Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy											Date: May 2021	
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 0604028N *I Small/Medium Unmanned Undersea Vehicles*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	173.752	45.467	38.968	84.676	-	84.676	-	-	-	-	-	-
2482: *Small Unmanned Undersea Vehicles*	0.000	0.000	4.577	15.881	-	15.881	-	-	-	-	-	-
2483: *Medusa*	0.000	0.000	0.000	1.877	-	1.877	-	-	-	-	-	-
3123: *SMCM UUV*	16.062	21.855	20.564	20.909	-	20.909	-	-	-	-	-	-
3785: *Razorback*	0.000	9.397	13.827	33.922	-	33.922	-	-	-	-	-	-
4023: *Expeditionary Underwater Systems*	157.690	0.000	0.000	12.087	-	12.087	-	-	-	-	-	-
9999: *Congressional Adds*	0.000	14.215	0.000	0.000	-	0.000	-	-	-	-	-	-

Note

Razorback FY19 and prior funding in PE 0604218N. Project 3785 Razorback realigned from PE 0604218N starting in FY 2020. SAFECAP realigned from PE 0603561N Project 2033 to PE 0604028N Project 3785 beginning in FY20.
LIONFISH (SUUV) programs realigned from PE 0603654N to PE 0604028N Project 2482 beginning in FY21. Project 4023 Expeditionary Underwater Systems is relocated from PE 0603654N to PE 0604028N beginning in FY22.

A. Mission Description and Budget Item Justification

LIONFISH (SUUV) and VIPERFISH (Medium MEMUUV) Unmanned Undersea Vehicles (UUVs) are a segment of the Navy's Family of UUVs defined as having a diameter between 3 inches and 10 inches for LIONFISH UUVs and a diameter of 10 inches to 21 inches for VIPERFISH UUVs. The UUVs can be launched by submarines, surface ships, or larger UUVs, and can be recovered by surface ships and submarines. This class of UUVs can have one or more types of sensors to perform multiple missions including Intelligence Preparation of the Operational Environment (IPOE), battlespace awareness, and mine warfare. Due to the unique features, sizes, weights, and sensor/payload capabilities for these UUV classes, a combination of both the LIONFISH and VIPERFISH UUVs will be used to meet the Navy's mission needs.

LIONFISH UUV Program - This Small Class Unmanned Undersea Vehicle program will field a light-weight, highly portable and mission configurable UUV for use by the Navy Explosive Ordnance Disposal (EOD), Naval Special Warfare (NSW), the Naval Oceanographic Community (NMOC), and United States Marine Corps operators. The program will deliver a baseline UUV capability and implement an incremental development approach, including phases for prototyping, integration, demonstration and fielding of Small Diameter UUVs to integrate with mission packages from each community.

Surface Mine Countermeasures Unmanned Undersea Vehicle (SMCM UUV) - The Knifefish program develops advanced medium class UUVs to support clandestine mine detection capability against volume, bottom, and buried mines. Equipment includes vehicles and associated systems support equipment. In parallel, Block Upgrade

design efforts aligned to Fleet needs are ongoing to support insertion of incremental capability when the technology is ready. Planned Block Upgrade candidates being considered include increased detection range capability, communications upgrades, on-board sonar processing and target recognition, command and control improvements, increased operational depth, and other smaller tasks, as well as future payloads as required.

Littoral Battlespace Sensing - Autonomous Undersea Vehicle Submarine Variant (LBS-AUV(S)), also known as Razorback, is a medium class UUV capable of persistent, autonomous, ocean sensing and data collection in support of Navy Intelligence Preparation of the Operational Environment (IPOE) missions. Razorback is deployed from host submarines in two variants: from the Dry Deck Shelter (DDS) or from the torpedo tube. The DDS deployed Razorback variant has been procured beginning in FY2017 with Fleet operational deployments beginning in FY2021. Development of requirements and submarine integration efforts commenced in FY2019 for the Torpedo Tube Launch and Recover (TTL&R) variant, which will be competitively sourced to industry by FY2022.

In order to deploy Razorback, or other small or medium class UUVs from a host submarine platform with sufficient endurance to perform a desired mission, high energy density sources such as lithium ion batteries are used. Consequently, safety is paramount and mitigation systems must be in place to prevent or stop a high energy casualty event. SAFECAP is being developed as an active mitigation strategy that includes a shock qualified capsule that aides in the launch and recovery of small and medium sized vehicles through the torpedo tube. It also contains a Battery Casualty Detection System that constantly monitors battery health and status, providing early warning signs of a battery short via an alarm. In the event of a casualty, the capsule and vehicle portion of SAFECAP are flooded via the fire hose connections and the event is extinguished.

MEDUSA is a medium class UUV capable of offensive mining capabilities deployed from a submarine. It may potentially carry other advanced payloads in the future to meet additional mission needs. MEDUSA features torpedo tube launch capability, long range, high payload placement accuracy, and can handle heavy payloads. A prototype system will be demonstrated in FY2021 using dummy payloads via an in-water launch from a host submarine. Lessons learned from the prototype and demonstration will inform a program start in FY2022 competitive award to Industry in FY2023 to develop and produce tactical systems. The MEDUSA prototype and Industry system differ from the Razorback Torpedo Tube Launch and Recovery (TTL&R) variant. MEDUSA is approximately 21 inches in diameter, impulse launched from the torpedo tube, and expendable once the payloads are deployed. Razorback TTL&R is expected to be less than 15 inches in diameter, swim out and launch and recover from the torpedo tube, and be capable of swappable payloads to conduct a variety of missions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
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 0604028N *I Small/Medium Unmanned Undersea Vehicles*

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	47.261	53.942	51.503	-	51.503
Current President's Budget	45.467	38.968	84.676	-	84.676
Total Adjustments	-1.794	-14.974	33.173	-	33.173
• Congressional General Reductions	-	-0.240			
• Congressional Directed Reductions	-	-14.734			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.794	0.000			
• Program Adjustments	0.000	0.000	33.640	-	33.640
• Rate/Misc Adjustments	0.000	0.000	-0.467	-	-0.467

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 9999: *Congressional Adds*		
Congressional Add: *MCM UUV UON*	14.215	0.000
Congressional Add Subtotals for Project: 9999	14.215	0.000
Congressional Add Totals for all Projects	14.215	0.000

Change Summary Explanation

Program Changes:
FY 2020: -$1,794K Small Business Innovation Research (SBIR); +$1K Miscellaneous increase
FY 2021: -$14,734K Congressional Directed Reductions; -$240K General Reductions
FY 2022: +$8,508K Payload Handling System Increase; +$12,097K Small Medium UUV Development; +$13,035K Knifefish Procurement Adjustment; -$467K Miscellaneous Rate Adjustments
Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 2482 / *Small Unmanned Undersea Vehicles*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2482: *Small Unmanned Undersea Vehicles*	0.000	0.000	4.577	15.881	-	15.881	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

As part of the Expeditionary UUV Family of Systems (FoS) the LIONFISH UUV Program of Record develops advanced SUUVs to support myriad missions across warfare domains. The missions include: expeditionary mine countermeasures, expeditionary data collection and surveillance, and intelligence preparation of the environment (IPOE). Equipment includes vehicles and associated systems support equipment. Planned block upgrades include increased detection range capability, communications upgrades, automated target recognition, cybersecurity, autonomy and command and control improvements, additional launch and recovery abilities, increased operational depth, and payloads as required.

Increase of $11.304M from FY 2021 to FY 2022 supports the increased development, test and evaluation, and implementation of cybersecurity solutions to comply with current cyber requirements. Additional LIONFISH (SUUV) test assets will be acquired via pre-production LIONFISH (SUUV) OTA agreements, resulting in increased development, test and evaluation, and integration of forward looking sonar and synthetic aperture sonar onto the test systems. Efforts in FY22 will enable LIONFISH (SUUV) production contract award in FY23.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: LIONFISH (SUUV)	0.000	4.577	15.881	0.000	15.881
Articles:	-	-	-	-	-
FY 2021 Plans: Prior to FY21, funding for this program was in PE 0603654N, Project 4023. FY20 funding formally initiated the LIONFISH (SUUV) Program of Record (PoR). FY21 efforts will include continued test and evaluation of LIONFISH (SUUV) prototypes from two vendors that were delivered through Defense Innovation Unit prototype OTAs awarded in FY20. Initiate development of autonomy, Automatic Target Recognition (ATR), and cybersecurity efforts.					
FY 2022 Base Plans: FY22 efforts will include delivery of LIONFISH (SUUV) test articles. These systems will support the continued integration of key capabilities and the ongoing development of cybersecurity solutions for both vendors' prototypes. Forward looking sonar and synthetic aperture sonar development, integration, and testing are planned to begin in FY22. Development efforts for autonomy and ATR will increase in FY22 and will bring the systems vehicles into compliance with Unmanned Maritime Autonomy Architecture (UMAA). FY22 efforts will					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2482 / *Small Unmanned Undersea Vehicles*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
also include critical test and evaluation to demonstrate operational effectiveness and suitability against CNO-approved Top Level Requirements (TLRs). ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $11.304M from FY 2021 to FY 2022 supports the increased development, test and evaluation, and implementation of cybersecurity solutions to comply with current cyber requirements. Additional LIONFISH (SUUV) test assets will be acquired via pre-production LIONFISH (SUUV) OTA agreements, resulting in increased development, test and evaluation, and integration of forward looking sonar and synthetic aperture sonar onto the test systems. Efforts in FY22 will enable LIONFISH (SUUV) production contract award in FY23.					
Accomplishments/Planned Programs Subtotals	0.000	4.577	15.881	0.000	15.881

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The LIONFISH (SUUV) Program is planned to be implemented and executed as a Middle Tier Acquisition Program in accordance with (IAW) Middle Tier Acquisition and Agility Interim Guidance approved by the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN RDA) on 24 April 2018 and the most recent update provided on 19 January 2019. Industry solicitations have been released based on market research and technology investment efforts. Prototype OTAs were competitively awarded through DIU as a result of this market research. System development efforts are ongoing while test and evaluation validate approved requirements demonstrating operational effectiveness and suitability. Production contract as a result of the prototype OTA efforts is planned to award.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 2482 / *Small Unmanned Undersea Vehicles*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPFF	TBD : TBD	0.000	0.000		1.925	Nov 2020	6.693	Nov 2021	-		6.693	-	-	-
Systems Engineering	C/CPFF	NSWC, Activities : Various	0.000	0.000		0.490	Nov 2020	1.510	Nov 2021	-		1.510	-	-	-
		Subtotal	0.000	0.000		2.415		8.203		-		8.203	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	Various : TBD	0.000	0.000		0.144	Nov 2020	0.388	Nov 2021	-		0.388	-	-	-
		Subtotal	0.000	0.000		0.144		0.388		-		0.388	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NIWC : San Diego	0.000	0.000		1.115	Nov 2020	4.521	Nov 2021	-		4.521	-	-	-
Developmental Test & Evaluation	WR	NUWC : Newport	0.000	0.000		0.787	Nov 2020	2.374	Nov 2021	-		2.374	-	-	-
		Subtotal	0.000	0.000		1.902		6.895		-		6.895	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWCIHEODTD : Indian Head, MD	0.000	0.000		0.116	Nov 2020	0.395	Nov 2021	-		0.395	-	-	-
		Subtotal	0.000	0.000		0.116		0.395		-		0.395	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 2482 / *Small Unmanned Undersea Vehicles*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		4.577		15.881		-		15.881	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2482 / *Small Unmanned Undersea Vehicles*

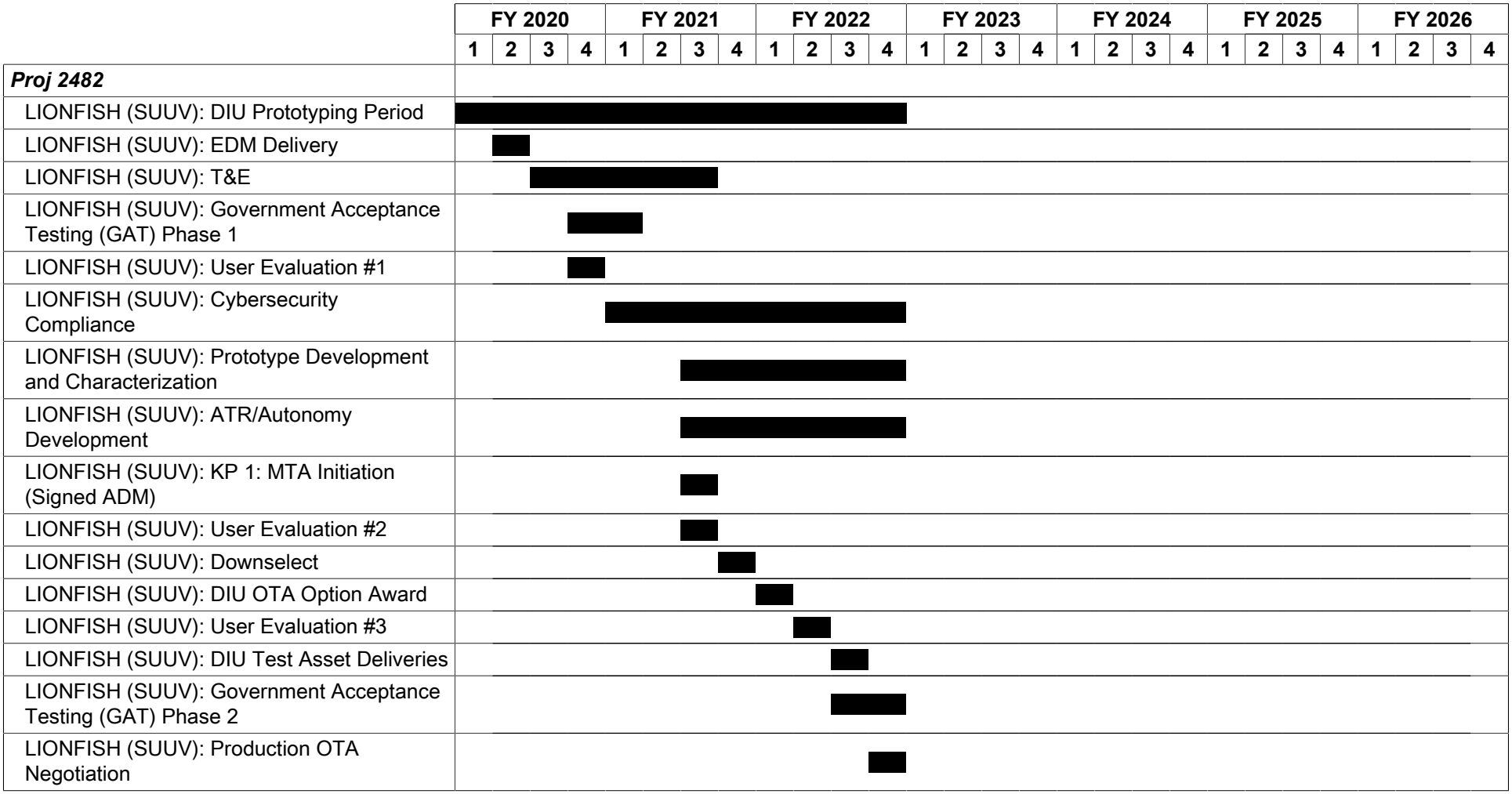

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2482 / *Small Unmanned Undersea Vehicles*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2482				
LIONFISH (SUUV): DIU Prototyping Period	1	2020	4	2022
LIONFISH (SUUV): EDM Delivery	2	2020	2	2020
LIONFISH (SUUV): T&E	3	2020	3	2021
LIONFISH (SUUV): Government Acceptance Testing (GAT) Phase 1	4	2020	1	2021
LIONFISH (SUUV): User Evaluation #1	4	2020	4	2020
LIONFISH (SUUV): Cybersecurity Compliance	1	2021	4	2022
LIONFISH (SUUV): Prototype Development and Characterization	3	2021	4	2022
LIONFISH (SUUV): ATR/Autonomy Development	3	2021	4	2022
LIONFISH (SUUV): KP 1: MTA Initiation (Signed ADM)	3	2021	3	2021
LIONFISH (SUUV): User Evaluation #2	3	2021	3	2021
LIONFISH (SUUV): Downselect	4	2021	4	2021
LIONFISH (SUUV): DIU OTA Option Award	1	2022	1	2022
LIONFISH (SUUV): User Evaluation #3	2	2022	2	2022
LIONFISH (SUUV): DIU Test Asset Deliveries	3	2022	3	2022
LIONFISH (SUUV): Government Acceptance Testing (GAT) Phase 2	3	2022	4	2022
LIONFISH (SUUV): Production OTA Negotiation	4	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 2483 / *Medusa*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2483: *Medusa*	0.000	0.000	0.000	1.877	-	1.877	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

MEDUSA is a medium class UUV capable of offensive mining capabilities deployed from a submarine. It may potentially carry other advanced payloads in the future to meet additional mission needs. MEDUSA features torpedo tube launch capability, long range, high payload placement accuracy, and can handle heavy payloads. A prototype system will be demonstrated in FY2021 using dummy payloads via an in-water launch from a host submarine. Lessons learned from the prototype and demonstration will inform a program start in FY2022 and competitive award to Industry in FY2023 to develop and produce tactical systems. The MEDUSA prototype and Industry system differ from the Razorback Torpedo Tube Launch and Recovery (TTL&R) variant. MEDUSA is approximately 21 inches in diameter, impulse launched from the torpedo tube, and expendable once the payloads are deployed. Razorback TTL&R is expected to be less than 15 inches in diameter, swim out and launch and recover from the torpedo tube, and be capable of swappable payloads to conduct a variety of missions.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: MEDUSA Product Development	0.000	0.000	1.417	0.000	1.417
Articles:	-	-	-	-	-
FY 2021 Plans: N/A					
FY 2022 Base Plans: Incorporate technical lessons learned from previous demonstrations into Program of Record documentation. Develop Top Level Requirements (TLR). Prepare Request for Proposal (RFP) for release to Industry.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: MEDUSA is a new start in FY2022.					
Title: MEDUSA Support	0.000	0.000	0.250	0.000	0.250
Articles:	-	-	-	-	-
FY 2021 Plans: N/A					
FY 2022 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Provide acquisition and engineering support for contract management activities and submarine integration efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** MEDUSA is a new start in FY2022.					
Title: MEDUSA Management Services ***Articles:*** ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** MEDUSA is a new start in FY2022.	0.000 -	0.000 -	0.210 -	0.000 -	0.210 -
Accomplishments/Planned Programs Subtotals	0.000	0.000	1.877	0.000	1.877

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

In FY2017, development of a single MEDUSA prototype system was initiated using Navy RDT&E funding to execute a demonstration from a host submarine as a proof of concept. The prototype MEDUSA system will be demonstrated in FY2021 using dummy payloads via an in-water launch from a host submarine. Lessons learned from the prototype and demonstration will inform a UUV program start in FY2022. Detailed acquisition planning and requirements generation will commence in FY2022, with the target to competitively award a contract to Industry in FY2023 for the development and production of tactical systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 2483 / *Medusa*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Product Development	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		1.047	Nov 2021	-		1.047	-	-	-
MEDUSA Product Development	WR	Various : Various	0.000	0.000		0.000		0.370	Nov 2021	-		0.370	-	-	-
		Subtotal	0.000	0.000		0.000		1.417		-		1.417	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Engineering Support	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		0.250	Nov 2021	-		0.250	-	-	-
		Subtotal	0.000	0.000		0.000		0.250		-		0.250	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Travel	Various	NAVSEA : Washington, DC	0.000	0.000		0.000		0.010	Nov 2021	-		0.010	-	-	-
MEDUSA Management	Various	Various : Various	0.000	0.000		0.000		0.200	Nov 2021	-		0.200	-	-	-
		Subtotal	0.000	0.000		0.000		0.210		-		0.210	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		1.877		-		1.877	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*

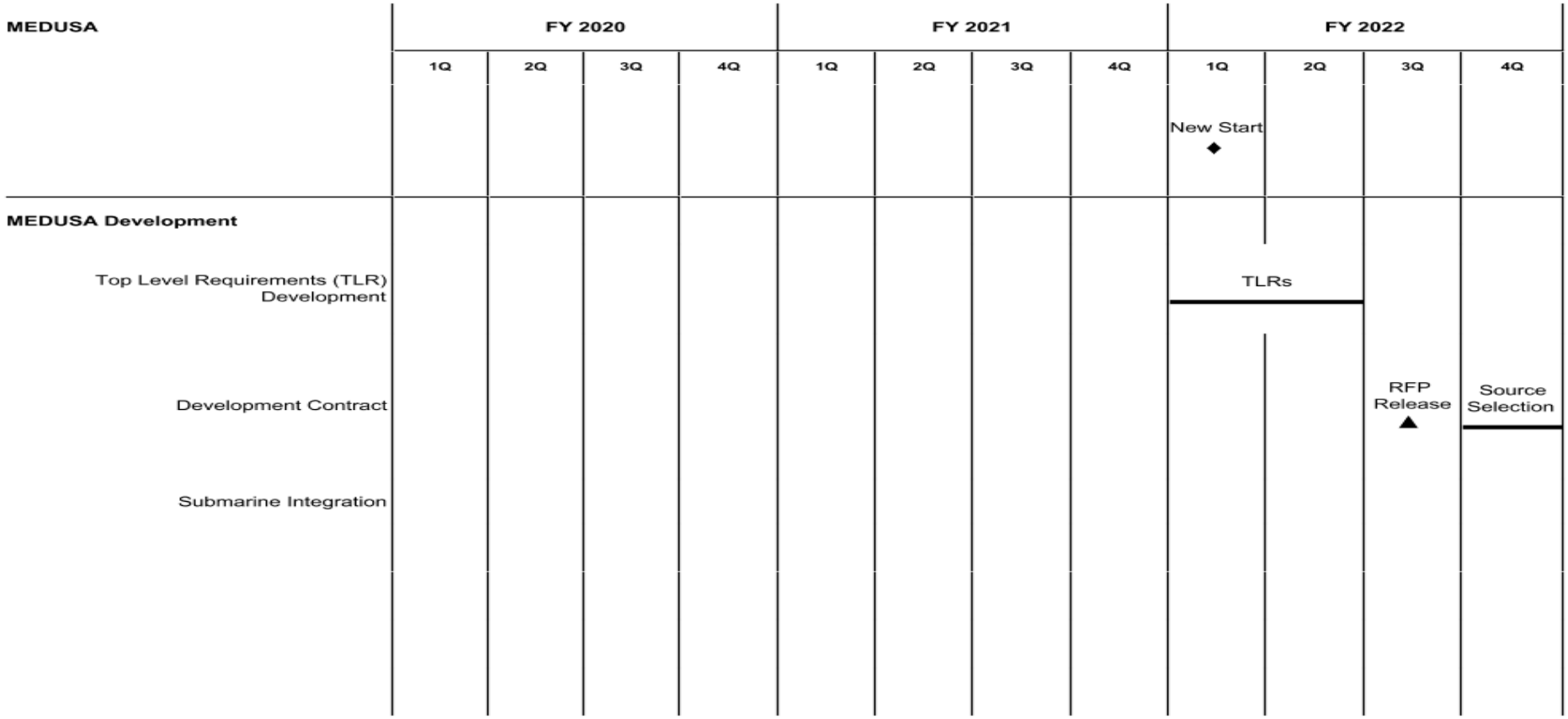

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MEDUSA				
Schedule Detail	1	2022	1	2022
MEDUSA Development: Top Level Requirements (TLR) Development: Schedule Detail	1	2022	2	2022
MEDUSA Development: Development Contract: RFP	3	2022	3	2022
MEDUSA Development: Development Contract: Source Selection	4	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 3123 / *SMCM UUV*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3123: *SMCM UUV*	16.062	21.855	20.564	20.909	-	20.909	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

As part of the UUV Family of Systems (FoS) and in support of the Mine Countermeasures (MCM) Mission Package (MP), the Knifefish Surface Mine Countermeasures Unmanned Undersea Vehicle (SMCM UUV) program develops advanced medium class UUVs to support clandestine mine detection capability against volume, bottom, and buried mines. Equipment includes vehicles and associated systems support equipment. The program has achieved Milestone C and entered into Low-Rate Initial Production (LRIP). Currently Block Upgrade design efforts aligned to Fleet needs are ongoing to support insertion of incremental capability when the technology is ready. Planned Block Upgrade candidates being considered include increased detection range capability, communications upgrades, on-board sonar processing and target recognition, command and control improvements, increased operational depth, and other smaller tasks, as well as potential future payloads as required.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Knifefish Development	16.929	14.098	15.727	0.000	15.727
Articles:	-	-	-	-	-
FY 2021 Plans: Continued development of Block 1 capabilities for Retrofit onto five LRIP Knifefish systems. Awarded competitive production contract for LRIP and Full Rate Production (FRP) systems. Conducted testing of LRIP systems in the Block 0 configuration. Commenced MCM Mission Package (MP) testing. Verify MCM MP command and control interoperability. Continue integration of Knifefish on the LCS Freedom variant. ***FY 2022 Base Plans:*** Complete development of Block 1. Integrate PMS updates for expanded operational environments. Complete MCM MP Independence variant IOT&E. Continue integration of Knifefish with LCS Freedom variant. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase required to support continued Block 1 development efforts.					
Title: Knifefish Support	3.165	4.212	2.805	0.000	2.805
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2021 Plans: Provide engineering support for beginning Block 1 upgrade development, competitive contract evaluation and award, LCS integration in support of LRIP testing. ***FY 2022 Base Plans:*** Provide engineering support for Block 1 upgrade, stand up engineering and development processes for new competitive contract, and conduct LCS integration in support of LRIP tests. Update logistic documentation to reflect Block 1 capabilities. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Engineering Support will see a decrease due to the completion of the Block 0 baseline and award of the competitive contract.					
Title: Knifefish Test and Evaluation	0.800	1.384	1.527	0.000	1.527
Articles:	-	-	-	-	-
FY 2021 Plans: Conducted DT/OA with the Block 0 LRIP system in a VOO configuration. Prepare and conduct testing from LCS. Integrated Knifefish on Independence variant and conducted Development Testing (DT). ***FY 2022 Base Plans:*** Participate and provide Knifefish system-level support for MCM MP IOT&E on the Independence variant. Complete planning and begin execution of Knifefish Block 1 IOT&E to support Knifefish system IOC. Conduct an at-sea LCS Freedom integration event. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Slight increase in support of the Knifefish IOT&E and following test analysis in support of IOC.					
Title: Knifefish Management Services	0.961	0.870	0.850	0.000	0.850
Articles:	-	-	-	-	-
FY 2021 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
LCS testing, Block 1 Retrofit and Block 2 upgrade. ***FY 2022 Base Plans:*** Conduct acquisition and management of new competitive contract, support of Knifefish IOC and FRPD. Manage development of the completion of the Block 2 design and prepare for contractual implementation of design on FRP contract. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Program Management Support will decrease slightly due to the award of the competitive contract.					
Accomplishments/Planned Programs Subtotals	21.855	20.564	20.909	0.000	20.909

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/1601: *LCS MCM Mission Modules*	64.789	218.822	222.754	-	222.754	-	-	-	-	-	-
• OPN/1611: *Small & Medium UUV*	25.601	70.655	45.036	-	45.036	-	-	-	-	-	-

Remarks

OPN 1601 and OPN 1611 funding lines account for several programs, of which the Knifefish program is only a portion.

D. Acquisition Strategy

The Knifefish program, initiated in FY 2011 and competitively sourced to General Dynamics Mission Systems (GDMS), develops SMCM UUVs equipped with advanced Low Frequency Broadband (LFBB) sonar to provide volume, bottom, and buried mine detection capability, when operated from the Littoral Combat Ship (LCS) Mine Countermeasures Mission Package (MCM MP) or Vessel of Opportunity (VOO). An Engineering Development Model (EDM) system was fabricated and tested through Developmental Testing (DT). After incorporating fixes and upgrades discovered during DT and from Fleet operator inputs, an Operational Assessment (OA) was completed from a VOO in order to inform the Milestone C (MS C) decision and Low Rate Initial Production (LRIP) award of five Knifefish systems. Initial integration testing with the LCS was completed prior to MS C. The MS C decision included direction to Retrofit Block I changes onto the LRIP Block 0 systems and test, prior to delivery to the Fleet. Following Block 1 testing, a full and open competitive production contract will be awarded. The overall approach is to deliver systems through incrementally increasing capability via two Block Upgrades, balancing technology development maturity against a manageable level of risk to the program. New capability Block Upgrades will not transition to the production system until stable requirements are established, demonstrated, and verified for each respective Block. Knifefish is designated as an ACAT II program.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Knifefish Development & Engineering Support	C/CPIF	General Dynamics AIS : McLeansville, NC	8.520	2.203	Dec 2019	0.000		0.000		-		0.000	-	-	-
Hardware/Software Development - Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.000		-		0.000	-	-	-
Knifefish Block 1 Development Contractor	C/CPIF	GDMS : McLeansville, NC	0.552	13.026	Nov 2019	12.371	Dec 2020	14.775	Nov 2021	-		14.775	-	-	-
Knifefish Block 1 Development	TBD	Various : Various	0.000	1.700	Jan 2020	1.727	Dec 2020	0.952	Nov 2021	-		0.952	-	-	-
		Subtotal	9.072	16.929		14.098		15.727		-		15.727	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	WR	NSWC, PC : PANAMA CITY, FL	2.211	1.450	Dec 2019	1.788	Dec 2020	1.210	Dec 2021	-		1.210	-	-	-
Engineering Support	WR	NUWC, Newport : NEWPORT, RI	0.974	0.850	Dec 2019	1.081	Nov 2020	0.745	Nov 2021	-		0.745	-	-	-
Engineering Support	WR	Various : Various	0.563	0.865	Dec 2019	1.343	Nov 2020	0.850	Nov 2021	-		0.850	-	-	-
		Subtotal	3.748	3.165		4.212		2.805		-		2.805	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government T&E Support	WR	Various : Various	0.145	0.000		0.267	Dec 2020	0.325	Dec 2021	-		0.325	-	-	-
Test and Evaluation	WR	COMOPTEVFOR : NORFOLK, VA	0.115	0.415	Dec 2019	0.400	Nov 2020	0.400	Nov 2021	-		0.400	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 3123 / *SMCM UUV*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government T&E Support	WR	NSWC, PC : PANAMA CITY, FL	2.200	0.385	Dec 2019	0.717	Nov 2020	0.802	Nov 2021	-		0.802	-	-	-
		Subtotal	2.460	0.800		1.384		1.527		-		1.527	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	Various : WASHINGTON, DC	0.682	0.887	Feb 2020	0.795	Dec 2020	0.800	Dec 2021	-		0.800	-	-	-
Travel	WR	NAVSEA : WNY, DC	0.100	0.074	Dec 2019	0.075	Nov 2020	0.050	Nov 2021	-		0.050	-	-	-
		Subtotal	0.782	0.961		0.870		0.850		-		0.850	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	16.062	21.855		20.564		20.909		-		20.909	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

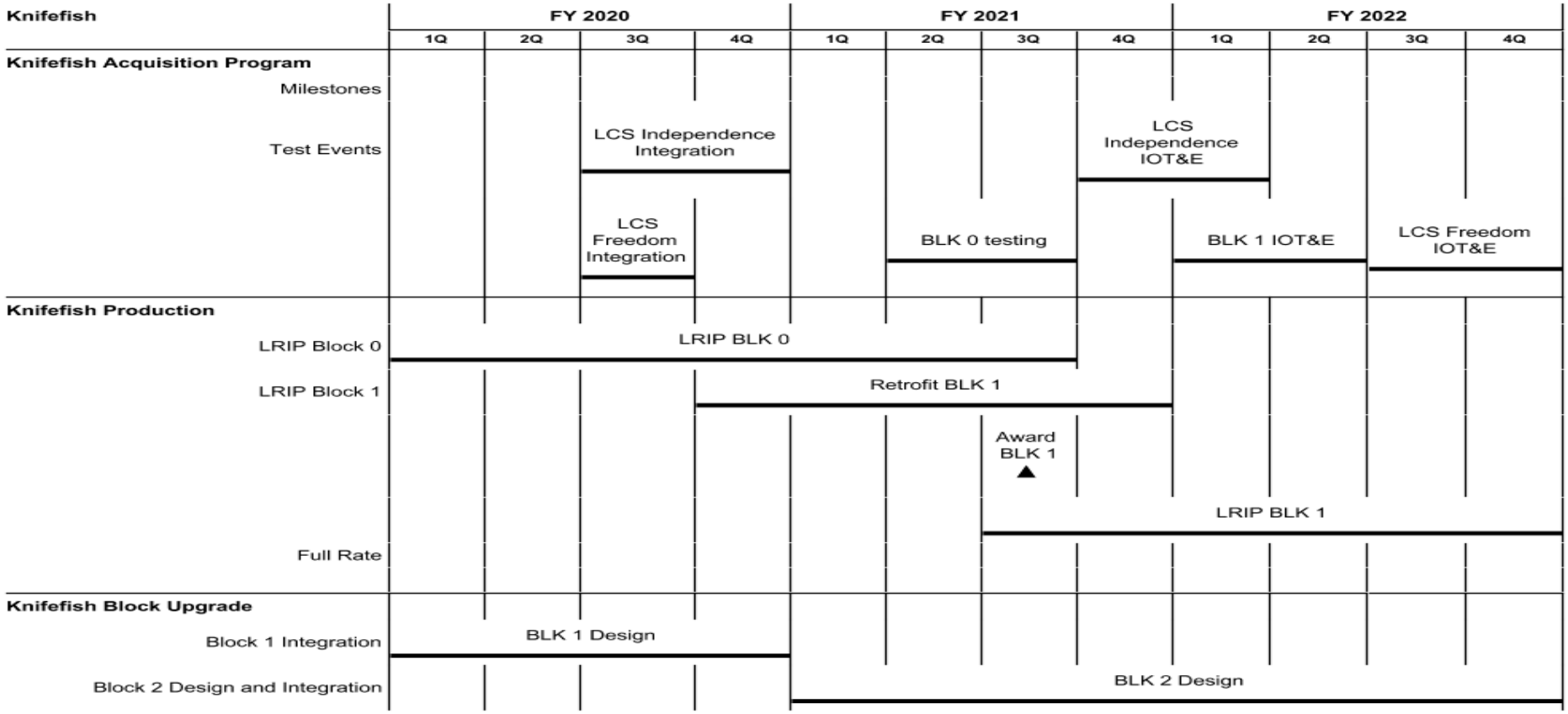

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Knifefish				
Knifefish Acquisition Program: Test Events: LCS Independence Variant Integration	3	2020	4	2020
Knifefish Acquisition Program: Test Events: LCS Independence MCM MP IOT&E	4	2021	1	2022
Knifefish Acquisition Program: Test Events: LCS Freedom Variant Integration	3	2020	3	2020
Knifefish Acquisition Program: Test Events: LCS Freedom MCM MP IOT&E	3	2022	4	2022
Knifefish Acquisition Program: Test Events: Block 0 testing	2	2021	3	2021
Knifefish Acquisition Program: Test Events: Block 1 IOT&E	1	2022	2	2022
Knifefish Production: LRIP Block 0: BLK 0 LRIP	1	2020	3	2021
Knifefish Production: LRIP Block 1: Retrofit Five LRIP Systems to Block 1	4	2020	4	2021
Knifefish Production: LRIP Block 1: Contract Award	3	2021	3	2021
Knifefish Production: LRIP Block 1: BLK 1 LRIP	3	2021	4	2022
Knifefish Block Upgrade: Block 1 Integration: Design	1	2020	4	2020
Knifefish Block Upgrade: Block 2 Design and Integration: Design	1	2021	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 3785 / *Razorback*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3785: *Razorback*	0.000	9.397	13.827	33.922	-	33.922	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Project 3785 Razorback realigned from PE 0604218N starting in FY 2020.

Shock and Fire Enclosure Capsule (SAFECAP) is a continuation effort being transferred from PE 0603561N Project 2033 to PE 0604028N Project 3785 beginning FY 2020.

A. Mission Description and Budget Item Justification

A part of the Family of UUVs, Littoral Battlespace Sensing - Autonomous Undersea Vehicle, Submarine variant (LBS-AUV(S)) or Razorback is a medium class UUV capable of persistent, autonomous, ocean sensing and data collection in support of Navy Intelligence Preparation of the Operational Environment (IPOE) mission. Razorback is deployed from host submarines in two variants: from the Dry Deck Shelter (DDS) or from the torpedo tube. The DDS deployed Razorback variant has been procured beginning in FY2017 with Fleet operational deployments planned for FY21-FY25. Development of requirements and submarine integration efforts commenced in FY2019 for the torpedo tube launch and recover (TTL&R) variant, which will be competitively sourced to industry in FY2022. Razorback TTL&R leverages risk reduction efforts for torpedo launch and recovery and host submarine integration performed under PE 0604029N UUV Core Technologies.

In order to deploy Razorback or other small or medium class UUVs from a host submarine platform with sufficient endurance to perform a desired mission, high energy density sources such as lithium ion batteries are used. Consequently, safety is paramount and mitigation systems must be in place to prevent or stop a high energy casualty event. Shock and Fire Enclosure Capsule (SAFECAP) is being developed as an active mitigation strategy that includes a shock qualified capsule that aides in the launch and recovery of small and medium sized UUVs through the torpedo tube, including Razorback. It also contains a Battery Casualty Detection System that constantly monitors battery health and status, providing early warning signs of a battery short. In the event of a casualty, the capsule and vehicle portion of SAFECAP are flooded via fire hose connections and the event is extinguished.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Product Development - Razorback	4.539	7.692	27.501	0.000	27.501
Articles:	-	-	-	-	-
FY 2021 Plans: Initiate development of the Forward Section sensor package. Prepare to award Engineering Development Model (EDM) contract(s) in Q1 FY2022 to up to two industry teams.					
FY 2022 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Manage up to two industry teams designing Razorback TTL&R. Conduct System Requirements Review (SRR) and System Functional Review (SFR). Conduct preliminary design and Preliminary Design Review (PDR). Initiate detailed design. Continue data products development and analysis for submarine integration including Temporary Alteration (TEMPALT) and Li-ion battery certification efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $19,809K is associated with phasing of funding for Razorback TTL&R EDM design on awarded contract(s).					
Title: Product Development - SAFECAP ***Articles:*** ***FY 2021 Plans:*** Continue integration testing of next generation Sandia National Lab (SNL) Sensors. Continue Early Fault Detection efforts. Commence Shock Test VACL. Commence Capsule Production. ***FY 2022 Base Plans:*** Continue integration testing of next generation Sandia National Lab (SNL) Sensors. Continue Early Fault Detection efforts. Leverage Shock Test VACL. Continue Capsule Production. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Slight decrease in FY22 due to Capsule efforts.	2.004 -	3.473 -	3.435 -	0.000 -	3.435 -
Title: Support ***Articles:*** ***FY 2021 Plans:*** Provide acquisition and engineering support for contract management activities and submarine integration efforts. ***FY 2022 Base Plans:***	2.250 -	2.100 -	2.198 -	0.000 -	2.198 -

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Provide acquisition and engineering support for contract management activities and submarine integration efforts, including TEMPALT development and technical reviews, and Li-ion battery certification efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Slight increase due to reduced engineering support with completion of technical reviews.					
Title: Management Services	0.604	0.562	0.788	0.000	0.788
Articles:	-	-	-	-	-
FY 2021 Plans: Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2022 Base Plans:*** Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** No significant change.					
Accomplishments/Planned Programs Subtotals	9.397	13.827	33.922	0.000	33.922

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN 1611: *Small & Medium UUV*	25.601	70.655	35.231	-	35.231	-	-	-	-	-	-

Remarks

The above OPN funding line accounts for several programs, of which the RAZORBACK program is only a portion.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

D. Acquisition Strategy

The Razorback torpedo tube launch and recover (TTL&R) variant will be a competitively sourced medium class UUV to support missions for the Submarine Force. The Razorback TTL&R acquisition strategy leverages collaboration with the Explosive Ordinance Disposal (EOD) community's Maritime Expeditionary Minehunting UUV (MEMUUV) medium class UUV for contracting order quantity, training, and sustainment efficiencies. Razorback will leverage lessons learned about mission capabilities and submarine integration from previous science and technology efforts, parallel risk reduction and demonstrations of torpedo tube launch and recovery under UUV Core Technology PE 0604029N, Project 4053 UxS Platform efforts, the Mine Countermeasures Urgent Operational Need (MCM UON), the LBS-AUV systems operated by Naval Oceanographic Command (NAVO), and from the Razorback Dry Deck Shelter variant. Requirements generation and initial submarine integration efforts began in FY2019, followed by Request for Proposal (RFP) release to industry in FY2020, and a planned award in early FY2022 for the Medium UUV contract (for both the Razorback TTL&R and MEMUUV). Both the Razorback TTL&R and MEMUUV will utilize a Government-designed Forward Section, featuring highly capable sensor, sonar, and communications technologies developed by the University of Texas Applied Research Laboratory. Initial forward sections for testing will be Government furnished, followed by transition to Industry production. SAFECAP development and submarine integration efforts will continue in parallel in order to provide Li-ion battery casualty mitigations to support Razorback vehicles.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RAZORBACK Product Development -	WR	NUWC NPT : Newport, RI	0.000	4.539	Mar 2020	0.835	Nov 2020	2.841	Nov 2021	-		2.841	-	-	-
RAZORBACK EDM Contract	C/CPIF	TBD : TBD	0.000	0.000		2.431	Nov 2021	17.657	Nov 2021	-		17.657	-	-	-
RAZORBACK Product Development	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		3.776	Nov 2020	5.099	Nov 2021	-		5.099	-	-	-
RAZORBACK Product Development	C/CPFF	APL/JHU : Laurel, MD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
RAZORBACK Product Development	WR	Various : Various	0.000	0.000		0.650	Nov 2020	1.904	Nov 2021	-		1.904	-	-	-
Product Development - SAFECAP	WR	NUWC NPT : Newport, RI	0.000	0.700	Oct 2019	0.650	Nov 2020	0.980	Nov 2021	-		0.980	-	-	-
Product Development - SAFECAP	C/CPFF	Sandia National Labs : Albuquerque, NM	0.000	0.750	Oct 2019	1.500	Nov 2020	0.900	Dec 2021	-		0.900	-	-	-
Product Development - SAFECAP	WR	NSWC CD : West Bethesda, MD	0.000	0.150	Oct 2019	0.175	Nov 2020	0.260	Nov 2021	-		0.260	-	-	-
Product Development - SAFECAP	WR	NSWC Crane : Crane, Indiana	0.000	0.150	Oct 2019	0.175	Nov 2020	0.196	Nov 2021	-		0.196	-	-	-
Product Development - SAFECAP	C/CPAF	HII Undersea : TBD	0.000	0.254	Nov 2019	0.373	Nov 2020	0.369	Dec 2021	-		0.369	-	-	-
Product Development - SAFECAP	C/CPAF	HII (Advex) : Norfolk, VA	0.000	0.000		0.600	Nov 2020	0.730	Dec 2021	-		0.730	-	-	-
		Subtotal	0.000	6.543		11.165		30.936		-		30.936	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support - RAZORBACK	WR	NUWC Newport : Newport, RI	0.000	2.250	Nov 2019	2.100	Nov 2020	2.198	Nov 2021	-		2.198	-	-	-
		Subtotal	0.000	2.250		2.100		2.198		-		2.198	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management - SAFECAP	Various	Varios : Washington DC	0.000	0.146	Oct 2019	0.147	Nov 2020	0.383	Nov 2021	-		0.383	-	-	-
Travel - RAZORBACK	Various	NAVSEA HQ : Washington DC	0.000	0.050	Oct 2019	0.005	Oct 2020	0.005	Nov 2021	-		0.005	-	-	-
Management - RAZORBACK	Various	Various : Various	0.000	0.408	Dec 2019	0.410	Dec 2020	0.400	Nov 2021	-		0.400	-	-	-
		Subtotal	0.000	0.604		0.562		0.788		-		0.788	-	-	N/A

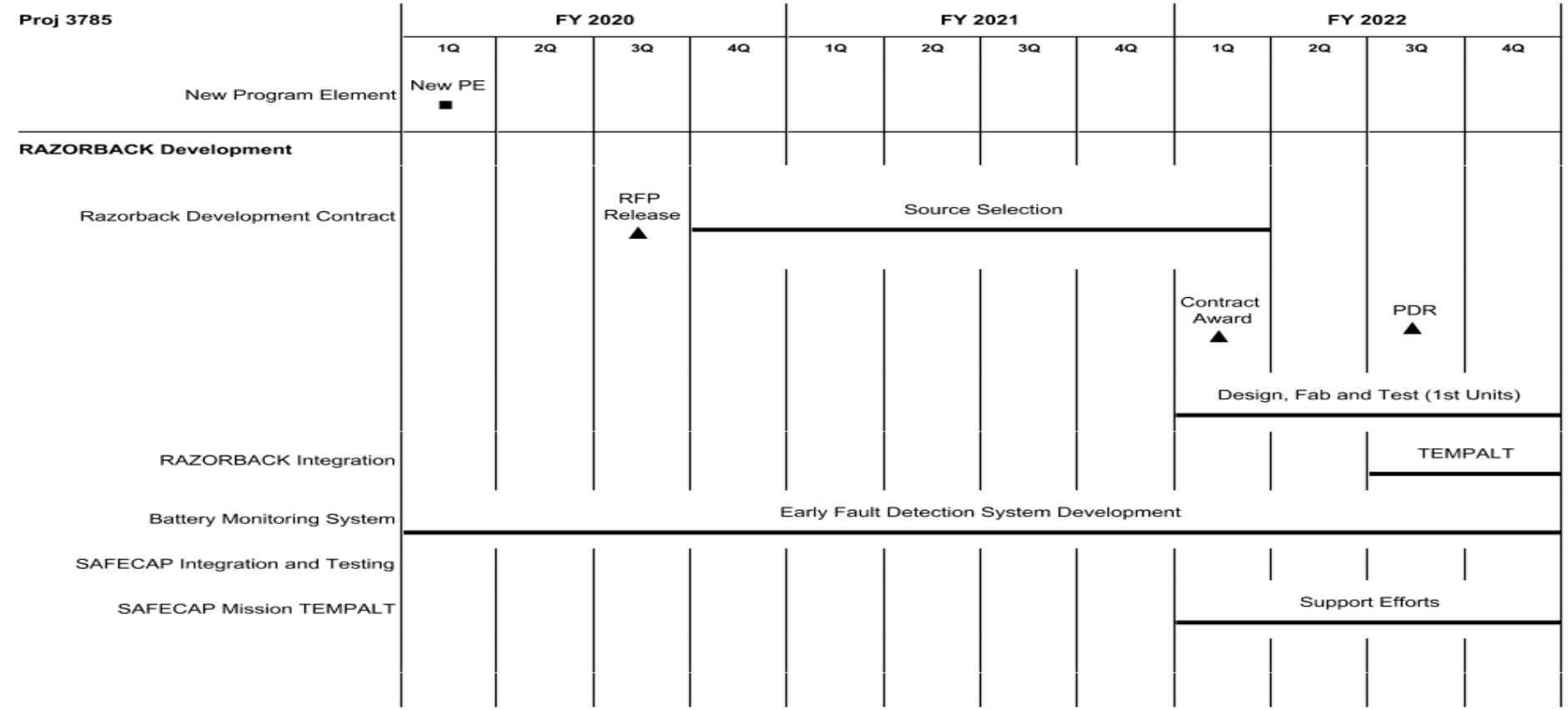
	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	9.397		13.827		33.922		-		33.922	-	-	N/A

Remarks

Razorback realigned from Program Element (PE) 0604218N Project 2345 to PE 0604028N Project 3785 beginning in FY 2020.

SAFECAP realigned from PE 0603561N Project 2033 to PE 0604028N Project 3785 beginning in FY 2020.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*



2022PB - 0604028N - 3785

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3785				
New Program Element: Schedule Detail	1	2020	1	2020
RAZORBACK Development: Razorback Development Contract: RFP	3	2020	3	2020
RAZORBACK Development: Razorback Development Contract: Source Selection	4	2020	1	2022
RAZORBACK Development: Razorback Development Contract: Contract Award	1	2022	1	2022
RAZORBACK Development: Razorback Development Contract: Preliminary Design Review	3	2022	3	2022
RAZORBACK Development: Razorback Development Contract: Design, Fabricate, and Test	1	2022	4	2022
RAZORBACK Development: RAZORBACK Integration: TEMPALT	3	2022	4	2022
RAZORBACK Development: Battery Monitoring System: Early Fault Detection System Development	1	2020	4	2022
RAZORBACK Development: SAFECAP Mission TEMPALT: TEMPALT Support Efforts	1	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 4023 / *Expeditionary Underwater Systems*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
4023: *Expeditionary Underwater Systems*	157.690	0.000	0.000	12.087	-	12.087	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding supports the development of unmanned systems for the Navy's expeditionary unmanned underwater Explosive Ordnance Disposal (EOD) and Mine Countermeasures (MCM) capability. Specifically, it provides for development of affordable expeditionary, unmanned underwater systems to support Navy Expeditionary forces including EOD, Mobile Diving and Salvage, Underwater Construction Teams (UCT), Very Shallow Water (VSW), and Expeditionary Mine Countermeasures (ExMCM) mission operations. The equipment must be highly portable in order to support the Navy EOD technician to safely approach, render safe, recover, exploit, and dispose of underwater explosive threats to include sea mines, limpet mines, and unexploded ordnance. Provides support for the Navy's high priority missions of Maritime Homeland Defense and MCM, including clandestine reconnaissance and mine clearance in support of amphibious operations. Development of Expeditionary UUV systems to support localization render-safe and detailed intelligence gathering of unexploded ordnance (UXO) including Underwater Improvised Explosive Devices (IEDs). This project directly supports Department of the Navy Strategic Roadmap for Unmanned Systems promulgated in March 2018 and the requirements defined by the Maritime Expeditionary MCM UUV (MEMUUV) CDD and is being executed in accordance with approved CNO N9I Requirement #056-95-19, "Capability Development Document for Maritime Expeditionary Standoff Response Family of Systems".

FY22 will continue the development and testing of advanced technologies that will allow warfighters to detect, classify, and localize high priority threats in meeting mine warfare missions. MK 18 Mod 2 Increment II upgrade will provide improved Automated Target Recognition (ATR) algorithms, more advanced autonomy architecture and continue to enhance electro-optic sensor performance. Increment II development and testing will focus on improving MCM performance and reducing the tactical timeline through development of a Reacquire, Identify and Mark capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Expeditionary UUV Family of Systems	0.000	0.000	12.087	0.000	12.087
Articles:	-	-	-	-	-
Description: This program supports development, testing and Fleet approval for evolving generations of affordable, expeditionary Unmanned Underwater Vehicle (UUVs) systems to address validated requirements in support of Expeditionary SW and VSW UMCM mission areas defined by the Maritime Expeditionary MCM UUV (MEMUUV) Capability Development Document (CDD) approved in September 2017.					
FY 2021 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
See PE 0603654N PU 4023 for FY2021 Plans. PU 4023 was relocated to PE 0604028N beginning in FY2022. ***FY 2022 Base Plans:*** FY22 development of VIPERFISH MEMUUV will focus on maturing the technology. Additionally, FY22 efforts will begin the transition of mature technology candidates that result from ONR investments in Future Naval Capabilities (FNC) programs (e.g., Automated Target Recognition (ATR) enhancements including active learning and automated performance estimation and sensor enhancements including Miniaturized Synthetic Aperture Sonar (MinSAS) and Acoustic Communications (ACOMMS)). The technologies developed and transitioned will enable VIPERFISH MEMUUV to take full advantage of improved computing power, batteries, and hardware/ software architecture. Test and evaluation events in FY22 will focus on demonstrating performance of systems and technology candidates in operationally realistic environments with significant fleet user engagement. Additionally, environmental and system acceptance testing will commence to demonstrate compliance with the system performance specification requirements. VIPERFISH UUV design and development contract award expected in FY22. FY22 efforts will include the design and development of the NextGen VIPERFISH MEMUUV in accordance with the MEMUUV CDD, the VIPERFISH UUV TLR, and VIPERFISH UUV performance specification. System Engineering Technical Reviews will be conducted throughout the FY (System Functional Review (SFR), System Requirements Review (SRR), Preliminary Design Review (PDR)). Acquisition documents will begin or continue development (i.e. test plans, cybersecurity plans, life cycle sustainment plans, configuration management plans). Will design and develop forward nose section as government furnished equipment. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** PU 4023 transitions to PE 0604028N from PE 0603654N in FY22. Decrease of $3.52M from FY2021 reflects a reduction in test and evaluation requirements for Mk 18 Mod 2 Inc II.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	12.087	0.000	12.087

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

D. Acquisition Strategy

Analysis of Alternatives (AOA) studies are conducted prior to the initiation of new sub-projects. The AOA addresses and emphasizes acquisitions strategies of the most cost-effective solution over the sub-projects' life -cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modifications), non-developmental item (including modifications), and lastly, developmental programs. Contracting for RDT&E, if required is competitive and when feasible, production options are included. This ongoing program capitalizes on a User Operational Evaluation System (UOES) effort involving Fleet operators engaged in tactical experimentation with prototype UUVs prior to fielding baseline systems and capability improvement package increments. These UUV operators also participate in detailed requirements analyses and definition. Operational capabilities with UUVs have been realized at designated operational units, with a competitive acquisition strategy. The addition of enhanced capabilities through an evolutionary acquisition approach to the UUV toolbox is programmed for delivery in accordance with approved CNO requirements and ONR Technology Deployment Agreements (TDAs) which close capability gaps. Further improvements to the toolbox to add basic mine and underwater explosive threats neutralization capabilities will continue to be pursued. A key attribute for these systems is minefield suitability and control of system signatures to counter influence fired ordnance. Influence signatures of subject UUVs will be characterized as a vital component of the acquisition initiatives. Maximum use of innovative contracting mechanisms will be assessed and pursued where applicable and in the best interest of the Navy.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	Multiple Activies : Not Specified	30.450	0.000		0.000		2.820	Nov 2021	-		2.820	-	-	-
Primary Hardware Development	WR	NSWC IH EODTD : Indian, Head, MD	16.238	0.000		0.000		0.000		-		0.000	-	-	-
Systems Engineering	WR	NSWC Activities : Not Specified	49.027	0.000		0.000		3.482	Nov 2021	-		3.482	-	-	-
		Subtotal	95.715	0.000		0.000		6.302		-		6.302	-	-	N/A

Remarks

PU 4023 funding transitioned into PE 0604028N from PE 0603654N in PB-22

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	PERATON : Not Specified	7.417	0.000		0.000		0.416	Nov 2021	-		0.416	-	-	-
		Subtotal	7.417	0.000		0.000		0.416		-		0.416	-	-	N/A

Remarks

PU 4023 funding transitioned into PE 0604028N from PE 0603654N in PB-22

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation-WR	WR	NSWC Activities : Not Specified	37.194	0.000		0.000		3.004	Nov 2021	-		3.004	-	-	-
Independent T&E	WR	NSWCIHEODTD : Indian Head, MD	1.424	0.000		0.000		0.000	Nov 2021	-		0.000	-	-	-
Independent T&E	WR	NSWC Activities : Not Specified	7.859	0.000		0.000		2.264	Nov 2021	-		2.264	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	46.477	0.000		0.000		5.268		-		5.268	-	-	N/A

Remarks

PU 4023 funding transitioned into PE 0604028N from PE 0603654N in PB-22

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWCIHEODTD : Indian Head, MD	5.350	0.000		0.000		0.000		-		0.000	-	-	-
Miscellaneous	WR	NSWC Activities : Not Specified	2.713	0.000		0.000		0.101	Nov 2021	-		0.101	-	-	-
DAWDF	WR	Not Specified : Not Specified	0.018	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	8.081	0.000		0.000		0.101		-		0.101	-	-	N/A

Remarks

PU 4023 funding transitioned into PE 0604028N from PE 0603654N in PB-22

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	157.690	0.000		0.000		12.087		-		12.087	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

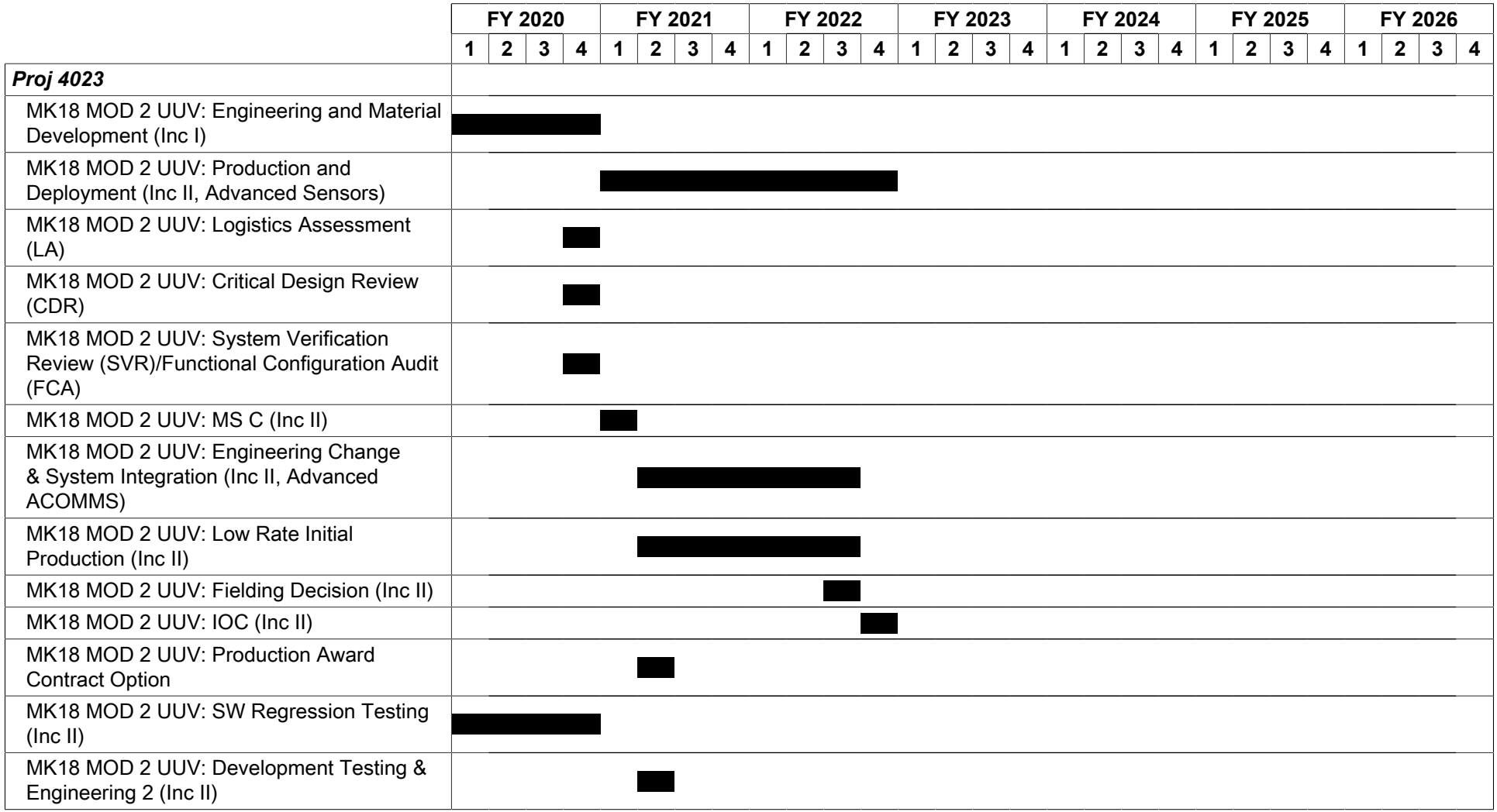


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

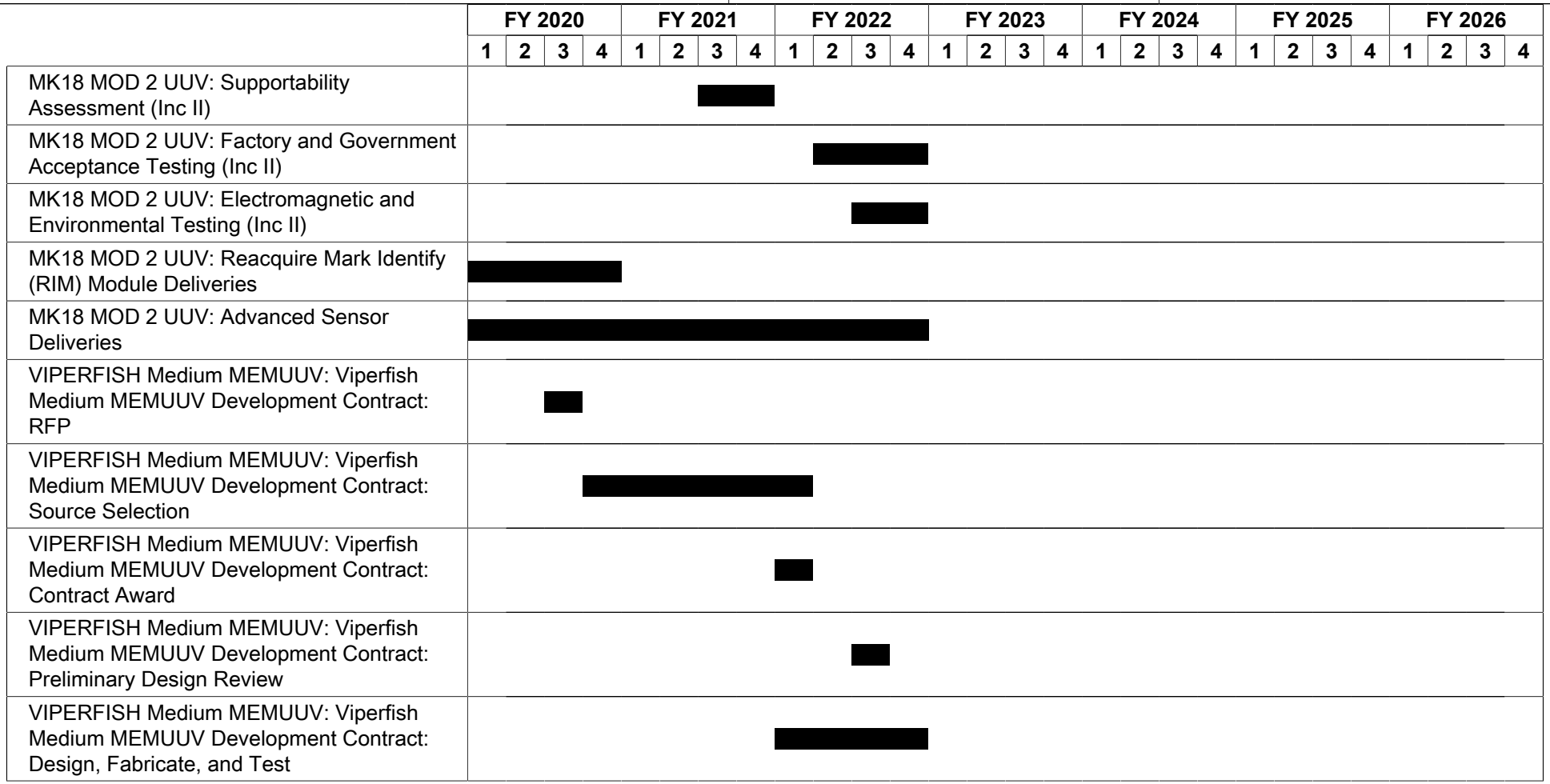


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 4023				
MK18 MOD 2 UUV: Engineering and Material Development (Inc I)	1	2020	4	2020
MK18 MOD 2 UUV: Production and Deployment (Inc II, Advanced Sensors)	1	2021	4	2022
MK18 MOD 2 UUV: Logistics Assessment (LA)	4	2020	4	2020
MK18 MOD 2 UUV: Critical Design Review (CDR)	4	2020	4	2020
MK18 MOD 2 UUV: System Verification Review (SVR)/Functional Configuration Audit (FCA)	4	2020	4	2020
MK18 MOD 2 UUV: MS C (Inc II)	1	2021	1	2021
MK18 MOD 2 UUV: Engineering Change & System Integration (Inc II, Advanced ACOMMS)	2	2021	3	2022
MK18 MOD 2 UUV: Low Rate Initial Production (Inc II)	2	2021	3	2022
MK18 MOD 2 UUV: Fielding Decision (Inc II)	3	2022	3	2022
MK18 MOD 2 UUV: IOC (Inc II)	4	2022	4	2022
MK18 MOD 2 UUV: Production Award Contract Option	2	2021	2	2021
MK18 MOD 2 UUV: SW Regression Testing (Inc II)	1	2020	4	2020
MK18 MOD 2 UUV: Development Testing & Engineering 2 (Inc II)	2	2021	2	2021
MK18 MOD 2 UUV: Supportability Assessment (Inc II)	3	2021	4	2021
MK18 MOD 2 UUV: Factory and Government Acceptance Testing (Inc II)	2	2022	4	2022
MK18 MOD 2 UUV: Electromagnetic and Environmental Testing (Inc II)	3	2022	4	2022
MK18 MOD 2 UUV: Reacquire Mark Identify (RIM) Module Deliveries	1	2020	4	2020
MK18 MOD 2 UUV: Advanced Sensor Deliveries	1	2020	4	2022
VIPERFISH Medium MEMUUV: Viperfish Medium MEMUUV Development Contract: RFP	3	2020	3	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
VIPERFISH Medium MEMUUV: Viperfish Medium MEMUUV Development Contract: Source Selection	4	2020	1	2022
VIPERFISH Medium MEMUUV: Viperfish Medium MEMUUV Development Contract: Contract Award	1	2022	1	2022
VIPERFISH Medium MEMUUV: Viperfish Medium MEMUUV Development Contract: Preliminary Design Review	3	2022	3	2022
VIPERFISH Medium MEMUUV: Viperfish Medium MEMUUV Development Contract: Design, Fabricate, and Test	1	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	14.215	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

MCM UON funding in PE 0604028N is a Congressional Add Line #75

A. Mission Description and Budget Item Justification

Mine Countermeasures (MCM) Urgent Operational Need (UON) was submitted by US Naval Forces Central Command (NAVCENT) and endorsed by US Fleet Forces Command (USFF) in August of 2018. 12 February 2019, OPNAV N9 issued a SECRET letter 3100 Ser N9/19S13905 "Resolution for Clandestine Mine Detection". This effort will deliver a baseline capability and a streamlined development approach including prototyping, integration, testing, demonstration and fielding of a mission package to answer this UON.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021
Congressional Add: MCM UUV UON	14.215	0.000
FY 2020 Accomplishments: N/A		
FY 2021 Plans: N/A		
Congressional Adds Subtotals	14.215	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 9999 / *Congressional Adds*

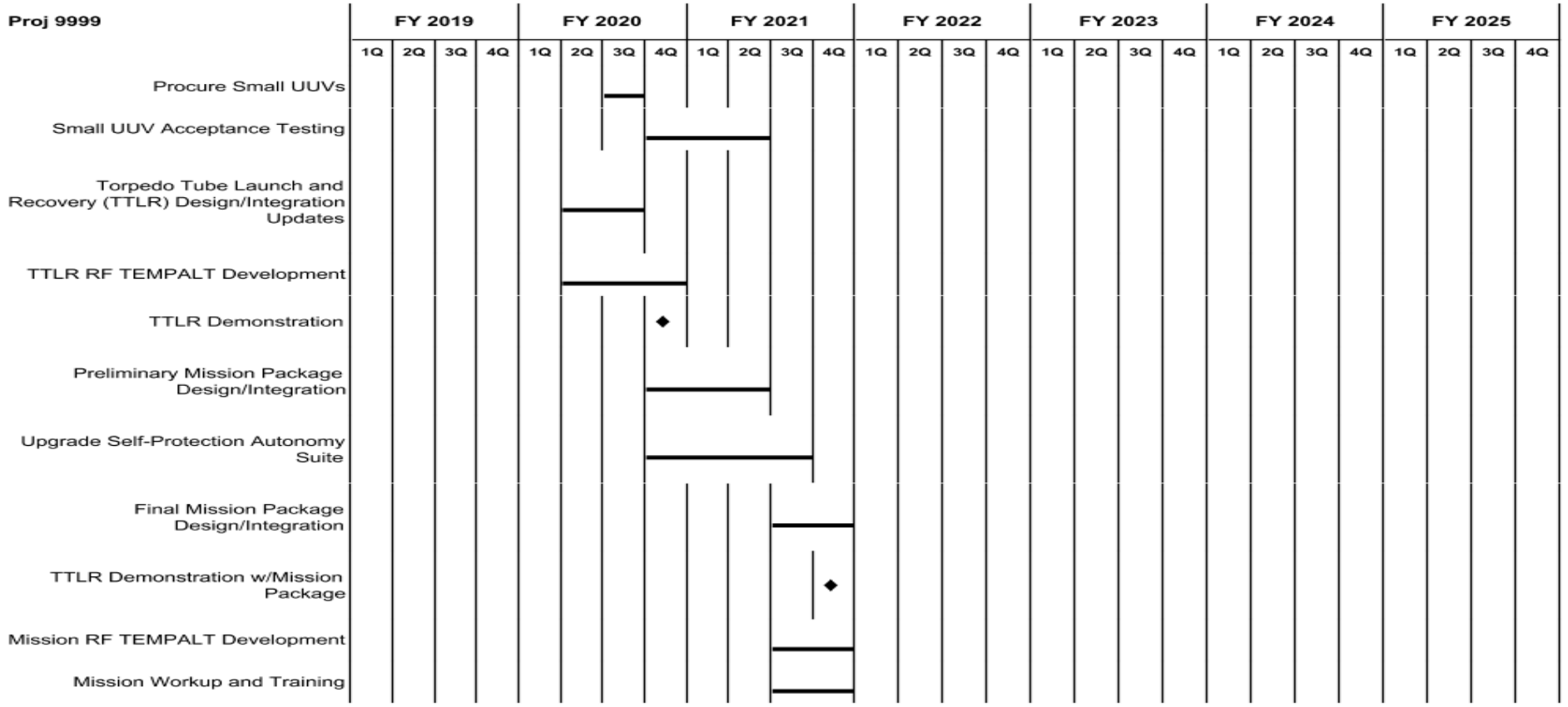
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NUWC NPT : Newport, RI	0.000	0.775	Feb 2020	0.000		0.000		-		0.000	-	-	-
Product Development	WR	PSNS : Bremerton, WA	0.000	0.089	Feb 2020	0.000		0.000		-		0.000	-	-	-
Product Development	FFRDC	ARL/UT : Austin, TX	0.000	9.981	Feb 2020	0.000		0.000		-		0.000	-	-	-
Product Development	FFRDC	ARL/PSU : State College, PA	0.000	2.600	Feb 2020	0.000		0.000		-		0.000	-	-	-
Product Development	C/CPAF	L3 : New River, MA	0.000	0.770	Feb 2020	0.000		0.000		-		0.000	-	-	-
		Subtotal	0.000	14.215		0.000		0.000		-		0.000	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	14.215		0.000		0.000		-		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 9999 / *Congressional Adds*



2021PB - 0604028N - 9999

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Procure Small UUVs: Procure Small UUVs	3	2020	3	2020
Small UUV Acceptance Testing: Small UUV Acceptance Testing	4	2020	2	2021
Torpedo Tube Launch and Recovery (TTLR) Design/Integration Updates: Torpedo Tube Launch and Recovery (TTLR) Design/Integration Updates	2	2020	3	2020
TTLR RF TEMPALT Development: TTLR RF TEMPALT Development	2	2020	4	2020
TTLR Demonstration: TTLR Demonstration	4	2020	4	2020
Preliminary Mission Package Design/Integration: Preliminary Mission Package Design/ Integration	4	2020	2	2021
Upgrade Self-Protection Autonomy Suite: Upgrade Self-Protection Autonomy Suite	4	2020	3	2021
Final Mission Package Design/Integration: Final Mission Package Design/Integration	3	2021	4	2021
TTLR Demonstration w/Mission Package: TTLR Demonstration w/Mission Package	4	2021	4	2021
Mission RF TEMPALT Development: Mission RF TEMPALT Development	3	2021	4	2021
Mission Workup and Training: Mission Workup and Training	3	2021	4	2021