

CLASSIFICATION:

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EXHIBIT R-2, RDT&E Budget Item Justification							DATE: February 2005	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7					R-1 ITEM NOMENCLATURE 0204229N Tomahawk Weapons System (TWS)			
COST (\$ in Millions)	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011
Total PE Cost	74.754	31.473	20.342	17.480	14.929	15.080	14.262	12.596
0545 Tomahawk	74.754	31.473	20.342	17.480	14.929	15.080	14.262	12.596
A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Tomahawk Weapons System (TWS) provides the 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 missile development 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 mulit-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 significantly 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 includes a high anti-jam GPS receiver, navigation improvements and associated antenna systems. The Tomahawk program (A0545) also includes development of Torpedo Tube Launch (TTL) capability for submarines and the continuing advances identified as spiral development under the Tomahawk Baseline IV Operation Requirements Document (ORD). 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 the nuclear (TMPC only) and conventional TLAM, including 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 training development, installation planning, and simulation/model development. 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 and all variants in inventory. Development of the Tactical Tomahawk Weapons Control System (TTWCS) requirements to meet the Joint Technical Architecture (JTA) version 6 requirements to meet FORCENet compliance and be Internet Protocol Version 6 (IPV6) ready is essential for continued interoperability within the Joint Service Architecture. These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability. TTWCS entered Engineering and Manufacturing Development (EMD) in FY99, with Phase A IOC (BLK III) in DEC 03, and Phase B IOC (TACTOM) in June 2004.								

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 Exhibit R-2, RDTEN Budget Item Justification
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2005	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-7		PROGRAM ELEMENT NUMBER AND NAME 0204229N Tomahawk Weapons System (TWS)			PROJECT NUMBER AND NAME 0545 TOMAHAWK			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	74.754	31.473	20.342	17.480	14.929	15.080	14.262	12.596
RDT&E Articles Qty								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Tomahawk Weapons System (TWS) provides the 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 missile development 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 significantly 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 includes a high anti-jam GPS receiver, navigation improvements and associated antenna systems. The Tomahawk program (A0545) also includes development of Torpedo Tube Launch (TTL) capability for submarines and the continuing advances identified as spiral development under the Tomahawk Baseline IV Operation Requirements Document (ORD).

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 and all variants in inventory. Development of the Tactical Tomahawk Weapons Control System (TTWCS) requirements to meet the Joint Technical Architecture (JTA) version 6 requirements to meet FORCENet compliance and be IPV6 ready is essential for continued interoperability within the Joint Service Architecture. These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability. TTWCS entered Engineering and Manufacturing Development (EMD) in FY99, with Phase A IOC (BLK III) in DEC 03, and Phase B IOC (TACTOM) in June 2004.

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(U) B. Accomplishments/Planned Program																																		
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY04</th><th style="width: 15%;">FY05</th><th style="width: 15%;">FY06</th><th style="width: 15%;">FY07</th></tr></thead><tbody><tr><td>Tactical Tomahawk All Up Round/Subtotal Cost</td><td style="text-align: right;">43.188</td><td style="text-align: right;">16.709</td><td style="text-align: right;">10.731</td><td style="text-align: right;">9.580</td></tr><tr><td>RDT&E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table> <div style="border: 1px solid black; padding: 10px; margin-top: 10px; min-height: 100px;"><p>Completed OPEVAL and IOC for Tactical Tomahawk. Continue development of the Tactical Tomahawk Torpedo-Tube Launch (TT-TTL) capability. Complete TTL software and hardware qualification testing, DT/OT flight tests and IOC. Continue hardware and software trade studies for Phase 2 ORD requirements to include Selective Availability Anti-Spoofing Module (SAASM) capability into the GPS, Precision Terrain Aided Navigation capability, Warhead Improvement/Penetration capability and High Speed (Supersonic) capability.</p></div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 20px;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY04</th><th style="width: 15%;">FY05</th><th style="width: 15%;">FY06</th><th style="width: 15%;">FY07</th></tr></thead><tbody><tr><td>TACTOM Command and Control/Subtotal Cost</td><td style="text-align: right;">11.348</td><td style="text-align: right;">4.778</td><td style="text-align: right;">4.853</td><td style="text-align: right;">4.747</td></tr><tr><td>RDT&E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table> <div style="border: 1px solid black; padding: 10px; margin-top: 10px; min-height: 100px;"><p>Continue development and incorporation of new capabilities in Tomahawk Command and Control systems necessary for the employment of Tactical Tomahawk. Support Tactical Tomahawk Weapon System OPEVAL. 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.</p></div>						FY04	FY05	FY06	FY07	Tactical Tomahawk All Up Round/Subtotal Cost	43.188	16.709	10.731	9.580	RDT&E Articles Quantity						FY04	FY05	FY06	FY07	TACTOM Command and Control/Subtotal Cost	11.348	4.778	4.853	4.747	RDT&E Articles Quantity				
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(U) B. Accomplishments/Planned Program				
	FY04	FY05	FY06	FY07
TACTOM Weapons Control System (TTWCS) /Subtotal Cost	14.218	5.986	4.758	3.153
RDT&E Articles Quantity				
<p>FY04: Complete Phase 1B Land Based and Sea Based System Testing of Weapons Control System. Successful completion of TECHEVAL/OPEVAL for TTWCS Phase B, deployment of Initial Operational Capability for TTWCS. Continued Development of Integrated Training Architecture in version 5 TTWCS.</p> <p>FY05: Continue development of Tactical Tomahawk Weapons System Integrated Training Architecture, continue development of version 5 software, initiate version 6 development activities to develop JTA version 6 requirements.</p> <p>FY06: Complete TTWCS version 5 development, enter TECHEVAL/OPEVAL for TTWCS version 5, continue with TTWCS version 6 development efforts, begin the TTWCS version 7 development efforts that complete the implementation of JTA version 6 requirements.</p> <p>FY07: Complete the development of TTWCS version 6, enter the TECHEVAL/OPEVAL for TTWCS version 6, continue with TTWCS version 7 development efforts</p>				
	FY04	FY05	FY06	FY07
Precision Terrain Aided Navigation/Subtotal Cost	6.000	4.000		
RDT&E Articles Quantity				
<p>Completed demonstration prototype of Precision Terrain Aided Navigation (PTAN) capability to demonstrate real-time operation. Initiate PTAN advanced technology risk reduction efforts to develop next generation PTAN prototypes and to integrate PTAN capability into the missile simulation labs.</p>				

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Exhibit R-2a, RDTEN Project Justification
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-7	PROGRAM ELEMENT NUMBER AND NAME 0204229N Tomahawk Weapons System (TWS)	PROJECT NUMBER AND NAME 0545 TOMAHAWK

(U) C. PROGRAM CHANGE SUMMARY:

	FY 2004	FY 2005	FY 2006	FY 2007
(U) Funding:				
Previous President's Budget:	76.524	28.776	18.262	13.409
Current BES/President's Budget	74.754	31.473	20.342	17.480
Total Adjustments	-1.770	2.697	2.080	4.071
Summary of Adjustments				
Congressional program reductions				
Congressional undistributed reductions		-0.297		
Congressional rescissions				
SBIR/STTR Transfer	-3.612			
Other		-0.006	1.899	3.869
Economic Assumptions	-0.089		0.181	0.202
Reprogrammings	1.931	-1.000		
Congressional increases		4.000		
Subtotal	-1.770	2.697	2.080	4.071

(U) Schedule:

Block IV successfully completed IOC in May 2004 and received Milestone III and full rate production decision approval in August 2004. A multiyear full rate production contract awarded in August 2004 for FY 2004-2008 production. Torpedo Tube Launch capability qualification will complete in FY 2006 followed by DT/OT and IOC in FY 2006. DT delayed from FY05 PB because Combined (DT/OT) of the Tactical Tomahawk, Torpedo Tube Launched (TT TTL) can only be done with a 688/688I Class submarine configured with the BYG-1 weapons control system that has been upgraded with Technology Insertion 04 (TI-04). The earliest that a platform (USS BOISE) can be made available by the Submarine Force for TT TTL DT/OT is January 2006.

(U) Technical:

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-7		PROGRAM ELEMENT NUMBER AND NAME 0204229N Tomahawk Weapons System (TWS)			PROJECT NUMBER AND NAME 0545 TOMAHAWK					
(U) D. OTHER PROGRAM FUNDING SUMMARY:										
<u>Line Item No. & Name</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>To Complete</u>	<u>Total Cost</u>
WPN BLI 210100 Tomahawk	351.971	279.113	353.409	366.200	445.385	431.618	443.362	448.021		3119.079
OPN BLI 525000 Surface Tomahawk Support Equipment	62.861	69.307	0.000	0.000	0.000	0.000	0.000	0.000		132.168
OPN BLI 525005 Surface Tomahawk Support Equipment Installation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0		0
OPN BLI 525500 Submarine Tomahawk Support Equipment	5.735	5.436	0.000	0.000	0.000	0.000	0.000	0.000		11.171
OPN BLI 5253000 Surface Tomahawk Support Equipment Installation			75.075	52.836	44.381	45.666	46.201	46.341		310.5
OPN Spares BLI 902010 Initial Spares	3.910	1.667	1.792	1.337	1.109	0.000	0.000	0.000		9.815
OPN Spares BLI 902090 Vendor Direct Spares	0.464	0.987	0.641	0.647	0.639	0.638	0.651	0.664		5.331
Related RDT&E,N: Not Applicable										
(U) E. ACQUISITION STRATEGY:										
<p>(U) D. ACQUISITION STRATEGY: 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 Tomahawk Baseline Improvement Program (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. Block IV received Milestone III and full rate production approval in August 2004.</p> <p>Torpedo Tube Launch (TTL) capability will IOC in FY 2006. TTL missiles will be procured within the current missile production budget as required to meet Fleet loadout requirements. Other spiral development capabilities will be introduced after successful qualification and testing.</p>										

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Exhibit R-2a, RDTEEN Project Justification
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Exhibit R-3 Cost Analysis (page 1)								DATE: February 2005				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-7			0204229N Tomahawk Weapons System (TWS)			0545 TOMAHAWK						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development												
Primary Hardware Development												
Tactical Tomahawk Program												
All Up Round	SS/CPFF	Raytheon, Tucson, AZ	217.622	4.658	11/04	2.200	11/05	6.502	11/06	10.513	241.495	241.495
TTPC	SS/CPFF	Raytheon, Tucson, AZ	3.189								3.189	3.189
TTL	SS/CPAF	Raytheon, Tucson, AZ	10.469	5.340	11/04	3.567	11/05				19.376	19.376
Award Fee TTL			0.819	0.469	11/04	0.585	11/05				1.873	
Mission Planning System	SS/CPFF	ComGlobal, San Jose, CA	32.633	2.102	12/04	2.150	12/05	2.111	12/06	5.165	44.161	44.161
Various	Various	Various	7.347	0.000	12/04	0.000	12/05	0.000	12/06	4.624	11.971	11.971
Weapons Control System	C/CPAF	Lockheed, Valley Forge, PA	90.512								90.512	90.512
Award Fee WCS			4.996								4.996	
Ship Integration												
Launcher Integration	SS/CPAF	NAVSEA, Washington, DC	24.316	0.969	12/04						25.285	25.285
Award Fee Launcher Integration			0.752	0.029	12/04						0.781	
Systems Engineering												
All Up Round	SS/FP	Raytheon, Tucson, AZ	14.203	0.200	11/04	0.366	11/05	0.196	11/06	0.647	15.612	15.612
	SS/CPFF	UARC APL, Laurel, MD	25.234	0.587	01/05	0.892	01/06	1.442	01/07	0.218	28.373	28.373
	C/FP	Boeing, St. Louis, MO	3.000								3.000	3.000
Weapons Control System	SS/CPFF	URAC APL, Laurel, MD	2.916	0.819	12/04	0.875	12/05	0.150	12/06	1.387	6.147	6.147
All Product Development Costs, 1974 through TBIP Costs in 1998			2,176.447								2,176.447	2,176.447
Subtotal Product Development			2,614.455	15.173		10.635		10.401		22.554	2,673.218	
Remarks: Prior year award fees earned is 94% (TTL) Prior year award fees earned is 61% (Launcher Integration) Prior year award fee earned for FY03 is 93% (WCS) Prior year award fee earned for FY04 is 75% (WCS)												

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 1)								DATE:				
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APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-7			0204229N Tomahawk Weapons System (TWS)			0545 TOMAHAWK						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Support (Development)												
Development Support												
All-Up-Round	WR	NUWC, Newport, RI	8.352	1.694	11/04	0.600	11/05				10.646	
	SS/CPFF	SAIC, Arlington, VA	8.913	0.784	12/04	0.760	12/05	0.560	12/06	4.350	15.367	15.367
	C/CPFF	Honeywell, Minneapolis, MN	3.924	3.640	01/05						7.564	7.564
	Various	Various	63.256	0.998	11/04	0.819	11/05	0.504	11/06	Continuing	Continuing	
Weapons Control Systems	WR	NUWC, Newport, RI	18.623	2.048	11/04	0.525	11/05	0.090	11/06	Continuing	Continuing	
Software Development												
Mission Planning Systems	SS/CPFF	Raytheon, Arlington, VA	5.100								5.100	5.100
	SS/CPFF	Lockheed, Valley Forge, PA	5.794	1.482	12/04	1.500	12/05	1.452	12/06	3.771	13.999	13.999
	SS/CPFF	SAIC, Arlington, VA	14.307								14.307	14.307
	SS/CPFF	URAC APL, Laurel, MD	15.443	1.194	12/04	1.203	12/05	1.184	12/06	8.805	27.829	27.829
Weapons Control Systems	WR	NSWC, Dahlgren VA	29.202	2.660	11/04	2.484	11/05	2.763	11/06	Continuing	Continuing	
	C/CPAF	Lockheed, Valley Forge, PA	99.246	1.280	12/04	0.788	12/05	0.135	12/06	2.122	103.571	103.571
Award Fee WCS				0.120	12/04	0.086	12/05	0.015	12/06		0.221	
Subtotal Support			272.160	15.900		8.765		6.703		Continuing	Continuing	
Remarks: Prior year award fees earned 90% (WCS)												

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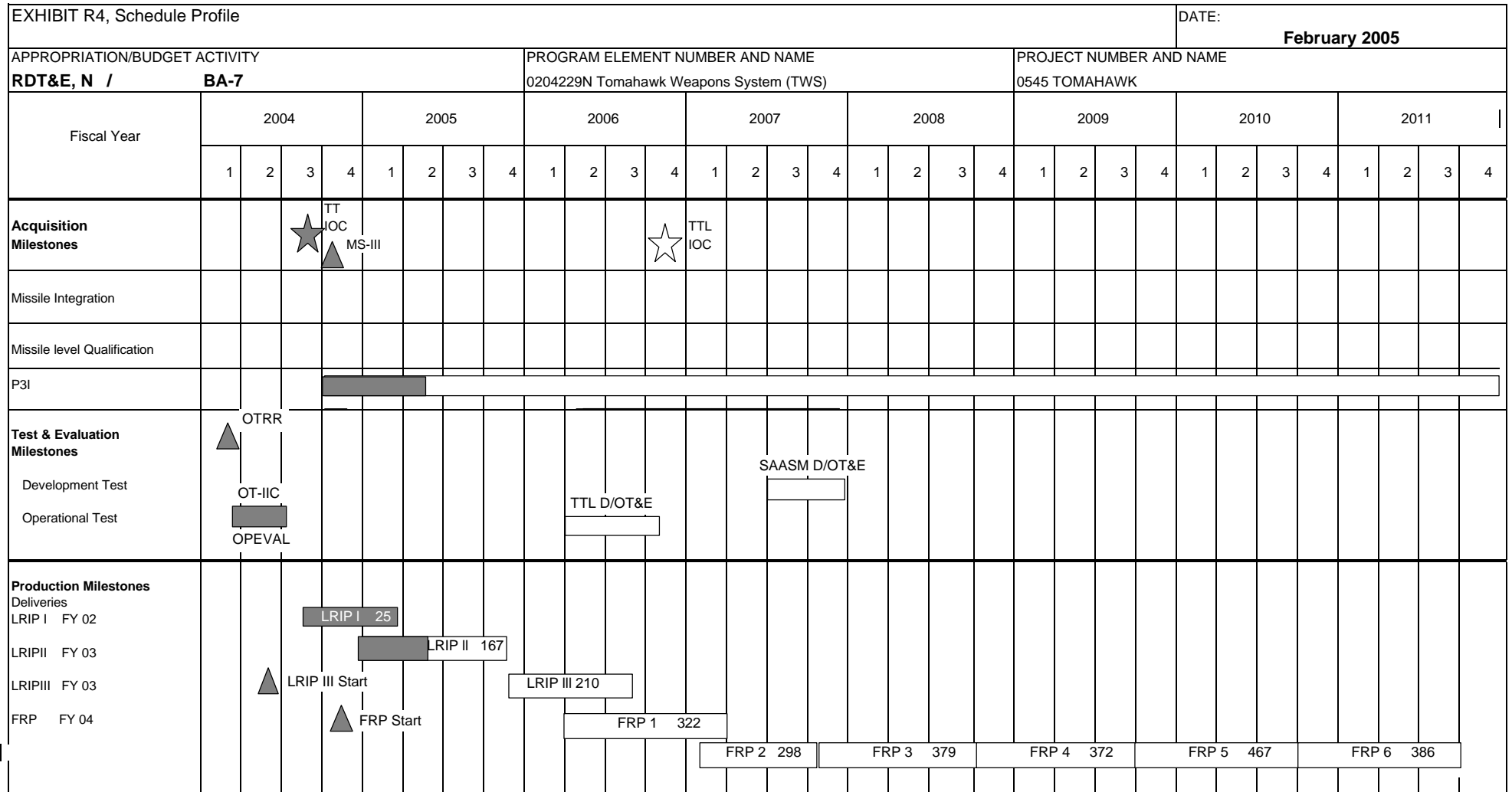
Exhibit R-3 Cost Analysis (page 2)										DATE: February 2005		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-7			PROGRAM ELEMENT 0204229N Tomahawk Weapons System (TWS)			PROJECT NUMBER AND NAME 0545 TOMAHAWK						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	Raytheon, Tucson, AZ	42.217								42.217	42.217
	SS/CPFF	URAC APL, Laurel MD	1.602	0.050	12/04	0.050	12/05				1.702	1.702
	Various	Various	37.023	0.350	11/04	0.892	11/05	0.376	11/06	Continuing	Continuing	
Subtotal T&E			80.842	0.400		0.942		0.376		Continuing	Continuing	
Remarks:												
Management												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			2,967.457	31.473		20.342		17.480		Continuing	Continuing	
Remarks:												

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Exhibit R-4, Schedule Profile
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Exhibit R-4a, Schedule Detail
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