Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
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 0603382N *I Advanced Combat Systems Tech*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	68.820	4.450	39.240	64.694	-	64.694	76.309	47.098	50.712	51.723	Continuing	Continuing
0324: *Adv Combat System Technology*	68.820	1.798	1.813	1.797	-	1.797	1.835	1.875	1.912	1.950	Continuing	Continuing
2480: *SSL-TM*	0.000	0.000	0.000	3.922	-	3.922	11.918	5.442	4.000	0.000	0.000	25.282
3422: *SHARC Surface Platform*	0.000	2.627	7.025	9.281	-	9.281	14.757	3.834	0.000	0.000	0.000	37.524
3423: *LOCUST*	0.000	0.013	1.954	2.960	-	2.960	5.948	7.940	8.103	8.265	Continuing	Continuing
3424: *Heterogeneous Collaborative Unmanned Systems (HCUS)*	0.000	0.012	1.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.012
3437: *EMW/SEWIP/SSEE Accelerator*	0.000	0.000	14.389	23.630	-	23.630	23.636	0.000	0.000	0.000	0.000	61.655
3438: *Innovative Naval Prototype (INP) Transition (6.4)*	0.000	0.000	13.059	23.104	-	23.104	18.215	28.007	36.697	41.508	Continuing	Continuing

Note

In FY 2020, Project Unit 2480 was created and includes Solid State Laser Technology Maturation (SSL-TM) resources and associated plans for better coordination and justification of this high priority research area within the Navy's research portfolio. These funds were realigned internally in the PE out of Project Unit 3438.

In FY 2019, plans and resources in Program Element (PE) 0603382N Advanced Combat System Tech, Project Unit (PU) 0385 Rapid Prototype Development was realigned to PE 0604030N Rapid Prototyping, Experimentation and Demonstration, PU 0385 Rapid Prototype Development. Additionally, PE 0603382N Advanced Combat System Tech, PU 0399 Unmanned Rapid Prototype Development was realigned within PU 3438 Innovative Naval Prototype (INP) Transition (6.4).

A. Mission Description and Budget Item Justification

The Advanced Combat System Technology line is to evolve the technical and business practices for programs to change to an open architecture construct. The program was constructed to mature both technical and business model integration for C5I systems programs of record in an open architecture environment. The priority was incorporating the principles of modular design and design disclosure, reusable application software, interoperability and secure information exchange, lifecycle affordability and encouraging competition and collaboration.

Project Unit 0324: Funding is to fully implement the Naval Open (Systems) Architecture (OSA) strategy. The implementation of this strategy provides the tools and leadership for assisting programs and the Naval Research and Development Establishment through the technical, business and cultural transition to OSA. The primary tools and assistance is established through a limited set of technical reference frameworks, consistent contract language guidance, Intellectual Property strategies and

improvements in transparency of design disclosure and information exchange on past and current investments to support portfolio management and cross-program reuse. The OSA transformation effort will be applied to programs of record and coupled with rapid prototyping efforts being realized as management efficiencies both within programs and in accelerated acquisition efforts. Those elements include ensuring that all naval systems, families of systems, programs and prototypes move to modular OSA in accordance with Department of Defense (DoD) Instruction 5000.01 of 7 January 2015 which mandates that all DoD programs utilize Modular OSA to rapidly field affordable and interoperable systems. This project facilitates a strategic shift in the technical and business methods to establish cooperation and cross-domain/COI business relationships. This improves innovation and economies of scale throughout the Navy and Marine Corps. This leadership effort has identified the business case and potential return on investment for moving the Navy towards an open systems approach, supported the development of open systems technologies, and integrated best business and technical practices for open systems development within Naval acquisition. Naval OSA ensures Navy-wide system architectures become extensible and scalable in function, capacity, and workload to meet Joint warfighting requirements. This also includes the identification and development of common software components, functions, reuse methodologies, and extensible product lines.

Project Unit 2480: The efforts described in this mission area address the advanced component development and prototype demonstration associated with the Navy's Solid State Laser Technology Maturation (SSL-TM) Innovative Naval Prototypes (INP) Program and the Leap Ahead Technology (LA-Tech) investments. The SSL-TM program is developing an integrated Laser Weapons System Demonstrator (LWSD). SSL-TM will provide a new capability to the Fleet to address known capability gaps against asymmetric threats (UAS, small boats, and ISR sensors) and will inform future acquisition strategies, system designs, integration architectures, and fielding plans for laser weapon systems.

Project Unit 3422: The SHARC Surface Platforms demonstration project is part of the Department of Defense Third Offset Strategy as one element in the Sensor Grid category for 24/7 autonomy infused Situational Awareness (SA). This project will purchase Commercial-off-the-Shelf SHARC Platforms (wave gliders) and integrate four (4) unique Government-owned classified mission payloads focused on the detection of threats. These capabilities will enable CONOPS development in an operationally relevant environment to demonstrate how these technologies can improve the SA to the battlespace Commanders.

Project Unit 3423: The LOCUST demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. LOCUST leverages the BA-3 Innovative Naval Prototype program developing and demonstrating swarming technology. The BA-3 effort is developing both the air vehicle, UAS swarming behaviors, and miniaturized sensor systems. ONR has demonstrated an autonomous system capable of launching 33 UASs in 40 seconds and flying them in a coordinated swarm. This BA-4 effort is trailing the BA-3 demonstration of technologies by a fiscal quarter and then demonstrating the technology in operationally relevant environments with military mission applications.

Project Unit 3424: The Heterogeneous Collaborative Unmanned Systems (HCUS) demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. HCUS provides autonomous, tactical monitoring of an adversary's port-sized littoral area for an extended period of time with capability to apply limited offensive effects on-demand. Vehicles and sensors are intended to be used in contested environments - employing local communications nets, autonomous vehicle behavior, low bandwidth command links and local navigation with no requirement for GPS input.

HCUS systems can be encapsulated and deployed as a single payload, or a small number of payload packages designed for specific missions. The payloads can be carried into theater by various manned or unmanned platforms depending on the degree of stealth required. A week-long project demonstration will simulate covert

deployment, operations of autonomous UAVs over the area of interest, data exfiltration to a remote operator, autonomous UAV recharging via USVs and/or UUVs, deployment of unmanned ground sensors for persistent sensing, and remote operator on-demand offensive attack on a simulated target.

Project 3437: The EMW/SEWIP/SSEE Accelerator is part of the Department of Defense Third Offset Strategy to improve real time Electro-Magnetic Maneuver Warfare operations. This effort will develop integrated cross platform active and passive sensing solutions, next generation network and real time spectrum operations.

Project 3438: This activity addresses the advanced component development and prototype demonstration associated with ONR's Innovative Naval Prototypes (INP) Program and the Leap Ahead Technology (LA-Tech) investments. INP and LA-Tech investments represent game changing technologies with the potential to revolutionize operational concepts. They are disruptive in nature as they would dramatically change the way naval forces fight. INPs and LA-Techs push the imagination of our nation's technical talent to deliver transformational warfighting capabilities. Investments may include such mission areas as Unmanned and Autonomous Systems, Directed Energy / Electric Weapons, Electromagnetic Maneuver Warfare, Cyber Warfare, and Undersea Warfare. Funding to be realigned from the Unmanned Rapid Prototype Development project (Project Number 0399) in FY 2019.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	61.381	59.741	67.098	-	67.098
Current President's Budget	4.450	39.240	64.694	-	64.694
Total Adjustments	-56.931	-20.501	-2.404	-	-2.404
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-20.501			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.253	0.000			
• Program Adjustments	0.000	0.000	-2.164	-	-2.164
• Rate/Misc Adjustments	0.001	0.000	-0.240	-	-0.240
• Congressional Directed Reductions Adjustments	-56.679	-	-	-	-

Change Summary Explanation

The FY 2020 request was reduced by $2.164 million to reflect the availability of prior year execution balances.

The funding increase from FY 2019 to FY 2020 reflects increased procurement of SHARC platforms in PU 3422, and increased investment in HIJENKS Operational Acceleration effort in Project 3438.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 0324 / *Adv Combat System Technology*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
0324: *Adv Combat System Technology*	68.820	1.798	1.813	1.797	-	1.797	1.835	1.875	1.912	1.950	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project Unit 0324: Funding is to fully implement the Naval Open (Systems) Architecture (OSA) strategy. The implementation of this strategy provides the tools and leadership for assisting programs and the Naval Research and Development Establishment (NR&DE) through technical, business and policy transition to OSA. The primary tools and assistance are provided through a limited set of technical reference frameworks, consistent contract language guidance, Intellectual Property strategies and improvements in transparency of design disclosure and information exchange on past and current investments to support portfolio management and cross-program reuse. The OSA transformation effort will be applied to programs of record and coupled with rapid prototyping efforts being realized as management efficiencies both within programs and in accelerated acquisition efforts. Those elements include ensuring that all naval systems, families of systems, programs and prototypes move to modular OSA in accordance with Department of Defense (DoD) Instruction 5000.01 of 7 January 2015 which mandates that all DoD programs utilize Modular Open Systems Architecture to rapidly field affordable and interoperable systems. This project facilitates a strategic shift in the technical and business methods to establish cooperation, cross-domain, and community of interest business relationships. This improves innovation and economies of scale throughout the Navy and Marine Corps. This leadership effort has identified the business case and potential return on investment for moving the Navy towards an open systems approach, supported the development of open systems technologies, and integrated best business and technical practices for open systems development within Naval acquisition. Naval OSA ensures Navy-wide system architectures become extensible and scalable in function, capacity, and workload to meet Joint warfighting requirements. This also includes the identification and development of common software components, functions, reuse methodologies, and extensible product lines.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Align the Naval Enterprise Across All Domains to Implement OA	0.560	0.562	0.560	0.000	0.560
Articles:	-	-	-	-	-
FY 2019 Plans: The FY 2019 budget plan is to continue to execute the FY 2018 plan in addition to support program Modular Open Architecture development in coordination with accelerated acquisition projects and POR and define where Modular Open Systems Architecture is needed based on technology growth areas and Threats.					
FY 2020 Base Plans: The FY 2020 budget will be utilized to continue to execute the FY 2019 plan supporting the initiated Modular Open Systems Architecture projects associated with rapid prototyping. These will be incorporated in conjunction with platform/system block upgrades. Additionally, it will promote policy changes and standards development					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 0324 / *Adv Combat System Technology*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
that support the implementation and standardization of Modular Open Systems Architecture for POR interoperability efforts. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Change the Naval and Marine Corps policy and guidance to Institutionalize OA Principle ***Articles:*** ***FY 2019 Plans:*** The FY 2019 budget will be utilized to continue to execute the FY 2018 plan in addition to support the initiation of Modular Open Systems Architecture for rapid prototyping projects to be incorporated in conjunction with platform system block upgrades and promote policy changes that support the implementation and standardization of Modular Open Systems Architecture for POR interoperability efforts. ***FY 2020 Base Plans:*** The FY 2020 budget will be utilized to continue to execute the FY 2019 plan supporting the initiated Modular Open Systems Architecture projects associated with rapid prototyping. These will be incorporated in conjunction with platform/system block upgrades. Additionally, it will promote policy changes and standards development that support the implementation and standardization of Modular Open Systems Architecture for POR interoperability efforts. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.	0.624 -	0.619 -	0.610 -	0.000 -	0.610 -
Title: OA Systems Engineering Leadership ***Articles:*** ***FY 2019 Plans:*** The FY 2019 budget will be utilized to continue to execute the FY 2018 plan in addition to coordinate the development and maintenance of Modular Open Systems Architecture interfaces and standards, promote	0.225 -	0.232 -	0.217 -	0.000 -	0.217 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 0324 / *Adv Combat System Technology*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
projects that have successfully implemented OA in its systems, and to delegate authority as appropriate to enable speed and agility. ***FY 2020 Base Plans:*** The FY 2020 budget will be utilized to continue to execute the FY 2019 plan supporting the initiated Modular Open Systems Architecture projects associated with rapid prototyping. These will be incorporated in conjunction with platform/system block upgrades. Additionally, it will promote policy changes and standards development that support the implementation and standardization of Modular Open Systems Architecture for POR interoperability efforts. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Knowledge Products for Implementing OSA ***Articles:*** ***FY 2019 Plans:*** The FY 2019 budget will continue to execute the FY 2018 plan and to provide Scientists and Engineers within NR&DE common products that can be used across the enterprise and identify test assets that can be leveraged between programs to implement OSA and accelerate acquisition. ***FY 2020 Base Plans:*** The FY 2020 budget will be utilized to continue to execute the FY 2019 plan supporting the initiated Modular Open Systems Architecture projects associated with rapid prototyping. These will be incorporated in conjunction with platform/system block upgrades. Additionally, it will promote policy changes and standards development that support the implementation and standardization of Modular Open Systems Architecture for POR interoperability efforts. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.	0.389 -	0.400 -	0.410 -	0.000 -	0.410 -
Accomplishments/Planned Programs Subtotals	1.798	1.813	1.797	0.000	1.797

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 0324 / *Adv Combat System Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This has been a Navy Acquisition Executive directed effort to fundamentally alter the business, technical and policy for warfare systems acquisition to result in improved cost, increased access to innovation, a reduction in time to field, and promote cultural environment change. The Navy's OSA Enterprise effort built off past successes such as the Acoustic Rapid Commercial-off-the-Shelf Insertion started program and established this core OA Budget line (policy statement dated 5 August 2004). The strategy was further refined in the Deputy Chief of Naval Operations (DCNO)requirement of 23 December 2005 (N6/7), the Naval OSA Strategy of 2011 and extended for applicability to the other Defense Services under the DoD Better Buying Power initiative. This effort continues to expand into and support the related strategic shift to Rapid Prototyping, Experimentation and Demonstration.

E. Performance Metrics

Change Naval Processes and business practices to cost-effectively innovate and rapidly deploy improved warfighting capability based on fleet requirements. Provide OSA to field common, interoperable capabilities; Change Navy and Marine Corps Business processes to Institutionalize OSA Principles.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 0324 / *Adv Combat System Technology*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SE/OA Domain Support	C/FP	APL/ IET Contract : VARIOUS	2.576	0.000		0.000		0.000		-		0.000	0.000	2.576	Continuing
Systems Engineering	MIPR	NSWC / Dahlgren : Dahlgren, VA	13.307	0.000		0.000		0.000		-		0.000	0.000	13.307	Continuing
Systems Engineering	WR	NSWC/CRANE, Carderock, DISA : VARIOUS	3.119	0.000		0.000		0.000		-		0.000	0.000	3.119	Continuing
Systems Engineering	C/CPAF	ASSETT; Lockheed Martin, NJ; Gartner, VA : Washington DC	5.114	0.000		0.000		0.000		-		0.000	0.000	5.114	Continuing
OA DOMAIN SUPPORT	WR	NUWC/Newport, Spawar, Navair : VARIOUS	11.931	0.000		0.000		0.000		-		0.000	0.000	11.931	Continuing
SE/Signal Processor	C/CPAF	Lockheed Martin : VARIOUS	6.000	0.000		0.000		0.000		-		0.000	0.000	6.000	Continuing
SE/Signal Processor	C/CPAF	BAE : VARIOUS	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	Continuing
SE/Signal Processor	C/CPAF	Raytheon : VARIOUS	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	Continuing
SE/Signal Processor	WR	NSWC/DD, NRL, PHD : VARIOUS	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	Continuing
Align the Naval Enterprise Across All Domains to Implement OA	WR	NSWCDD : VARIOUS	1.988	0.631	Oct 2017	0.562	Oct 2018	0.560	Oct 2019	-		0.560	0.000	3.741	-
Change the Naval and Marine Corps policy and guidance to Institutionalize OA Principle	WR	NSWC, NRL, NUWC, NAWC : VARIOUS	0.400	0.553	Oct 2017	0.619	Oct 2018	0.610	Oct 2019	-		0.610	0.000	2.182	-
OA Systems Engineering Leadership	WR	NSWC, NRL, NUWC, NAWC : VARIOUS	0.320	0.225	Oct 2017	0.232	Oct 2018	0.217	Oct 2019	-		0.217	0.000	0.994	-
Knowledge Products for Implementing OSA	WR	NSWC, NRL, NUWC, NAWC NUW, NEWPORT,	0.447	0.389	Oct 2017	0.400	Oct 2018	0.410	Oct 2019	-		0.410	0.000	1.646	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 0324 / *Adv Combat System Technology*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		NSWC CRANE : VARIOUS													
		Subtotal	46.202	1.798		1.813		1.797		-		1.797	0.000	51.610	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Industry Development	C/FP	IBM, ANGLE, TBD (New IET Contract) : VARIOUS	9.805	0.000		0.000		0.000		-		0.000	0.000	9.805	Continuing
Technical Data-Academia	WR	NPS-Monterey/DAU : MONTEREY, CA	2.348	0.000		0.000		0.000		-		0.000	0.000	2.348	Continuing
Software Development	C/FP	TRIDENT, ASSET : VARIOUS	0.309	0.000		0.000		0.000		-		0.000	0.000	0.309	Continuing
		Subtotal	12.462	0.000		0.000		0.000		-		0.000	0.000	12.462	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Test & Evaluation	WR	NSWC/DD : DAHLGREN, VA	2.216	0.000		0.000		0.000		-		0.000	0.000	2.216	Continuing
OA Asset Repository (SBIR Account)	WR	Miscellaneous : VARIOUS	0.150	0.000		0.000		0.000		-		0.000	0.000	0.150	Continuing
		Subtotal	2.366	0.000		0.000		0.000		-		0.000	0.000	2.366	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 0324 / *Adv Combat System Technology*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	Miscellaneous : VARIOUS	3.021	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SBIR Assessment (Cong Add)	WR	NSWC/DD : DAHLGREN, VA	4.748	0.000		0.000		0.000		-		0.000	0.000	4.748	Continuing
DAWDF	TBD	TBD : TBD	0.021	0.000		0.000		0.000		-		0.000	0.000	0.021	Continuing
		Subtotal	7.790	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	68.820	1.798		1.813		1.797		-		1.797	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 0324 / *Adv Combat System Technology*

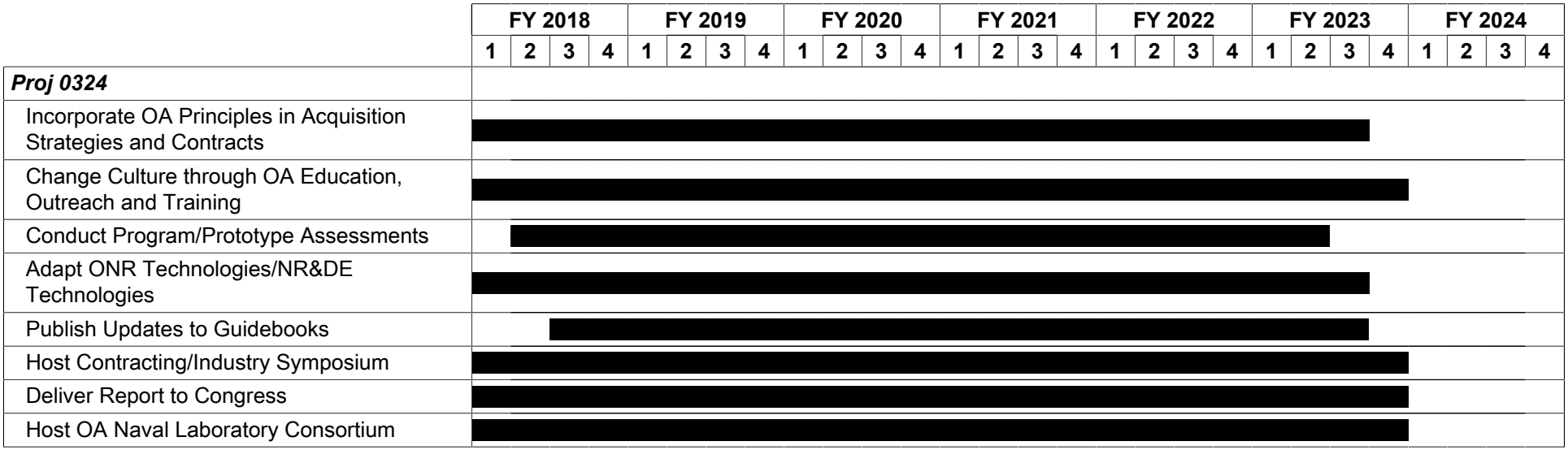


Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 0324 / *Adv Combat System Technology*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0324				
Incorporate OA Principles in Acquisition Strategies and Contracts	1	2018	3	2023
Change Culture through OA Education, Outreach and Training	1	2018	4	2023
Conduct Program/Prototype Assessments	2	2018	2	2023
Adapt ONR Technologies/NR&DE Technologies	1	2018	3	2023
Publish Updates to Guidebooks	3	2018	3	2023
Host Contracting/Industry Symposium	1	2018	4	2023
Deliver Report to Congress	1	2018	4	2023
Host OA Naval Laboratory Consortium	1	2018	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 2480 / *SSL-TM*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2480: *SSL-TM*	0.000	0.000	0.000	3.922	-	3.922	11.918	5.442	4.000	0.000	0.000	25.282
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This project unit (PU) was established in FY 2020 from funding internally realigned in the PE out of Project Unit 3438. This is not a new start. This PU 2480 includes Solid State Laser Technology Maturation (SSL-TM) resources and associated plans intended to provide advanced component development and prototyping for selected SSL-TM technologies maturing out of ONR's supporting Leap Ahead Technology (LA-Tech) and Innovative Naval Prototype (INP) BA3 portfolio.

A. Mission Description and Budget Item Justification

The efforts described in this mission area address the advanced component development and prototype demonstration associated with the Navy's Solid State Laser Technology Maturation (SSL-TM) Innovative Naval Prototypes (INP) Program and the Leap Ahead Technology (LA-Tech) investments. The SSL-TM program is developing an integrated Laser Weapons System Demonstrator (LWSD). SSL-TM will provide a new capability to the Fleet to address known capability gaps against asymmetric threats (UAS, small boats, and ISR sensors) and will inform future acquisition strategies, system designs, integration architectures, and fielding plans for laser weapon systems.

INP and LA-Tech investments represent game changing technologies with the potential to revolutionize operational concepts. They are disruptive in nature as they would dramatically change the way naval forces fight. INPs and LA-Techs push the imagination of our nation's technical talent to deliver transformational warfighting capabilities. Successful demonstrations are intended to present the Department of the Navy with a programmatic challenge as these new capabilities can lead to the obsolescence of existing capabilities and significant decisions as to the path forward for integrating the new technological capabilities into the warfighting systems of the future.

ONR manages a continuum of INP and LA-Tech development from BA2 to BA3 to BA4. The goal of these BA4 investments is to further mature development and expend efforts necessary to evaluate integrated technologies, representative modes or prototype systems in high fidelity and realistic operating environments. This BA4 investment includes system specific efforts that help expedite technology transition from the laboratory to operational use. Emphasis is on proving component and subsystem maturity prior to integration in major and complex systems and may involve risk reduction initiatives. Projects in this category involve efforts prior to Milestone B and are referred to as advanced component development activities and include technology demonstrations. It is the goal of these projects to achieve Technology Readiness Levels 6 or 7. Successful experimentation and demonstration highlights the viability of new technological capabilities that could be implemented if an acquisition program were to be established to support further development. The portfolio is periodically refreshed through the selection of new INPs and LA-Tech investments as existing ones are completed.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Solid State Laser Technology Maturation (SSL-TM)	0.000	0.000	3.922	0.000	3.922

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 2480 / *SSL-TM*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Articles:	-	-	-	-	-
Description: The Solid State Laser Technology Maturation (SSL-TM) Program is developing an integrated Laser Weapons System Demonstrator (LWSD) that will be installed on USS Portland (LPD-27) during FY 2019 with investments funded in the BA3 Innovative Naval Prototypes Program Element 0603801N. The investment programmed in Program Element 0603382N, Advanced Combat Systems Technology, funds costs for extended at-sea experimentation, operations, and support of the installed system on LPD-27 in the Pacific operating areas. SSL-TM will provide a new capability to the Fleet to address known capability gaps against asymmetric threats (UAS, small boats, and ISR sensors) and will inform future acquisition strategies, system designs, integration architectures, and fielding plans for laser weapon systems. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** Conduct extended experimentation and laser weapons systems capabilities demonstration on USS Portland during fleet operations and experiments. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase in FY 2020 is due to establishment of the project for fiscal transparency into investments in SSL-TM technology experimentation and demonstration activity. Prior work was conducted under Project 3438.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.922	0.000	3.922

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The projects identified for execution are non-acquisition programs. The Office of Naval Research will provide Government oversight to the projects. Each project will develop a project plan to support execution. Project plans will include a schedule and the necessary technical requirements and objectives to measure and evaluate performance. Additionally, each project will be subjected to experimentation then demonstrated in operationally relevant environments to assess their ability to meet warfighter requirements. Project deliverables will include the actual integrated hardware/software prototype systems, test reports, and technical data, necessary to

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 2480 / *SSL-TM*

support decision making. These decisions include the transition of technologies to acquisition, further refinement of the technology, or termination and reinvestment of remaining funds to other technologies that add military value.

E. Performance Metrics

In all cases, the technologies being developed within this PE support the Department of the Navy INP and Leap Ahead Programs and are managed at the Office of Naval Research. The primary technological metrics used in this PE involve experiments and tests that demonstrate, in an operationally relevant environment, the proof of concept for the technological capability being developed. Technology development is informed by periodic interaction with Naval warfighters, resource sponsors and the acquisition community. At the lowest level, each project is evaluated against technical and financial milestones on a frequent basis. Annually, each project is reviewed in depth for technical performance and development status by the Chief of Naval Research. Department of the Navy leadership is briefed on the portfolio's status by the Chief of Naval Research.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 2480 / *SSL-TM*	

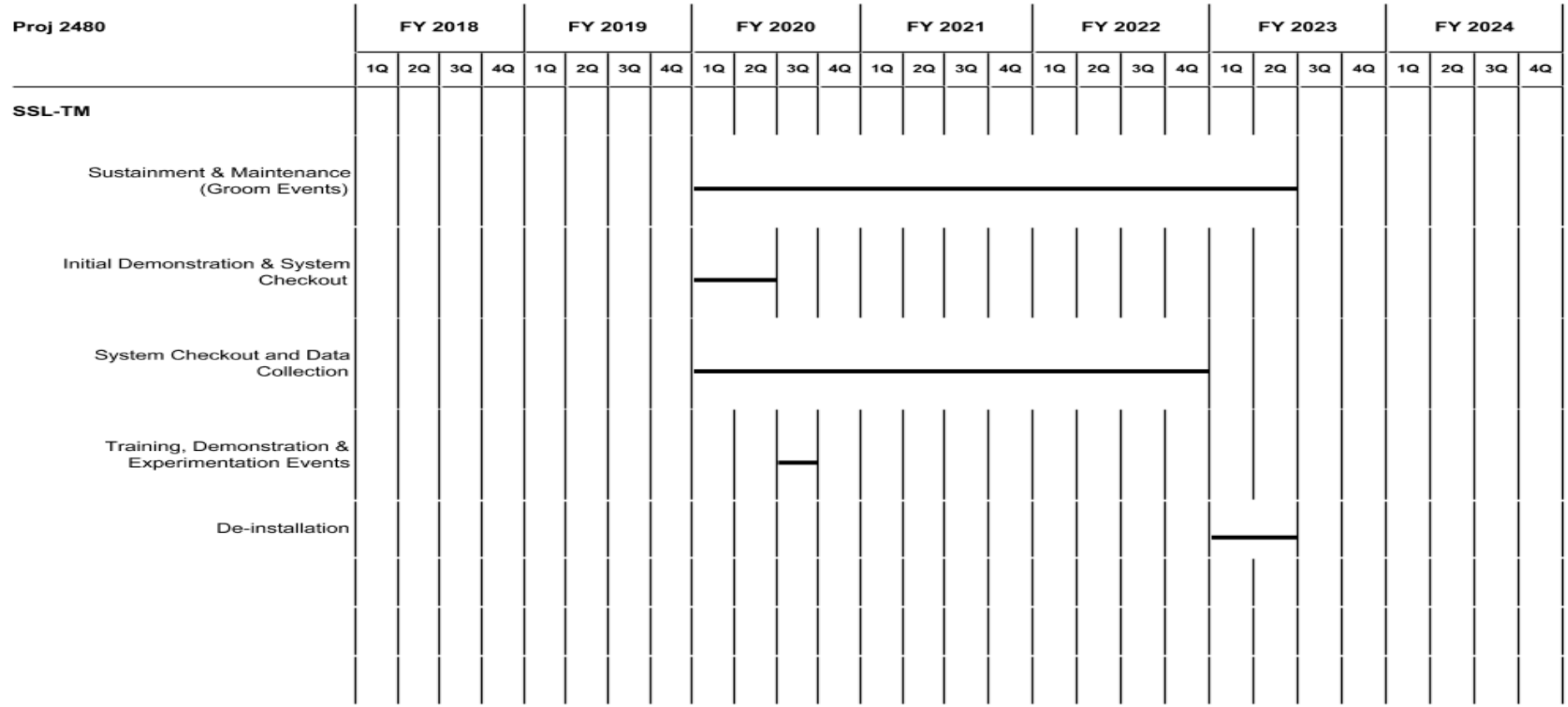
Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SSL-TM Experimentation and Testing	WR	Naval Surface Warfare Center Dahlgren Division : Dahlgren, VA	0.000	0.000		0.000		1.922	Oct 2019	-		1.922	0.000	1.922	-
SSL-TM Experimentation and Sustainment	WR	Naval Surface Warfare Center, Port Hueneme Divisio : Port Hueneme, CA	0.000	0.000		0.000		1.000	Oct 2019	-		1.000	0.000	1.000	-
SSL-TM Technical and Engineering T&E	C/CPFF	Northrup Grumman : Redondo Beach, CA	0.000	0.000		0.000		1.000	Oct 2019	-		1.000	0.000	1.000	-
		Subtotal	0.000	0.000		0.000		3.922		-		3.922	0.000	3.922	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		3.922		-		3.922	0.000	3.922	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 2480 / *SSL-TM*



2020PB - 0603382N - 2480

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 2480 / *SSL-TM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2480				
SSL-TM: Sustainment & Maintenance (Groom Events): Sustainment & Maintenance (Groom Events)	1	2020	2	2023
SSL-TM: Initial Demonstration & System Checkout: Initial Demonstration & System Checkout	1	2020	2	2020
SSL-TM: System Checkout and Data Collection: System Checkout and Data Collection	1	2020	4	2022
SSL-TM: Training, Demonstration & Experimentation Events: Training, Demonstration & Experimentation Events	3	2020	3	2020
SSL-TM: De-installation: De-installation	1	2023	2	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3422 / *SHARC Surface Platform*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3422: *SHARC Surface Platform*	0.000	2.627	7.025	9.281	-	9.281	14.757	3.834	0.000	0.000	0.000	37.524
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Sensor Hosting Autonomous Remote Craft (SHARC) Surface Platforms demonstration project is part of the Department of Defense Third Offset Strategy as one element in the Sensor Grid category for 24/7 autonomy infused Situational Awareness (SA). This project will purchase Commercial-off-the-Shelf (COTS) SHARC Platforms (wave gliders) and integrate unique Government-owned classified mission payloads and enhanced capabilities including the detection of threats with persistence. The focus of this effort is to accelerate demonstration of capabilities to meet Combatant Commander (COCOM) requirements that do not exist elsewhere in DoD and provide the fleet with a low cost, asymmetric advantage in support of multiple classified missions. This includes persistent, autonomous situational awareness and early warning of submarines or related submarine activity as well as broad area, clandestine implementation of capabilities that enhance Intelligence Preparation of the Battlefield (IPB) and strike missions. The successful demonstration of one particular payload integration to support a high priority warfighting mission area will be followed by a prototype operational event. These capabilities will enable Concepts of Operation (CONOPS) development in an operationally relevant environment to demonstrate how these technologies can improve the SA to the battlespace Commanders.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Sensor Hosting Autonomous Remote Craft (SHARC)	2.627	7.025	9.281	0.000	9.281
Articles:	-	-	-	-	-
Description: This project will demonstrate the warfighting utility of multiple, long endurance platforms with classified payloads conducting critical Intelligence, Surveillance and Reconnaissance (ISR) missions with simultaneous, wideband data links for signal and imagery data transmission between host assets and Operational level processing systems. Emerging technologies and engineering innovations from Naval/DoD research and development and industry, will be integrated to demonstrate secure and reliable collection, analysis, tactical level access to host asset ISR data and fusion of ISR and targeting data from organic assets and sensors.					
Through FY 2018, the SHARC program has accomplished the following major objectives:					
- The first three COTS platforms were be procured and classified payloads delivered for integration and testing. - Integration of mature technologies was initiated to include enabling payload critical mission capabilities. Also initiates was the adaptation of an existing capability to function as a Universal SHARC Payload module (UPS) to enable all other mission system adaptations.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3422 / *SHARC Surface Platform*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Preliminary mission CONOPS development, program planning, trade analysis, integration design requirements development, and systems engineering efforts were be conducted. Additional details are available at higher classification levels. ***FY 2019 Plans:*** - Complete requirements analysis, update component and subsystem specifications, and refine CONOPS. - Procure six SHARC platforms to include additional platforms to meet USPACOM emergent requirements. - Complete design and build the UPS; SPAWARSYSCEN Pacific (SSCPAC) will integrate multiple classified payloads and conduct initial functional lab testing of an both an adapted wide area Anti-Submarine sensor and a strike warfare payload. - Develop and integrate required capability for a high priority IPB mission. - The Maritime Surveillance Systems (MSS) Program Office and SSCPAC will initiate and coordinate the development of system level test plans and conduct initial system level at-sea test and evaluation to assess performance. - Additional details are available at higher classification levels. ***FY 2020 Base Plans:*** - Continue requirements analysis and update component and subsystem specifications as required. - Integrate mature technologies developed in the areas of low probability of intercept and detection (LPI/LPD) techniques, high data rate exchange, long-range multi-band and wideband links, software-defined modes, encryption, and signal processing modules. - Complete payload adaptation for classified Intelligence Preparation of the Battlefield (IPB) mission payload. Conduct integration on SHARC, with functional lab and at-sea testing followed by fleet exercise demonstration. - Develop CONOPS for execution of the prototype operation. - Conduct system level user test and evaluation to assess performance on additional payloads and delivery systems against vetted Measures of Effectiveness (MOE). - Procure nine SHARC platforms and payload systems for FY 2021/2022 high priority IPB Prototype Operation to meet USPACOM ISR mission requirements. - Additional details are available at higher classification levels. ***FY 2020 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3422 / *SHARC Surface Platform*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 is due to the procurement of additional SHARC platforms in preparation for prototype operations which requires an increase in the number of wave gliders. The IPB payload will also require additional non-recurring engineering for adaptation to the SHARC and its UPS.					
Accomplishments/Planned Programs Subtotals	2.627	7.025	9.281	0.000	9.281

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

FY2019: T&E Milestone: Developmental Test (DT) and assessment of initial payloads installed on SHARC platforms
FY2020: T&E Milestone: DT and assessment of additional payloads installed on SHARC platforms
FY2021: T&E Milestone: Build and validate readiness of integrated Prototype Operational units

E. Performance Metrics

Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3422 / *SHARC Surface Platform*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and CONOPS Development	MIPR	Naval Undersea Warfare Center (NUWC) : Keyport, WA	0.000	0.225	Oct 2017	0.450	Oct 2018	0.450	Oct 2019	-		0.450	0.000	1.125	-
Payload Design, Engineering, and Integration	MIPR	Space and Naval Warfare System Center Pacific (SSC : San Diego, CA	0.000	0.644	Oct 2017	2.908	Oct 2018	1.792	Oct 2019	-		1.792	0.000	5.344	-
Purchase COTS SHARC platforms	C/FFP	Space and Naval Warfare System Center Pacific (SSC : San Diego, CA	0.000	1.275	Oct 2017	2.500	Dec 2018	6.100	Oct 2019	-		6.100	0.000	9.875	-
		Subtotal	0.000	2.144		5.858		8.342		-		8.342	0.000	16.344	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation Phase	MIPR	PMS-485 Maritime Surveillance Systems, SSCPAC : San Diego, CA	0.000	0.158	Oct 2017	0.515	Mar 2019	0.120	Mar 2020	-		0.120	0.000	0.793	-
		Subtotal	0.000	0.158		0.515		0.120		-		0.120	0.000	0.793	N/A

Management Services ($ in Millions)

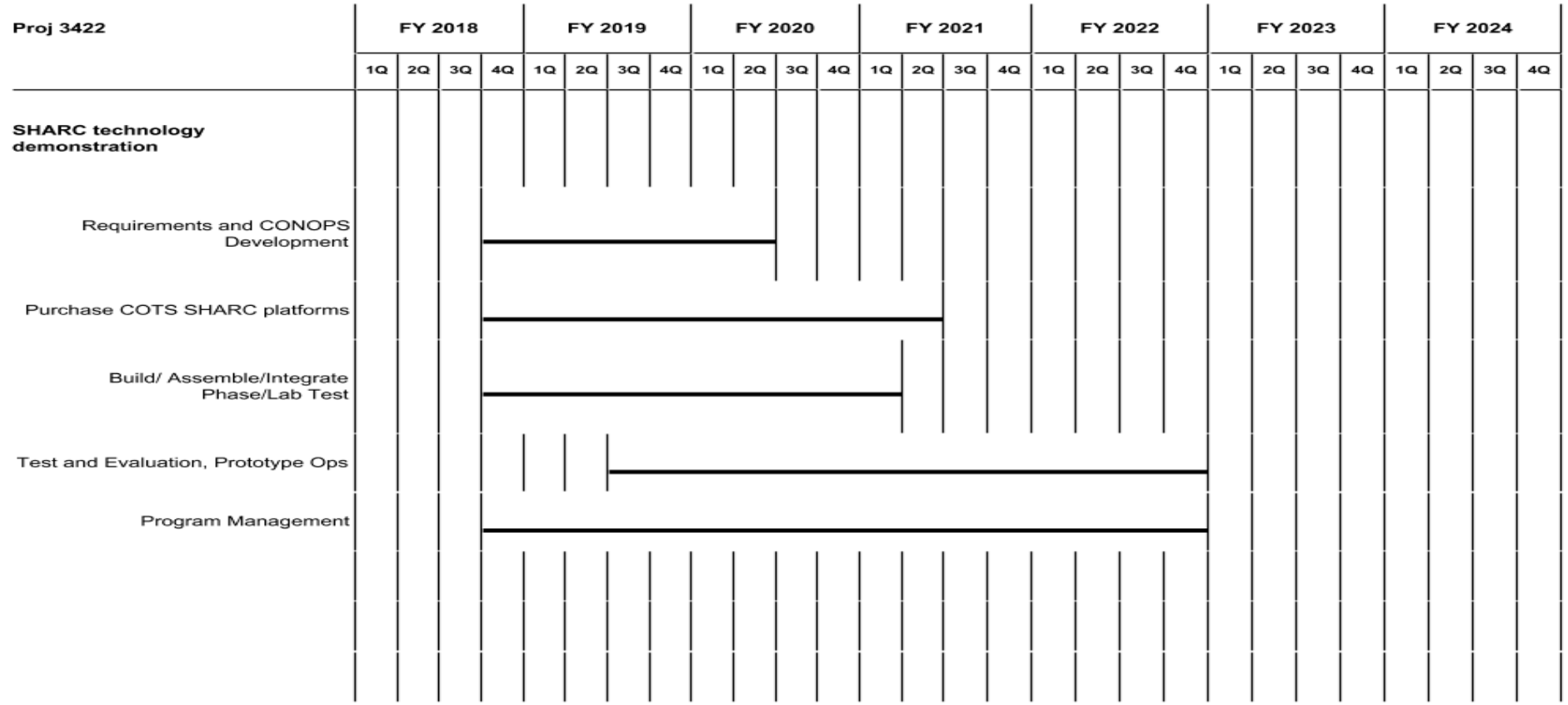
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	PMS-485 Maritime Surveillance Systems, SSCPAC : San Diego, CA	0.000	0.325	Oct 2017	0.652	Oct 2018	0.819	Oct 2019	-		0.819	0.000	1.796	-
		Subtotal	0.000	0.325		0.652		0.819		-		0.819	0.000	1.796	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3422 / *SHARC Surface Platform*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.627		7.025		9.281		-		9.281	0.000	18.933	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3422 / *SHARC Surface Platform*



2020OSD - 0603382N - 3422

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3422 / *SHARC Surface Platform*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3422				
SHARC technology demonstration: Requirements and CONOPS Development: Requirements and CONOPS Development	4	2018	2	2020
SHARC technology demonstration: Purchase COTS SHARC platforms: Purchase COTS SHARC platforms	4	2018	2	2021
SHARC technology demonstration: Build/ Assemble/Integrate Phase/Lab Test: Build/ Assemble/Integrate Phase/Lab Test	4	2018	1	2021
SHARC technology demonstration: Test and Evaluation, Prototype Ops: Test and Evaluation, Prototype Ops	3	2019	4	2022
SHARC technology demonstration: Program Management: Program Management	4	2018	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3423 / *LOCUST*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3423: *LOCUST*	0.000	0.013	1.954	2.960	-	2.960	5.948	7.940	8.103	8.265	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The LOCUST demonstration is part of the Department of Defense (DOD) Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. LOCUST leverages the BA-3 Innovative Naval Prototype program developing and demonstrating swarming technology. The BA-3 effort is developing both the air vehicle, UAS swarming behaviors, and miniaturized sensor systems. ONR has demonstrated an autonomous system capable of launching 33 UASs in 40 seconds and flying them in a coordinated swarm. This BA-4 effort is trailing the BA-3 demonstration of technologies by a fiscal quarter and then demonstrating the technology in operationally relevant environments with military mission applications. Due to limitation of funding, FY 2018 accomplishments were limited to just the planned warfighter workshops and program planning. The LOCUST budget and schedule have been adjusted accordingly to reflect this situation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: LOCUST	0.013	1.954	2.960	0.000	2.960
Articles:	-	-	-	-	-
Description: This Project focuses on demonstration of mixed-initiative UAV swarming behaviors, enabling the development of payload appropriate CONOPS/TTPs for Many Vehicle/Many Salvo swarms, and provides unmanned system capability to degrade threat Integrated Air Defense Systems (IADS) in support of follow-on manned system operations.					
FY 2019 Plans: Phase I integration and test activities to assess functional performance of LOCUST Counter-Improvised Explosive Device (IED) subsystems and communications jamming capabilities installed on autonomous platforms and launched from USMC Military-RZR (M-RZR, based off of Polaris RZR off-road platform), M-RZR trailer. Conduct system-level experimentation and demonstration of the prototype system. The Center for Naval Analysis will assess system performance for the ground-launched system and develop Concepts of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTP) to support future USMC operations. In FY 2019, the LOCUST efforts will initiate transition from the Phase I efforts into Phase II demonstrating multi-domain launch of swarming UAVs' to provide information, surveillance, reconnaissance (ISR) and kinetic attack					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
for strike of land and sea targets in support of follow-on manned missions. Effort will procure flight assets to begin integration of payloads and flight testing. ***FY 2020 Base Plans:*** In FY 2020, the LOCUST efforts will initiate transition from the Phase I efforts into Phase II demonstrating multi-domain launch of swarming UAVs' to provide information, surveillance, reconnaissance (ISR) and kinetic attack for strike of land and sea targets in support of follow-on manned missions. Specifically, Phase II will develop and demonstrate an unmanned undersea vehicle (UUV)-launched Swarm for conducting counter-Integrated Air Defense Systems missions in support of naval units. This project will demonstrate mixed-initiative UAV swarming behaviors developed by the BA-3 activity, enable the development of payload appropriate CONOPS/TTPs for Many Vehicle/Many Salvo swarms, and provide unmanned system capability to degrade threat IADS in support of follow-on manned system operations ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 is associated with increased cost for procurement of launcher hardware and planned development tests.					
Accomplishments/Planned Programs Subtotals	0.013	1.954	2.960	0.000	2.960

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

There are multiple phases for this non-acquisition project.

Phase 1 - Marine Corps Warfighting Laboratory (MCWL) Air Combat Element (ACE) will lead the Phase I effort in FY 2018 & FY 2019. MCWL will procure additional launchers, LOCUST platforms and payloads. MCWL will work with the Common Launch Tube Program of Record to procure the multiple missile Common Launch Tube. MCWL will task NAWC AD to help integrate the launcher system onto the MV-22 and support flight test and flight certification. MCWL will use a supporting Warfare Center to integrate the launcher onto a Marine Corps Polaris Corporation M-RZR vehicle or M-RZR trailer. MCWL ACE will closely coordinate with the BA-3 LOCUST program manager to procure the new 6" diameter, additive manufactured, air frame (purchase through BA-3 activity contract). MCWL Experimental Division will define CONOPS/TTPs, the experimental parameters and measures of effectiveness, and operational experiments suitable to apply the capability in a relevant

operational environment to evaluate the military utility of the system to a small Marine Corps maneuver element. The Center for Naval Analysis will consolidate the post demonstration report for the systems military utility.

Phase II -ONR execute a multi-domain swarm effort in FY 2020-2023 to demonstrate the advantages of small swarming UAVs against adversary defenses. ONR will work with the Naval Warfare Development Center (NWDC) to develop CONOPS / TTPS for this mission capability and fleet experimentation. NSWC Panama City Division (NSWC PCD) will provide operational and logistics support for the launch and recovery of the vehicles. Initiation of Phase II in FY2020 intentionally follows the 6.3 INP by two fiscal years to allow the INP to develop and mature the miniaturized payloads required for an operational demo.

Phase III - Beginning in FY 2024, the LOCUST effort will transition to a phase III effort to provide ISR and kinetic strike against a broader target set than in Phase II as well as heterogeneous multi-domain launch platforms.

E. Performance Metrics

MCWL Experimental Division (Phase I) and PACOM (Phase II) will define CONOPS/TTPs, the experimental parameters and measures of effectiveness, and operational experiments suitable to apply the capability in a relevant operational environment to evaluate the military utility of the system to a small Marine Corps maneuver element.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3423 / *LOCUST*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi-Rotor Platform Procur	MIPR	NRL : Wash, DC	0.000	0.013	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Rotor Platform Payload	MIPR	MITRE : Mclean, VA	0.000	0.000	Jan 2018	0.350	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Payload Procurement	C/CPFF	Raytheon : Tucson, AZ	0.000	0.000		0.704	Feb 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Rotor Tests	MIPR	NSWC : Indian Head, MD	0.000	0.000		0.100	Feb 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Fixed-Wing Procurement	C/CPFF	Raytheon : Tuxson, AZ	0.000	0.000		0.800	Feb 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Platform Specific Launcher Development	Various	Various : Various	0.000	0.000		0.000		1.290	Nov 2019	-		1.290	Continuing	Continuing	Continuing
Command and Control Integration	Various	Various : Various	0.000	0.000		0.000		0.560	Nov 2019	-		0.560	Continuing	Continuing	Continuing
Fixed Wing Tests	Various	Various : Various	0.000	0.000		0.000		0.950	Jun 2020	-		0.950	Continuing	Continuing	Continuing
		Subtotal	0.000	0.013		1.954		2.800		-		2.800	Continuing	Continuing	N/A

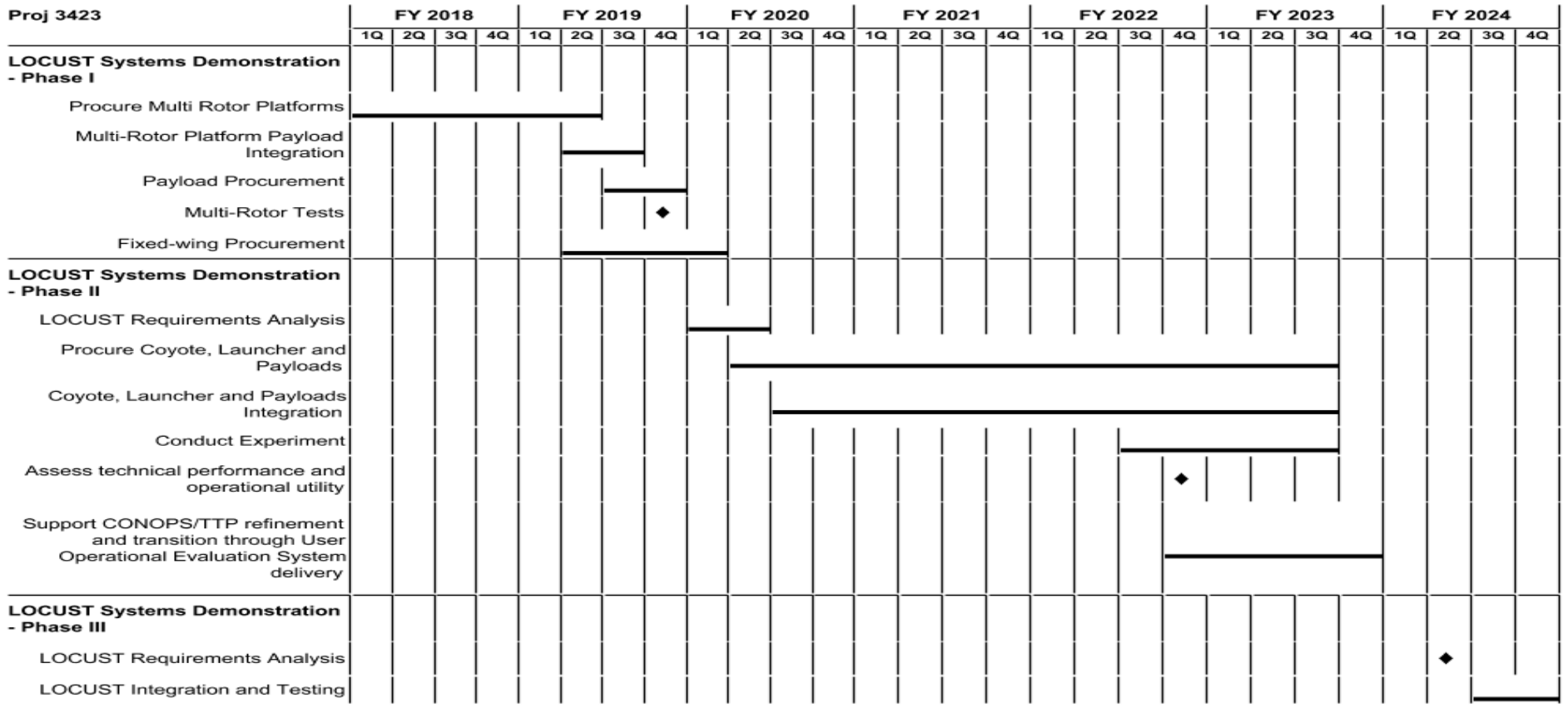
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management	TBD	Not Specified : Not Specified	0.000	0.000		0.000		0.160	Oct 2019	-		0.160	0.000	0.160	-
		Subtotal	0.000	0.000		0.000		0.160		-		0.160	0.000	0.160	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.013		1.954		2.960		-		2.960	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*



2020PB - 0603382N - 3423

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3423				
LOCUST Systems Demonstration - Phase I: Procure Multi Rotor Platforms: Procure Multi Rotor Platforms	1	2018	2	2019
LOCUST Systems Demonstration - Phase I: Multi-Rotor Platform Payload Integration: Multi-Rotor Platform Payload Integration	2	2019	3	2019
LOCUST Systems Demonstration - Phase I: Payload Procurement: Payload Procurement	3	2019	4	2019
LOCUST Systems Demonstration - Phase I: Multi-Rotor Tests: Multi-Rotor Tests	4	2019	4	2019
LOCUST Systems Demonstration - Phase I: Fixed-wing Procurement: Fixed-wing Procurement	2	2019	1	2020
LOCUST Systems Demonstration - Phase II: LOCUST Requirements Analysis: LOCUST Requirements Analysis	1	2020	2	2020
LOCUST Systems Demonstration - Phase II: Procure Coyote, Launcher and Payloads: Procure Coyote, Launcher and Payloads	2	2020	3	2023
LOCUST Systems Demonstration - Phase II: Coyote, Launcher and Payloads Integration: Coyote, Launcher and Payloads Integration	3	2020	3	2023
LOCUST Systems Demonstration - Phase II: Conduct Experiment: Conduct Experiment	3	2022	3	2023
LOCUST Systems Demonstration - Phase II: Assess technical performance and operational utility: Assess technical performance and operational utility	4	2022	4	2022
LOCUST Systems Demonstration - Phase II: Support CONOPS/TTP refinement and transition through User Operational Evaluation System delivery: Support CONOPS/ TTP refinement and transition through User	4	2022	4	2023
LOCUST Systems Demonstration - Phase III: LOCUST Requirements Analysis: LOCUST Requirements Analysis	2	2024	2	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LOCUST Systems Demonstration - Phase III: LOCUST Integration and Testing: LOCUST Integration and Testing	3	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3424 / *Heterogeneous Collaborative Unmanned Systems (HCUS)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3424: *Heterogeneous Collaborative Unmanned Systems (HCUS)*	0.000	0.012	1.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.012
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This project funding is being realigned in FY 2020 to project 3438 Innovative Naval Prototype (INP) Transition (6.4) within PE 0603382N Advanced Combat Systems Tech.

A. Mission Description and Budget Item Justification

The HCUS demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. HCUS provides autonomous, tactical monitoring of an adversary's port-sized littoral area for an extended period of time with capability to apply limited offensive effects on-demand. Vehicles and sensors are intended to be used in contested environments - employing local communications nets, autonomous vehicle behavior, low bandwidth command links and local navigation with no requirement for GPS input.

HCUS systems can be encapsulated and deployed as a single payload, or a small number of payload packages designed for specific missions. The payloads can be carried into theater by various manned or unmanned platforms depending on the degree of stealth required. A week-long project demonstration will simulate covert deployment, operations of autonomous UAVs over the area of interest, data exfiltration to a remote operator, autonomous UAV recharging via USVs and/or UUVs, deployment of unmanned ground sensors for persistent sensing, and remote operator on-demand offensive attack on a simulated target.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Heterogeneous Collaborative Unmanned Systems (HCUS)	0.012	1.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: Conduct Government program management and oversight of HCUS development activities. Johns Hopkins University Applied Physics Laboratory, in conjunction with NSWC Dahlgren Division, will complete HCUS system-level design and integration and commence manufacturing of initial HCUS systems.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3424 / *Heterogeneous Collaborative Unmanned Systems (HCUS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects the realignment of funding to Project 3438 within this program element to support the Solid State Laser Technology Maturation (SSL-TM) program.					
Accomplishments/Planned Programs Subtotals	0.012	1.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

NSWCDD will provide Government oversight to the project and develop a multi-domain mission planning system compatible with the Aegis Combat System and Ship Self Defense System (SSDS) capable of tasking the JHU-APL autonomous systems. University Affiliated Research Center John Hopkins University: Applied Physics Laboratory will be responsible for the design and development of additive manufactured quad-copters, UUV launch system for UAV launch, low-profile USVs with commercial sensor systems, and unattended ground sensors (UGS) with a UGS deployment capability, the network backbone and long haul communications back to a combat system or Maritime Operations Center.

E. Performance Metrics

Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3424 / *Heterogeneous Collaborative Unmanned Systems (HCUS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HCUS System Development	MIPR	DLA : Alexandria, VA	0.000	0.000	Oct 2017	0.416	Jan 2019	0.000		-		0.000	0.000	0.416	-
HCUS System Development	MIPR	Naval Surface Warfare Center DD : Panama City, FL	0.000	0.000	Oct 2017	0.496	Dec 2018	0.000		-		0.000	0.000	0.496	-
HCUS System Development	MIPR	SPAWAR : San Diego, CA	0.000	0.000		0.088	Dec 2018	0.000		-		0.000	0.000	0.088	-
		Subtotal	0.000	0.000		1.000		0.000		-		0.000	0.000	1.000	N/A

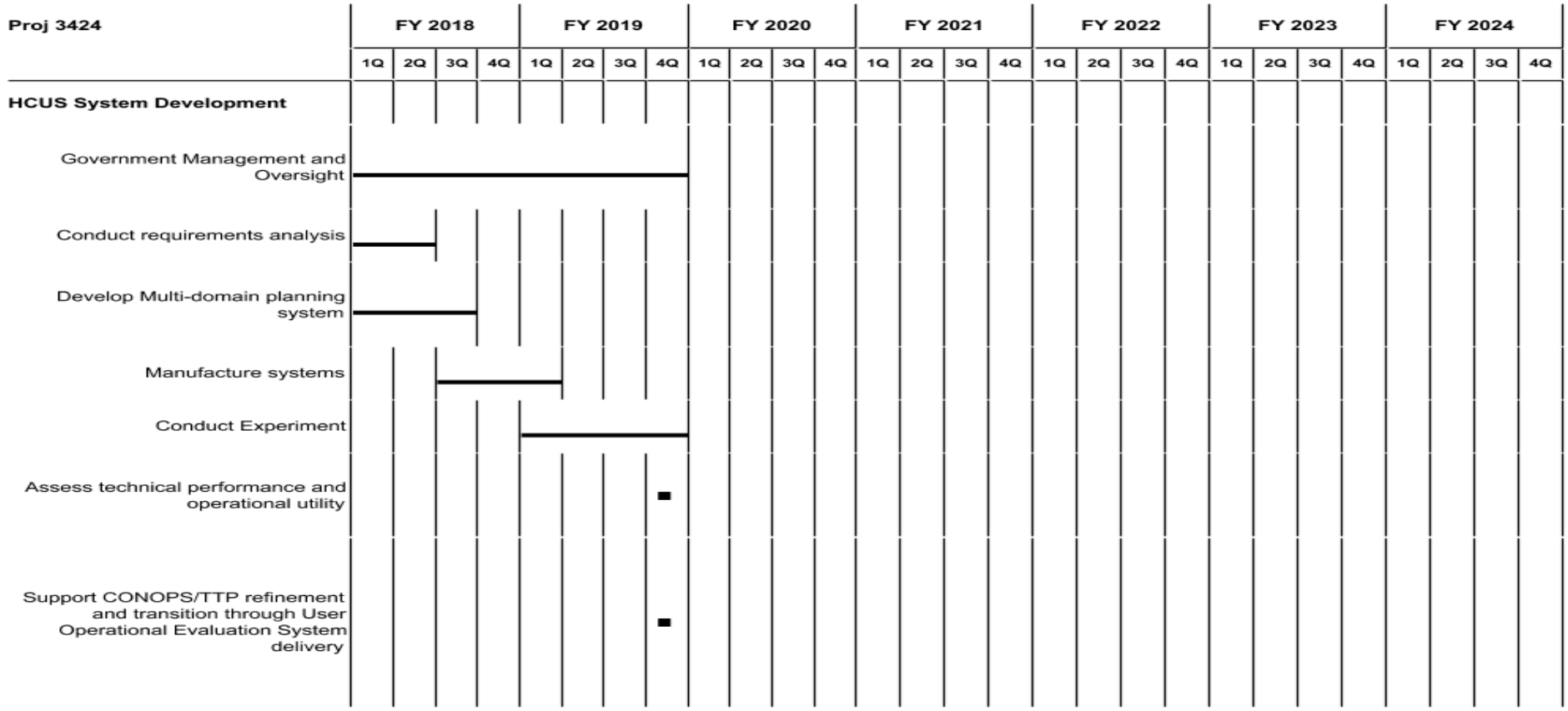
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Management and Oversight	MIPR	NSWC : Dalhgren, VA	0.000	0.012	Oct 2017	0.000		0.000		-		0.000	0.000	0.012	-
		Subtotal	0.000	0.012		0.000		0.000		-		0.000	0.000	0.012	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.012		1.000		0.000		-		0.000	0.000	1.012	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3424 / *Heterogeneous Collaborative Unmanned Systems (HCUS)*



2020OSD - 0603382N - 3424

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3424 / *Heterogeneous Collaborative Unmanned Systems (HCUS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3424				
HCUS System Development: Conduct requirements analysis: Conduct requirements analysis	4	2018	4	2018
HCUS System Development: Procurement UUV Hardware: Procurement UUV Hardware	1	2019	4	2019
HCUS System Development: Conduct Experiment: Conduct Experiment	1	2019	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3437 / *EMW/SEWIP/SSEE Accelerator*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3437: *EMW/SEWIP/SSEE Accelerator*	0.000	0.000	14.389	23.630	-	23.630	23.636	0.000	0.000	0.000	0.000	61.655
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This was a new project in FY 2019 - Electromagnetic Maneuver Warfare/Surface Electronic Warfare Improvement Program to improve real time Electro-Magnetic Maneuver Warfare operations.

A. Mission Description and Budget Item Justification

The Electromagnetic Maneuver Warfare/Surface Electronic Warfare Improvement Program/Ship's Signals Exploitation Equipment (EMW/SEWIP/SSEE) Accelerator is part of the Department of Defense Third Offset Strategy to improve real time Electro-Magnetic Maneuver Warfare operations. EMW/SEWIP/SSEE Accelerator leverages the S&T Budget Activity (BA)-3 Electro-Magnetic Maneuver Warfare technology developments specifically in cross platform operations. The BA-3 effort is developing high speed sensor and electro-magnetic networking, real time spectrum operations and passive targeting technologies. ONR has demonstrated elements of next generation networking, passive tracking, and cross platform combat system coordination. This BA-4 effort is trailing the BA-3 demonstration of technologies deploying and demonstrating the technology in operationally relevant environments with military mission applications. The deployment will allow the ONR to significantly reduce risk, incorporate early warfighter improvements and test with real world data and scenarios.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: EMW/SEWIP/SSEE Accelerator	0.000	14.389	23.630	0.000	23.630
Articles:	-	-	-	-	-
Description: EMW/SEWIP/SSEE accelerator builds off of two BA-3 efforts: Surface platform arrays, radios and control software were developed under the Multi-Link CDL System Future Naval Capability and airborne relay were developed within the High Altitude Relay and Routing Future Naval Capability. To date ONR has demonstrated 4-beam CDL surface arrays, radios and controls via land based motion simulators, while the airborne relay functionality has been demonstrated on a P-3 platform in a relevant environment. This was a new project for this PE in FY 2019 to develop integrated cross platform active and passive sensing solutions, next generation network and real time spectrum operations.					
FY 2019 Plans: Develop and test a multi-beam next generation network allowing significantly more throughputs with low latency designed for cross platform combat system integration, applications to coordinate multiple disparate Electronic					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3437 / *EMW/SEWIP/SSEE Accelerator*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Warfare (EW) systems, passive targeting algorithms and real time spectrum operations. This technology accelerator will operationally field 3 shipsets for trials and evaluation. ***FY 2020 Base Plans:*** FY 2020 efforts will develop dual frequency airborn network arrays and networking waveform; test compatibility of airborne systems with fielded surface next gen network arrays; and, for the deployed surface systems, develop and field autojoin and low probability of intercept (LPI) waveforms. This investment will fund expand deployed network capabilities and provide one additional ship set and one airborne relay prototype; provide additional deployed ESM hardware and decoy technologies; and provide Fifth generation fighter integration. Shipsets to be procured include 1 shipboard and 1 airborne deployed prototype. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects the ramp up of work required to integrate cross platform active and passive sensing solutions, next generation and real time spectrum operations to improve real time Electro-Magnetic Maneuver Warfare operations with additional costs to expand and provide deployed network capabilities including one additional ship set and one airborne relay prototype, additional deployed ESM hardware and decoy technologies and Fifth generation fighter integration.					
Accomplishments/Planned Programs Subtotals	0.000	14.389	23.630	0.000	23.630

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Projects identified for execution under this project number are non-acquisition programs. Each project will develop a project plan to support project execution. Project plans will include a project schedule and technical requirements and objectives to measure project performance. Based on prior BA-3 work prototype contracts are in place and can be used to develop hardware for at sea trials. Software and ship installation will are expected to use a combination of existing shipyard contracts and government field activities.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3437 / *EMW/SEWIP/SSEE Accelerator*

E. Performance Metrics

Performance metrics are specific to each of the projects funded. All will include measures identified in the objective statements, including completions, successes, terminations, and iterative development prototype cycle times.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3437 / *EMW/SEWIP/SSEE Accelerator*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype Development	MIPR	NSWC : various	0.000	0.000		6.056	Oct 2018	12.910	Oct 2019	-		12.910	0.000	18.966	-
Prototype Development	PO	NAWC : various	0.000	0.000		3.333	Oct 2018	6.747	Oct 2019	-		6.747	0.000	10.080	-
Prototype Development	MIPR	SUPSHIP : Bath Maine	0.000	0.000		2.000	Oct 2018	1.987	Oct 2019	-		1.987	0.000	3.987	-
Prototype Development	MIPR	NRL : Washington, DC	0.000	0.000		3.000	Oct 2018	1.986	Oct 2019	-		1.986	0.000	4.986	-
Prototype Development	Various	TBD : TBD	0.000	0.000		0.000	Sep 2020	0.000		-		0.000	0.000	0.000	-
		Subtotal	0.000	0.000		14.389		23.630		-		23.630	0.000	38.019	N/A

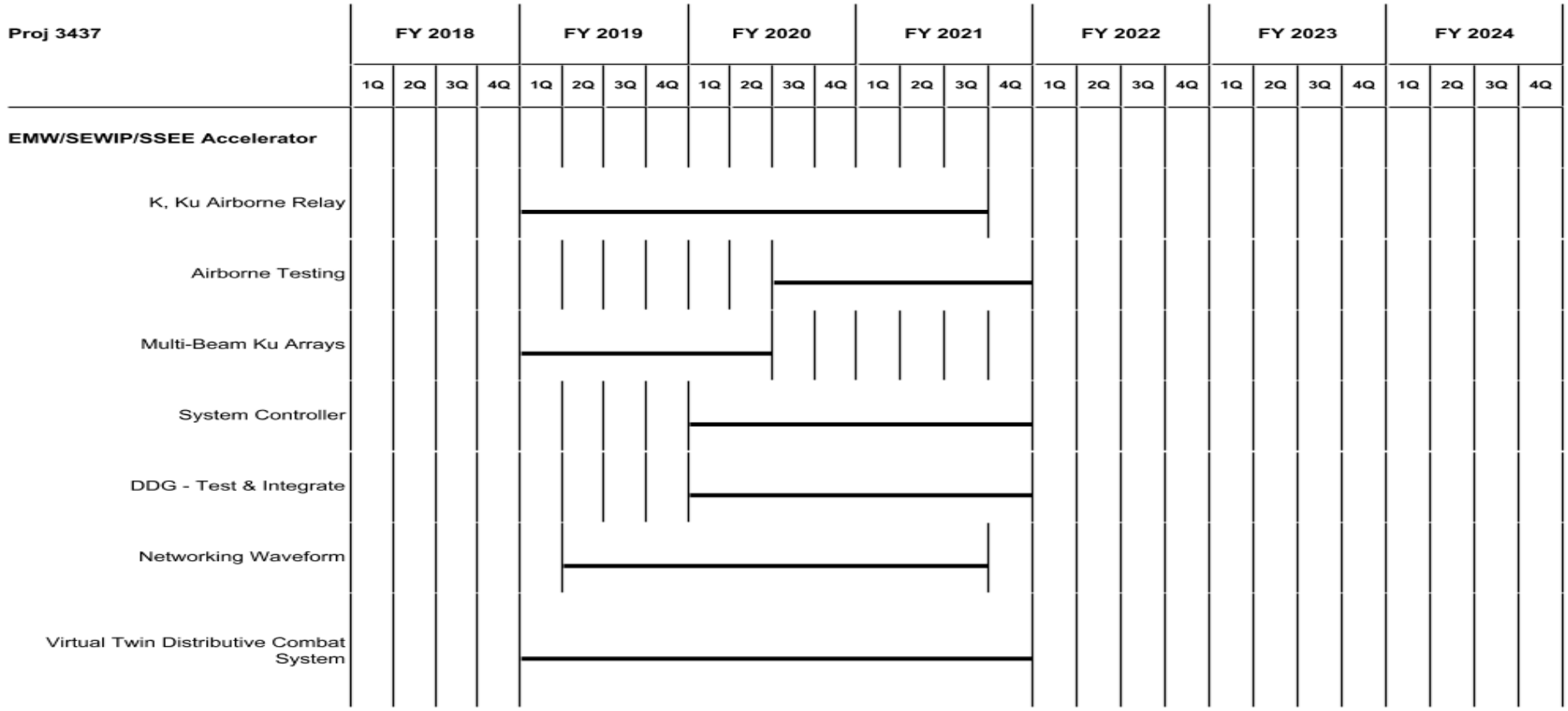
Remarks

NSWC: Prototype development of shipboard next generation networking apertures and EMW cross platform software.
NAWC: Prototype development of airborne next generation apertures and networking software.
SUPSHIP: Installation and testing of Cross platform EMW accelerator prototype on 2 Navy test vessels.
NRL: Installation and testing of Cross platform EMW accelerator prototype on Navy maritime patrol aircraft.

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		14.389		23.630		-		23.630	0.000	38.019	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3437 / *EMW/SEWIP/SSEE Accelerator*



2020PB - 0603382N - 3437

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3437 / *EMW/SEWIP/SSEE Accelerator*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3437				
EMW/SEWIP/SSEE Accelerator: K, Ku Airborne Relay: K, Ku Airborne Relay	1	2019	3	2021
EMW/SEWIP/SSEE Accelerator: Airborne Testing: Airborne Testing	3	2020	4	2021
EMW/SEWIP/SSEE Accelerator: Multi-Beam Ku Arrays: Multi-Beam Ku Arrays	1	2019	2	2020
EMW/SEWIP/SSEE Accelerator: System Controller: System Controller	1	2020	4	2021
EMW/SEWIP/SSEE Accelerator: DDG - Test & Integrate: DDG - Test & Integrate	1	2020	4	2021
EMW/SEWIP/SSEE Accelerator: Networking Waveform: Networking Waveform	2	2019	3	2021
EMW/SEWIP/SSEE Accelerator: Virtual Twin Distributive Combat System: Virtual Twin Distributive Combat System	1	2019	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*				Project (Number/Name) 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
3438: *Innovative Naval Prototype (INP) Transition (6.4)*	0.000	0.000	13.059	23.104	-	23.104	18.215	28.007	36.697	41.508	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This is a new project unit (PU) in FY 2019. This PU is intended to provide advanced component development and prototyping for selected technologies maturing out of or supporting ONR's Leap Ahead Technology (LA-Tech) and Innovative Naval Prototype (INP) BA3 portfolio.

Changes from FY 2019 to FY 2020 includes the new HIJENKS program activity initiated in the PE and Project Unit 3438 as work in this program is transitioning in FY 2020 from Budget Activity (BA) 3 Advanced Technology Development to the BA4 Advanced Component Development and Prototypes phase of development.

A. Mission Description and Budget Item Justification

The efforts described in this mission area address the advanced component development and prototype demonstration associated with ONR's Innovative Naval Prototypes (INP) Program and the Leap Ahead Technology (LA-Tech) investments. INP and LA-Tech investments represent game changing technologies with the potential to revolutionize operational concepts. They are disruptive in nature as they would dramatically change the way naval forces fight. INPs and LA-Techs push the imagination of our nation's technical talent to deliver transformational warfighting capabilities. Successful demonstrations are intended to present the Department of the Navy with a programmatic challenge as these new capabilities can lead to the obsolescence of existing capabilities and significant decisions as to the path forward for integrating the new technological capabilities into the warfighting systems of the future.

ONR manages a continuum of INP and LA-Tech development from BA2 to BA3 to BA4. The goal of these BA4 investments is to further mature development and expend efforts necessary to evaluate integrated technologies, representative modes or prototype systems in high fidelity and realistic operating environments. This BA4 investment includes system specific efforts that help expedite technology transition from the laboratory to operational use. Emphasis is on proving component and subsystem maturity prior to integration in major and complex systems and may involve risk reduction initiatives. Projects in this category involve efforts prior to Milestone B and are referred to as advanced component development activities and include technology demonstrations. It is the goal of these projects to achieve Technology Readiness Levels 6 or 7. Successful experimentation and demonstration highlights the viability of new technological capabilities that could be implemented if an acquisition program were to be established to support further development. The portfolio is periodically refreshed through the selection of new INPs and LA-Tech investments as existing ones are completed.

INP, LA-Tech, and supporting technology investments may include R-2 Activities mission areas such as Unmanned and Autonomous Systems, Directed Energy / Electric Weapons, Electromagnetic Maneuver Warfare, Cyber Warfare, and Undersea Warfare.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Unmanned and Autonomous Systems: Advanced ASW sensor array package for medium sized unmanned surface vehicles. ***Articles:*** ***Description:*** This is a new project beginning in FY 2019 that will develop, integrate, experiment and demonstrate onboard a medium sized unmanned surface vehicle an advanced ASW sensor array package. This package is intended to be used on a platform being developed with Innovative Prototype (INP) and Leap Ahead Technology (LA-Tech) investments. That platform will serve as host for a wide variety of operationally focused capability payloads such as the advance ASW sensor array package being developed in this activity. These warfighter focused packages will enable Unmanned and Autonomous Systems platforms to support the requirement to augment manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains. ***FY 2019 Plans:*** Initiate advanced component hardware and software development and the necessary system-to-hull integration which will lead to a prototype demonstration, in an operational environment, of an advanced ASW sensor array package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle. ***FY 2020 Base Plans:*** Prototype demonstration, in an operational environment, by deploying, recovering and towing an advanced ASW sensor array package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020	0.000 -	5.347 -	5.315 -	0.000 -	5.315 -
Title: Unmanned and Autonomous Systems: Advanced ASW kinetic effects package for medium sized unmanned surface vehicle. ***Articles:*** ***Description:*** This is a new project beginning in FY 2019 that will develop, integrate, experiment and demonstrate onboard a medium sized unmanned surface vehicle an advanced ASW kinetic effects package. This capability package is intended to be used on a platform being developed with Innovative Prototype (INP)	0.000 -	5.712 -	5.815 -	0.000 -	5.815 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
and Leap Ahead Technology (LA-Tech) investments. That platform will serve as host for a wide variety of operationally focused capability payloads such as the advance ASW kinetic effects package being developed in this activity. These warfighter focused packages will enable Unmanned and Autonomous Systems platforms to support the requirement to augment manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains. ***FY 2019 Plans:*** Initiate advanced component development and the necessary system-to-hull integration which will lead to prototype demonstration, in an operational environment, of an advanced ASW kinetic effects package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle. ***FY 2020 Base Plans:*** Prototype demonstration, in an operational environment, by launching from a manned vessel and engagement of a surrogate of an advanced ASW kinetic effects package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020					
Title: Unmanned and Autonomous Systems: Advanced aerial lift package for medium sized unmanned surface vehicle. ***Articles:*** ***Description:*** This is a new project beginning in FY 2019 that will develop, integrate, experiment and demonstrate onboard a medium sized unmanned surface vehicle an advanced aerial lift package. This capability package will dramatically increase the range of regard of various sensor payloads that will be carried aloft. It is intended to be used on a platform being developed with Innovative Prototype (INP) and Leap Ahead Technology (LA-Tech) investments. That platform will serve as host for a wide variety of operationally focused capability payloads such as the advance aerial lift package being developed in this activity. These warfighter focused payloads will enable Unmanned and Autonomous Systems platforms to support the requirement to augment manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains. ***FY 2019 Plans:***	0.000 -	2.000 -	3.967 -	0.000 -	3.967 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Initiate advanced component hardware development and the necessary system-to-hull integration which will lead to prototype demonstration, in an operational environment, of an advanced aerial lift package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle. ***FY 2020 Base Plans:*** Prototype demonstration, in an operational environment, by demonstrating automated TALONs, an advanced aerial lift package capable of operational use, onboard a medium sized autonomous, unmanned surface vehicle. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 is due to increased cost to conduct prototype demonstrations and participation from Navy Lab and NASA JPL personnel.					
Title: HIJENKS Operational Acceleration	0.000	0.000	8.007	0.000	8.007
Articles:	-	-	-	-	-
Description: HIJENKS System Integration, T&E and Alternate Platform development and test activity will focus on software development for integration of new High Power Microwave (HPM) capabilities into control systems and mission planning software. Technical objectives of HIJENKS focus on improving the robustness of HPM systems in new airborne platforms and improving the mission planning capability for HPM engagement scenarios. The prototype will mature several of these areas to enable operational capability in a phased approach for multi-platform integration and demonstration combined with validation/certification paths of software and hardware architectures. Activities are intended as risk reduction, operational analysis, and system level environmental test in order to reduce transition program cost for platform capability. Phase 1 FY-20 The first phase of the prototype will focus on initiating platform integration activities for software, mission planning and environmental hardening and alternate platform analysis Phase 2 FY-21 Phase 2 brings component level environmental testing and certification as well as software development for limited pre-planned missions					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Phase 3 FY-22 Phase 3 brings system level environmental and EMC testing and certification as well as software development for limited dynamic mission planning and expanded target class surrogate development and test Phase 4 FY-23 Phase 4 brings integration and certification of mission planning and weapon control software to reduce transition costs for Program of Record ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** HIJENKS System Integration, T&E and Alternate Platform Phase 1 FY-20 Initiate first phase of the prototype development to focus on initiating platform integration activities for software, mission planning and environmental hardening and alternate platform analysis. Detailed FY 2020 technical plans and objectives at a higher classification to be briefed separately upon request. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 reflects elements of the HIJENKS program transitioning from Budget Activity (BA) 3 Advanced Technology Development to BA4 Advanced Component Development and Prototypes.					
Accomplishments/Planned Programs Subtotals	0.000	13.059	23.104	0.000	23.104

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

D. Acquisition Strategy

The projects identified for execution are non-acquisition programs. The Office of Naval Research will provide Government oversight to the projects. Each project will develop a project plan to support execution. Project plans will include a schedule and the necessary technical requirements and objectives to measure and evaluate performance. Additionally, each project will be subjected to experimentation then demonstrated in operationally relevant environments to assess their ability to meet warfighter requirements. Project deliverables will include the actual integrated hardware/software prototype systems, test reports, and technical data, necessary to support decision making. These decisions include the transition of technologies to acquisition, further refinement of the technology, or termination and reinvestment of remaining funds to other technologies that add military value.

E. Performance Metrics

In all cases, the technologies being developed within this PE support the Department of the Navy INP and Leap Ahead Programs and are managed at the Office of Naval Research. The primary technological metrics used in this PE involve experiments and tests that demonstrate, in an operationally relevant environment, the proof of concept for the technological capability being developed. Technology development is informed by periodic interaction with Naval warfighters, resource sponsors and the acquisition community. At the lowest level, each project is evaluated against technical and financial milestones on a frequent basis. Annually, each project is reviewed in depth for technical performance and development status by the Chief of Naval Research. Department of the Navy leadership is briefed on the portfolio's status by the Chief of Naval Research.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced ASW sensor payload	MIPR	NUWC : Newport, Rhode Island	0.000	0.000		1.200	Oct 2018	1.340	Oct 2019	-		1.340	0.000	2.540	-
Advanced ASW sensor payload	MIPR	JHU-APL : Columbia, Maryland	0.000	0.000		2.100	Oct 2018	1.340	Oct 2019	-		1.340	0.000	3.440	-
Advanced ASW sensor payload	MIPR	SSC-PAC : San Diego, California	0.000	0.000		0.890	Oct 2018	1.302	Oct 2019	-		1.302	0.000	2.192	-
Advanced ASW sensor payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000		1.157	Oct 2018	1.333	Oct 2019	-		1.333	0.000	2.490	-
Advanced ASW kinetic payload	MIPR	PSU -ARL : State College, Pennsylvania	0.000	0.000		4.000	Oct 2018	3.889	Oct 2019	-		3.889	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	SSC-PAC : San Diego, California	0.000	0.000		1.400	Oct 2018	1.026	Oct 2019	-		1.026	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000		0.312	Oct 2018	0.900	Oct 2019	-		0.900	Continuing	Continuing	Continuing
Advanced aerial lift payload	MIPR	NSWC-CD : Bethesda, Maryland	0.000	0.000		0.200	Oct 2018	1.336	Oct 2019	-		1.336	0.000	1.536	-
Advanced aerial lift payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000		0.000	Oct 2018	1.335	Oct 2019	-		1.335	0.000	1.335	-
Advanced aerial lift payload	MIPR	SSC-PAC : San Diego, California	0.000	0.000		1.800	Oct 2018	1.296	Oct 2019	-		1.296	0.000	3.096	-
HIJENKS Mission Planning Software Development	WR	NAVAIR : Patuxent River, Md	0.000	0.000		0.000		0.330	Jan 2020	-		0.330	Continuing	Continuing	Continuing
HIJENKS Launch System Software/Hardware Integration	WR	NAVAIR : Patuxent River, Md	0.000	0.000		0.000		0.500	Nov 2019	-		0.500	0.000	0.500	-
HIJENKS System Requirements and CONEMPS	WR	NAVAIR : Patuxent River, Md	0.000	0.000		0.000		0.250	Oct 2019	-		0.250	0.000	0.250	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HIJENKS Airborne Launch Study	C/CPFF	Platform Prime : TBD	0.000	0.000		0.000		0.500	Apr 2020	-		0.500	0.000	0.500	-
HIJENKS Mission Analysis	FFRDC	JH APL : Laurel, MD	0.000	0.000		0.000		0.500	Oct 2019	-		0.500	0.000	0.500	-
HIJENKS T&E Launcher	C/CPFF	Platform Prime : TBD	0.000	0.000		0.000		0.300	Apr 2020	-		0.300	0.000	0.300	-
HIJENKS Safe and Arm Design	C/FFP	Platform Prime : TBD	0.000	0.000		0.000		0.500	Jan 2020	-		0.500	0.000	0.500	-
HIJENKS Environmentally Hardened Payload Activities	C/UCA	DOTC - Multiple Awards : Various	0.000	0.000		0.000		1.500	Mar 2020	-		1.500	0.000	1.500	-
HIJENKS Target Procurement and Testing	WR	NRL : Washington, DC	0.000	0.000		0.000		0.500	Oct 2019	-		0.500	0.000	0.500	-
HIJENKS T&E Platform Payload Source Devlopment	C/UCA	DOTC - Multiple Awards : Various	0.000	0.000		0.000		2.927	Nov 2019	-		2.927	0.000	2.927	-
HIJENKS Program Support	WR	NSWCDD and NAWCWD : Dahlgren, VA	0.000	0.000		0.000		0.200	Oct 2019	-		0.200	0.000	0.200	-
		Subtotal	0.000	0.000		13.059		23.104		-		23.104	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		13.059		23.104		-		23.104	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

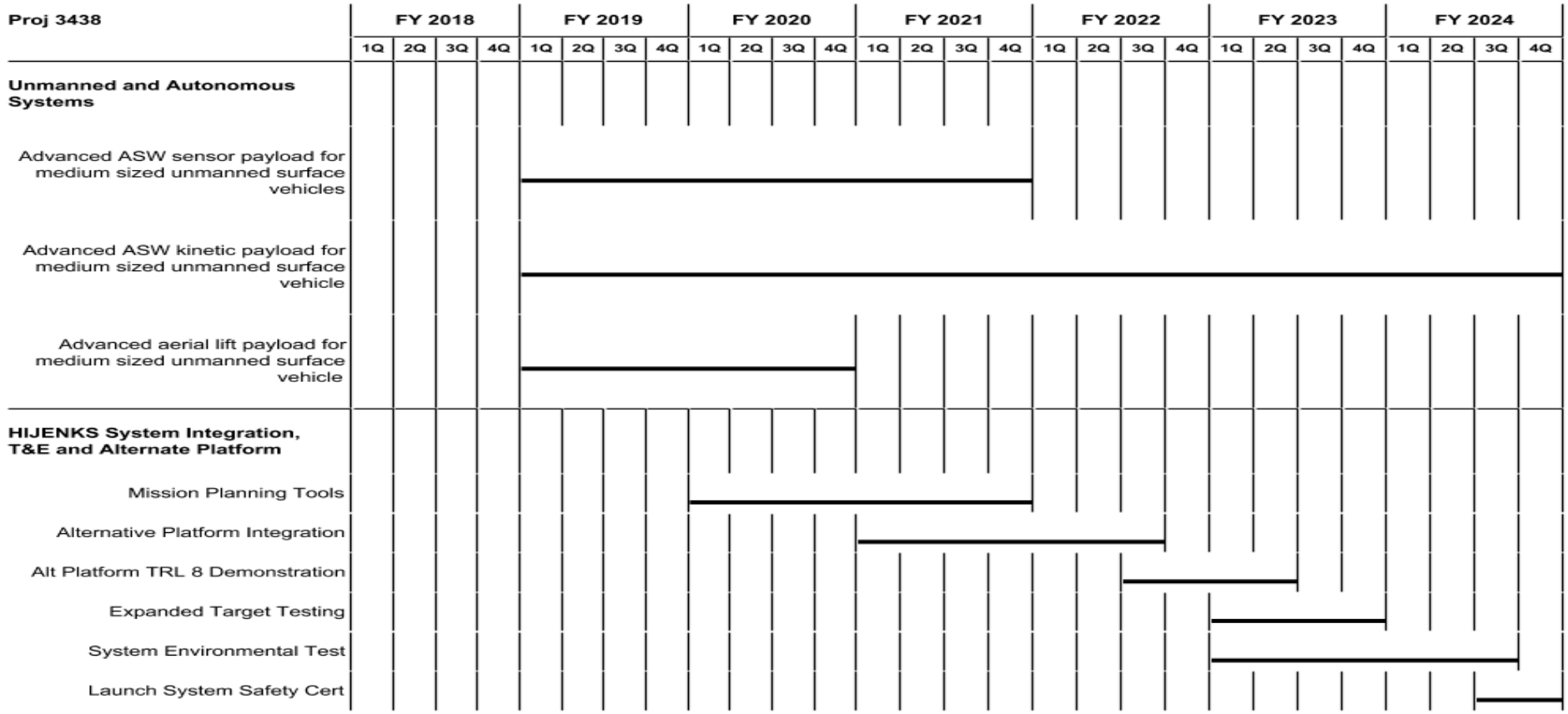

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (INP) Transition (6.4)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3438				
Unmanned and Autonomous Systems: Advanced ASW sensor payload for medium sized unmanned surface vehicles: Advanced ASW sensor payload for medium sized unmanned surface vehicles	1	2019	4	2021
Unmanned and Autonomous Systems: Advanced ASW kinetic payload for medium sized unmanned surface vehicle: Advanced ASW kinetic payload for medium sized unmanned surface vehicle	1	2019	4	2024
Unmanned and Autonomous Systems: Advanced aerial lift payload for medium sized unmanned surface vehicle: Advanced aerial lift payload for medium sized unmanned surface vehicle	1	2019	4	2020
HIJENKS System Integration, T&E and Alternate Platform: Mission Planning Tools: Mission Planning Tools	1	2020	4	2021
HIJENKS System Integration, T&E and Alternate Platform: Alternative Platform Integration: Alternative Platform Integration	1	2021	3	2022
HIJENKS System Integration, T&E and Alternate Platform: Alt Platform TRL 8 Demonstration: Alt Platform TRL 8 Demonstration	3	2022	2	2023
HIJENKS System Integration, T&E and Alternate Platform: Expanded Target Testing: Expanded Target Testing	1	2023	4	2023
HIJENKS System Integration, T&E and Alternate Platform: System Environmental Test: System Environmental Test	1	2023	3	2024
HIJENKS System Integration, T&E and Alternate Platform: Launch System Safety Cert: Launch System Safety Cert	3	2024	4	2024