Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602792N *I (U)Innovative Naval Prototypes(INP) Applied Res*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	0.000	0.000	171.146	-	171.146	160.349	161.929	161.945	165.184	Continuing	Continuing
0000: *(U)Innovative Naval Prototypes(INP) Applied Res*	0.000	0.000	0.000	171.146	-	171.146	160.349	161.929	161.945	165.184	Continuing	Continuing

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) address the Applied Research associated with the Innovative Naval Prototypes (INP) Program and its associated Leap Ahead Technology (LA-Tech) investments. 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 technology 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 established to further develop the demonstrated capability. These investments are selected by a process that involves senior leadership in the Department of the Navy, with new INPs approved by the 4-star RDT&E Corporate Board.

Developing INPs and Leap Ahead Technologies requires a systematic expansion and application of knowledge to develop useful materials, devices, and systems oriented toward the design and development of prototypes applicable to specific mission area requirements. The efforts funded within this PE translate promising basic research into solutions for broadly defined military needs. These efforts include developing breadboard hardware and algorithms that establish the initial feasibility and practicality of proposed solutions to technological challenges, as well as other pre-Milestone B efforts such as concept exploration efforts, studies, investigations, and non-system specific technology efforts.

This is a new PE for FY 2018 that consolidates all Navy 6.2 Applied Research investments funding INPs and their associated LA-Tech investments into a single Navy 6.2 PE. In FY 2017, these investments were spread across 4 separate 6.2 PEs: 0602114N Power Projection Applied Research , 0602123N Force Protection Applied Research, 0602271N Electromagnetic Systems Applied Research, and 0602747N Undersea Warfare Applied Research. The consolidation in this PE allows all investments within this portfolio to be viewed in one place. It greatly enhances the visibility of the Program by providing an easily navigable overview of all 6.2 INP and LA-Tech investments in a single place.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy					Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 2: *Applied Research*			R-1 Program Element (Number/Name) PE 0602792N *I (U)Innovative Naval Prototypes(INP) Applied Res*		
B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	171.146	-	171.146
Total Adjustments	0.000	0.000	171.146	-	171.146
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	171.146	-	171.146

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 2	R-1 Program Element (Number/Name) PE 0602792N / *(U)Innovative Naval Prototypes(INP) Applied Res*	Project (Number/Name) 0000 / *(U)Innovative Naval Prototypes(INP) Applied Res*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
0000: *(U)Innovative Naval Prototypes(INP) Applied Res*	0.000	0.000	0.000	171.146	-	171.146	160.349	161.929	161.945	165.184	Continuing	Continuing

A. Mission Description and Budget Item Justification

Innovative Naval Prototype (INP) 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. All prototypes developed within this program require BA2 and BA3 funded technology development, which is coordinated to ensure the investments conclude with a demonstration proving the feasibility of the new technological capability in relevant environment. The portfolio is periodically refreshed through the selection of new INPs and Leap Ahead Technology (LA-Tech) investments as existing ones are completed. Successful 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, requiring 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, including FY17 jump start efforts, 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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Cyber	0.000	0.000	24.923	0.000	24.923
Description: This R-2 Activity contains all Innovative Prototype (INP) and associated Leap Ahead Technology (LA-Tech) investments that are developing new technologies for cyber warfare. FY 2018 reflects the sum total of all BA 6.2 efforts in the program. Applied research for the Total Platform Cyber Protection (TPCP) INP shown below was initiated in FY17 under PE 0602123N Force Protection Applied Research. The INP was selected after the President's Budget for FY17 was delivered to the Congress. Starting in FY 2018, all INP/LA-Tech investments in Cyber warfare will be shown in this R-2 Activity to better convey exactly what the Office of Naval Research is working on in this area.					
FY 2016 Accomplishments: N/A					
FY 2017 Plans: N/A					
FY 2018 Base Plans: INP: Total Platform Cyber Protection (TPCP)					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602792N / *(U)Innovative Naval Prototypes(INP) Applied Res*	**Project (Number/Name)** 0000 / *(U)Innovative Naval Prototypes(INP) Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue the TPCP project, previously funded in PE 0602123N Force Protection Applied Research. Develop leap-ahead resilient cybersecurity tools that will enable our warfighting platforms to fight through current and future unauthorized cyber intrusions and assure command and control of any naval platform (submarine, surface, and air platforms) providing an adaptive cyber toolkit and real time cyber sensors. This project develops 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. This project will develop software based capabilities and a compact and affordable computing appliance applicable to any aircraft, surface vessel, submarine or ground vehicle. The technical development will leverage dynamic and active sensing and cyber vulnerability prevention science and technology approaches, including formal methods, model checking, and static/dynamic analyses which reduce cyber platform attack surfaces, prevent the exploitation of system vulnerabilities, shorten detection timelines, and perform other mitigation functions. Commercial off-the-shelf software components will be leveraged to develop technology for de-bloating and delayering so as to reduce the attack surface and ensure platform resiliency against unauthorized cyber intrusions. ***FY 2018 OCO Plans:*** N/A					
Title: Directed Energy / Electric Weapons ***Description:*** This R-2 Activity contains all Innovative Prototype (INP) and associated Leap Ahead Technology (LA-Tech) investments that are developing new technologies for directed energy and electric weapons. FY 2018 reflects the sum total of all such BA 6.2 efforts in the program. Continued and completing applied research efforts in this R-2 Activity were previously funded in PE 0602114N Power Projection Applied Research. Starting in FY 2018, all INP and LA-Tech investments in directed energy and electric weapons will be shown in this R-2 Activity to better convey exactly what the Office of Naval Research is working on in this area. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** INP: Electro-Magnetic Railgun (EMRG)	0.000	0.000	57.475	0.000	57.475

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue EMRG, previously funded in PE 0602114N Power Projection Applied Research. 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. Conduct applied research addressing the unique technical challenges inherent in the construction, assembly and operation of an Electro Magnetic (EM) railgun prototype capable of launching long range projectiles repeatedly, many times per minute. Special materials and compact sub-system components will be developed that are capable of operating in harsh thermal and electromagnetic environments. Advanced modeling tools will be developed to assess design options, analyze system concepts and inform experimental hardware design and testing. Develop and test next generation battery energy storage and pulsed power components to assess performance and applicability towards future designs. Develop and refine algorithms for controlling the precision timed electromagnetic pulse used to fire the railgun in the rep-rate mode. Conduct material, physics and thermal property research for long-life, rep-rate electromagnetic launch systems and actively monitor performance to understand the high currents, elevated operating temperatures, and cooling of components, so as to improve designs and increase their reliability. Develop modeling and simulation tools that support electromagnetic launch, multi-shot life development, testing, and assessments. LA-Tech: Solid State Laser Technology Maturation (SSL TM) Complete the SSL TM project, which was previously funded in PE 0602114N Power Projection Applied Research. Finish development of technologies suitable for a solid state laser weapon system, including technologies for a maritime beam director, targeting, tracking and laser subsystems, which are capable of supporting future Navy surface ship defensive missions to defeat small boat and Unmanned Aerial Vehicle (UAV) swarms, and which provide Intelligence, Surveillance and Reconnaissance (ISR) disruption and/or defeat. This effort includes conducting scientific studies that address the modeling and simulation critical to understanding the missions involved in a layered defensive capability in the maritime environment. Conclude testing against threat representative targets, components and subsystems to determine weapon capabilities and lethality. These tests provide data that support improved modeling and simulation and the development of governing technical requirements for an integrated High Energy Laser (HEL) weapon system capable of conducting Navy surface ship self-defense missions. Finish studies of atmospheric scattering, absorption and turbulence effects in low altitude, maritime, surface conditions, which provide critical data for understanding the impact of boundary layer and sea-water-air turbulent mechanics on future laser weapon systems effectiveness. Complete scientific studies and testing on laser subcomponents, including tests on laser pump diodes and laser					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
gain media. These laser subcomponent technologies have potential in future weapon acquisition programs that are based on solid state laser technologies. Efforts in this area will focus on emerging commercial technologies and government sponsored research that is suitable for use in the maritime domain. Conclude scientific trade studies of notional predictive avoidance systems, which examine the control interfaces between sensors and future prototypical naval laser weapons and provide an inherent 'safe-arm' function for the projection of laser power at long range (potentially beyond visible, line-of-sight distances). The capability to halt laser energy propagation in real time while performing Navy surface ship self-defense missions is necessary to avoid inadvertent illumination of non-threat forces (e.g., friendly sensors or platforms). Conduct testing of the laser weapon system demonstrator, including a Tactical Laser Core Module (TLCM). LA-Tech: High-power Joint Electromagnetic Non-Kinetic Strike (HIJENKS) Continue HIJENKS, a joint USAF/USN project previously funded as a FY17 Leap-Ahead jump-start effort in PE 0602114N Power Projection Applied Research. 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 applied research development efforts are planned: investigate Radio Frequency (RF) effects on complex electronic systems with the goal being to finalize an RF waveform specification; investigate HPRF weapons effects for non-kinetic counter electronics to include the prediction model improvements required for mission planning of Directed Energy Weapons (DEW); perform Modeling and Simulation (M&S) to capture RF antenna output, RF propagation, RF interaction with complex enclosures, and RF interaction with electronic circuits to characterize DEW performance to the maximum extent possible; conduct research into the time-out of action or recuperation time for complex electronics, exploring Battle Damage Indicators (BDI) for electronic disruption; determine the critical pulsed power and RF components required to reduce the HPRF payload's Size, Weight, and Power (SWaP); perform a trade-off analysis of the technology alternatives, their maturity, and their suitability for this application; develop the most promising component technologies, such as conformal antenna designs for high power, advanced high power RF source technologies, pulsed power components with higher energy densities, and advanced architectures and magnetic materials for high voltage power electronics systems; conduct risk reduction research for the RF source and					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
antenna subsystems by examining high risk, high payoff technology alternatives to improve output power while simultaneously reducing system size and weight, and examine the efficiency of each subsystem and the impact of overall payload prime power requirements. ***FY 2018 OCO Plans:*** N/A					
Title: Electromagnetic Maneuver Warfare ***Description:*** This R-2 Activity contains all Innovative Prototype (INP) and associated Leap Ahead Technology (LA-Tech) investments that are developing new technologies for Electromagnetic Maneuver Warfare (EMW). FY 2018 reflects the sum total of all such BA 6.2 efforts in the program. These efforts were previously funded in PE 0602271N Electromagnetic Systems Applied Research. Starting in FY 2018, all INP and LA-Tech investments in Electromagnetic Maneuver Warfare will be shown in this R-2 Activity to better convey exactly what the Office of Naval Research is working on in this area. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:*** INP: Electromagnetic Maneuver & Control Capability (EMC2) Continue the EMC2 project by conducting applied research efforts that will enable a battle group to work cooperatively in the Electromagnetic Spectrum (EMS) to optimize Electronic Warfare (EW), Information Operations (IO), Communications and Radar performance. EMC2 will develop technology that optimizes Radio Frequency (RF) resources in order to meet the commander's intent across multiple warfare areas simultaneously within a single platform and across a strike group. It will complete technology development and design that will be used for a Low-band RF Intelligent Distribution Resource (LowRIDR) prototype. In addition, EMC2 will conduct studies and continue the technology development and design for a wideband, multifunction airborne system that will be integrated with ship-based, wideband multifunction systems.	0.000	0.000	24.086	0.000	24.086

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
INP: Nemesis Complete the Nemesis project by finishing research efforts to develop and mature technologies in multiple areas that will be used to assess the feasibility of Nemesis to coordinate Electronic Warfare (EW) operations across distributed EW systems. Technologies being matured include swarming vehicle operations, distributed resource mission control, multi-domain coordinated operations and advanced RF component and subsystems technologies. These emerging technologies are being designed and developed for prototype Nemesis systems which will be capable of performing coordinated EW operations across distributed EW systems.					
Title: INP Management ***Description:*** This R-2 Activity includes the Science and Technology (S&T) analyses and studies required to take new Innovative Naval Prototypes (INPs) and Leap Ahead Technology (LA-Tech) investments and produce the detailed technology specifications and performance metrics needed to procure the component level technologies that must be developed and tested in order to build the intended prototypes. This activity includes development and implementation of innovative and dynamically changing technology management business processes required to manage the INP and LA-Tech investment portfolio. These efforts were previously funded in PEs 0602114N Power Projection Applied Research, 0602123N Force Protection Applied Research, 0602271N Electromagnetic Systems Applied Research, and 0602747N Undersea Warfare Applied Research. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** INP Management Continue INP Management Support/OPS Analysis (previously funded in PEs 0602114N Power Projection Applied Research, 0602123N Force Protection Applied Research, 0602271N Electromagnetic Systems Applied Research, and 0602747N Undersea Warfare Applied Research. Conduct applied research and analysis, including technology management of Innovative Naval Prototypes (INPs) and Leap Ahead Technology (LA-	0.000	0.000	1.500	0.000	1.500

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Tech) investments supporting Department of the Navy priorities for emerging technologies of a disruptive and game changing nature. ***FY 2018 OCO Plans:*** N/A					
Title: Undersea Warfare ***Description:*** This R-2 Activity contains all Innovative Prototype (INP) and associated Leap Ahead Technology (LA-Tech) investments that are developing new technologies for Undersea Maneuver Warfare (UMW). FY 2018 reflects the sum total of all such BA 6.2 efforts in the program. These efforts were previously funded in PE 0602747N Undersea Warfare Applied Research. Starting in FY 2018, all INP and LA-Tech investments in Undersea Maneuver Warfare will be shown in this R-2 Activity to better convey exactly what the Office of Naval Research is working on in this area. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** INP: Forward Deployed Energy & Communications Outpost (FDECO) Continue the FDECO project, previously funded in PE 0602747N Undersea Warfare Applied Research. Continue the FDECO architecture planning study to analyze distributed, open, adaptable, and scalable architectures suitable to future naval demands. Conduct limited objective experiments of component technologies for docking, energy transfer, communications and control. The docking task will focus on developing and testing technologies and approaches that are vehicle agnostic (type & size), reliable and repeatable. The energy task will focus on developing and testing technologies and approaches that maximize the availability and efficiency to transfer electrical energy to/from various networked energy sources and sinks (FDECO batteries, vehicle batteries, communication systems and sensors). The communications task will focus on developing interface control definitions that support plug-and-play operation, federated network protocols, multiple communication modalities, dynamic latencies, various bandwidths, and adaptive command & control structures.	0.000	0.000	14.732	0.000	14.732

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
LA-Tech: Anti-Submarine Warfare Mission Packages (ASW MP) Continue ASW MP, previously funded in PE 0602747N Undersea Warfare Applied Research. The ASW MP is developing a set of sensors and autonomy algorithms to enable a Large Displacement Unmanned Undersea Vehicle (LDUUV) to perform a classified ASW mission. The 6.2 funds will be used to develop technology components of the mission packages and develop autonomy algorithms. During FY18, design of situational awareness sensor electronics and components will be initiated and algorithms will be developed for mission autonomy and the mission state generator. Fabrication of sensor hardware components will begin and software development will be conducted. ***FY 2018 OCO Plans:*** N/A					
Title: Unmanned and Autonomous Systems ***Description:*** This R-2 Activity contains all Innovative Prototype (INP) and associated Leap Ahead Technology (LA-Tech) investments that are developing new technologies for Unmanned and Autonomous Systems. FY 2018 reflects the sum total of all such BA 6.2 efforts in the program. These efforts were previously funded in PE 0602123N Force Protection Applied Research, 0602271N Electromagnetic Systems Applied Research and 0602747N Undersea Warfare Applied Research. Starting in FY 2018, all INP and LA-Tech investments in Unmanned and Autonomous Systems will be shown in this R-2 Activity to better convey exactly what the Office of Naval Research is working on in this area. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** INP: Autonomous Aerial Cargo/Utility System (AACUS) Complete the AACUS project, which was previously funded in 0602123N Force Protection Applied Research. The AACUS project will complete research efforts to develop and mature technologies that perform autonomous take-off, conduct en-route navigation, classify the terrain of landing zones, detect and avoid ground-based obstacles, and safely operate in degraded visual environments. In addition to maturing these individual	0.000	0.000	48.430	0.000	48.430

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
technologies, specific attention will be directed toward the task of integrating them into a full scale autonomous platform to increase their technology readiness level. INP: Claws Initiate Claws. Claws 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, research will be conducted and technology will be matured in the areas of precision navigation, obstacle avoidance, robust communications, on-board vulnerability assessment, and payload autonomy. Applied research efforts in advanced undersea autonomy will also be initiated. INP: Large Displacement Unmanned Undersea Vehicle (LDUUV) Complete the LDUUV project, which was previously funded in 0602747N Undersea Warfare Applied Research. The LDUUV INP is developing the critical technologies of energy, autonomy, endurance, and submarine launch and recovery. These critical technologies are needed to enable Large UUVs to be pier and ship launched, and recovered. The technologies will enable the completion of missions with long ranges, as well as those requiring over 60 days of endurance for Intelligence, Surveillance, and Reconnaissance (ISR) tasks. Continue development of the long endurance, air-independent energy source technology for large UUVs. Continue development of the autonomy technology that will support operation of the UUV in the littorals. Continue development of core UUV technologies that will extend the reliability and endurance of the UUV operating in the littorals. Conduct a UUV fuel cell systems technology analysis, which will be used to support a land-based demonstration. INP: Low-Cost UAV Swarming Technology (LOCUST) Continue the LOCUST project, previously funded in PEs 0602114N Power Projection Applied Research and 0602123N Force Protection Applied Research. LOCUST 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					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
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. The applied research effort in 2018 specifically will conduct preliminary system design and technology developments within the three major LOCUST sub-systems: (1) the Distributed, Collaborative, Coordinated, & Cognitive autonomy system architecture; (2) the distributed Command & Control system architecture; and (3) a series of modular UAV payloads. LA-Tech: Large Displacement UUV - Advanced Power and Energy Demonstration (LDUUV-APED) Continue LDUUV-APED, which was previously funded in PE 0602747N Undersea Warfare Applied Research. The LDUUV-APED Program is integrating the Aluminum Power System (ALPS) air-independent fuel cell system into an existing LDUUV vehicle and conducting at-sea testing to demonstrate a mission endurance capability that meets the Navy's UUV far-term objectives (up to 70 days) for a persistent forward presence. During FY18, the hull structural design and analysis will be completed and the energy section hull will be fabricated. Integration of ALPS into the energy section hull will begin. Modifications to the vehicle to accept the ALPS energy section will begin. The notional mission profiles will be finalized and development of the test plan will begin. The vehicle-level hazards analysis will be completed and the range approval process will continue to be supported. LA-Tech: Medium Displacement Unmanned Surface Vehicle (MDUSV) Continue MDUSV, which was previously funded in 0602123N Force Protection Applied Research. The MDUSV project will continue research efforts to develop and mature technologies in multiple areas that will be used to assess the feasibility of an MDUSV to perform Mine Countermeasures (MCM), Anti-Submarine Warfare (ASW) and Electronic Warfare (EW) mission area requirements. Autonomy technologies being matured include a robust perception approach using Electro-Optic/Infrared (EO/IR) sensors and technologies that enable autonomous all-weather operations, detection of low radar cross section craft, reduced vulnerability to jamming, and operations with reduced Radio Frequency (RF) emissions. MCM technologies being developed include mine sweeping capabilities using High Temperature Superconductor (HTS) magnets in combination with acoustic sweep technologies. ASW technologies being developed include an advanced version of the Non-Traditional Sensor System (NTSS) to be assessed for its autonomous ASW track and trail capability. The project also includes development of an NTSS EW payload integrated with an MS3 Sonar. These emerging					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
technologies are being designed and developed for an MSUSV prototype that will be capable of performing multiple autonomous missions over extended periods of time. LA-Tech: Tern Complete Tern, a joint ONR and DARPA project, previously funded in 0602123N Force Protection Applied Research. Continue airplane launch and recovery component and subsystem technology developments to enable medium size, long-endurance, long-range Unmanned Aerial Vehicles (UAVs) to be launched and recovered on short deck ships. Continue the maturation of technology addressing integration challenges associated with developing a Vertical Take-Off and Landing (VTOL) UAV capability. LA-Tech: USV Swarm Continue USV Swarm, which was previously funded in PE 0602271N Electromagnetic Systems Applied Research . Conduct applied research into cooperative autonomy for unmanned surface vehicle swarms including task allocation, route planning and perception. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	171.146	0.000	171.146

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. All investments are coordinated with the acquisition, resources/requirements, and Fleet communities, with periodic briefs given to the Department of the Navy's leadership, including the 4-star RDT&E Corporate Board. At the lowest level, each project is measured against technical and financial milestones on a periodic and frequent basis.

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Annually, each project is reviewed in depth for technical performance and development status by the Chief of Naval Research. Department of the Navy leadership, including the RDT&E Corporate Board is briefed on the program's status at least annually, if not more often, by the Chief of Naval Research.