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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 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/Supt Sys</i>
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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	32.464	1.242	0.378	1.303	-	1.303	1.422	1.341	1.365	1.395	Continuing	Continuing
1964: <i>Anti-Armor Weapon System</i>	2.982	0.930	0.378	0.886	-	0.886	1.022	0.974	0.991	1.014	Continuing	Continuing
2614: <i>SMAW Follow-On</i>	29.482	0.312	0.000	0.417	-	0.417	0.400	0.367	0.374	0.381	Continuing	Continuing

Note

The Joint Light Tactical Vehicle (JLTV) program, Project number 3209 transitioned to BA 04 PE 0605812M beginning in FY 2013.

A. Mission Description and Budget Item Justification

This PE supports the demonstration and validation of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations. This program is funded under Demonstration & Validation because it develops and integrates hardware for experimental tests related to specific ground weapon systems.

B. Program Change Summary (\$ in Millions)

	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>
Previous President's Budget	1.342	0.623	1.444	-	1.444
Current President's Budget	1.242	0.378	1.303	-	1.303
Total Adjustments	-0.100	-0.245	-0.141	-	-0.141
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.245			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.100	0.000			
• SBIR/STTR Transfer	-0.001	0.000			
• Rate/Misc Adjustments	0.001	0.000	-0.141	-	-0.141

Change Summary Explanation

The increase in funding for Anti-Armor Weapon System (Project 1964) from FY16 to FY17 (\$508K) is due to efforts to improve the Saber power system and the Global Positioning System (GPS).

The increase in funding for SMAW Follow-On (Project 2614) from FY16 to FY17 (\$417K) is in support of qualification and testing of the densified propellant.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/ Supt Sys</i>				Project (Number/Name) 1964 / <i>Anti-Armor Weapon System</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
1964: <i>Anti-Armor Weapon System</i>	2.982	0.930	0.378	0.886	-	0.886	1.022	0.974	0.991	1.014	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The M41A4 Saber system is the primary heavy, anti-armor launch system for the TOW Missile within the Ground Combat Element of the Marine Corps. The Anti-Armor Weapons System-Heavy (AAWS-H) program, working in concert with the U.S. Army, will develop and integrate technology improvements into the Improved Target Acquisition System (ITAS) to meet Increment II system requirements as jointly agreed. Improvements centered on integration of sight image enhancements were concluded in FY13. Other efforts have focused on providing engineering and technical support such as the study of densified propellant and battery replacement for the Saber system (far-target location accuracy improvements). Laser designation capability has been postponed due to prioritization.

The increase in funding from FY16 to FY17 (\$0.508M) is due to efforts to improve the Saber power system and the Global Positioning System (GPS) of the Saber system.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Densified Propellant	0.199	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2015 Accomplishments: -Completed the qualification of densified propellant.					
FY 2016 Plans: N/A					
FY 2017 Base Plans: N/A					
FY 2017 OCO Plans: N/A					
Title: Saber Battery Replacement	0.731	0.378	0.636	0.000	0.636
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys	Project (Number/Name) 1964 / Anti-Armor Weapon System

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>-Continued research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity. Previous research resulted in a technical data package.</p> <p>-Initiated testing of replacement battery.</p> <p>FY 2016 Plans:</p> <p>-Continue research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity.</p> <p>-Continue testing of replacement battery.</p> <p>FY 2017 Base Plans:</p> <p>-Complete research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity.</p> <p>-Complete testing of replacement battery.</p> <p>FY 2017 OCO Plans:</p> <p>N/A</p>					
<p>Title: Global Positioning System (GPS) Improvement</p> <p align="right">Articles:</p>	0.000 -	0.000 -	0.250 -	0.000 -	0.250 -
<p>FY 2015 Accomplishments:</p> <p>N/A</p> <p>FY 2016 Plans:</p> <p>N/A</p> <p>FY 2017 Base Plans:</p> <p>-Initiate research for improvements to future GPS for the Saber system.</p> <p>FY 2017 OCO Plans:</p> <p>N/A</p>					
Accomplishments/Planned Programs Subtotals	0.930	0.378	0.886	0.000	0.886

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/ Supt Sys</i>	Project (Number/Name) 1964 / <i>Anti-Armor Weapon System</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2017</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• PMC/3017: <i>Anti-Armor Weapon Systems-Heavy</i>	1.506	0.668	17.080	-	17.080	21.483	21.957	5.926	6.049	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Saber system is a joint program with the U.S. Army. FY15-FY17 funding supports the development, integration, and qualification of incremental improvements to meet objective requirements and assesses emergent technologies.

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 / 4	R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys	Project (Number/Name) 1964 / Anti-Armor Weapon System
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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			
Anti Armor	WR	NSWC Indian Head : Indian Head, MD	2.423	0.199	Oct 2014	0.000		0.000		-		0.000	0.000	2.622	-
Anti Armor	WR	NSWC Crane : Crane, IN	0.385	0.731	Oct 2014	0.196	Jan 2016	0.636	Oct 2016	-		0.636	0.000	1.948	-
Anti Armor	WR	NSWC Carderock : Bethesda, MD	0.000	0.000		0.182	Feb 2016	0.000		-		0.000	0.000	0.182	-
Anti Armor	WR	Yuma Test Ground : Yuma, AZ	0.174	0.000		0.000		0.000		-		0.000	0.000	0.174	-
Anti Armor	TBD	CCWS Redstone Arsenal : Huntsville, AL	0.000	0.000		0.000		0.250	Apr 2017	-		0.250	Continuing	Continuing	Continuing
Subtotal			2.982	0.930		0.378		0.886		-		0.886	-	-	-

Remarks
The increase in funding from FY16 to FY17 supports testing of the replacement battery.

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.982	0.930	0.378	0.886	-	0.886	-	-	-

Remarks

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/ Supt Sys</i>	Project (Number/Name) 1964 / <i>Anti-Armor Weapon System</i>
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Proj 1964	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Densified Propellant																												
Saber Battery Replacement																												
Future GPS Improvement																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/ Supt Sys</i>	Project (Number/Name) 1964 / <i>Anti-Armor Weapon System</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 1964				
Densified Propellant: Densified Propellant	1	2015	4	2015
Saber Battery Replacement: Saber Battery Replacement	1	2015	2	2017
GPS Improvement: Future GPS Improvement	3	2017	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys				Project (Number/Name) 2614 / SMAW Follow-On			
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
2614: SMAW Follow-On	29.482	0.312	0.000	0.417	-	0.417	0.400	0.367	0.374	0.381	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The solution to the Follow on to SMAW (FOTS) capability requirement has been defined as the SMAW MOD 2 system. It is a lightweight, short range, fire-and-forget assault weapon comprised of a launcher and integral sighting system that enables a Marine to neutralize a variety of ground targets. Marine Expeditionary Forces will employ the SMAW MOD 2 across the spectrum of conflict, under all environmental conditions, to destroy a variety of ground targets. As defined in the FOTS Capability Production Document (CPD), the program consists of requirements for a new Launcher and integrated laser range finder and thermal sight. The Launcher will be physically and functionally compatible with existing inventory of SMAW rocket variants [High Explosive Dual Purpose, Anti-Armor, Novel Explosive and Common Practice (CP)] and will replace the existing Mark 153 Mod 0 SMAW launcher. R&D supports the work being performed to develop new propellant technologies for an enhanced rocket motor as well as development of the SMAW Mod 2 replacement millijoule meter and next generation firing mechanism.

Due to change in acquisition strategy, full rate production of SMAW Mod 2 is now scheduled to begin in FY17.

The increase in funding for SMAW Follow-On (Project 2614) from FY16 to FY17 (\$417K) is in support of qualification and testing of the densified propellant.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Engineer and technical support.	0.312	0.000	0.417	0.000	0.417
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					
-Continued engineering support for the development and testing of the Densified Propellant.					
FY 2016 Plans:					
N/A					
FY 2017 Base Plans:					
-Continue engineering support for the development and testing of the Densified Propellant.					
-Initiate qualification of Densified Propellant in accordance with Technology Transition Agreement (TTA) .					
-Initiate and complete qualification of current millijoule meter.					
-Initiate development of replacement millijoule meter.					
-Initiate development of next generation firing mechanism.					
FY 2017 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/ Supt Sys</i>	Project (Number/Name) 2614 / <i>SMAW Follow-On</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
N/A					
Accomplishments/Planned Programs Subtotals	0.312	0.000	0.417	0.000	0.417

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• PMC/3016: <i>Follow on to SMAW</i>	4.818	0.000	24.666	-	24.666	25.058	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

FY15-FY17 strategy is to complete development and qualification of upgraded components to the SMAW MOD 2 system.

The Office of Naval Research is funding densified propellant under a Technology Transition Agreement (TTA) through FY18. The PMO will begin programmatic documentation and planning to support transition for final design and qualification of densified propellant in FY17 if TTA technology readiness level 7 is achieved per Memorandum of Agreement (MOA).

E. Performance Metrics

Milestone reviews and technical reviews.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4				PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys				2614 / SMAW Follow-On							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Prior Year Cumulative Funding	Various	Various : Various	1.748	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			1.748	0.000		0.000		0.000		-		0.000	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Prior Year Cumulative Funding	Various	Various : Various	16.300	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Technical Support	WR	NSWC Indian Head : Indian Head, VA	0.529	0.312	Dec 2014	0.000		0.217	Dec 2016	-		0.217	Continuing	Continuing	Continuing
Engineering & Technical Support	TBD	MCSC Contracts : Quantico, VA	0.000	0.000		0.000		0.100	Feb 2017	-		0.100	Continuing	Continuing	Continuing
Engineering & Technical Support	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.000		0.100	Dec 2016	-		0.100	0.000	0.100	-
Subtotal			16.829	0.312		0.000		0.417		-		0.417	-	-	-
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Operational Testing & Support	WR	Marine Corps Operational Test & Eval Activity : Quantico, VA	5.164	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Prior year cumulative funding	Various	Various : Various	0.326	0.000		0.000		0.000		-		0.000	0.000	0.326	-
Subtotal			5.490	0.000		0.000		0.000		-		0.000	-	-	-

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys	Project (Number/Name) 2614 / SMAW Follow-On
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Proj 2614	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Densified Propellant Development	██████████								██████████																			
Densified Propellant Qualification									██████████				██████████				██████████											
Densified Propellant System Verification Review																	██████████											
Densified Propellant Developmental Testing																					██████████							
Densified Propellant Engineering Change Proposal																												◆
Millijoule Meter									██████████																			
Next Generation Firing Mechanism									██████████																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / <i>Marine Corps Grnd Cmbt/ Supt Sys</i>	Project (Number/Name) 2614 / <i>SMAW Follow-On</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2614				
Densified Propellant Development: Densified Propellant Development	1	2015	4	2015
Densified Propellant Development: Densified Propellant Development - Continued	1	2017	4	2017
Densified Propellant Qualification: Densified Propellant Qualification	1	2018	4	2020
Densified Propellant System Verification Review: Densified Propellant System Verification Review	1	2019	4	2020
Densified Propellant Developmental Testing: Densified Propellant Developmental Testing	3	2019	2	2020
Densified Propellant Engineering Change Proposal: Densified Propellant Engineering Change Proposal	3	2021	3	2021
Millijoule Meter: Millijoule Meter	1	2017	4	2017
Next Generation Firing Mechanism: Next Generation Firing Mechanism	1	2017	4	2017

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