Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy												Date: February 2015
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604580N *I (U)Virginia Payload Module (VPM*							
COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	57.282	120.602	167.719	-	167.719	100.234	68.989	-	-	-	514.826
4500: *VIRGINIA Payload Module*	0.000	57.282	120.602	167.719	-	167.719	100.234	68.989	-	-	-	514.826
Program MDAP/MAIS Code: 516												

Note

1. Beginning in FY2014, an administrative change shifted efforts funded from PE 0604558N (New Design SSN) / Project 4500 to PE 0604580N (VIRGINIA Payload Module) / Project 4500. This shift is consistent with Congressional intent identified in the FY14 Appropriations Act Committee Report.

2. Detailed design funding for this project transitions to SCN (BLI: 2013) beginning in FY17 to support VPM production beginning in FY19.

A. Mission Description and Budget Item Justification

The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The VIRGINIA Class Submarine, formerly the New Attack Submarine (New SSN), is designed to fulfill this need. It will counter the potential threats of the next century in a multi- mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing cost reduction, producibility improvement, and technical risk management. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the VIRGINIA Payload Module (VPM). VPM mitigates and will recapitalize the conventional TOMAHAWK Land Attack Missile (TLAM) gap created by the retirement of SSGNs in the late 2020s while maintaining current platform requirements. This PE directly supports the following VIRGINIA Class Submarine missions: (1) covert strike warfare; (2) anti-submarine warfare; (3) covert intelligence collection/surveillance, indication and warning, and electronic warfare; (4) anti-surface ship warfare; (5) special warfare; (6) mine warfare; and (7) battle group support.

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	59.120	132.602	167.719	-	167.719
Current President's Budget	57.282	120.602	167.719	-	167.719
Total Adjustments	-1.838	-12.000	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-12.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.838	-			
• Program Adjustments	-	-	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy	Date: February 2015
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604580N *I (U)Virginia Payload Module (VPM*

Change Summary Explanation

The FY 2015 congressional reduction was due to program execution.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604580N / *(U)Virginia Payload Module (VPM*	Project (Number/Name) 4500 / *VIRGINIA Payload Module*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
4500: *VIRGINIA Payload Module*	-	57.282	120.602	167.719	-	167.719	100.234	68.989	-	-	-	514.826
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project encompasses Navy RDT&E efforts required to incorporate a modular design for future VIRGINIA Class Submarines (VCS) which integrates strike payload capacity for Tomahawk Land Attack and follow on missiles. The design is targeted for VCS Block V (FY19-23 ships).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Non-Propulsion Electronics System (NPES) Engineering	15.250	25.241	27.506	-	27.506
Articles:	-	-	-	-	-
FY 2014 Accomplishments: Continued development of VPM system launch control and integration with existing VIRGINIA Class combat systems. Integrated and automated launch processes to enable efficient launch of payloads. Assessed launcher electronics and software design to support rapid, low cost integration and testing of payloads. Reduced overall launch electronics weight and footprint, and provided increased unit space for future payload electronics. Specified and developed interfaces including software for VPM systems and existing C3I systems.					
FY 2015 Plans: Continue development of VPM system launch control and integration with existing VIRGINIA Class combat systems. Integrate and automate launch processes to enable efficient launch of payloads. Assess launcher electronics and software design to support rapid, low cost integration and testing of payloads. Reduce overall launch electronics weight and footprint, and provide increased unit space for future payload electronics. Products include specifications, systems diagrams, arrangements, implementation of Advanced Message Queuing Protocol (AMQP) to VPM network (CORBA technology replacement), next generation tomahawk (replaces TLAM BLK IV), implementation of new Tomahawk Control System (PMA280 software), implementation of TTWCS 5.6 supporting tomahawk cell tasking vice tube tasking.					
FY 2016 Base Plans: Continue development of VPM system launch control and integration with existing VIRGINIA Class combat systems. Integrate and automate launch processes to enable efficient launch of payloads. Assess launcher electronics and software design to support rapid, low cost integration and testing of payloads. Reduce overall launch electronics weight and footprint, and provide increased unit space for future payload electronics. Products					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604580N / *(U)Virginia Payload Module (VPM*	**Project (Number/Name)** 4500 / *VIRGINIA Payload Module*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
include specifications, systems diagrams, arrangements, implementation of Advanced Message Queuing Protocol (AMQP) to VPM network (CORBA technology replacement), next generation tomahawk (replaces TLAM BLK IV), implementation of new Tomahawk Control System (PMA280 software), implementation of TTWCS 5.6 supporting tomahawk cell tasking vice tube tasking. ***FY 2016 OCO Plans:*** N/A					
Title: Hull, Mechanical, and Electrical (HM&E) Systems Engineering	42.032	95.361	140.213	-	140.213
Articles:	-	-	-	-	-
FY 2014 Accomplishments: Continued design efforts for the VPM including integration to existing hull structure, hydrodynamic assessments, hydraulic system design, tube control interface, and internal arrangements to accommodate hardware, electronics and personnel. Developed Integrated Master Schedule (IMS) and Manufacturing Plans. Conducted design studies to assess all ship characteristics including maneuvering, signature levels, shock survivability, operational impacts and life cycle support. Products include specifications, system diagrams, and arrangements.					
FY 2015 Plans: Continue design efforts for the VPM including integration to existing hull structure, hydrodynamic assessments, hydraulic system design, tube control interface, and internal arrangements to accommodate hardware, electronics and personnel. Update Integrated Master Schedule (IMS) and Manufacturing Plans. Design studies to assess all ship characteristics including maneuvering, signature levels, shock survivability, operational impacts and life cycle support. Products include specifications, system diagrams, arrangements, technical trade studies, system description documents, develop long lead time components and update requirements matrix.					
FY 2016 Base Plans: Continue design efforts for the VPM including integration to existing hull structure, hydrodynamic assessments, hydraulic system design, tube control interface, and internal arrangements to accommodate hardware, electronics and personnel. Executing Integrated Master Schedule (IMS) and Manufacturing Plans. Start payload tube prototype construction. Complete ship specifications and diagrams. Begin development of plug design arrangements and base ship arrangements. Products include specifications, system diagrams, arrangements, system description documents, long lead time components and payload tube prototype.					
FY 2016 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604580N / *(U)Virginia Payload Module (VPM*	**Project (Number/Name)** 4500 / *VIRGINIA Payload Module*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A					
Accomplishments/Planned Programs Subtotals	57.282	120.602	167.719	-	167.719

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• SCN//2013: *VIRGINIA Class Submarine*	6,462.316	5,832.079	5,340.110	-	5,340.110	5,184.120	5,023.887	6,691.774	6,768.232	-	90,040.091
• OPN/0942: *VA CL Support Equipment*	69.341	70.689	35.747	-	35.747	56.262	49.263	49.672	50.743	Continuing	Continuing
• O&MN/0204283N: *Sub Ops & Safety*	38.776	33.938	31.355	-	31.355	28.028	29.238	30.175	30.770	Continuing	Continuing
• RDT&E/0604558N: *New Design SSN**	58.070	85.125	115.006	-	115.006	112.727	173.190	87.948	84.689	Continuing	Continuing

Remarks

*Note: RDT&E PE 0604558N contains project 3062: Submarine Multi-Mission Team Trainer which is not funding directly related to the VIRGINIA Class Program.

D. Acquisition Strategy

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing Electric Boat (EB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries (HII), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, EB remained the design yard for the VIRGINIA Class Submarine and HII became a part of the IPPD process. The Program Office is managing three Multi-Year Procurement (MYP) contracts. The first and second contracts are for the Block II (FY04-08) and Block III (FY09-13) ships. The third contract is for Block IV (FY14-18) ships awarded April 2014. All Block I & II ships (SSNs 774-783) have been delivered. The lead Block III ship, SSN 784, delivered in August 2014 with the remaining 7 ships awarded and under construction. Developmental efforts began in FY13 and will be executed via current Lead Design Yard Agent contract with Electric Boat.

E. Performance Metrics

Preliminary Design Review
Critical Design Review

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604580N / *(U)Virginia Payload Module (VPM*	**Project (Number/Name)** 4500 / *VIRGINIA Payload Module*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Component Development	WR	NSWC : Carderock, MD	0.000	12.500	Mar 2014	12.000	Jan 2015	15.674	Nov 2015	-		15.674	15.815	55.989	-
Component Development	WR	NUWC : Newport, RI	0.000	11.250	Mar 2014	16.290	Jan 2015	7.647	Nov 2015	-		7.647	20.538	55.725	-
Component Development	C/CPFF	Electric Boat : Groton, CT	0.000	33.282	Mar 2014	85.062	Nov 2014	137.148	Nov 2015	-		137.148	132.370	387.862	-
Component Development	C/CPFF	GD-AIS : Pittsfield, MA	0.000	-		7.000	Feb 2015	7.000	Nov 2015	-		7.000	-	14.000	-
		Subtotal	0.000	57.032		120.352		167.469		-		167.469	168.723	513.576	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	C/CPAF	URS : Rockville, MD	0.000	0.250	Mar 2014	0.250	Feb 2015	0.250	Nov 2015	-		0.250	0.500	1.250	-
		Subtotal	0.000	0.250		0.250		0.250		-		0.250	0.500	1.250	-

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	57.282		120.602		167.719		-		167.719	169.223	514.826	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604580N / *(U)Virginia Payload Module (VPM*	**Project (Number/Name)** 4500 / *VIRGINIA Payload Module*

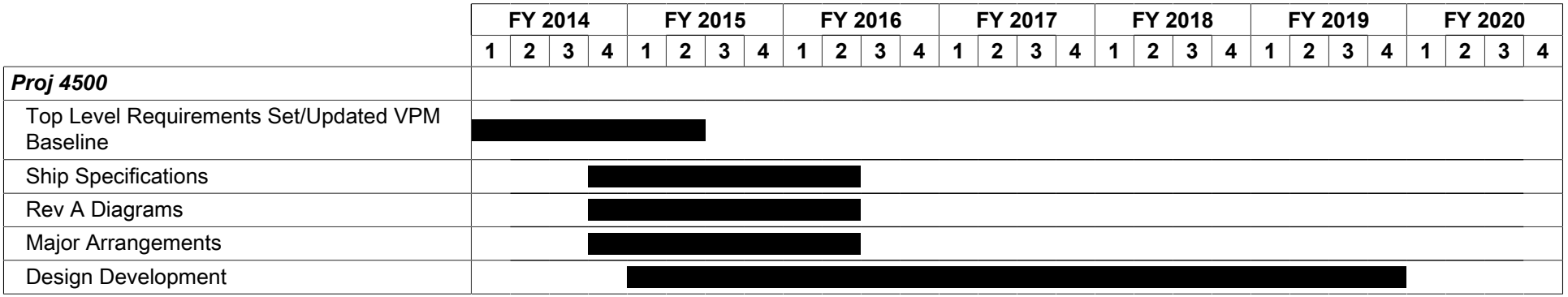

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604580N / *(U)Virginia Payload Module (VPM*	**Project (Number/Name)** 4500 / *VIRGINIA Payload Module*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 4500				
Top Level Requirements Set/Updated VPM Baseline	1	2014	2	2015
Ship Specifications	4	2014	2	2016
Rev A Diagrams	4	2014	2	2016
Major Arrangements	4	2014	2	2016
Design Development	1	2015	4	2019