Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603925N *I Directed Energy and Electric Weapon System*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	58.503	41.355	32.700	107.310	-	107.310	117.907	78.621	48.042	32.202	Continuing	Continuing
3370: *Railgun*	45.699	31.980	23.776	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	101.455
3402: *Surface Navy Laser Weapon System (SNLWS)*	0.000	0.000	0.000	63.281	-	63.281	83.807	60.221	45.942	30.062	Continuing	Continuing
9823: *Lasers for Navy applicat*	12.804	9.375	8.924	44.029	-	44.029	34.100	18.400	2.100	2.140	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element will transition Directed Energy and Electric Weapon Systems (DE&EWS) technology from Science and Technology (S&T) research to the Technology Maturation and Risk Reduction phase, ultimately leading to acquisition initiation for the Surface/Subsurface Navy.

DE&EWS consist of multiple breakthrough technologies including: laser weapons that provide for speed-of-light engagements at tactically significant ranges resulting in savings realized by minimizing the use of defensive missiles and projectiles; electromagnetic launch of projectiles that will significantly increase firing ranges imposing greater cost to adversaries of ballistic and air defense missile engagements; enhance the land attack mission; and fielding of high power radio frequency systems for non-kinetic electronic attack and active denial technology, allowing for non-lethal determination of threat intent beyond small arms fire ranges.

Development of DE&EWS includes: Weapons Grade High Energy Lasers, Electromagnetic Railgun (EMRG) Weapon Systems, High Power Radio Frequency Weapon/ Sensor Systems, and other systems/capabilities.

Project 3370 - Railgun: EMRG provides ship-based program/technical development to produce a standard railgun/mount for use onboard Navy warships. Railgun provides increased capability for the following mission sets: Naval Surface Fire Support (NSFS), Integrated Air and Missile Defense (IAMD), Fast Attack Craft and Fast Inshore Attack Craft (FAC/FIAC), and future potential for Anti-Surface Warfare (ASuW). EMRG uses electromagnetic energy, vice traditional chemical propellant (i.e. gun powder), to launch projectiles providing: greatly increased range (110+nm vice 13nm for current 5" chemical propellant [gunpowder] guns); increased ammunition storage capacity; increased ship safety; increased layered point defense; and decreased costs when compared to current weapons. The net effect is an increased capacity against multiple simultaneous threats at a lower operational cost to offset a potential adversary's asymmetric missile strategy. The EMRG will launch the Hyper Velocity Projectile (HVP).

The funding decrease from FY17 to FY18 reflects delay for evaluation of transition opportunities focused on component technologies and ship integration risk reduction. Further, Hypervelocity Projectile into 5" conventional guns has been prioritized as risk reduction (funded in PE 0603795N Land Attack Technology PU 3401) on the path to Railgun component technologies maturation.

Project 3402 - Surface Navy Laser Weapon System (SNLWS): SNLWS funding is requested for the expedited development and fielding of the SNLWS system to Naval Forces. SNLWS will include the development of an advanced prototype laser weapon system in the 60 kW or higher class. SNLWS leverages mature technology

to deliver a proven laser weapon capability to the Fleet. SNLWS development leverages the Office of Naval Research (ONR) efforts on the Solid State Laser (SSL) Quick Reaction Capability (QRC) and Solid State Laser (SSL) Technology Maturation (TM) efforts. SNLWS provides a capability to address existing Low Power Module (LPM), Anti-Surface Warfare, Integrated Air and Missile Defense and Counter-Intelligence, Surveillance and Reconnaissance (C-ISR) Gaps with the ability to dazzle and destroy Unmanned Aerial Systems (UASs) and Fast Inshore Attack Craft (FIAC).

The funding increase from FY17 to FY18 reflects the establishment of Surface Navy Laser Weapon System (SNLWS) prototype development efforts.

Project 9823 - Lasers for Navy Applications: Low Power Module (LPM) development will provide near-term, directed energy, shipboard Counter-Intelligence, Surveillance, and Reconnaissance (C-ISR) capabilities to dazzle Unmanned Aerial Systems (UASs) and other platforms, and could provide enhanced ISR and Battle Damage Assessment (BDA) capabilities that will address urgent operational needs of the Fleet. FY18 is the first year of funding that will support the design, development and procurement of eight standalone units over the FYDP, for deployment on DDG 51 surface combatants. The program will support the non-recurring engineering, procurement of long lead material, assembly and checkout, system certification, and platform integration/installation.

The increased funding in FY 2018 reflects a change in project direction from a single module attached to the Office of Naval Research's SSL Technical Maturation (SSL-TM) efforts to the design and procurement of eight standalone units for deployment on DDG 51 surface combatants. The increased funding is for the non-recurring development, procurement of long lead material, assembly and checkout, system certification, and platform integration/installation for these eight standalone units.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	41.730	32.700	33.828	-	33.828
Current President's Budget	41.355	32.700	107.310	-	107.310
Total Adjustments	-0.375	0.000	73.482	-	73.482
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.375	0.000			
• Program Adjustments	0.000	0.000	73.656	-	73.656
• Rate/Misc Adjustments	0.000	0.000	-0.174	-	-0.174

Change Summary Explanation

The FY18 Program Adjustment in the amount of +73.5 million is a result of the following:

+$63.5 million Project 3402 - This increase reflects the first year of funding for the establishment of a Project Unit (PU) for the Surface Navy Laser Weapon System (SNLWS). Funding will support the initiation of the development of SNLWS prototype efforts.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603925N *I Directed Energy and Electric Weapon System*

-$24.4 million Project 3370 - The removal of the Railgun Investment reflects delay for evaluation of transition opportunities focused on component technologies and ship integration risk reduction. Further, Hypervelocity Projectile into 5" conventional guns has been prioritized as risk reduction (funded in PE 0603795N Land Attack Technology Project 3401 Guided Projectile) on the path to Railgun component technologies maturation. Railgun funding will continue to remain active in S&T PEs under the Office of Naval Research.

+$34.5 million Project 9823 - This increase supports the change in project direction from a single module attached to the Office of Naval Research's (ONR's) Solid State Laser Technology Maturation (SSL TM) efforts to the first year of the design and procurement of eight stand alone units for deployment on DDG 51 surface combatants.

-$0.2 million decrease reflects miscellaneous adjustments.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / *Directed Energy and Electric Weapon System*	Project (Number/Name) 3370 / *Railgun*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
3370: *Railgun*	45.699	31.980	23.776	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	101.455
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

EMRG provides ship-based program/technical development to produce a standard railgun/mount for use onboard Navy warships. Railgun provides increased capability for the following mission sets: Naval Surface Fire Support (NSFS), Integrated Air and Missile Defense (IAMD), Fast Attack Craft and Fast Inshore Attack Craft (FAC/FIAC), and future potential for Anti-Surface Warfare (ASuW). EMRG uses electromagnetic energy, vice traditional chemical propellant (i.e. gun powder), to launch projectiles providing: greatly increased range (110+nm vice 13nm for current 5" chemical propellant [gunpowder] guns); increased ammunition storage capacity; increased ship safety; increased layered point defense; and decreased costs when compared to current weapons. The net effect is an increased capacity against multiple simultaneous threats at a lower operational cost to offset a potential adversary's asymmetric missile strategy. The EMRG will launch the Hyper Velocity Projectile (HVP), currently in development as a Future Naval Capability (FNC).

The funding decrease from FY17 to FY18 reflects delay for evaluation of transition opportunities focused on component technologies and ship integration risk reduction. Further, Hypervelocity Projectile into 5" conventional guns has been prioritized as risk reduction (funded in PE 0603795N PU 3401) on the path to Railgun component technologies maturation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Railgun	31.980	23.776	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Commissioned the first RDT&E Railgun launcher based on the design of the S&T Railgun developed by ONR. This is the first critical step in proving a repeatable design. - Accepted delivery and qualification of the first two pulse power vans for planned integration at White Sands Missile Range (WSMR). - Awarded a contract for site improvements at White Sands Missile Range (WSMR) to support long-term Railgun and Powder gun testing intended to ensure commonality of the Hypervelocity Projectile between the two launching methodologies. - Awarded contract to build Railgun test assembly for WSMR. - Awarded contracts to 2 vendors via the Defense Ordnance Technology Consortium (DOTC) to develop prototype engineering models for the Pulse Current Transfer (PCT) subsystem of a future Railgun Mount. The					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3370 / *Railgun*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
PCT is assessed as the highest risk engineering challenge towards integrating a fully articulated Railgun mount into any existing platform. - Transitioned management of the Program to PEO IWS. ***FY 2017 Plans:*** - Manufactured Bridge Rectifying Charging Containers for WSMR test site. - Completed acceptance testing for Pulsed Power Containers and ancillary equipment for WSMR. - Executed Defense Ordnance Technology Consortium (DOTC) initiative for Pulsed Current Transfer to advance slip ring technology for tactical system. - Executed engineering tasks to reduce SWAP-C of the Pulsed Power System. - Commission a Railgun Integration Test Site in White Sands, New Mexico able to conduct close-loop fire control testing on a controlled range with an HVP fired from a Railgun. The Railgun at WSMR will be fired from a non-articulated test stand fixture. - Continue railgun system-level management, engineering development, integration, and testing of the Railgun. ***FY 2018 Base Plans:*** - Complete acceptance of remaining equipment and support ONR Railgun INP operations. ***FY 2018 OCO Plans:*** N/A.					
Accomplishments/Planned Programs Subtotals	31.980	23.776	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Tech maturation and system development efforts will be competitive in nature and are currently focused on establishing the technical requirements for the next round of competition prior to entering the Engineering & Manufacturing Development (E&MD) phase. The focus of the current efforts under cognizance of this PE are to ensure there are a sufficient quantity of qualified vendors at the critical component and system level to ensure a robust competitive environment at Milestone B. This effort is outside the scope of ONR efforts, which are focused on the development of component technologies and demonstration of repetitive firings at a tactical rate.

E. Performance Metrics

- Complete EMRG Design Review

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3370 / *Railgun*

- Conduct EMRG Test Events and Test Artifacts Review
- Conduct EMRG Test Plan Review
- Conduct EMRG System Testing & Analysis Review

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / *Directed Energy and Electric Weapon System*	Project (Number/Name) 3402 / *Surface Navy Laser Weapon System (SNLWS)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
3402: *Surface Navy Laser Weapon System (SNLWS)*	0.000	0.000	0.000	63.281	-	63.281	83.807	60.221	45.942	30.062	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Surface Navy Laser Weapon System (SNLWS) funding is requested for the expedited development and fielding of the SNLWS system to Naval Forces. SNLWS will include the development of an advanced prototype laser weapon system in the 60 kW or higher class. SNLWS leverages mature technology to deliver a proven laser weapon capability to the Fleet. SNLWS development leverages the Office of Naval Research (ONR) efforts on the Solid State Laser (SSL) Quick Reaction Capability (QRC) and Solid State Laser (SSL) Technology Maturation (TM) efforts. SNLWS provides a capability to address existing Low Power Module (LPM), Anti-Surface Warfare, Integrated Air and Missile Defense and Counter-Intelligence, Surveillance and Reconnaissance (C-ISR) Gaps with the ability to dazzle and destroy Unmanned Aerial Systems (UASs) and Fast Inshore Attack Craft (FIAC).

The funding increase from FY17 to FY18 reflects the establishment of Surface Navy Laser Weapon System (SNLWS) prototype development efforts.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: SNLWS Development	0.000	0.000	36.104	0.000	36.104
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A.					
FY 2017 Plans: N/A.					
FY 2018 Base Plans: - Initiate SNLWS development. This includes system hardware and software design and documentation development; non-recurring system/sub-system/component engineering and management; and component/sub-system procurement, assembly, and testing. - Conduct systems engineering efforts for laser, mount, beam transport, power and cooling, and systems/ ship integration. Perform functional decomposition of the system level documentation into sub-system level requirements for the laser, weapon mount, beams control architecture and transport system, power and cooling sub system and ship interface requirements. - Conduct System Requirements Review					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Conduct System Functional Review. - Develop Preliminary Design Data/Package. - Conduct Preliminary Design Review. - Initiate development of Interface Functional Descriptions (IFDs) for the appropriate combat system baseline. - Conduct SNLWS Technical Interchange Meetings (TIMs) with PEO IWS and designated field activities. - Provide programmatic and engineering support to SNLWS Integrated Product Teams (IPTs) and Working Groups (WGs). - Initiate procurement of long lead items as applicable: Mount, Lasers, Computer Systems, Cables/Connectors, Beam Director, Optics/Bench, Mirrors, Cameras/Illuminators, Laser Structure/Foundation, Power/Cooling Mod Kits, and Platform Mod Kits. - Develop and deliver required contract cost, schedule and performance related documentation. ***FY 2018 OCO Plans:*** N/A.					
Title: SNLWS Government and Support Engineering Services ***Articles:*** ***FY 2016 Accomplishments:*** N/A. ***FY 2017 Plans:*** N/A. ***FY 2018 Base Plans:*** - Review proposals and Conduct SNLWS Source Selection. - Develop and award SNLWS contract. - Support System Requirements Review conducted by the prime contractor. - Support System Functional Review conducted by the prime contractor. - Support Preliminary Design Review (PDR) efforts leading up to the formal PDR. - Initiate AEGIS Combat System software and integration planning, trade studies and engineering. - Initiate DDG 51 Flight IIA Ship Integration & Installation requirements, trade studies and engineering. - Provide engineering support of the contractor development of Interface Functional Descriptions (IFDs) for the appropriate combat system baseline. - Initiate test planning and procedure development to ensure traceability to system requirements to support future system testing.	0.000 -	0.000 -	27.177 -	0.000 -	27.177 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Initiate hardware/software development/build of Laser Weapon Control System (LWCS) to be provided as government furnished equipment (GFE). - Initiate development/build of the De-confliction Safety System (DSS) to be provided as GFE. - Support SNLWS Technical Interchange Meetings (TIMs). - Support SNLWS Integrated Product Teams (IPTs) and Working Groups (WGs). - Develop programmatic and technical documentation to support the Rapid Prototyping, Experimentation, and Demonstration (RPED) initiative. ***FY 2018 OCO Plans:*** N/A.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	63.281	0.000	63.281

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The SNLWS is an initiative that provides for industry-developed and government integrated capability to the Fleet in as short a timeframe as possible. Competition is utilized for system development and prototype production efforts. The acquisition strategy permits accelerated fielding of laser weapon systems in the Fleet.

E. Performance Metrics

- Conduct SNLWS Source Selection.
- Award SNLWS contract.
- Conduct System Requirements Review.
- Conduct System Functional Review.
- Develop/deliver Laser Weapon Control System GFE to Vendor.
- Conduct Preliminary Design Review.
- Conduct Final Design Review.
- Develop/deliver De-confliction Safety System GFE to Vendor.
- Conduct Production Readiness Review.
- Conduct T&E review for Contractor Test.
- Conduct Contractor Test.
- Deliver Test Unit.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*

- Install, Develop, Test & Operate delivered system.
- Sustain delivered system.
- Initiate Combat System Integration & DDG 51 Flight IIA Integration/Installation Engineering.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SNLWS Development	C/CPFF	Contractor TBD : TBD	0.000	0.000		0.000		36.104	Apr 2018	-		36.104	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		36.104		-		36.104	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SNLWS Systems Engineering, Program Management, GFE/GFI	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.000		14.425	Dec 2017	-		14.425	Continuing	Continuing	Continuing
SNLWS Ship Installation Documentation	C/CPFF	BIW : Bath, ME	0.000	0.000		0.000		1.171	Feb 2018	-		1.171	Continuing	Continuing	Continuing
SNLWS Combat System Integration	C/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.000		0.000		2.813	Feb 2018	-		2.813	Continuing	Continuing	Continuing
SNLWS Systems Engineering	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		1.386	Dec 2017	-		1.386	0.000	1.386	-
SNLWS Systems Engineering	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		0.881	Dec 2017	-		0.881	0.000	0.881	-
SNLWS Systems Engineering	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.628	Dec 2017	-		0.628	0.000	0.628	-
SNLWS Systems Engineering	WR	NPS : Monetrey, CA	0.000	0.000		0.000		0.628	Dec 2017	-		0.628	0.000	0.628	-
SNLWS Systems Engineering	MIPR	MIT LL : Lexington, MA	0.000	0.000		0.000		0.628	Dec 2017	-		0.628	0.000	0.628	-
SNLWS Systems Engineering	C/CPFF	PSU EOC : Freeport, PA	0.000	0.000		0.000		1.131	Dec 2017	-		1.131	0.000	1.131	-
		Subtotal	0.000	0.000		0.000		23.691		-		23.691	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SNLWS Test & Evaluation	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		0.493	Dec 2017	-		0.493	Continuing	Continuing	Continuing
SNLWS Test & Evaluation	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.500	Dec 2017	-		0.500	0.000	0.500	-
SNLWS Test & Evaluation	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.000		0.500	Dec 2017	-		0.500	0.000	0.500	-
		Subtotal	0.000	0.000		0.000		1.493		-		1.493	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SNLWS Program Management/Engineering Support	C/CPFF	GRYPHON Technologies : Washington, D.C.	0.000	0.000		0.000		0.843	Dec 2017	-		0.843	0.000	0.843	-
SNLWS Program Management/Engineering Support	C/CPFF	SPA : Washington, D.C.	0.000	0.000		0.000		1.000	Dec 2017	-		1.000	Continuing	Continuing	Continuing
SNLWS Travel	Various	NAVSEA : Washington, D.C.	0.000	0.000		0.000		0.150	Sep 2018	-		0.150	0.000	0.150	-
		Subtotal	0.000	0.000		0.000		1.993		-		1.993	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		63.281		-		63.281	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*

SNLWS

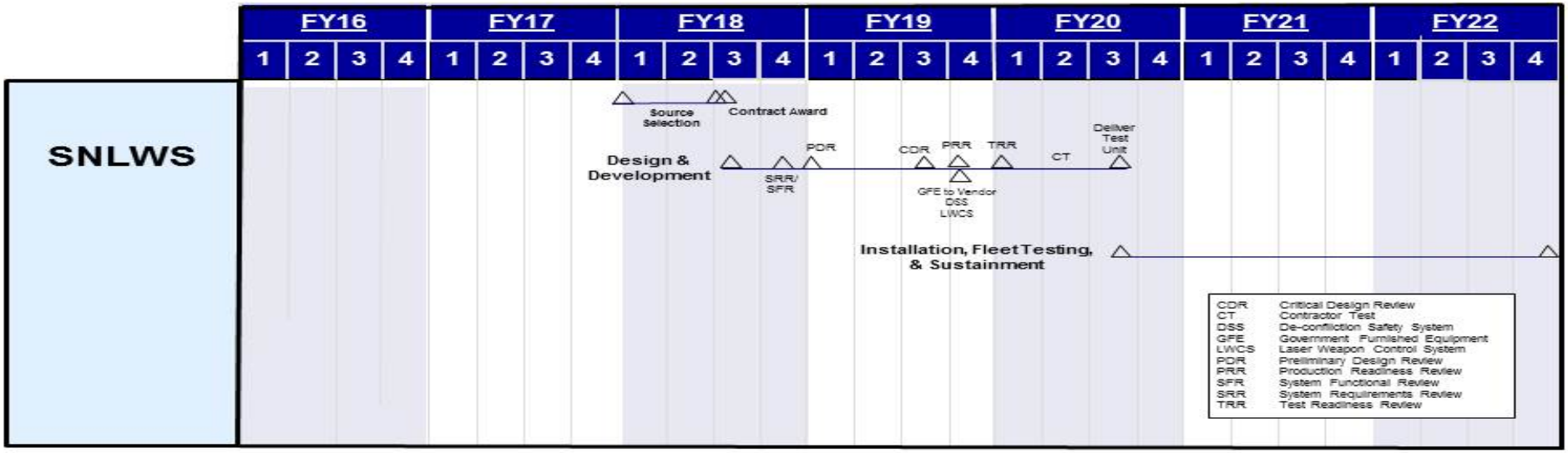

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 3402 / *Surface Navy Laser Weapon System (SNLWS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3402				
SNLWS: Conduct SNLWS Source Selection	1	2018	2	2018
SNLWS: Contract Award	3	2018	3	2018
SNLWS: Conduct System Requirements Review/System Functional Review	3	2018	4	2018
SNLWS: Preliminary Design Review	1	2019	1	2019
SNLWS: Critical Design Review	3	2019	3	2019
SNLWS: Laser Weapon Control System GFE to Vendor	4	2019	4	2019
SNLWS: Deconfliction Safety System GFE to Vendor	4	2019	4	2019
SNLWS: Production Readiness Review	4	2019	4	2019
SNLWS: Test Readiness Review	1	2020	1	2020
SNLWS: Contractor Test	1	2020	3	2020
SNLWS: Deliver Test Unit	3	2020	3	2020
SNLWS: Installation, Fleet Testing & Sustainment	3	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / *Directed Energy and Electric Weapon System*	Project (Number/Name) 9823 / *Lasers for Navy applicat*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
9823: *Lasers for Navy applicat*	12.804	9.375	8.924	44.029	-	44.029	34.100	18.400	2.100	2.140	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Lasers for Navy Applications: Low Power Module (LPM) development will provide near-term, directed energy, shipboard Counter-Intelligence, Surveillance, and Reconnaissance (C-ISR) capabilities to dazzle Unmanned Aerial Systems (UASs) and other platforms. FY18 is the first year of funding that will support the design, development and procurement of eight standalone units over the FYDP, for deployment on DDG 51 surface combatants. The program will support the non-recurring engineering, procurement of long lead material, assembly and checkout, system certification, and platform integration/installation.

The increased funding in FY 2018 reflects a change in project direction from a single module attached to the Office of Naval Research's SSL Technical Maturation (SSL-TM) efforts to the design and procurement of eight standalone units for deployment on DDG 51 surface combatants. The increased funding is for the non-recurring development, procurement of long lead material, assembly and checkout, system certification, and platform integration/installation for these eight standalone units.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Solid State Laser (SSL) Low Power Module (LPM) Development	9.375	8.924	44.029	0.000	44.029
Articles:	-	-	-	-	-
FY 2016 Accomplishments:					
- Continued LPM management, engineering, design, development.					
- Conducted rigorous outdoor testing to validate software models using the design reference wavelengths.					
- Conducted initial and final design reviews.					
- Initiated procurement of test bed components.					
- Conducted subsystem testing of components.					
- Initiated LPM Test Plan.					
- Initiated development of the LPM Weapon System Specification Update.					
- Initiated development of the LPM System Requirements Document.					
- Initiated development of the LPM Sub-System Requirements Document.					
- Initiated procurement of a Hybrid Predictive Avoidance Safety System.					
- Initiated LPM Technical Design Concepts & Reviews.					
- Initiated LPM Trade Studies & Analyses.					
- Initiated LPM Analysis of available Space, Weight, Power & Cooling (SWAP-C) onboard a DDG 51 Flight IIA Class Ship.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 9823 / *Lasers for Navy applicat*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Planned for integrated testing in FY 17. ***FY 2017 Plans:*** - Continue LPM management, engineering, design, development, procurement and integration of test bed components. - Develop System Requirements Document (SRD) for Stand Alone System. - Develop Concept of Operations Document (CONOPS) for Stand Alone System. - Perform Top Level Design of a Stand Alone Systems. - Design and procure Stand Alone Gimbal. - Conduct LPM Prototype Testing/Analysis. - Conduct LPM Subsystem Integration & Testing. ***FY 2018 Base Plans:*** - Complete System Engineering of initial LPM design and initiate the detailed design of a Stand Alone System to include the train and elevation capability, pointing/tracking mount and associated hardware/software, and additional beam control software required for a stand alone capability - Conduct Technical Design Reviews - Procure/integrate additional sensor components, i.e., track illumination laser and Battle Damage Assessment laser, required for Stand Alone System - Conduct non-recurring engineering, design, and documentation for shipboard integration and installation on DDG 51 class ships - Perform Assembly and Checkout of first two units. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	9.375	8.924	44.029	0.000	44.029

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The LPM Stand Alone is a government designed, developed, and produced system that will provide eight units for use on DDG 51 class ships. This effort will transition the developed LPM capabilities to the Fleet, while informing the development of future prototyping capabilities and program of record efforts.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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E. Performance Metrics

- Conduct Systems Requirements Review
- Conduct Engineering/Program Review
- Conduct Design Review
- Conduct Prototype Testing/Analysis Review
- Conduct Test Plan Review
- Conduct Integration & Testing Review
- Conduct Analysis and Final Report Review

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LPM Development	WR	NSWC DD : Dahlgren, VA	2.702	2.138	Apr 2016	1.680	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	WR	SSC PAC : San Diego, CA	1.058	0.030	Mar 2016	0.400	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	WR	NSWC CRANE : Crane, IN	0.980	0.540	Mar 2016	0.625	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	WR	NRL : Washington, D.C.	0.195	0.275	Dec 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	C/CPFF	BOEING : San Diego, CA	1.349	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Testbed	WR	NSWC DD : Dahlgren, VA	1.227	1.500	Mar 2016	0.952	May 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Testbed	C/CPFF	PSU EOC : Freeport, PA	0.500	0.500	Mar 2016	0.540	Mar 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	WR	NSWC DD : Dahlgren, VA	0.222	0.297	Mar 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	WR	NSWC CRANE : Crane, IN	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	WR	NSWC CARDEROCK : Bethesda, MD	0.240	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	C/CPFF	Huntington Ingalls : Newport News, VA	0.000	0.012	Sep 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hardware & Software - Material Buys	C/FFP	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		25.407	Jan 2018	-		25.407	Continuing	Continuing	Continuing
Engineering/Development	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.255	May 2017	2.748	Dec 2017	-		2.748	Continuing	Continuing	Continuing
Software Development	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		1.976	Dec 2017	-		1.976	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering/Development	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.435	May 2017	0.000		-		0.000	0.000	0.435	-
		Subtotal	8.473	5.292		4.887		30.131		-		30.131	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems/Mgmt Engineering	WR	NSWC DD : Dahlgren, VA	0.100	0.150	Dec 2015	0.280	May 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems/Mgmt Engineering	C/CPFF	PSU EOC : Freeport, PA	0.907	0.817	Mar 2016	0.727	May 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Modeling & Simulation	WR	NSWC DD : Dahlgren, VA	0.249	0.150	Mar 2016	0.160	May 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems/Mgmt Engineering	WR	PATUXENT PARTNERSHIP : Lexington Park, MD	0.000	0.202	May 2016	0.220	Apr 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems/Mgmt Engineering	C/CPFF	CSC : Washington, D.C.	0.000	0.080	May 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.448	May 2017	7.858	Jan 2018	-		7.858	Continuing	Continuing	Continuing
Platform Intgegration	WR	NSWC CRANE : Crane, IN	0.000	0.000		0.060	Feb 2017	0.250	Dec 2017	-		0.250	Continuing	Continuing	Continuing
Platform Integration	WR	SPAWAR : San Diego, CA	0.000	0.000		0.112	May 2017	0.150	Dec 2017	-		0.150	Continuing	Continuing	Continuing
Platform Integration	C/FFP	PSU EOC : Freeport, PA	0.000	0.000		0.000		0.350	Jan 2018	-		0.350	Continuing	Continuing	Continuing
Spares	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		0.654	Dec 2017	-		0.654	Continuing	Continuing	Continuing
Packaging, Handling, Storage & Transportation	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		0.088	Dec 2017	-		0.088	Continuing	Continuing	Continuing
		Subtotal	1.256	1.399		2.007		9.350		-		9.350	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Planning & Execution	C/CPFF	NSWC DAHGREN : Dahlgren, VA	0.000	0.320	Apr 2016	0.100	May 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Test Planning & Execution	WR	PHD NSWC : Port Hueneme, CA	0.180	0.275	Jan 2016	0.150	May 2017	1.062	Dec 2017	-		1.062	Continuing	Continuing	Continuing
Test Planning & Execution	WR	NSWC DD : Dahlgren, VA	0.250	0.777	May 2016	0.100	May 2017	1.063	Dec 2017	-		1.063	Continuing	Continuing	Continuing
Test Planning & Execution	WR	NSWC CRANE : Crane, IN	0.214	0.078	Feb 2016	0.015	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Test Planning & Execution	MIPR	KIRTLAND AFT : Albuquerque, NM	0.000	0.045	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Planning & Execution	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.644	1.495		0.365		2.125		-		2.125	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Safety, Product Support, Security, Operations	WR	NSWC DD : Dahlgren, VA	1.609	0.905	Mar 2016	0.788	May 2017	1.862	Dec 2017	-		1.862	Continuing	Continuing	Continuing
Program Mgmt/Support	C/CPFF	GRYPHON Technologies : Washington, D.C.	0.000	0.178	Sep 2016	0.320	May 2017	0.250	Jan 2018	-		0.250	Continuing	Continuing	Continuing
Program Mgmt/Support	MIPR	ARDEC : Picatinny Arsenal, NJ	0.822	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Safety, Product Support, Security, Operations	WR	NAVFACENG : San Diego, CA	0.000	0.030	Sep 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SBIR Withhold	C/FFP	TBD : TBD	0.000	0.024	Sep 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Travel	Various	NAVSEA : Washington, D.C.	0.000	0.052	Sep 2017	0.052	Sep 2017	0.076	Sep 2018	-		0.076	Continuing	Continuing	Continuing
Program Mgmt/Support	C/CPFF	SPA : Washington, D.C.	0.000	0.000		0.355	May 2017	0.235	Jan 2018	-		0.235	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Mgmt/Support	C/CPFF	TMB : Washington, D.C.	0.000	0.000		0.150	May 2017	0.000		-		0.000	0.000	0.150	-
		Subtotal	2.431	1.189		1.665		2.423		-		2.423	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	12.804	9.375		8.924		44.029		-		44.029	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
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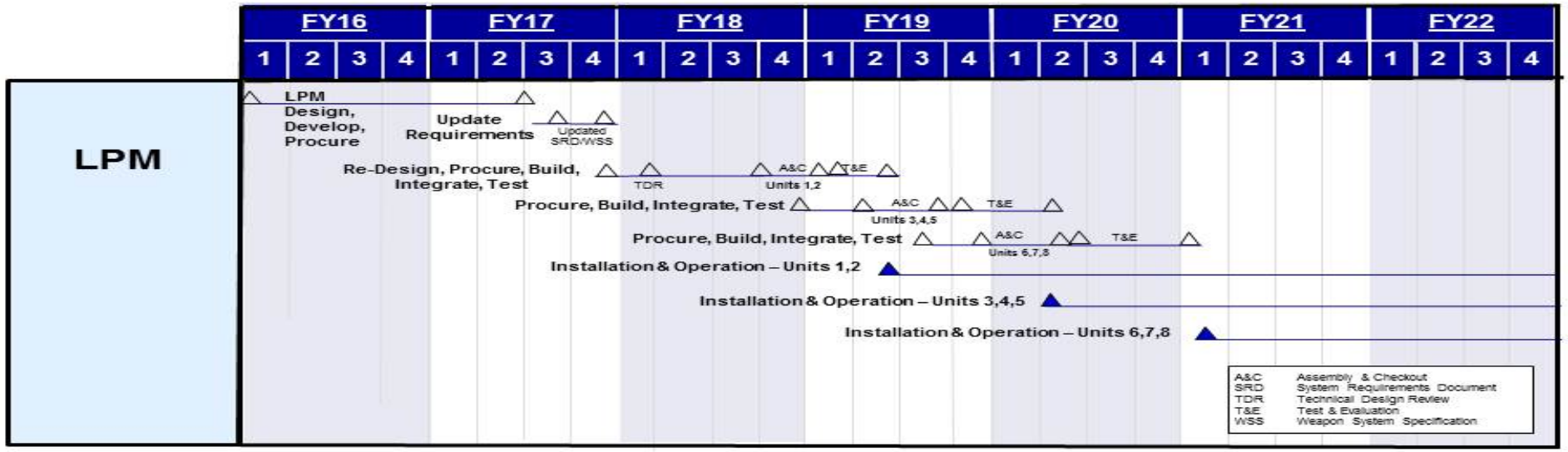

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603925N / *Directed Energy and Electric Weapon System*	**Project (Number/Name)** 9823 / *Lasers for Navy applicat*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9823				
Engineering	1	2016	1	2019
Design	1	2016	1	2016
Initial Design Review	1	2016	1	2016
Final Design	1	2016	3	2016
Prototype Module Development/Procurement	1	2016	3	2017
Test Plan Development	1	2016	1	2017
Final Design Review	3	2016	3	2016
Prototype Module Testing/Analysis	4	2016	3	2017
Subsystem Integration & Testing	1	2017	1	2017
SSL Integration/Testing	1	2017	3	2017
Update Systems Requirements Document (SRD)	3	2017	4	2017
Update Weapon System Spec (WSS)	3	2017	4	2017
Redesign, Procure, Build, Integrate, Test (Unit's 1 & 2)	4	2017	2	2019
Technical Design Review (Unit's 1 & 2)	1	2018	1	2018
Assembly & Checkout (Unit's 1 & 2)	3	2018	1	2019
Procure, Build, Integrate, Test (Unit's 3, 4, 5)	4	2018	2	2020
Test & Evaluation (Unit's 1 & 2)	1	2019	2	2019
Assembly & Checkout (Unit's 3, 4, 5)	2	2019	3	2019
Testing/Analysis and final report	2	2019	4	2019
Installation & Operation (Unit's 1 & 2)	2	2019	4	2022
Procure, Build, Integrate, Test (Unit's 6, 7, 8)	3	2019	2	2020

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Assembly & Checkout (Unit's 6, 7, 8)	4	2019	4	2019
Test & Evaluation (Unit's 3, 4, 5)	4	2019	2	2020
Instalation & Operation (Unit's 3, 4, 5)	2	2020	4	2022
Test & Evaluation (Unit's 6, 7, 8)	2	2020	1	2021
Installation & Operation (Unit's 6, 7,8)	1	2021	4	2022