Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy											Date: February 2015	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0205632N *I MK-48 ADCAP*							
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	217.170	10.050	25.952	42.206	-	42.206	38.351	65.689	92.237	90.559	Continuing	Continuing
0366: *MK 48 ADCAP*	217.170	10.050	25.952	42.206	-	42.206	38.351	65.689	92.237	90.559	Continuing	Continuing

A. Mission Description and Budget Item Justification

MK48 ADCAP (Advanced Capability) Research, Development, Test and Evaluation (RDT&E) program executes incremental development of weapon performance improvements in three development product areas: (1) Common Broadband Advanced Sonar System (CBASS), (2) Advanced Processor Builds (APBs), and (3) torpedo technology insertion. The budget enables Acquisition Category (ACAT) III development to address Chief of Naval Operations (CNO) defined capability-based requirements and mission needs. This program is tied to development programs that leverage a joint United States/Australia Armaments Cooperative Project (ACP) to develop MK48 ADCAP CBASS; and Future Naval Capability (FNC) technologies developed by the Office of Naval Research (ONR).

Countermeasure (CM) sophistication and availability on the open market directly affects ADCAP kill probability and its ability to counter rapidly evolving threats. The focus of the MK-48 ADCAP torpedo program from FY 2001 and out shifted from being primarily concentrated on software block upgrade efforts towards coordinated hardware upgrades, rapid Commercial-Off-the-Shelf (COTS) insertion, and APBs to rapidly upgrade the ADCAP to counter evolving threats and maintain robust performance. The CBASS program developed and fielded a broadband sonar capable of identifying CMs and discriminating them from the target. CBASS Phase I achieved IOC in FY 2006 and Phase II was achieved in 2013. The Commonwealth of Australia Royal Navy (RAN) is jointly participating to develop CBASS APB5 to improve shallow water performance under a signed Memorandum of Agreement (MOA) extension November 2009. The MOA extension expires Nov 2019.

The MK48 ADCAP torpedo program focuses on two specific areas near term; torpedo APBs and hardware tech insertions. The CNO continues to stress shallow water (less than 600 feet) as a critical operating area to counter third world diesel electric submarines. Torpedo testing in shallow water has demonstrated that in-service ADCAP has less than full capability in this difficult environment. However, this testing, in conjunction with laboratory simulation efforts, has shown that significant performance improvements can be made by implementing changes to weapon tactics and software algorithms. Development, implementation, and testing of these changes is being accomplished under the torpedo APB program. The APB program also leverages the RAN joint torpedo program and FNC technologies developed by the ONR in the areas of torpedo broadband signal processing, tactics processing, and alertment. The torpedo tech insertion program will leverage the MK54 Lightweight Torpedo (LWT) algorithms. Further hardware investment involves development of Guidance & Control (G&C) replacement required to support ordinance requirements and development of automated test equipment replacement to improve comprehensive system testing of full up CBASS torpedoes.

The torpedo technology insertion program will provide for evolutionary torpedo improvements and upgrades (including the transition and testing of advanced technologies from the Science and Technology community). This approach will incorporate developmental testing of the FNC transitioning technologies for ADCAP upgrades in the areas of torpedo sensors, weapon/platform connectivity, warhead lethality, speed and endurance. These efforts will continue torpedo development investment at a lower cost and shorter term than traditional torpedo programs.

APB5 software upgrades are currently in process for MK-48 ADCAP torpedoes.

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy	Date: February 2015
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0205632N *I MK-48 ADCAP*

Both FNC technologies and MK-54 LWT developments will be transitioned into ADCAP through APBs and technology insertion packages. Priorities for APBs and technology insertion are: (1) improved torpedo effectiveness through advanced processing algorithms, (2) advanced counter-countermeasure capability, and (3) a new array to improve torpedo effectiveness.

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	10.080	25.952	30.876	-	30.876
Current President's Budget	10.050	25.952	42.206	-	42.206
Total Adjustments	-0.030	-	11.330	-	11.330
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.006	-			
• SBIR/STTR Transfer	-0.024	-			
• Program Adjustments	-	-	12.600	-	12.600
• Rate/Misc Adjustments	-	-	-1.270	-	-1.270

Change Summary Explanation

The FY 2016 funding request was reduced by $1.266 million to account for the availability of prior year execution balances.

FY16 was increased to fund the transition of the MK48 Fuze and MK48 ASuW upgrade FNC's which includes requirement documentation to be completed, model updates, software integration, in-water and land-based testing, and performance matrix testing. Hardware and software requirements including: critical item performance specifications, system requirements specification, interface control drawings and interface requirement specifications. Additional in-water run testing and software updates are required as well as Weapons Analysis Facility (WAF) modeling and software updates will have to be incorporated and validated.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205632N / *MK-48 ADCAP*	Project (Number/Name) 0366 / *MK 48 ADCAP*	

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
0366: *MK 48 ADCAP*	217.170	10.050	25.952	42.206	-	42.206	38.351	65.689	92.237	90.559	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

MK48 ADCAP program executes incremental development of weapon performance improvements in two development product areas: (1) APBs, and (2) torpedo technology insertion. The budget enables ACAT III development to address CNO defined capability-based requirements and mission needs. This program is tied to development programs that leverage a joint United States/Australia ACP to develop MK48 ADCAP; and FNC technologies being developed by the ONR.

APB software upgrades will improve torpedo performance in challenging water and countered environments through incorporation of new algorithms designed to address broadband, multiband, classifications and tactics processing changes. Hardware technology insertions will improve weapon performance against slow/low doppler targets. It provides improved target detection at long and short ranges and improved counter measure rejection in countered and shallow water scenarios. Availability will be improved through development of a G&C replacement and an ATE replacement.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: TORPEDO APB	6.269	11.089	24.576	-	24.576
Articles:	-	-	-	-	-
FY 2014 Accomplishments: Completed development of G&C replacement. Continued APB 5 software development. Continued development of ATE replacement.					
FY 2015 Plans: Continue APB 5 development. Complete development of ATE replacement.					
FY 2016 Base Plans: Continue APB 5 development. Start transition of Fuze and ASuW FNC products to include requirement documentation to be completed, model updates, software integration, in-water and land-based testing, and performance matrix testing.					
FY 2016 OCO Plans: N/A					
Title: TEST & EVALUATION	3.781	14.863	17.630	-	17.630
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205632N / *MK-48 ADCAP*	**Project (Number/Name)** 0366 / *MK 48 ADCAP*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
FY 2014 Accomplishments: Continued APB 5 developmental testing ***FY 2015 Plans:*** Conduct 2 APB 5 in-water engineering events, each with 15 torpedo firings over 5 days at sea and follow-on analysis and reports. Conduct 3 Demos (GPS Coms, Payload Launch Module, and Long Range Propulsion) ***FY 2016 Base Plans:*** Start APB 5 Developmental Testing (DT); 2 major DT events with 38 firings over ~14 days at sea as well as follow-on analysis and reports for each event. ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	10.050	25.952	42.206	-	42.206

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
• WPN/3225: *MK-48 Torpedo ADCAP Mods*	48.503	40.863	63.317	-	63.317	39.543	44.411	45.234	46.154	Continuing	Continuing

Remarks

D. Acquisition Strategy

Sole source production contract awarded in FY 2004 for MK48 ADCAP MODS, MK-54 LWT, and CBASS kits, including RAN units. A full and competitive procurement for MK48 Mod 7 CBASS production kits was awarded in March 2011 with a FY 2010/2011 base year and four option years for FY 2012-2015. A new FY16 competitive contract will be awarded to continue procurement of CBASS Kits.

E. Performance Metrics

Milestone reviews.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Software Development - Sprial 4 / PY Development	WR	NUWC NPT : Newport RI	31.839	-		-		-		-		-	-	31.839	-
Primary Software Development - APB 5	WR	NUWC NPT : Newport RI	0.000	2.388	Oct 2013	5.984	Oct 2014	13.132	Oct 2015	-		13.132	Continuing	Continuing	Continuing
Primary Hardware Development - Spiral 4 / PY Development	WR	NUWC NPT : Newport RI	31.201	-		-		-		-		-	-	31.201	-
Primary Hardware Development - APB 5	WR	NUWC NPT : Newport RI	0.000	2.255	Dec 2013	5.500	Oct 2014	7.125	Jan 2016	-		7.125	Continuing	Continuing	Continuing
Primary Software Development - IM	WR	Indian Head : Indian Head	0.000	0.450	Oct 2013	-	Oct 2014	0.450	Oct 2015	-		0.450	Continuing	Continuing	Continuing
		Subtotal	63.040	5.093		11.484		20.707		-		20.707	-	-	-

Remarks

Funds torpedo, modeling and simulation hardware and software development, including the engineering and project manager's costs. Software development for APB5 increased in FY16 to support completion of APB5 by IOC 2020. Hardware development increased due to fully funding the transition of the FUZE and ASuW FNCs.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NUWC NPT : Newport RI	19.147	0.752	Oct 2013	3.353	Oct 2014	3.353	Oct 2015	-		3.353	Continuing	Continuing	Continuing
Software Development	Various	Various : Not Specified	36.317	-		-		-		-		-	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NUWC NPT : Newport RI	2.243	-		-		-		-		-	Continuing	Continuing	Continuing
Systems Engineering WCF	WR	NUWC NPT : Newport RI	17.750	-		-		-		-		-	Continuing	Continuing	Continuing
Systems Engineering	Various	NUWC NPT : Newport RI	0.676	-		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	76.133	0.752		3.353		3.353		-		3.353	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks															
Funds activity program support costs, post test and evaluation WAF analysis, and WAF facilities costs.															

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation - Spiral 4 / PY	WR	NUWC NPT : Newport RI	17.086	-		-		-		-		-	Continuing	Continuing	Continuing
Test & Evaluation - APB 5	WR	NUWC NPT : Newport RI	0.000	0.932	Oct 2013	2.986	Oct 2014	-		-		-	Continuing	Continuing	Continuing
Developmental Testing - APB 5	WR	NUWC NPT : Newport RI	0.000	-		-		5.418	Oct 2015	-		5.418	Continuing	Continuing	Continuing
Test & Evaluation	WR	Operational Test Force : Norfolk VA	8.411	0.409	Nov 2013	0.450	Oct 2014	0.545	Jul 2016	-		0.545	Continuing	Continuing	Continuing
Modeling & Simulation	WR	NUWC NPT : Newport RI	9.745	-		-		-		-		-	Continuing	Continuing	Continuing
Modeling & Simulation	C/CPFF	ARL / PSU : State College PA	8.700	0.830	Dec 2013	1.584	Dec 2014	1.476	Apr 2016	-		1.476	Continuing	Continuing	Continuing
Test & Evaluation - Spiral 4 / PY	WR	NUWC Keyport (KPT) : Keyport WA	29.437	-		-		-		-		-	Continuing	Continuing	Continuing
Test & Evaluation - APB 5	WR	NUWC Keyport (KPT) : Keyport WA	0.000	1.609	Oct 2013	5.548	Oct 2014	-		-		-	Continuing	Continuing	Continuing
Developmental Testing - APB 5	WR	NUWC Keyport (KPT) : Keyport WA	0.000	-		-		10.190	Oct 2015	-		10.190	Continuing	Continuing	Continuing
		Subtotal	73.379	3.780		10.568		17.629		-		17.629	-	-	-

Remarks

Funds in-water run costs and personnel to support such events and modeling and simulation performance evaluation. NUWC Newport increase in FY16 is due to the program conducting the Developmental Test runs in support of ENG-C, DT-A, and DT-B. NUWC Keyport increase in FY16 is due to the increased number of weapon turns and in water support for ENG-C, DT-A, and DT-B.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/FFP	Alion Science : Mclean VA	3.531	0.405	Oct 2013	0.454	Oct 2014	0.468	Oct 2015	-		0.468	Continuing	Continuing	Continuing
Travel	WR	NAVSEA : Washington DC	1.087	0.020	Oct 2013	0.093	Oct 2014	0.049	Oct 2015	-		0.049	Continuing	Continuing	Continuing
		Subtotal	4.618	0.425		0.547		0.517		-		0.517	-	-	-

Remarks

Funds program support, program travel, and OPTEVFOR travel.

	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	217.170	10.050		25.952		42.206		-		42.206	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205632N / *MK-48 ADCAP*	**Project (Number/Name)** 0366 / *MK 48 ADCAP*

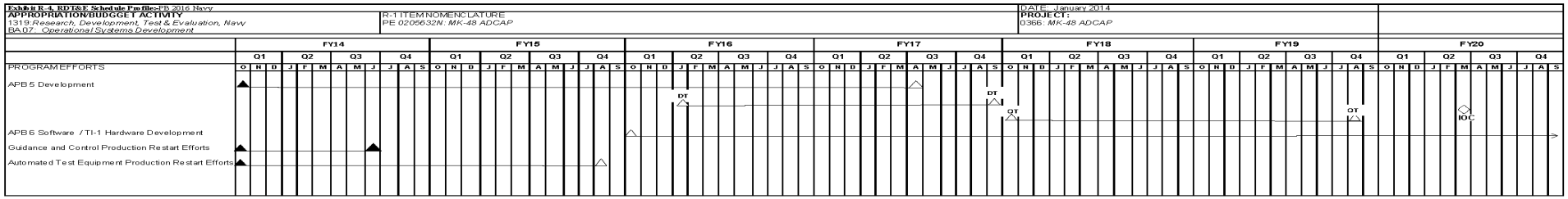

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205632N / *MK-48 ADCAP*	**Project (Number/Name)** 0366 / *MK 48 ADCAP*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0366				
APB 5 Development: APB 5 Development	1	2014	3	2017
APB 5 Development: APB 5 Developmental Test (DT)	2	2016	4	2017
APB 5 Development: APB 5 Operation Test (OT)	1	2018	4	2019
APB 5 Development: APB 5 IOC	2	2020	2	2020
APB 6 Software / TI-1 Hardware Development: APB 6 Development	1	2016	4	2020
Guidance and Production Restart Efforts: Guidance and Production Restart Efforts	1	2014	3	2014
Automated Test Equipment Production Restart Efforts: Automated Test Equipment Production Restart Efforts	1	2014	4	2015