Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	244.182	77.806	88.839	110.506	-	110.506	56.586	50.809	27.103	26.109	Continuing	Continuing
2482: *Small Unmanned Undersea Vehicles*	4.509	11.006	7.380	8.681	-	8.681	0.533	0.311	0.314	0.321	Continuing	Continuing
2483: *Medusa*	0.000	1.835	15.583	32.534	-	32.534	11.352	13.537	0.817	0.835	Continuing	Continuing
3123: *SMCM UUV*	57.792	20.239	19.788	9.025	-	9.025	8.153	4.341	4.309	2.848	Continuing	Continuing
3785: *Razorback*	22.767	32.687	31.985	37.091	-	37.091	21.861	20.377	9.358	9.546	Continuing	Continuing
4023: *Expeditionary Underwater Systems*	159.114	12.039	14.103	23.175	-	23.175	14.687	12.243	12.305	12.559	Continuing	Continuing

A. Mission Description and Budget Item Justification

Small and Medium 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 small UUVs and a diameter of 10 inches to 21 inches for medium 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.

Small 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), Submarine UUV Squadron (UUVRON), 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.

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 Unmanned Campaign Framework promulgated in March 2021 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," July 23 2019.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
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*

FY24 will continue the development and testing of advanced technologies that will allow warfighters to detect, classify, and localize high priority threats in meeting mine and undersea warfare missions. Investments will continue in Artificial Intelligence and Machine Leaning (AI/ML) technologies, as well as continued improvements in Automated Target Recognition (ATR) algorithms, more advanced autonomy architecture and enhancements to acoustic and electro-optic sensor performance.

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.

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 FY17 with Fleet operational deployments beginning in FY21. Development of requirements and submarine integration efforts commenced in FY19 for the torpedo tube launch and recover (TTL&R) variant, which was competitively sourced to industry in FY22.

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. MEDUSA features torpedo tube launch capability, long range, high payload placement accuracy, and can handle heavy payloads. A demonstration system was developed and tested in FY21 using dummy payloads using a land-based launch facility and surface launched in-water demonstrations. Lessons learned from the demonstration will inform a competitive award to Industry in FY23 to develop and produce tactical prototype systems. The MEDUSA demonstration and Industry prototype variant 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 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 2024 Navy	Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	79.947	106.347	82.023	-	82.023
Current President's Budget	77.806	88.839	110.506	-	110.506
Total Adjustments	-2.141	-17.508	28.483	-	28.483
• Congressional General Reductions	-	-0.528			
• Congressional Directed Reductions	-	-16.980			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.141	0.000			
• Program Adjustments	0.000	0.000	31.952	-	31.952
• Rate/Misc Adjustments	0.000	0.000	-3.469	-	-3.469

Change Summary Explanation

Program Changes:
Technical: Not applicable.
Schedule: Not applicable.
Cost:
FY 2022: -$2.141M Small Business Innovative Research
FY 2023: No Change
FY 2024: +$31.515M program adjustments: +$17.816M Razorback development; +$4.591M Knifefish development; +$9.108M Viperfish development; +$0.822M Miscellaneous Adjustments

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
2482: *Small Unmanned Undersea Vehicles*	4.509	11.006	7.380	8.681	-	8.681	0.533	0.311	0.314	0.321	Continuing	Continuing
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. FY 2024 supports the completion of follow-on development, test and evaluation, and implementation of cybersecurity solutions to comply with current cyber requirements, leading to full rate production. Additional LIONFISH (SUUV) enhancements to include integration of forward looking sonar and synthetic aperture sonar into the baseline Lionfish architecture will be pursued.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: SMALL UNMANNED UNDERWATER VEHICLES	11.006	7.380	8.681	0.000	8.681
Articles:	-	-	-	-	-
FY 2023 Plans: FY23 efforts include the continued development and integration of cyber security, autonomy, and Automated Target Recognition (ATR) sensors. Increased testing of the SUUV baseline configuration will provide sensor data used for the development of ATR algorithms as well as OQE for future increments. Authority to Operate (ATO) is planned to occur to meet Security Classification Guide (SCG) requirements critical to meeting the multiple warfare communities UUV requirements. Autonomy efforts will include the tuning of autonomous software. Results of these efforts will culminate in production vehicles delivered to the government for government acceptance testing.					
FY 2024 Base Plans: FY24 efforts will focus on initial acceptance testing, delivery, and fielding of production units. Funding will provide additional investments in the transition of advanced technologies as they are critical to the continued development and integration of key capabilities, including improvements in cyber security, autonomy, and					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Automated Target Recognition (ATR) efforts. These efforts will support test and evaluation to demonstrate operational effectiveness and suitability. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase from FY 2023 to FY 2024 due to costs associated with production acceptance testing and evaluation of advanced capabilities.					
Accomplishments/Planned Programs Subtotals	11.006	7.380	8.681	0.000	8.681

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• 8128: *Lionfish*	0.000	18.354	9.494	-	9.494	17.612	16.183	17.861	0.000	0.000	79.504

Remarks

D. Acquisition Strategy

The LIONFISH (SUUV) Program is completing its OTA and entering production negotiations under a FAR based contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	MIPR	Defense Innovation Unit (DIU) : Mountain View, California	1.892	6.547	Nov 2021	3.048	Nov 2022	3.389	Nov 2023	-		3.389	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	NSWC, Activities : Various	0.490	1.010	Nov 2021	0.726	Nov 2022	0.899	Nov 2023	-		0.899	Continuing	Continuing	Continuing
		Subtotal	2.382	7.557		3.774		4.288		-		4.288	Continuing	Continuing	N/A

Remarks

FY24 increase is due to engineering changes in cybersecurity architecture.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	Various : TBD	0.144	0.388	Nov 2021	0.184	Nov 2022	0.228	Nov 2023	-		0.228	Continuing	Continuing	Continuing
		Subtotal	0.144	0.388		0.184		0.228		-		0.228	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NIWC : San Diego	1.101	1.498	Nov 2021	2.201	Nov 2022	2.545	Nov 2023	-		2.545	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NUWC : Newport	0.766	1.174	Nov 2021	1.034	Nov 2022	1.415	Nov 2023	-		1.415	Continuing	Continuing	Continuing
		Subtotal	1.867	2.672		3.235		3.960		-		3.960	Continuing	Continuing	N/A

Remarks

FY24 increase is due to engineering changes in cybersecurity architecture.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
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*	

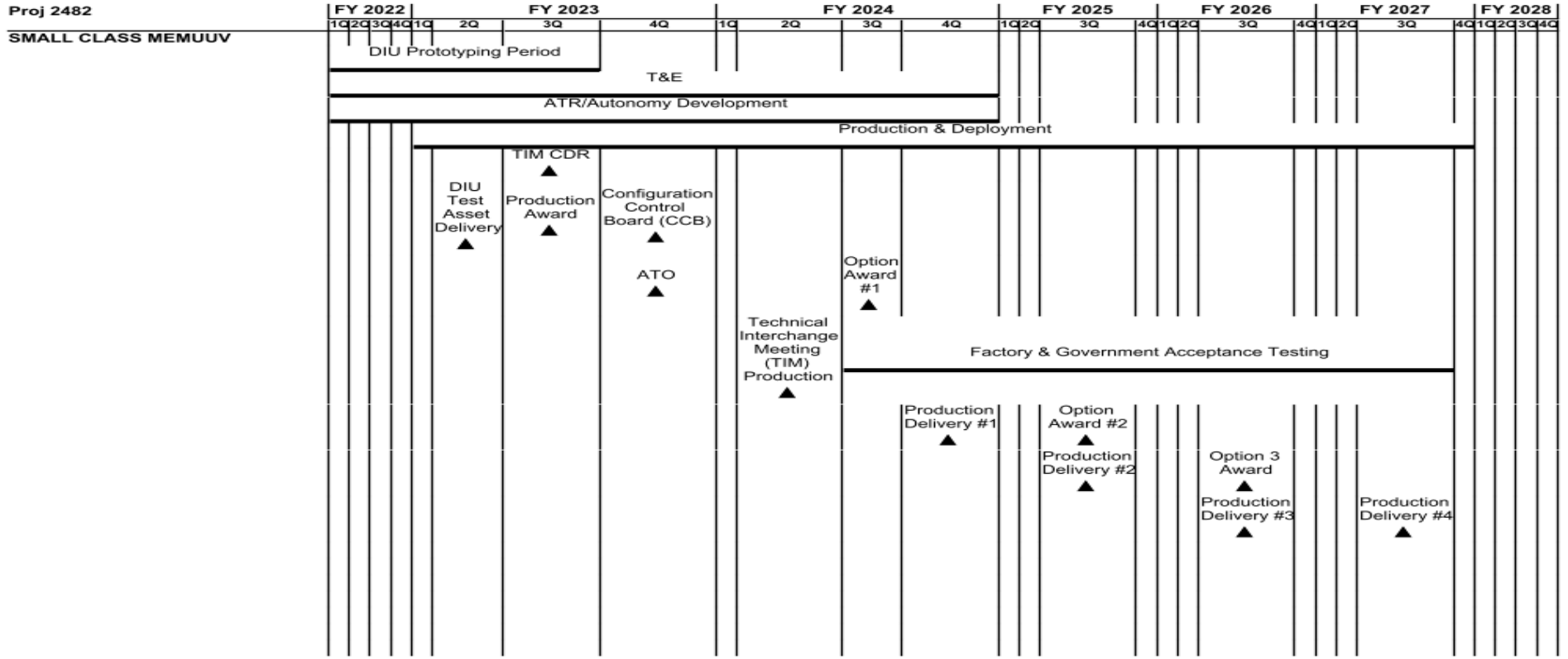
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWCIHEODTD : Indian Head, MD	0.116	0.389	Nov 2021	0.187	Nov 2022	0.205	Nov 2023	-		0.205	Continuing	Continuing	Continuing
		Subtotal	0.116	0.389		0.187		0.205		-		0.205	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.509	11.006		7.380		8.681		-		8.681	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
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*



2024OSD - 0604028N - 2482

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
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				
SMALL CLASS MEMUUV: Development and User Testing	1	2022	4	2028
SMALL CLASS MEMUUV: DIU Prototyping Period	1	2022	3	2024
SMALL CLASS MEMUUV: ATR/Autonomy Development	1	2022	4	2028
SMALL CLASS MEMUUV: ECP Initiation	1	2022	1	2022
SMALL CLASS MEMUUV: DIU OTA Option Award	2	2022	2	2022
SMALL CLASS MEMUUV: Cybersecurity Compliance	4	2023	4	2028
SMALL CLASS MEMUUV: RFP Release	1	2023	1	2023
SMALL CLASS MEMUUV: DIU Test Asset Delivery (1-2)	3	2023	3	2023
SMALL CLASS MEMUUV: Production, Deployment & Sustainment	3	2023	4	2028
SMALL CLASS MEMUUV: Factory and Government Acceptance Testing	3	2022	4	2028
SMALL CLASS MEMUUV: ATO	3	2023	3	2023
SMALL CLASS MEMUUV: DIU Test Asset Delivery (3-6)	4	2023	4	2023
SMALL CLASS MEMUUV: Production Award	4	2023	4	2023
SMALL CLASS MEMUUV: PRR Production	3	2024	3	2024
SMALL CLASS MEMUUV: Option Award #1	3	2024	3	2024
SMALL CLASS MEMUUV: Production Delivery #1 (10)	4	2024	4	2024
SMALL CLASS MEMUUV: Production Delivery #2 (5)	2	2025	2	2025
SMALL CLASS MEMUUV: Option Award #2	2	2025	2	2025
SMALL CLASS MEMUUV: Production Delivery #3 (5)	2	2026	2	2026
SMALL CLASS MEMUUV: Option Award #3	3	2026	3	2026
SMALL CLASS MEMUUV: Production Delivery #4 (10)	2	2027	2	2027

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
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*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SMALL CLASS MEMUUV: Option Award #4	3	2027	3	2027
SMALL CLASS MEMUUV: Production Delivery #5 (2)	2	2028	2	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy											Date: March 2023	
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 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
2483: *Medusa*	0.000	1.835	15.583	32.534	-	32.534	11.352	13.537	0.817	0.835	Continuing	Continuing
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. MEDUSA features torpedo tube launch capability, long range, high payload placement accuracy, and can handle heavy payloads. A demonstration system was developed and tested in FY21 using dummy payloads using a land-based launch facility and surface launched in-water demonstrations. Lessons learned from the demonstration informed a program start in FY22 and anticipated competitive award to Industry in FY24 to develop and produce tactical prototype systems. The MEDUSA demonstration system and Industry prototype 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 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**
Title: MEDUSA Product Development	1.417	14.281	28.908	0.000	28.908
Articles:	-	-	-	-	-
FY 2023 Plans: Release RFP to industry and perform source selection. Initiate submarine integration planning/preparations and safety planning. Initiated submarine combat system integration development. Initiate government risk reduction efforts to address high technical risk areas.					
FY 2024 Base Plans: Award competitive prototyping contract to industry to design and develop MEDUSA. Initiate and quickly ramp up industry risk reduction efforts on contract and preliminary design activities. Initiate submarine integration planning/preparations and safety planning. Initiate submarine combat system integration development. Continue government risk reduction efforts.					
FY 2024 OCO Plans: N/A					
FY 2023 to FY 2024 Increase/Decrease Statement: Increase due to award of competitive prototyping contract to industry and execution of risk reduction activities and preliminary design efforts under the contract.					
Title: MEDUSA Support	0.250	1.075	3.158	0.000	3.158

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Articles:	-	-	-	-	-
FY 2023 Plans: Provide acquisition and engineering support for source selection. ***FY 2024 Base Plans:*** Provide acquisition and engineering support for source selection, contract management activities, and initiate submarine integration efforts, including TEMPALT development and battery certification efforts. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase due to contract management activities following contract award and initiation of submarine integration efforts.					
Title: MEDUSA Management Services	0.168	0.227	0.468	0.000	0.468
Articles:	-	-	-	-	-
FY 2023 Plans: Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2024 Base Plans:*** Provide technical guidance, project planning, program management, financial management, and travel for contract administration and submarine integration efforts. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase due to contracting management activities from contract award.					
Accomplishments/Planned Programs Subtotals	1.835	15.583	32.534	0.000	32.534

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• OPN/1611: *Small & Medium UUV (Medusa only)*	0.000	0.000	0.000	-	0.000	0.000	8.814	21.931	18.690	Continuing	Continuing

Remarks

The above OPN line item 1611 accounts for several programs. Only the MEDUSA funding is displayed above.

D. Acquisition Strategy

In FY17, development of a single MEDUSA demonstration system was initiated using Navy RDT&E funding to execute a demonstration from a host submarine as a proof of concept. The demonstration system was developed and tested in FY21 using dummy payloads using a land-based launch facility and surface launched in-water demonstrations. Lessons learned from the demonstration informed a UUV program start in FY22. Detailed acquisition planning and requirements generation commenced in FY22, with the target to competitively award a contract to Industry in FY24 for the fabrication of tactical prototype systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Product Development	WR	NSWC PCD : Panama City, FL	0.000	0.944	Apr 2022	6.286	Nov 2022	2.642	Nov 2023	-		2.642	Continuing	Continuing	Continuing
MEDUSA Product Development	WR	NUWC NPT : Newport, RI	0.000	0.314	Apr 2022	5.895	Nov 2022	1.094	Nov 2023	-		1.094	Continuing	Continuing	Continuing
MEDUSA Product Debelopment	WR	Various : Various	0.000	0.159	Apr 2022	2.100	Nov 2022	1.188	Nov 2023	-		1.188	Continuing	Continuing	Continuing
MEDUSA Prototype Contract	C/FPIF	TBD : TBD	0.000	0.000		0.000		23.984	Aug 2024	-		23.984	0.000	23.984	-
		Subtotal	0.000	1.417		14.281		28.908		-		28.908	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Engineering Support	WR	NSWC PD : Panama City, FL	0.000	0.125	Apr 2022	0.716	Nov 2022	1.479	Nov 2023	-		1.479	Continuing	Continuing	Continuing
MEDUSA Engineering Support	WR	Various : Various	0.000	0.086	Apr 2022	0.300	Nov 2022	1.061	Nov 2023	-		1.061	Continuing	Continuing	Continuing
MEDUSA Safety Support	WR	NSWC IHD : Indian Head, MD	0.000	0.039	Apr 2022	0.059	Nov 2022	0.618	Nov 2023	-		0.618	0.000	0.716	-
		Subtotal	0.000	0.250		1.075		3.158		-		3.158	Continuing	Continuing	N/A

Management Services ($ in Millions)

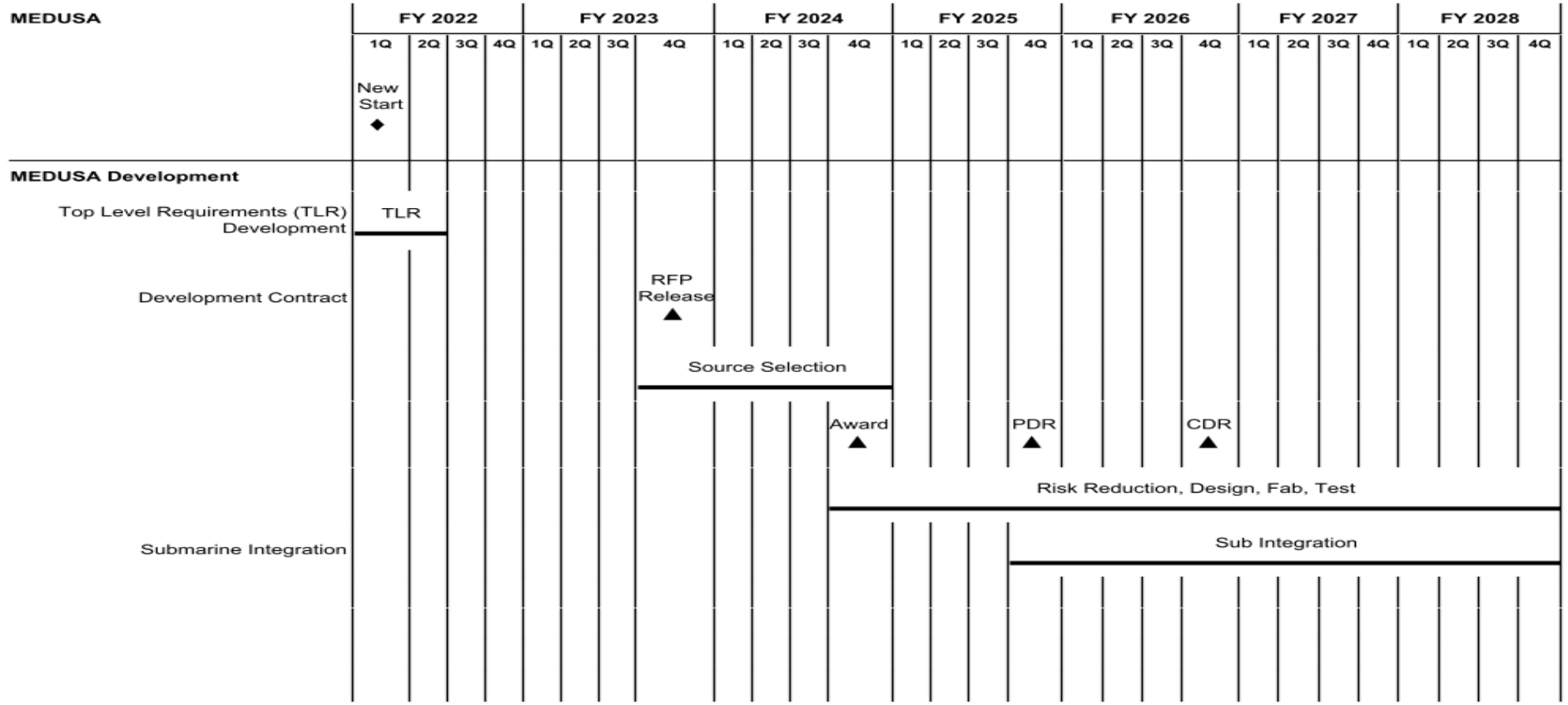
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Travel	Various	NAVSEA : Washington, DC	0.000	0.010	Apr 2022	0.025	Nov 2022	0.050	Nov 2023	-		0.050	Continuing	Continuing	Continuing
MEDUSA Management	Various	Various : Various	0.000	0.158	Apr 2022	0.202	Nov 2022	0.418	Nov 2023	-		0.418	Continuing	Continuing	Continuing
		Subtotal	0.000	0.168		0.227		0.468		-		0.468	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 2483 / *Medusa*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	1.835		15.583		32.534		-		32.534	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*



2024PB - 0604028N - 2483

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
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				
,	1	2022	1	2022
MEDUSA Development: Top Level Requirements (TLR) Development:	1	2022	2	2022
MEDUSA Development: Development Contract: RFP	4	2023	4	2023
MEDUSA Development: Development Contract: Source Selection	4	2023	4	2024
MEDUSA Development: Development Contract: Contract Award	4	2024	4	2024
MEDUSA Development: Development Contract: Preliminary Design Review	4	2025	4	2025
MEDUSA Development: Development Contract: Critical Design Review	4	2026	4	2026
MEDUSA Development: Development Contract: Risk Reduction, Design, Fabricate, and Test	4	2024	4	2028
MEDUSA Development: Submarine Integration: Submarine Integration	4	2025	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3123: *SMCM UUV*	57.792	20.239	19.788	9.025	-	9.025	8.153	4.341	4.309	2.848	Continuing	Continuing
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 Surface Mine Countermeasures Unmanned Undersea Vehicle (SMCM UUV) Program, also referred to as Knifefish, develops advanced medium class UUVs to support clandestine mine detection capability against volume, bottom, and buried mines, in high clutter environments. Equipment includes UUVs and associated system support equipment. The program achieved Milestone C in FY 2019 and entered into Low-Rate Initial Production (LRIP) for five (5) Block 0 systems in FY 2019. The prime contractor for Knifefish is General Dynamics Mission Systems (GDMS) located in Quincy, MA.

In FY 2021, GDMS was awarded a contract to retrofit the LRIP systems with Block 1 capabilities and upgrade a number of performance characteristics to meet Navy bottom and buried mine hunting requirements. The Navy will conduct a limited validation of these capabilities during system acceptance testing and sell off to the government in Q1-Q2FY24. Upon delivery of these systems to the Navy, they will be available for limited Fleet operations from LCS or Vessels of Opportunity (VOO).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Knifefish Development	15.057	14.204	9.025	0.000	9.025
Articles:	-	-	-	-	-
FY 2023 Plans: - Complete Block 1 hardware and software development - Conduct data collection in mud bottom type environments to train and tune Post Mission Analysis (PMA) algorithm. - Execute tasking to ensure the Knifefish Block 1 system maintains Cybersecurity compliance - Conduct and complete training and tuning of Block 1 PMA algorithm					
FY 2024 Base Plans: Knifefish System Acceptance ($4.0M) - Complete Factory Acceptance Test (FAT) and System Acceptance Test (SAT) for system sell off. - Accept delivery of 5 Knifefish systems - Complete Standard Operating Procedures (SOPs) for maintenance and training. - Complete orderly transition to limited operations and sustainment of delivered Knifefish systems.					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Establish an Engineering Review Team (ERT) lead by OPNAV N95 and N97 and consisting of subject matter experts (SMEs) to include NAVSEA 05, Fleet, Academia, Warfare Centers, Science and Technology, and Acquisition representatives to ($5.1M): - Validate the requirements and mission concept of operations and recommend changes if necessary. This will include a comparison and potential merging of similar Subsea and Seabed Warfare (SSW) requirements, if applicable, to realize cost savings, efficiency, and synergy. - Assess Knifefish system against the requirements to include sensor and platform demonstrated performance, supporting interface systems, and operations. - Capture lessons learned from Knifefish program including testing approaches, automated target recognition applications and challenges, and military utility. - Evaluate new and alternative technologies to address the remaining capability gap - Assess technical maturity, risk, schedule, cost, platform integration options, and potential improvements of alternative solutions. - Evaluate program structure ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease reflects Navy funding reduction in PB24.					
Title: Knifefish Support	2.805	2.514	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2023 Plans: - Preparing mine target fields and provide test support vessels for conduct of data collections in mud environments to train and tune Post Mission Analysis (PMA) algorithm. ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Decrease reflects Navy funding reduction in PB24.					
Title: Knifefish Test and Evaluation	1.527	2.210	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2023 Plans: N/A ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease reflects Navy funding reduction in PB24.					
Title: Knifefish Management Services	0.850	0.860	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2023 Plans: - Execute tasking and prepare artifacts for the basis of authorization to transition the program. ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease reflects Navy funding reduction in PB24.					
Accomplishments/Planned Programs Subtotals	20.239	19.788	9.025	0.000	9.025

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• OPN/1601: *LCS MCM Mission Modules*	30.119	92.495	93.961	-	93.961	122.654	103.972	59.906	61.344	1,508.277	2,664.640

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• OPN/1611: *Small & Medium UUV*	44.534	49.763	61.951	-	61.951	47.916	68.156	107.839	102.724	Continuing	Continuing

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 FY11 and competitively sourced to General Dynamics Mission Systems (GDMS), develops Surface Mine Countermeasures Unmanned Undersea Vehicles (SMCM UUVs) equipped with advanced Low Frequency Broadband (LFBB) sonar to provide volume, bottom, and buried mine detection capability, in high clutter environments, 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 (5) 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. A Block 1 retrofit contract was awarded in Q3FY21 to develop the Engineering Change Proposals (ECPs) to address additional Block 1 requirements, and to deliver Block 0 to Block 1 retrofit kits for the 5 Block 0 LRIP systems. The Navy will conduct a limited validation of these capabilities during system acceptance testing and sell off to the government in Q1-Q2FY24. Upon delivery of these systems to the Navy, they will be available for limited Fleet operations from LCS or Vessels of Opportunity (VOO

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Knifefish Development & Engineering Support	C/CPIF	General Dynamics AIS : McLeansville, NC	10.723	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Knifefish Block 1 Development Contractor	C/CPIF	GDMS : McLeansville, NC	25.259	14.105	Nov 2021	10.452	Nov 2022	4.000	Nov 2023	-		4.000	Continuing	Continuing	Continuing
Knifefish Block 1 Development	C/CPIF	Various : Various	3.427	0.952	Nov 2021	0.971	Nov 2022	2.425	Nov 2023	-		2.425	0.000	7.775	-
LFBB technology improvements	WR	NRL : Washington DC	0.000	0.000		0.781	Nov 2022	0.000		-		0.000	0.000	0.781	-
Knifefish Engineering Review Team	WR	NSWC PC : Panama City, FL	0.000	0.000		0.000		2.600	Nov 2023	-		2.600	0.000	2.600	-
		Subtotal	39.409	15.057		12.204		9.025		-		9.025	Continuing	Continuing	N/A

Remarks

Knifefish program is investigating options for integrating future low frequency broadband technology (e.g. NRL Skyfish) into existing UUVs as an incremental upgrade. Existing technology demonstrators have been shown to physically fit and are expected to be easily integrated as a new payload to current UUVs to provide additional buried minehunting capability.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	WR	NSWC, PC : Panama City, FL	5.449	1.210	Dec 2021	1.734	Nov 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Support	WR	NUWC, Newport : Newport, RI	2.905	0.745	Nov 2021	0.530	Nov 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Support	WR	Various : Various	2.771	0.850	Nov 2021	0.250	Nov 2022	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	11.125	2.805		2.514		0.000		-		0.000	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	Various : Various	0.412	0.325	Dec 2021	0.850	Dec 2022	0.000		-		0.000	0.000	1.587	-
Operational Test & Evaluation (OT&E)	WR	COMOPTEVFOR : Norfolk, VA	0.930	0.400	Nov 2021	0.408	Nov 2022	0.000		-		0.000	0.000	1.738	-
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	NSWC, PC : Panama City, FL	3.302	0.802	Nov 2021	2.952	Nov 2022	0.000		-		0.000	0.000	7.056	-
		Subtotal	4.644	1.527		4.210		0.000		-		0.000	0.000	10.381	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	Various : Washington, DC	2.364	0.800	Dec 2021	0.810	Dec 2022	0.000		-		0.000	0.000	3.974	-
Travel	WR	NAVSEA : WNY, DC	0.250	0.050	Nov 2021	0.050	Nov 2022	0.000		-		0.000	0.000	0.350	-
		Subtotal	2.614	0.850		0.860		0.000		-		0.000	0.000	4.324	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	57.792	20.239		19.788		9.025		-		9.025	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

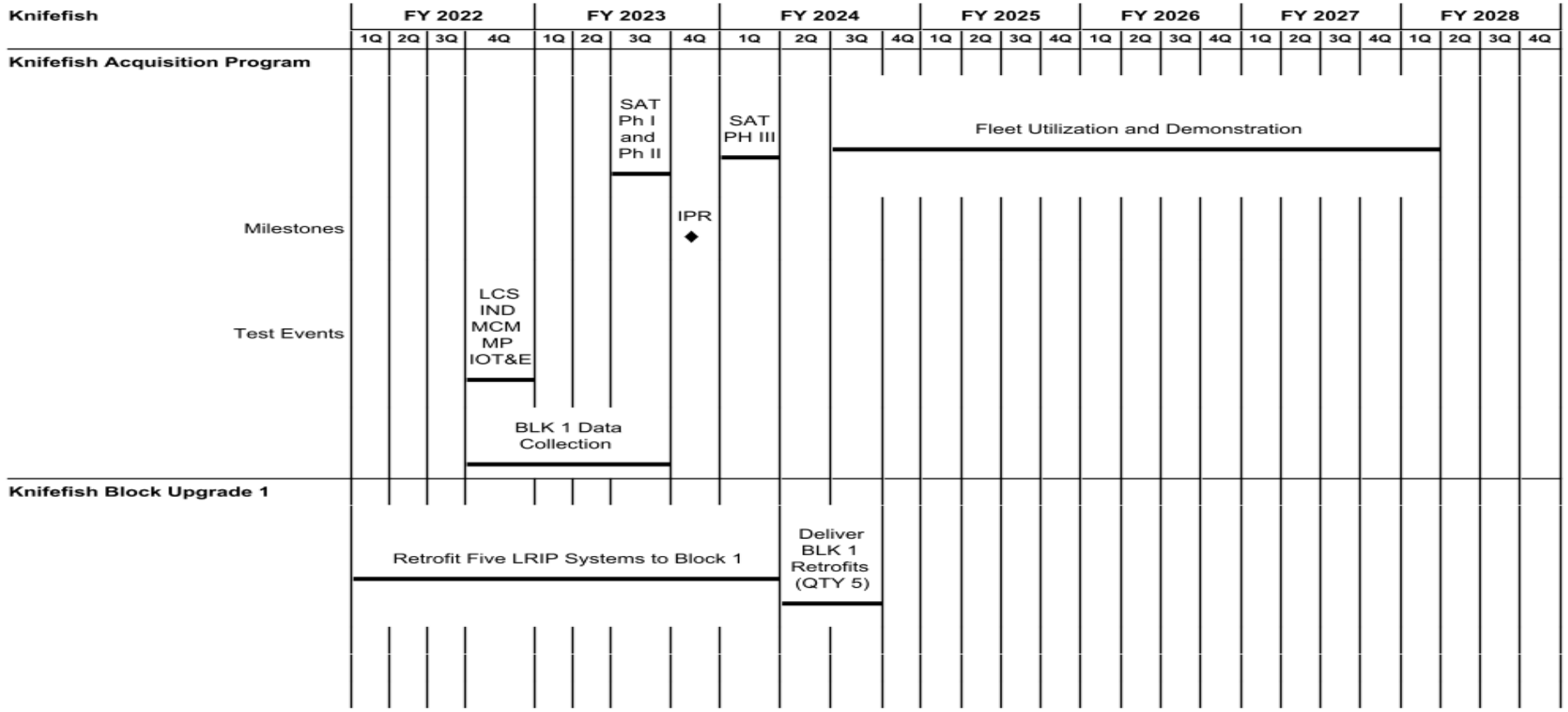


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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Knifefish				
Knifefish Acquisition Program: Fleet Utilization and Demonstration	3	2024	1	2028
Knifefish Acquisition Program: SAT Ph I and Ph II	3	2023	3	2023
Knifefish Acquisition Program: SAT Ph III	1	2024	1	2024
Knifefish Acquisition Program: Milestones: In Progress Review (IPR)	4	2023	4	2023
Knifefish Acquisition Program: Test Events: LCS Independence MCM MP IOT&E	4	2022	4	2022
Knifefish Acquisition Program: Test Events: Block 1 Data Collection	4	2022	3	2023
Knifefish Block Upgrade 1: Retrofit Five LRIP Systems to Block 1	1	2022	1	2024
Knifefish Block Upgrade 1: Deliver Block 1 Retrofits (QTY 5)	2	2024	3	2024
Knifefish Block Upgrade 1: PMA Training and Tuning	3	2023	4	2023
Knifefish Block Upgrade 1: Final PMA HW & SW Integration	4	2023	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3785: *Razorback*	22.767	32.687	31.985	37.091	-	37.091	21.861	20.377	9.358	9.546	Continuing	Continuing
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, 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 FY17 with Fleet operational deployments planned for FY21-FY27. Development of requirements and submarine integration efforts commenced in FY19 for the torpedo tube launch and recover (TTL&R) variant, which was competitively sourced to industry in FY22. 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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Product Development - Razorback	26.340	21.954	24.926	0.000	24.926
Articles:	-	-	-	-	-
FY 2023 Plans: Complete preliminary design and conduct Preliminary Design Review (PDR). Conduct detailed design and Critical Design Review (CDR). Initiate EDM fabrication. Continue data products development and analysis					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
for submarine integration including Temporary Alteration (TEMPALT) and Li-ion battery certification efforts. Continue submarine combat system integration development. ***FY 2024 Base Plans:*** Complete EDM fabrication. Conduct EDM Contractor Design Verification Testing (DVT). Initiate EDM Government DVT. Continue data products development and analysis for submarine integration including Temporary Alteration (TEMPALT) and Li-ion battery certification efforts. Continue submarine combat system integration development. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** No significant change					
Title: Product Development - SAFECAP ***Articles:*** ***FY 2023 Plans:*** Leverage Shock Test Virginia Class VACL. Continue Capsule Production increased levels. ***FY 2024 Base Plans:*** Continue integration testing and increased Capsule Production levels. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY24 due to Capsule Production efforts.	3.296 -	8.304 -	8.921 -	0.000 -	8.921 -
Title: Support ***Articles:*** ***FY 2023 Plans:*** 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 2024 Base Plans:***	2.198 -	0.832 -	2.332 -	0.000 -	2.332 -

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 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 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** No significant change					
Title: Management Services ***Articles:*** ***FY 2023 Plans:*** Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2024 Base Plans:*** Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** No significant change	0.853 -	0.895 -	0.912 -	0.000 -	0.912 -
Accomplishments/Planned Programs Subtotals	32.687	31.985	37.091	0.000	37.091

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• OPN 1611: *Small & Medium UUV (Razorback only)*	5.725	10.306	16.178	-	16.178	23.533	22.973	38.375	39.193	Continuing	Continuing

Remarks

The above OPN line item 1611 accounts for several programs. Only the RAZORBACK funding is displayed above.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 Viperfish Maritime Expeditionary Minehunting UUV (MEMUUV) medium class UUV for contracting order quantity, training, and sustainment efficiencies. Razorback TTL&R 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 FY19, followed by Request for Proposal (RFP) release to industry in FY20, and an award in FY22 for the Medium UUV contract (for both the Razorback TTL&R and Viperfish). Both the Razorback TTL&R and Viperfish 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 2024 Navy		Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RAZORBACK Product Development -	WR	NUWC NPT : Newport, RI	4.917	5.605	Nov 2021	1.544	Nov 2022	3.580	Nov 2023	-		3.580	0.000	15.646	-
RAZORBACK EDM Contract	C/CPIF	Leidos : Reston, VA	1.997	8.118	Jul 2022	12.989	Jun 2023	11.433	Nov 2023	-		11.433	0.000	34.537	-
RAZORBACK Product Development	C/CPFF	ARL/UT : Austin, TX	4.276	9.704	Jun 2022	0.757	Nov 2022	3.977	Nov 2023	-		3.977	0.000	18.714	-
RAZORBACK Product Development	WR	Various : Various	0.589	2.913	Nov 2021	6.664	Nov 2022	5.936	Nov 2023	-		5.936	0.000	16.102	-
Product Development - SAFECAP	WR	NUWC NPT : Newport, RI	1.350	0.841	Nov 2021	4.793	Nov 2022	4.335	Nov 2023	-		4.335	Continuing	Continuing	Continuing
Product Development - SAFECAP	C/CPFF	Inventus Power : Woodridge, IL	2.250	0.900	Dec 2021	0.652	Dec 2022	3.260	Dec 2023	-		3.260	Continuing	Continuing	Continuing
Product Development - SAFECAP	WR	NSWC CD : West Bethesda, MD	0.325	0.260	Nov 2021	0.815	Nov 2022	0.168	Nov 2023	-		0.168	Continuing	Continuing	Continuing
Product Development - SAFECAP	WR	NSWC Crane : Crane, Indiana	0.325	0.196	Nov 2021	1.570	Nov 2022	0.184	Nov 2023	-		0.184	Continuing	Continuing	Continuing
Product Development - SAFECAP	C/CPAF	HII Undersea : TBD	0.627	0.369	Dec 2021	0.368	Dec 2022	0.655	Dec 2023	-		0.655	0.000	2.019	-
Product Development - SAFECAP	C/CPAF	HII (Advex) : Norfolk, VA	0.600	0.730	Dec 2021	0.106	Dec 2022	0.319	Dec 2023	-		0.319	0.000	1.755	-
		Subtotal	17.256	29.636		30.258		33.847		-		33.847	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support - RAZORBACK	WR	NUWC Newport : Newport, RI	4.350	2.198	Nov 2021	0.832	Nov 2022	2.332	Nov 2023	-		2.332	0.000	9.712	-
		Subtotal	4.350	2.198		0.832		2.332		-		2.332	0.000	9.712	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	Project (Number/Name) 3785 / *Razorback*	

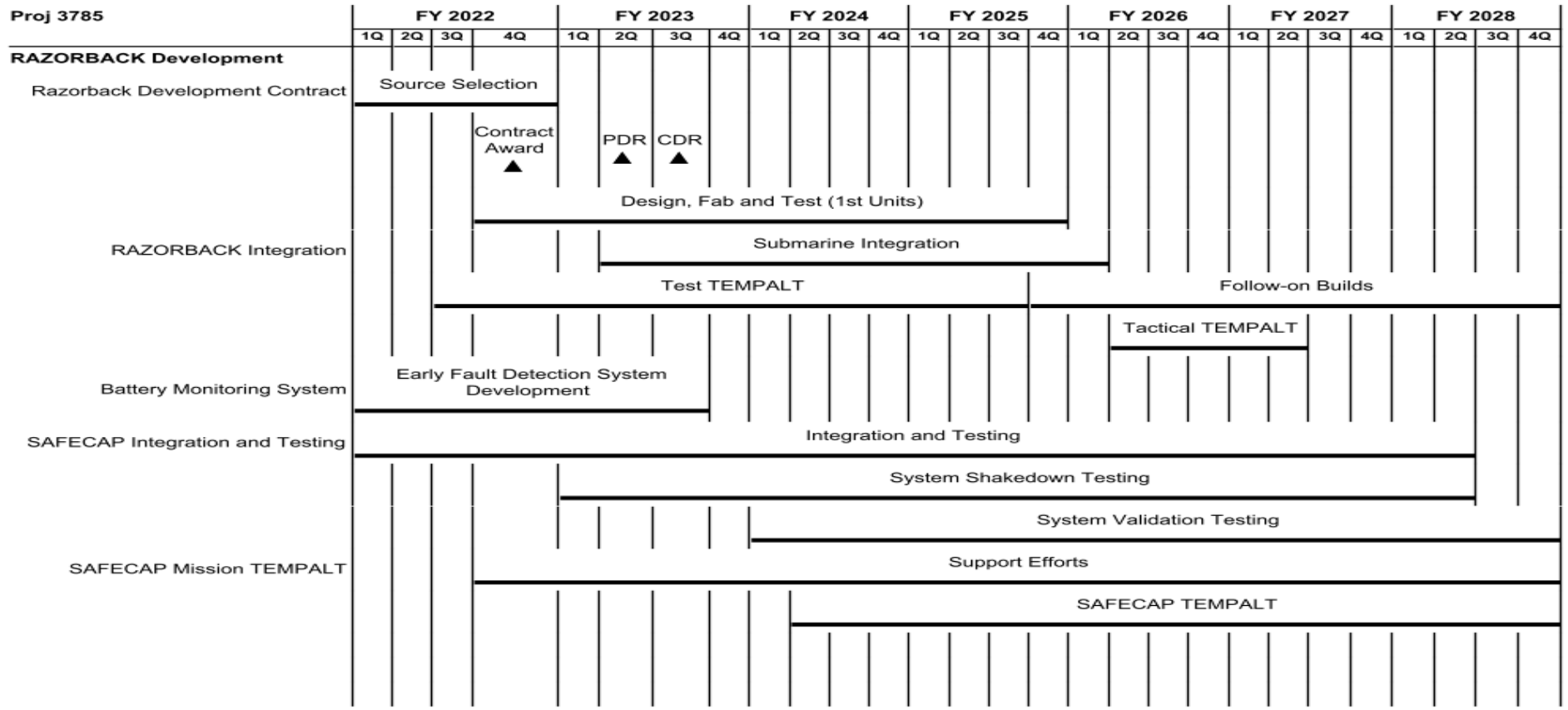
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management - SAFECAP	Various	Various : Washington DC	0.293	0.383	Nov 2021	0.395	Nov 2022	0.400	Nov 2023	-		0.400	Continuing	Continuing	Continuing
Travel - RAZORBACK	Various	NAVSEA HQ : Washington DC	0.060	0.070	Nov 2021	0.085	Nov 2022	0.085	Nov 2023	-		0.085	0.000	0.300	-
Management - RAZORBACK	Various	Various : Various	0.808	0.400	Nov 2021	0.415	Nov 2022	0.427	Nov 2023	-		0.427	0.000	2.050	-
		Subtotal	1.161	0.853		0.895		0.912		-		0.912	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	22.767	32.687		31.985		37.091		-		37.091	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*



2024PB - 0604028N - 3785

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
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				
RAZORBACK Development: Razorback Development Contract: Source Selection	1	2022	4	2022
RAZORBACK Development: Razorback Development Contract: Contract Award	4	2022	4	2022
RAZORBACK Development: Razorback Development Contract: Preliminary Design Review	2	2023	2	2023
RAZORBACK Development: Razorback Development Contract: Critical Design Review	3	2023	3	2023
RAZORBACK Development: Razorback Development Contract: Design, Fabricate, and Test	4	2022	4	2025
RAZORBACK Development: RAZORBACK Integration: Submarine Integration	2	2023	1	2026
RAZORBACK Development: RAZORBACK Integration: Follow-on Builds	4	2025	4	2028
RAZORBACK Development: RAZORBACK Integration: Test TEMPALT	3	2022	3	2025
RAZORBACK Development: RAZORBACK Integration: Tactical TEMPALT	2	2026	2	2027
RAZORBACK Development: Battery Monitoring System: Early Fault Detection System Development	1	2022	3	2023
RAZORBACK Development: SAFECAP Integration and Testing: Procurement and Integration	1	2022	2	2028
RAZORBACK Development: SAFECAP Integration and Testing: System Shakedown Testing	1	2023	2	2028
RAZORBACK Development: SAFECAP Integration and Testing: System Validation Testing	1	2024	4	2028
RAZORBACK Development: SAFECAP Mission TEMPALT: TEMPALT Support Efforts	4	2022	4	2028
RAZORBACK Development: SAFECAP Mission TEMPALT: TEMPALT	2	2024	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy											Date: March 2023	
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 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
4023: *Expeditionary Underwater Systems*	159.114	12.039	14.103	23.175	-	23.175	14.687	12.243	12.305	12.559	Continuing	Continuing
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 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 the requirements defined by the Maritime Expeditionary MCM UUV (MEMUUV) CDD.

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.

Viperfish UUV is an incremental increase in capability from MKI8 MOD 2. It will leverage simultaneous volume and bottom mine hunting capabilities, increase endurance from the Mod 2 system, increased depth capability, and will have embedded automated target recognition (ATR).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Expeditionary UUV Family of Systems	12.039	14.103	23.175	0.000	23.175
Articles:	-	-	-	-	-
Description: This program supports MK18 FOS and Viperfish 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 2023 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY23 efforts will conduct System Functionality Review, System Requirements Review, Preliminary Design Review, and Critical Design Review (CDR) leading to fabrication, testing, and integration. FY23 will also complete the development and testing of the MK 18 Mod 2 Increment II leading to achieving Initial Operational Capability (IOC). ATR investments will continue to enable the transition of Artificial Intelligence/Machine Learning (AI/ML) capabilities into fleet systems. Investments in data warehousing and data pipeline development will continue in FY23 leading to more responsive and agile ATR during GPC scenarios. ***FY 2024 Base Plans:*** FY24 development of MEMUUVs will focus on maturing technology and continue the transition of mature technology candidates that resulted from ONR investments in Future Naval Capabilities (FNC) programs and collaborative efforts with DIU. The technologies developed and transitioned will enable Viperfish and future increments of MEMUUVs to take full advantage of improved computing power, batteries, and hardware/ software architecture. Test and evaluation events in FY24 will focus on demonstrating performance of Advanced Sensor Packages 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 FY24 efforts will include the integration of the GFE Front Nose Section, continued testing and evaluation of the MUUV system, continued software development, and Automated Target Recognition development. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase due to funding required for Viperfish wholeness, development, testing, and technology integration. Increase provides critical government support and oversight to the MUUV contract execution through design and T&E. Increase will provide funding for FY24 events to include: Engineering Development Model fabrication, Test Readiness Review, Contractor-led Design Verification Testing, Quality Assurance testing, Government-led Design Verification Testing, Risk Management Framework steps 3 & 4, initial hazard analysis, Contract Data Requirement List government reviews, and Front Nose Section integration.					
Accomplishments/Planned Programs Subtotals	12.039	14.103	23.175	0.000	23.175

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Viperfish: A competitive contract was awarded to Leidos in July of 2022 in coordination with PMS 406's Razorback Torpedo Tube Launch & Recovery UUV program. The 10 year contract is broken into 2 phases, design and production. Viperfish design phase began in FY22 and will continue into FY26 (System Requirements Review, System Functionality Review, Preliminary Design Review, Critical Design Review, Design Verification Testing, Quality Assurance Testing, Proof Testing, Production Readiness Review). Future technology exploration will continue through the FYDP to incrementally increase the Viperfish system to meet the needs of the Expeditionary community.

MK 18 Legacy: This ongoing program leverages on-going S&T investments by ONR, academia, and industry to transition mature technologies into the Programs of Record to address identified capability gaps. Innovative acquisition approaches, such as the use of User Operational Evaluation System (UOES) strategies, are employed to accelerate the delivery of capability to the Fleet. These approaches provide unique opportunities to engage Fleet operators in tactical experimentation with prototype systems and technologies prior to fielding baseline systems and capability improvement package increments.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	Various : Various	30.450	2.810	Nov 2021	3.325	Nov 2022	5.855	Nov 2023	-		5.855	Continuing	Continuing	Continuing
Primary Hardware Development	WR	NSWC IH EODTD : Indian, Head, MD	16.238	0.000		0.000		0.000		-		0.000	0.000	16.238	-
Systems Engineering	WR	Various : Various	49.027	3.469	Nov 2021	4.068	Nov 2022	6.698	Nov 2023	-		6.698	Continuing	Continuing	Continuing
		Subtotal	95.715	6.279		7.393		12.553		-		12.553	Continuing	Continuing	N/A

Remarks

FY24 increase supports design, development, testing, integration, and evaluation of the Viperfish system as a result of POM-24 Viperfish Wholeness investment decisions to properly fund Viperfish Development.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	Various : Various	7.417	0.406	Nov 2021	0.563	Nov 2022	0.925	Nov 2023	-		0.925	Continuing	Continuing	Continuing
		Subtotal	7.417	0.406		0.563		0.925		-		0.925	Continuing	Continuing	N/A

Remarks

FY24 increase supports design, development, testing, integration, and evaluation of the Viperfish system as a result of POM-24 Viperfish Wholeness investment decisions to properly fund Viperfish Development.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	Various : Various	46.477	5.253	Nov 2021	6.022	Nov 2022	9.461	Nov 2023	-		9.461	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NSWCIHEODTD : Indian Head, MD	1.424	0.000	Nov 2021	0.000	Nov 2022	0.000		-		0.000	0.000	1.424	-
		Subtotal	47.901	5.253		6.022		9.461		-		9.461	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

FY24 increase supports design, development, testing, integration, and evaluation of the Viperfish system as a result of POM-24 Viperfish Wholeness investment decisions to properly fund Viperfish Development.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 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	0.000	5.350	-
Miscellaneous	WR	Various : Various	2.713	0.101	Nov 2021	0.125	Nov 2022	0.236	Nov 2023	-		0.236	Continuing	Continuing	Continuing
DAWDF	WR	Not Specified : Not Specified	0.018	0.000		0.000		0.000		-		0.000	0.000	0.018	-
		Subtotal	8.081	0.101		0.125		0.236		-		0.236	Continuing	Continuing	N/A

Remarks

FY24 increase supports design, development, testing, integration, and evaluation of the Viperfish system as a result of POM-24 Viperfish Wholeness investment decisions to properly fund Viperfish Development.

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	159.114	12.039		14.103		23.175		-		23.175	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
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*

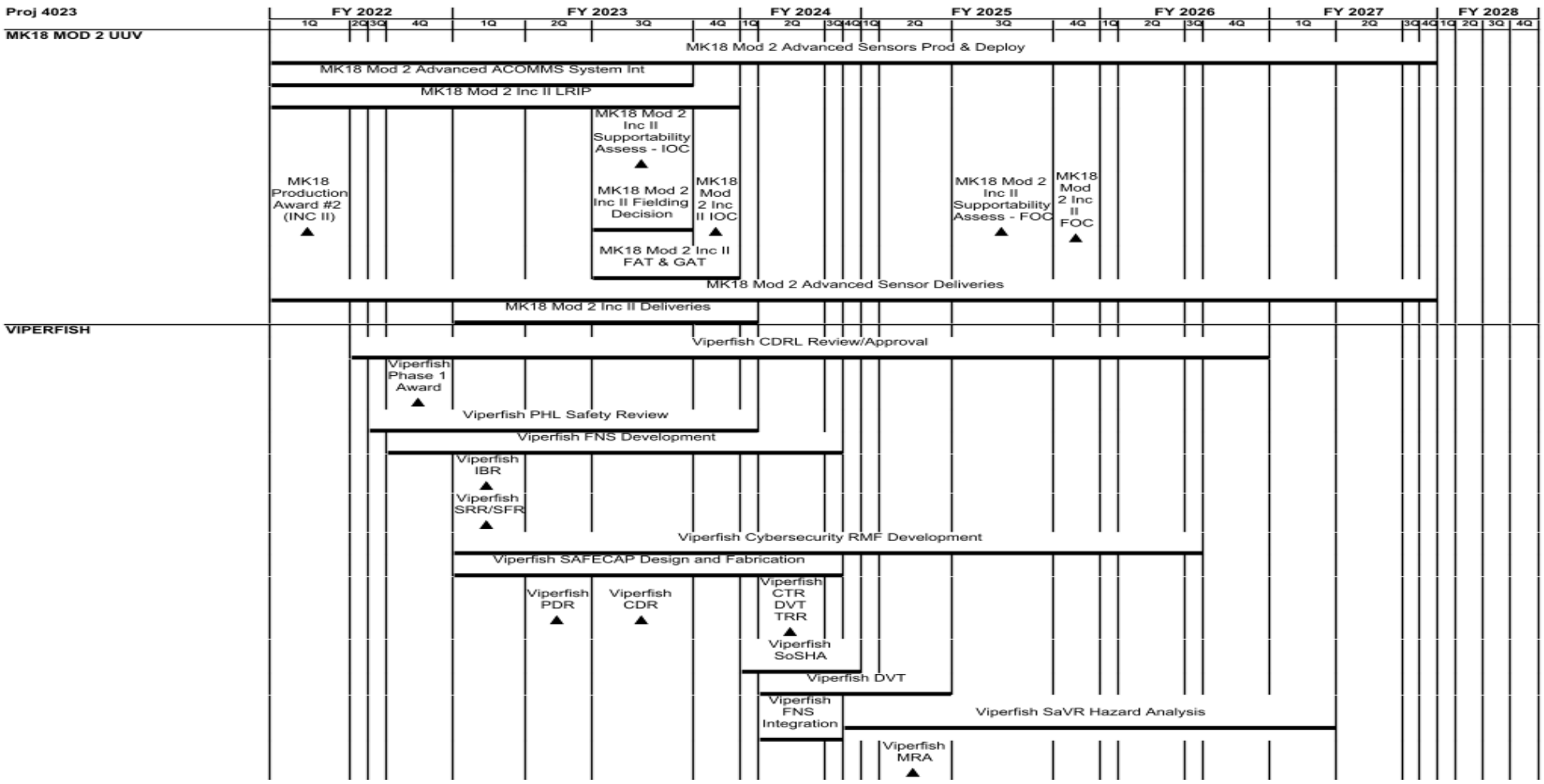


Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 4023				
MK18 MOD 2 UUV: Production and Deployment (Inc II, Advanced Sensors)	1	2022	4	2027
MK18 MOD 2 UUV: Engineering Change & System Integration (Inc II, Advanced ACOMMS)	1	2022	3	2023
MK18 MOD 2 UUV: Low Rate Initial Production (Inc II)	1	2022	4	2023
MK18 MOD 2 UUV: Supportability Assessment (Inc II) - IOC	3	2023	3	2023
MK18 MOD 2 UUV: Fielding Decision (Inc II)	3	2023	3	2023
MK18 MOD 2 UUV: IOC (Inc II)	4	2023	4	2023
MK18 MOD 2 UUV: Supportability Assessment (Inc II) - FOC	3	2025	3	2025
MK18 MOD 2 UUV: FOC (Inc II)	4	2025	4	2025
MK18 MOD 2 UUV: Production Award #2 (Inc II)	1	2022	1	2022
MK18 MOD 2 UUV: Factory and Government Acceptance Testing (Inc II)	3	2023	4	2023
MK18 MOD 2 UUV: Advanced Sensor Deliveries	1	2022	4	2027
MK18 MOD 2 UUV: Inc II Deliveries	1	2023	1	2024
VIPERFISH: Viperfish (Medium MEMUUV) CDRL Review/Approval	2	2022	4	2026
VIPERFISH: Viperfish (Medium MEMUUV) Phase 1 Award	4	2022	4	2022
VIPERFISH: Viperfish (Medium MEMUUV) PHL Safety Review	3	2022	1	2024
VIPERFISH: Viperfish (Medium MEMUUV) FNS Development	4	2022	3	2024
VIPERFISH: Viperfish (Medium MEMUUV) IBR	1	2023	1	2023
VIPERFISH: Viperfish (Medium MEMUUV) SRR/SFR	1	2023	1	2023
VIPERFISH: Viperfish (Medium MEMUUV) Cybersecurity RMF Development	1	2023	3	2026
VIPERFISH: Viperfish (Medium MEMUUV) SAFECAP Design and Fabrication	1	2023	3	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
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: Viperfish (Medium MEMUUV) PDR	2	2023	2	2023
VIPERFISH: Viperfish (Medium MEMUUV) CDR	3	2023	3	2023
VIPERFISH: Viperfish (Medium MEMUUV) CTR DVT TRR	2	2024	2	2024
VIPERFISH: Viperfish (Medium MEMUUV) SoSHA	1	2024	4	2024
VIPERFISH: Viperfish (Medium MEMUUV) DVT	2	2024	2	2025
VIPERFISH: Viperfish (Medium MEMUUV) FNS Integration	2	2024	3	2024
VIPERFISH: Viperfish (Medium MEMUUV) SaVR Hazard Analysis	4	2024	1	2027
VIPERFISH: Viperfish (Medium MEMUUV) MRA	2	2025	2	2025
VIPERFISH: Viperfish (Medium MEMUUV) SVR/FCA	2	2025	2	2025
VIPERFISH: Viperfish (Medium MEMUUV) Phase 2 Source Selection	2	2025	3	2025
VIPERFISH: Viperfish (Medium MEMUUV) PRR	3	2025	3	2025
VIPERFISH: Viperfish (Medium MEMUUV) Phase 2 Award	3	2025	3	2025
VIPERFISH: Viperfish (Medium MEMUUV) Production Lot 1	3	2025	1	2027
VIPERFISH: Viperfish (Medium MEMUUV) TTL&R	3	2025	1	2026
VIPERFISH: Viperfish (Medium MEMUUV) Production Lot 2	2	2026	3	2027
VIPERFISH: Viperfish (Medium MEMUUV) Prod. FAQT TRR	2	2026	2	2026
VIPERFISH: Viperfish (Medium MEMUUV) ATO Submission	2	2026	1	2027
VIPERFISH: Viperfish (Medium MEMUUV) PCA	4	2026	4	2026
VIPERFISH: Viperfish (Medium MEMUUV) IOC	1	2027	1	2027
VIPERFISH: Viperfish (Medium MEMUUV) ATO Approval	2	2027	2	2027
VIPERFISH: Viperfish (Medium MEMUUV) Production Lot 3	2	2027	3	2028
VIPERFISH: Viperfish (Medium MEMUUV) Production Lot 4	2	2028	4	2028