Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy											DATE: April 2013	
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)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	1,439.133	843.645	555.123	852.977	-	852.977	926.177	1,099.748	778.495	794.581	Continuing	Continuing
0223: *Sub Combat System Improvement (ADV)*	310.770	39.678	36.873	32.813	-	32.813	36.037	37.336	37.930	37.561	Continuing	Continuing
2033: *Adv Submarine Systems Development*	334.245	37.372	35.155	32.546	-	32.546	30.580	25.258	31.435	36.014	Continuing	Continuing
3220: *SBSD Advanced Submarine System Development*	794.118	761.215	483.095	787.618	-	787.618	859.560	1,037.154	709.130	721.006	Continuing	Continuing
9999: *Congressional Adds*	0.000	5.380	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.380
MDAP/MAIS Code(s): P444												

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy	DATE: April 2013
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 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, Mechanical, and Electrical (HM&E) technologies and future naval concepts 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; develops, initially integrates, and does test validation of leading payload concepts for submarine integration in support of the Design for Undersea Warfare, 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 Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs and near and mid-term technology insertion to achieve future submarine class total ownership cost reductions, 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, Australia and other international partners.

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
- Stone Mason
- SSN/SSGN Survivability (S3P)

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
- Electric Actuation of Retractable Bow Plane Control Surfaces
- Hybrid Multi-Material Rotor Development (HMMR)

Improved Payload & Sensor Capabilities
- Next Generation Towed Array Handler System and Towed Array Reliability

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy	DATE: April 2013
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*

- Innovation Technology Transition
- Universal Launch and Recovery Module (ULRM)
- Large Displacement Unmanned Undersea Vehicle/Unmanned Air Vehicle (LDUUV/UAV)

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 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	861.366	555.123	860.236	-	860.236
Current President's Budget	843.645	555.123	852.977	-	852.977
Total Adjustments	-17.721	0.000	-7.259	-	-7.259
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.469	0.000			
• SBIR/STTR Transfer	-20.190	0.000			
• Program Adjustments	0.000	0.000	-1.538	-	-1.538
• Rate/Misc Adjustments	0.000	0.000	-5.721	-	-5.721

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2012	FY 2013
Project: 9999: *Congressional Adds*		
Congressional Add: *Adv Sub Sys Dev (Cong)*	5.380	-
Congressional Add Subtotals for Project: 9999	5.380	0.000
Congressional Add Totals for all Projects	5.380	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
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)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
0223: *Sub Combat System Improvement (ADV)*	310.770	39.678	36.873	32.813	-	32.813	36.037	37.336	37.930	37.561	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 2012	FY 2013	FY 2014
Title: Advanced Processing Build - (Acoustic/Imaging/Tactical)	32.316	34.176	30.913
Articles:	0	0	0
FY 2012 Accomplishments: Completed land-based and at-sea testing and the transition for APB-11. Established content and continued the development of capabilities for APB-13. APB-13 will focus on revitalizing Operator Machine Interfaces (OMI) to apply commercial industry design thinking and technologies to support ease of use and reduced training burden; continued improvement of new passive acoustic ranging techniques; automated contact tracking; enhanced software architecture to improve system reliability; improved periscope image clarity; periscope image automation and tracking; and continued refinement of technologies initiated in APB-11. Additionally, initiated development of a Submarine Mission Planning capability.			
FY 2013 Plans: Continue development of APB-13 focusing on revitalizing OMI to apply commercial industry design thinking and technologies to support ease of use and reduced training burden; continued improvement of new passive acoustic ranging techniques; automated contact tracking; enhanced software architecture to improve system reliability; improved periscope image clarity; periscope image automation and tracking; and continued refinement of technologies initiated in APB-11. Integrate APB-13 for testing.			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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 2012	FY 2013	FY 2014
Conduct land-based testing of APB-13, including laboratory string testing, and Return-On-Investment (ROI) Watch Section Task Analysis (WSTA) testing using the Submarine Mission Module Team Trainer (SMMTT). Initiate planning for APB-15 to include establishment of the tactical scenario to guide development focus; conduct of a WSTA gaps and seams test to inform system shortfalls in the context of the selected scenarios; and conduct of an Industry Day and Broad Agency Announcement (BAA) Solicitation to drive competition for APB-15 innovative technologies. Continue development of the Submarine Mission Planning capability. APB tactical scenarios and capability focus areas are provided by the Submarine Fleet via the Submarine Tactical Requirements Group (STRG), COMSUBFOR and CNO N97. ***FY 2014 Plans:*** Conduct at-sea testing and the transition of APB-13. Use the product of FY14 ROI, WSTA gaps and seams, and BAA evaluations along with direction from the Fleet/STRG/COMSUBFOR/N97 to establish content and continue the development of capabilities for APB-15. Development will include the first two steps of the 4 Step APB process; Step 1 - algorithm assessment by peer review panels of subject matter experts to down-select technologies and assist developers with technical guidance; Step 2 - algorithm/ technology testing with open and closed data sets to further down-select and refine capabilities prior to integration and test. Continue development, conduct system integration and initiate testing of the Submarine Mission Planning capability.			
Title: Advanced Sensors	7.362	2.697	1.900
Articles:	0	0	0
FY 2012 Accomplishments: Conformal Acoustic Velocity Sonar (CAVES) Large Vertical Array (LVA) completed cold water at-sea testing and analysis. Completed system integration of 12X single line towed array Advanced Development Model (ADM). Conducted 12X ADM Lake Pend Oreille (LPO) and Research Vessel (RV) tests. Completed the 12X ADM TEMPALT development and conducted submarine demonstration. Initiated advanced development of fat line Vector Sensor Towed Array (VSTA). ***FY 2013 Plans:*** Conduct Light Weight (LW) Low Cost Conformal Array (LCCA) sea test and transition to 688I program. Continue development and test of Advanced Towed Array Technologies. Conduct 12X ADM at sea test and analysis. Initiate studies for development of sensors for the Ohio Class Replacement Program. Continue fat line VSTA ADM development. ***FY 2014 Plans:*** Complete fat line VSTA ADM development. Continue Ohio Class Replacement Program sensor development studies.			
Accomplishments/Planned Programs Subtotals	39.678	36.873	32.813

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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 2014 Navy		DATE: April 2013
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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPFF	Adaptive Methods:VA	0.925	0.000		0.000		0.000		-		0.000	0.000	0.925	Continuing
Product Development	C/CPFF	Alion Sciences:VA	3.267	0.000		0.000		0.000		-		0.000	0.000	3.267	Continuing
Product Development	C/CPFF	Chesapeake Science:MD	6.626	0.750	Feb 2012	0.750	Apr 2013	0.700	Dec 2013	-		0.700	Continuing	Continuing	Continuing
Product Development	C/CPFF	Electric Boat:ME	0.725	1.040	Jan 2012	0.975	Apr 2013	0.925	Dec 2013	-		0.925	Continuing	Continuing	Continuing
Product Development	C/CPFF	General Dynamics:VA	13.547	0.300	Jan 2012	0.300	Dec 2012	0.300	Dec 2013	-		0.300	Continuing	Continuing	Continuing
Product Development	C/CPFF	GA Tech Research Institute:GA	2.916	0.000		0.000		0.000		-		0.000	0.000	2.916	Continuing
Product Development	C/CPFF	In Depth Engineering:VA	2.650	0.750	Dec 2011	0.750	Dec 2012	0.700	Dec 2013	-		0.700	Continuing	Continuing	Continuing
Product Development	C/CPFF	JHU/APL:MD	55.816	8.250	Dec 2011	8.350	Dec 2012	7.437	Dec 2013	-		7.437	Continuing	Continuing	Continuing
Product Development	C/CPFF	Lockheed Martin:VA	33.456	5.400	Dec 2011	5.330	Dec 2012	4.650	Dec 2013	-		4.650	Continuing	Continuing	Continuing
Product Development	C/CPFF	Lockheed Martin:NY	8.314	0.400	Dec 2011	0.200	Dec 2012	0.200	Dec 2013	-		0.200	Continuing	Continuing	Continuing
Product Development	C/CPFF	METRON:VA	4.158	0.000		0.000		0.000		-		0.000	0.000	4.158	Continuing
Product Development	WR	NSWC/ Carderock:MD	22.665	0.750	Dec 2011	0.750	Nov 2012	0.650	Nov 2013	-		0.650	Continuing	Continuing	Continuing
Product Development	WR	NUWC/Newport:RI	65.228	7.099	Nov 2011	7.290	Nov 2012	6.199	Nov 2013	-		6.199	Continuing	Continuing	Continuing
Product Development	C/CPAF	NSMA:VA	7.944	1.250	Mar 2012	1.000	Jan 2013	0.650	Dec 2013	-		0.650	Continuing	Continuing	Continuing
Product Development	WR	ONI:DC	1.545	0.750	Feb 2012	0.500	Dec 2012	0.250	Dec 2013	-		0.250	Continuing	Continuing	Continuing
Product Development	WR	ONR:VA	2.725	0.000		0.000		0.000		-		0.000	0.000	2.725	Continuing
Product Development	C/CPFF	Progeny:VA	3.888	0.200	Jan 2012	0.150	Dec 2012	0.150	Dec 2013	-		0.150	Continuing	Continuing	Continuing
Product Development	C/CPFF	PSU/ARL:PA	5.058	1.570	Dec 2011	1.340	Dec 2012	1.200	Dec 2013	-		1.200	Continuing	Continuing	Continuing
Product Development	C/CPFF	SAIC:VA	3.555	0.000		0.000		0.000		-		0.000	0.000	3.555	Continuing
Product Development	C/CPFF	SEDNA:VA	5.714	0.750	Dec 2011	0.950	Dec 2012	0.900	Dec 2013	-		0.900	Continuing	Continuing	Continuing
Product Development	WR	SSC/San Diego:CA	1.513	0.000		0.000		0.000		-		0.000	0.000	1.513	Continuing
Product Development	MIPR	U.S. Army Research Lab:MD	1.700	0.000		0.000		0.000		-		0.000	0.000	1.700	Continuing
Product Development	MIPR	U.S. Army/MITRE:NJ	4.595	0.000		0.000		0.000		-		0.000	0.000	4.595	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy		DATE: April 2013
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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	MIPR	U.S. Hanscom AFB/ MIT Lincoln Labs:MA	10.884	1.400	Feb 2012	1.200	Dec 2012	0.775	Dec 2013	-		0.775	Continuing	Continuing	Continuing
Product Development	C/CPFF	UT/ARL:TX	20.575	2.520	Dec 2011	2.350	Feb 2013	2.000	Dec 2013	-		2.000	Continuing	Continuing	Continuing
Product Development	C/CPFF	VAR:VAR*	9.047	4.424	Dec 2011	3.292	Dec 2012	3.767	Dec 2013	-		3.767	Continuing	Continuing	Continuing
		Subtotal	299.036	37.603		35.477		31.453		0.000		31.453			

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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	BAE Systems:MD	9.399	1.050	Feb 2012	0.766	Feb 2013	0.700	Dec 2013	-		0.700	Continuing	Continuing	Continuing
Program Management Support	C/CPFF	EG&G:VA	1.900	0.950	Jan 2012	0.580	Mar 2013	0.600	Dec 2013	-		0.600	Continuing	Continuing	Continuing
Travel	Allot	NAVSEA PEO IWS5:DC	0.435	0.075	Jan 2012	0.050	Oct 2012	0.060	Oct 2013	-		0.060	Continuing	Continuing	Continuing
		Subtotal	11.734	2.075		1.396		1.360		0.000		1.360			

	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	310.770	39.678		36.873		32.813		0.000		32.813			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
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)*

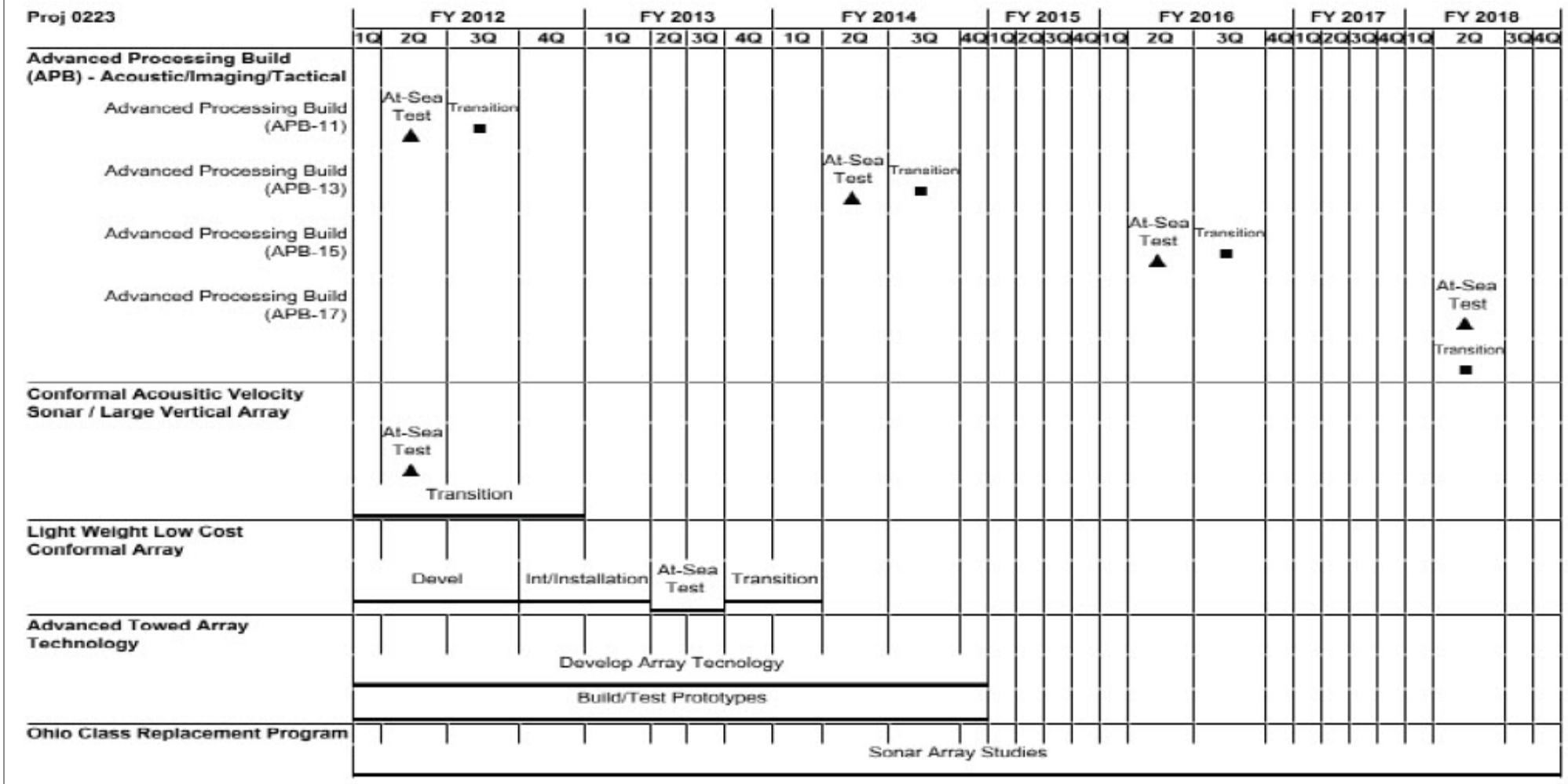

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 0223: *Sub Combat System Improvement (ADV)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0223				
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-11): APB-11 At-Sea Test	2	2012	2	2012
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-11): Transition APB-11 to ARCI/BYG-1	3	2012	3	2012
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-13): APB-13 At-Sea Test	2	2014	2	2014
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-13): Transition APB-13 to ARCI/BYG-1	3	2014	3	2014
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-15): APB-15 At-Sea Test	2	2016	2	2016
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-15): Transition APB-15 to ARCI/BYG-1	3	2016	3	2016
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-17): APB-17 At-Sea Test	2	2018	2	2018
Advanced Processing Build (APB) - Acoustic/Imaging/Tactical: Advanced Processing Build (APB-17): Transition APB-17 to ARCI/BYG-1	2	2018	2	2018
Conformal Acousitic Velocity Sonar / Large Vertical Array: CAVES LVA At-Sea Test (cold water)	2	2012	2	2012
Conformal Acousitic Velocity Sonar / Large Vertical Array: Transition to VA Class SSNs (CAVES/LVA)	1	2012	4	2012
Light Weight Low Cost Conformal Array: LW LCCA ADM Development	1	2012	3	2012
Light Weight Low Cost Conformal Array: LW LCCA Integration/Installation	4	2012	1	2013
Light Weight Low Cost Conformal Array: LW LCCA ADM At-Sea Test	2	2013	3	2013
Light Weight Low Cost Conformal Array: Transition to 688I	4	2013	1	2014

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
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)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Advanced Towed Array Technology: Develop Array Technologies	1	2012	4	2014
Advanced Towed Array Technology: Build & Test Prototype Arrays	1	2012	4	2014
Ohio Class Replacement Program: Conduct Ohio Class Repacement Array Studies	1	2012	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
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)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
2033: *Adv Submarine Systems Development*	334.245	37.372	35.155	32.546	-	32.546	30.580	25.258	31.435	36.014	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 and future naval concepts 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; develops, initially integrates, and does test validation of leading payload concepts for submarine integration in support of the Design for Undersea Warfare, 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 Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs and near and mid-term technology insertion to achieve future submarine class total ownership cost reductions, 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, Australia other international partners.

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
- Stone Mason
- SSN/SSGN Survivability Program (S3P)

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

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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*

- Corrosion Control

Development of Advanced Propulsion System and Ship Concepts
- DARPA/Navy Tango Bravo Technology Transition
- Electric Actuation of Retractable Bow Plane Control Surfaces
- Advanced Material Propeller (AMP) Technology
- 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)- Advanced Weapons Enabled by Submarine UAS against Mobile targets (AWESUM)

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Title: Payloads and Sensors/Subtotal Cost	9.533	13.323	14.279
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 2012 Accomplishments:
Commenced concept development, systems improvements and prototype development for Towed Array Handling System (TAHS). Continued leveraging products between Small Business and Future Naval Concepts. Perform preliminary requirements definition for technology transfer initiatives based on Small Business Research studies. Completed prototype development, fabrication and commence land-based integration of the Universal Launch and Recovery Module (ULRM).

FY 2013 Plans:
Complete Infuser and Conformal Belt prototypes and conduct land-based testing for TAHS. Continue Handler Reliability System Improvements. Commence supporting the Towed Systems Future Naval Capabilities (FNC) project. Commence development of TEMPALT package and conduct land based testing for towed handler improvements for 688 class OA-9070B Handling System. Transition TAHS FCT. Continue to leverage products between Small Business and Future Naval Concepts. Complete ULRM TEMPALT and conduct fully integrated system testing. Lead the technology development and demonstrate, via Fleet Exercise

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
(FLEX), for Submarine Launched UAS in support of Advanced Weapons Enabled by Submarine UAS against Mobile targets (AWESUM) capability. ***FY 2014 Plans:*** Complete TAHS TEMPALT package, install handler improvements, and test at sea for 688 Class OA-9070B Handling System. Continue OA-9070 Handler Improvements. Commence VA Class (OA-9070E) design efforts and land-based testing. Continue to leverage products between Small Business and Future Naval Concepts (FNC). Install ULRM TEMPALT, conduct at-sea test on SSGN and remove TEMPALT. Demonstrate submarine launch UAS capability via FLEX in support of AWESUM. Continue submarine LDUUV/UAV submarine integration CONOPs development in support of ULRM and AWESUM.			
Title: Stealth/Subtotal Cost	17.619	13.734	14.290
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. Address gaps in stealth and survivability for current and future SSN/SSGN force. ***FY 2012 Accomplishments:*** Exercised wake signature prediction tool to analyze design concepts associated with future advanced submarine platforms. Conducted LSV maintenance, support, and operations and maintain LSV and ISMS test ranges. Supported Virginia Class and Ohio Replacement signature trials. Continued 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 to address gaps in stealth and survivability for current and future SSN/SSGN force to execute submarine tactical and strategic operations. ***FY 2013 Plans:*** 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. ***FY 2014 Plans:*** Conduct LSV maintenance, support, and operations and maintain LSV and ISMS test ranges. Support Ohio Replacement signature trials. Continue Electromagnetic Silencing PA with the UK executing the third (four planned) scale stress magnetization			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
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	5.898	2.180	1.773
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 2012 Accomplishments:*** Below Threshold Reprogramming (BTR) to fund Submarine Valve Regulated Lead Acid Batteries (SVRLA) to develop and evaluate battery test equipment and procedures and develop and test MFX (antimony and cadmium) alloy battery. Conducted at-sea demonstration and monitored the Ball Valve Rotary Electrical Actuation System (EAS) TEMPALT on USS Missouri. Designed and built a full-capacity advanced CO2 Scrubber (VA Class Block IV qualified) prototype and performed vendor test and evaluation. Began full transition of the CO2 Scrubber technology to VA Class program office. Commenced transition of ONR Corrosion Control Future Naval Capabilities (FNC) with mutual approved Technology Transition Agreements (TTA). ***FY 2013 Plans:*** Remove Ball Valve Rotary EAS and Universal Modular Mast (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. Complete the transition of the CO2 Scrubber technology to VA Class program office. Remove the CO2 Scrubber SSN shipboard test cube. Begin prototyping of ONR Corrosion FNC deliverables on VA Class. ***FY 2014 Plans:*** Remove the CO2 Scrubber SSBN shipboard test cube. Continue transition of submarine corrosion prevention technology to VA Class with prototype TEMPALT/OPALT development.			
Title: Advanced Propulsion/Ship Concept Developments/Subtotal Cost	4.322	5.918	2.204
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 technical area for Radical Ship HM&E Infrastructure Reduction. Develop submarine alternative propulsion, propeller designs, 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			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
future submarines in areas of hull and platform technologies, propulsors, propellers, 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 2012 Accomplishments:*** Completed fabrication of Retractable Bow Plane (RBP) Electrical Actuation System (EAS) and continued performing engineering efforts in support of planned land-based testing. Continued partnership with DARPA on Hybrid Multi-Material Rotor (HMMR) program to include delivery of coupled design software tool sets and multi-material characterization. ***FY 2013 Plans:*** Monitoring Advanced Material Propeller (AMP) Future Naval Capabilities (FNC) to influence project direction for FY14 partnership kickoff. Conduct 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 fabrication of DARPA HMMR multi-material rotor solution for testing on LSV-2. ***FY 2014 Plans:*** Continue partnership with ONR on the AMP FNC program. Initiate efforts to integrate the AMP into a follow-on 6.4 development effort to further mature the AMP technology to TRL 7, leading to fabrication of a propeller supporting U.S. submarines. Support the U.S. and Australian collaborative project to demonstrate a full scale AMP on the Australian Collins Class submarine. Test DARPA HMMR multi-material rotor solution on LSV-2.			
Accomplishments/Planned Programs Subtotals	37.372	35.155	32.546

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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 and OHIO Replacement designs and affordability assessments.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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-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 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.
-Develop and test innovation Towed Array Handler concepts focused on improving system reliability and fleet operational availability.
-Conduct in depth assessment of SSN/SGN Survivability for peacetime and wartime operations in anti-access area denial environment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	MIPR	DARPA:Arlington, VA	3.084	0.000		4.500	Mar 2013	0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	NGSB:Newport News, VA	3.332	0.394	Dec 2011	1.075	Mar 2013	2.800	Mar 2014	-		2.800	Continuing	Continuing	Continuing
Product Development	WR	NSWC:Dahlgren, VA	5.241	0.000		0.000		0.000		-		0.000	0.000	5.241	5.241
Product Development	SS/CPFF	Kollmorgen:N. Hampton, MA	1.100	0.000		0.000		0.000		-		0.000	0.000	1.100	1.100
Product Development	SS/CPFF	Oceaneering:Chesapeake, VA	1.900	0.000		0.000		0.000		-		0.000	0.000	1.900	1.900
Product Development	SS/CPFF	Boeing:St. Louis, MO	0.925	0.000		0.000		0.000		-		0.000	0.000	0.925	Continuing
Product Development	SS/CPFF	EB:Groton, CT	36.281	4.329	Mar 2012	6.992	Mar 2013	7.622	Mar 2014	-		7.622	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Raytheon:Portsmouth, RI	16.034	0.000		0.000		0.000		-		0.000	0.000	16.034	16.340
Product Development	WR	NSWC:Carderock, MD	69.183	5.007	Mar 2012	5.236	Mar 2013	5.200	Mar 2014	-		5.200	Continuing	Continuing	Continuing
Product Development	SS/CPFF	ARL/PSU:State College, PA	4.787	0.700	Jan 2012	0.700	Feb 2013	0.700	Apr 2014	-		0.700	Continuing	Continuing	Continuing
Product Development	SS/CPFF	UT/ARL:Austin, TX	6.050	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	JHU/APL:Laurel, MD	15.794	0.000		0.000		0.300	May 2014	-		0.300	Continuing	Continuing	Continuing
Product Development	Various	Various:Various	31.924	1.168	Mar 2012	0.500	Mar 2013	0.499	Mar 2014	-		0.499	Continuing	Continuing	Continuing
Product Development	WR	NUWC:Newport, RI	52.789	5.671	Mar 2012	2.570	Mar 2013	2.350	Mar 2014	-		2.350	Continuing	Continuing	Continuing
Product Development	WR	ONR:Arlington, VA	8.066	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Lockheed Martin:Bethesda, MD	8.934	1.849	Aug 2012	2.000	Mar 2013	2.500	Apr 2014	-		2.500	Continuing	Continuing	Continuing
Product Development	WR	SPAWAR:San Diego, CA	5.850	0.000		0.000		0.000		-		0.000	0.000	5.850	Continuing
		Subtotal	271.274	19.118		23.573		21.971		0.000		21.971			

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 2014 Navy			DATE: April 2013
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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 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	Feb 2014	-		0.800	Continuing	Continuing	Continuing
Government Engineering Support	WR	Various:Various	4.353	0.780	Dec 2011	0.700	Jan 2013	0.700	Feb 2014	-		0.700	Continuing	Continuing	Continuing
Travel	WR	NAVSEA HQ:Not Specified	0.509	0.100	Nov 2011	0.100	Dec 2012	0.100	Dec 2013	-		0.100	Continuing	Continuing	Continuing
Acquisition Workforce	Various	Not Specified:Not Specified	0.293	0.000		0.000		0.000		-		0.000	0.000	0.293	0.293
		Subtotal	13.552	1.765		1.600		1.600		0.000		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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	EB:Groton, CT	4.846	4.041	Mar 2012	2.827	Mar 2013	2.875	Apr 2014	-		2.875	Continuing	Continuing	Continuing
Developmental Test & Evaluation	SS/CPFF	Raytheon:Portsmouth, VA	9.104	0.000		0.000		0.000		-		0.000	0.000	9.104	9.104
Developmental Test & Evaluation	WR	NAVAIR:Patuxent, MD	2.593	0.000		0.000		0.000		-		0.000	0.000	2.593	2.593
Developmental Test & Evaluation	Various	Various:Various	6.372	0.000		0.250	Apr 2013	0.000		-		0.000	0.000	6.622	6.372
Developmental Test & Evaluation	WR	NUWC:Newport, RI	10.121	6.357	Mar 2012	2.780	Feb 2013	2.225	Mar 2014	-		2.225	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWC:Carderock, MD	13.255	6.091	Mar 2012	3.125	Feb 2013	3.125	Apr 2014	-		3.125	Continuing	Continuing	Continuing
Developmental Test & Evaluation	SS/CPFF	NGSB:Newport News, VA	0.783	0.000		1.000	Mar 2013	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy		DATE: April 2013
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	JHU/ARL:Laurel, MD	0.305	0.000		0.000		0.750	May 2014	-		0.750	0.000	1.055	0.305
Developmental Test & Evaluation	SS/CPFF	ARL/PSU:State College, PA	0.720	0.000		0.000		0.000		-		0.000	0.000	0.720	0.720
Developmental Test & Evaluation	WR	NSWC:Dahlgren, VA	1.320	0.000		0.000		0.000		-		0.000	0.000	1.320	1.320
		Subtotal	49.419	16.489		9.982		8.975		0.000		8.975			

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.

	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	334.245	37.372		35.155		32.546		0.000		32.546			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
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*

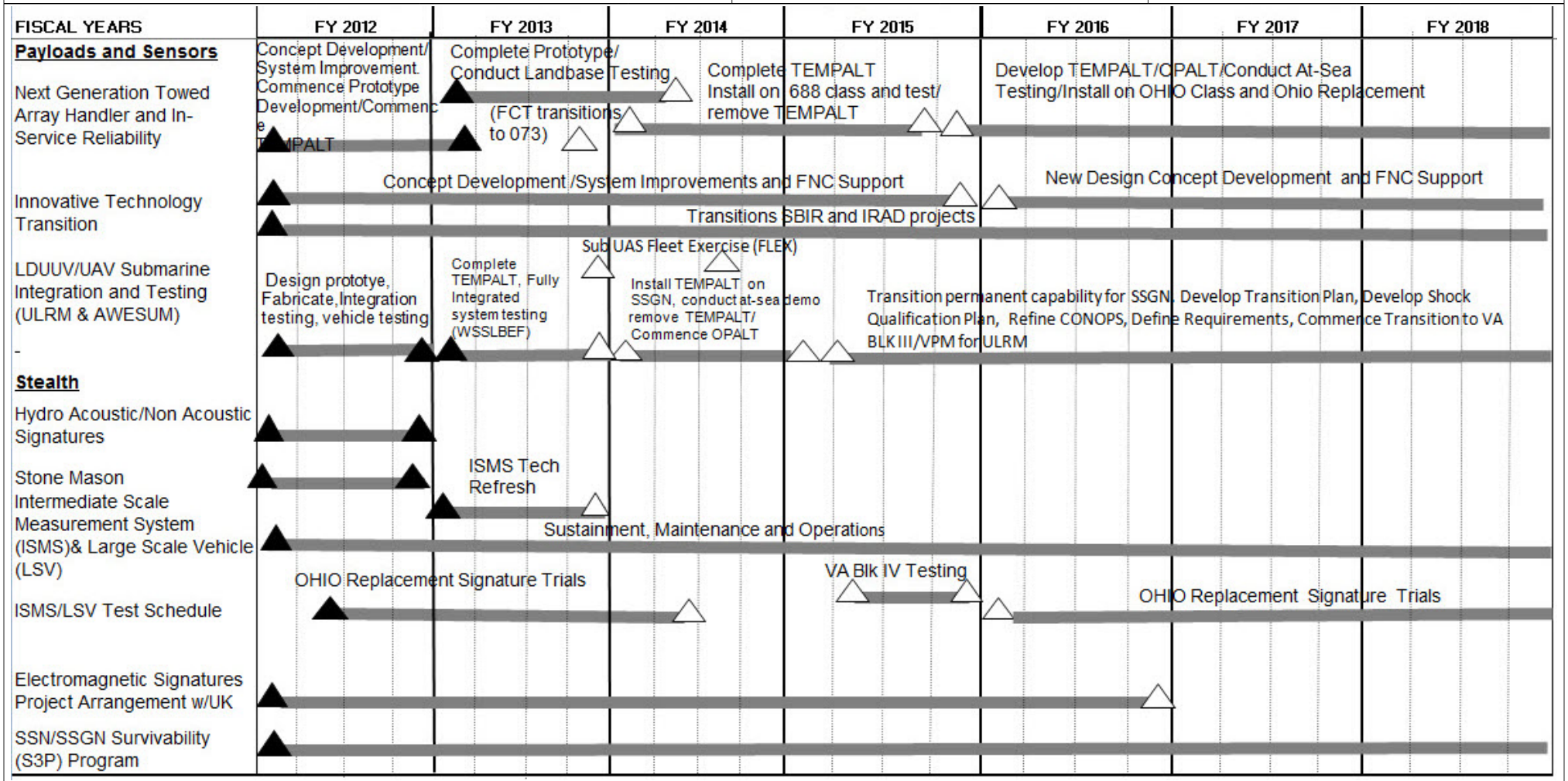
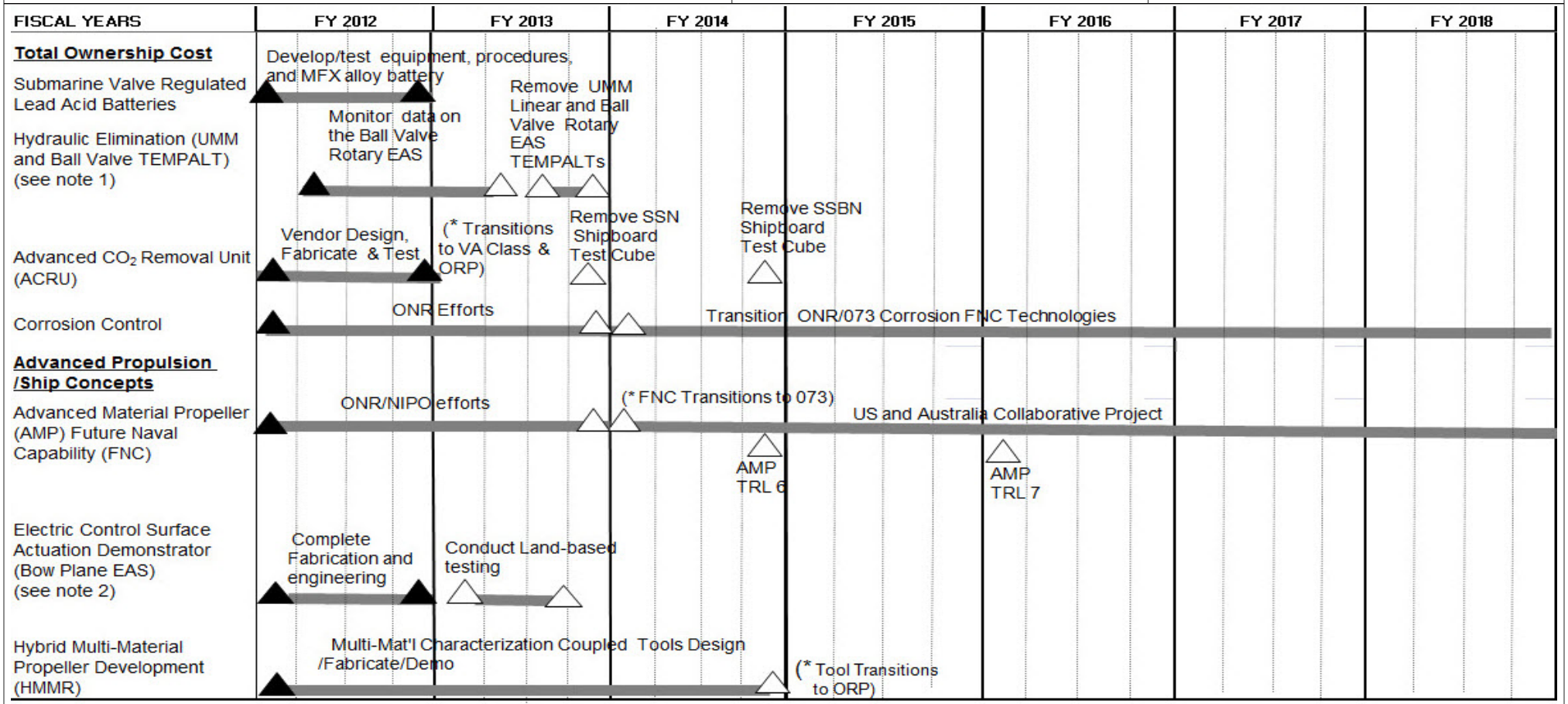


Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603561N: *Advanced Submarine System Development*	**PROJECT** 2033: *Adv Submarine Systems Development*



NOTES: * Transitions to POR
1 Informs VA Class and ORP
2 Informs VA Class and ORP

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
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 - TAHS - Concept Dev/Sys Improv/Prototype Dev/Commence TEMPALT	1	2012	1	2013
P&S TAHS - Complete Prototype Dev & Landbase Testing	1	2013	2	2014
P&S TAHS - Complete TEMPALT/Install on 688/Conduct At-Sea Testing/remove TEMPALT	1	2014	3	2015
P&S TAHS - Develop TEMPALT/OPALT/Conduct At-sea test/Install on OHIO Class and ORP	4	2015	4	2018
P&S TAHS - Foreign Comparative Test (FCT) Transitons	4	2013	4	2013
P&S Innovation Technology Transition - Concept Dev/Sys Improv. and FNC Spt	1	2012	4	2015
P&S Innovation Technology Transition - New Design Concept/Dev and FNC Spt	1	2016	4	2018
P&S Innovation Technology Transition - Transitions SBIR and IRAD Projects	1	2012	4	2018
P&S LDUUV/UAV Submarine Integration and Testing - Design Prototype, Fabricate, and integrate and vehicle testing	1	2012	4	2012
P&S LDUUV/UAV Submarine Integration and Testing - Complete TEMPALT/conduct fully integrated testing	1	2013	4	2013
P&S LDUUV/UAV Submarine Integration and Testing - Install TEMPALT on SSGN / conduct at-sea test demo/remove TEMPALT/Commence OPALT	1	2014	1	2015
P&S LDUUV/UAV Submarine Integration and Testing - Sub UAS Fleet Exercise (FLEX)	4	2013	4	2013
-P&S LDUUV/UAV Submarine Integration and Testing - Sub UAS FLEX	3	2014	3	2014
-P&S LDUUV/UAV Submarine Integration and Testing - Transition permanent capability for SSGN/ Dev Transition Plan & Shock Qual Plan/Refine CONOPS/ Commence Transition to VA Blk III/VPM for ULRM	2	2015	4	2018
STEALTH Hydro Acoustic & Non-Acoustic Signatures	1	2012	4	2012

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
STEALTH Stone Mason	1	2012	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	2012	4	2018
STEALTH ISMS/LSV Test Schedule OHIO Replacement Signature Trials	2	2012	2	2014
STEALTH ISMS/LSV Test Schedule VA Blk IV Testing	2	2015	4	2015
STEALTH ISMS/LSV Test Schedule OHIO Replacement Signature Trial	1	2016	4	2018
STEALTH Electromagnetic Signatures Project Arrangement (PA) w/UK	1	2012	4	2016
STEALTH SSN/SSGN Survivability (S3P)	1	2012	4	2018
TOC - Submarine Valve Regulated Lead Acid Batteries - Develop/test MFX Alloy batteries	1	2012	4	2012
TOC Hydraulic Elimination Ball Valve & UMM Linear TEMPALT - Monitor data on Ball Valve Rotary EAS	2	2012	2	2013
TOC Hydraulic Elimination Ball Valve & UMM TEMPALTs Removal (Informs VA Class and ORP)	3	2013	4	2013
TOC Advanced CO2 Removal System Vendor Design, Build and Test	1	2012	4	2012
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 - Transition Corrosion FNC Technologies	1	2014	4	2018
Adv Prop/Ship Concept AMP FNC - US and Australia Collaborative Project	1	2014	4	2018
Adv Prop/Ship Concept AMP FNC - AMP TRL -6	4	2014	4	2014
Adv Prop/Ship Concept AMP FNC - AMP TRL -7	1	2016	1	2016
Adv Prop/Ship Concept Electric Control Surface Actuation Complete Fabrication and Engineering	1	2012	4	2012
-Adv Prop/Ship Concept Electric Control Surface Actuation - Conduct Land-based Testing (Informs VA Class and ORP)	1	2013	3	2013

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
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**
Adv Prop/Ship Concept Hybrid Multi-Material Propeller Dev (HMMR) - Characterization Coupled Design Tools/Fabricate/demo	1	2012	4	2014

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
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)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
3220: *SBSD Advanced Submarine System Development*	794.118	761.215	483.095	787.618	-	787.618	859.560	1,037.154	709.130	721.006	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 U.S. 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 CMC as agreed by the UK Secretary of State for Defence and the U.S. 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 military requirements established for this SSBN to achieve mission success in a challenging environment.

The FY 2013 funding level reflects the shifted procurement of the OHIO Replacement lead ship by two years and requires a portion of FY 2012 funding be available to finance FY 2013 requirements.
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 U.S. 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.

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 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 2014 are required to maintain the development schedule for the first article prototype of the CMC in 2015 to support the UK SUCCESSOR progamme. The CMC program will mature required technologies and 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 for stealth capability 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 are required 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 2012	FY 2013	FY 2014
Title: CMC Design and Prototyping	356.087	101.377	262.623
Articles:	0	0	0
FY 2012 Accomplishments: Continued efforts for the design and development of the CMC to include: related sections of the first article quad pack ship specification, missile tube requirements review and continuation of the missile tube detail design and first article missile tube quad pack design. Continued CMC system diagrams. On-site installation of the missile tube integration fixture and execution of the missile tube quarter crown and barrel prototype quad pack. Continued concept studies and preliminary designs for additional fixtures. Continued casting vendor qualification and concept design of missile tube quad to hull manufacturing prototypes to validate planned missile compartment production techniques. Completed validation of the forged barrel prototyping for the Integrated Tube and Hull (ITH) shape in support of the CMC build strategy. Completed the CMC quad pack ship specification. Competitive ITH shape and missile tube manufacturing process development. Continued system engineering efforts to refine the required CMC build strategy. Continued planning activities and trade studies for CMC test facilities. Continued initial planning, development, and testing of missile tube to keel robotic welding.			
FY 2013 Plans: Continue efforts for the design and development of the CMC to include: completion of CMC ship specifications, continue missile tube design and first article missile quad pack design, and 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. Complete validation and verification of the ITH shape weldment design and preliminary design/prototyping of the missile tube			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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 2012	FY 2013	FY 2014
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 design for the missile compartment. Commence planning activities for CMC test facilities. Continue development and testing of missile tube to keel robotic welding techniques. ***FY 2014 Plans:*** Continue efforts for the design and development of the CMC to include: 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 design for the missile compartment. Finalize 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 ***Articles:*** ***FY 2012 Accomplishments:*** Continued with preliminary design of forward and aft ends of OHIO Replacement Class. Continued Rest of Ship concept development, system integration, component design, system definition documents, system diagrams, ship arrangements, construction drawings, control surface design and studies. Continued Rest of Ship specifications development. Continued CMC interface with Rest of Ship. ***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 Rest of Ship specifications development. Continue CMC interface with Rest of Ship. Develop ship manufacturing assembly plan. ***FY 2014 Plans:*** Continue with preliminary design of forward and aft ends of OHIO Replacement Class. Complete ship specifications. 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 Ship specifications development. Continue CMC interface with Rest of Ship.	36.525 0	39.276 0	101.205 0
Title: NAVSEA R&D and Prototyping ***Articles:***	84.383 0	83.820 0	107.603 0

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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 2012	FY 2013	FY 2014
FY 2012 Accomplishments: Completed scale model testing, numerical simulations, and man-in-the-loop testing of various candidate control surface configurations. Accepted delivery of a motion simulator to support ship control Concept of Operation Exercises (COOPEX). Developed propulsor design guidance and propulsor interface control documents. Completed initial small scale propulsor testing. Implemented strategies for developing various components (i.e. diesel generator, trim and drain pump, heat exchangers, thin line towed array handler, etc.) to meet requirements in support of ship design and construction timelines. Completed large scale model testing to provide design information for superstructure and hatch fairing concepts. Completed drawings for a temporary installation of equipment on a full scale surrogate platform that will be tested to generate information to support the design of the ship's stern. Continued component development to support ship requirements. ***FY 2013 Plans:*** Final model testing and simulations to support selection of the control surface configuration. Continue Generation 1 design for propulsor concepts including testing in the large cavitation channel. Conduct resistance and powering testing for Generation 1 propulsors. Demonstrate capability to manufacture a concept for a propulsor to shaft inner hub connection. Deliver an instrumented rotor to support large scale vehicle testing. Initial testing and simulations to support control surface design. Fabrication and testing of CMC pressure hull models. Populate motion simulator with electronics to support a ship control COOPEX. Conduct a full scale low voltage anode test. Equipment surrogate full scale test platform to support stern design. Continue component development to support ship requirements. ***FY 2014 Plans:*** Finalize Generation 1 propulsor designs for OHIO Replacement. Test Generation 1 Propulsor models on the large scale vehicle. Initiate large scale vehicle modifications. Conduct CMC pressure hull model testing. Initial full scale bearing test rig evaluation of VA-like design. Conduct high Reynolds number testing for control surface design. Conduct full scale low voltage anode simulations. Development of the cathodic protection system preliminary design. Conduct full scale at-sea test on surrogate platform to inform stern design. Continue component development to support ship requirements.			
Title: Test and Evaluation	2.515	2.700	2.795
Articles:	0	0	0
FY 2012 Accomplishments: Continued efforts to identify T&E requirements for the program and interface with OSD oversight organizations for T&E. ***FY 2013 Plans:*** Continue efforts to identify T&E requirements for the program and interface with OSD oversight organizations for T&E. Draft Test and Evaluation Master Plan (TEMP) and refine LFT&E Master Plan. ***FY 2014 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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 2012	FY 2013	FY 2014
Continue efforts to identify T&E requirements for the program and interface with OSD oversight organizations for T&E. Complete TEMP and LFT&E Master Plan. Complete Commander Operational Test and Evaluation Force (COMOPTEVFOR) Mission Based Test Design Integrated Evaluation Framework.			
Title: Strategic Weapons Systems Integration	151.179	149.354	178.764
Articles:	0	0	0
FY 2012 Accomplishments: Continued system engineering efforts required for the technical repackaging of the TRIDENT II (D5) SWS on the OHIO Replacement submarine. Continued concept and design work to develop a missile launch tube test capability and test stand including refurbishment of a test vehicle to support launch system prototype effort and qualification. Initiated system engineering efforts related to development of Special Test Vehicles. Continued system engineering design efforts associated with the physical arrangement drawings for SWS equipment within the CMC and Missile Control Center Module (MCCM).			
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 MCCM. Limited SWS test systems material procurement and builds, Test berth / facility modifications and development of special test vehicles. SWS Ashore test capability development. SWS training capability / requirements development. Material procurement and build of Fire Control Engineering Test Systems. Continue design efforts 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.			
FY 2014 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 MCCM. Limited SWS test systems material procurement and builds, test berth / facility modifications and development of special test vehicles. SWS Ashore test capability development. SWS training capability / requirements development. Build and delivery of Fire Control Engineering Test Systems. Continue design efforts 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 design and development efforts for shipboard & ashore navigation center engineering development models. Initiate systems engineering design efforts related to the OHIO Replacement guidance handling carts. Material procurement for underwater launch risk mitigation testing.			
Title: Systems Engineering/Program Management	80.526	56.568	84.628

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Articles:	0	0	0
FY 2012 Accomplishments: Continued to provide technical oversight including Program Office management and technical support from government laboratories for review, analysis and modeling. Commenced 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. ***FY 2014 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	50.000
Articles:	0	0	0
FY 2012 Accomplishments: Initiated execution of the DFA program and related design initiatives by establishing the DFA team within the program office. Established bi-weekly review of DFA initiatives with government and industry stakeholders. Established an Operations and Support (O&S) Cost Reduction Integrated Product Team (IPT) and action plan. ***FY 2013 Plans:*** Continue execution of the DFA program and related design initiatives. Commence execution of government cost reduction plans to reduce non-recurring engineering (NRE) costs. Commence execution of cost reduction plans to reduce O&S costs. ***FY 2014 Plans:*** Continue execution of the DFA program and related design initiatives in order to achieve OR cost objectives for NRE, construction and O&S costs.			
Accomplishments/Planned Programs Subtotals	761.215	483.095	787.618

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• RDTEN/3219: *SBSD Nuclear Technology Development*	285.367	81.817	296.050		296.050	361.827	422.492	411.428	401.525	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• SCN/1045: *Ohio Replacement Submarine*	0.000	0.000	0.000		0.000	0.000	0.000	777.793	791.793	Continuing	Continuing

Remarks

D. Acquisition Strategy

The common missile compartment will be designed and developed to support the U.S. and UK in development of the OHIO Replacement and SUCCESSOR SSBN programs enabling a common U.S.-UK CMC and maximizing the benefit of the ongoing U.S.-UK partnership in strategic deterrence. The OHIO Replacement R&D efforts will incentivize cost reduction initiatives in the design, construction and operations & support portions of the program. 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 2014 Navy			DATE: April 2013
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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	SS/CPFF	Ship Design Contractor-EB:Groton, CT	117.096	36.525	Oct 2011	39.276	Dec 2012	101.205	Dec 2013	-		101.205	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Ship Design Contractor DFA Support-EB:Groton, CT	0.000	40.000	Jan 2012	40.000	Jan 2013	40.000	Dec 2013	-		40.000	Continuing	Continuing	Continuing
Product Development	WR	NSWC:Carderock, MD	93.080	91.620	Oct 2011	72.626	Dec 2012	80.032	Oct 2013	-		80.032	Continuing	Continuing	Continuing
Product Development	WR	NSWC DFA Support:Carderock, MD	0.000	2.000	Jan 2012	2.000	Jan 2013	2.000	Jan 2014	-		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	0.370	Dec 2013	-		0.370	Continuing	Continuing	Continuing
Product Development	SS/CPFF	EB:Groton, CT	29.431	27.872	Oct 2011	22.001	Dec 2012	55.149	Dec 2013	-		55.149	Continuing	Continuing	Continuing
Product Development	SS/CPFF	NGMS:Sunnyvale, CA	32.550	48.891	Oct 2011	24.024	Dec 2012	46.206	Dec 2013	-		46.206	Continuing	Continuing	Continuing
Product Development	WR	NUWC:Newport, RI	16.750	6.398	Oct 2011	8.315	Dec 2012	17.943	Oct 2013	-		17.943	Continuing	Continuing	Continuing
Product Development	WR	NUWC DFA Support:Newport, RI	0.000	7.900	Jan 2012	8.000	Jan 2013	8.000	Jan 2014	-		8.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Missile Comp Design Contractor-EB:Groton, CT	308.890	356.087	Oct 2011	101.377	Oct 2012	262.623	Dec 2013	-		262.623	Continuing	Continuing	Continuing
Product Development	SS/CPFF	JHU/APL:Laurel, MD	11.269	6.374	Dec 2011	5.954	Dec 2012	5.832	Dec 2013	-		5.832	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Draper Labs:Cambridge, MA	3.000	2.775	Oct 2011	2.669	Dec 2012	3.365	Dec 2013	-		3.365	Continuing	Continuing	Continuing
Product Development	SS/CPFF	LMFS:Mitchel Field, NY	8.251	5.694	Oct 2011	9.535	Dec 2012	12.352	Dec 2013	-		12.352	Continuing	Continuing	Continuing
Product Development	Various	NAVSEA:Various	15.131	18.393	Oct 2011	16.160	Dec 2012	18.046	Oct 2013	-		18.046	Continuing	Continuing	Continuing
Product Development	WR	NOTU:Cape Canaveral, FL	4.400	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy		DATE: April 2013
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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	SS/CPFF	LMMSC:Sunnyvale, CA	27.570	16.639	Oct 2011	31.154	Dec 2012	32.462	Dec 2013	-		32.462	Continuing	Continuing	Continuing
Product Development	C/CPFF	GDAIS:Pittsfield, MA	35.181	23.207	Jan 2012	33.911	Dec 2012	35.259	Dec 2013	-		35.259	Continuing	Continuing	Continuing
Product Development	SS/CPFF	IEC:Anaheim, CA	4.846	1.072	Oct 2011	1.612	Dec 2012	1.726	Dec 2013	-		1.726	Continuing	Continuing	Continuing
Product Development	WR	NSWC:Dahlgren, VA	2.590	3.593	Oct 2011	7.300	Nov 2012	6.575	Nov 2013	-		6.575	Continuing	Continuing	Continuing
Product Development	SS/CPFF	BAE:Rockville, MD	13.200	12.080	Oct 2011	10.680	Dec 2012	11.510	Dec 2013	-		11.510	Continuing	Continuing	Continuing
Product Development	SS/CPFF	BNA:Huntington Beach, CA	3.487	2.500	Oct 2011	2.102	Dec 2012	2.278	Dec 2013	-		2.278	Continuing	Continuing	Continuing
Product Development	WR	NSWC Crane:Crane, IN	7.724	7.525	Oct 2011	7.261	Nov 2012	10.449	Nov 2013	-		10.449	Continuing	Continuing	Continuing
Product Development	WR	NWC CL:China Lake, CA	5.863	11.840	Oct 2011	1.819	Nov 2012	1.837	Nov 2013	-		1.837	Continuing	Continuing	Continuing
Product Development	SS/CPFF	SPA:Alexandria, VA	2.953	3.585	Oct 2011	3.579	Dec 2012	3.573	Dec 2013	-		3.573	Continuing	Continuing	Continuing
Product Development	Various	SSP:Various	13.124	5.048	Oct 2011	7.391	Nov 2012	4.970	Nov 2013	-		4.970	Continuing	Continuing	Continuing
		Subtotal	759.605	737.974		459.109		763.762		0.000		763.762			

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	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 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	0.435	Dec 2012	0.467	Oct 2013	-		0.467	Continuing	Continuing	Continuing
Government Test and Evaluation Support	WR	T&E Support:Various	2.391	2.095	Oct 2011	2.265	Dec 2012	2.328	Oct 2013	-		2.328	Continuing	Continuing	Continuing
		Subtotal	2.691	2.515		2.700		2.795		0.000		2.795			

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy		DATE: April 2013
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*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Management Support	C/CPFF	Various:Multiple Awards	15.450	9.799	Oct 2011	10.142	Apr 2013	9.391	Oct 2013	-		9.391	Continuing	Continuing	Continuing
Government Management Support	WR	Various:NSWC Carderock, MD	15.872	10.427	Oct 2011	10.792	Dec 2012	11.170	Oct 2013	-		11.170	Continuing	Continuing	Continuing
Travel	WR	NAVSEA HQ:Washington, D.C.	0.500	0.500	Oct 2011	0.352	Dec 2012	0.500	Oct 2013	-		0.500	Continuing	Continuing	Continuing
		Subtotal	31.822	20.726		21.286		21.061		0.000		21.061			

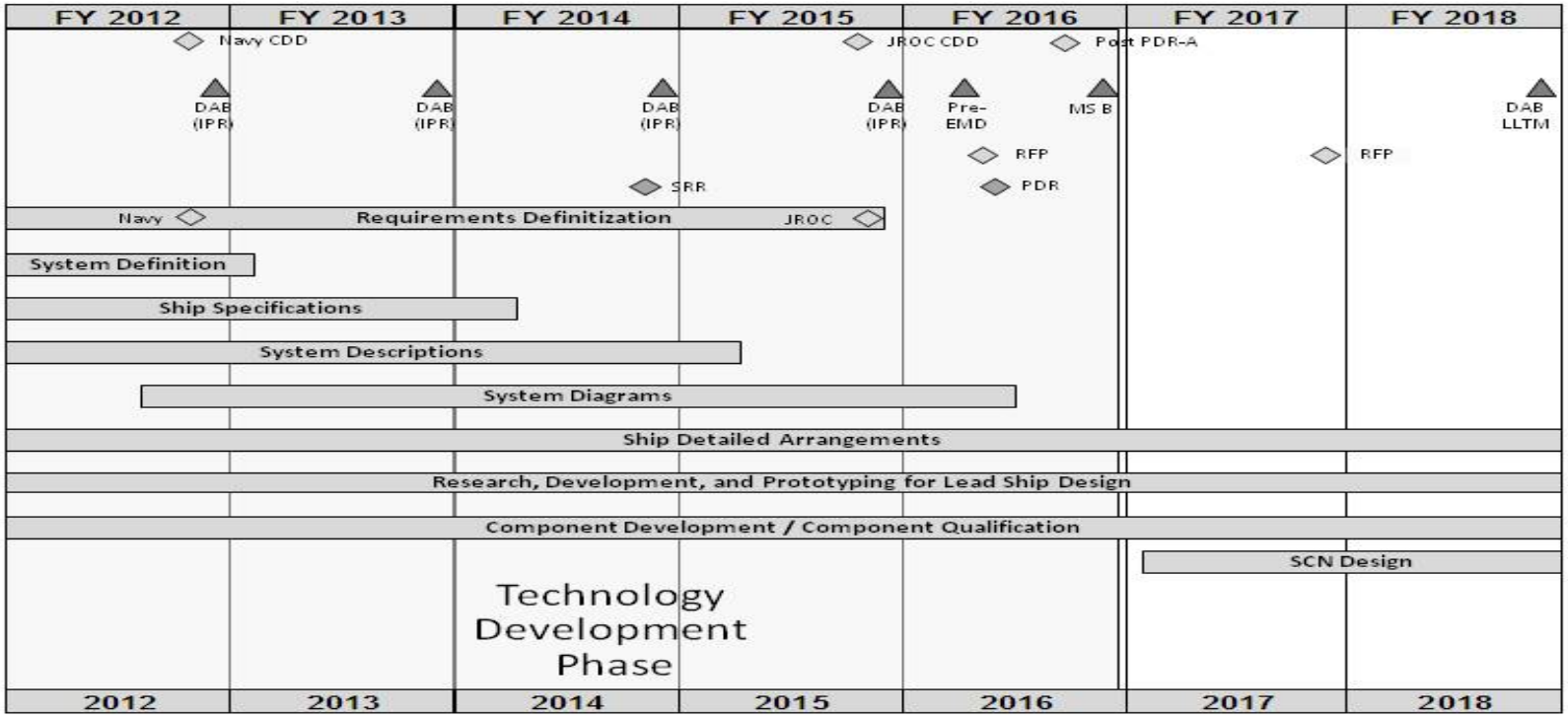
Remarks

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

	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	794.118	761.215		483.095		787.618		0.000		787.618			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
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*



CDD - Capabilities Development Document
DAB - Defense Acquisition Board
EMD - Engineering and Manufacturing Development
IPR - In Progress Review
JROC - Joint Requirements Oversight Council
LLTM - Long Lead Time Material
MS - Milestone
PDR - Preliminary Design Review
RFP - Request for Proposal
SCN - Shipbuilding and Conversion, Navy
SRR - System Requirements Review

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
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 2012. ** Effort continues past 4th Quarter FY 2018. (Reflects June 2012 Integrated Master Schedule)				
Requirements Definitization*	1	2012	4	2015
Research Development and Prototyping for Lead Ship Design* **	1	2012	4	2018
Component Development/Component Qualification* **	1	2012	4	2018
System Definition*	1	2012	1	2013
Ship Specifications*	1	2012	2	2014
System Diagrams	3	2012	2	2016
Ship Detailed Arrangements**	1	2012	4	2018
SCN Design	1	2017	4	2018
System Descriptions*	1	2012	2	2015

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
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)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	5.380	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.380
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

Congressional Add Projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013
Congressional Add: Adv Sub Sys Dev (Cong)	5.380	-
FY 2012 Accomplishments: Developed a modified MFX alloy SVRLA prototype battery (redevelopment from previous design) and test at a government owned land based test facility. Continue the on-going Root Cause Analysis (RCA) efforts to identify and correct cause for capacity decline.		
Congressional Adds Subtotals	5.380	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Add Projects.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
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*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NSWC:Crane, IN	0.000	4.982	Feb 2012	0.000		0.000		-		0.000	0.000	4.982	
Product Development	C/BA	PSNSY:Brementon, WA	0.000	0.398	May 2012	0.000		0.000		-		0.000	0.000	0.398	
		Subtotal	0.000	5.380		0.000		0.000		0.000		0.000	0.000	5.380	

	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	5.380		0.000		0.000		0.000		0.000	0.000	5.380	

Remarks