

CLASSIFICATION:

**UNCLASSIFIED**

EXHIBIT R-2, 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 <b>LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N</b>				
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	<b>18.745</b>	<b>6.173</b>	<b>9.965</b>	<b>32.184</b>	<b>28.727</b>	<b>8.323</b>	<b>8.561</b>
Lightweight Torpedo 2234	<b>15.889</b>	<b>6.173</b>	<b>9.965</b>	<b>32.184</b>	<b>28.727</b>	<b>8.323</b>	<b>8.561</b>
Lightweight/Heavyweight Baseline Commonality 9239	<b>2.856</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Quantity of RDT&E Articles			<b>8</b>				

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. MK54 Test & Evaluation 2234: FY 2003 Congressional increases of (\$4.200M) to support extended TECHEVAL and OPEVAL programs that incorporate additional in water firings and an additional \$4.390M (\$2.790M BTR and \$1.600M Mid-Year Review Adjustment). FY2004: Congressional increase (\$2.8M) to support improvement of MK54 array performance and reliability. Starting in FY05, budget increases to support a Pre-Planned Product Improvement program for MK54 using a spiral development acquisition approach. The first spiral will focus on MK48 common hardware and software architecture enhancements and integration with Vertical Launch Anti Submarine Rocket (VLA).

Lightweight/Heavyweight Baseline Commonality 9239: FY 2003 Congressional increase (\$3M) to develop and test hardware and software design changes that would realign the lightweight and heavyweight torpedo hardware and software baselines to achieve greater commonality.

R-1 SHOPPING LIST - Item No. 120

**Exhibit R-2, RDT&E Budget Item Justification**  
 (Exhibit R-2, page 1 of 10)

**UNCLASSIFIED**

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-2, 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 <b>LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N</b>	
<b>B. Accomplishments/Planned Program</b>			
<b>MK54 Baseline Development 2234</b>	<b>FY 03</b>	<b>FY 04</b>	<b>FY 05</b>
TOTAL	15.889	3.373	0.000
<b>FY 2003 ACCOMPLISHMENTS:</b> Continued Lightweight torpedo system engineering, software, and hardware development efforts. Completed TECHEVAL and initiated operational in-water test program (OPEVAL).			
<b>FY 2004 Plan</b> Complete OPEVAL and conduct Milestone III review in FY04 to be ready for Full Rate Production contract in FY05.			
<b>MK54 Pre-Planned Product Improvement (includes MK54 VLA Integration) 2234</b>	<b>FY 03</b>	<b>FY 04</b>	<b>FY 05</b>
TOTAL	0.000	2.800	9.965
Quantity of RDT&E Articles			8
<b>FY 2003 ACCOMPLISHMENTS:</b> N/A			
<b>FY 2004 Plan:</b> Initiate Spiral 2 engineering trade-off studies on array concept development.			
<b>FY 2005 Plan:</b> Initiate Spiral 1 to integrate Vertical Launch Anti Submarine Rocket (VLA) with MK54 torpedo. Efforts include hardware design, develop prototypes, hardware/software integration, and launch system integration. Also, initiate development efforts for hardware and software improvements (single card box, MK103 warhead modification, Torpedo Downloader System (TDS), and Advanced Processor Build (APB) software upgrade).			
<b>Lightweight/Heavyweight Baseline Commonality 9239</b>	<b>FY 03</b>	<b>FY 04</b>	<b>FY 05</b>
TOTAL	2.856	0.000	0.000
<b>FY 2003 ACCOMPLISHMENTS:</b> Congressional funds for this task were received at the beginning of 2Q FY03. Initiated Lightweight/Heavyweight Baseline Commonality initiatives to better align lightweight and heavyweight torpedoes hardware and software baselines. Conducted engineering trade-off studies needed to specify hardware and software design requirements and design approaches. Results of these studies identified priorities and associated risks for P3I. Complete top level design of a single card box to combine the forward and aft processor assemblies. This effort is a FY03 Congressional Plus-Up and will be completed in FY04.			
<b>FY 2004 Plan:</b> N/A			
<b>FY 2005 Plan:</b> N/A			

R-1 SHOPPING LIST - Item No. 120

Exhibit R-2, RDT&E Budget Item Justification  
(Exhibit R-2, page 2 of 10)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-2, 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 <b>LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N</b>	
<b>C. PROGRAM CHANGE SUMMARY:</b>			
Funding:	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Previous Presidents Budget' 04: (FY04 PB Controls)	14.638	3.442	10.072
Current BES/President's Budget: (FY05 PB Controls)	18.745	6.173	9.965
Total Adjustments	4.107	2.731	-0.107
Summary of Adjustments			
FY2003 Update MK54 T&E - BTR	2.790		
BTR Adjustment April 03	-0.076		
FY03 Midyear Review Adjustment for MK54 T&E	1.600		
BSO Adjustments	-0.020		
MK54 Torpedo P3I - Array Improvement		2.800	
Economic Assumptions		-0.069	-0.053
NWC Rates - NUWC Rates			-0.053
Rates			0.002
WCF - R&D			-0.003
SBIR/STTR Transfer	-0.187		
Subtotal	4.107	2.731	-0.107
Schedule: Testing schedule slippage of five months caused by unavailability of target services due to operations in Iraq. Plan developed to mitigate MK54 testing schedule changes to maintain MIII / IOC July 04.			
Technical: Not applicable.			

R-1 SHOPPING LIST - Item No. 120

**Exhibit R-2, RDT&E Budget Item Justification**  
(Exhibit R-2, page 3 of 10)

UNCLASSIFIED

**CLASSIFICATION:**

**UNCLASSIFIED**

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: <b>February 2004</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RESEARCH DEVELOPMENT TEST &amp; EVALUATION, NAVY/BA-7</b>						R-1 ITEM NOMENCLATURE <b>LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N</b>		
<b>D. OTHER PROGRAM FUNDING SUMMARY:</b>								
	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete
Torpedo MK 46 MODS / MK54 MODS 0 (WPN / PE 0204228N / BA3 / BLI 321500)	37.846	42.649	61.503	76.788	96.497	115.686	128.411	CONT.
<b>E. ACQUISITION STRATEGY:</b>								
<p>The EDM contract is currently 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>Contract award planned in FY 2004 for MK48 ADCAP MODS and Lightweight MK54 torpedoes.</p>								
<b>F. MAJOR PERFORMERS:</b>								
<p>NUWC, Newport: 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.</p> <p>NSWC Indian Head: Warhead Development for Lightweight/Heavyweight Baseline Commonality.</p> <p>Raytheon Corporation: Hardware Development, Lightweight/Heavyweight Baseline Commonality.</p> <p>Material System Incorporated: Hardware Design for array technology.</p> <p>TBD: Hardware engineering and system engineering for VLA integration.</p>								

R-1 SHOPPING LIST - Item No. 120

**Exhibit R-2, RDT&E Budget Item Justification**  
(Exhibit R-2, page 4 of 10)

**UNCLASSIFIED**

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 1)								DATE: <b>February 2004</b>				
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N/BA-5</b>			PROGRAM ELEMENT <b>0604610N</b>			PROJECT NAME AND NUMBER <b>Lightweight Torpedo 2234</b>						
Cost Categories (Tailor to WBS, or System/Item Requirements)	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
Hardware Development	WR	NUWC Newport/Keyport	CONT.	0.919	10/02	0.160	10/03	0.125	10/04	CONT.	CONT.	N/A
	SS/FP	Material Systems Inc.	N/A	0.000		2.000	04/04	0.000				
	SS/FP	Raytheon Corporation	N/A	0.000		0.400	04/04	0.000				
Systems Engineering	WR	NUWC Newport/Keyport	CONT.	2.681	10/02	0.938	10/03	0.340	10/04	CONT.	CONT.	N/A
Systems Engineering	Various	Various						4.837	10/04	CONT.	CONT.	N/A
Systems Engineering	WR	NSWC Indian Head	0.209	0.000		0.000		0.314	10/03	CONT.	CONT.	N/A
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			CONT.	3.600		3.498		5.616		CONT.	CONT.	
Development Support Equipment												
Software Development	WR	NUWC Newport/Keyport	CONT.	1.433	10/02	0.125	10/03	0.743	10/04	CONT.	CONT.	N/A
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			CONT.	1.433		0.125		0.743		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 120

**Exhibit R-3, Project Cost Analysis**  
(Exhibit R-3, page 5 of 10)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 2)								DATE: <b>February 2004</b>				
APPROPRIATION/BUDGET ACTIVITY <b>RD&amp;E, N/BA-5</b>			PROGRAM ELEMENT <b>0604610N</b>			PROJECT NAME AND NUMBER <b>Lightweight Torpedo 2234</b>						
Cost Categories (Tailor to WBS, or System/Item Requirements)	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
System Test & Evaluation	WR	COMOPTEVFOR	CONT.	0.780	10/02	0.462	10/03	0.075	10/04	CONT.	CONT.	N/A
	WR	NUWC Newport/Keyport	CONT.	9.078	10/02	1.500	10/03	1.386	10/04	CONT.	CONT.	N/A
	WR	NSWC Dahlgren	0.692					1.420	10/04	CONT.	CONT.	N/A
	WR	NSWC Patuxent River	N/A	0.600	08/03	0.151	10/03	0.000		N/A	0.751	N/A
	WR	ARL/PSU State College, PA	1.707	0.200	12/03	0.000		0.200		N/A	N/A	N/A
Subtotal T&E			CONT.	10.658		2.113		3.081		CONT.	CONT.	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	Various	Anteon	CONT.	0.183	MISC.	0.409	MISC.	0.404	MISC.	CONT.	CONT.	N/A
Travel			CONT.	0.015	MISC.	0.010	MISC.	0.040	MISC.	CONT.	CONT.	N/A
Labor (Research Personnel)						0.000						
Overhead			CONT.	0.000	MISC.	0.018	MISC.	0.081	MISC.	CONT.	CONT.	N/A
Subtotal Management			CONT.	0.198		0.437		0.525		CONT.	CONT.	
Remarks:												
Total Cost			CONT.	15.889		6.173		9.965		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 120

**Exhibit R-3, Project Cost Analysis**  
(Exhibit R-3, page 6 of 10)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 1)						DATE: <b>February 2004</b>						
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
<b>RDT&amp;E, N/BA-5</b>			<b>0604610N</b>			<b>Lightweight/Heavyweight Baseline Commonality 9239</b>						
Cost Categories (Tailor to WBS, or System/Item Requirements)	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
Hardware Development	SS, FP	Raytheon Corporation	N/A	1.698	MISC.					N/A	N/A	N/A
Systems Engineering	WR	NUWC Newport	N/A	0.516	03/03					N/A	N/A	N/A
Systems Engineering	WR	NSWC Indian Head	N/A	0.642	03/03					N/A	N/A	N/A
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			N/A	2.856		0.000		0.000				
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Remarks:												

R-1 SHOPPING LIST - Item No. 120

**Exhibit R-3, Project Cost Analysis**  
(Exhibit R-3, page 7 of 10)

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 2)								DATE: February 2004				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			0604610N			Lightweight Torpedo 9239						
Cost Categories (Tailor to WBS, or System/Item Requirements)	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
System Test & Evaluation												
Subtotal T&E			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Remarks:												
Total Cost			N/A	2.856		0.000		0.000				
Remarks:												

R-1 SHOPPING LIST - Item No. 120

Exhibit R-3, Project Cost Analysis  
(Exhibit R-3, page 8 of 10)

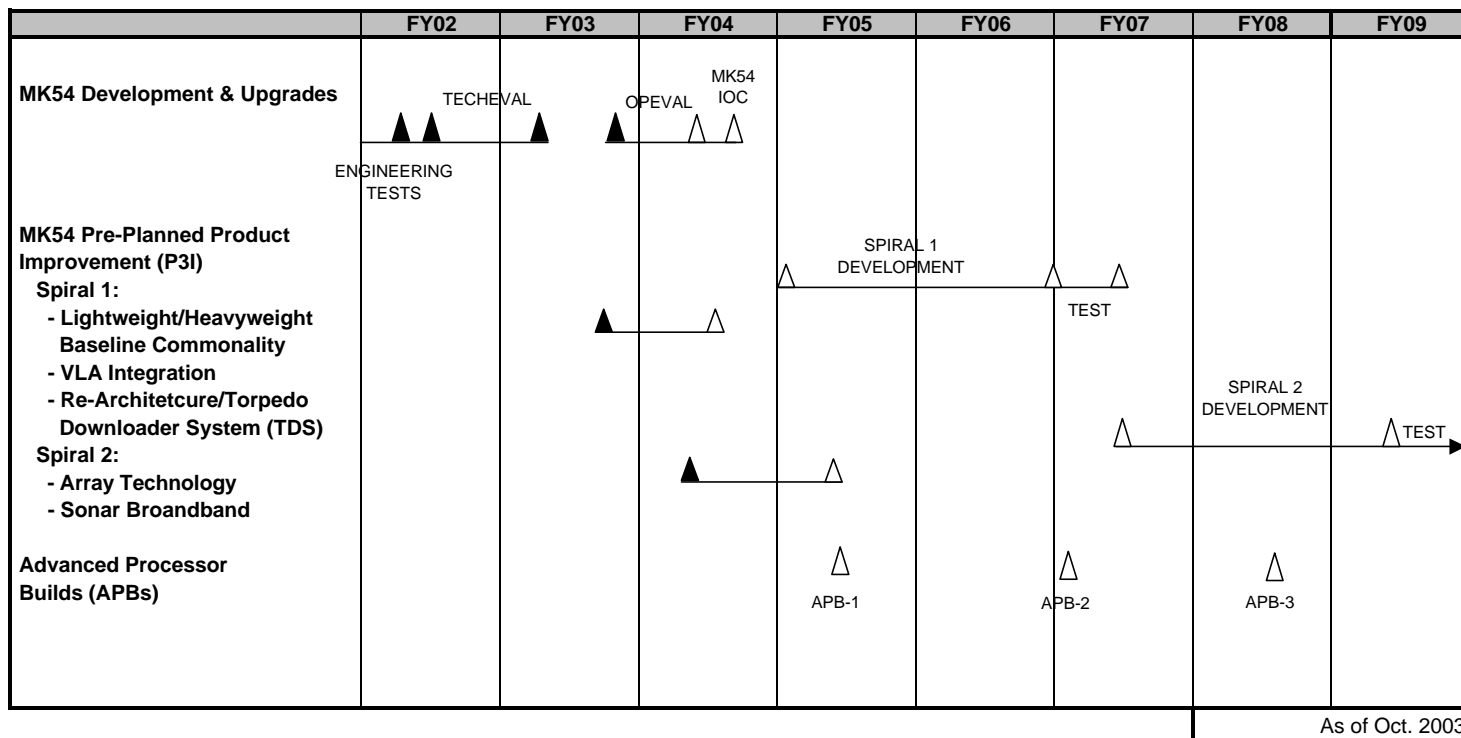
UNCLASSIFIED



**CLASSIFICATION:**

**UNCLASSIFIED**

EXHIBIT R-4, Schedule Profile		DATE:	February 2004
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5		LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N	



R-1 SHOPPING LIST - Item No. 120

**Exhibit R-2, RDT&E Budget Item Justification**  
(Exhibit R-2, page 9 of 10)

**UNCLASSIFIED**

CLASSIFICATION:

UNCLASSIFIED

Exhibit R-4a, Schedule Detail						DATE: <b>February 2004</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E,N/BA-5</b>	PROGRAM ELEMENT <b>0604610N</b>			PROJECT NUMBER AND NAME <b>LIGHTWEIGHT TORPEDO DEVELOPMENT / 0604610N</b>				
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
<b>MK54 Development &amp; Upgrades</b>								
Engineering Test	1Q							
TECHEVAL	2Q-4Q	2Q						
OPEVAL		4Q	3Q					
IOC			4Q					
<b>MK54 Pre-Planned Product Improvement (P3I)</b>								
Spiral 1:								
LWT/HWT Baseline Commonality Contract Preparation		4Q						
LWT/HWT Baseline Commonality Architecture Study		4Q	1Q-3Q					
VLA Integration & Test				1Q-4Q	1Q-4Q			
Re-Architecture / Torpedo Downloader System (TDS) Development				2Q-4Q	1Q-2Q			
Re-Architecture / Torpedo Downloader System (TDS) Test					2Q-4Q			
Torpedo Dowloader System (TDS)								
Spiral 2:								
Array Technology			2Q	2Q				
Braodband Sonar Development						2Q-4Q	1Q-4Q	2Q
Braodband Sonar Test								3Q-4Q
<b>Advanced Processor Builds</b>								
APB-1				2Q				
APB-2						1Q		
APB-3							3Q	

R-1 SHOPPING LIST - Item No. 120

Exhibit R-4a, RDT&E Budget Item Justification  
(Exhibit R-4a, page 10 of 10)

UNCLASSIFIED