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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>					R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>							
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	211.306	10.962	15.122	10.490	-	10.490	17.640	11.024	8.775	8.968	Continuing	Continuing
0267: <i>Mine Improvements</i>	211.306	10.962	15.122	10.490	-	10.490	17.640	11.024	8.775	8.968	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project is the only R&D program for mine systems, and is the sole support for the capability to maintain the effectiveness of mines facing new threat targets and increasing emphasis on major regional conflicts and littoral warfare in shallow water. Project tasks are grouped into several areas: (1) Threat Modeling/Analysis, which collects, analyzes, and develops digital models of data on current priority threat target characteristics to support computer simulations; (2) Target Detection and Response, which uses target models to develop optimal mine designs, settings, and firing algorithms; (3) Developing and upgrading Tactical Decision Aids (TDAs) to assist the warfighter in planning and placing more effective minefields; (4) Test and Evaluation (T&E) to support aircraft certification; (5) Redesigning test sets for Submarine Launched Mobile Mine (SLMM) to address obsolescence; (6) Developing a conversion kit to convert SLMM warheads into Unmanned Underwater Vehicle (UUV) delivered mines. The first increment (FY15-FY16) focuses on rapid development using existing SLMM components including the Target Detection TDD Mk-57. The second increment (FY16-FY20) will improve upon the first increment by integrating the TDD Mk 71 and adding a remote command and control capability. (7) Design, develop and test the Clandestine Delivered Mine (CDM) capability.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	14.067	15.122	14.478	-	14.478
Current President's Budget	10.962	15.122	10.490	-	10.490
Total Adjustments	-3.105	0.000	-3.988	-	-3.988
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.730	0.000			
• SBIR/STTR Transfer	-0.375	0.000			
• Rate/Misc Adjustments	0.000	0.000	-3.988	-	-3.988

Change Summary Explanation

The FY 2017 funding request was reduced by \$3.4 million to account for the availability of prior year execution balances. Additional decrease by \$460 thousand to Mine Development as required for the Department of the Navy to comply with the Bipartisan Budget Act of 2015.

Total Adjustments: FY15 -\$2.730 BTR to ONR, and -\$375K: SBIR/Misc adjustments.

Total Adjustments: FY16

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Total Adjustments: FY17 -\$3.988 Rate/Other adjustments.		

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>				Project (Number/Name) 0267 / <i>Mine Improvements</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
0267: <i>Mine Improvements</i>	211.306	10.962	15.122	10.490	-	10.490	17.640	11.024	8.775	8.968	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Product Development	8.313	12.346	7.840	0.000	7.840
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					
Software Development: Modified algorithms based on testing results. Continued generating OPDATA for the Fast Patrol Boat, Air Cushioned Vehicle, and large ship algorithms. Began development of a replacement test set to address SLMM obsolescence issues. Completed preliminary design of a Clandestine Delivered Mine (CDM) that uses existing SLMM components and legacy TDD Mk 57 to allow for delivery of mines by UUV. Design includes modifications to fuse components, batteries, weapon casing, and mine rails which attach the mines to the UUV. Initial prototyping and testing was conducted successfully.					
FY 2016 Plans:					
Modify algorithms based on testing results. Continue generating OPDATA for the Air Cushioned Vehicle. Deliver to the fleet new algorithms for the TDD Mk 71 for Fast Patrol Boat and large ships. Continue development of replacement test set for SLMM. Complete design of CDM and build prototypes for testing. Begin development of remote command and control capability for CDM and integration of the programmable TDD Mk 71. Conduct WSESRB testing and obtain concurrence for CDM phase 1.					
FY 2017 Base Plans:					
Deliver Air Cushioned Vehicle algorithm to the fleet for use within the TDD Mk 71. Support and assess results of end-to-end testing of CDM phase 1 during an in-water event that demonstrates weapon build-up, loading,					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
transit, delivery, arming sequence, target detection, and simulated fire. Continue development of CDM phase 2 by integrating the programmable TDD Mk 71 and a remote command and control capability.						
FY 2017 OCO Plans: N/A						
Title: Support		0.050	0.050	0.060	0.000	0.060
	Articles:	-	-	-	-	-
FY 2015 Accomplishments: Information Assurance (IA) and technical support of Mine Warfare development lab for Quickstrike Mines.						
FY 2016 Plans: Information Assurance (IA) and technical support of Mine Warfare development lab for Quickstrike Mines.						
FY 2017 Base Plans: Information Assurance (IA) and technical support of Mine Warfare development lab for Quickstrike Mines.						
FY 2017 OCO Plans: N/A						
Title: Management:		0.050	0.050	0.050	0.000	0.050
	Articles:	-	-	-	-	-
FY 2015 Accomplishments: Program Management Support, contract support and Travel						
FY 2016 Plans: Program Management Support, contract support and Travel						
FY 2017 Base Plans: Program Management Support, contract support and Travel						
FY 2017 OCO Plans: N/A						
Title: Test and Evaluation		2.549	2.676	2.540	0.000	2.540
	Articles:	-	-	-	-	-
FY 2015 Accomplishments:						

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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 0267 / <i>Mine Improvements</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Continued aircraft certification (B-52 and F/A-18). Conducted flight testing of mines standoff (wing kit) prototype. Performed in-water testing of initial CDM prototype shapes. FY 2016 Plans: Continue aircraft certification (to include F/A-18). Conduct in-water testing for planned algorithms for TDD Mk 71. Conduct system and subsystem level testing on CDM in preparation for an end-to-end demonstration in FY17. Begin safety qualification testing of fuse and battery components of CDM. Conduct in-water test of CDM to evaluate interfaces with delivery vehicle, proper deployment and safe arming sequence. FY 2017 Base Plans: Finish aircraft certification of F/A-18. Conduct end-to-end testing of CDM phase 1 during an in-water event that demonstrates weapon build-up, loading, transit, delivery, arming sequence, target detection, and simulated fire. FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	10.962	15.122	10.490	0.000	10.490

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	<u>Cost To Complete</u>	<u>Total Cost</u>
• WPN 3231: <i>Quickstrike Mine</i>	6.966	10.754	1.236	-	1.236	10.276	7.313	5.224	5.334	0.000	91.030

Remarks

D. Acquisition Strategy
Procurement of Target Detecting Device (TDD) Mk 71, MK 62/63 kits, MK 65, Clandestine Delivered Mine (CDM) kits and associated components.

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / Mine Development	Project (Number/Name) 0267 / Mine Improvements
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Hardware Development	WR	NSWC PC : WX	117.357	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ancillary Hardware Development	C/CPAF	Various : Various	3.612	0.400	Dec 2014	0.050	Nov 2015	0.000		-		0.000	Continuing	Continuing	Continuing
Ship Suitability	WR	NSWC PC : WX	2.467	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
GFE	C/CPAF	Various : Various	4.790	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Software Development	WR	NSWC, PC : WX	18.822	1.193	Dec 2014	1.200	Nov 2015	1.270	Nov 2016	-		1.270	0.000	22.485	-
Clandestine Mine	WR	NSWC, PC : WX	0.000	1.940	Nov 2014	3.603	Nov 2015	1.682	Nov 2016	-		1.682	0.000	7.225	-
Clandestine Mine	WR	NSWC, IH : WX	0.000	2.050	Nov 2014	3.963	Nov 2015	2.167	Nov 2016	-		2.167	0.000	8.180	-
Clandestine Mine	C/CPFF	JHU/APL : WX	0.000	2.730	Nov 2014	3.530	Nov 2015	2.721	Dec 2016	-		2.721	0.000	8.981	-
Subtotal			147.048	8.313		12.346		7.840		-		7.840	-	-	-

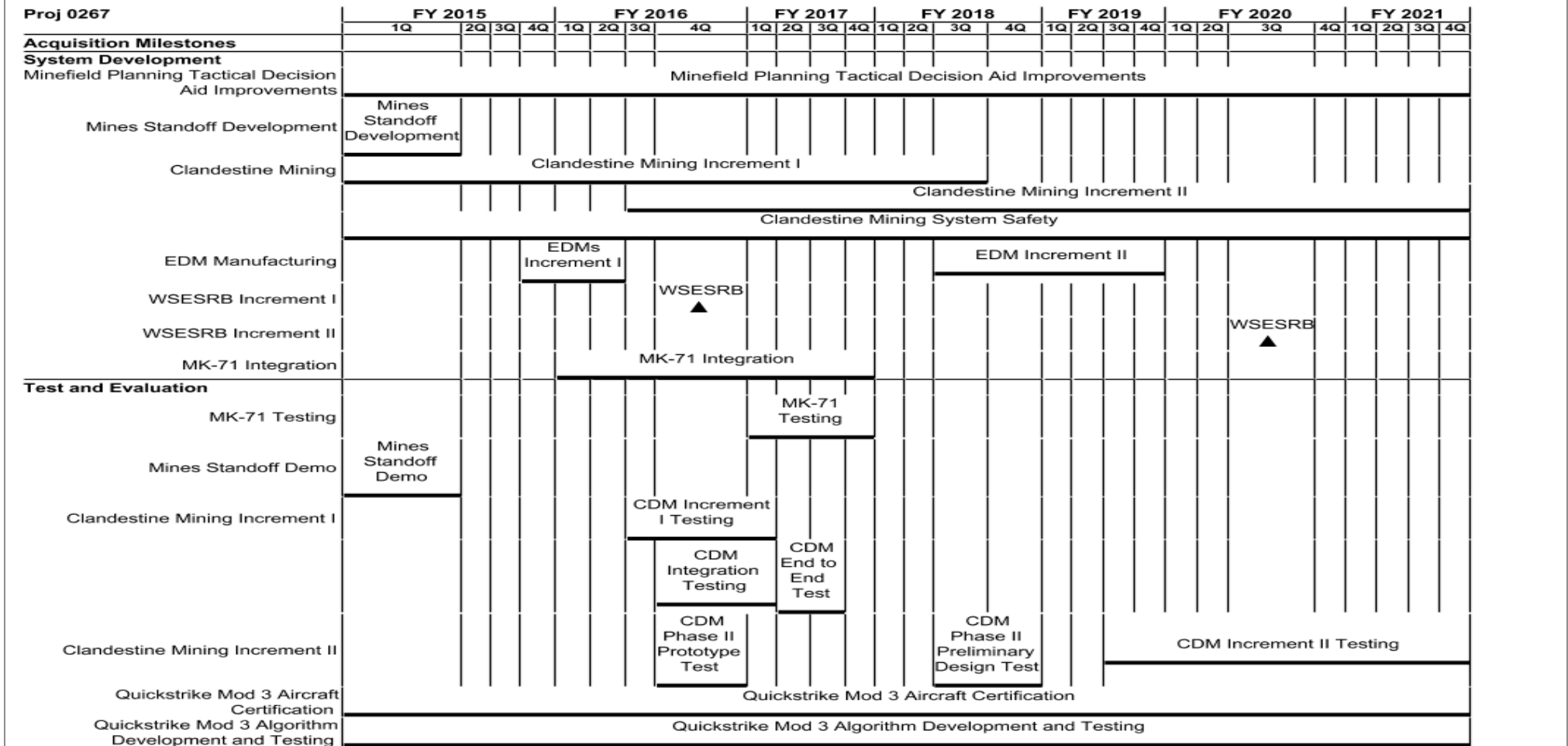
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
IA/ILS/Technical	WR	NSWC PC : WX	0.772	0.050	Nov 2014	0.050	Nov 2015	0.060	Nov 2016	-		0.060	Continuing	Continuing	Continuing
Subtotal			0.772	0.050		0.050		0.060		-		0.060	-	-	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Test & Evaluation	WR	NSWC PC : WX	26.522	2.549	Nov 2014	2.676	Nov 2015	2.540	Nov 2016	-		2.540	0.000	34.287	-
Subtotal			26.522	2.549		2.676		2.540		-		2.540	0.000	34.287	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / Mine Development	Project (Number/Name) 0267 / Mine Improvements
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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy Date: February 2016

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
1319 / 5	PE 0604601N / <i>Mine Development</i>	0267 / <i>Mine Improvements</i>

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604601N / <i>Mine Development</i>	Project (Number/Name) 0267 / <i>Mine Improvements</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0267				
System Development: Minefield Planning Tactical Decision Aid Improvements:	1	2015	4	2021
System Development: Mines Standoff Development:	1	2015	1	2015
System Development: Clandestine Mining: Increment I	1	2015	3	2018
System Development: Clandestine Mining: Increment II	3	2016	4	2021
System Development: Clandestine Mining: System Safety	1	2015	4	2021
System Development: EDM Manufacturing: EDM Manufacturing Increment I	4	2015	2	2016
System Development: EDM Manufacturing: EDM Manufacturing Increment II	3	2018	4	2019
System Development: WSESRB Increment I: Increment I	4	2016	4	2016
System Development: WSESRB Increment II: Increment II	3	2020	3	2020
System Development: MK-71 Integration: MK-71 Integration	1	2016	4	2017
Test and Evaluation: MK-71 Testing: MK-71 Testing	1	2017	4	2017
Test and Evaluation: Mines Standoff Demo:	1	2015	1	2015
Test and Evaluation: Clandestine Mining Increment I: Increment I Testing	3	2016	1	2017
Test and Evaluation: Clandestine Mining Increment I: CDM Integration Testing	4	2016	1	2017
Test and Evaluation: Clandestine Mining Increment I: End to End Test	2	2017	3	2017
Test and Evaluation: Clandestine Mining Increment II: Testing	3	2019	4	2021
Test and Evaluation: Clandestine Mining Increment II: CDM Phase II Prototype Test	4	2016	4	2016
Test and Evaluation: Clandestine Mining Increment II: CDM Phase II Preliminary Design Test	3	2018	4	2018
Test and Evaluation: Quickstrike Mod 3 Aircraft Certification:	1	2015	4	2021
Test and Evaluation: Quickstrike Mod 3 Algorithm Development and Testing:	1	2015	4	2021