

CLASSIFICATION: UNCLASSIFIED

EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION **DATE**
February 2008

APPROPRIATION/BUDGET ACTIVITY **R-1 ITEM NOMENCLATURE**
RD TEN/BA 5 **0604562N/SUBMARINE TACTICAL WARFARE SYSTEM**

COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	53.148	55.728	58.592	55.902	54.632	58.149	59.300
0236 / SSN Comb Cont Sys Imprvmt (ENG)	50.073	52.548	58.592	55.902	54.632	58.149	59.300
9999 / CONGRESSIONAL ADDS	3.075	3.180	0.000	0.000	0.000	0.000	0.000

A. MISSION DESCRIPTION:

Project Unit 0236: This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades to integrate improved tactical and weapons control capabilities for multiple submarine Classes (SSN688, 688I, SSGN, SEAWOLF, and VIRGINIA (Post Shakedown Availability)). The AN/BYG-1 is the combat control system common across submarine platforms which incorporates tactical control, weapon control and tactical Local Area Network (LAN) functions into a single development program. The hardware upgrades (technology insertions (TI's)) are developed on a biennial basis to provide improved capability and address COTS obsolescence. Funding also accommodates the annual integration of software Advanced Processing Builds (APBs) for both tactical control (APB(T)) and weapon control (APB(W)) subsystems. The tactical control integration effort incorporates the integration of other sensor (ESM, sonar, radar, etc.) inputs to provide a common operation picture and improved situational awareness in an information assurance (IA) compliant environment. The weapon control development effort provides improvements to the weapons control subsystem based on improvements to missiles and torpedoes. AN/BYG-1 allows the submarine Navy to rapidly update the ship safety tactical picture, integrates the common tactical picture into the battlegroup, improves torpedo interfaces and provides Tactical TOMAHAWK (TOMAHAWK Block IV) capability.

This program also develops and tests a Common Weapon Launcher, a COTS-based software weapons launch capability for SSN688 and Virginia Class submarines. This upgrade provides a more reliable capability for launching missiles and torpedoes from submarines while providing the architecture to support the introduction of the next generation of payloads and sensors. This new design will also reduce the recurring costs of VA Class submarine weapon launch systems.

Project Unit 9999 is comprised of FY07 & FY08 congressional adds for Automated Submarine Command and Control Center, Submarine Maintenance Automation and Communication, Submarine Maintenance Automation and Communication and Automated Sub Command and Control Center.

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EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION (CONTINUATION)	DATE February 2008
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APPROPRIATION/BUDGET ACTIVITY RDTEN/BA 5	R-1 ITEM NOMENCLATURE 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM
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B. PROGRAM CHANGE SUMMARY:

Funding:	FY 2007	FY 2008	FY 2009
FY2008 President Budget	51.454	53.703	54.954
FY2009 President Budget	50.073	52.548	58.592
Total Adjustments	-1.381	-1.155	3.638
Summary of Adjustments			
Cancelled Accounts Liabilities	- 0.065	0.000	0.000
Sea Strike-TACTOM Mission-Security	0.000	0.000	2.000
Sub Bridge Modernization Shipalt Dev	0.000	0.000	2.000
Small Business Innovation Research (SBIR) Tax	-1.316	0.000	0.000
Navy Working Capital Fund (NWCF) Rate	0.000	0.000	0.016
Reductions, adjustments, economic assumptions	0.000	-0.349	-0.378
ExecRealign SB Issue	0.000	-0.806	0.000
Sub Total	-1.381	-1.155	3.638

C. OTHER PROGRAM FUNDING SUMMARY:

Related RDT&E:
 PE 0204229N (Tomahawk & Tomahawk Mission Planning Center)
 PE 0205632N (MK 48 ADCAP)
 PE 0603561N (Advanced Submarine Systems Development)
 PE 0604503N (SSN-688 and Trident Modernization)
 PE 0604558N (New Design SSN)

Line Item No. and Name	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost
OPN/BA-4 5420	87.575	106.142	92.500	105.282	104.622	104.928	105.975	CONT.	CONT.

D. ACQUISITION STRATEGY:

- This budget integrates APBs developed by the advanced development community.
- This program has been tailored in accordance with the new DoD5000 directive to incorporate annual MDA production reviews.
- Competitive contracts awarded in Dec 02 started the development of a combat control system which segregates tactical control from weapons control system.
- Advanced Processing Builds (APB) products associated with AN/BYG-1 Release-To- Fleet 4Q 2003, 3Q 2004, 3Q 2006, 3Q 2007, 3Q 2008, and 3Q 2009.

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<p>- Follow-On contracts for both tactical and weapons control subsystems are planned for award in FY2009.</p> <p>E. MAJOR PERFORMERS: Raytheon Portsmouth, RI - Software Development for AN/BYG-1 weapon control subsystem - December 2002. General Dynamics (GD AIS) Fair Lakes, VA - Software Development for AN/BYG-1 tactical control subsystem - December 2002. NUWC Newport, RI - Government Engineering Progeny Systems, Manassas, VA - Common Weapon Launcher development</p>		

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EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY RDTEN/BA 5		PROGRAM ELEMENT NUMBER AND NAME 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM			PROJECT NUMBER AND NAME 0236/SSN Comb Cont Sys Imprvmt (ENG)		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	50.073	52.548	58.592	55.902	54.632	58.149	59.300
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Project Unit 0236: This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades to integrate improved tactical and weapons control capabilities for multiple submarine Classes (SSN688, 688I, SSGN, SEAWOLF, and VIRGINIA (Post Shakedown Availability)). The AN/BYG-1 is the combat control system common across submarine platforms which incorporates tactical control, weapon control and tactical Local Area Network (LAN) functions into a single development program. The hardware upgrades (technology insertions (TI's)) are developed on a biennial basis to provide improved capability and address COTS obsolescence. Funding also accommodates the annual integration of software Advanced Processing Builds (APBs) for both tactical control (APB(T)) and weapon control (APB(W)) subsystems. The tactical control integration effort incorporates the integration of other sensor (ESM, sonar, radar, etc.) inputs to provide a common operation picture and improved situational awareness in an information assurance (IA) compliant environment. The weapon control development effort provides improvements to the weapons control subsystem based on improvements to missiles and torpedoes. AN/BYG-1 allows the submarine Navy to rapidly update the ship safety tactical picture, integrates the common tactical picture into the battlegroup, improves torpedo interfaces and provides Tactical TOMAHAWK (TOMAHAWK Block IV) capability.

This program also develops and tests a Common Weapon Launcher, a COTS-based software weapons launch capability for SSN688 and Virginia Class submarines. This upgrade provides a more reliable capability for launching missiles and torpedoes from submarines while providing the architecture to support the introduction of the next generation of payloads and sensors. This new design will also reduce the recurring costs of VA Class submarine weapon launch systems.

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APPROPRIATION/BUDGET ACTIVITY RDTEN/BA 5	PROGRAM ELEMENT NUMBER AND NAME 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM	PROJECT NUMBER AND NAME 0236/SSN Comb Cont Sys Imprmnt (ENG)	
B. ACCOMPLISHMENTS/PLANNED PROGRAM:			
	FY 2007	FY 2008	FY 2009
AN/BYG-1 TI-04	0.500	0.000	0.000
RDT&E Articles Quantity	0	0	0
FY07: Completed development, integration and test of the next generation AN/BYG-1 (TI04) for SSN 688 Class/SSGN submarines scheduled for delivery in FY07.			
	FY 2007	FY 2008	FY 2009
AN/BYG-1 TI-06	10.588	2.995	0.000
RDT&E Articles Quantity	0	0	0
FY07: Continued development, integration and test of the next generation AN/BYG-1 (TI06) for SSN 688 Class submarines scheduled for delivery in FY07. FY08: Complete development, integration and test of the next generation AN/BYG-1 (TI06) for SSN 688 Class submarines scheduled for delivery in FY08.			
	FY 2007	FY 2008	FY 2009
AN/BYG-1 TI-08	3.974	13.288	12.125
RDT&E Articles Quantity	0	0	0
FY07: Began engineering development process for selection and prototyping of new technologies for TI08. FY08: Continue development, integration and test of the next generation AN/BYG-1 (TI08) for SSN 688/SSGN Class submarines scheduled for delivery in FY09. FY09: Continue development, integration and test of the next generation AN/BYG-1 (TI08) for SSN 688/SSGN Class submarines scheduled for delivery in FY09.			
	FY 2007	FY 2008	FY 2009
AN/BYG-1 TI-10	0.000	2.143	7.572
RDT&E Articles Quantity	0	0	0
FY08: Began engineering development process for selection and prototyping of new technologies for TI10. FY09: Continue development, integration and test of the next generation AN/BYG-1 (TI10) for SSN 21/688 Class submarines scheduled for delivery in FY11. One capability for delivery will include hardware improvements to provide the Officer of the Deck improved situational awareness, particularly in the area of navigation and contact management.			
	FY 2007	FY 2008	FY 2009
Advanced Processor Builds	16.871	21.122	26.395
RDT&E Articles Quantity	0	0	0
FY07: Began integration of APB-07 into AN/BYG-1. Completed APB-06 integration into AN/BYG-1 baseline. FY08: Began integration of APB-08 into AN/BYG-1. Complete APB-07 integration into AN/BYG-1 baseline. FY09: Begin integration of APB-09 into AN/BYG-1. One capability for delivery will be the ability to operate the TOMAHAWK Weapon System at the SECRET level, while maintaining the ability to operate at the TOP SECRET level if the need arises. Complete APB-08 integration into AN/BYG-1 baseline.			
	FY 2007	FY 2008	FY 2009

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EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)				DATE February 2008
APPROPRIATION/BUDGET ACTIVITY RDTEN/BA 5	PROGRAM ELEMENT NUMBER AND NAME 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM	PROJECT NUMBER AND NAME 0236/SSN Comb Cont Sys Imprmnt (ENG)		
Testing		4.300	4.000	6.000
RDT&E Articles Quantity		0	0	0
FY07: Completed FOT&E for AN/BYG-1 TI04 and APB-05 and began FOT&E for AN/BYG-1 TI06 and APB-06 on SSN 688 Class submarines.				
FY08: Complete FOT&E for AN/BYG-1 TI06 and APB-06 and begin FOT&E for AN/BYG-1 APB-07 on SSN 688 Class/SSGN submarines.				
FY09: Begin FOT&E for AN/BYG-1 TI08 and APB-08 on 688 Class/SSGN submarines.				
		FY 2007	FY 2008	FY 2009
Common Weapon Launcher (CWL)		13.840	9.000	6.500
RDT&E Articles Quantity		0	0	0
FY07: Continued development and integration on Common Weapon Launcher (CWL)				
FY08: Continue integration of CWL with AN/BYG-1 TI-08				
FY09: Conduct DT/OT on CWL				

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EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS										DATE		
										February 2008		
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT NUMBER AND NAME					PROJECT NUMBER AND NAME					
RDTEN/BA 5		0604562N/SUBMARINE TACTICAL WARFARE SYSTEM					0236/SSN Comb Cont Sys Imprmnt (ENG)					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost (\$000)	FY 2007 Cost (\$000)	FY 2007 Award Date	FY 2008 Cost (\$000)	FY 2008 Award Date	FY 2009 Cost (\$000)	FY 2009 Award Date	Cost to Complete (\$000)	Total Cost (\$000)	Target Value of Contract
Multi-Tube Weapon Simulator	SBIR	Progeny	2.635	0.000		0.000		0.000		0.000	2.635	0.000
AN/BYG-1 Tech Insertion	CPIF/CPAF	Raytheon Portsmouth, RI	22.755	7.080	OCT-06	8.478	OCT-07	10.201	OCT-08	CONT	CONT	0.000
AN/BYG-1 Tech Insertion	CPIF/CPAF	General Dynamics (GDAIS)	20.906	6.063	OCT-06	7.500	OCT-07	7.241	OCT-08	CONT	CONT	0.000
Government Engineering	WX	NUWC Newport, RI	62.187	1.919		2.140		2.255		CONT	CONT	0.000
AN/BYG-1 Tech Insertion	FFRDC	MITRE	2.202	0.000		0.308		0.000		0.000	2.510	0.000
AN/BYG-1 Tech Insertion	CPIF/CPAF	ANTEON	6.000	0.000		0.000		0.000		0.000	6.000	0.000
COTS Hardware & Software	CPFF	DDL Omni	8.500	0.000		0.000		0.000		0.000	8.500	0.000
Common Weapon Launcher	CPAF	Progeny	4.052	13.840	JAN-07	9.000	JAN-08	6.500	JAN-09	CONT	CONT	0.000
Subtotal Product Development			129.237	28.902		27.426		26.197		CONT	CONT	0.000
Remarks:												
APB Software Integration	CPIF/CPAF	Raytheon Portsmouth, RI	16.876	6.700	OCT-06	7.947	OCT-07	11.460	OCT-08	CONT	CONT	0.000
APB Software Integration	CPIF/CPAF	General Dynamics (GDAIS)	16.110	6.300	OCT-06	7.700	OCT-07	9.088	OCT-08	CONT	CONT	0.000
APB Software Integration	WX	NUWC Newport, RI	9.195	3.871		5.475		5.847		CONT	CONT	0.000
Software Development	Various	Various	36.679	0.000		0.000		0.000		0.000	36.679	0.000
Subtotal Support Costs			78.860	16.871		21.122		26.395		CONT	CONT	0.000
Remarks:												
Developmental Test & Evaluation	WX	NUWC	15.312	2.700	OCT-06	2.300	OCT-07	3.500	OCT-08	CONT	CONT	0.000
Operational Test & Evaluation	WX	COMOPTEVFOR	11.169	1.600	OCT-06	1.700	OCT-07	2.500	OCT-08	CONT	CONT	0.000
Test & Evaluation	Various	Various	1.295	0.000		0.000		0.000		0.000	1.295	0.000
Subtotal Test and Evaluation			27.776	4.300		4.000		6.000		CONT	CONT	0.000
Remarks:												
Program Management Support	CPFF	EG&G Arlington, VA	9.330	0.000		0.000		0.000		0.000	9.330	0.000
Travel	PD	NAVSEA Arlington, VA	0.370	0.000		0.000		0.000		0.000	0.370	0.000
Subtotal Management Services			9.700	0.000		0.000		0.000		0.000	9.700	0.000
Remarks:												

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Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost (\$000)	FY 2007 Cost (\$000)	FY 2007 Award Date	FY 2008 Cost (\$000)	FY 2008 Award Date	FY 2009 Cost (\$000)	FY 2009 Award Date	Cost to Complete (\$000)	Total Cost (\$000)	Target Value of Contract
Total Cost			245.573	50.073		52.548		58.592		CONT	CONT	0.000

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EXHIBIT R4, Schedule Pr

DATE: **February 2008**

APPROPRIATION/BUDGET AC PROGRAM ELEMENT NUMBER AND NAME

RD&E, N / BA-5

0604562N / Submarine Tactical Warfare System

PROJECT NUMBER AND NAME

0236 / Submarine Combat System Improvements

Fiscal Year	2007				2008				2009				2010				2011				2012				2013					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
Acquisition Milestones				▲ Annual MDA Program Review				▲ Annual MDA Program Review				▲ Annual MDA Program Review				▲ Annual MDA Program Review				▲ Annual MDA Program Review				▲ Annual MDA Program Review				▲ Annual MDA Program Review		
APB I&T, Certification		APB-07				APB-08				APB-09				APB-10				APB-11				APB-12				APB-13				
Development, I&T Certification		TI-06				TI-08				TI-10				TI-12				TI-14												
Common Weapon Launcher (CWL)		CWL																												
Test & Evaluation Milestones																														
DT / FOT&E																														
AN/BYG-1	▲ APB05		▲ TI-06	▲ APB-06		▲ APB-07	▲		▲ TI-08	▲ APB-08			▲ APB-09	▲		▲ TI-10	▲ APB-10			▲ APB-11	▲		▲ TI-12							
CWL										▲ CWL (DT/OT)	▲						▲ CWL (FOT&E)	▲												
Production																														
FY07	▲ Contract Award					▲ First Delivery																								
FY08						▲ Contract Award				▲ First Delivery																				
FY09										▲ Contract Award				▲ First Delivery																
FY10														▲ Contract Award																
FY11																		▲ First Delivery												
FY12																						▲ Contract Award								
FY13																										▲ First Delivery				

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EXHIBIT R-4a, SCHEDULE DETAIL						DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY RD TEN/BA 5		PROGRAM ELEMENT NUMBER AND NAME 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM			PROJECT NUMBER AND NAME 0236/SSN Comb Cont Sys Imprvmt (ENG)			
Schedule Profile		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
AN/BYG-1 TI06 - Development		1Q-4Q						
AN/BYG-1 - APB06 Integration & Test, Certification		1Q-4Q						
Common Weapon Launcher - Development		1Q-4Q						
AN/BYG-1 APB07 Integration & Test, Certification		2Q-4Q	1Q					
AN/BYG-1 APB05 DT/OT		1Q						
AN/BYG-1 APB06/TI06 DT/OT		4Q	1Q-2Q					
AN/BYG-1 TI08 - Development		2Q-4Q	1Q-4Q	1Q-3Q				
CWL DT/OT				3Q-4Q				
AN/BYG-1 APB08 - MDA Review		4Q						
AN/BYG-1 APB08 Integration & Test, Certification			2Q-4Q	1Q				
AN/BYG-1 APB08/TI08 DT/OT				4Q	1Q			
AN/BYG-1 APB09 Integration & Test, Certification				2Q-4Q	1Q			
AN/BYG-1 APB09 MDA Review			4Q					
AN/BYG-1 APB07 DT/OT			4Q	1Q				
AN/BYG-1 TI10 Development				2Q-4Q	1Q-4Q	1Q-3Q		
AN/BYG-1 APB10 MDA Review				4Q				
AN/BYG-1 APB10 Integration & Test, Certification					2Q-4Q	1Q		
AN/BYG-1 TI12/APB11 MDA Review					4Q			
AN/BYG-1 APB11 Integration & Test, Certification						2Q-4Q	1Q	
AN/BYG-1 APB09 DT/OT					4Q	1Q		
AN/BYG-1 TI12 Development						2Q-4Q	1Q-4Q	1Q-3Q
AN/BYG-1 APB10/TI10 DT/OT						4Q	1Q	
CWL FOT&E						4Q	1Q	
AN/BYG-1 APB12 MDA Review						4Q		
AN/BYG-1 APB12 Integration & Test, Certification							2Q-4Q	1Q
AN/BYG-1 APB11 DT/OT							4Q	1Q
AN/BYG-1 APB13 MDA Review							4Q	
AN/BYG-1 APB13 Integration & Test, Certification								2Q-4Q
AN/BYG-1 TI14 Development								2Q-4Q
AN/BYG-1 TI12 DT/OT								4Q

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EXHIBIT R-4a, SCHEDULE DETAIL (CONTINUATION)						DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY RD TEN/BA 5		PROGRAM ELEMENT NUMBER AND NAME 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM			PROJECT NUMBER AND NAME 0236/SSN Comb Cont Sys Imprvmt (ENG)			
Schedule Profile		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
AN/BYG-1 APB14 MDA Review								4Q

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B. ACCOMPLISHMENTS/PLANNED PROGRAM:			
	FY 2007	FY 2008	FY 2009
9999 Sub Maintenance Automation and Communication	0.000	1.590	0.000
RDT&E Articles Quantity	0	0	0
The congressional add will be used to expand the Submarine Maintenance Free Operating Period (MFOP) effort, designed to automate scheduled preventive maintenance events, potentially reducing the weekly allocation of man-hours dedicated to maintenance.			
	FY 2007	FY 2008	FY 2009
9999 Automated Sub Command and Control Center	0.000	1.590	0.000
RDT&E Articles Quantity	0	0	0
The congressional add will be used to support the insertion of knowledge management and automation technologies into the AN/BYG-1 combat system modernization efforts. This additional technology will allow for a reduced number of crew members to safely perform the actions required in the submarine attack center.			
	FY 2007	FY 2008	FY 2009
9A50N Sub Maintenance Automation and Communication	2.087	0.000	0.000
RDT&E Articles Quantity	0	0	0
The congressional add will be used to expand the Submarine Maintenance Free Operating Period (MFOP) effort, designed to automate scheduled preventive maintenance events, potentially reducing the weekly allocation of man-hours dedicated to maintenance.			
	FY 2007	FY 2008	FY 2009
9850C Automated Sub Command and Control Center	0.988	0.000	0.000
RDT&E Articles Quantity	0	0	0
The congressional add will be used to support the insertion of knowledge management and automation technologies into the AN/BYG-1 combat system modernization efforts. This additional technology will allow for a reduced number of crew members to safely perform the actions required in the submarine attack center.			