nemesis project, previously funded in 0603271N Electromagnetic Systems Advanced Technology Development, by designing and building prototype Nemesis payloads that implement industry standards for software, hardware, and firmware interfaces. Nemesis expendable decoys and prototype system hardware will be completed and delivered for field testing. Demonstrations of Nemesis platforms and payload will be conducted during fleet experimentation, as well as during focused field and laboratory tests. ***FY 2019 Base Plans:*** Continue BA3 to develop technology which will enable a strike group to work cooperatively in the Electromagnetic Spectrum (EMS) to optimize Electronic Warfare (EW), Information Operations (IO), communications, and radar performance. ***FY 2019 OCO Plans:***					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The FY18 to FY19 decrease is due to the completion of a distributed EW systems project and a decrease in funding for an electromagnetic spectrum agility effort (in the program's second to last year).					
Title: Undersea Warfare ***Description:*** This R-2 Activity contains all BA3 Innovative Prototype (INP) investments that are developing new technologies for Undersea Maneuver Warfare. This R-2 Activity explores development of technologies to achieve and maintain undersea dominance in the areas of ASW and mine warfare, and to improve environmental sensing capabilities which support the Undersea Warfare domain. Technologies within this activity will dramatically improve sensing and sense-making, provide integrated and distributed autonomy to forces, and provide scalable lethality through development of kinetic and non-kinetic effects payloads. ***FY 2018 Plans:*** Forward Deployed Energy & Communications Outpost (FDECO) Complete FDECO, which was previously funded in PE 0603123N Force Protection Advanced Technology Development. Incorporate results from the FDECO architecture planning study into the FDECO design. Begin integrating FDECO component technologies into experimental FDECO subsystems and utilize the results of limited objective experiments to begin developing a future demonstration plan. Continue to demonstrate FDECO's ability and capacity to support vehicle agnostic docking, autonomous and efficient energy management, and federated command & control (C2) of the system and hosted assets. Continue to demonstrate notional intelligence preparation of the operational environment and begin demonstrating notional mine warfare and anti-submarine warfare capabilities. Anti-Submarine Warfare Mission Packages (ASW MP) Complete ASW MP, which was previously funded in PE 0603747N Undersea Warfare Advanced Technology Development. The ASW MP is developing a system of ASW sensors and autonomy algorithms for undersea systems. ***FY 2019 Base Plans:*** Complete BA3 efforts to develop next generation ASW capability. ***FY 2019 OCO Plans:***	0.000	13.168	1.490	0.000	1.490

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The FY18 to FY19 decrease is due primarily to the completion of an undersea warfare technology development project.					
Title: Unmanned and Autonomous Systems ***Description:*** This R-2 Activity contains all BA3 Innovative Prototype (INP) investments that are developing new technologies for Unmanned and Autonomous Systems. Increased proliferation of inexpensive lethal threats targeting individual warfighters and high-value assets, combined with continued rapid advances in computing, power and energy, robotics, sensors and position guidance technologies, drives the requirement to augment expensive manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains. Technologies within this activity will provide integrated and distributed, autonomous and disaggregated systems to increase flexibility and reach. ***FY 2018 Plans:*** Autonomous Aerial Cargo/Utility System (AACUS) Complete the AACUS project, which was previously funded in PE 0603123N Force Protection Advanced Technology Development. Continue development of the design and build of a prototype sensor suite and software package suitable for integration and testing on an existing USMC rotary wing aircraft that will enable the capability for optional unmanned autonomous flight. Conduct development and planning for a demonstration of the system's ability to autonomously perform an assault support mission in an operationally representative environment. This demonstration will include performing autonomous take-off, conducting en route navigation, approaching and landing at multiple unprepared landing zones using supervisory control managed by a minimally trained Marine via a tablet-based application, detecting and avoiding ground based obstacles, and safely operating in degraded visual environments. Claws Initiate Claws which will develop the autonomy required to operate large and extra-large Unmanned Undersea Vehicles (UUVs) in an anti-access, anti-denial environment. To support large and extra-large UUV operations further forward and farther from the battle group, the technology will be evolved to allow operations with limited navigational fixes and limited communication opportunities. During FY18, at-sea testing of Technology Readiness Level (TRL) 5 research technologies will be initiated in a realistic environment. At-sea data will be collected to support the further development of Claws technologies emerging out of the Claws applied research	0.000	37.511	32.837	0.000	32.837

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
effort in PE 0602792N. Analysis of promising technologies will be conducted using laboratory and at-sea testing to provide realistic performance data. Large Displacement Unmanned Undersea Vehicle (LDUUV) Complete LDUUV, which was previously funded in PE 0603747N Undersea Warfare Advanced Technology Development. Continue progress developing a prototype LDUUV and demonstrate the autonomy technology that enables the LDUUV to avoid undersea static obstacles, operate in a variety of currents, and adapt to local environments so as to maintain station. Conduct development, testing and demonstration of the endurance technology and recommend a reliability strategy allowing for 30 days of continuous operations. Conduct a demonstration of the LDUUV fuel cell system installed in an LDUUV vehicle operating in an Intelligence Surveillance Reconnaissance (ISR) like mission for 60 days. Continue to document the data analysis from the technology development in order to transition the information to Program Executive Office for the Littoral Combat Ship. Low-Cost UAV Swarming Technology (LOCUST) Initiate the BA 3 technology development effort for the LOCUST project, which will ultimately deliver a scalable system of inexpensive Unmanned Aerial Vehicles (UAVs) and payloads that will provide game-changing disruptive capabilities over a wide range of military operations and areas of operations. LOCUST will make advances in unmanned system collective autonomous behaviors, robust low probability of interception or detection ad hoc networks, and payload miniaturization and modularity breakthroughs to counter threats in constrained urban environments, as well as large-scale anti-access area denial defenses. This will be accomplished at greatly reduced cost and risk when compared to traditional manned platform target prosecution. During FY18, the LOCUST program will begin to develop a range of key technologies that will be integrated together in order to demonstrate a scalable system of inexpensive, commoditized, swarming UAVs that provide disruptive capabilities. Critical milestones for each major sub-system and system will be established, as well as a revisit to requirements and metrics throughout. Yearly wargames will be utilized to shape and inform the demonstrations, which will be of increasing complexity in both mission and operating environment. The demonstrations in turn will provide the Navy with an ability to spiral out capability as needed. FY18 demonstrations are planned to encompass missions utilizing intelligence, surveillance, reconnaissance and kinetic strike payloads. Medium Displacement Unmanned Surface Vehicle (MDUSV)					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue the MDUSV project, which was previously funded predominantly in 0603123N Force Protection Advanced Technology Development. The MDUSV project will design and build a prototype MDUSV platform sized for theater or global independent operations. New autonomy, Mine Countermeasures (MCM), Anti-Submarine Warfare (ASW), and Electronic Warfare (EW) technologies will be integrated into the MDUSV platform. The capability of the MDUSV to autonomously perform ASW, MCM and EW missions over an extended period of time will be demonstrated during a 40-day period of at-sea testing. The capability to autonomously operate in all-weather conditions, using new technologies that provide robust perception using Electro-Optic/Infrared (EO/IR) sensors that detect low radar cross-section craft with reduced vulnerability to jamming and reduced Radio Frequency (RF) emissions, will be assessed. The use of integrated acoustic and High Temperature Superconductor (HTS) mine influence sweep technologies as well as a novel ASW sensor suite that includes an advanced version of the Non-Traditional Sensor System (NTSS) will be tested on an instrumented range. Tern Complete Tern, a joint ONR and DARPA effort, previously funded in 0603123N Force Protection Advanced Technology Development. Continue TERN technology development by conducting hardware and software testing and a sea-based Vertical Take-Off and Landing (VTOL) flight demonstration. The developed Tern enabling technologies have been focused on supporting a DDG-51 and LCS-2 based future long endurance Unmanned Air Vehicle (UAV) capability that could be transitioned and implemented with minimal ship modification. ***FY 2019 Base Plans:*** Continue BA3 development of autonomous payloads for large and extra-large unmanned undersea vehicles. Continue BA3 development of autonomy algorithms, the command and control architecture needed for swarm control (a flying ad-hoc network), effects payloads and sensing modalities. Continue BA3 development and integration of autonomy systems and various mission area payloads onto unmanned surface vehicles. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The overall FY18 to FY19 decrease is due to a significant reduction of funding levels associated with the completion of three unmanned and autonomous systems technology development projects, countered by an increase in funding in the second year of two FY18 new start INPs.					
Accomplishments/Planned Programs Subtotals	0.000	108.285	161.859	0.000	161.859

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

In all cases, the technologies being developed within this PE support the Department of the Navy INP Program and are managed at the Office of Naval Research. The primary technological metrics used in this PE involve experiments and tests that demonstrate proof of concept for the technological capability being developed. Technology development is informed by periodic interaction with Naval warfighters, resource sponsors and the acquisition community. At the lowest level, each project is evaluated against technical and financial milestones on a frequent basis. Annually, each project is reviewed in depth for technical performance and development status by the Chief of Naval Research. Department of the Navy leadership is briefed on the portfolio's status by the Chief of Naval Research.