

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7						R-1 ITEM NOMENCLATURE 0204229N, TOMAHAWK & TMPC		
COST (\$ in Millions)	FY 2008	FY 2009	FY 2010					
Total PE Cost	14.633	18.132	13.238					
0545 TOMAHAWK	10.293	14.143	13.238					
9999 CONGRESSIONAL ADD	4.340	3.989						

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Tomahawk Weapons System (TWS) provides a Tomahawk cruise missile attack capability against targets on land (Tomahawk Land Attack Missile (TLAM)). The TLAM can be fitted with either conventional unitary warhead (TLAM/C), nuclear warhead (TLAM/N) or submunition dispenser (TLAM/D). This program ensures that the TWS exploits state-of-the-art technology to preserve the efficiency of this proven weapon system, and includes all missile development, mission planning system development, and submarine and surface ship weapons control system development.

The Tactical Tomahawk (TACTOM) All-Up-Round Block IV missile is a comprehensive spiral baseline upgrade to the TWS that provides the tactical commander a quick reaction response capability as well as improved flexibility, increased accuracy and higher lethality. A five-year multi-year (FY04-FY08) production contract was awarded in August 2004 for the production of up to 2200 Block IV Tomahawk missiles. The essential upgrades of the Block IV missile are: improved guidance, navigation, control and mission computer two-way satellite communications, and a lower production cost as compared to the Block III missile. Block IV provides a UHF SATCOM data link to enable the missile to receive in-flight mission modification messages, to transfer health and status messages and to broadcast Battle Damage Indication (BDI) messages. Block IV also included a high anti-jam GPS receiver, navigation improvements and associated antenna systems. The Tomahawk Program (A0545) also included development of Torpedo Tube Launch (TTL) capability for submarines and the continuing advances identified as spiral development under the Tomahawk Baseline IV Operational Requirements Document (ORD), to include development of the Joint Chiefs of Staff (JCS)-directed incorporation of Selective Availability Anti-Spoofing Module (SAASM) capability. A third waiver will be requested as the program slipped its FY09 date for SAASM incorporation to FY11.

The Tomahawk Command and Control System (TC2S) Theater Mission Planning Center (TMPC) and Afloat Planning System (APS) (a shipboard version of TMPC) provide mission planning and employment support information for both the nuclear (TMPC only) and conventional TLAM, including the distribution of mission data and command information essential to TLAM employment via the Mission Distribution System (MDS) and associated communications infrastructure. Development of Tactical Tomahawk capabilities in TMPC/APS/MDS includes software development, integration, test, and delivery, including support for TECHEVAL and OPEVAL, training development, installation planning, and simulation/model development required by COMOPTEVFOR to offset live missile flights in TECHEVAL and OPEVAL. This project also includes development related to national and tactical imagery architectures, as well as software development to decrease mission-planning time and increase the quality and accuracy of each mission for Block III and IV TLAM.

The Tomahawk Weapons Control System provides launch capability for surface and submarine platforms. Development of the Tactical Tomahawk Weapons Control System (TTWCS) provides a common architecture to launch the Tactical Tomahawk Block IV and all variants in inventory. Development of upgrades to the Tactical Tomahawk Weapons Control System (TTWCS) is required to meet the DoD IT Standards Registry (DISR), to meet FORCEnet compliance and be Internet Protocol Version 6 (IPv6) ready in order to remain interoperable within the Joint Service Architecture. These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability.

The Tactical Tomahawk FY 09 Congressional funding supporting the Cost Reduction Initiative (CRI) provides for development and implementation of an affordability process to identify, investigate, plan and execute viable cost reduction initiatives (CRIs) for the Tomahawk F415 engine.

FY 08 and FY 09 Congressional funding for the Precision Terrain-Aided Navigation (PTAN) provides for the development and design maturation of the PTAN subsystem and provides expertise in integrating the PTAN into the Tomahawk Block IV (AUR). The efforts support simulations, test missions development and integration of PTAN with the Tomahawk Block IV avionics.

FY 09 Congressional funding for Image-Based Navigation funds provide analysis to assess reliability and performance of Image Navigation Reference Products in the TC2S.

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APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7		R-1 ITEM NOMENCLATURE 0204229N, TOMAHAWK & TMPC

B. PROGRAM CHANGE SUMMARY:

Funding:	FY08	FY09	FY10
Previous President's Budget:	15.687	14.212	13.435
Current BES	14.633	18.132	13.238
Total Adjustments	-1.054	3.920	-0.197

Summary of Adjustments

Congressional Rescissions			
Congressional Adjustments		3.969	
SBIR/STTR/FTT Assessments	-0.197		
Program Adjustments	-0.834		-0.195
Rate/Misc Adjustments	-0.023	-0.049	-0.002
Subtotal	-1.054	3.920	-0.197

Schedule:

The schedule for the software implementation of the SAASM features was shifted to align with the Tactical Tomahawk Weapons Control System (TTWCS) software version v5.4.0 development schedule. The one quarter difference between v5.4 and SAASM's IOC is for platform integration testing of SAASM once v5.4 is installed on the platforms.

SAASM capability will be demonstrated on an Operational Test Launch (OTL) Flight Test.

Launch Platform Integration covers integration of the Tomahawk Weapons System onto DDG-1000, VIRGINA Class, and SSGN platforms.

TTWCS v5.4.0 - software build for DDG 112 integration.

TTWCS v5.3.6 - maintenance build to fix DT/OT IIID issues.

Technical:

N/A

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EXHIBIT R-2a, RDT&E Project Justification							DATE:	
							May 2009	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT NUMBER AND NAME			PROJECT NUMBER AND NAME			
RDT&E, N / BA-7		0204229N, TOMAHAWK & TMPC			0545, TOMAHAWK			
COST (\$ in Millions)	FY 2008	FY 2009	FY 2010					
0545 TOMAHAWK	10.293	14.143	13.238					
RDT&E Articles Qty - N/A								

U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

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EXHIBIT R-2a, RDT&E Project Justification			DATE: May 2009																
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA -7	PROGRAM ELEMENT NUMBER AND NAME 0204229N, TOMAHAWK & TMPC	PROJECT NUMBER AND NAME 0545, TOMAHAWK																	
B. Accomplishments/Planned Program																			
<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 30%;">Tactical Tomahawk All-Up-Round (TACTOM AUR)</td><td style="width: 10%;">FY 08</td><td style="width: 10%;">FY 09</td><td style="width: 10%;">FY 10</td><td style="width: 40%;"></td></tr><tr><td>Accomplishments/Effort/Subtotal Cost</td><td>5.130</td><td>8.535</td><td>8.284</td><td></td></tr><tr><td>RDT&E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></table>					Tactical Tomahawk All-Up-Round (TACTOM AUR)	FY 08	FY 09	FY 10		Accomplishments/Effort/Subtotal Cost	5.130	8.535	8.284		RDT&E Articles Quantity				
Tactical Tomahawk All-Up-Round (TACTOM AUR)	FY 08	FY 09	FY 10																
Accomplishments/Effort/Subtotal Cost	5.130	8.535	8.284																
RDT&E Articles Quantity																			
Continue hardware and software trade studies for Phase 2 ORD requirements. Incorporate Selective Availability Anti-Spoofing Module (SAASM) capability into the GPS and continue to develop Precision Terrain Aided Navigation (PTAN) capability. Completed demonstration prototype of Precision Terrain Aided Navigation (PTAN) capability to demonstrate real-time operation. Initiated PTAN advance technology risk reduction efforts to develop next generation PTAN prototypes and to integrate PTAN capability into the missile simulation labs. Completed real-time processing capability for PTAN scenes. Continue integration and development of a precision Radar Altimeter into the All-Up-Round (AUR).																			
<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 30%;">TACTOM Weapons Control System (TTWCS)</td><td style="width: 10%;">FY 08</td><td style="width: 10%;">FY 09</td><td style="width: 10%;">FY 10</td><td style="width: 40%;"></td></tr><tr><td>Accomplishments/Effort/Subtotal Cost</td><td>2.920</td><td>2.920</td><td>2.323</td><td></td></tr><tr><td>RDT&E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></table>					TACTOM Weapons Control System (TTWCS)	FY 08	FY 09	FY 10		Accomplishments/Effort/Subtotal Cost	2.920	2.920	2.323		RDT&E Articles Quantity				
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RDT&E Articles Quantity																			
Initiate minimal Tactical Tomahawk Weapons Control System (TTWCS) viability development activities to reduce risks in the areas of overall TTWCS supportability, sustainment and interoperability with external interfaces. Begin to address key DoD/DoN mandates such as Internet Protocol (IP)v6, FORCEnet, Open Architecture and SAASM. Complete the development of TTWCS viability and enter the TECHEVAL/OPEVAL.																			
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TACTOM Command and Control	FY 08	FY 09	FY 10																
Accomplishments/Effort/Subtotal Cost	2.243	2.688	2.631																
RDT&E Articles Quantity																			
Continue development and incorporation of new capabilities in Tomahawk Command and Control systems necessary for the employment of Tactical Tomahawk. Continue development of TTWS Integration Training Architecture. Continue development of related training and installation materials. Continue imagery upgrades to Tomahawk Command and Control System. Continue Test & Evaluation support for Tomahawk Command and Control Systems.																			

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EXHIBIT R-2a, RDT&E Project Justification			DATE:	May 2009
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME		
RDT&E, N / BA-7	0204229N, TOMAHAWK & TMPC	0545, TOMAHAWK		
C. OTHER PROGRAM FUNDING SUMMARY:				
<u>Line Item No. & Name</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	
WPN - BLI 210100 TOMAHAWK	475.826	280.267	283,055	
OPN - BLI 525300 TOMAHAWK SUP EQUIP	54.711	55.312	88.475	
OPN SPARES - BLI 902010 INITIAL SPARES	0.759	0.167	0.554	
OPN SPARES - BLI 902090 VEND DIR SPARES	0.420	0.040	0.573	
D. ACQUISITION STRATEGY:				
(U) In 1998, the Tomahawk Baseline Improvement Program (TBIP) transitioned to the Tactical Tomahawk (Block IV) Program. This program is outlined in the Class Justification and Approval (CJ&A No. AIR-22448) signed by the Under Secretary of the Navy on 29 May 1998. The acquisition strategy was to transition the TBIP to Tactical Tomahawk. The Tactical Tomahawk development program was a cost-sharing contract between the Government and the Contractor to add capability to the missile. A multi-year full-rate production contract was awarded in August 2004 for FY 2004-2008 production. Torpedo Tube Launch (TTL) met capability IOC in FY 2008. TTL missiles were procured beginning in FY08 within the current missile production budget as required to meet Fleet load-out requirements. Other spiral development capabilities (PTAN, Multi-effects Warhead, Anti Surface Warfare (ASUW) will be introduced after successful qualification and testing. Continue SAASM				

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Exhibit R-3 Cost Analysis (page 1)								DATE: May 2009				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-7			0204229N, TOMAHAWK & TMPC			0545, TOMAHAWK						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 09 Cost	FY 09 Award Date	FY 10 Cost	FY 10 Award Date					
PRODUCT DEVELOPMENT												
PHD - Weapons Control System	C-CPAF	LM Valley Forge	91.964									
Award Fees - WCS			4.996									
PHD - Weapons Control System	RX	NAVSEA, WNY DC	0.875									
PHD-Mission Plan Systems TC2S	SS/CPFF	COMGLOBAL SYS, San Jose C	36.714	0.403	12/08	1.000	12/09					
PHD-Mission Plan Systems TC2S	VARIOUS	VARIOUS	7.674									
Primary Hardware Devel - AUR	C/CPFF	RAYTHEON CO Tucson, AZ	217.782	0.500	06/09	1.487	03/10					
Primary Hardware Devel - PTAN	C/CPFF	RAYTHEON CO Tucson, AZ	2.644									
Primary Hardware Devel - SAASM	C/CPFF	RAYTHEON CO Tucson, AZ	6.725									
Primary Hardware Devel- TTL	C/CPAF	RAYTHEON CO Tucson, AZ	11.886									
Primary H/W Devel - TTL Award Fee	C/CPAF	RAYTHEON CO Tucson, AZ	0.819									
Primary Hardware Devel - TTPC	C/CPFF	RAYTHEON CO Tucson, AZ	3.189									
Primary Hardware Devel - ASUW	C/CPFF	RAYTHEON CO Tucson, AZ	0.206									
Primary Hardware Devel - WCS	C/CPFF	RAYTHEON CO Tucson, AZ	0.828									
Ship Integr - Launch Integr	RX	NAVSEA, WNY, DC	29.743	1.887	03/09							
Ship Interation - Award Fee	C/CPFF	NAVSEA, WNY, DC	0.752									
Systems Engineering	RX	JHU/APL, COLUMBIA, MD	4.831									
Systems Engineering - AUR	RX	JHU/APL, COLUMBIA, MD	27.374	1.862	03/09	1.687	02/10					
Systems Engineering - AUR	C/FP	Boeing, St Louis, MO	3.000									
Systems Engineering - PTAN	RX	JHU/APL, COLUMBIA, MD	2.691									
Systems Engineering - SAASM	C/CPFF	VARIOUS	0.972			0.260	01/10					
System Engineering - AUR	C/FP	RAYTHEON CO Tucson, AZ	14.237									
System Engineering - TTL	C/FP	RAYTHEON CO Tucson, AZ	0.496									
System Engineering - TTL	SS/CPFF	JHU/APL, COLUMBIA, MD	0.912									
1974 thru TBIP Costs in 1996	VARIOUS	VARIOUS	2,176.447									
Subtotal Product Development			2,647.757	4.652		4.434						
Remarks:												

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Exhibit R-4a, Schedule Detail

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Exhibit R-3 Cost Analysis (page 1)								DATE:				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-7			0204229N, TOMAHAWK & TMPC			0545, TOMAHAWK						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 09 Cost	FY 09 Award Date	FY 10 Cost	FY 10 Award Date					
Development Support												
Dev Sup - Weapons Control Sys	WX	NUWC, NEWPORT RI	20.966									
Development Support	SS/CPFF	SAIC, SAN DIEGO, CA	9.700									
Development Support	WX	NSWC Dahlgren	0.214	0.153	Various	0.553	Various					
Development Support - AUR SAASM	C/CPFF	SAIC, SAN DIEGO, CA	0.260	0.318	12/08	0.250	12/09					
Development Support - AUR	SS/CPFF	SAIC, SAN DIEGO, CA	1.112	0.888	12/08	1.388	12/09					
Development Support - AUR	WX	VARIOUS	0.486	0.686	Various	0.703	Various					
Development Support - AUR	WX	NAWCWD CHINA LAKE, CA	64.334	1.376	Various	1.705	Various					
Development Support - PTAN	VARIOUS	VARIOUS	0.020									
Development Support - PTAN	C/CPFF	HONEWELL, MINNEAPOLIS	3.924									
Development Support - PTAN	WX	NAWCWD CHINA LAKE, CA	0.606									
Development Support - SAASM	WX	VARIOUS	2.114									
Development Support - TTL	SS/CPFF	SAIC, SAN DIEGO, CA	0.576									
Development Support - TTL	WX	NUWC, NEWPORT RI	10.521									
Development Support - TTL	WX	VARIOUS	5.503									
Government Eng Sup - SAASM	WX	STRATEGIC SYS PR, DC	3.383	0.865	01/09							
Government Eng Sup - SAASM	WX	VARIOUS	0.061									
Soft Dev-Mission Plan Sys TC2S	RX	RAYTHEON CO, TUCSON	5.100									
Soft Dev-Mission Plan Sys TC2S	MIPR	HQ SEC OF AF-FMB, DC	0.951									
Soft Dev-Mission Plan Sys TC2S	RX	JHU/APL, COLUMBIA MD	18.996	0.250	12/08	0.150	12/09					
Soft Dev-Mission Plan Sys TC2S	MIPR	LM, VALLEY FORGE PA	7.104	0.945	01/09	1.027	01/10					
Soft Dev-Mission Plan Sys TC2S	RX	NAVY SYS MGT ACT, VA	5.821	1.090	Various	0.455	Various					
Soft Dev-Mission Plan Sys TC2S	RX	NAVY SYS MGT ACT, VA	4.326									
Soft Dev-Mission Plan Sys TC2S	RX	SAIC, SAN DIEGO, CA	14.307									
Soft Dev -Weapons Control Sys	WX	NSWC Dahlgren	31.325									
Soft Dev -Weapons Control Sys	C/CPFF	LM, VALLEY FORGE PA	99.735	2.920	02/09	2.323	02/10					
Soft Dev -Weapons Control Sys	RX	VARIOUS	1.438									
Soft Dev-PTAN	RX	JHU/APL, COLUMBIA MD	1.702									
Subtotal Support			314.585	9.491		8.554						
Remarks:												

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Exhibit R-4a, Schedule Detail

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Exhibit R-3 Cost Analysis (page 2)								DATE: May 2009				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDTE, N / BA-7			0240229N, TOMAHAWK & TMPC			0545, TOMAHAWK						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 09 Cost	FY 09 Award Date	FY 10 Cost	FY 10 Award Date					
Developmental Test & Evaluation	SS/CPFF	RAYTHEON CO, TUCSON	42.883									
Developmental Test & Evaluation	RX	JHU/APL, COLUMBIA, MD	1.730									
Developmental Test & Evaluation	WX	VARIOUS	37.593			0.250	Various					
Developmental Test & Evaluation	WX	VARIOUS	0.275									
Developmental Test & Evaluation	WX	NUWC, NEWPORT RI	0.681									
Subtotal T&E			83.162	0.000		0.250						
Remarks:												
Contractor Engineering Support	SS/CPFF	SAIC, SAN DIEGO, CA	0.401									
Government Engineering Support												
Program Management Support												
Travel												
Transportation												
SBIR Assessment												
Subtotal Management			0.401	0.000		0.000		0.000		0.000		
Remarks:												
Total Cost			3,045.905	14.143		13.238		0.000		0.000	0.000	
Remarks:												

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EXHIBIT R4, Schedule Profile											DATE:			May 2009										
APPROPRIATION/BUDGET ACTIVITY					PROGRAM ELEMENT NUMBER AND NAME						PROJECT NUMBER AND NAME													
RDT&E,N / BA-7					0204229N, TOMAHAWK & TMPC						0545, TOMAHAWK													
Fiscal Year	FY 2008				FY 2009				FY 2010															
	1	2	3	4	1	2	3	4	1	2	3	4												
Acquisition Milestones			★	TTL	IOC																			
Missile Integration								SAASM INTEGRATION																
Launcher Platform Integration								LAUNCHER PLATE																
TTWCS V5.4.0																								
P3I																								
TTWCS V5.3.6					☆	IOC																		
Test & Evaluation Milestones																								
TTWCS V5.3.6/TC2S4.2																								
Production Milestones Deliveries																								
Deliveries - FRP 2 - 298																								
Deliveries - FRP 3 - 408																								
Deliveries - FRP 4 thru FRP 10					FRP 4			355		FRP 5			496											

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Exhibit R-4a, Schedule Detail

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EXHIBIT R-2a, RDT&E Project Justification								DATE:	
APPROPRIATION/BUDGET ACTIVITY				PROGRAM ELEMENT NUMBER AND NAME				May 2009	
RDT&E, N /				0204229N, TOMAHAWK & TMPC				9999 CONGRESSIONAL ADD	
BA 7									
COST (\$ in Millions)				FY 2008	FY 2009	FY 2010			
Project Cost				4.340	3.989				
RDT&E Articles Qty Not Applicable									

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

Congressional Adds.

B. ACCOMPLISHMENTS / PLANNED PROGRAM:

0545A PTAN	FY 2008	FY 2009	FY 2010	
Accomplishments / Effort / Sub-total Cost	3.085	1.595		
RDT&E Articles Qty				

Initiate PTAN Advance technology risk reduction effort to develop next generation PTAN prototypes and to integrate PTAN capability into the missile simulation labs.

9C53A Tomahawk Weapons Control System	FY 2008	FY 2009	FY 2010	
Accomplishments / Effort / Sub-total Cost	1.255			
RDT&E Articles Qty				

Initiate alternative studies concerning loss of C4I Interoperability (Command, Control, Communication and Computer Interoperability), SSN TTWCS capability, hardware performance, obsolescence and supportability issues.

9E14A Tomahawk Cost Reduction Initiative	FY 2008	FY 2009	FY 2010	
Accomplishments / Effort / Sub-total Cost		1.596		
RDT&E Articles Qty				

The Tactical Tomahawk congressional funding supporting the Cost Reduction Initiative (CRI) provides for development and implementation of an affordability process to identify, investigate, plan and execute viable cost reduction initiatives (CRIs) for the Tomahawk F415 engine.

9E15 Tomahawk Low-Cost Image-Based Navigation and Precision Targeting	FY 2008	FY 2009	FY 2010	
Accomplishments / Effort / Sub-total Cost		.798		
RDT&E Articles Qty				

Image-Based Navigation funds provide analysis to assess reliability and performance of Image Navigation Reference Products in the TC2S.

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