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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy **Date:** February 2015

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>					R-1 Program Element (Number/Name) PE 0603506N / <i>Surface Ship Torpedo Defense</i>							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	469.695	83.366	50.781	77.385	-	77.385	76.221	78.373	71.772	51.013	Continuing	Continuing
0225: <i>Surface Ship Torpedo Defense (SSTD)</i>	469.695	83.366	50.781	77.385	-	77.385	76.221	78.373	71.772	51.013	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Surface Ship Torpedo Defense (SSTD) program provides a detect-to-engage layered torpedo defense capability. It is comprised of four major efforts, the AN/SLQ-25 (NIXIE) system, Torpedo Warning System (TWS), the Countermeasure Anti-Torpedo (CAT) and Acoustic Device Countermeasure (ADC MK2 Mod4). There are two development programs, the CAT program develops a canisterized Anti-Torpedo Torpedo (ATT) and is planned to be a ACAT II program. The TWS develops the required torpedo detection, classification and localization (TDCL) ship systems an ACAT III program.

The program will develop and field six Surface Ship Torpedo Defense prototype (TWS/CAT) Engineering Design Model (EDM) systems on CVNs. Each prototype consists of one TWS and eight CATs. The six systems were accelerated due to the lack of hard-kill torpedo defense on HVUs which has been exacerbated by recent real-world events and evolving threats. The systems provide a hard-kill torpedo defense capability in advance of the IOC as part of the program of record. The program delivered one hybrid prototype system in FY13 on USS GHW BUSH. The next prototype was delivered in FY14; This system was delivered in a roll-on/roll-off (RO-RO) configuration and installed on USS Roosevelt. The program will build and deliver one additional RO-RO and one EDM in FY15 and 2 EDMs in FY16.

The program will focus on first providing torpedo defense capability to High Value Units (HVU). For the Initial Operational Capability (IOC) the system will be installed on one CVN and one Combat Logistics Force (CLF) ship (both HVUs) with IOC in FY22.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	85.649	52.781	30.063	-	30.063
Current President's Budget	83.366	50.781	77.385	-	77.385
Total Adjustments	-2.283	-2.000	47.322	-	47.322
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-2.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.282	-			
• Program Adjustments	-	-	47.322	-	47.322
• Rate/Misc Adjustments	-0.001	-	-	-	-

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Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense	
<u>Change Summary Explanation</u> The FY 2016 funding reflects program increases to accelerate and deliver the SALVO capability by the end of FY16 including 2 additional independent system integration at sea tests on CVNs. Continue successful fielding of the prototype systems to deploying CVNs and reduce the overall program risk. The CAT program will enter Milestone B in FY16, with a Milestone C decision in FY19. The FY 2014 funding request include reduction for other rate/misc adjustments and SBIR transfer.		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy										Date: February 2015		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
0225: Surface Ship Torpedo Defense (SSTD)	469.695	83.366	50.781	77.385	-	77.385	76.221	78.373	71.772	51.013	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Surface Ship Torpedo Defense (SSTD) program provides a layered torpedo defense capability with four efforts; two of which are currently in development. The Countermeasure Anti-Torpedo (CAT) program develops a canisterized Anti-Torpedo Torpedo (ATT). The Torpedo Warning System (TWS) develops the required TDCL systems.

The program will develop and field six Surface Ship Torpedo Defense prototype EDM systems on CVNs, two of which will be delivered in a RO-RO configuration and one hybrid prototype system on USS GHW BUSH.

SSTD system will be installed on one CVN and one Combat Logistics Force (CLF) ship (both HVUs) with IOC defined as FY22.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Countermeasure Anti-Torpedo (CAT)	38.248	25.845	41.385	-	41.385
Articles:	20	12	-	-	-
FY 2014 Accomplishments: Complete shipyard and AIT installation of one RO-RO EDM system on CVN-71. Continue land based and in water testing of EDM-2 ATT thermal engine variant. Build CATs for FY15 EDM systems. Conduct software development and testing for ATT SALVO capability.					
FY 2015 Plans: Continue land based and in-water testing of EDM-2 ATT thermal engine variant. Build CATs for FY15 EDM systems and procure long lead material for FY16 EDM systems. Conduct follow-on software development and testing for ATT SALVO capability.					
FY 2016 Base Plans: Complete land based software development and in-water testing of the EDM-2 thermal engine variant. Assemble and deliver CAT systems purchased in FY15. Accelerate ATT SALVO Capability. Complete follow-on software development and testing for ATT SALVO capability. Conduct 2 independent integrated in-water tests on CVNs					

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Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
with TWS systems for the acceleration of the ATT SALVO Capability. Deliver ATT SALVO capability at the end of FY16.											
FY 2016 OCO Plans: N/A											
Title: Torpedo Warning System (TWS)							45.118	24.936	36.000	-	36.000
Articles:							2	2	1	-	1
FY 2014 Accomplishments: Conduct Land-Based Integration of TWS prototype EDM system fabricated in FY13. Install one RO-RO EDM system on CVN-71 and commence fabrication of one RO-RO and one EDM system for install in FY15. Develop TWS active source software and hardware. Conduct initial active source testing.											
FY 2015 Plans: Buy 2 EDM systems to install in FY16 and install 2 systems from FY14. Continue land based and in-water integration testing of TWS and CAT. Follow-on TWS active source software and hardware development and testing. Conduct software development for TWS SALVO capability.											
FY 2016 Base Plans: Install 2 EDM systems that were purchased in FY 15. Continue land based and in-water integration testing of the TWS and CAT systems. Continue TWS active source software and hardware development and testing. Accelerate TWS SALVO Capability. Conduct 2 independent integrated in-water tests on CVNs with the CAT systems for the acceleration of the TWS SALVO capability. Deliver TWS SALVO capability at the end of FY16.											
FY 2016 OCO Plans: N/A											
Accomplishments/Planned Programs Subtotals							83.366	50.781	77.385	-	77.385
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• OPN/221300: SSTD	-	12.051	22.167	-	22.167	23.559	31.887	43.324	44.227	Continuing	Continuing
• WPN/311300: SSTD	3.978	6.562	22.768	-	22.768	24.520	26.725	36.502	37.232	Continuing	Continuing
Remarks											

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603506N / <i>Surface Ship Torpedo Defense</i>	Project (Number/Name) 0225 / <i>Surface Ship Torpedo Defense (SSTD)</i>
<u>D. Acquisition Strategy</u> CAT Program: In FY09 and FY10, the CAT project completed a Systems Requirements Review (SRR) and Preliminary Design Review (PDR) on the second Engineering Development Model (EDM-2) design. Applied Research Lab (ARL) will complete the EDM-2 design and hold a Critical Design Review (CDR) in FY18. ARL will fabricate test articles and 40 total EDM-2 CATS in support of the prototype fielding. Integration testing began in FY13 and will continue through delivery of the prototype CATs. A complete Technical Data Package (TDP) will be prepared. Program will enter Milestone B in FY16, with a milestone C decision in FY19. A competitive fixed price contract will be awarded to build low rate initial production (LRIP) units starting in FY20. These units will support developmental testing beginning in FY19 with an FY22 IOC. TWS Program: In FY09 and FY10, a towed sensor system specification was developed and 2 sea tests were conducted on Navy destroyers that demonstrated the ability of three different passive sonar ranging techniques and demonstrated the benefit of new torpedo detection sonar waveforms. Data from these tests is being applied to the HVU application, and the sensor specification is being modified to meet the increased capability required for HVU ships. Development and production of the new sensors is being conducted by 3Phoenix. A complete sensor set was delivered in 2nd QTR FY12 to support an at sea test in the 3rd QTR FY12. At the same time, a ready-stowage rack, and fire control systems are being developed by Pacific Engineering Incorporated (PEI) and In-Depth Engineering, respectively. All of these components were brought together for integration in FY13. This integration supported fabrication and fielding of the prototype systems. A Milestone C decision is planned in late FY18. A contract will be awarded for TWS LRIP systems to support Developmental Testing beginning in FY19, with an FY22 IOC. <u>E. Performance Metrics</u> Torpedo Effectiveness for the CAT Torpedo Detection Classification and Localization (TDCL) False Alert Rate TDCL probability of correct classification TWS System Availability		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy												Date: February 2015			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)					
Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	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	NUWC : Newport, RI	35.269	4.501	Nov 2013	1.700	Nov 2014	2.341	Nov 2015	-		2.341	Continuing	Continuing	Continuing
Systems Engineering ATT Dev.	C/CPFF	PSU/ARL : State College, PA	208.551	25.467	Dec 2013	22.551	Dec 2014	24.710	Dec 2015	-		24.710	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	JHU/APL : Baltimore , MD	1.740	-		-		-		-		-	Continuing	Continuing	Continuing
Systems Engineering Warhead Dev.	WR	NSWC : Indian Head, MD	56.255	8.700	Nov 2013	3.200	Nov 2014	5.545	Nov 2015	-		5.545	Continuing	Continuing	Continuing
Systems Engineering	WR	NUWC : Keyport,WA	36.882	6.100	Nov 2013	2.300	Nov 2014	9.470	Nov 2015	-		9.470	Continuing	Continuing	Continuing
Systems Engineering TDCL	C/CPFF	Ultra : Braintree, MA	11.640	-		-		-		-		-	-	11.640	Continuing
Systems Engineering ATT	WR	ONR : Arlington, VA	1.680	-		-		-		-		-	Continuing	Continuing	Continuing
Systems Engineering TDCL	C/CPFF	AAC : Hauppauge, NY	4.280	0.200	Feb 2014	-		-		-		-	-	4.480	Continuing
Systems Engineering	WR	OPTEVFOR : Norfolk, VA	1.513	0.100	Feb 2014	0.100	Feb 2015	0.377	Feb 2016	-		0.377	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	ArgonST : Manassas, VA	0.800	-		-		-		-		-	-	0.800	Continuing
Systems Engineering TDCL	WR	NSWC : Dahlgren, VA	8.047	1.500	Nov 2013	0.600	Nov 2014	0.177	Nov 2015	-		0.177	-	10.324	Continuing
Systems Engineering TDCL	WR	SPAWAR : San Diego, CA	6.687	1.700	Dec 2013	0.600	Dec 2014	1.161	Dec 2015	-		1.161	-	10.148	Continuing
Systems Engineering	C/CPFF	UT/ARL : Arlington, TX	0.600	-		-		-		-		-	-	0.600	Continuing
Systems Engineering	C/CPFF	Alion : Bridgeport, CT	8.741	3.400	Dec 2013	1.670	Feb 2015	1.117	Dec 2015	-		1.117	-	14.928	Continuing
Systems Engineering	WR	NUWC DET : Norfolk, VA	12.263	9.600	Dec 2013	4.160	Dec 2014	7.158	Dec 2015	-		7.158	-	33.181	-
Systems Development	C/CPFF	3 Phoenix : Fairfax, VA	54.744	17.450	Dec 2013	10.400	Dec 2014	21.300	Dec 2015	-		21.300	-	103.894	Continuing
Integrated Logistic Spt	WR	NSWC Crane : Crane, IN	0.534	0.300	Dec 2013	0.100	Mar 2015	0.130	Dec 2015	-		0.130	-	1.064	Continuing
Systems Engineering	C/CPFF	PEI : Roca, NE	1.844	0.750	Dec 2013	0.300	Dec 2014	0.851	Dec 2015	-		0.851	-	3.745	-

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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	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	CARDEROCK : Bethesda, MD	0.577	0.400	Dec 2013	0.100	Dec 2014	0.258	Dec 2015	-		0.258	-	1.335	-
Systems Engineering	C/CPFF	CGI : Washington, DC	0.200	-		-		-		-		-	-	0.200	-
Systems Engineering	C/BA	Dam Neck : Virginia Beach, VA	0.022	-		-		-		-		-	-	0.022	-
Systems Engineering	C/BA	NSWC Panama City : Panama City, FL	0.255	-		-		-		-		-	-	0.255	-
Systems Engineering	C/BA	Devron 26 : Not Specified	0.139	-		-		-		-		-	-	0.139	-
Subtotal			453.263	80.168		47.781		74.595		-		74.595	-	-	-
Remarks The key events driving the increase in funding between FY15 and FY16 are the following efforts: Assemble and deliver CAT systems purchased in FY15. Accelerate and delivery of SALVO capability in FY16 including 2 additional independent system integration at sea tests on CVNs with TWS systems for the accelerated ATT SALVO capability. FY16 will also complete the land based software development and in-water testing of the EDM-2 thermal engine variant, complete follow-on software development and testing for SALVO capability															
Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Earned Value Mgmt Spt	C/CPAF	Pioneer : Virigina	0.050	-		-		-		-		-	-	0.050	-
Program Management Support	C/FFP	EG&G : Gaithersburg, Md.	2.846	-		-		-		-		-	-	2.846	Continuing
DAWDF	Various	Not Specified : Not Specified	0.237	-		-		-		-		-	-	0.237	Continuing
Program Management Support	C/CPAF	Tech-Marine : Washington, DC	9.930	-		-		-		-		-	-	9.930	Continuing
Travel	Various	PMS 415 : Not Specified	0.744	0.100	Nov 2013	0.100	Nov 2014	0.100	Nov 2015	-		0.100	-	1.044	Continuing

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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	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	C/CPFF	SPA : Alexandria, VA	0.375	0.200	Feb 2014	-		-		-		-	-	0.575	Continuing
Program Management Support	C/CPAF	Booz Allen : Washington, DC	2.100	2.648	Feb 2014	2.900	Feb 2015	2.690	Feb 2016	-		2.690	-	10.338	-
Program Management Support	C/CPAF	Alion : Washington, DC	0.150	0.250	Feb 2014	-		-		-		-	-	0.400	-
Subtotal			16.432	3.198		3.000		2.790		-		2.790	-	25.420	-
			Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			469.695	83.366		50.781		77.385		-		77.385	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy

Date: February 2015

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603506N / Surface Ship Torpedo
Defense

Project (Number/Name)

0225 / Surface Ship Torpedo Defense
(SSTD)

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 0225																												
CAT - Critical Design Review (CDR)																												
CAT - In Water Test																												
CAT - RoRo - 1																												
CAT - Milestone C																												
CAT - RoRo - 2																												
CAT - SALVO At-Sea Integration Test																												
CAT - Developmental Testing (DT)																												
CAT - DT2																												
CAT - LRIP 1																												
TWS - Preliminary Design Review (PDR)																												
TWS - RoRo - 1																												
TWS - Critical Design Review (CDR)																												
TWS - RoRo Demo																												
TWS - EDM 5/6																												
TWS - Milestone C																												
TWS - At Sea Integration Test																												
TWS - LRIP 1																												
TWS - RoRo - 2																												
TWS - Prototype (EDM) 5																												
TWS - Prototype (EDM) 6																												
TWS - LRIP 2																												
TWS - DT1																												
TWS - DT2																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy																		Date: February 2015																			
Appropriation/Budget Activity 1319 / 4										R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense								Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)																			
										FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
										1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
TWS - IOC																																					
TWS - FRP																																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603506N / <i>Surface Ship Torpedo Defense</i>	Project (Number/Name) 0225 / <i>Surface Ship Torpedo Defense (SSTD)</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0225				
CAT - Critical Design Review (CDR)	1	2018	1	2018
CAT - In Water Test	4	2014	4	2016
CAT - RoRo - 1	2	2015	2	2015
CAT - Milestone C	4	2019	4	2019
CAT - RoRo - 2	2	2016	2	2016
CAT - SALVO At-Sea Integration Test	3	2015	4	2016
CAT - Developmental Testing (DT)	2	2019	3	2019
CAT - DT2	3	2019	2	2020
CAT - LRIP 1	1	2020	4	2020
TWS - Preliminary Design Review (PDR)	3	2014	3	2014
TWS - RoRo - 1	4	2014	4	2014
TWS - Critical Design Review (CDR)	2	2017	2	2017
TWS - RoRo Demo	4	2014	4	2014
TWS - EDM 5/6	1	2015	4	2015
TWS - Milestone C	2	2018	2	2018
TWS - At Sea Integration Test	3	2015	4	2016
TWS - LRIP 1	3	2018	1	2019
TWS - RoRo - 2	3	2015	3	2015
TWS - Prototype (EDM) 5	2	2016	2	2016
TWS - Prototype (EDM) 6	4	2016	4	2016
TWS - LRIP 2	1	2019	1	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy			Date: February 2015		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense		Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)	
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
TWS - DT1		2	2019	2	2019
TWS - DT2		3	2019	1	2020
TWS - IOC		4	2019	4	2019
TWS - FRP		4	2019	4	2019