

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy **DATE:** April 2013

APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE							
1319: Research, Development, Test & Evaluation, Navy BA 5: System Development & Demonstration (SDD)					PE 0604610N: Lightweight Torpedo Development							
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	179.068	25.457	49.818	26.444	-	26.444	29.999	22.765	20.323	20.570	Continuing	Continuing
2234: <i>Lightweight Hybrid Torpedo</i>	179.068	25.457	49.818	26.444	-	26.444	29.999	22.765	20.323	20.570	Continuing	Continuing

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

Lightweight Torpedo Program designs, integrates and tests the Lightweight Torpedo (LWT, MK54). The LWT 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. Initial Operating Capability (IOC) of the MK 54 Mod 0 was achieved in 2004. IOC of the MK 54 equipped VLA was achieved in 2010.

Budget supports Pre-Planned Product Improvement (P3I) Program using an incremental developmental acquisition approach combining hardware and Advanced Processor Build (APB) software upgrades to enable rapid fielding of improvements to the Fleet. The P3I program will focus on common LWT and Heavyweight Torpedo (HWT) hardware and software architecture enhancements that will provide re-architecture, broadband array improvements, Block Upgrade (BUG), and APB software improvements. Future APB software builds will utilize the common torpedo software to deliver software and tactics to both the MK 48 Advanced Capability (ADCAP) and MK 54 Lightweight torpedoes. The P3I program will also support development of enhanced weapon delivery methods, including the high altitude launch of the MK 54 from Maritime Patrol Aircraft (MPA) with the High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC).

B. Program Change Summary (\$ in Millions)	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	32.592	49.818	38.249	-	38.249
Current President's Budget	25.457	49.818	26.444	-	26.444
Total Adjustments	-7.135	0.000	-11.805	-	-11.805
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-6.364	0.000			
• SBIR/STTR Transfer	-0.771	0.000			
• Program Adjustments	0.000	0.000	-4.021	-	-4.021
• Rate/Misc Adjustments	0.000	0.000	-7.784	-	-7.784

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 5: System Development & Demonstration (SDD)	R-1 ITEM NOMENCLATURE PE 0604610N: Lightweight Torpedo Development	
<u>Change Summary Explanation</u> Technical: Rephasing of Technology Insertion (TI-1) funds for APB-5 design, development, test, and evaluation from FY14 to FY15 and FY16 (-\$4.021). Rephasing of HAAWC funds for contractor design, development, and qualification of high altitude capability from FY 14 to FY 15 (-\$7.407), in addition to other miscellaneous adjustments (-\$0.377).		

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy										DATE: April 2013		
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 5: System Development & Demonstration (SDD)					R-1 ITEM NOMENCLATURE PE 0604610N: Lightweight Torpedo Development				PROJECT 2234: Lightweight Hybrid Torpedo			
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
2234: Lightweight Hybrid Torpedo	179.068	25.457	49.818	26.444	-	26.444	29.999	22.765	20.323	20.570	Continuing	Continuing
Quantity of RDT&E Articles	0	20	21	14		14	0	0	0	0		
# FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012												
## The FY 2014 OCO Request will be submitted at a later date												
A. Mission Description and Budget Item Justification												
The program designs, integrates and tests the LWT, MK54. The LWT provides performance improvements in shallow water, counter-measure environments. The EDM contract was awarded to Raytheon Systems Company in June 1996. IOC of the MK54 Mod 0 achieved in 2004. IOC of MK 54 equipped VLA MK 54 MOD 1 achieved in 2010.												
FY 2012 delivery includes 18 TI-1 POM												
FY 2012 achievement of BUG/TURF Software IOC												
FY 2012 achievement of Anti-Torpedo Demo												
FY 2013 delivery includes 20 HAAWC POD units												
FY 2013 achievement of BUG IOC												
FY 2014 HAAWC Contract delivery of 14 POM Units												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2012	FY 2013	FY 2014	
Title: MK54 Pre-Planned Product Improvement									25.457	49.818	26.444	
									20	21	14	
Description: MK54 Pre-Planned Product Improvement (P3I) includes the MK54 VLA Integration and HAAWC programs.												
FY 2012 Accomplishments: Developed hardware/software improvements for P3I program. Developed MK 54 high altitude launch capability from MPA.												
A modification to the MK54 P3I program was directed by CNO to address a Fleet Urgent Operational Need (UON), which enabled the early fielding of specific BUG capabilities. The development of these changes was being accomplished under the software program and are referred to as the Torpedo UON Rapid Fielding (TURF) effort. TURF development and testing, was accomplished through a Quick Reaction Assessment (QRA), resuting in TURF fleet release in Jan 2012.												
A modification to the MK54 P3I program was directed to accomplish a technical feasibility demonstration of the MK54 as an Anti-Torpedo Torpedo (ATT). These efforts were initiated in FY11 and scheduled to conclude in 1Q FY13.												

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy								DATE: April 2013			
APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 5: <i>System Development & Demonstration (SDD)</i>				R-1 ITEM NOMENCLATURE PE 0604610N: <i>Lightweight Torpedo Development</i>				PROJECT 2234: <i>Lightweight Hybrid Torpedo</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2012	FY 2013	FY 2014	
Conducted BUG Operational Testing. FY 2013 Plans: Continue development of hardware/software improvements for P3I program. Continue development of MK54 high altitude launch capability from MPA. Complete Block Upgrade testing, and field BUG. Achievement of Production Readiness Review (PRR) of hardware improvements (112 element array) on MK54 MOD 1. FY 2014 Plans: Continue development of hardware/software improvements for P3I program. Continue development of MK54 high altitude launch capability from MPA. Conduct MK54 MOD 1 Development Testing.											
Accomplishments/Planned Programs Subtotals								25.457	49.818	26.444	
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u> <u>Base</u>	<u>FY 2014</u> <u>OCO</u>	<u>FY 2014</u> <u>Total</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• WPN/3215,WPN/3215,WPN/3215: MK54 Torpedo Mods,MK54 Torpedo Mods,MK54 Torpedo Mods	76.605	74.487	125.898		125.898	150.569	198.236	201.883	205.259	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
The EDM contract held by Raytheon Systems Company supports an incremental upgrade strategy to counter evolving threats. The award of EDM contracts among qualified producers includes both hardware and software upgrades. The contract was awarded as a Cost-Plus-Award Fee in June 1996, and was converted to Cost-Plus-Incentive Fee in December 1998. Sole Source Production Contract awarded in FY 2004 for MK48 ADCAPS MODS/CBASS and MK54 Lightweight Torpedoes. The MK54 Lightweight Torpedo Kit Fixed-Price-Incentive (Firm Target) procurement contract was awarded in September 2011 to Raytheon Systems Company. The TI-1 Cost-Plus-Fixed-Fee contract was awarded to Progeny in September 2008.											
E. Performance Metrics											
Milestone Reviews. System Engineering Technical Review.											

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 5: <i>System Development & Demonstration (SDD)</i> Earned Value Management Reviews.	R-1 ITEM NOMENCLATURE PE 0604610N: <i>Lightweight Torpedo Development</i>	PROJECT 2234: <i>Lightweight Hybrid Torpedo</i>

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy												DATE: April 2013			
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 5: System Development & Demonstration (SDD)						R-1 ITEM NOMENCLATURE PE 0604610N: Lightweight Torpedo Development				PROJECT 2234: Lightweight Hybrid Torpedo					
Product Development (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Development	WR	NUWC:Newport/Keyport	37.948	2.761	Oct 2011	2.534	Oct 2012	2.219	Oct 2013	-		2.219	Continuing	Continuing	Continuing
Hardware Development	C/CPAF	Raytheon:Not Specified	3.530	0.000		0.000		0.000		-		0.000	0.000	3.530	
Hardware Development	WR	NSWC:Indian Head, MD	0.882	1.573	Oct 2011	0.600	Oct 2012	0.990	Oct 2013	-		0.990	Continuing	Continuing	Continuing
Systems Engineering	WR	NUWC:Newport/Keyport	18.489	0.156	Dec 2011	0.317	Oct 2012	0.375	Oct 2013	-		0.375	Continuing	Continuing	Continuing
Systems Engineering	SS/FP	Lockheed Martin - VLA:Akron, OH	2.501	0.000		0.000		0.000		-		0.000	0.000	2.501	
Systems Engineering	WR	PEO-IWS 3,:Dahlgren, VA	2.882	0.000		0.000		0.000		-		0.000	0.000	2.882	
Systems Engineering	WR	PEO-IWS 5,:Dahlgren, VA	2.223	0.000		0.000		0.000		-		0.000	0.000	2.223	
Systems Engineering	WR	NSWC PMA 290:Paxtuxent, MD	5.167	0.440	Oct 2011	1.250	Oct 2012	1.250	Oct 2013	-		1.250	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCWD:China Lake	1.173	0.962	Dec 2011	1.250	Oct 2012	1.400	Oct 2013	-		1.400	0.000	4.785	
Systems Engineering	SS/FP	SPA Inc.:Not Specified	0.640	0.000		0.000		0.000		-		0.000	0.000	0.640	
Hardware Development	SS/FP	Progeny Systems:Not Specified	24.394	0.000		0.000		0.000		-		0.000	0.000	24.394	
Hardware Development	C/CPAF	TBD for HAAWC:Not Specified	22.278	9.164	Mar 2013	27.591	Mar 2013	10.197	Apr 2014	-		10.197	Continuing	Continuing	Continuing
System Test & Evaluation	WR	NUWC:Newport/Keyport	18.313	1.080	Oct 2011	0.384	Oct 2012	0.770	Oct 2013	-		0.770	Continuing	Continuing	Continuing
Systems Engineering	WR	Naval Operational Logistics Support Center (NOLSC):Not Specified	0.025	0.000		0.000		0.000		-		0.000	0.000	0.025	

UNCLASSIFIED

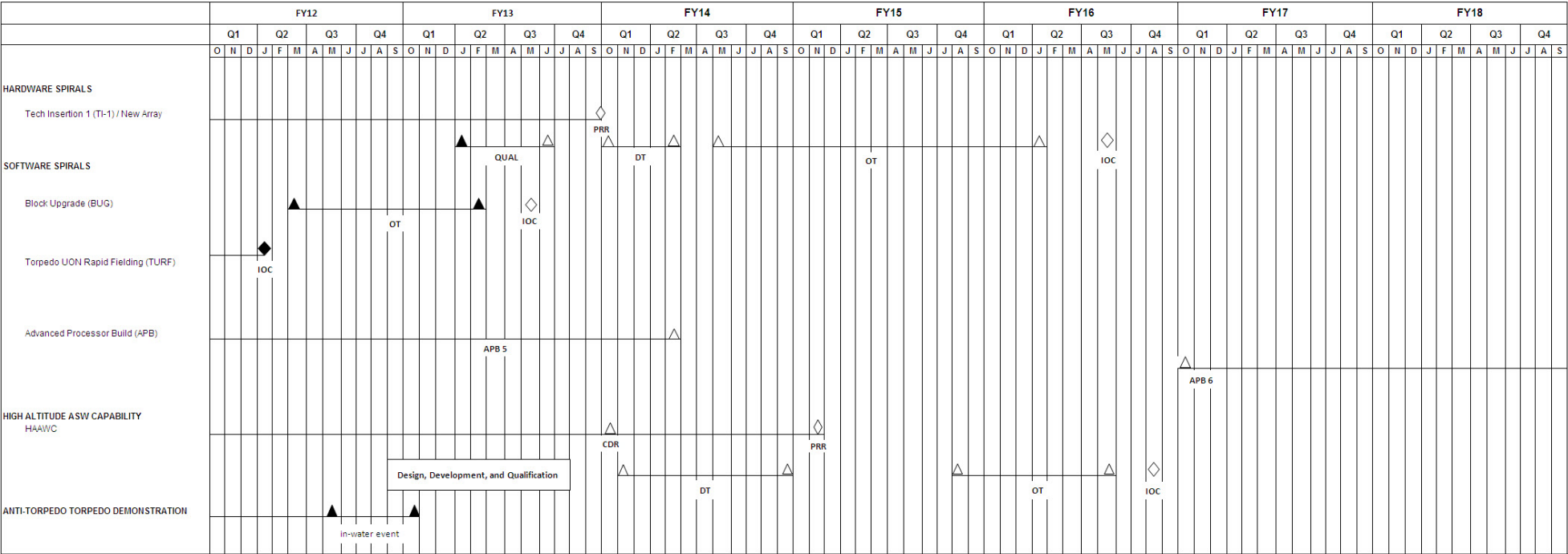
Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy												DATE: April 2013			
APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 5: <i>System Development & Demonstration (SDD)</i>						R-1 ITEM NOMENCLATURE PE 0604610N: <i>Lightweight Torpedo Development</i>						PROJECT 2234: <i>Lightweight Hybrid Torpedo</i>			
Product Development (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	John Hopkins University:Baltimore, MD	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	
Software Development	C/CPFF	MIT:Boston, MA	0.000	0.300	Oct 2011	0.309	Oct 2012	0.045	Oct 2013	-		0.045	0.000	0.654	
Subtotal			140.495	16.436		34.235		17.246		0.000		17.246			
Support (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation	WR	NUWC:Newport/Keyport	20.847	0.992	Oct 2011	2.416	Oct 2012	2.405	Oct 2013	-		2.405	Continuing	Continuing	Continuing
Systems Engineering	WR	NUWC:Newport/Keyport	0.000	0.120	Oct 2011	0.120	Oct 2012	0.000		-		0.000	0.000	0.240	
Program Management Support	WR	NUWC:Newport/Keyport	0.000	1.875	Oct 2011	1.957	Oct 2012	1.466	Oct 2013	-		1.466	0.000	5.298	
Hardware Development	WR	NUWC:Newport/Keyport	0.000	0.750	Oct 2011	1.200	Oct 2012	1.100	Oct 2013	-		1.100	0.000	3.050	
Program Management Support	Various	NAVSEA:Not Specified	0.000	0.044	Nov 2011	0.038	Oct 2012	0.015	Oct 2013	-		0.015	0.000	0.097	
Program Management Support	C/BA	ARL/PSU:Philadelphia, PA	0.000	0.441	Dec 2011	0.000		0.000		-		0.000	0.000	0.441	
Subtotal			20.847	4.222		5.731		4.986		0.000		4.986			
Test and Evaluation (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NSWC:Carderock	0.090	0.000		0.000		0.000		-		0.000	0.000	0.090	
System Test and Evaluation	WR	OPTEVFOR:Not Specified	1.272	0.813	Oct 2011	1.555	Oct 2012	0.500	Oct 2013	-		0.500	Continuing	Continuing	Continuing

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy												DATE: April 2013			
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 5: System Development & Demonstration (SDD)						R-1 ITEM NOMENCLATURE PE 0604610N: Lightweight Torpedo Development				PROJECT 2234: Lightweight Hybrid Torpedo					
Test and Evaluation (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation	WR	NUWC:Newport/Keyport	13.832	3.272	Oct 2011	7.644	Oct 2012	3.053	Oct 2013	-		3.053	Continuing	Continuing	Continuing
System Test and Evaluation	C/CPIF	ARL/PSU:Philadephia, PA	0.000	0.068	Mar 2012	0.000	Oct 2012	0.000		-		0.000	0.000	0.068	
Subtotal			15.194	4.153		9.199		3.553		0.000		3.553			
Management Services (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Alion Science:Not Specified	1.905	0.435	Dec 2011	0.462	Oct 2012	0.462	Oct 2013	-		0.462	Continuing	Continuing	Continuing
Travel	WR	NAVSEA:Not Specified	0.308	0.050	Nov 2011	0.025	Oct 2012	0.026	Oct 2013	-		0.026	Continuing	Continuing	Continuing
Acquisition Workforce Fund	Various	Various:Various	0.226	0.000		0.000		0.000		-		0.000	0.000	0.226	
Program Management Support	C/CPFF	ARL/PSU:Philadephia, PA	0.000	0.161	Oct 2011	0.166	Oct 2012	0.171	Oct 2013	-		0.171	0.000	0.498	
Program Management Support	Various	NAVSEA:Not Specified	0.093	0.000	Nov 2011	0.000		0.000		-		0.000	0.000	0.093	
Subtotal			2.532	0.646		0.653		0.659		0.000		0.659			
			All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			179.068	25.457		49.818		26.444		0.000		26.444			
Remarks															

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy			DATE: April 2013		
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 5: System Development & Demonstration (SDD)		R-1 ITEM NOMENCLATURE PE 0604610N: Lightweight Torpedo Development		PROJECT 2234: Lightweight Hybrid Torpedo	
Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy				DATE: February 2013	
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 05: Development & Demonstration		R-1 ITEM NOMENCLATURE PE 0604610N: Lightweight Torpedo Development		PROJECT 2234: Lightweight Hybrid Torpedo	



- ATT = Anti-Torpedo Torpedo
- CDR = Critical Design Review
- DT = Development Testing
- IOC = Initial Operation Capability
- OT = Operational Testing

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 5: <i>System Development & Demonstration (SDD)</i>	R-1 ITEM NOMENCLATURE PE 0604610N: <i>Lightweight Torpedo Development</i>	PROJECT 2234: <i>Lightweight Hybrid Torpedo</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2234				
Tech Insertion 1 (TI-1) /New Array Production Readiness Review (PRR):	1	2014	1	2014
Tech Insertion 1 (TI-1)/New Array Developmental Testing (DT):	1	2014	2	2014
Tech Insertion 1 (TI-1) /New Array OT:	3	2014	2	2016
Tech Insertion 1 (TI-1) /New Array IOC:	3	2016	3	2016
Software Spirals BUG/CAT OT:	2	2012	2	2013
Software Spirals BUG/CAT OT: Software Spirals BUG/CAT IOC: Schedule Detail	3	2013	3	2013
Software Spirals BUG/CAT OT: Torpedo UON Rapid Fielding (TURF): Schedule Detail	1	2012	2	2012
Software Spirals BUG/CAT OT: Torpedo UON Rapid Fielding IOC:	2	2012	2	2012
Software Spirals BUG/CAT OT: Anti-Torpedo Torpedo (ATT) Demonstration: Schedule Detail	1	2012	1	2013
Software Spirals BUG/CAT OT: APB 5:	1	2012	2	2014
Software Spirals BUG/CAT OT: APB 6:	1	2017	4	2018
Software Spirals BUG/CAT OT: HAAWC Design/Development/Qualification:	1	2012	1	2015
Software Spirals BUG/CAT OT: HAAWC Production Readiness Review (PRR):	1	2015	1	2015
Software Spirals BUG/CAT OT: HAAWC DT:	1	2014	4	2014
Software Spirals BUG/CAT OT: HAAWC OT:	4	2015	3	2016
Software Spirals BUG/CAT OT: HAAWC IOC:	4	2016	4	2016