Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	72.944	38.674	57.947	70.218	-	70.218	49.000	51.715	51.655	52.691	Continuing	Continuing
0324: *Adv Combat System Technology*	70.618	1.743	1.797	1.299	-	1.299	2.196	2.126	1.950	1.989	Continuing	Continuing
2480: *SSL-TM*	0.000	0.000	3.922	11.909	-	11.909	5.434	3.992	0.000	0.000	0.000	25.257
3416: *HIJENKS*	0.000	0.000	0.000	14.981	-	14.981	16.945	24.690	0.000	0.000	0.000	56.616
3422: *SHARC Surface Platform*	2.301	6.754	5.731	14.741	-	14.741	3.814	0.000	0.000	0.000	0.000	33.341
3423: *LOCUST*	0.013	1.879	2.960	3.561	-	3.561	6.425	5.949	0.000	0.000	0.000	20.787
3424: *Heterogeneous Collaborative Unmanned Systems (HCUS)*	0.012	0.962	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.974
3437: *EMW/SEWIP/SSEE Accelerator*	0.000	14.389	23.630	21.508	-	21.508	1.250	0.822	0.000	0.000	0.000	61.599
3438: *Innovative Naval Prototype (INP) Transition (6.4)*	0.000	12.947	19.907	2.219	-	2.219	4.996	5.085	34.716	35.413	Continuing	Continuing
3443: *Advanced Long Range Targeting (ALRT)*	0.000	0.000	0.000	0.000	-	0.000	7.940	9.051	14.989	15.289	Continuing	Continuing

Note

In FY2021, PE 0603382N Advanced Combat System Tech, partial funding from PU 3438 Innovative Naval Prototype (INP) Transition (6.4)was moved to new PU 3416 HIJENKS.

A. Mission Description and Budget Item Justification

Open architecture sets standards for technology fields to promote interoperability. For defense systems, standards enable interconnectivity across services and in coalition operations at machine-to-machine speeds. Reducing barriers associated with proprietary software speeds development and delivery of warfighting advantage. 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
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*

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
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*

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.

Advanced Component Development and Prototypes (ACD&P) efforts necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment are funded in this PE. Most of the work in this PE can be classified between Technology Readiness Level (TRL) 6 (system/subsystem model or prototype demonstration in a relevant environment) and TRL 7 (system prototype demonstration in an operational environment).

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	39.240	64.694	76.309	-	76.309
Current President's Budget	38.674	57.947	70.218	-	70.218
Total Adjustments	-0.566	-6.747	-6.091	-	-6.091
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-6.747			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.566	0.000			
• Program Adjustments	0.000	0.000	-6.034	-	-6.034
• Rate/Misc Adjustments	0.000	0.000	-0.057	-	-0.057

Change Summary Explanation

The FY 2021 funding request was reduced by $6.091 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
0324: *Adv Combat System Technology*	70.618	1.743	1.797	1.299	-	1.299	2.196	2.126	1.950	1.989	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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. Those elements include ensuring that all naval systems, families of systems, programs and prototypes move to modular OSA in accordance with DoD Instruction 5000.01 of 7 Jan 2015 which mandates that all DoD programs utilize Modular OSA to 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. Supports Systems engineering and acquisition services to deliver capabilities through acquisition, development, integration, production, test, deployment and sustainment of interoperable command, control, communication, computers, intelligence, surveillance reconnaissance, cyber, and information technology capabilities enabling Information Warfare; and other functions. 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Align the Naval Enterprise Across All Domains to Implement OA	0.492	0.560	0.199	0.000	0.199
Articles:	-	-	-	-	-
FY 2020 Plans: The FY 2020 budget will be utilized to support the initiated Modular Open Systems Architecture projects. 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 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The FY21 budget will be utilized to generate Web-accessible reference resource providing OA-related policy and guidance. Efforts include an updated contracting guidebook, interface standards, or proprietary data rights. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** This task is complete and resources will be aligned with Knowledge Products for Implementing OSA.					
Title: Change the Naval and Marine Corps policy and guidance to Institutionalize OA Principle	0.619	0.610	0.100	0.000	0.100
Articles:	-	-	-	-	-
FY 2020 Plans: The FY 2020 budget will be utilized to support the initiated Modular Open Systems Architecture projects. 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 2021 Base Plans:*** The FY 2021 budget will be utilized to continue to execute the FY 2020 plan supporting the initiated Modular Open Systems Architecture projects 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 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** This task is in the final phases of completion and therefore funding is reduced and aligned with Knowledge Products for Implementing OSA.					
Title: OA Systems Engineering Leadership	0.232	0.217	0.100	0.000	0.100
Articles:	-	-	-	-	-
FY 2020 Plans: The FY 2020 budget will be utilized to support the initiated Modular Open Systems Architecture projects. 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 2021 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The FY 2021 budget will be utilized to support the initiated Modular Open Systems Architecture projects. 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 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** This task is in the final phases of completion and therefore funding is reduced to Knowledge Products for Implementing OSA.					
Title: Knowledge Products for Implementing OSA	0.400	0.410	0.900	0.000	0.900
Articles:	-	-	-	-	-
FY 2020 Plans: The FY 2020 budget will be utilized to supporting the initiated Modular Open Systems Architecture projects 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. Supports Systems engineering and acquisition services to deliver capabilities through acquisition, development, integration, production, test, deployment and sustainment of interoperable command, control, communication, computers, intelligence, surveillance reconnaissance, cyber, and information technology capabilities enabling Information Warfare; and other functions. ***FY 2021 Base Plans:*** The FY 2021 budget will be utilized to continue FY2020 tasks supporting Modular Open Systems Architecture projects conjunction with platform/system block upgrades. Additionally, it will promote policy changes and standards development that support the implementation and standardization of and to award new projects aligning with strategic imperatives and project transition opportunities in conjunction with platform/system block upgrades. Anticipated areas of emphasis will be OA support to Distributed Maritime Operations, particularly for Marine Corps, ISR and strike systems. Supports Systems engineering and acquisition services to deliver capabilities through acquisition, development, integration, production, test, deployment and sustainment of interoperable command, control, communication, computers, intelligence, surveillance reconnaissance, cyber, and information technology capabilities enabling Information Warfare; and other functions. ***FY 2021 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The OA products are evolving and different products are being delivered at different times. Resources are being realigned to Knowledge Products for the implementation of OSA across domains.					
Accomplishments/Planned Programs Subtotals	1.743	1.797	1.299	0.000	1.299

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, 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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	2.619	0.492	Oct 2018	0.560	Oct 2019	0.199	Oct 2020	-		0.199	0.000	3.870	-
Change the Naval and Marine Corps policy and guidance to Institutionalize OA Principle	WR	NSWC, NRL, NUWC, NAWC : VARIOUS	0.953	0.619	Oct 2018	0.610	Oct 2019	0.100	Oct 2020	-		0.100	0.000	2.282	-
OA Systems Engineering Leadership	WR	NSWC, NRL, NUWC, NAWC : VARIOUS	0.545	0.232	Oct 2018	0.217	Oct 2019	0.100	Oct 2020	-		0.100	0.000	1.094	-
Knowledge Products for Implementing OSA	WR	NSWC, NRL, NUWC, NAWC NUW, NEWPORT,	0.836	0.400	Oct 2018	0.410	Oct 2019	0.900	Oct 2020	-		0.900	0.000	2.546	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		NSWC CRANE : VARIOUS													
		Subtotal	48.000	1.743		1.797		1.299		-		1.299	0.000	52.839	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	70.618	1.743		1.797		1.299		-		1.299	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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*

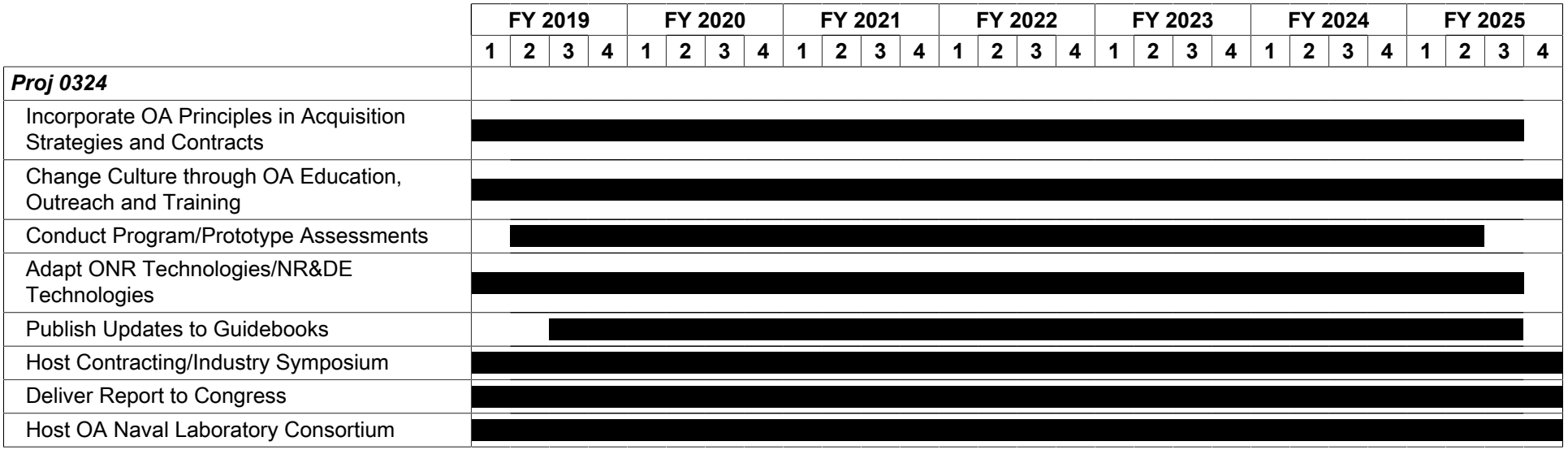


Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 0324 / *Adv Combat System Technology*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0324				
Incorporate OA Principles in Acquisition Strategies and Contracts	1	2019	3	2025
Change Culture through OA Education, Outreach and Training	1	2019	4	2025
Conduct Program/Prototype Assessments	2	2019	2	2025
Adapt ONR Technologies/NR&DE Technologies	1	2019	3	2025
Publish Updates to Guidebooks	3	2019	3	2025
Host Contracting/Industry Symposium	1	2019	4	2025
Deliver Report to Congress	1	2019	4	2025
Host OA Naval Laboratory Consortium	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2480: *SSL-TM*	0.000	0.000	3.922	11.909	-	11.909	5.434	3.992	0.000	0.000	0.000	25.257
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 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 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Solid State Laser Technology Maturation (SSL-TM)	0.000	3.922	11.909	0.000	11.909
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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 2020 Plans:*** Conduct extended experimentation and laser weapons systems capabilities demonstration on USS Portland during fleet operations and experiments. ***FY 2021 Base Plans:*** Continue extended experimentation and laser weapons system capability demonstrations on USS Portland during fleet operations and experiments. Develop lesson learned and document system technical performance during operations, demonstrations and experiments. Groom events will include detailed inspection of LWSD system on ship to determine material condition and identify any repairs that are needed. Operators and maintenance personnel will be trained prior to deployment. System sustainment will be provided by deployed sailors with support from contractor and government maintenance experts as well as reach-back capability to address questions and issues beyond deployed maintenance team capability. A test team will be deployed during demonstrations and experiments to support coordination of demonstration and test execution, data collection and report writing requirements. The system will be available to support daily operational mission requirements and two (2) focused demonstration /experimentation events are planned during 2 and 3 Quarters of 2021. The scheduled will be adjusted as additional information about the USS Portlands schedule is defined ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increases from FY20 to FY21 to support test system demonstrations deployment operations in maturation.					
Accomplishments/Planned Programs Subtotals	0.000	3.922	11.909	0.000	11.909

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 2480 / *SSL-TM*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 1319/ 0603801N/ 3400: *Solid State Laser Technology Maturation*	51.300	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	51.300
• 1319/ 0603801N/ 2480: *Solid State Laser Technology Maturation*	0.000	8.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.000

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 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 2480 / *SSL-TM*	

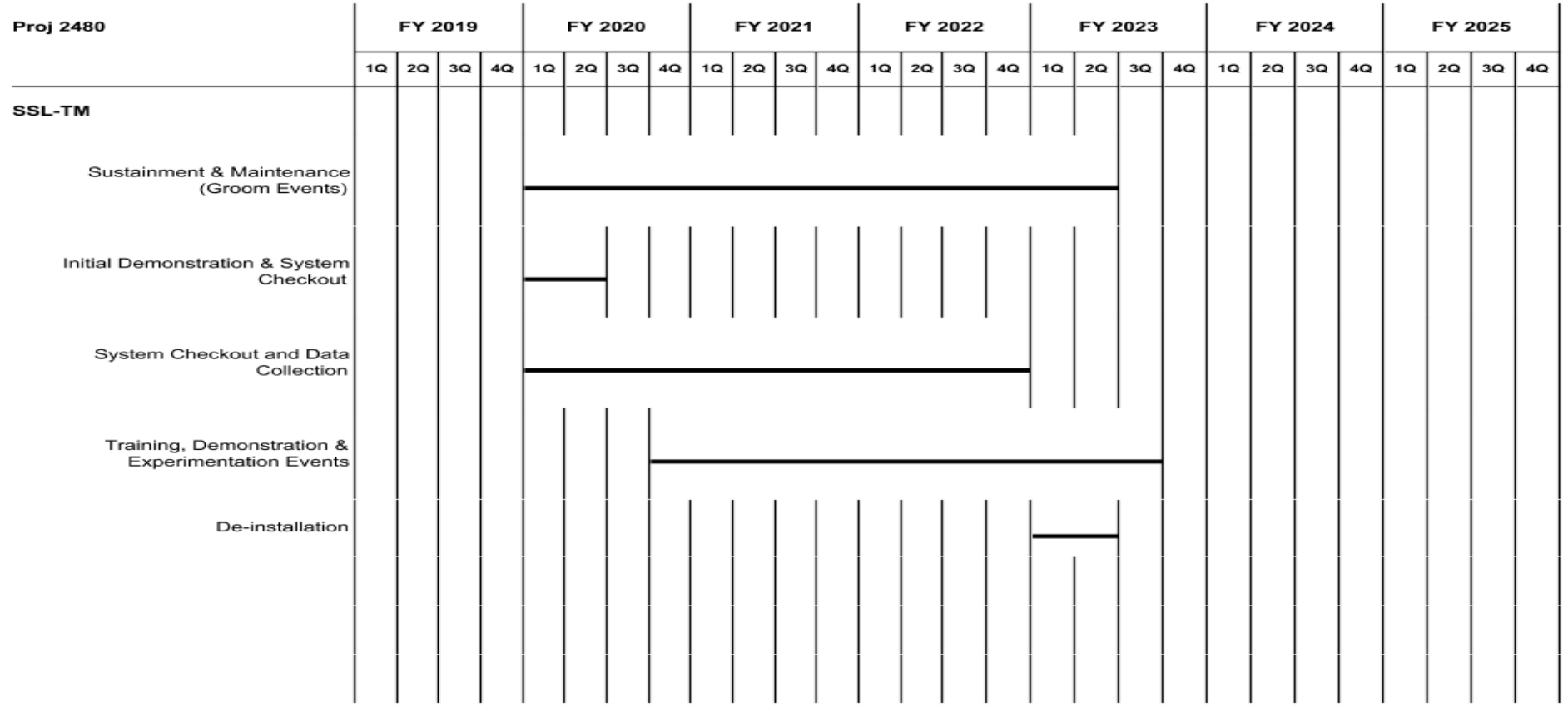
Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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		1.922	Oct 2019	1.759	Oct 2020	-		1.759	0.000	3.681	-
SSL-TM Experimentation and Sustainment	WR	Naval Surface Warfare Center, Port Hueneme Divisio : Port Hueneme, CA	0.000	0.000		1.000	Oct 2019	7.150	Oct 2020	-		7.150	0.000	8.150	-
SSL-TM Technical and Engineering T&E	C/CPFF	Northrup Grumman : Redondo Beach, CA	0.000	0.000		1.000	Oct 2019	3.000	Oct 2020	-		3.000	0.000	4.000	-
		Subtotal	0.000	0.000		3.922		11.909		-		11.909	0.000	15.831	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		3.922		11.909		-		11.909	0.000	15.831	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 2480 / *SSL-TM*



2021PB - 0603382N - 2480

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
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	4	2020	3	2023
SSL-TM: De-installation: De-installation	1	2023	2	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3416 / *HIJENKS*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3416: *HIJENKS*	0.000	0.000	0.000	14.981	-	14.981	16.945	24.690	0.000	0.000	0.000	56.616
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0603382N Advanced Combat System Tech, partial funding from PU 3438 Innovative Naval Prototype (INP) Transition (6.4)was moved to new PU 3416 HIJENKS. This is not a new start.

A. Mission Description and Budget Item Justification

High Power Joint Electromagnetic Non-Kinetic Strike (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 2 FY-2021
Phase 2 brings component level environmental testing and certification as well as software development for limited pre- planned missions

Phase 3 FY-2022
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-2023
Phase 4 brings integration and certification of mission planning and weapon control software to reduce transition costs for Program of Record

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: HIJENKS Operational Acceleration	0.000	0.000	14.981	0.000	14.981
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3416 / *HIJENKS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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. ***FY 2020 Plans:*** N/A ***FY 2021 Base Plans:*** Phase 2 FY-2021 Phase 2 brings component level environmental testing and certification as well as software development for limited pre-planned missions. Environmental test and evaluation of critical HPM sub-systems. Functional testing on existing system surrogate Navy test simulators. Control interface testing with representative platform surrogate control systems. Mission planning tool assessment and early modification activities for launch and mission execution certification. Joint Munitions Effectiveness Manual (JMEM) and weaponeering accreditation process activities. Alternative platform integration work towards T&E demonstration and scaled ASuW testing. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2020 to FY 2021 increase is due to the transition from HIJENKS PU 3438 Innovative Naval Prototype (INP) to this PU 3416 HIJENKS. Additionally, the increase will include investments in manufacturing of payload subsystems critical to transition with focused development in materials to meet storage shelf life and other environmental requirements as well as range extension.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	14.981	0.000	14.981

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3416 / *HIJENKS*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 1319/0602792N/0000: *Directed Energy/ Electric Weapons*	29.825	22.046	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	51.871
• 1319/0603801N/3400: *Directed Energy/ Electric Weapons*	8.190	14.225	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	22.415
• RDTEN/0603801N/3416: *HIJENKS*	0.000	0.000	14.465	-	14.465	7.656	0.000	0.000	0.000	0.000	22.121
• RDTEN/0602792N/3416: *HIJENKS*	0.000	0.000	22.320	-	22.320	9.943	0.000	0.000	0.000	0.000	32.263

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 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*	Project (Number/Name) 3416 / *HIJENKS*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HIJENKS Mission Planning Software Development	WR	NAVAIR : Patuxent, MD	0.000	0.000		0.000		0.330	Jan 2021	-		0.330	0.000	0.330	-
HIJENKS Launch System Software/Hardware Integration	WR	NAVAIR : Patuxent, MD	0.000	0.000		0.000		0.500	Nov 2020	-		0.500	0.000	0.500	-
HIJENKS System Requirements and CONEMPS	WR	NAVAIR : Patuxent, MD	0.000	0.000		0.000		0.250	Oct 2020	-		0.250	0.000	0.250	-
HIJENKS Airborne Launch Study	C/CPFF	Platform Prime : Available SECRET	0.000	0.000		0.000		0.500	Apr 2021	-		0.500	0.000	0.500	-
HIJENKS Mission Analysis	C/FFP	JHU-APL : Laurel, MD	0.000	0.000		0.000		0.500	Oct 2020	-		0.500	0.000	0.500	-
HIJENKS T&E Launcher	C/FFP	Platform Prime : Available SECRET	0.000	0.000		0.000		0.200	Apr 2021	-		0.200	0.000	0.200	-
HIJENKS Safe and Arm	C/UCA	Platform Prim : Available SECRET	0.000	0.000		0.000		0.500	Oct 2020	-		0.500	0.000	0.500	-
HIJENKS Hard Tube Capability	WR	Multiple Awards : Various	0.000	0.000		0.000		0.800	Jan 2021	-		0.800	0.000	0.800	-
HIJENKS Target Procurement and Testing	C/UCA	NRL : Washington, DC	0.000	0.000		0.000		0.750	Oct 2020	-		0.750	0.000	0.750	-
HIJENKS T&E Platform-Payload Source Development	C/BPA	Lockheed Martin : Grand Prairie, TX	0.000	0.000		0.000		3.000	Oct 2020	-		3.000	0.000	3.000	-
HIJENKS T&E Platform-Payload Source Development	C/BPA	General Atomics : San Diego, CA	0.000	0.000		0.000		4.000	Nov 2020	-		4.000	0.000	4.000	-
HIJENKS T&E Platform-Payload Source Development	C/BPA	Raytheon : Albuquerque, NM	0.000	0.000		0.000		2.700	Oct 2020	-		2.700	0.000	2.700	-
NSWCDD and HIJENKS Program Support	WR	NSWCDD : Dahlgren, VA and NAWCWD China Lake, CA	0.000	0.000		0.000		0.400	Oct 2020	-		0.400	0.000	0.400	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3416 / *HIJENKS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NSWCDD Government Pulsed Power GFE Hardware	WR	NSWCDD : Dahlgren, VA and NAWCWD China Lake, CA	0.000	0.000		0.000		0.551	Oct 2020	-		0.551	0.000	0.551	-
		Subtotal	0.000	0.000		0.000		14.981		-		14.981	0.000	14.981	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		14.981		-		14.981	0.000	14.981	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3416 / *HIJENKS*

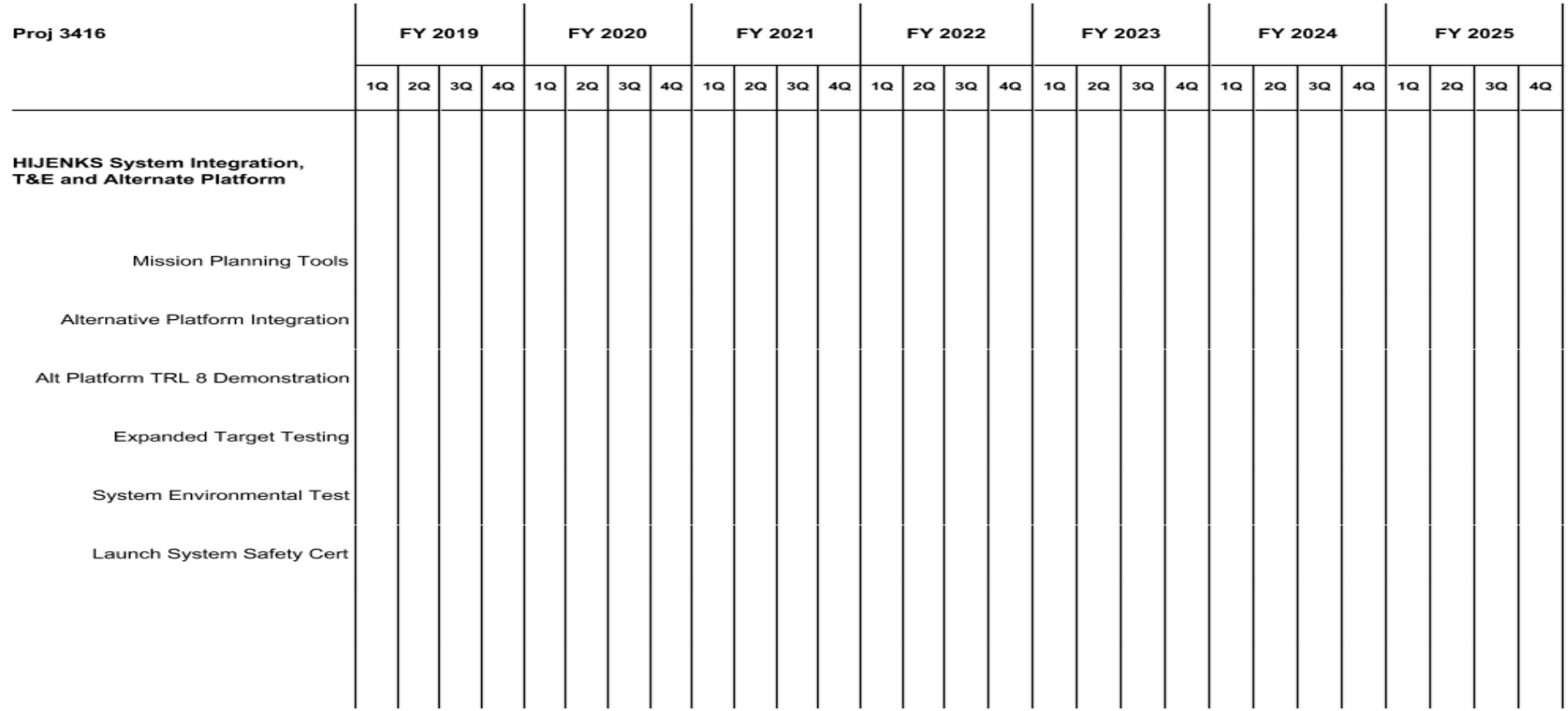


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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3416 / *HIJENKS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3416				
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	2023
HIJENKS System Integration, T&E and Alternate Platform: Launch System Safety Cert: Launch System Safety Cert	3	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3422: *SHARC Surface Platform*	2.301	6.754	5.731	14.741	-	14.741	3.814	0.000	0.000	0.000	0.000	33.341
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 in potential support of TASWO/TRAPS as well as broad area, clandestine implementation of capabilities that enhance Intelligence Preparation of the Battlefield (IPB) and strike missions. Successful payload integration and system demonstration will support high priority warfighting mission areas and future prototype operations. 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Sensor Hosting Autonomous Remote Craft (SHARC)	6.754	5.731	14.741	0.000	14.741
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.					
FY 2020 Plans: - Conduct system level test, evaluation, and analysis to assess performance on baseline program sensors, payloads and delivery systems against vetted Measures of Effectiveness (MOE). - Deliver 7 Systems and Assessment Reports from the baseline classified SHARC program to COCOM and PEOSUBS-PMS485 for potential transition of technology and consideration of lessons learned to support DSS Program of Record.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Continue requirements analysis and update component and subsystem specifications as required. Continue CONOPS development for execution of multiple prototype operations. - Integrate mature technologies developed in the areas of C2 and Information Assurance (IA), high data rate exchange, long-range multi-band and wideband links, software-defined modes, encryption, and signal processing modules. - Complete payload adaptation design for classified Intelligence Preparation of the Battlefield (IPB) mission. Conduct integration on SHARC, with functional lab and at-sea testing followed by mission equivalent demonstration. - Obtain six (6) SHARC platforms, payload systems, and associated subsystems for priority IPB Prototype Operations to meet COCOM ISR mission requirements. - Additional details are available at higher classification levels.					
FY 2021 Base Plans: FY 2021 Base Plans: - Complete development, integration and testing of twelve (12) SHARC platforms, payload systems, and associated subsystems for a total of sixteen (16) SHARC systems by the end of FY21. The full mission test requires a total of 20 SHARC systems to demonstrate the capability for priority IPB Prototype Operations to meet PACOM ISR mission requirements. Additional information is available at higher classification Levels. - Finalize C2, IA/Cybersecurity implementation for payload integration and IPB prototype mission execution and Complete CONOPS. - Conduct full up prototype mission testing, payload performance evaluation, analysis and assessment. - Incorporate engineering modifications based on system design, build, test, and analysis/assessment. - Execute government acceptance testing for all systems. - Develop design specifications and purchase support equipment to include storage and transport systems. - Complete design and build of the initial Rapid Deployment Systems (RDS). The RDS includes support equipment that will enable minimal manning for rapid deployment of the wave glider from multiple ships/vessels to meet mission requirements. - Full system integration, test and delivery of twenty prototype ready-for-issue systems to COCOM. - Design and build planned variants for baseline system to meet stakeholder CONOPS					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The increase from FY20 to FY21 is required to develop and integrate the remaining systems (total of 20) to meet PACOM mission requirements and is consistent with the overall program plan. An operationally relevant mission demonstration requires a total of 20 systems by the end of FY21 for final operational demonstration, assessment, and delivery for transition to a program of record (POR) in mid-FY22 as originally scheduled. Critical Program Execution and Full Mission Demonstration is being executed in FY21/22.					
Accomplishments/Planned Programs Subtotals	6.754	5.731	14.741	0.000	14.741

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

FY 2019: T&E Milestone: Developmental Test (DT) and assessment of initial payloads installed on SHARC platforms
FY 2020: T&E Milestone: DT and assessment of additional payloads installed on SHARC platforms
FY 2021: T&E Milestone: Build and validate readiness of integrated Prototype Operational units

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and CONOPS Development	MIPR	Naval Undersea Warfare Center (NUWC) : Keyport, WA	0.225	0.450	Oct 2018	0.600	Oct 2019	0.500	Oct 2020	-		0.500	0.000	1.775	-
System & Payload Design, Engineering, and Integration	MIPR	Space and Naval Warfare System Center Pacific (SSC : San Diego, CA	0.644	2.907	Oct 2018	1.919	Oct 2019	4.976	Oct 2020	-		4.976	0.000	10.446	-
Purchase COTS SHARC platforms	C/FFP	Space and Naval Warfare System Center Pacific (SSC : San Diego, CA	1.274	2.500	Dec 2018	1.772	Oct 2019	7.175	Dec 2020	-		7.175	0.000	12.721	-
		Subtotal	2.143	5.857		4.291		12.651		-		12.651	0.000	24.942	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation Phase	MIPR	PMS-485 Maritime Surveillance Systems, SSCPAC : San Diego, CA	0.158	0.245	Mar 2019	0.480	Mar 2020	1.110	Apr 2021	-		1.110	0.000	1.993	-
		Subtotal	0.158	0.245		0.480		1.110		-		1.110	0.000	1.993	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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	0.652	Oct 2018	0.960	Oct 2019	0.980	Oct 2020	-		0.980	0.000	2.592	-
		Subtotal	0.000	0.652		0.960		0.980		-		0.980	0.000	2.592	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.301	6.754		5.731		14.741		-		14.741	0.000	29.527	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3422 / *SHARC Surface Platform*

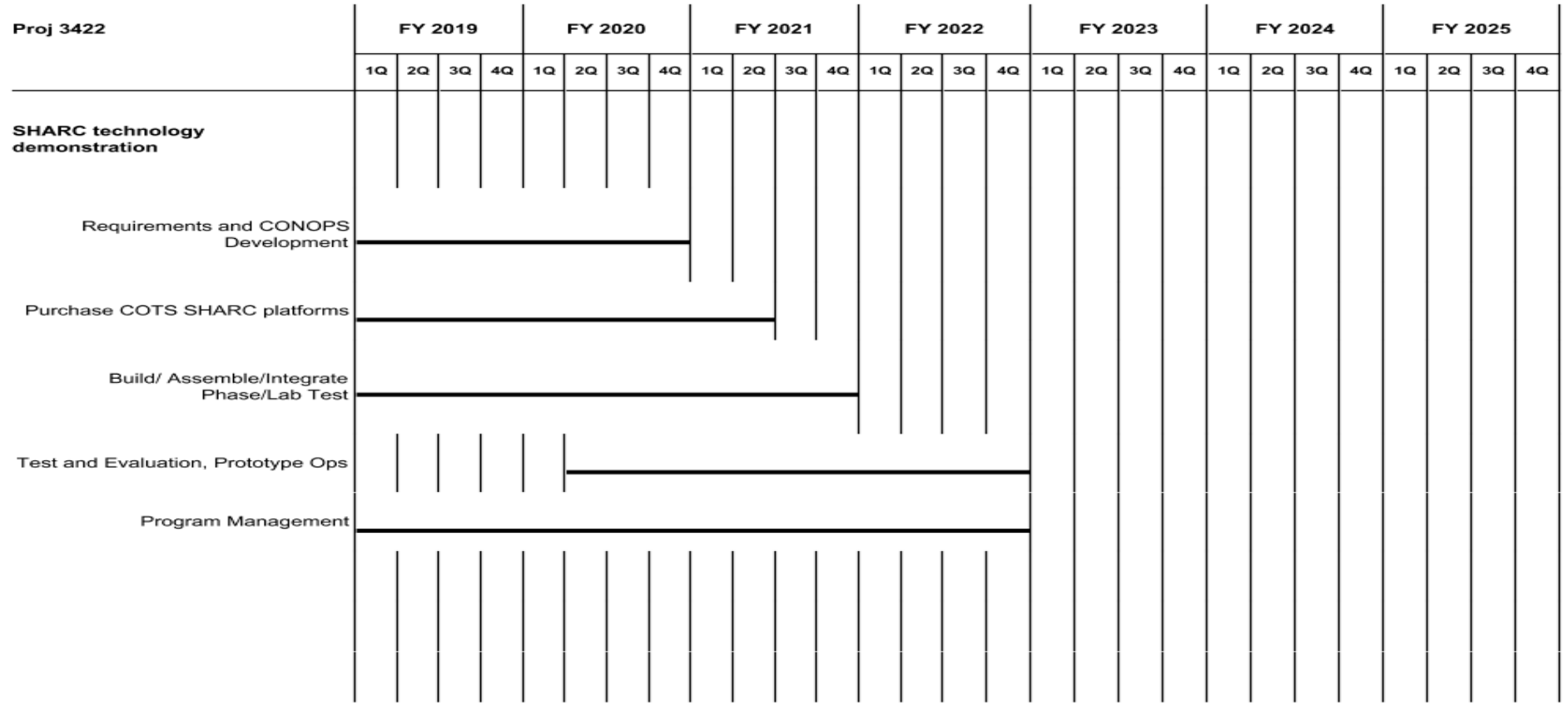

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3422 / *SHARC Surface Platform*

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	1	2019	4	2020
SHARC technology demonstration: Purchase COTS SHARC platforms: Purchase COTS SHARC platforms	1	2019	2	2021
SHARC technology demonstration: Build/ Assemble/Integrate Phase/Lab Test: Build/ Assemble/Integrate Phase/Lab Test	1	2019	4	2021
SHARC technology demonstration: Test and Evaluation, Prototype Ops: Test and Evaluation, Prototype Ops	2	2020	4	2022
SHARC technology demonstration: Program Management: Program Management	1	2019	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3423: *LOCUST*	0.013	1.879	2.960	3.561	-	3.561	6.425	5.949	0.000	0.000	0.000	20.787
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Low-Cost Uav Swarming Technology (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.

To achieve ability to operative in relevant environment with military applications, the LOCUST effort is ruggedizing the air platform to survive extended deployments in high shock and vibration environments while in the launchers as well as in-flight for adverse electromagnetic and weather conditions. Significant additional effort is being done to integrate the air platform, command and control, and launchers into and onto several different manned and unmanned host platforms for mission deployment. Scale-up considerations for manufacturing and supply-chain assurance/vulnerability are being pursued.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Low-Cost Uav Swarming Technology (LOCUST)	1.879	2.960	3.561	0.000	3.561
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 2020 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					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Many Vehicle/Many Salvo swarms, and provide unmanned system capability to degrade threat IADS in support of follow-on manned system operations ***FY 2021 Base Plans:*** In FY 2021, the LOCUST efforts will continue activities initiated in FY2020 and conduct an operational demonstration of one mission scenario involving operator in-the-loop autonomous strike missions against adversary threat systems that will be completed in 2QFY2021. Activities will initiate towards a second mission relevant scenario addressing counters to adversary defensive systems. Additional technology areas being addressed are improved mission planning to minimize/reduce operator workload and manned/unmanned operations. Hardware procurements to support increased flight testing and complexity of demonstration scenarios is also planned. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** No significant change					
Accomplishments/Planned Programs Subtotals	1.879	2.960	3.561	0.000	3.561

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTEN/0602792N/3423: *LOCUST*	0.000	0.000	22.046	-	22.046	5.553	0.000	0.000	0.000	0.000	27.599
• RDTEN/0603801N/3423: *LOCUST*	0.000	0.000	12.750	-	12.750	3.396	0.000	0.000	0.000	0.000	16.146

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*

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. Additionally, close coordination and involvement with acquisition community through these NWDC events and well as simulation exercises and the objective experiments and demonstrations is being done to shape requirements and budget submissions

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi-Rotor Platform Procur	MIPR	NRL : Wash, DC	0.013	0.000		0.000		0.000		-		0.000	0.000	0.013	-
Multi-Rotor Platform Payload	MIPR	MITRE : Mclean, VA	0.000	0.350	Dec 2018	0.000		0.000		-		0.000	0.000	0.350	-
Payload Procurement	C/CPFF	Raytheon : Tucson, AZ	0.000	0.704	Feb 2019	0.000		0.400	Nov 2020	-		0.400	0.000	1.104	-
Multi-Rotor Tests	MIPR	NSWC : Indian Head, MD	0.000	0.025	Feb 2019	0.000		0.000		-		0.000	0.000	0.025	-
Fixed-Wing Procurement	C/CPFF	Raytheon : Tuxson, AZ	0.000	0.800	Feb 2019	0.000		1.723	Nov 2020	-		1.723	0.000	2.523	-
Platform Specific Launcher Development	Various	Various : Various	0.000	0.000		1.290	Nov 2019	0.000		-		0.000	0.000	1.290	-
Command and Control Integration	Various	Various : Various	0.000	0.000		0.560	Nov 2019	0.000		-		0.000	0.000	0.560	-
Fixed Wing Tests	Various	Various : Various	0.000	0.000		0.950	Jun 2020	1.338	May 2021	-		1.338	0.000	2.288	-
		Subtotal	0.013	1.879		2.800		3.461		-		3.461	0.000	8.153	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management	TBD	Not Specified : Not Specified	0.000	0.000		0.160	Oct 2019	0.100	Oct 2020	-		0.100	0.000	0.260	-
		Subtotal	0.000	0.000		0.160		0.100		-		0.100	0.000	0.260	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.013	1.879		2.960		3.561		-		3.561	0.000	8.413	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*

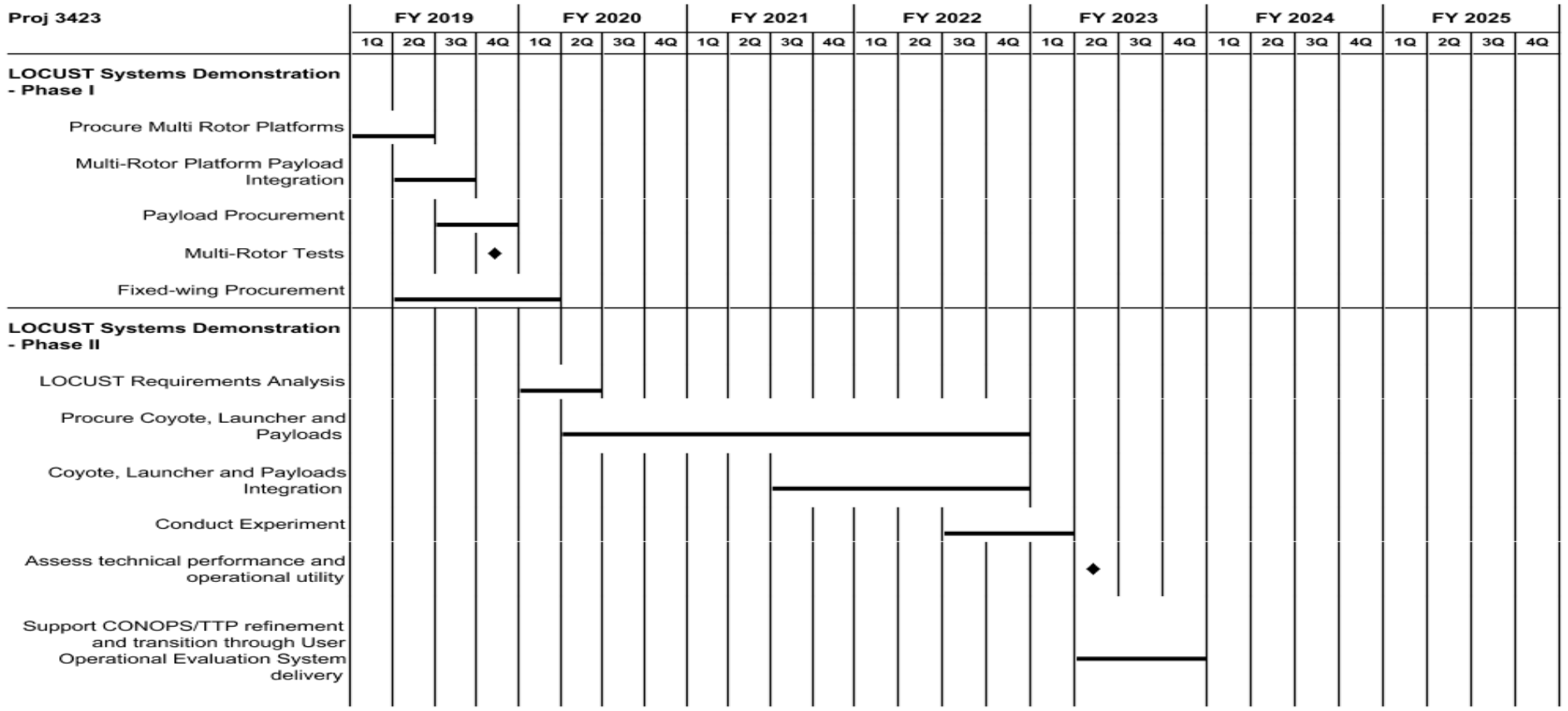

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3423 / *LOCUST*

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	2019	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	4	2022
LOCUST Systems Demonstration - Phase II: Coyote, Launcher and Payloads Integration: Coyote, Launcher and Payloads Integration	3	2021	4	2022
LOCUST Systems Demonstration - Phase II: Conduct Experiment: Conduct Experiment	3	2022	1	2023
LOCUST Systems Demonstration - Phase II: Assess technical performance and operational utility: Assess technical performance and operational utility	2	2023	2	2023
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	2	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3424: *Heterogeneous Collaborative Unmanned Systems (HCUS)*	0.012	0.962	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.974
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Heterogeneous Collaborative Unmanned Systems (HCUS)	0.962	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.962	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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)*

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HCUS System Development	MIPR	DLA : Alexandria, VA	0.000	0.416	Jan 2019	0.000		0.000		-		0.000	0.000	0.416	-
HCUS System Development	MIPR	Naval Surface Warfare Center DD : Panama City, FL	0.000	0.496	Dec 2018	0.000		0.000		-		0.000	0.000	0.496	-
HCUS System Development	MIPR	SPAWAR : San Diego, CA	0.000	0.050	Dec 2018	0.000		0.000		-		0.000	0.000	0.050	-
		Subtotal	0.000	0.962		0.000		0.000		-		0.000	0.000	0.962	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Management and Oversight	MIPR	NSWC : Dalhgren, VA	0.012	0.000		0.000		0.000		-		0.000	0.000	0.012	-
		Subtotal	0.012	0.000		0.000		0.000		-		0.000	0.000	0.012	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.012	0.962		0.000		0.000		-		0.000	0.000	0.974	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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)*

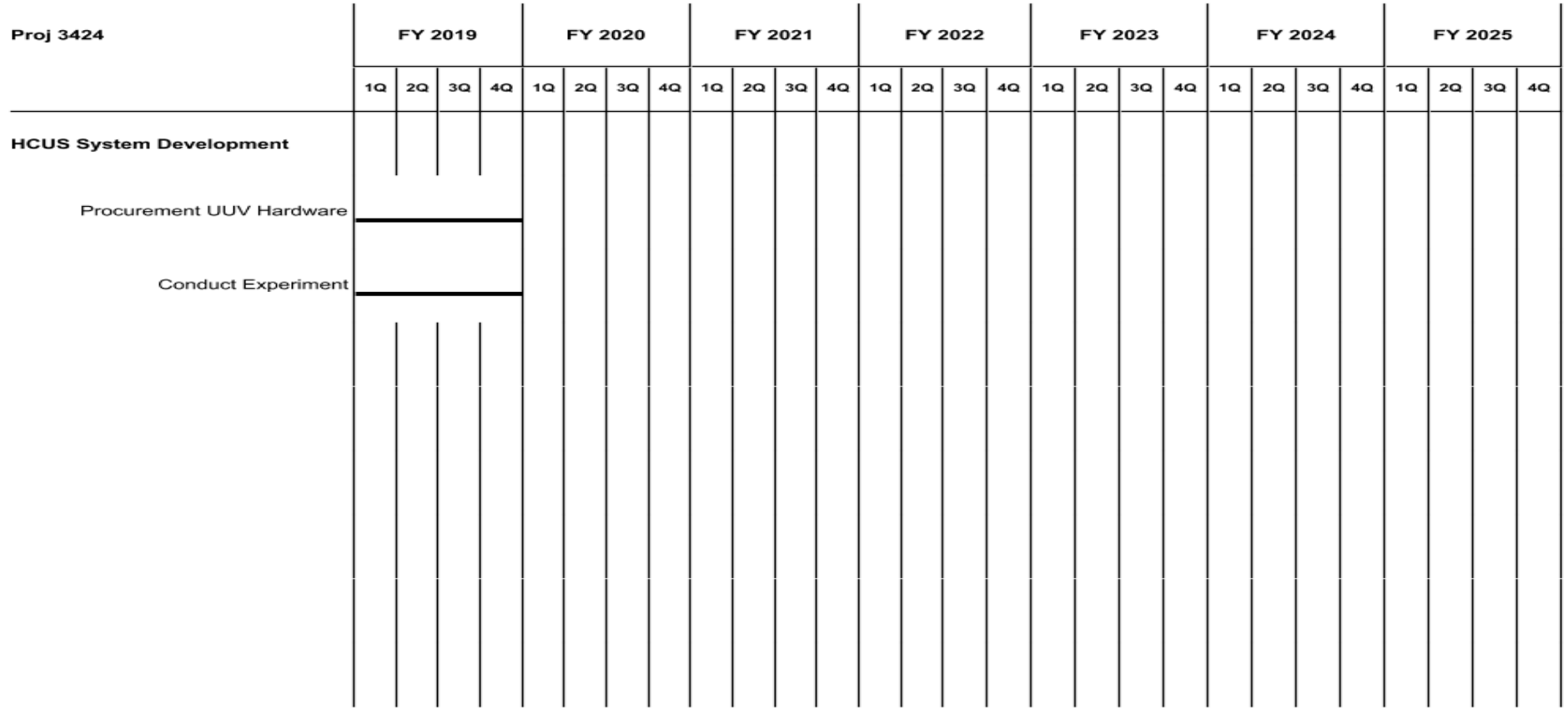

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3424 / *Heterogeneous Collaborative Unmanned Systems (HCUS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3424				
HCUS System Development: 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 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3437: *EMW/SEWIP/SSEE Accelerator*	0.000	14.389	23.630	21.508	-	21.508	1.250	0.822	0.000	0.000	0.000	61.599
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: EMW/SEWIP/SSEE Accelerator	14.389	23.630	21.508	0.000	21.508
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 2020 Plans: FY 2020 efforts will develop dual frequency airborn network arrays and networking waveform; test compatibility of					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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 2021 Base Plans:*** - Continue developing the directional networking waveform to include routing along with dynamic spectrum allocation. A frequency division overlay will be incorporated into the waveform which will allow greater node capacity and reduced latency. The addition of software-defined networking capabilities will enable distributed sensor data dissemination and interoperability with legacy platforms that use nonstandard networking protocols. -Acquire additional hardware for expanded at sea testing aboard deployed surface platforms and continue the development of airborne systems. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY20 to FY21 is the result of a FY21 funding realignment for navy priorities.					
Accomplishments/Planned Programs Subtotals	14.389	23.630	21.508	0.000	21.508

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-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype Development	MIPR	NSWC : various	0.000	6.056	Oct 2018	12.910	Oct 2019	11.763	Oct 2020	-		11.763	0.000	30.729	-
Prototype Development	PO	NAWC : various	0.000	3.333	Oct 2018	6.747	Oct 2019	6.145	Oct 2020	-		6.145	0.000	16.225	-
Prototype Development	MIPR	SUPSHIP : Bath Maine	0.000	2.000	Oct 2018	1.987	Oct 2019	1.800	Oct 2020	-		1.800	0.000	5.787	-
Prototype Development	MIPR	NRL : Washington, DC	0.000	3.000	Oct 2018	1.986	Oct 2019	1.800	Oct 2020	-		1.800	0.000	6.786	-
Prototype Development	Various	TBD : TBD	0.000	0.000	Sep 2020	0.000		0.000		-		0.000	0.000	0.000	-
		Subtotal	0.000	14.389		23.630		21.508		-		21.508	0.000	59.527	N/A

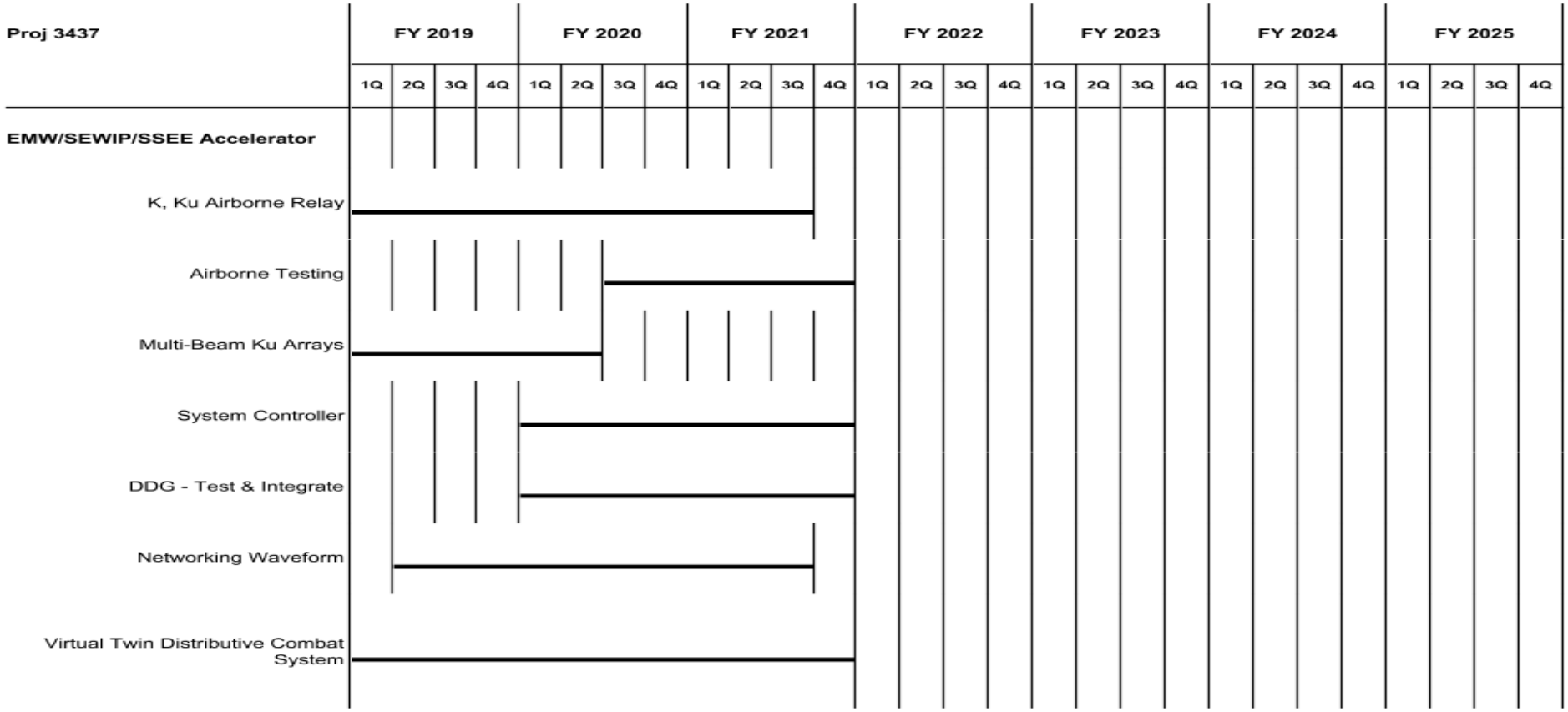
Remarks

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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	14.389		23.630		21.508		-		21.508	0.000	59.527	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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*



2021PB - 0603382N - 3437

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
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 2021 Navy											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
3438: *Innovative Naval Prototype (INP) Transition (6.4)*	0.000	12.947	19.907	2.219	-	2.219	4.996	5.085	34.716	35.413	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 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 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 2020 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 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Project ended in FY20	5.291 -	5.315 -	0.000 -	0.000 -	0.000 -
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) 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	5.656 -	5.815 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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 2020 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 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 is a result of the project ending in 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 2020 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 2021 Base Plans:***	2.000 -	3.967 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Project ending in FY 2020					
Title: HIJENKS Operational Acceleration ***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 2020 The first phase of the prototype will focus on initiating platform integration activities for software, mission planning and environmental hardening and alternate platform analysis ***FY 2020 Plans:*** HIJENKS System Integration, T&E and Alternate Platform Phase 1 FY 2020 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 2021 Base Plans:***	0.000 -	4.810 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** In FY2021, PE 0603382N Advanced Combat System Tech, funding moves from PU 3438 Innovative Naval Prototype (INP) Transition (6.4)to new PU 3416 HIJENKS.					
Title: Advanced Long Range Targeting (ALRT) ***Articles:*** ***Description:*** This is a new effort beginning in FY 2021 that transitioned out of 6.3 FNC into 6.4 INP. This effort will remain in INP transition for a period of one year for integration experimentation and demonstration of an Advanced Long Range Targeting (ALRT) capability. This capability will utilize a family of systems that will dramatically increase the range at which the U.S. Navy can provide targeting solutions and hold targets at risk. It will cross multiple platforms, sensors and warfare domains and leverage technology developments from a broad set of Future Naval Capability (FNC) and Innovative Prototype (INP) investments. It will perform integration, experimentation and demonstration of sensors, communications and battle management command and control (BMC2) technologies to enable integrated and distributed forces that are capable of dynamic synchronized actions ***FY 2020 Plans:*** N/A ***FY 2021 Base Plans:*** Efforts will focus on planning for the integration, experimentation and demonstration activities including obtaining the needed certifications and technology. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is a result of the Advanced Long Range Targeting (ALRT) efforts starting in FY21.	0.000 -	0.000 -	2.219 -	0.000 -	2.219 -
Accomplishments/Planned Programs Subtotals	12.947	19.907	2.219	0.000	2.219

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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)*

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 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced ASW sensor payload	MIPR	NUWC : Newport, Rhode Island	0.000	1.200	Oct 2018	1.340	Oct 2019	0.000		-		0.000	0.000	2.540	-
Advanced ASW sensor payload	MIPR	JHU-APL : Columbia, Maryland	0.000	2.100	Oct 2018	1.340	Oct 2019	0.000		-		0.000	0.000	3.440	-
Advanced ASW sensor payload	MIPR	SSC-PAC : San Diego, California	0.000	0.890	Oct 2018	1.302	Oct 2019	0.000		-		0.000	0.000	2.192	-
Advanced ASW sensor payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	1.157	Oct 2018	1.333	Oct 2019	0.000		-		0.000	0.000	2.490	-
Advanced ASW kinetic payload	MIPR	PSU -ARL : State College, Pennsylvania	0.000	4.000	Oct 2018	3.889	Oct 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	SSC-PAC : San Diego, California	0.000	1.400	Oct 2018	1.026	Oct 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.312	Oct 2018	0.900	Oct 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Advanced aerial lift payload	MIPR	NSWC-CD : Bethesda, Maryland	0.000	0.200	Oct 2018	1.336	Oct 2019	0.000		-		0.000	0.000	1.536	-
Advanced aerial lift payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000	Oct 2018	1.335	Oct 2019	0.000		-		0.000	0.000	1.335	-
Advanced aerial lift payload	MIPR	SSC-PAC : San Diego, California	0.000	1.688	Oct 2018	1.296	Oct 2019	0.000		-		0.000	0.000	2.984	-
HIJENKS Mission Planning Software Development	WR	NAVAIR : Patuxent River, Md	0.000	0.000		0.330	Jan 2020	0.000		-		0.000	Continuing	Continuing	Continuing
HIJENKS Launch System Software/Hardware Integration	WR	NAVAIR : Patuxent River, Md	0.000	0.000		0.500	Nov 2019	0.000		-		0.000	0.000	0.500	-
HIJENKS System Requirements and CONEMPS	WR	NAVAIR : Patuxent River, Md	0.000	0.000		0.250	Oct 2019	0.000		-		0.000	0.000	0.250	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HIJENKS Airborne Launch Study	C/CPFF	Platform Prime : TBD	0.000	0.000		0.500	Apr 2020	0.000		-		0.000	0.000	0.500	-
HIJENKS Mission Analysis	FFRDC	JH APL : Laurel, MD	0.000	0.000		0.303	Oct 2019	0.000		-		0.000	0.000	0.303	-
HIJENKS T&E Launcher	C/CPFF	Platform Prime : TBD	0.000	0.000		0.300	Apr 2020	0.000		-		0.000	0.000	0.300	-
HIJENKS Safe and Arm Design	C/FFP	Platform Prime : TBD	0.000	0.000		0.500	Jan 2020	0.000		-		0.000	0.000	0.500	-
HIJENKS Environmentally Hardened Payload Activities	C/UCA	DOTC - Multiple Awards : Various	0.000	0.000		0.500	Mar 2020	0.000		-		0.000	0.000	0.500	-
HIJENKS Target Procurement and Testing	WR	NRL : Washington, DC	0.000	0.000		0.500	Oct 2019	0.000		-		0.000	0.000	0.500	-
HIJENKS Hard Tube Capability	C/CPFF	Multiple Awards - Various : TDB	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
HIJENKS T&E Platform Payload Source Devlopment	C/UCA	DOTC - Multiple Awards : Various	0.000	0.000		0.927	Nov 2019	0.000		-		0.000	0.000	0.927	-
HIJENKS T&E Platform-Payload Source Development	C/BPA	Lockheed Martin, : Grand Prairie, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
HIJENKS Program Support	WR	NSWCDD and NAWCWD : Dahlgren, VA	0.000	0.000		0.200	Oct 2019	0.000		-		0.000	0.000	0.200	-
HIJENKS T&E Platform-Payload Source Development	C/BPA	General Atomics : San Diego, CA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
HIJENKS T&E Platform-Payload Source Development	WR	Raytheon, Albuquerque, NM : Albuquerque, NM	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
NSWCDD Government Pulsed Power GFE Hardware	WR	NSWCDD Dahlgren, VA : Dahlgren, VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
ALRT BMC2 Integration	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.924	Oct 2020	-		0.924	0.000	0.924	-
ALRT Program Support	WR	TBD : TBD	0.000	0.000		0.000		0.700	Oct 2020	-		0.700	0.000	0.700	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ALRT Sensor IntegrationALRT Sensor Integration	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.595	Oct 2020	-		0.595	0.000	0.595	-
		Subtotal	0.000	12.947		19.907		2.219		-		2.219	Continuing	Continuing	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	12.947		19.907		2.219		-		2.219	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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)*

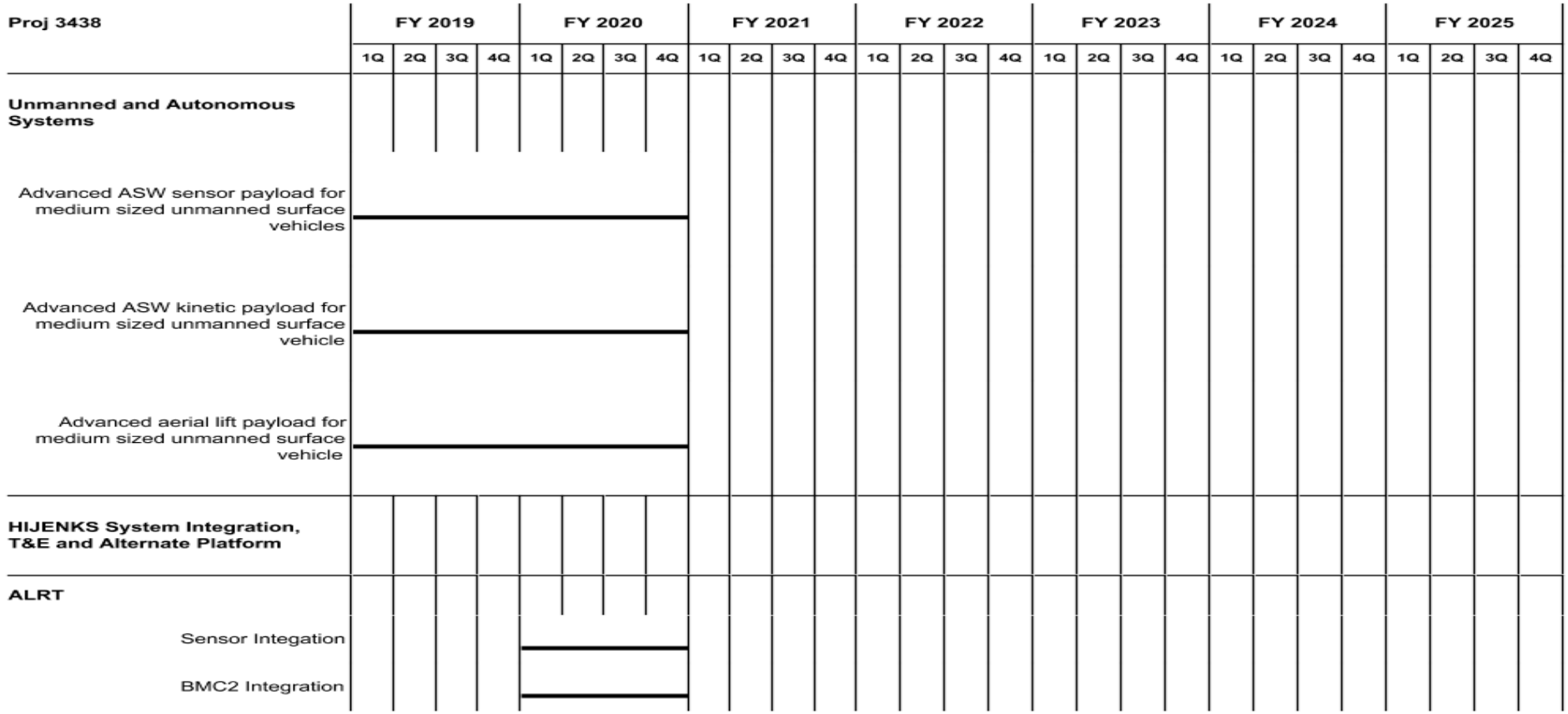


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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603382N / *Advanced Combat Systems Tech*	**Project (Number/Name)** 3438 / *Innovative Naval Prototype (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	2020
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	2020
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
ALRT: Sensor Integation: Sensor Integration	1	2020	4	2020
ALRT: BMC2 Integration: BMC2 Integration	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy												Date: February 2020
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / *Advanced Combat Systems Tech*				Project (Number/Name) 3443 / *Advanced Long Range Targeting (ALRT)*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
3443: *Advanced Long Range Targeting (ALRT)*	0.000	0.000	0.000	0.000	-	0.000	7.940	9.051	14.989	15.289	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This capability will utilize a family of systems that will dramatically increase the range at which the U.S. Navy can provide targeting solutions and hold targets at risk. It will cross multiple platforms, sensors and warfare domains and leverage technology developments from a broad set of Future Naval Capability (FNC) and Innovative Prototype (INP) investments. It will perform integration, experimentation and demonstration of sensors, communications and battle management command and control (BMC2) technologies to enable integrated and distributed forces that are capable of dynamic synchronized actions. Activity in this phase will focus on prototyping, integration, experimentation and demonstration activities to transition this capability to the U.S. Navy.