Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*				R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*							
COST ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	549.702	861.366	555.123	-	555.123	860.236	926.870	1,098.191	780.457	Continuing	Continuing
0223: *Sub Combat System Improvement (ADV)*	49.460	40.688	36.873	-	36.873	36.600	37.603	38.319	38.963	Continuing	Continuing
2033: *Adv Submarine Systems Development*	47.556	33.723	35.155	-	35.155	30.113	27.861	22.512	32.604	Continuing	Continuing
3197: *Undersea Superiority*	21.264	-	-	-	-	-	-	-	-	0.000	21.264
3220: *SBSD Advanced Submarine System Development*	431.422	781.575	483.095	-	483.095	793.523	861.406	1,037.360	708.890	Continuing	Continuing
9999: *Congressional Adds*	-	5.380	-	-	-	-	-	-	-	0.000	5.380

A. Mission Description and Budget Item Justification

This program element supports innovative research and development in submarine hull and combat systems technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible. The program element also supports programs
transitioning from Science and Technology (S&T), Defense Advanced Research Projects Agency (DARPA), Independent Research and Development, and Small Business Innovation Research (SBIR) projects.

Project Unit 0223:
The Advanced Submarine Combat Systems Development non-acquisition (NON-ACAT) Project supports Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of sonar and tactical control systems improvements. This Project transitions technologies developed by Navy Technology bases, the private sector, Office of Naval Research (ONR), Future Naval Capabilities (FNC), and DARPA. The Project addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battle space preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware/software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. Specifically, the focus of the technology efforts will be Advanced Processing Build - Acoustic (APB-A), Advanced Processing Build - Tactical (APB-T), Advanced Processing Build - Imaging (APB-I) and Advanced Sonar Arrays. APBs develop and demonstrate improvements to current and future sonar/combat control systems. The Advanced Sonar Arrays program develops and tests new sensors and demonstrates large array configuration. This Project is funded under demonstration and validation, as it develops and integrates hardware for experimental tests related to specific platform applications.

Project Unit 2033:
The Advanced Submarine Systems Development (ASSD) Program is a non-acquisition program that develops and matures technologies for successful integration into future and modernized submarine classes, thus lowering acquisition and life cycle program costs while improving mission capability. ASSD transitions Hull,

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy	DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*

Mechanical, and Electrical (HM&E) technologies from Science & Technology (S&T) and Research and Development (R&D) to operational platforms; performs tests and demonstrates submarine design and naval architecture products destined for integration into future submarine classes or backfit into existing fleet assets; and operates unique R&D experimentation, modeling, testing and simulation facilities to enhance submarine stealth, maneuverability, capability, and affordability. The program is structured to support near and mid-term technology insertion to achieve future submarine class total ownership cost reductions and requirements, and influence future submarine concept designs and core technologies. Experimentation and demonstration is conducted in a joint warfighting context with other services, (i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force), to enable early assessment of warfighting capabilities, and to contribute to smarter technology selection decisions for potential incremental development. This program also supports Information Exchange Programs and joint Project Arrangements (PA) with the United Kingdom, Canada, and Australia.

Project 2033 is comprised of four budget categories: Stealth, Payloads & Sensors, Advanced Propulsion/Ship Concept Development and Total Ownership Cost/ Affordability.

The major developmental efforts include:
Sustainment of Vital Submarine Stealth R&D Capabilities
- Large Scale Vehicle (LSV)
- Intermediate Scale Measurement System (ISMS)
- Submarine Signature Management
- Conformal Array Hull Mechanical & Electrical (HM&E) Technologies
- Stone Mason
- SSN/SSGN Survivability

Development of Technologies to Reduce Submarine Total Ownership Cost:
- Hydraulics Elimination through Electrification
- Advanced CO2 Scrubber
- Corrosion Control

Development of Advanced Propulsion Systems and Ship Concepts:
- Advanced Material Propeller (AMP) Future Naval Capability (FNC)
- DARPA/Navy Tango Bravo Technology Transition
- Control Surface Electric Actuation of Retractable Bow Planes
- Hybrid Multi-Material Rotor Development (HMMR)

Improved Payload & Sensor Capabilities
- Next Generation Towed Array Handler System and Towed Array Reliability
- Innovation Technology Transition
- Universal Launch and Recovery Module (ULRM)
- Irregular Warfare

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy	DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*

Project Unit 3197:
The Undersea Superiority Project supports offboard Anti-Submarine Warfare (ASW) technologies selected by the Chief of Naval Operations (CNO) ASW Cross Functional Team for technologies that hold the potential for deployment and/or use by submarine platforms. Efforts associated with these technologies include design, development, integration and testing of future Undersea Superiority systems.

Project Unit 3220:
The objective of the Sea Based Strategic Deterrent (SBSD) Advanced Submarine System Development project is to design and prepare for construction of the replacement of the OHIO Class SSBN.

B. Program Change Summary ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	608.566	856.326	927.814	-	927.814
Current President's Budget	549.702	861.366	555.123	-	555.123
Total Adjustments	-58.864	5.040	-372.691	-	-372.691
• Congressional General Reductions	-	-0.340			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	5.380			
• Congressional Directed Transfers	-	-			
• Reprogrammings	5.700	-			
• SBIR/STTR Transfer	-12.258	-			
• Program Adjustments	-	-	-371.244	-	-371.244
• Rate/Misc Adjustments	-	-	-1.447	-	-1.447
• Congressional General Reductions Adjustments	-3.006	-	-	-	-
• Congressional Directed Reductions Adjustments	-49.300	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2011	FY 2012
Project: 9999: *Congressional Adds*		
Congressional Add: *Adv Sub Sys Dev (Cong)*	-	5.380
Congressional Add Subtotals for Project: 9999	-	5.380
Congressional Add Totals for all Projects	-	5.380

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 0223: *Sub Combat System Improvement (ADV)*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
0223: *Sub Combat System Improvement (ADV)*	49.460	40.688	36.873	-	36.873	36.600	37.603	38.319	38.963	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Project Unit 0223: The Advanced Submarine Combat Systems Development Non-ACAT program supports Navy Submarine Acoustic Superiority and Technology Insertion Initiatives by the application of advanced development and testing of sonar and tactical control systems improvements. This Project addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battle space preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. These technologies, developed by Navy technology bases, the private sector, ONR, FNC, and DARPA are then transitioned. Prototype hardware / software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. Specifically, the focus of the technology efforts are APB-A, APB-T, APB-I, tactical control, and Advanced Sonar Arrays. APBs develop and demonstrate improvements to current and future sonar/combat control systems. The Advanced Sonar Arrays program develops and tests new sensors and demonstrates large array configuration.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Advanced Processing Build - Acoustic	16.923	15.026	15.576
Articles:	0	0	0
FY 2011 Accomplishments: FY11 focused on completing development, integration and initiating land-based testing for APB-11. Developed Temporary Alterations (TEMPALTs) and test plans/procedures for APB-11 land-based and at-sea testing. Initated development of concepts and tactical scenarios for APB-13.			
FY 2012 Plans: FY12 will focus on completing land-based and at-sea testing and the transition for APB-11. Establish content and continue the development of capabilities for APB-13.			
FY 2013 Plans: Continue development of APB-13. Conduct land-based testing of APB-13.			
Title: Advanced Processing Build - Tactical	8.000	8.100	8.200
Articles:	0	0	0
FY 2011 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 0223: *Sub Combat System Improvement (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY11 focused on completing development, integration and initiating land-based testing of APB-11. Developed TEMPALTs and test plans and procedures for APB-11 land-based and at-sea testing. Developed concepts and tactical scenarios for APB-13. ***FY 2012 Plans:*** FY12 will focus on completing land-based and at-sea testing and transition for APB-11. Establish content and continue the development of capabilities for APB-13. ***FY 2013 Plans:*** Continue development of APB-13. Conduct land-based testing of APB-13.			
Title: Advanced Processing Build - Imaging	10.000	10.200	10.400
Articles:	0	0	0
FY 2011 Accomplishments: Established groups, charters and infrastructure for commencement of APB-Imaging efforts. APB-11 development efforts began focus on improving imaging system's signal processing to automate repetitive tasks and develop automated detection, tracking and ranging capabilities. Initiated efforts to baseline system performance. Completed development, integration and land-based testing of APB-11. Developed TEMPALTs and test plans/procedures for APB-11 at-sea testing. Developed concepts and tactical scenarios for APB-13. ***FY 2012 Plans:*** FY12 will focus on completing at-sea testing and transition for APB-11. Conduct land-based testing. Establish content and initiate the development of capabilities for APB-13. ***FY 2013 Plans:*** FY13 will focus on the continued development of APB-13. Conduct land-based testing of APB-13.			
Title: Advanced Sensors	14.537	7.362	2.697
Articles:	0	0	0
FY 2011 Accomplishments: Completed Conformal Acoustic Velocity Sonar (CAVES) Large Vertical Array (LVA) warm water at-sea testing and analysis. Light Weight (LW) Low Cost Conformal Acoustic (LCCA) Advanced Development Model (ADM) fabrication is scheduled to be completed by the end of FY11 and tow tests of 3X Twin Line Thin Line (TLTL) and 3X Vector Sensor Towed Array (VSTA) will be completed. ***FY 2012 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 0223: *Sub Combat System Improvement (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
CAVES LVA will complete cold water at-sea testing and analysis. Complete system integration of 12X single line towed array ADM. Conduct 12X ADM Lake Pend Oreille (LPO) and Research Vessel (RV) tests. Complete the 12X ADM TEMPALT development and conduct submarine demonstration. ***FY 2013 Plans:*** Conduct LW LCCA sea test and transition to VA Class program. Continue development and test of Advanced Towed Array Technologies. Initiate development of sensors for the Ohio Class Replacement Program.			
Accomplishments/Planned Programs Subtotals	49.460	40.688	36.873

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.

E. Performance Metrics

- Advanced Processing Build (APB): Deliver at-sea tested submarine capability improvements to PEO Submarines as prescribed by the Fleet every two years. Conduct milestone reviews with the Milestone Decision Authority and PEO Submarines prior to delivery.
- Conducted Conformal Acoustic Velocity Sonar (CAVES) sea test. CAVES provides significant advantages over existing technology; 2/3 of acquisition and installation costs, 10% of life cycle costs, and less impact on hull structure. CAVES/Wide Aperture Array (WAA) replacement of Light Weight WAA provides a cost savings of $8M - $13M/ship.
- Conducted Low Cost Conformal Array (LCCA) Advanced Development Model (ADM) sea test.
- Deliver Twin Line Thin Line (TLTL) Short Aperture (3X) Array, Vector Sensor Towed Array (VSTA) Short Aperture (3X) Array, TLTL & VSTA (3X) Lake Pend Oreille Test Reports.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*		PROJECT 0223: *Sub Combat System Improvement (ADV)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPFF	Adaptive Methods:VA	0.925	-		-		-		-	0.000	0.925	Continuing
Product Development	C/CPFF	Alion Sciences:VA	3.267	-		-		-		-	0.000	3.267	Continuing
Product Development	C/CPFF	Chesapeake Science:MD	6.626	0.750	Feb 2012	0.750	Dec 2012	-		0.750	Continuing	Continuing	Continuing
Product Development	C/CPFF	Electric Boat:ME	0.725	1.040	Jan 2012	0.975	Dec 2012	-		0.975	Continuing	Continuing	Continuing
Product Development	C/CPFF	General Dynamics:VA	13.547	0.300	Jan 2012	0.300	Dec 2012	-		0.300	Continuing	Continuing	Continuing
Product Development	C/CPFF	GA Tech Research Institute:GA	2.916	-		-		-		-	0.000	2.916	Continuing
Product Development	C/CPFF	In Depth Engineering:VA	2.650	0.750	Dec 2011	0.750	Dec 2012	-		0.750	Continuing	Continuing	Continuing
Product Development	C/CPFF	JHU/APL:MD	55.816	8.750	Dec 2011	8.350	Dec 2012	-		8.350	Continuing	Continuing	Continuing
Product Development	C/CPFF	Lockheed Martin:VA	33.456	5.500	Dec 2011	5.230	Dec 2012	-		5.230	Continuing	Continuing	Continuing
Product Development	C/CPFF	Lockheed Martin:NY	8.314	0.400	Dec 2011	0.200	Dec 2012	-		0.200	Continuing	Continuing	Continuing
Product Development	C/CPFF	METRON:VA	4.158	-		-		-		-	0.000	4.158	Continuing
Product Development	WR	NSWC/Carderock:MD	22.665	0.750	Dec 2011	0.750	Nov 2012	-		0.750	Continuing	Continuing	Continuing
Product Development	WR	NUWC/Newport:RI	65.228	7.509	Nov 2011	7.290	Nov 2012	-		7.290	Continuing	Continuing	Continuing
Product Development	C/CPAF	NSMA:VA	7.944	1.250	Mar 2012	1.000	Dec 2012	-		1.000	Continuing	Continuing	Continuing
Product Development	WR	ONI:DC	1.545	0.750	Feb 2012	0.500	Dec 2012	-		0.500	Continuing	Continuing	Continuing
Product Development	WR	ONR:VA	2.725	-		-		-		-	0.000	2.725	Continuing
Product Development	C/CPFF	Progeny:VA	3.888	0.200	Jan 2012	0.150	Dec 2012	-		0.150	Continuing	Continuing	Continuing
Product Development	C/CPFF	PSU/ARL:PA	5.058	1.570	Dec 2011	1.340	Dec 2012	-		1.340	Continuing	Continuing	Continuing
Product Development	C/CPFF	SAIC:VA	3.555	-		-		-		-	0.000	3.555	Continuing
Product Development	C/CPFF	SEDNA:VA	5.714	0.750	Dec 2011	0.950	Dec 2012	-		0.950	Continuing	Continuing	Continuing
Product Development	WR	SSC/San Diego:CA	1.513	-		-		-		-	0.000	1.513	Continuing
Product Development	MIPR	U.S. Army Research Lab:MD	1.700	-		-		-		-	0.000	1.700	Continuing
Product Development	MIPR	U.S. Army/MITRE:NJ	4.595	-		-		-		-	0.000	4.595	Continuing
Product Development	MIPR	U.S. Hanscom AFB/MIT Lincoln Labs:MA	10.884	1.400	Feb 2012	1.200	Dec 2012	-		1.200	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 0223: *Sub Combat System Improvement (ADV)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPFF	UT/ARL:TX	20.575	2.520	Dec 2011	2.350	Dec 2012	-		2.350	Continuing	Continuing	Continuing
Product Development	C/CPFF	VAR:VAR*	9.047	4.424	Dec 2011	3.292	Dec 2012	-		3.292	Continuing	Continuing	Continuing
		Subtotal	299.036	38.613		35.377		-		35.377			

Remarks

*Consists of multiple performing activities with funding for each not greater than $1M per year.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	Stanley and Associates:VA	1.000	-		-		-		-	0.000	1.000	Continuing
Program Management Support	C/CPAF	BAE Systems:MD	8.399	1.050	Feb 2012	0.766	Dec 2012	-		0.766	Continuing	Continuing	Continuing
Program Management Support	C/CPFF	EG&G:VA	1.900	0.950	Jan 2012	0.665	Dec 2012	-		0.665	Continuing	Continuing	Continuing
Travel	Allot	NAVSEA PEO IWS5:DC	0.435	0.075	Jan 2012	0.065	Oct 2012	-		0.065	Continuing	Continuing	Continuing
		Subtotal	11.734	2.075		1.496		-		1.496			

	Total Prior Years Cost	FY 2012 Cost	FY 2012	FY 2013 Base Cost	FY 2013 Base	FY 2013 OCO Cost	FY 2013 OCO	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	310.770	40.688		36.873		-		36.873			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 0223: *Sub Combat System Improvement (ADV)*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 0223: *Sub Combat System Improvement (ADV)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0223				
APB-11 Sea Test	2	2012	2	2012
Transition APB-11 to ARCI/BYG-1	3	2012	3	2012
APB-13 Sea Test	3	2014	3	2014
Transition APB-13 to ARCI/BYG-1	4	2014	4	2014
APB-15 Sea Test	3	2016	3	2016
Transition APB-15 to ARCI/BYG-1	4	2016	4	2016
CAVES LVA At-Sea Test (warm water)	3	2011	3	2011
CAVES LVA At-Sea Test (cold water)	2	2012	2	2012
Transition to VA Class SSNs (CAVES/LVA)	1	2011	4	2012
LW LCCA ADM Development	1	2011	4	2011
LW LCCA Integration/Installation	1	2012	4	2012
LW LCCA ADM Sea Test	1	2013	1	2013
Transition to VA Class SSNs	2	2013	4	2013
Develop Array Technologies	1	2011	4	2014
Build & Test Prototype Arrays	1	2011	4	2014
Conduct Ohio Class Repacement Array Studies	1	2012	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
2033: *Adv Submarine Systems Development*	47.556	33.723	35.155	-	35.155	30.113	27.861	22.512	32.604	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The Advanced Submarine Systems Development (ASSD) Program is a non-acquisition program that develops and matures technologies for successful integration into future and modernized submarine classes, thus lowering acquisition and life cycle program costs while improving mission capability. ASSD transitions Hull, Mechanical, and Electrical (HM&E) technologies from Science & Technology (S&T) and Research and Development (R&D) to operational platforms; performs tests and demonstrates submarine design and naval architecture products destined for integration into future submarine classes or backfit into existing fleet assets; and operates unique R&D experimentation, modeling, testing and simulation facilities to enhance submarine stealth, maneuverability, capability, and affordability. The program is structured to support near and mid-term technology insertion to achieve future submarine class total ownership cost reductions and requirements, and influence future submarine concept designs and core technologies. Experimentation and demonstration is conducted in a joint warfighting context with other services, (i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force), to enable early assessment of warfighting capabilities, and to contribute to smarter technology selection decisions for potential incremental development. This program also supports Information Exchange Programs and joint Project Arrangements (PA) with the United Kingdom, Canada, and Australia.

Project 2033 is comprised of four budget categories: Stealth, Payloads & Sensors, Advanced Propulsion/Ship Concept Development and Total Ownership Cost (TOC)/ Affordability.

The major developmental efforts include:
Sustainment of Vital Submarine Stealth R&D Capabilities
- Large Scale Vehicle (LSV)
- Intermediate Scale Measurement System (ISMS)
- Submarine Signature Management
- Conformal Array Hull Mechanical & Electrical (HM&E) Technologies
- Stone Mason
- SSN/SSGN Survivability

Development of Technologies to Reduce Submarine Total Ownership Cost:
- Hydraulic Elimination through Electrification
- Advanced CO2 Scrubber
- Corrosion Control

Development of Advanced Propulsion System and Ship Concepts
- DARPA/Navy Tango Bravo Technology Transition

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

- Control Surface Electric Actuation of Retractable Bow Planes
- Hybrid Multi-Material Rotor (HMMR)

Improved Payload & Sensor Capabilities
- Next Generation Towed Array Handler System and Towed Array Reliability
- Innovation Technology Transition
- Universal Launch and Recovery Module (ULRM)
- Irregular Warfare

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Payloads and Sensors/Subtotal Cost	8.397	5.769	13.054
Articles:	0	0	0

Description: Develop promising advanced technologies and/or concepts capable of revolutionizing submarine design, reducing cost, improving payload flexibility, increasing capability, reducing weight and space requirements, exploring alternative payload launch mechanisms, increasing reliability with accompanying decreases in required maintenance, and improving material strength. Develop payload demonstrations targeted at improving flexible ocean interfaces, Intelligence, Surveillance, Reconnaissance (ISR) requirements, and payload and launch retrieval methods from undersea platforms. Conduct Navy and joint SEA TRIALS that take demonstrations to the Fleet in order to assess the operational value of the technologies and systems under consideration. The SEA TRIALS/experiments support examination and assessment of potential new Fleet capabilities based on Sea Power 21.

FY 2011 Accomplishments:
Continued to leverage products between Small Business and Future Naval Concepts Perform preliminary requirements definition for technology transfer initiatives based on small business research studies. Developed, tested, and transitioned ISR technologies to support Irregular Warfare. Conducted SSGN exercises as part of planned exercises to demonstrate an integrated Joint ISR architecture, persistent ISR, and advanced networking capability to Joint Force and local commanders in real time. Experimented as part of Talisman Sabre 2011 (TS11) and included SSGN integration with autonomous vehicles to support Theater Commander's requirements. Conducted operational testing of the SHARC Unmanned Vehicle and integrate those operations into the Naval Oceanographic Office (NAVOCEANO) Glider Operation Center (GOC). Executed evaluation demonstration for the Universal Launch and Recovery Module (ULRM) from an SSGN and commenced prototyping design, manufacturing, designing and TEMPALT installation. The initiative focuses on unmanned systems integration and deployment, procedure development and refinement, and risk reduction activities to transition to a Theatre Commander.

FY 2012 Plans:
Commence concept development and systems improvements for Towed Array Handling System (TAHS) and commence prototype development. Continue to leverage products between Small Business and Future Naval Concepts Perform preliminary

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
requirements definition for technology transfer initiatives based on small business research studies. Complete prototype development, test and install TEMPALT for the ULRM. ***FY 2013 Plans:*** Develop prototype and conduct land-base testing for TAHS. Continue to leverage products between Small Business and Future Naval Concepts. Complete the transition of the SSGN Prototype ULRM to a mission capable unit and develop a SSGN Class OPALT for a mission capable ULRM.			
Title: Stealth/Subtotal Cost	23.732	18.119	13.138
Articles:	0	0	0
Description: Develop technologies and tools to increase the survivability of submarines by recognizing and mitigating sources of noise and non-acoustic vulnerabilities to ensure submarines can penetrate contested waters and remain undetected in the littorals. Develop technologies and Tactics, Techniques, and Procedures (TTPs) that facilitate new or enhance existing warfighting concepts. Operate the Large Scale Vehicle (LSV 2) and the Intermediate Scale Measurement System (ISMS) to conduct large model experiments for submarines focusing on stealth, maneuvering and control, affordability, and operational effectiveness. ***FY 2011 Accomplishments:*** Completed development of coupled wake signature prediction tool by performing analysis and comparing to available full scale system. Executed 1/4-scale LSV test to measure flow noise resulting from surface roughness to validate numerical prediction capabilities. Completed qualification testing associated with a new material for use in future conformal arrays. Conducted LSV operations and maintained LSV and ISMS test ranges. Supported OHIO Class SSBN replacement and future VA Class design development. Conducted full-scale baseline trials. Conducted signature measurement trials under the Electromagnetic (EM) Silencing PA with the UK to fabricate and test both a stress magnetization and electric signatures models. Published a degaussing technological report with the UK. ***FY 2012 Plans:*** Exercise wake signature prediction tool to analyze design concepts associated with future advanced submarine platforms. Support demonstration of imaging technologies being developed to perform inspections under submarine hull treatment material without requiring removal. Conduct LSV maintenance, support, and operations and maintain LSV and ISMS test ranges. Support Virginia Class and Ohio Replacement signature trials. Continue Electromagnetic Silencing PA with the UK executing second stress magnetization and electric model tests focusing on development of signature control algorithms and validation test planning. Funding addresses gaps in stealth and survivability for current and future SSN/SSGN force to execute submarine tactical and strategic operations. ***FY 2013 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Perform initial control algorithm validation and initiate optimization. Perform initial work in expanding wake signature prediction tool to handle non steady-state conditions such as maneuvers and depth changes. Develop and validate performance of control algorithms for both magnetic and electric signatures. Conduct LSV maintenance, support, and operations and maintain LSV and ISMS test ranges. Perform tech refresh at ISMS range. Support Virginia Class and Ohio Replacement signature trials. Continue Electromagnetic Silencing PA with the UK executing the third (four planned) scale stress magnetization and electric model experiments. Funding addresses gaps in stealth and survivability for current and future SSN/SSGN force to execute submarine tactical and strategic operations.			
Title: Total Ownership Cost/Affordability/Subtotal Cost	8.813	5.809	2.982
Articles:	0	0	0
Description: Demonstrate technologies with potential to reduce total ownership costs of submarine systems by lowering construction costs, improving commonality of interfaces, extending the life of parts, and lowering life cycle maintenance requirements.			
FY 2011 Accomplishments: Finalized updates to maintenance documentation for Main Ballast Tank (MBT) damping configurations. Performed Navy land-based test and evaluation of the Universal Modular Mast (UMM) linear Electric Actuation System (EAS). Installed UMM linear EAS and Ball Valve Rotary EAS TEMPALTs on USS Missouri (SSN780) to demonstrate electrically-actuated systems at-sea. Continued at-sea data collection and analysis of advanced carbon dioxide (CO2) test cubes. Developed the system procurement specification, and design and build a full capacity CO2 Scrubber prototype (TRL-6) for further technical evaluation of solid sorbent technology. Continued assessment of total ownership cost reduction opportunities for in-service submarines to reduce current and future submarine maintenance cost. Initiated corrosion control opportunities with the United Kingdom (UK). Executed Below Threshold Reprogramming (BTR) to address an emergent issue associated with the Submarine Valve Regulated Lead Acid Batteries (SVRLA). Developed and evaluated battery test equipment, procedures and developed and tested MFX (antimony & cadmium) and battery alloy.			
FY 2012 Plans: During at-sea demonstrations monitor and record data on the Ball Valve Rotary EAS and UMM linear EAS TEMPALTs on USS Missouri. Design and build a full-capacity advanced CO2 Scrubber prototype and perform vendor test and evaluation. The prototype is the VA Class Block IV qualified version. Continue corrosion control opportunities with the UK and establish Information Exchange Agreement (IEA). Engage transitional opportunities with ONR corrosion Future Naval Capabilities (FNC) with mutual approved Technology Transition Agreements (TTA).			
FY 2013 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Remove Ball Valve Rotary EAS and UMM Linear EAS TEMPALTs from USS Missouri and restore shipboard hydraulic service systems. Conduct Navy Test and Evaluation on CO2 Scrubber unit in Navy Laboratory. Continue corrosion control opportunities with the UK. Leverage the S&T effort of ONR FNC projects for further technical maturity and prepare for transition of corrosion prevention technology to the fleet.			
Title: Advanced Propulsion/Ship Concept Developments/Subtotal Cost	6.614	4.026	5.981
Articles:	0	0	0
Description: Overcome technological barriers that have significant impact on submarine HM&E systems so as to enable design options for a submarine with VIRGINIA Class capability in two technical areas: Shaftless Propulsion and Radical Ship HM&E Infrastructure Reduction. Develop submarine alternative propulsion and stern configurations with potential to significantly reduce submarine acquisition costs. Demonstrate critical performance parameters through appropriate scale demonstrators in realistic environmental conditions. Evaluate integration of technologies and approaches for cost reduction in future submarines. Develop understanding of ship concept studies and submarine cost drivers and model analysis. Develop and demonstrate technologies for future submarines in areas of hull and platform technologies, propulsors, ship control, electric actuation, sensors, and self defense. This work will apply to future submarine designs including the long-lead concept work on the OHIO Replacement Program. Evaluate current platforms via full scale signature measurement trials to guide future R&D investments. ***FY 2011 Accomplishments:*** Continued demonstration and performance testing of TB Shaftless Propulsion prototype. Continued partnership with DARPA on TB Shaftless Propulsion projects. Continued fabrication of Retractable Bow Planes (RBP) Electric Actuation System (EAS) to test bow plane control surface EAS operation. Continued preliminary multi-material characterization/construction and demonstration of multi-material beams, and propulsor design tool for Hybrid Multi-Material Rotor (HMMR). ***FY 2012 Plans:*** Complete fabrication of RBP EAS. Conduct land-based end-to-end testing of RBP Control Surface EAS. Continue partnership with DARPA on HMMR program to include delivery of coupled design software tool sets and multi-material characterization. ***FY 2013 Plans:*** Complete land-based testing of RBP Control Surface EAS. Continue partnership with DARPA on HMMR program to include delivery of coupled design software tool sets and multi-material characterization. .			
Accomplishments/Planned Programs Subtotals	47.556	33.723	35.155

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

D. Acquisition Strategy

F2033: Sole source Concept Formulation (CONFORM) contracts with the only two submarine design/construction shipyards, General Dynamics Electric Boat (GDEB) and Huntington Ingalls Industries (HII). Engagement with industry to build vendor base and support development of R&D products for enhanced submarine capability via competitively awarded Small Business Innovation Research (SBIR) contracts to support Hull Mechanical & Electrical systems (HM&E).

E. Performance Metrics

To enable transition of a minimum of three technology challenge solutions supporting emergent warfighter needs.

-Sustain critical one of a kind national R&D hydroacoustic infrastructure enabling the design and assessment of VIRGINIA Class cost reduction and the OHIO Replacement designs for affordability.

-Refine the design of the Advanced Carbon Dioxide Removal System (ACRU) CO2 Scrubber System based on at-sea testing of new solid sorbent materials and the removal of liquid amine system from future submarines.

-Install and perform three at-sea demonstrations for electric actuation of critical ship control and ship system operational components in support of the OHIO Replacement and follow-on VIRGINIA Class Block Upgrades.

-Assess as-built VIRGINIA and OHIO Class SSBN/SSGN submarine for design drivers/design tools and model validation to define R&D needs for OHIO Class component development and technical design maturity.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	MIPR	DARPA:Arlington, VA	1.084	-		-		-		-	1.084	2.168	2.168
Product Development	SS/CPFF	NGSB:Newport News, VA	3.332	0.394	Dec 2011	2.075	Mar 2013	-		2.075	Continuing	Continuing	Continuing
Product Development	WR	NSWC:Dahlgren, VA	5.241	-		-		-		-	0.000	5.241	5.241
Product Development	SS/CPFF	Kollmorgen:N. Hampton, MA	1.100	-		-		-		-	0.000	1.100	1.100
Product Development	SS/CPFF	Oceaneering:Chesapeake, VA	1.900	-		-		-		-	0.000	1.900	1.900
Product Development	SS/CPFF	Boeing:St. Louis, MO	0.925	-		-		-		-	0.000	0.925	0.925
Product Development	SS/CPFF	EB:Groton, CT	36.281	3.429	Mar 2012	8.076	Mar 2013	-		8.076	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Raytheon:Portsmouth, RI	16.034	-		-		-		-	0.000	16.034	16.340
Product Development	WR	NSWC:Carderock, MD	69.183	5.007	Mar 2012	5.366	Mar 2013	-		5.366	Continuing	Continuing	Continuing
Product Development	SS/CPFF	ARL/PSU:State College, PA	4.787	0.700	Jan 2012	0.700	Feb 2013	-		0.700	Continuing	Continuing	Continuing
Product Development	SS/CPFF	UT/ARL:Austin, TX	6.050	-		-		-		-	0.000	6.050	6.050
Product Development	SS/CPFF	JHU/APL:Laurel, MD	15.794	-		-		-		-	0.000	15.794	15.794
Product Development	Various	Various:Various	31.924	1.168	Mar 2012	1.166	Mar 2013	-		1.166	Continuing	Continuing	Continuing
Product Development	WR	NUWC:Newport, RI	52.789	5.671	Mar 2012	2.570	Mar 2013	-		2.570	Continuing	Continuing	Continuing
Product Development	WR	ONR:Arlington, VA	8.066	-		-		-		-	0.000	8.066	8.066
Product Development	SS/CPFF	Lockheed Martin:Bethesda, MD	8.934	-		2.000	Mar 2013	-		2.000	0.000	10.934	8.934
Product Development	WR	SPAWAR:San Diego, CA	5.850	-		-		-		-	0.000	5.850	5.850
		Subtotal	269.274	16.369		21.953		-		21.953			

Remarks

Various/VAR is used to group multiple activities with small funding levels.
Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	SS/CPFF	Various:Various	8.397	0.885	Dec 2011	0.800	Dec 2012	-		0.800	Continuing	Continuing	Continuing
Government Engineering Support	WR	Various:Various	4.353	0.780	Dec 2011	0.700	Jan 2013	-		0.700	Continuing	Continuing	Continuing
Travel	WR	NAVSEA HQ:Not Specified	0.509	0.100	Nov 2011	0.100	Dec 2012	-		0.100	Continuing	Continuing	Continuing
Acquisition Workforce	Various	Not Specified:Not Specified	0.293	-		-		-		-	0.000	0.293	0.293
		Subtotal	13.552	1.765		1.600		-		1.600			

Remarks

Various/VAR is used to group multiple activities with small funding levels.
Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	EB:Groton, CT	4.846	3.141	Mar 2012	2.827	Mar 2013	-		2.827	Continuing	Continuing	Continuing
Developmental Test & Evaluation	SS/CPFF	Raytheon:Portsmouth, VA	9.104	-		-		-		-	0.000	9.104	9.104
Developmental Test & Evaluation	WR	NAVAIR:Patuxent, MD	2.593	-		-		-		-	0.000	2.593	2.593
Developmental Test & Evaluation	Various	Various:Various	6.372	-		-		-		-	0.000	6.372	6.372
Developmental Test & Evaluation	WR	NUWC:Newport, RI	10.121	6.357	Mar 2012	2.780	Feb 2013	-		2.780	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWC:Carderock, MD	13.255	6.091	Mar 2012	5.995	Feb 2013	-		5.995	Continuing	Continuing	Continuing
Developmental Test & Evaluation	SS/CPFF	NGSB:Newport News, VA	0.783	-		-		-		-	0.000	0.783	0.783

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	JHU/ARL:Laurel, MD	0.305	-		-		-		-	0.000	0.305	0.305
Developmental Test & Evaluation	SS/CPFF	ARL/PSU:State College, PA	0.720	-		-		-		-	0.000	0.720	0.720
Developmental Test & Evaluation	WR	NSWC:Dahlgren, VA	1.320	-		-		-		-	0.000	1.320	1.320
		Subtotal	49.419	15.589		11.602		-		11.602			

Remarks

Various/VAR is used to group multiple activities with small funding levels.
Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	332.245	33.723		35.155		-		35.155			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 2033: *Adv Submarine Systems Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2033				
P&S Towed Array Handling System (TAHS) - Concept Development	1	2012	2	2013
P&S TAHS - Prototype Dev & Landbase Testing	1	2013	2	2014
P&S TAHS - Dev TEMPALT/Install/Conduct At-Sea Testing for 688 and VA Class	1	2014	3	2015
P&S TAHS - TEMPALT/Install/Conduct At-Sea Testing for Ohio and Ohio Replacement	4	2015	2	2017
P&S Innovation Technology Transition SBIR/IRAD Projects	1	2011	4	2017
P&S Irregular Warfare Technology Development/Test/Transition	1	2011	4	2011
P&S Universal Launch and Recovery Module (ULRM) Design/Fabricate/Test/Install Prototype	1	2011	1	2013
P&S ULRM SSGN Class OPALT	1	2013	4	2013
STEALTH Coupled Wake Signature Model Validation	1	2011	4	2017
STEALTH Conformal Array HM&E Technologies	1	2011	4	2012
STEALTH Stone Mason	1	2011	4	2012
STEALTH Intermediate Scale Measurement System (ISMS)/Large Scale Vehicle (LSV) Tech Refresh	1	2013	4	2013
STEALTH ISMS /LSV Sustainment, Maintenance and Operations	1	2011	4	2017
STEALTH ISMS/LSV Test Schedule OHIO Replacement Signature Trials	2	2012	2	2014
STEALTH ISMS/LSV Test Schedule VA Blk IV Testing	1	2014	4	2014
STEALTH ISMS/LSV Test Schedule OHIO Replacement Signature Trial	1	2016	4	2017
STEALTH ISMS/LSV Full Scale Baseline Trials	1	2011	4	2011
STEALTH Electromagnetic Signatures Project Arrangement (PA) w/UK	1	2011	4	2014
STEALTH SSN/SSGN Survivability	1	2012	4	2017

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 2033: *Adv Submarine Systems Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
TOC SSN 688 Class Man Ballast Tank Damping Treatment, Update Maint. Docmtn.	1	2011	4	2011
TOC Hydraulic Elimination Ball Valve & UMM TEMPALT	1	2011	1	2012
TOC Hydraulic Elimination Monitor Ball Valve/UMM Monitor At-Sea	2	2012	2	2013
TOC Hydraulic Elimination Ball Valve & UMM TEMPALTs Removal	3	2013	4	2013
TOC Advanced CO2 Removal System Collect & Analyze Data; Mfg, Test Mat'l, Award Prototype Contract	1	2011	4	2011
TOC Advanced CO2 Removal System Vendor Design, Build and Test	1	2012	4	2012
TOC Advanced CO2 Transition to VA Class	1	2013	1	2013
TOC Advanced CO2 Remove SSN Shipboard Test Cube	4	2013	4	2013
TOC Advanced CO2 Remove SSBN Shipboard Test Cube	4	2014	4	2014
TOC - Corrosion Control Collaborative Agreement with UK	1	2011	4	2014
TOC - Transition Corrosion ONR Technologies	1	2014	4	2017
Adv Prop/Ship Concept - AMP US and Australia Collaborative Project	1	2014	4	2017
Adv Prop/Ship Concept - Tango Bravo Shaftless Propulsion	1	2011	4	2011
Adv Prop/Ship Concept - Electric Control Surface Actuation Complete TDP, Procure Material Fabricate, Engineer, and Conduct Land Based Test	1	2011	4	2013
Adv Prop/Ship Concept - HMMR Development Coupled Tool Architecture, Build Full Thickness	1	2011	4	2011
Adv Prop/Ship Concept - Multi-Material Characterization Coupled Design Tools	1	2012	4	2013

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
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COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
3197: *Undersea Superiority*	21.264	-	-	-	-	-	-	-	-	0.000	21.264
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Project Unit 3197: This Project supports Navy Undersea Superiority through the application of advanced development and testing of organic and offboard sonar and tactical control systems. This Project transitions technologies developed by Navy technology bases, the private sector, ONR, Future Naval Capabilities, and DARPA. This non-acquisition Project addresses technology challenges to improve Anti-Submarine Warfare (ASW) in littoral and open ocean environments for a variety of operational missions by relevant tactical ASW capabilities. Prototype hardware/software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. Technologies are selected by the CNO's ASW Initiative which was established to support the CNO's vision to "fundamentally change the way ASW is currently conducted to render the enemy submarine irrelevant against US and coalition forces". This Project matures promising Undersea Warfare (USW) technologies via an incremental development methodology, establishes military utility through sea testing and self assessment, and supports transition to production as merited by results.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Undersea Superiority	21.264	-	-
Articles:	0		
FY 2011 Accomplishments: Completed fabrication and tested upgraded version of Deep Water Active Detection System (DWADS) design based on initial at-sea and MUA test results. Conduct at-sea demonstration of updated DWADS (4Q11). Complete development of Reliable Acoustic Path Vertical Line Array (RAP VLA) and conduct at-sea demonstration (4Q11) of a fully functioning prototype. Complete studies, analysis and assessments of potential transformational ASW technologies.			
Accomplishments/Planned Programs Subtotals	21.264	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.

E. Performance Metrics

- Reliable Acoustic Path Vertical Line Array (RAP VLA) provides detection of quiet diesel submarines at ranges 3 to 7 times water depth. Completed RAP VLA development and conducted a Deep Digital Array sea test and an Engineering Integration test.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3197: *Undersea Superiority*

- Deep Water Active Detection System (DWADS) - participated in Distributed Netted System (DNS) 10-1 Prototype testing in Convergence Zone and Valiant Shield 10 with Integrated Units.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3197: *Undersea Superiority*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPFF	In Depth Engineering:VA	0.900	-		-		-		-	0.000	0.900	0.900
Product Development	C/CPFF	JHU/APL:MD	12.516	-		-		-		-	0.000	12.516	12.516
Product Development	C/CPFF	Lockheed Martin:VA	19.675	-		-		-		-	0.000	19.675	19.675
Product Development	C/CPFF	Lockheed Martin:CA	22.746	-		-		-		-	0.000	22.746	23.365
Product Development	WR	Marine Acoustics Inc.:NC	0.363	-		-		-		-	0.000	0.363	0.363
Product Development	WR	Naval Research Lab:DC	0.885	-		-		-		-	0.000	0.885	0.885
Product Development	WR	NUWC/Newport:RI	3.866	-		-		-		-	0.000	3.866	3.866
Product Development	C/CPFF	Scientific Solutions Inc:NH	0.500	-		-		-		-	0.000	0.500	0.500
Product Development	MIPR	U.S. AFB/MIT Lincoln Labs:MA	1.200	-		-		-		-	0.000	1.200	1.200
		Subtotal	62.651	-		-		-		-	0.000	62.651	63.270

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	C/CPFF	JHU/APL:MD	7.780	-		-		-		-	0.000	7.780	7.780
Test and Evaluation	WR	NUWC/Newport:RI	6.657	-		-		-		-	0.000	6.657	6.657
Test and Evaluation	WR	SPAWAR, San Diego:CA	1.600	-		-		-		-	0.000	1.600	1.600
Test and Evaluation	MIPR	US AFB/MIT Lincoln Labs:MA	0.150	-		-		-		-	0.000	0.150	0.150
Test and Evaluation	C/CPFF	UT/ARL:TX	2.400	-		-		-		-	0.000	2.400	2.400
Test and Evaluation	WR	VAR:VAR*	5.318	-		-		-		-	0.000	5.318	5.318
		Subtotal	23.905	-		-		-		-	0.000	23.905	23.905

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3197: *Undersea Superiority*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

* Consists of multiple performing activities with funding for each not greater than $1M per year.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	BAE SYSTEMS:MD	1.200	-		-		-		-	0.000	1.200	1.200
Travel	WR	NAVSEA PEO IWS5:DC	0.130	-		-		-		-	0.000	0.130	0.130
		Subtotal	1.330	-		-		-		-	0.000	1.330	1.330

	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	87.886	-		-		-		-	0.000	87.886	88.505

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3197: *Undersea Superiority*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 3197: *Undersea Superiority*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3197				
DWADS Design/Development	1	2011	3	2011
DWADS Fully Functional Prototype Sea Test/MUA	3	2011	4	2011
RAP/VLA Design Development	1	2011	3	2011
RAP/VLA Fully Functional Prototype Sea Test/MUA	3	2011	4	2011

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3220: *SBSD Advanced Submarine System Development*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
3220: *SBSD Advanced Submarine System Development*	431.422	781.575	483.095	-	483.095	793.523	861.406	1,037.360	708.890	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The Sea Based Strategic Deterrent (SBSD) Advanced Submarine System Development project supports the OHIO Replacement (OR) program. The funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for Common Missile Compartment (CMC) design, whole ship design, and component technologies development for the next generation US ballistic missile submarine. This RDT&E program supports cooperation with the United Kingdom (UK) to maintain strategic deterrence, based on a single effort to develop a common missile compartment as agreed by the UK Secretary of State for Defence and the US Secretary of Defense in 2009.

The OHIO Replacement program strategy is to maximize the re-use of existing OHIO systems and new designs from VIRGINIA Class (as applicable), focus on Life Cycle Total Ownership Cost (TOC) affordability, and meet the higher standards required for this SSBN to achieve mission success in a challenging environment.

* The phasing of this project differs from the profile in the FY 2012 President's Budget request following the delay in procurement of the SSBN(X) lead ship by two years. Successful execution of the FY 2013 efforts is contingent upon use of appropriated FY2012 funding.

The following key activities support a ship acquisition program to replace the OHIO Class SSBNs:
1. Design and development of a missile compartment, launch system, and strategic support systems to meet US strategic requirements while cooperating with the UK on modernizing its strategic deterrent in accordance with Presidential direction (December 2006).

2. Concept and System Definition for remaining portions of the ship will be accomplished by the design/ build/ sustain approach modeled after the VIRGINIA Class program.

3. Development of advanced submarine platform technologies to provide capabilities needed to enhance platform operational effectiveness and minimize life cycle cost.

OR Concept and System Definition Prototyping, and Technology Development Efforts

The OR program supports design, systems engineering, prototyping and vendor qualification activities needed to develop CMC design, the OHIO Replacement whole ship design, and component development. The OR design timelines are based on the approach proven on VIRGINIA Class Program, adjusted for the additional complexity of a missile compartment and Strategic Weapons Systems (SWS). Planned technical studies and prototyping are necessary to reduce risks associated with updating SSBN system designs for current technical standards and demonstrating design feasibility of technical options to inform the establishment of detailed requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 3220: *SBSD Advanced Submarine System Development*

The Navy continues investing $150M ($50M/year in FY 2012-2014) in Design for Affordability (DFA) initiatives similar to those employed successfully for VIRGINIA Class, but will be further tailored to the uniqueness of OHIO Replacement to drive down overall program costs. Efforts will focus on reducing ship construction costs through implementing more effective design features to produce a more affordable/producible class. As part of this effort, alternative contracting strategies will be examined.

Activities planned for FY 2012 and 2013 are required to maintain the development schedule for the first article of the Common Missile Compartment in 2015 and fully supports the UK Successor Progamme. The CMC will mature required technologies and to re-host the TRIDENT II D5 SWS (Launcher, Fire Control and Navigation) while ensuring no degradation to D5 security, safety and performance. In addition, whole ship design efforts are focused on technologies requiring significant development times and those technologies with early design impacts. These include propulsor development, ship control (e.g., control surfaces) and ship signatures. These technologies are critical to understand stealth capabilities for a ship class that will be in service until the 2080s. Ship concept design efforts include important pre-construction activities such as trade studies of ship requirements, risk characterization of technology options, improvement and validation of performance prediction tools and improvement of design tools. Technology development will address maturation of technologies that must be mature to support ship design and construction schedules such as the propulsor, maneuvering/ship control and signatures.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: CMC Design and Prototyping	171.017	387.266	101.377
Articles:	0	0	0
FY 2011 Accomplishments: Continue efforts for the design and development of the CMC to include: related sections of the ship specification, missile tube requirements review, and commencement of the missile tube detailed design and first article missile quad pack design. Continue CMC system diagrams. On-site installation of the missile tube integration fixture and execution of the missile tube quarter crown and barrel prototype quad. Continue concept studies and commence preliminary designs for additional fixtures. Continue casting vendor qualification and concept design of missile tube quad to hull manufacturing prototypes to validate planned missile compartment production techniques. Continue system engineering efforts to refine the required CMC build strategy. Continue planning activities and trade studies for CMC test facilities. Commence initial planning, development, and testing of missile tube to keel robotic welding.			
FY 2012 Plans: Continue efforts for the design and development of the CMC to include: completion of sections of the CMC ship specification, continue missile tube detailed design and first article missile quad pack design. Continue CMC system diagrams. Continue design and prototype efforts and manufacturing of additional fixtures. Continue validation of missile tube to missile tube quad pack production techniques. Continue validation and verification of the casting design and preliminary design of the missile tube quad to hull manufacturing fixture prototypes to validate planned missile compartment production techniques. Continue system engineering efforts to define the required CMC testing during the build cycle. Commence detailed design Missile Compartment			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3220: *SBSD Advanced Submarine System Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
studies. Commence detailed planning activities for CMC test facilities. Continue development and testing of missile tube to keel robotic welding techniques. ***FY 2013 Plans:*** Continue efforts for the design and development of the CMC to include: completion of remaining sections of the CMC ship specification, drawings of the first article missile tube quad pack, and CMC system diagrams. Review missile tube drawings and commence CMC arrangements. Continue validation of missile tube to missile tube quad pack production techniques. Continue design and prototype efforts and manufacturing of additional fixtures. Continue validation and verification of the casting design and preliminary design of the missile tube quad to hull manufacturing fixture prototypes to validate planned missile compartment production techniques. Continue system engineering efforts to define the required CMC testing during the build cycle. Continue detailed design Missile Compartment studies. Finalize detailed planning activities for CMC test facilities. Continue development and testing of missile tube to keel robotic welding techniques to support process certification.			
Title: Ship Study and Design	47.600	36.525	39.276
Articles:	0	0	0
FY 2011 Accomplishments: Commence with preliminary design of forward and aft ends of OHIO Replacement Class. Continue Rest of Ship concept development, system integration, component design, system definition documents, system diagrams, ship arrangements, construction drawings, control surface design and studies. Commence Rest of Ship specifications development. Commence CMC interface with Rest of Ship. ***FY 2012 Plans:*** Continue with preliminary design of forward and aft ends of OHIO Replacement Class. Continue Rest of Ship concept development, system integration, component design, system definition documents, system diagrams, ship arrangements, construction drawings, control surface design and studies. Continue Rest of Ship specifications development. Continue CMC interface with Rest of Ship. Develop ship manufacturing assembly plan. ***FY 2013 Plans:*** Continue with preliminary design of forward and aft ends of OHIO Replacement Class. Continue Rest of Ship concept development, system integration, component design, system definition documents, system diagrams, ship arrangements, construction drawings, control surface design and studies. Continue of Ship specifications development. Continue CMC interface with Rest of Ship.			
Title: NAVSEA R&D and Prototyping	32.094	84.383	98.174
Articles:	0	0	0
FY 2011 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Continue Technology Development efforts for corrosion control, undersea sensor suite, propulsor, shafting system, hydrodynamics, maneuvering, ship control, composites, component development, ship signatures, above/below water sensors, shock, and structures. ***FY 2012 Plans:*** Continue Technology Development efforts for corrosion control, undersea sensor suite, propulsor, shafting system, hydrodynamics, maneuvering, ship control, composites, component development, ship signatures, above/below water sensors, shock, and structures. ***FY 2013 Plans:*** Continue Technology Development efforts for corrosion control, undersea sensor suite, propulsor, shafting system, hydrodynamics, maneuvering, ship control, composites, ship signatures, above/below water sensors, shock, and structures.			
Title: Test and Evaluation ***Articles:*** ***FY 2011 Accomplishments:*** Approved Test and Evaluation Strategy. Drafted Live Fire Test and Evaluation (LFT&E) Master Plan. Continue efforts to identify T&E requirements for the program and interface with OSD oversight organizations for T&E. ***FY 2012 Plans:*** Update Test and Evaluation Strategy for approval in January 2012. Continue efforts to identify T&E requirements for the program and interface with OSD oversight organizations for T&E. Continue drafting Test and Evaluation Master Plan (TEMP) and refining LFT&E Master Plan. Complete Early Operational Assessment One and Vulnerability Assessment One. ***FY 2013 Plans:*** Continue efforts to identify T&E requirements for the program and interface with OSD oversight organizations for T&E. Complete and route TEMP and LFT&E Master Plan for approval. Complete Commander Operational Test and Evaluation Force (COMOPTEVFOR) Mission Based Test Design Integrated Evaluation Framework.	1.193 0	2.515 0	2.700 0
Title: Strategic Weapons Systems Integration ***Articles:*** ***FY 2011 Accomplishments:*** Continue system engineering efforts for the development of SWS system diagrams as they interface with the CMC. Continue concept and design work to develop a missile launch tube test facility and test stand including refurbishment of a test vehicle to support launch system prototype effort and qualification. Conduct evaluation of missile gas temperature test data acquired during Demonstration and Shakedown Operations (DASO) to verify missile performance in re-hosted environment. Continue system	92.626 0	120.000 0	135.000 0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
engineering design efforts associated with the physical arrangement drawings of missile tubes and SWS hardware within the CMC and Missile Control Center (MCC). ***FY 2012 Plans:*** Continue system engineering efforts required for the technical repackaging of the TRIDENT D5 SWS on the OHIO Replacement submarine. Continue concept and design work to develop a missile launch tube test facility and test stand including refurbishment of a test vehicle to support launch system prototype effort and qualification. Initiation of system engineering efforts related to development of Special Test Vehicles. Continue system engineering design efforts associated with the physical arrangement drawings for SWS equipment within the CMC and MCC. ***FY 2013 Plans:*** Continue system engineering efforts required for the technical re-hosting of the TRIDENT II (D5) SWS on the OHIO Replacement submarine; including review and modification of SWS Interface Drawings, SWS Subsystem preliminary design, and Software requirements development. Continue system engineering design efforts associated with the physical arrangement drawings for SWS equipment within the CMC and MCC. Limited SWS Test Systems material procurement and builds, Test Berth / Facility modifications and development of Special Test Vehicles. Plan for the development of a Missile Launch Tube Test Capability and Test Stand including refurbishment of a Test Vehicle to support launch system prototype efforts and evaluation / qualification. Initiate systems engineering planning and design efforts for a SWS Ashore integrated SWS/SWSS test capability for OHIO Replacement program.			
Title: Systems Engineering/Program Management	86.892	100.886	56.568
Articles:	0	0	0
FY 2011 Accomplishments: Continue to provide technical oversight including Program Office management and technical support from government laboratories for review, analysis and modeling. Commence maintenance planning and design for sustainment activities. Commence Design for Affordability (DFA) planning activities. ***FY 2012 Plans:*** Continue to provide technical oversight including Program Office management and technical support from government laboratories for review, analysis and modeling. Continue maintenance planning and design for sustainment activities. ***FY 2013 Plans:*** Continue to provide technical oversight including Program Office management and technical support from government laboratories for review, analysis and modeling. Continue maintenance planning and design for sustainment activities.			
Title: Design for Affordability	-	50.000	50.000
Articles:		0	0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY 2012 Plans: Commence execution of Contractor and Government generation of initiatives and business cases associated with reducing ship construction costs through implementing more effective design features to produce a more affordable/producible class. Commence formal Government management efforts of the DFA Program including: generation and management of Design, Construction and Operation & Sustainment Action plans and glide slopes, management of the OHIO Replacement Banker's scorecard, and review and approval of DFA initiatives. ***FY 2013 Plans:*** Continue execution of Contractor and Government generation of initiatives and business cases associated with reducing ship construction costs through implementing more effective design features to produce a more affordable/producible class. Continue formal Government management efforts of the DFA Program including: generation and management of Design, Construction and Operation & Sustainment Action plans and glide slopes, management of the OHIO Replacement Banker's scorecard, and review and approval of DFA initiatives.			
Accomplishments/Planned Programs Subtotals	431.422	781.575	483.095

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
• SCN/1045: *SSBN(X)*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	777.793	Continuing	Continuing
• RDTEN/3219: *SBSD Nuclear Technology Development*	178.345	285.367	81.817	0.000	81.817	296.021	360.398	420.770	409.666	Continuing	Continuing

D. Acquisition Strategy

The missile compartment will be designed and developed to support the US and UK in development of the OHIO Replacement and Successor SSBN programs. It also enables the potential for a common US-UK CMC production, which would maximize the benefit of the ongoing US-UK partnership in strategic deterrence. Whole ship concepts and System Definition efforts will be performed primarily by the US submarine shipyards. R&D efforts will be performed by Navy laboratories, shipyards, private industry, and University Affiliated Research Centers.

E. Performance Metrics

Updated Integrated Master Schedule, and CMC build strategy down-select. Development of Signature Management efforts to address knowledge gap, Concepts for Propulsor and Shafting, and Design Guidance and Interface Control Requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3220: *SBSD Advanced Submarine System Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	SS/CPFF	Ship Design Contractor:EB	117.096	36.525	Oct 2011	39.276	Oct 2012	-		39.276	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Ship Design Contractor DFA Support:EB	-	40.000	Jan 2012	40.000	Jan 2013	-		40.000	Continuing	Continuing	Continuing
Product Development	WR	NSWC:Carderock, MD	93.080	113.876	Oct 2011	82.462	Oct 2012	-		82.462	Continuing	Continuing	Continuing
Product Development	WR	NSWC DFA Support:Carderock, MD	-	2.000	Jan 2012	2.000	Jan 2013	-		2.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	ARL Penn State University:State College, PA	3.219	0.356	Dec 2011	0.363	Dec 2012	-		0.363	0.000	3.938	2.310
Product Development	SS/CPFF	EB:Groton, CT	29.431	30.735	Oct 2011	27.874	Oct 2012	-		27.874	Continuing	Continuing	Continuing
Product Development	SS/CPFF	NGMS:Sunnyvale, CA	32.550	26.208	Oct 2011	26.252	Oct 2012	-		26.252	Continuing	Continuing	Continuing
Product Development	WR	NUWC:Newport, RI	16.750	17.000	Oct 2011	7.384	Oct 2012	-		7.384	Continuing	Continuing	Continuing
Product Development	WR	NUWC DFA Support:Newport, RI	-	8.000	Jan 2012	8.000	Jan 2013	-		8.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Missile Comp Design Contractor-EB:Groton, CT	308.890	387.266	Oct 2011	101.377	Oct 2012	-		101.377	Continuing	Continuing	Continuing
Product Development	SS/CPFF	JHU/APL:Laurel, MD	11.269	6.268	Dec 2011	6.056	Dec 2012	-		6.056	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Draper Labs:Cambridge, MA	3.000	2.750	Oct 2011	3.000	Oct 2012	-		3.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	LMFS:NY	8.251	5.000	Oct 2011	8.010	Oct 2012	-		8.010	Continuing	Continuing	Continuing
Product Development	Various	NAVSEA:Various	15.131	4.328	Oct 2011	19.622	Oct 2012	-		19.622	Continuing	Continuing	Continuing
Product Development	WR	NOTU:FL	4.400	-		-		-		-	Continuing	Continuing	Continuing
Product Development	SS/CPFF	LMMSC:CA	27.570	21.861	Oct 2011	22.551	Oct 2012	-		22.551	Continuing	Continuing	Continuing
Product Development	C/CPFF	GDAIS:MA	35.181	22.706	Jan 2012	25.553	Jan 2013	-		25.553	Continuing	Continuing	Continuing
Product Development	SS/CPFF	IEC:VA	4.846	1.012	Oct 2011	1.119	Oct 2012	-		1.119	Continuing	Continuing	Continuing
Product Development	WR	NSWC:VA	2.590	4.775	Oct 2011	4.100	Oct 2012	-		4.100	Continuing	Continuing	Continuing
Product Development	SS/CPFF	BAE:MD	13.200	9.297	Oct 2011	9.405	Oct 2012	-		9.405	Continuing	Continuing	Continuing
Product Development	SS/CPFF	BNA:CA	3.487	2.000	Oct 2011	2.002	Oct 2012	-		2.002	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3220: *SBSD Advanced Submarine System Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NSWC Crane:IN	7.724	2.829	Oct 2011	10.492	Oct 2012	-		10.492	Continuing	Continuing	Continuing
Product Development	WR	NWC CL:CA	5.863	4.051	Oct 2011	4.064	Oct 2012	-		4.064	Continuing	Continuing	Continuing
Product Development	SS/CPFF	SPA:VA	2.953	2.581	Oct 2011	2.606	Oct 2012	-		2.606	Continuing	Continuing	Continuing
Product Development	Various	SSP:Various	13.124	8.306	Oct 2011	9.427	Oct 2012	-		9.427	Continuing	Continuing	Continuing
		Subtotal	759.605	759.730		462.995		-		462.995			

Remarks

Note: Various is used for multiple activities with different award dates

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Test and Evaluation Support	C/CPFF	T&E Support:Various	0.300	0.420	Oct 2011	0.650	Oct 2012	-		0.650	Continuing	Continuing	Continuing
Government Test and Evaluation Support	WR	T&E Support:Various	2.391	2.095	Oct 2011	2.050	Oct 2012	-		2.050	Continuing	Continuing	Continuing
		Subtotal	2.691	2.515		2.700		-		2.700			

Remarks

Note: Various is used for multiple activities with different award dates. Contractor Test & Evaluation Support cost category item funds will be sent to Shipbuilder and Support Contractors to be determined. Government Test and Evaluation Support cost category item funds will be sent to several Navy activities to be determined.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Management Support	C/CPFF	Various:Multiple Awards	15.450	11.917	Oct 2011	11.431	Oct 2012	-		11.431	Continuing	Continuing	Continuing
Government Management Support	WR	Various:NSWC Carderock, MD	15.872	6.995	Oct 2011	5.636	Oct 2012	-		5.636	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	WR	NAVSEA HQ:Washington, D.C.	0.500	0.418	Oct 2011	0.333	Oct 2012	-		0.333	Continuing	Continuing	Continuing
		Subtotal	31.822	19.330		17.400		-		17.400			

Remarks

Note: Various is used for multiple activities with different award dates

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	794.118	781.575		483.095		-		483.095			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 3220: *SBSD Advanced Submarine System Development*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 3220: *SBSD Advanced Submarine System Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Notes: * Effort began prior to 1st Quarter FY 2011. ** Effort continues past 4th Quarter FY 2017.				
Requirements Definitization*	1	2011	4	2016
Concept Studies*	1	2011	1	2014
Research Development and Prototyping for Lead Ship Design* **	1	2011	4	2017
Component Development/Component Qualification* **	1	2011	4	2017
System Definition*	1	2011	4	2012
Ship Specifications*	1	2011	4	2014
System Diagrams	1	2011	4	2017
Ship Arrangements**	1	2011	4	2017
SCN Design**	1	2017	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603561N: *Advanced Submarine System Development*	PROJECT 9999: *Congressional Adds*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
9999: *Congressional Adds*	-	5.380	-	-	-	-	-	-	-	0.000	5.380
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Congressional Add Projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012
Congressional Add: Adv Sub Sys Dev (Cong)	-	5.380
FY 2012 Plans: N/A		
Congressional Adds Subtotals	-	5.380

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Add Projects.