

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification				DATE: February 2006			
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE					
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5		LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N					
COST (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	15.281	31.348	40.540	31.434	42.493	36.665	21.512
Lightweight Torpedo 2234	15.281	31.348	40.540	31.434	42.493	36.665	21.512
Quantity of RDT&E Articles				1	1		
Notes: FY05 includes \$5.040 million reprogramming for MK54 High Altitude ASW Weapons Concept Demo Program. Articles reflect VLA Kit Integration deliveries in FY08 and Array Improvements delivery in FY09.							
A. (U) Mission Description and Budget Item Justification:							
Lightweight Torpedo / 2234: The program designs, integrates and tests the Lightweight Torpedo (LWT, MK54). The Lightweight Torpedo provides performance improvements in shallow water, counter-measure environments. The Engineering Development Model (EDM) contract was awarded to Raytheon Systems Company in June 1996. The EDM contract has delivered twenty-one EDM units to support the in-water test program. IOC achieved in 2004. FY2005: Initiated MK54 Vertical Launch Anti Submarine Rocket (VLA) integration effort. Congressional increase (\$1.5M) received to support improvements of MK54 array performance and reliability. \$5.040M reprogramming received to conduct High Altitude ASW Weapons Concept (HAAWC) Demo. FY2006: Budget increased significantly to support a Pre-Planned Product Improvement Program (P3I) for MK54 using a hardware spirals development acquisition approach and Advanced Processor Build (APB) software upgrades process to enable rapid hardware and software improvements to the Fleet. The P3I program will focus on common hardware and software architecture enhancements that will provide re-architecture / Torpedo Downloader System (TDS), MK54 VLA Integration, Insensitive Munitions Warhead (IM W/H) capability improvement, broadband array improvements, fully open architecture design, and connectivity / advanced interface. The APB program also will incorporate MK 48 ADCAP Torpedo algorithms and tactics software to create a Common Torpedo Development program. Future APB software builds will utilize the common torpedo software to deliver software and tactics to both the MK 48 ADCAP and MK 54 Lightweight torpedoes. FY07: Continue development of hardware/software improvements for P3I program. Initiate development of launcher and fire control prototypes and conduct demo of MK54 capability from Unmanned Surface Vehicle (USV). Initiate development of MK54 high altitude launch capability from Maritime Patrol Aircraft (MPA).							

R-1 SHOPPING LIST - Item No. 121

Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 1 of 8)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification		DATE: February 2006													
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5		R-1 ITEM NOMENCLATURE LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N													
B. Accomplishments/Planned Program															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">MK54 Pre-Planned Product Improvement (includes MK54 VLA Integration) 2234</td> <td style="padding: 5px; text-align: center;">FY 05</td> <td style="padding: 5px; text-align: center;">FY 06</td> <td style="padding: 5px; text-align: center;">FY 07</td> </tr> <tr> <td style="padding: 5px;">TOTAL</td> <td style="padding: 5px; text-align: center;">15.281</td> <td style="padding: 5px; text-align: center;">31.348</td> <td style="padding: 5px; text-align: center;">40.540</td> </tr> <tr> <td style="padding: 5px;">Quantity of RDT&E Articles</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> </table>				MK54 Pre-Planned Product Improvement (includes MK54 VLA Integration) 2234	FY 05	FY 06	FY 07	TOTAL	15.281	31.348	40.540	Quantity of RDT&E Articles			
MK54 Pre-Planned Product Improvement (includes MK54 VLA Integration) 2234	FY 05	FY 06	FY 07												
TOTAL	15.281	31.348	40.540												
Quantity of RDT&E Articles															
<p>FY 2005 ACCOMPLISHMENTS:</p> <p>Awarded contract to conduct system engineering, software and hardware development for new prototype array (funded with Congressional add). Performed engineering trade-off studies leading to initiating Hardware Spirals in FY05. Initiated engineering studies for VLA integration. Initiated High Altitude ASW Weapons Concept (HAAWC) Demo Program. Complete array technology demo.</p> <p>FY 2006 Plan:</p> <p>Complete FOT&E Funding increases to support commencing development of hardware spirals improvements and software upgrades for Advanced Processor Build (APB). Continue hardware spiral development to integrate Vertical Launch Anti Submarine Rocket (VLA) with MK54 torpedo. VLA efforts include hardware design, develop prototypes, hardware/software integration, and launch system integration; development includes efforts for hardware and software improvements of re-architecture / Torpedo Downloader System (TDS), and Insensitive Munitions Warhead (IM W/H) capability improvement. Initiate P3I contract award efforts to contractors. Initiate increased software upgrades development efforts in order to address fleet identified performance priorities for the MK54 LWT. Initiate design and qualification of array and transmitter. Complete HAAWC Demo.</p> <p>FY 2007 Plan:</p> <p>Continue hardware spirals development to integrate Vertical Launch Anti Submarine Rocket (VLA) with MK54 torpedo. VLA efforts include hardware design, develop prototypes, hardware/software integration, and launch system integration; development includes efforts for hardware and software improvements of re-architecture / Torpedo Downloader System (TDS), and Insensitive Munitions (IM) capability improvement. Continue software upgrades development efforts; software development to include coding, and modeling and simulation. Conduct in-water tests of VLA. Initiate MK54 launcher and fire control prototypes as part of the Unmanned Surface Vehicle (USV) Concept Demo Program. Initiate MK54 High Altitude ASW Weapon Concept (HAAWC) capability program.</p>															

R-1 SHOPPING LIST - Item No. 121

Exhibit R-2, RDT&E Budget Item Justification

UNCLASSIFIED

(Exhibit R-2, page 2 of 8)

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification		DATE: February 2006																																																	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5		R-1 ITEM NOMENCLATURE LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N																																																	
<p>C. PROGRAM CHANGE SUMMARY:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 45%;"></th> <th style="text-align: right; width: 15%;">FY 2005</th> <th style="text-align: right; width: 15%;">FY 2006</th> <th style="text-align: right; width: 15%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Previous President's Budget: (FY06 PB Controls)</td> <td style="text-align: right;">11.324</td> <td style="text-align: right;">31.826</td> <td style="text-align: right;">28.583</td> </tr> <tr> <td>Current BES/President's Budget: (FY07 PB Controls)</td> <td style="text-align: right;">15.281</td> <td style="text-align: right;">31.348</td> <td style="text-align: right;">40.540</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">3.957</td> <td style="text-align: right; border-top: 1px solid black;">-0.478</td> <td style="text-align: right; border-top: 1px solid black;">11.957</td> </tr> <tr> <td colspan="4" style="padding-top: 20px;">Summary of Adjustments:</td> </tr> <tr> <td>Small Business Innovation Research</td> <td style="text-align: right;">-0.110</td> <td></td> <td></td> </tr> <tr> <td>Department of Energy Transfer (P.L. 108-447)</td> <td style="text-align: right;">-0.009</td> <td></td> <td></td> </tr> <tr> <td>Rescissions</td> <td></td> <td style="text-align: right;">-0.478</td> <td></td> </tr> <tr> <td>Programmatic changes</td> <td></td> <td></td> <td style="text-align: right;">11.957</td> </tr> <tr> <td>Reprogramming</td> <td style="text-align: right;">4.076</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">Sub-Total</td> <td style="text-align: right; border-top: 1px solid black;">3.957</td> <td style="text-align: right; border-top: 1px solid black;">-0.478</td> <td style="text-align: right; border-top: 1px solid black;">11.957</td> </tr> </tbody> </table> <p style="margin-top: 40px;">Schedule: Not applicable.</p> <p>Technical: Not applicable.</p>					FY 2005	FY 2006	FY 2007	Funding:				Previous President's Budget: (FY06 PB Controls)	11.324	31.826	28.583	Current BES/President's Budget: (FY07 PB Controls)	15.281	31.348	40.540	Total Adjustments	3.957	-0.478	11.957	Summary of Adjustments:				Small Business Innovation Research	-0.110			Department of Energy Transfer (P.L. 108-447)	-0.009			Rescissions		-0.478		Programmatic changes			11.957	Reprogramming	4.076			Sub-Total	3.957	-0.478	11.957
	FY 2005	FY 2006	FY 2007																																																
Funding:																																																			
Previous President's Budget: (FY06 PB Controls)	11.324	31.826	28.583																																																
Current BES/President's Budget: (FY07 PB Controls)	15.281	31.348	40.540																																																
Total Adjustments	3.957	-0.478	11.957																																																
Summary of Adjustments:																																																			
Small Business Innovation Research	-0.110																																																		
Department of Energy Transfer (P.L. 108-447)	-0.009																																																		
Rescissions		-0.478																																																	
Programmatic changes			11.957																																																
Reprogramming	4.076																																																		
Sub-Total	3.957	-0.478	11.957																																																

R-1 SHOPPING LIST - Item No. 121

Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 3 of 8)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification					DATE: February 2006		
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5				R-1 ITEM NOMENCLATURE LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N			
D. OTHER PROGRAM FUNDING SUMMARY:							
	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Torpedo MK 46 MODS / MK54 MODS 0 (WPN / PE 0204228N / BA3 / BLI 321500)	60.822	68.582	96.505	84.945	176.628	151.056	167.627
E. ACQUISITION STRATEGY:							
<p>The EDM contract is held by Raytheon Systems Company. The contract was awarded as a Cost-Plus-Award Fee in June 1996 and was converted to Cost-Plus-Incentive Fee in December 1998.</p> <p>Sole Source Production Contract awarded in FY 2004 for MK48 ADCAP MODS/CBASS and MK54 Lightweight Torpedoes.</p> <p>P3I spiral acquisition strategy is to award EDM contract's among qualified producers.</p>							
F. MAJOR PERFORMERS:							
<p>NUWC, Newport: MK54 System Engineering, System Integration, Software development, and Hardware Engineering development.</p> <p>NUWC, Keyport: MK 54 Torpedo preparation for in-water testing and safety and environmental engineering including Fleet Exercise Section and Automatic Test Equipment. VLA: System Engineering and Integration.</p> <p>NSWC Indian Head: Warhead Development for torpedoes.</p> <p>PEO-IWS 3, Dahlgren: VLA Integration: MK41 Vertical Launching System (VLS) Systems Integration and software development.</p> <p>PEO-IWS 5, Dahlgren: VLA Integration: ASW Fire Control system integration and software development.</p> <p>PMA 290: Development of MK54 high altitude launch capability.</p> <p>Lockheed Martin: Development of MK54 high altitude launch capability.</p> <p>Raytheon Corporation: MK54 Hardware Development.</p> <p>Material System Incorporated: Hardware Design for array technology.</p> <p>Lockheed Martin: System Engineering for VLA integration.</p>							

R-1 SHOPPING LIST - Item No. 121

Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-2, page 4 of 8)

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 1)								DATE: February 2006				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			0604610N			Lightweight Torpedo 2234						
Cost Categories (Tailor to WBS, or System/Item Requirements)	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
Hardware Development	WR	NUWC Newport/Keyport	CONT.	0.965	10/04	5.300	10/05	7.925	10/06	CONT.	CONT.	N/A
Hardware Development	SS/FP	Material Systems Inc.	N/A	1.150	10/04	0.000		0.000				
Hardware Development	SS/FP	Raytheon Corporation	N/A	0.000		2.678	01/06	1.475	11/06	CONT.	CONT.	N/A
Hardware Development	SS/FP	Lockheed Martin - Orlando	N/A	2.417	09/05	0.000		0.000				
Hardware Development	WR	NSWC Indian Head	N/A	0.500	10/04	0.977	11/05	0.600	10/06	CONT.	CONT.	N/A
Hardware Development	WR	ARL/PSU State College, PA	0.200	0.050	10/04	0.000	11/05	0.000		N/A	N/A	N/A
Systems Engineering	WR	NUWC Newport/Keyport	CONT.	2.817	10/04	4.423	10/05	8.902	10/06	CONT.	CONT.	N/A
Systems Engineering	SS/FP	Lockheed Martin - Akron		0.500	10/04	1.680	01/06	0.510	11/06	CONT.	CONT.	N/A
Systems Engineering	WR	PEO-IWS 3, Dahlgren	N/A	2.000	10/04	2.922	10/05	4.500	10/06	CONT.	CONT.	N/A
Systems Engineering	WR	PEO-IWS 5, Dahlgren	N/A	0.655	10/04	1.981	01/06	1.817	10/06	CONT.	CONT.	N/A
Systems Engineering	WR	NSWC PMA 290	N/A	1.235		0.000		1.357	10/06			
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			CONT.	12.289		19.961		27.086		CONT.	CONT.	
Development Support Equipment												
Software Development	WR	NUWC Newport/Keyport	CONT.	2.104	10/04	10.350	10/05	11.825	10/06	CONT.	CONT.	N/A
Software Development	WR	ARL/PSU State College, PA	0.200	0.075	10/04	0.000		0.000				
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			CONT.	2.179		10.350		11.825		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 121

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 5 of 8)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2006		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			0604610N			Lightweight Torpedo 2234						
Cost Categories (Tailor to WBS, or System/Item Requirements)	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
System Test & Evaluation	WR	Operational Test Support	CONT.	0.364	10/04	0.600	10/05	0.600	10/06	CONT.	CONT.	N/A
System Test & Evaluation	WR	NUWC Newport/Keyport	CONT.	0.000	10/04	0.000	10/05	0.000	10/06	CONT.	CONT.	N/A
System Test & Evaluation	WR	NSWC PMA 290	0.600	0.000	10/04	0.000	10/05	0.600	10/06	N/A	0.000	N/A
System Test & Evaluation	WR	ARL/PSU State College, PA	0.200	0.000	10/04	0.000	11/05	0.000	11/06	N/A	N/A	N/A
Subtotal T&E			CONT.	0.364		0.600		1.200		CONT.	CONT.	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	Various	Anteon	CONT.	0.399	MISC.	0.397	MISC.	0.389	MISC.	CONT.	CONT.	N/A
Travel			CONT.	0.050	MISC.	0.040	MISC.	0.040	MISC.	CONT.	CONT.	N/A
Labor (Research Personnel)				0.000		0.000		0.000				
Overhead			CONT.	0.000	MISC.	0.000	MISC.	0.000	MISC.	CONT.	CONT.	N/A
Subtotal Management			CONT.	0.449		0.437		0.429		CONT.	CONT.	
Remarks:												
Total Cost			CONT.	15.281		31.348		40.540		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 121

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 6 of 8)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-4, Schedule Profile				DATE:			
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE			
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5				LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N			
	FY05	FY06	FY07	FY08	FY09	FY10	FY11
MK54 Development		FoT&E △					
MK54 Pre-Planned Product Improvement (P3I)				TDS/VLA	ARRAY		
Hardware Spirals	▲			△	△		→
Software Upgrades	▲			BU △	APB △		APB △ →
DT/OT			VLA OT △ △	ARRAY-BU DT/OT △ △	APB DT/OT △		→
Unmanned Surface Vehicle (USV)			△		DEMO △		
High Altitude Capability	△	DEMO △	△		DT △ △	OT △ △	IOC △ →

R-1 SHOPPING LIST - Item No. 121

Exhibit R-2, RDT&E Budget Item Justification
(Exhibit R-4, page 7 of 8)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-4a, Schedule Detail				DATE:			
				February 2006			
APPROPRIATION/BUDGET ACTIVITY		PROJECT NUMBER AND NAME					
RDT&E,N/BA-5		LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N					
Schedule Profile	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
MK54 Development & Upgrades							
FOT&E		4Q					
MK54 Pre-Planned Product Improvement (P3I)							
Hardware Spirals	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Software Spirals	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
DT/OT			2Q-4Q	3Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Unmanned Surface Vehicle			1Q-4Q	1Q-4Q	1Q-2Q		
High Altitude Capability Demo	3Q-4Q	1Q-3Q					
High Altitude Capability			1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q

R-1 SHOPPING LIST - Item No. 121

Exhibit R-4a, RDT&E Budget Item Justification
(Exhibit R-4a, page 8 of 8)

UNCLASSIFIED