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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 0603795N / <i>Land Attack Tech</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	14.274	0.310	0.887	6.015	-	6.015	15.608	19.044	15.771	22.239	Continuing	Continuing
2038: <i>ADVANCED MINOR CALIBER GUN</i>	14.274	0.310	0.887	0.573	-	0.573	0.000	0.000	0.000	0.000	0.000	16.044
3370: <i>Railgun</i>	0.000	0.000	0.000	5.442	-	5.442	15.608	19.044	15.771	22.239	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Minor Caliber Gun will support non-recurring engineering, component integration, and testing efforts required for capability upgrades to the MK38 Mod 2, a minor caliber gun weapon system.

Project 3370 Railgun is not a new Start. Hyper Velocity Projectile was budgeted under the railgun program element and project. The funding has been realigned to Land Attack Tech and the project title will be renamed in future submissions.

Funding for the Hyper Velocity Projectile (HVP) has been realigned from PE 0603925N (Directed Energy and Electric Weapon Systems) to PE 0603795N (Land Attack Tech) under the, currently shared with Railgun, PRJ code 3370.

Efforts within this budget fund Phase 1 of HVP development will implement technologies increasing effective range and lethality of Naval Surface Fire Support (NSFS) and integration with the 5'62 Mk 45 MOD 4 Gun and Mk 160 Gun Component System.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.318	0.887	0.591	-	0.591
Current President's Budget	0.310	0.887	6.015	-	6.015
Total Adjustments	-0.008	0.000	5.424	-	5.424
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.008	0.000			
• Rate/Misc Adjustments	0.000	0.000	5.424	-	5.424

Change Summary Explanation

Decrease in Land Attack Tech by \$0.023M as required for the Department of the Navy to comply with the Bipartisan Budget Act of 2015.

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<p>Project 3370: In FY17 (\$+5.442M) funding realigned from 3370 RAILGUN PE PE 0603925N / Directed Energy and Electronic Weapon Systems program to 3370 RAILGUN PE 0603795 to support Hyper Velocity Projectile (HVP).</p>		

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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 0603795N / <i>Land Attack Tech</i>	Project (Number/Name) 2038 / <i>ADVANCED MINOR CALIBER GUN</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
2038: <i>ADVANCED MINOR CALIBER GUN</i>	14.274	0.310	0.887	0.573	-	0.573	0.000	0.000	0.000	0.000	0.000	16.044
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Minor Caliber Gun project will support non-recurring engineering, component integration, testing and qualification efforts required for the capability upgrades to the MK38 Mod 2, a minor caliber gun weapon system. The new configuration (MOD 3) creates a near term improvement to address ship based, close range solutions to defeat the Fast Attack Craft (FAC)/Fast In-Shore Attack Craft (FIAC) threat. The MK38 Mod 2 was developed in FY04 under Chief of Naval Operations (CNO) direction to outfit near term deployers to counter small boat threats.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Systems Engineering and Testing	0.310	0.887	0.573	0.000	0.573
Articles:	-	-	-	-	-
FY 2015 Accomplishments: Completed final system qualification effort in order to obtain Weapon System Explosive Safety Review Board (WSESRB) deployment concurrence.					
FY 2016 Plans: Implement system improvement based on qualification/Sea Trials results.					
FY 2017 Base Plans: Revise engineering change based on results from revisions from sea trial.					
FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.310	0.887	0.573	0.000	0.573

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

N/A

Remarks

D. Acquisition Strategy

The hardware improvements for MOD 3 were integrated into new production orders and separate kits for backfit in FY15.

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E. Performance Metrics

Quarterly program reviews and semi-annual product certification panel reviews.

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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 0603795N / <i>Land Attack Tech</i>	Project (Number/Name) 2038 / <i>ADVANCED MINOR CALIBER GUN</i>
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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 Product Integration	SS/BOA	BAE Systems : Minneapolis MN	11.927	0.135	Dec 2014	0.000		0.527	Apr 2017	-		0.527	0.200	12.789	-
Subtotal			11.927	0.135		0.000		0.527		-		0.527	0.200	12.789	-

Remarks
ECPs spiral development - Electro Optical Site (EOS) capabilities

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			
Government Engineering Services	WR	NSWC, DD : Dahlgren, VA	1.713	0.072	Dec 2014	0.621	Dec 2015	0.000		-		0.000	1.000	3.406	-
Government Engineering Services	WR	NSWC, IHD : Picatinny, NJ	0.300	0.072	Dec 2014	0.266	Dec 2015	0.046	Oct 2016	-		0.046	0.278	0.962	-
Subtotal			2.013	0.144		0.887		0.046		-		0.046	1.278	4.368	-

Remarks
Configuration Management (CM) work engineering tech manuals updates.

Management Services (\$ 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			
Program Support Services	C/CFFF	ALION : Washington, DC	0.334	0.031	Jan 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.334	0.031		0.000		0.000		-		0.000	-	-	-

			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			14.274	0.310	0.887	0.573	-	0.573	-	-	-

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 0603795N / <i>Land Attack Tech</i>	Project (Number/Name) 2038 / <i>ADVANCED MINOR CALIBER GUN</i>
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FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
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 2038																												
MOD 3 Upgrade Capability Improvement																												
Increment I - Design for integration																												
Increment I Qualification Test																												
Logistics Update TMs & Training Material																												
Increment II - MOD 3 Upgrades Eng design for integration																												
Increment II Qualification Test																												
Engineer Changes based on Sea Trials																												
Increment II																												

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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 0603795N / <i>Land Attack Tech</i>	Project (Number/Name) 2038 / <i>ADVANCED MINOR CALIBER GUN</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 2038</i>				
MOD 3 Upgrade Capability Improvement	1	2015	4	2017
Increment I - Design for integration	1	2015	4	2015
Increment I Qualification Test	1	2015	4	2016
Logistics Update TMs & Training Material	1	2015	4	2016
Increment II - MOD 3 Upgrades Eng design for integration	1	2015	4	2016
Increment II Qualification Test	3	2015	4	2017
Engineer Changes based on Sea Trials	4	2015	4	2017
Increment II	4	2016	4	2017

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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 0603795N / <i>Land Attack Tech</i>				Project (Number/Name) 3370 / <i>Railgun</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
3370: <i>Railgun</i>	0.000	0.000	0.000	5.442	-	5.442	15.608	19.044	15.771	22.239	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Hyper Velocity Projectile (HVP) effort will double the range of the current 5-inch Mk 45 MOD 4 Gun, meeting Naval Surface Fire Support (NSFS) operational requirements for support of combat troops ashore. This project executes pre MS-B activities for Engineering and Manufacturing Development Phase. Phase 1 of HVP development will implement technologies increasing effective range and lethality of Naval Surface Fire Support (NSFS) and integration with the 5"/62 Mk 45 MOD 4 Gun and Mk 160 Gun Computer System. Phase 1 includes airframe and sabot development to improve weight and volume allocations, definition of government controlled sub-section interfaces, and the development of an High Explosive (HE) warhead. Phases 2-3 are oriented at expansion of the capabilities of HVP beyond NSFS currently addressed in this Budget Item. The Hyper Velocity Projectile project was previously funded under the PE 0603925N / Directed Energy and Electronic Weapon Systems

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Systems Engineering and Testing	0.000	0.000	5.442	0.000	5.442
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					
(The Hyper Velocity Projectile technology development was previously funded under the PE 0603925N / Directed Energy and Electronic Weapon Systems)					
Defined interface and control requirements.					
Defined and designed projectile critical components.					
Developed/conducted flight simulations.					
Conducted lethality analyses and developed/designed projectile electronics components/subsystems.					
FY 2016 Plans:					
(The Hyper Velocity Projectile technology development was previously funded under the PE 0603925N / Directed Energy and Electronic Weapon Systems)					
Complete critical design efforts.					
Conduct integration testing for sub-systems.					
Continue development for the improved Naval Surface Fire Support (NSFS) capabilities and their interface to the AEGIS Combat System.					

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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
Continue the development and qualification process for the Mk 34 GWS Ordnance Alteration (ORDALT) and propellant to support HVP use by existing gun systems. <i>FY 2017 Base Plans:</i> Technology development/establishment of technical requirements for 5-inch HVP. Preparation of acquisition documentation in preparation for Milestone B, including Acquisition Program Baseline (APB), Capabilities Development Document (CDD), Should Cost Report, Systems Engineering Plan (SEP), and Test & Evaluation Master Plan (TEMP). Prepare and publish Request for Proposals for E&MD award. Complete Cost and Technology Assisted Review. <i>FY 2017 OCO Plans:</i> N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.442	0.000	5.442

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

N/A

Remarks

D. Acquisition Strategy

Leveraging the sponsored ONR Future Naval Capabilities project and Gov't developed Interface Control Drawings and specifications, establish a competitive solicitation for E&MD Phase.

E. Performance Metrics

Quarterly Program Reviews, Monthly Reports, and Periodic Design Reviews.

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

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 3370</i>				
Technical Studies/Risk Reduction effort	4	2016	4	2018
Capabilities Development Document (CDD) Development	4	2016	2	2018
System Engineering Plan (SEP) Development	4	2016	4	2017
Test & Evaluation Master Plan (TEMP) Development	4	2016	3	2018
Acquisition Program Baseline (APB) Development	4	2016	3	2018
Milestone B Approval and E&MD Award	4	2018	4	2018
Tactical Design Development	1	2019	4	2021
Component/System Element Qualification Build Test Hardware	1	2021	4	2021