

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Budget Item Justification							DATE: <b>FEBRUARY 2004</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RESEARCH DEVELOPMENT TEST &amp; EVALUATION, NAVY / BA-5</b>					R-1 ITEM NOMENCLATURE Submarine Tactical Warfare System/0604562N			
COST (\$ in Millions)		FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost		24.445	32.354	43.404	40.425	54.467	56.318	57.356
0236/SSN COMB CONT SYS IMP (ENG)		24.445	32.354	43.404	40.425	54.467	56.318	57.356

**Defense Emergency Response Funds (DERF) Funds: Not Applicable**

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades to integrate improved weapons and tactical control capabilities for all submarine Classes (SSN688, 688I, SSBN726, SEAWOLF, SSGN, and VIRGINIA (Post PSA)). The hardware upgrades (technology insertions) will be developed on a bi-annual basis to provide improved capability and address COTS obsolescence. The AN/BYG-1 is the combat control system common across all submarine platforms which incorporates tactical control, weapon control and tactical Local Area Network (LAN) functions into a single development program. Funding also accomodates the annual integration of Advanced Processing Builds (APBs) software to 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 improve 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 torpedos. 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.

Outyear funding develops and tests a COTS-based software weapons launch capability for all SSN688/688I and SEAWOLF submarines. This upgrade provides a more reliable launching capability for missiles and torpedos.

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APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N /BA-5</b>	PROGRAM ELEMENT NUMBER AND NAME 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM	PROJECT NUMBER AND NAME 0236/SSN COMB CONT SYS IMP (ENG)														
<b>B. Accomplishments/Planned Program</b>																
<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 30%;"></td><td style="width: 30%; text-align: center;">FY 03</td><td style="width: 30%; text-align: center;">FY 04</td><td style="width: 30%; text-align: center;">FY 05</td></tr><tr><td>Accomplishments/Effort/Subtotal Cost</td><td style="text-align: center;">13.759</td><td style="text-align: center;">0.000</td><td style="text-align: center;">0.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td></tr></table>						FY 03	FY 04	FY 05	Accomplishments/Effort/Subtotal Cost	13.759	0.000	0.000	RDT&E Articles Quantity			
	FY 03	FY 04	FY 05													
Accomplishments/Effort/Subtotal Cost	13.759	0.000	0.000													
RDT&E Articles Quantity																
<div>Continue to develop engineering change to CCS MK2 Program D0 Block 1C to incorporate Tactical Tomahawk capabilities and upgrade for commonality with VIRGINIA Class and SSN 21 Class.</div>																
<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 30%;"></td><td style="width: 30%; text-align: center;">FY 03</td><td style="width: 30%; text-align: center;">FY 04</td><td style="width: 30%; text-align: center;">FY 05</td></tr><tr><td>Accomplishments/Effort/Subtotal Cost</td><td style="text-align: center;">3.686</td><td style="text-align: center;">0.000</td><td style="text-align: center;">0.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td></tr></table>						FY 03	FY 04	FY 05	Accomplishments/Effort/Subtotal Cost	3.686	0.000	0.000	RDT&E Articles Quantity			
	FY 03	FY 04	FY 05													
Accomplishments/Effort/Subtotal Cost	3.686	0.000	0.000													
RDT&E Articles Quantity																
<div>Mitigate combat systems obsolescence, improve life-cycle cost, increase commonality and provide advanced war fighting capability to the submarine fleet based on the CCS MK2 combat system.</div>																
<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 30%;"></td><td style="width: 30%; text-align: center;">FY 03</td><td style="width: 30%; text-align: center;">FY 04</td><td style="width: 30%; text-align: center;">FY 05</td></tr><tr><td>Accomplishments/Effort/Subtotal Cost</td><td style="text-align: center;">4.000</td><td style="text-align: center;">0.000</td><td style="text-align: center;">0.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td></tr></table>						FY 03	FY 04	FY 05	Accomplishments/Effort/Subtotal Cost	4.000	0.000	0.000	RDT&E Articles Quantity			
	FY 03	FY 04	FY 05													
Accomplishments/Effort/Subtotal Cost	4.000	0.000	0.000													
RDT&E Articles Quantity																
<div>Development of AN/BSG-1, mission distribution system upgrades and shore site support infrastructure.</div>																

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<b>B. Accomplishments/Planned Program (Cont.)</b>																			
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 10%;"></th><th style="width: 15%;">FY 03</th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th></tr></thead><tbody><tr><td>Accomplishments/Effort/Subtotal Cost</td><td></td><td style="text-align: center;">3.000</td><td style="text-align: center;">0.000</td><td style="text-align: center;">0.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>							FY 03	FY 04	FY 05	Accomplishments/Effort/Subtotal Cost		3.000	0.000	0.000	RDT&E Articles Quantity				
		FY 03	FY 04	FY 05															
Accomplishments/Effort/Subtotal Cost		3.000	0.000	0.000															
RDT&E Articles Quantity																			
<div style="border: 1px solid black; padding: 5px;">Non Propulsion Electronics System Engineering, Integration and Test Program. The program also segregates CCS into a Tactical Control System and a Weapons Control System concurrent with the development of CCS MK2 V5.</div>																			
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 10%;"></th><th style="width: 15%;">FY 03</th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th></tr></thead><tbody><tr><td>Accomplishments/Effort/Subtotal Cost</td><td></td><td style="text-align: center;">0.000</td><td style="text-align: center;">19.238</td><td style="text-align: center;">27.583</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>							FY 03	FY 04	FY 05	Accomplishments/Effort/Subtotal Cost		0.000	19.238	27.583	RDT&E Articles Quantity				
		FY 03	FY 04	FY 05															
Accomplishments/Effort/Subtotal Cost		0.000	19.238	27.583															
RDT&E Articles Quantity																			
<div style="border: 1px solid black; padding: 5px;">Complete development, integration and test of AN/BYG-1 Technology Insertion 00 (TI-00) and TI02. Develop, integrate and test AN/BYG-1 TI04</div>																			
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 10%;"></th><th style="width: 15%;">FY 03</th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th></tr></thead><tbody><tr><td>Accomplishments/Effort/Subtotal Cost</td><td></td><td style="text-align: center;">0.000</td><td style="text-align: center;">13.116</td><td style="text-align: center;">15.821</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>							FY 03	FY 04	FY 05	Accomplishments/Effort/Subtotal Cost		0.000	13.116	15.821	RDT&E Articles Quantity				
		FY 03	FY 04	FY 05															
Accomplishments/Effort/Subtotal Cost		0.000	13.116	15.821															
RDT&E Articles Quantity																			
<div style="border: 1px solid black; padding: 5px;">Integrate and test APB(T) and APB(W) technology insertion and technology refresh.</div>																			

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### C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY2004 President Budget)	25.089	32.238	35.670
FY2005 PB05 Budget Submit	24.445	32.354	43.404
Total Adjustments	-0.644	0.116	7.734

#### Summary of Adjustments:

SBIR	-0.574		
Miscellaneous	-0.070	-0.384	-0.266
Weapon Control System		7.000	
Tactical Control System		4.000	
AN/BSG-1		-10.500	
SEAWOLF CCS			8.000
TOTAL:	-0.644	0.116	7.734

#### Schedule:

- Nomenclature used in the PB04 budget submit (CCS MK2 ECP4) has been changed to reflect the newly assigned AN/BYG-1 nomenclature. This nomenclature was changed to reflect the addition of Virginia Class Combat Control System into the common acquisition and development strategy. This allows for AN/BYG-1 to be the common combat control system nomenclature across all submarine platforms. The AN/ BYG-1 nomenclature, with bi-annual technology insertion designation (i.e. AN/BYG-1 (T104)), replaces the CCS Mk2 Block 1C ECP4 nomenclature.
- AN/BSG-1 funding was reduced by \$10.5M due to Milestone III schedule delay.

#### Technical:

- FY05 budget reflects the submarine combat systems business strategy embodied in the AN/BYG-1 program. This strategy incorporates integration of annual performance improvements and bi-annual technology refresh to address COTS obsolescence issues. As a result of this strategy there is an increase in test events required to satisfy DOT&E requirements.
- Department Of Navy is working to update requirement for AN/BSG-1 IOC date.

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Exhibit R-2a, RDTE Project Justification  
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**D. OTHER PROGRAM FUNDING SUMMARY:**

Line Item No. & Name	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete CONT.	Total Cost CONT.
OPN/BA-4 5420	61.652	69.513	147.481	148.068	110.294	122.027	125.375		

Related RDT&E:  
 PE 0204229N (Tomahawk & Tomahawk Missile Planning Center)  
 PE 0205632N (MK 48 ADCAP)  
 PE 0603504N (Advanced Submarine Combat Systems Dev.)  
 PE 0604503N (SSN-688 and Trident Modernization)  
 PE 0604707N (Submarine Electronic Warfare Architecture/Eng. Support)

**E. ACQUISITION STRATEGY: AN/BYG-1:**

- Competitive contract awarded in Dec 02 which starts the development of a combat control which segregates tactical control from weapons control system.
- This budget integrates APBs developed by the advanced development community.
- Advanced Processing Builds-Tactical (APB (T)) products associated with AN/BYG-1 Release-To- Fleet 4Q 2003, 3Q 2004, 3Q 2006, 3Q 2007, 3Q 2008, and 3Q 2009.
- Advanced Processing Builds-Weapons (APB (W)) integration associated with AN/BYG-1 begins FY2005 and will be Released-To-Fleet bi-annually and concurrently with an annual APB(T) product. APB(W) are integrated bi-annually due to increased time for weapon certification and safety issues.
- Follow-On contract for both tactical and weapons control subsystems are planned for award in FY2008.
- This program has been tailored in accordance with the new DoD5000 directive to incorporate annual MDA production reviews.

**F. MAJOR PERFORMERS:**

Raytheon Portsmouth, RI - Software Development for AN/BYG-1 weapon control subsystem - December 2002 and System Development for AN/BSG-1 - June 1997  
 Digital Systems Resources (DSR) Fair Lakes, VA - Software Development for AN/BYG-1 tactical control system - December 2002.  
 NUWC Newport, RI - Government Engineering

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Exhibit R-3 Cost Analysis (page 1)										DATE: <b>FEBRUARY 2004</b>			
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME							
<b>RDT&amp;E, N / BA-5</b>			0604562N/SUBMARINE TACTICAL WARFARE SYSTEM			0236/SSN COMB CONT SYS IMP (ENG)							
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
AN/BSG-1 System Development	CPIF	Raytheon Portsmouth, RI	16.143	1.177	12/02	0.000		0.000		4.500	21.820		
Ancillary Hardware Dev (AN/BSG-1)	PD	PEO-CMU Pax River, MD	9.003	1.582	Various	0.000	Various	0.000		6.000	16.585		
Government Engineering	WR	NUWC Newport, RI	52.089	2.512	Various	3.723	Various	11.034	Various	CONT.	CONT.		
Multi-Tube Weapon Simulator	SBIR	Progeny	1.635	0.000		1.000				0.000	2.635		
CCS MK2 Block 1C ECP	FFRDC	MITRE	0.754	0.383	11/02					1.000	2.137		
COTS Hardware & Software	CPFF	DDL Omni	7.000	1.500	01/03					0.000	8.500		
AN/BYG-1	CPIF/CPAF	Raytheon Portsmouth, RI				12.616	10/03	15.657	10/04	CONT.	CONT.		
AN/BYG-1	CPIF/CPAF	DSR				10.000	10/03	14.500	10/04	CONT.	CONT.		
AN/BYG-1	FFRDC	MITRE				0.365	10/03	0.513	10/04	CONT.	CONT.		
AN/BYG-1	CPIF/CPAF	ANTEON				4.000	12/03				4.000		
											0.000		
Subtotal Product Development			86.624	7.154		31.704		41.704		11.500	178.686		
Remarks: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <u>Contract</u>  AN/BYG-1  AN/BSG-1 </div> <div> <u>Award/Oblig</u>  Dec 02  Jun 97 </div> </div>													
Development Support Equipment											0.000		
Software Development (Mod0/1,2,3)	CPFF	Raytheon Portsmouth, RI	21.000	11.679	Various	0.000		0.000		CONT.	CONT.		
Software Development (Mod 5)	CPIF/CPAF	DSR		0.100	12/02						0.100		
Software Development (Mod 5)	CPIF/CPAF	Raytheon Portsmouth, RI		3.900	12/02								
Technical Data											0.000		
GFE											0.000		
Configuration Management											0.000		
Subtotal Support			21.000	15.679		0.000		0.000		0.000	36.679		
Remarks:													

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Exhibit R-2a, RD TEN Project Justification  
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Exhibit R-3 Cost Analysis (page 2)										DATE: <b>FEBRUARY 2004</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDTE, N / BA-5</b>			PROGRAM ELEMENT 0604562N/SUBMARINE TACTICAL WARFARE SYSTEM				PROJECT NUMBER AND NAME 0236/SSN COMB CONT SYS IMP (ENG)					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	Various	Various	7.800	1.112	01/03	0.300	10/03	1.000	10/04	CONT.	CONT.	
Operational Test & Evaluation	Various	Various	7.169	0.500	01/03	0.100	10/03	0.400	10/04	CONT.	CONT.	
Test & Evaluation	Various	Various	1.295	0.000		0.000		0.000			1.295	
.											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			16.264	1.612		0.400		1.400		0.000	19.676	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support	CPFF	EG&G Arlington, VA	8.481	0.000		0.250	10/03	0.300	10/04	CONT.	CONT.	
Travel	PD	NAVSEA Arlington, VA	0.350							CONT.	CONT.	
Labor (Research Personnel)											0.000	
SBIR Assessment											0.000	
Subtotal Management			8.831	0.000		0.250		0.300		0.000	9.381	
<div style="display: flex; justify-content: space-between;"> <span>Remarks:</span> <span>Contract EG&amp;G</span> <span>Award/Oblig Dec 01</span> </div>												
Total Cost			132.719	24.445		32.354		43.404		11.500	244.422	
Remarks:												

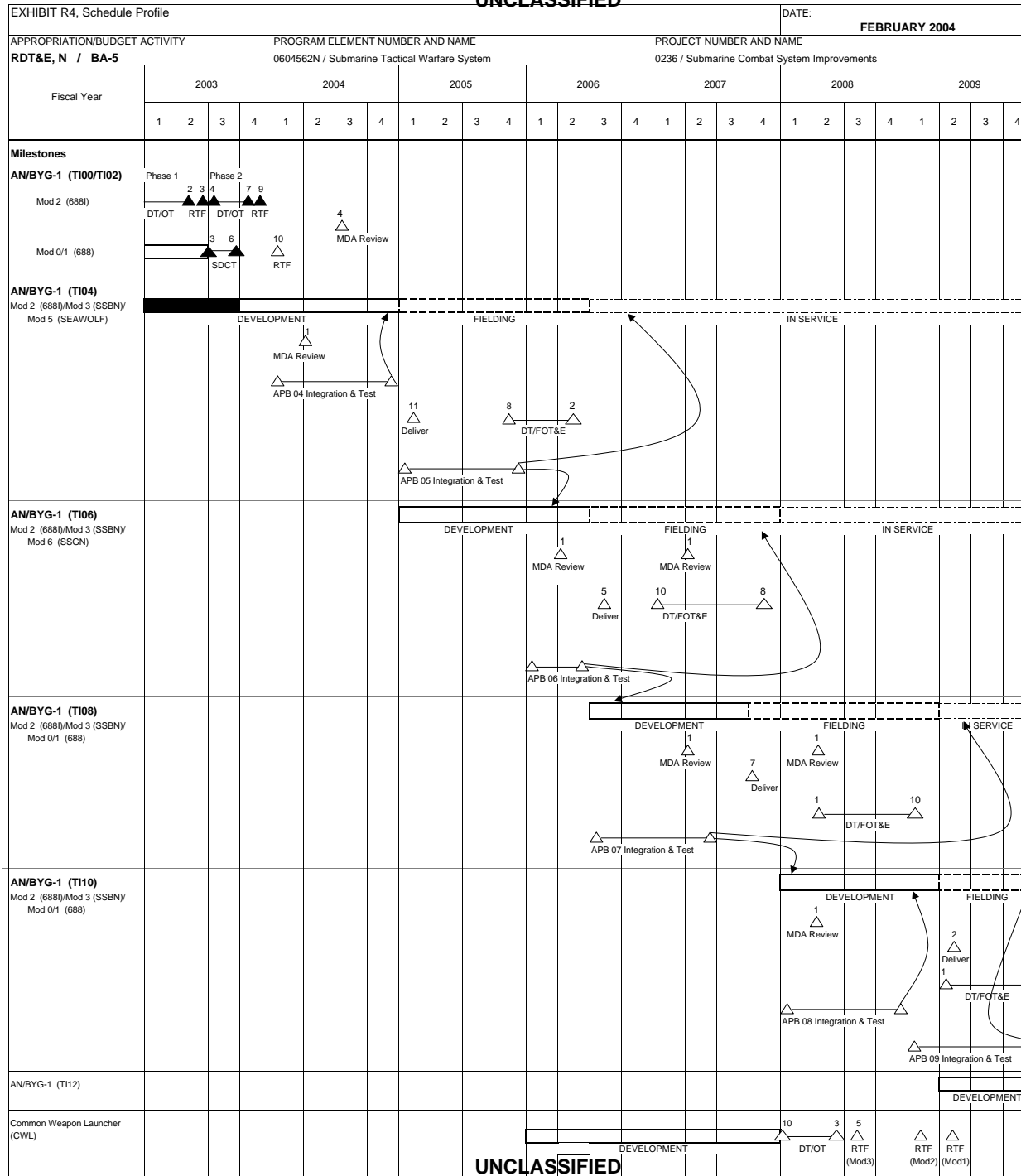
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**Exhibit R-3, Project Cost Analysis**  
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Exhibit R-4a, Schedule Detail					DATE: <b>FEBRUARY 2004</b>		
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME		
<b>RDT&amp;E, N / BA-5</b>	0604562N / Submarine Tactical Warfare System				0236 / Submarine Combat System Improvements		
Schedule Profile	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
AN/BYG-1 (TI00/TI02), Mod 0/1 - Development	1Q - 2Q						
AN/BYG-1 (TI00/TI02), Mod 2 - Phase 1 DT/OT	1Q - 2Q						
AN/BYG-1 (TI04) - Development	1Q - 4Q	1Q - 4Q					
AN/BYG-1 (TI00/TI02), Mod 2 - Phase 1 RTF	2Q						
AN/BYG-1 (TI00/TI02), Mod 0/1 - SDCT	2Q - 3Q						
AN/BYG-1 (TI00/TI02), Mod 2 - Phase 2 DT/OT	3Q - 4Q						
AN/BYG-1 (TI00/TI02), Mod 2 - Phase 2 RTF	4Q						
CCS MK2 Block 1C ECP 4, Mod 0/1 - RTF		1Q					
AN/BYG-1 (TI04) - APB 04 Integration & Test		1Q - 4Q					
AN/BYG-1 (TI04) - MDA Review		1Q					
AN/BYG-1 (TI00/TI02) - MDA Review		3Q					
AN/BYG-1 (TI04) - APB 05 Integration & Test			1Q - 4Q				
AN/BYG-1 (TI06) - Development			1Q - 4Q	1Q - 2Q			
AN/BYG-1 (TI04) - Deliver			1Q				
AN/BYG-1 (TI04) - DT/FOT&E			4Q	1Q - 2Q			
AN/BYG-1 (TI06) - APB 06 Integration & Test				1Q - 2Q			
Common Weapon Launcher - Development				1Q - 4Q	1Q - 4Q		
AN/BYG-1 (TI06) - MDA Review				2Q			
AN/BYG-1 (TI06) - Deliver				3Q			
AN/BYG-1 (TI08) - Development				3Q - 4Q	1Q - 3Q		
AN/BYG-1 (TI08) - APB 07 Integration & Test				3Q - 4Q	1Q - 2Q		
AN/BYG-1 (TI06) - DT/FOT&E					1Q - 4Q		
AN/BYG-1 (TI06) - MDA Review					2Q		
AN/BYG-1 (TI08) - MDA Review					2Q		
AN/BYG-1 (TI08) - Deliver					4Q		
AN/BYG-1 (TI10) - Development						1Q - 4Q	1Q
AN/BYG-1 (TI10) - APB 08 Integration & Test						1Q - 4Q	
Common Weapon Launcher - DT/OT						1Q - 2Q	
AN/BYG-1 (TI08) - MDA Review						2Q	
AN/BYG-1 (TI08) - DT/FOT&E						2Q - 4Q	1Q
AN/BYG-1 (TI10) - MDA Review						2Q	
Common Weapon Launcher - Mod3 RTF						3Q	
AN/BYG-1 (TI10) - APB 09 Integration & Test							1Q - 4Q
Common Weapon Launcher - Mod2 RTF							1Q
AN/BYG-1 (TI10) - DT/FOT&E							2Q - 4Q
AN/BYG-1 (TI10) - Deliver							2Q
AN/BYG-1 (TI12) - Development							2Q - 4Q
Common Weapon Launcher - Mod1 RTF							2Q

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**Exhibit R-3, Project Cost Analysis**  
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