Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	321.988	81.927	110.506	52.994	-	52.994	69.400	57.221	39.424	31.646	Continuing	Continuing
1036: *TETRA*	0.000	0.000	0.000	5.393	-	5.393	4.383	4.410	1.536	1.565	Continuing	Continuing
2482: *Small Unmanned Undersea Vehicles*	15.515	7.278	8.681	6.227	-	6.227	4.465	4.327	3.724	3.746	Continuing	Continuing
2483: *Medusa*	1.835	10.679	32.534	9.270	-	9.270	22.743	22.847	10.068	2.609	Continuing	Continuing
3123: *SMCM UUV*	78.031	19.198	9.025	1.888	-	1.888	1.870	1.866	1.857	0.000	0.000	113.735
3785: *Razorback*	55.454	30.837	37.091	17.820	-	17.820	23.191	11.278	10.097	11.395	Continuing	Continuing
4023: *Expeditionary Underwater Systems*	171.153	13.935	23.175	12.396	-	12.396	12.748	12.493	12.142	12.331	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. This Lionfish UUV system will be the first fielded UUV with cyber compliance.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
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*

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.

FY 2024 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. The Razorback has two variants, the Razorback MK19, formerly referred to as Razorback Dry Deck Shelter (DDS), and the Razorback Torpedo Tube Launch and Recovery (TTL&R). The Razorback MK19 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 Razorback torpedo tube launch and recover (TTL&R) variant, which was competitively sourced to industry in FY 2022.

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. SAFECAP effort is being transferred from PE0604028N PU3785 to PE0604029 PU4053 beginning in FY25.

Minning Expendable Delivery Unmanned Submarine Asset (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 FY24 to develop and produce tactical prototype systems.

Tetra is an operationally relevant Remotely Operated Vehicle (ROV) that is launched, and recovered, from submarine torpedo tubes with the capacity for multiple mission payloads as a key enabler to Subsea Seabed Warfare (SSW) to locate, identify, and provide real-time payload employment to effect objects of interest. As a tethered system, Tetra will provide real-time operational data back to the platform and enable man-in-the-loop intervention to maximize the efficiency of a sortie.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	88.839	110.506	56.586	-	56.586
Current President's Budget	81.927	110.506	52.994	-	52.994
Total Adjustments	-6.912	0.000	-3.592	-	-3.592
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-4.500	0.000			
• SBIR/STTR Transfer	-2.412	0.000			
• Program Adjustments	0.000	0.000	-2.710	-	-2.710
• Rate/Misc Adjustments	0.000	0.000	-0.882	-	-0.882

Change Summary Explanation

Program Changes:
Technical: Not applicable.
Schedule: Not applicable.
Cost:
FY 2023: -$2.412M Small Business Innovative Research; -$4.500M MEDUSA Payloads Below Threshold Reprogramming
FY 2024: No Change
FY 2025: -$3.592M: -$2.710M general program reduction; -$0.882M Miscellaneous Adjustments due to reductions in razorback requirements decreasing development efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy											Date: March 2024	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*				Project (Number/Name) 1036 / *TETRA*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
1036: *TETRA*	0.000	0.000	0.000	5.393	-	5.393	4.383	4.410	1.536	1.565	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Tetra program is a continuation of efforts, realigned from Program Element (PE) 0604029N (UUV Core Technologies) Project Unit (PU) 4053 (UxS Platform) to PE 0604028N (Small/Medium Unmanned Undersea Vehicles) PU 1036 (Tetra), and also includes payload development addressing emergent operational requirements.

This is the sole project unit that enables deployment of Tetra, which is an operationally relevant Remotely Operated Vehicle (ROV) that is launched, and recovered, from submarine torpedo tubes. Tetra is a ROV with the capacity for multiple mission payloads as a key enabler to Subsea Seabed Warfare (SSW) to locate, identify, and provide real-time payload employment to effect objects of interest as identified in the SSW Initial Capabilities Document (ICD). As a tethered system, Tetra will provide real-time operational data back to the platform and enable man-in-the-loop intervention to maximize the efficiency of a sortie. Experimentations will be conducted with Unmanned Undersea Vehicle Squadron One (UUVRON ONE) utilizing government test events, lake testing, and barge tests to provide Fleet and acquisition stakeholders with relevant payload and vehicle employment to inform Concept of Operations (CONOP) and fielding decisions using platforms of opportunity. This project line is also utilized for the development, and integration, of payloads into the Tetra ROV.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**
Title: Product Development	0.000	0.000	5.373	0.000	5.373
Articles:	-	-	-	-	-
Description: Tetra is one of the Navy's key enablers for delivering customer defined payload capabilities not offered by submarines, or Unmanned Underwater Vehicles (UUVs), through Torpedo Tube Launch and Recovery (TTL&R). These capabilities satisfy a maximum variety of SSW Fleet demands. SSW mission packages will develop vehicle interface standards to include potential hardware for Tetra ROVs to enable streamlined development, training, and vehicle reconfiguration. This includes development and implementation plans to test, analyze and integrate required SSW mission package(s) for relevant submarine operations and missions. ***FY 2024 Plans:*** Tetra FY 2024 efforts are funded under PE 0604029N PU 4053. ***FY 2025 Base Plans:*** RF TEMPALT platform demonstration of the first Tetra Shipset and mission package.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 1036 / *TETRA*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Begin emergent requirement development. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Tetra was originally funded in PE 0604029N PU 4053. Increase is the realignment of funds to the new project line ($1.5M) and ($3.9M) for emergent requirement development.					
Title: Test & Evaluation ***Articles:*** ***FY 2024 Plans:*** Tetra FY24 efforts are funded under PE 0604029N PU 4053. ***FY 2025 Base Plans:*** Continued testing support for Tetra efforts. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Tetra was originally funded in PE 0604029N PU 4053. Increase is the realignment of funds to the new project line.	0.000 -	0.000 -	0.020 -	0.000 -	0.020 -
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.393	0.000	5.393

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Tetra is a program that leverages government laboratories, field activities, and industry to enable research and development efforts in support of technology and system development, manufacture, testing and field on submarine host platforms. Engagement with industry will support development of systems for enhanced submarine capability via competitively awarded contracts (e.g., Family of Systems UUV Indefinite Delivery Indefinite Quantity (IDIQ) Contract and utilized Defense Logistics Agency (DLA) IDIQ). These vehicles will facilitate requirements development, system development, and payload production to allow rapid integration into existing ship baselines.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 1036 / *TETRA*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development - Tetra	C/CPFF	ARL/UT : Austin, Texas	0.000	0.000		0.000		0.400	Nov 2024	-		0.400	Continuing	Continuing	Continuing
Product Development - Tetra	WR	NUWC NPT : Newport, RI	0.000	0.000		0.000		0.080	Oct 2024	-		0.080	Continuing	Continuing	Continuing
Product Development - Tetra	WR	PNSY : Portsmouth, NH	0.000	0.000		0.000		0.000	Oct 2024	-		0.000	Continuing	Continuing	Continuing
Product Development - Tetra	WR	NSWC IH : Indian Head, MD	0.000	0.000		0.000		0.000	Oct 2024	-		0.000	Continuing	Continuing	Continuing
Product Development - Tetra	WR	NSWC PD : Philadelphia, PA	0.000	0.000		0.000		0.000	Oct 2024	-		0.000	Continuing	Continuing	Continuing
Product Development - Tetra	C/CPAF	OII : Hanover, MD	0.000	0.000		0.000		1.000	Oct 2024	-		1.000	Continuing	Continuing	Continuing
Product Development - Tetra	C/BA	NIWC PAC : San Diego, CA	0.000	0.000		0.000		3.893	Nov 2024	-		3.893	0.000	3.893	-
		Subtotal	0.000	0.000		0.000		5.373		-		5.373	Continuing	Continuing	N/A

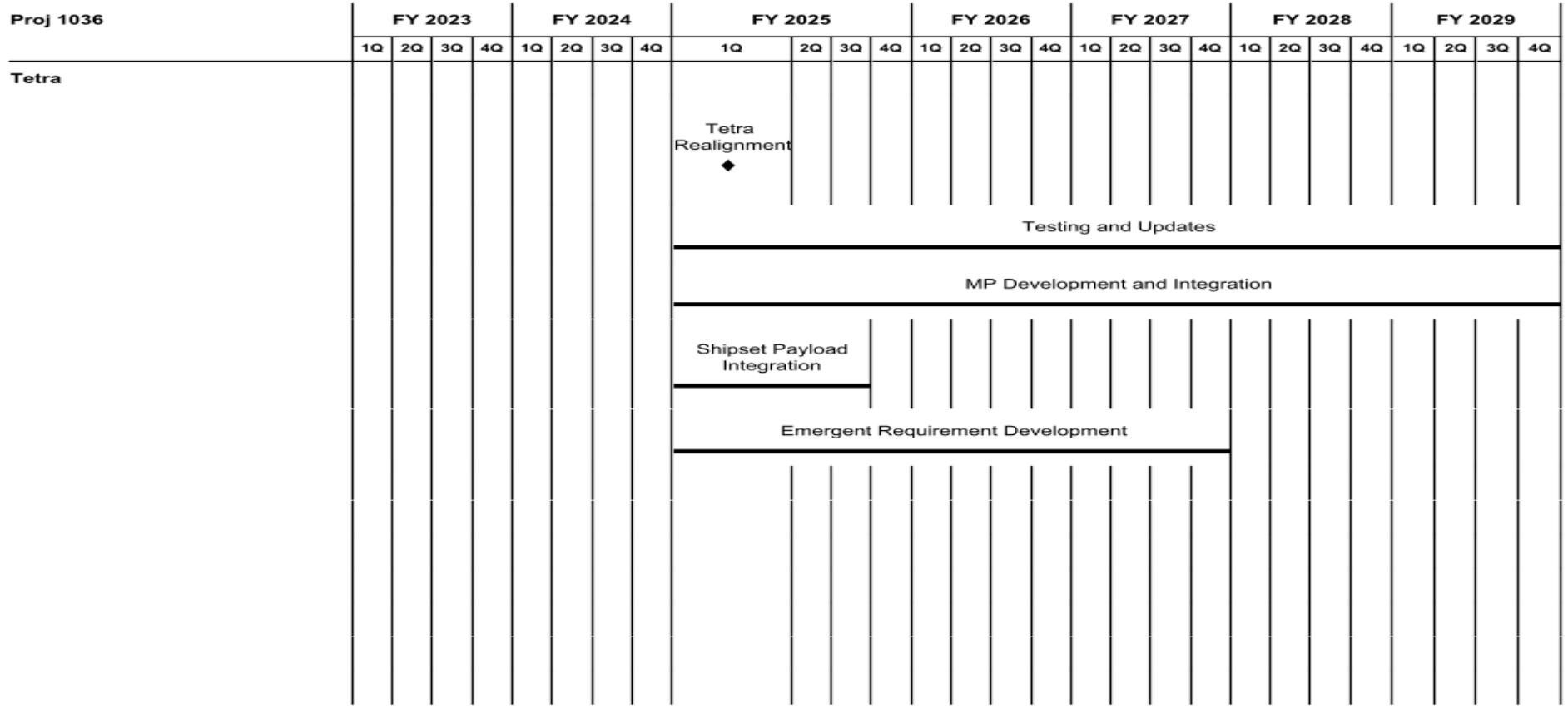
Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	Various : Various	0.000	0.000		0.000		0.020	Jan 2025	-		0.020	0.000	0.020	-
		Subtotal	0.000	0.000		0.000		0.020		-		0.020	0.000	0.020	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		5.393		-		5.393	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 1036 / *TETRA*



2025PB - 0604028N - 1036

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 1036 / *TETRA*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1036				
Tetra: Realignment from PE 0604029N PU 4053	1	2025	1	2025
Tetra: Testing and Updates	1	2025	4	2029
Tetra: Mission Package (MP) Development and Integration	1	2025	4	2029
Tetra: Shipset Payload Integration	1	2025	3	2025
Tetra: Emergent Requirement Development	1	2025	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy											Date: March 2024	
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 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
2482: *Small Unmanned Undersea Vehicles*	15.515	7.278	8.681	6.227	-	6.227	4.465	4.327	3.724	3.746	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 into the baseline Lionfish architecture will be pursued.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: SMALL UNMANNED UNDERWATER VEHICLES	7.278	8.681	6.227	0.000	6.227
Articles:	-	-	-	-	-
FY 2024 Plans: FY 2024 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 Automated Target Recognition (ATR) efforts. These efforts will support test and evaluation to demonstrate operational effectiveness and suitability.					
FY 2025 Base Plans: FY 2025 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 Automated Target Recognition efforts. These efforts will support test and evaluation to demonstrate operational effectiveness and suitability.					
FY 2025 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease due to reduce costs associated with transition of Lionfish from prototype to production, thus reducing the developmental test & evaluation required.					
Accomplishments/Planned Programs Subtotals	7.278	8.681	6.227	0.000	6.227

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• 8128: *Lionfish*	18.354	9.494	17.612	-	17.612	16.183	17.861	0.000	0.000	0.000	79.504

Remarks

D. Acquisition Strategy

The LIONFISH (SUUV) program was awarded in September 2023 to HII using a FAR based firm-fixed-price contract. This contract includes production, training, and engineering support.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy		Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	MIPR	Defense Innovation Unit (DIU) : Mountain View, California	8.439	1.482	Aug 2023	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Advanced Sensors Development	FFRDC	ARL UT/ARL PSU : Not Specified	0.000	0.000		0.000		2.718	Mar 2025	-		2.718	0.000	2.718	-
Systems Engineering	C/CPFF	NSWC, Activities : Various	1.500	0.726	Nov 2022	0.899	Nov 2023	0.730	Nov 2024	-		0.730	Continuing	Continuing	Continuing
		Subtotal	9.939	2.208		0.899		3.448		-		3.448	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	Various : TBD	0.532	0.238	Nov 2022	0.387	Nov 2023	0.100	Nov 2024	-		0.100	Continuing	Continuing	Continuing
		Subtotal	0.532	0.238		0.387		0.100		-		0.100	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NIWC : San Diego	2.599	2.672	Nov 2022	3.945	Nov 2023	1.753	Nov 2024	-		1.753	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NUWC : Newport	1.940	1.933	Nov 2022	3.155	Nov 2023	0.815	Nov 2024	-		0.815	Continuing	Continuing	Continuing
		Subtotal	4.539	4.605		7.100		2.568		-		2.568	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
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*	

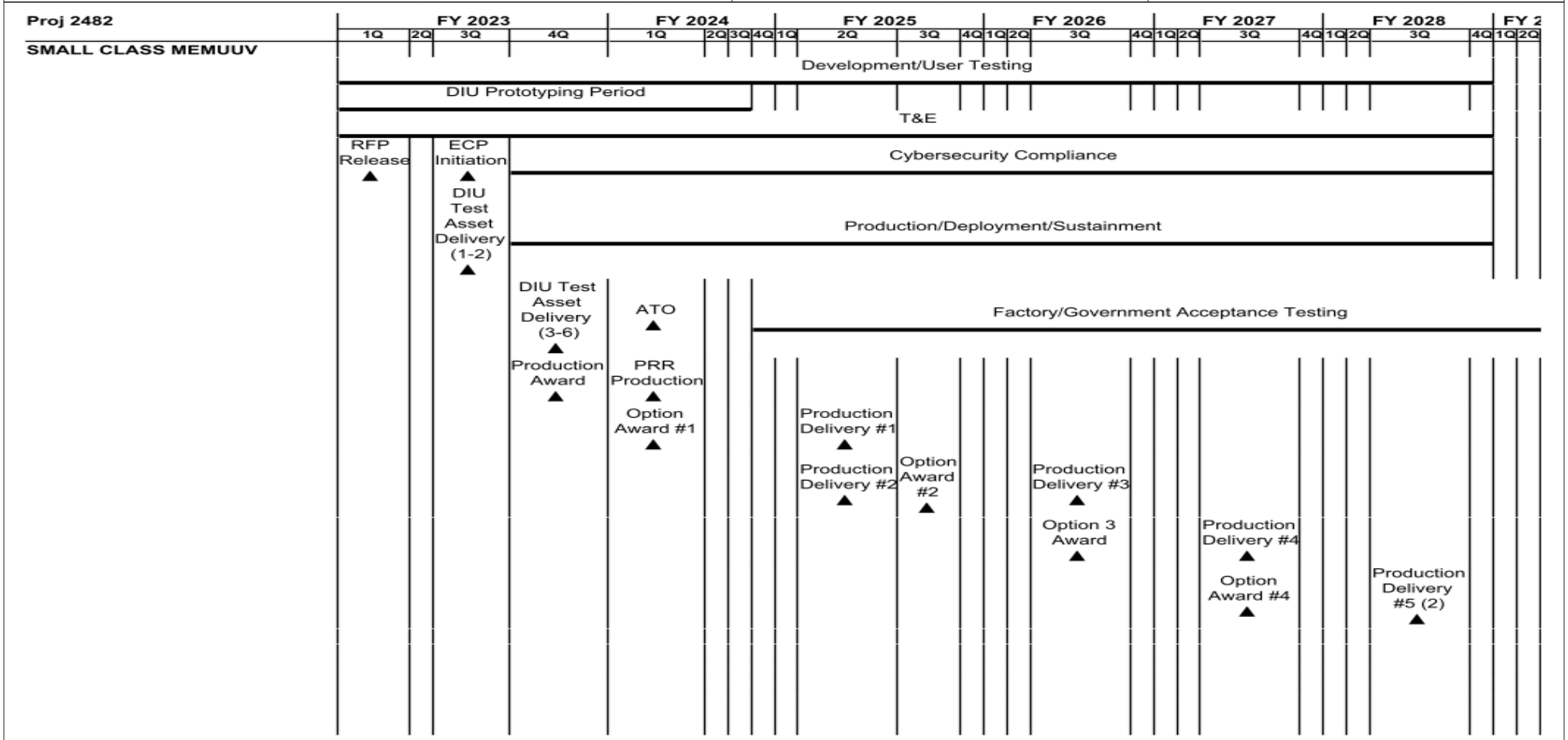
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWCIHEODTD : Indian Head, MD	0.505	0.227	Nov 2022	0.295	Nov 2023	0.111	Nov 2024	-		0.111	Continuing	Continuing	Continuing
		Subtotal	0.505	0.227		0.295		0.111		-		0.111	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.515	7.278		8.681		6.227		-		6.227	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
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*



2025OSD - 0604028N - 2482

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
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 2025 Navy		Date: March 2024
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	2023	4	2028
SMALL CLASS MEMUUV: DIU Prototyping Period	1	2023	3	2024
SMALL CLASS MEMUUV: ATR/Autonomy Development	1	2023	4	2028
SMALL CLASS MEMUUV: ECP Initiation	3	2023	3	2023
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	4	2023	4	2028
SMALL CLASS MEMUUV: Factory and Government Acceptance Testing	1	2024	4	2029
SMALL CLASS MEMUUV: ATO	3	2024	3	2024
SMALL CLASS MEMUUV: DIU Test Asset Delivery (3-6)	4	2023	4	2024
SMALL CLASS MEMUUV: Production Award	4	2023	4	2023
SMALL CLASS MEMUUV: PRR Production	3	2024	3	2024
SMALL CLASS MEMUUV: Option Award #1	1	2024	1	2024
SMALL CLASS MEMUUV: Production Delivery #1 (21)	2	2026	2	2026
SMALL CLASS MEMUUV: Production Delivery #2 (13)	2	2027	2	2027
SMALL CLASS MEMUUV: Option Award #2	1	2025	1	2025
SMALL CLASS MEMUUV: Production Delivery #3 (11)	3	2028	3	2028
SMALL CLASS MEMUUV: Option Award #3	1	2026	1	2026
SMALL CLASS MEMUUV: Production Delivery #4 (5)	3	2029	3	2029
SMALL CLASS MEMUUV: Option Award #4	1	2027	1	2027

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
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: Production Delivery #5 (2)	3	2028	3	2028

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
2483: *Medusa*	1.835	10.679	32.534	9.270	-	9.270	22.743	22.847	10.068	2.609	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 with dummy payloads using a land-based launch facility and surface launched in-water demonstrations. Lessons learned from the demonstration informed a program start in FY 2022 and anticipated competitive award to Industry in FY 2024 to develop and produce tactical prototype systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: MEDUSA Product Development	9.377	28.908	8.433	0.000	8.433
Articles:	-	-	-	-	-
FY 2024 Plans: Begin source selection. Award competitive prototyping contract to industry to design and develop MEDUSA in Q3. Initiate and quickly ramp up industry risk reduction efforts on contract and preliminary design activities. Continue submarine integration planning/preparations and safety planning. Continue mission planning and submarine control system planning/preparations. Maintain government risk reduction efforts. Begin product development.					
FY 2025 Base Plans: Continue industry risk reduction efforts on contract and preliminary design activities. Perform submarine integration, system safety engineering activities, mine payload development, and mission planning and submarine control system integration efforts. Advance product development of MEDUSA through Preliminary Design Review (PDR).					
FY 2025 OCO Plans: N/A					
FY 2024 to FY 2025 Increase/Decrease Statement: Decrease due to the completion of multiple technical Risk Reduction efforts and transition to primarily contractor design efforts.					
Title: MEDUSA Support	1.075	3.158	0.735	0.000	0.735
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
FY 2024 Plans: Provide acquisition and engineering support for source selection, contract award, and contract management activities. ***FY 2025 Base Plans:*** Provide acquisition and engineering support for contract management activities. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** FY 2025 funding is decreased due to reduced technical oversight activities prior to initiation of critical design activities under product development.					
Title: MEDUSA Management Services	0.227	0.468	0.102	0.000	0.102
Articles:	-	-	-	-	-
FY 2024 Plans: Provide technical guidance, project planning, program management, financial management, and travel for contract administration and submarine integration efforts. ***FY 2025 Base Plans:*** Provide technical guidance, project planning, program management, financial management, and travel for contract administration and submarine integration efforts. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** FY 2025 funding is decreased due to reduced management activities prior to initiation of critical design activities under product development.					
Accomplishments/Planned Programs Subtotals	10.679	32.534	9.270	0.000	9.270

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• OPN/1611: *Small & Medium UUV*	0.000	0.000	0.000	-	0.000	0.000	0.000	9.210	17.176	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost

Remarks

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

D. Acquisition Strategy

The MEDUSA UUV will be competed and awarded on a FAR based contract to a prime contractor for the risk reduction, development, and fabrication of test units for system qualification and tactical assessment. The MEDUSA UUV will be integrated with a mine payload which will be acquired separately from the UUV. Detailed acquisition planning and requirements generation commenced in FY 2022, with the target to competitively award the contract to Industry in FY 2024.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Product Development	WR	NSWC PCD : Panama City, FL	0.944	2.650	Nov 2022	2.642	Nov 2023	1.445	Nov 2024	-		1.445	Continuing	Continuing	Continuing
MEDUSA Product Development	WR	NUWC NPT : Newport, RI	0.314	2.570	Nov 2022	1.094	Nov 2023	0.928	Nov 2024	-		0.928	Continuing	Continuing	Continuing
MEDUSA Product Debelopment	WR	Various : Various	0.159	4.157	Nov 2022	1.188	Nov 2023	0.449	Nov 2024	-		0.449	Continuing	Continuing	Continuing
MEDUSA Prototype Contract	C/FPIF	TBD : TBD	0.000	0.000		23.984	Aug 2024	5.611	Jan 2025	-		5.611	0.000	29.595	-
		Subtotal	1.417	9.377		28.908		8.433		-		8.433	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Engineering Support	WR	NSWC PD : Panama City, FL	0.125	0.716	Nov 2022	1.479	Nov 2023	0.350	Nov 2024	-		0.350	Continuing	Continuing	Continuing
MEDUSA Engineering Support	WR	Various : Various	0.086	0.300	Nov 2022	1.061	Nov 2023	0.295	Nov 2024	-		0.295	Continuing	Continuing	Continuing
MEDUSA Safety Support	WR	NSWC IHD : Indian Head, MD	0.039	0.059	Nov 2022	0.618	Nov 2023	0.090	Nov 2024	-		0.090	0.000	0.806	-
		Subtotal	0.250	1.075		3.158		0.735		-		0.735	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDUSA Travel	Various	NAVSEA : Washington, DC	0.010	0.025	Nov 2022	0.050	Nov 2023	0.010	Nov 2024	-		0.010	Continuing	Continuing	Continuing
MEDUSA Management	Various	Various : Various	0.158	0.202	Nov 2022	0.418	Nov 2023	0.092	Nov 2024	-		0.092	Continuing	Continuing	Continuing
		Subtotal	0.168	0.227		0.468		0.102		-		0.102	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
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 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.835	10.679		32.534		9.270		-		9.270	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*

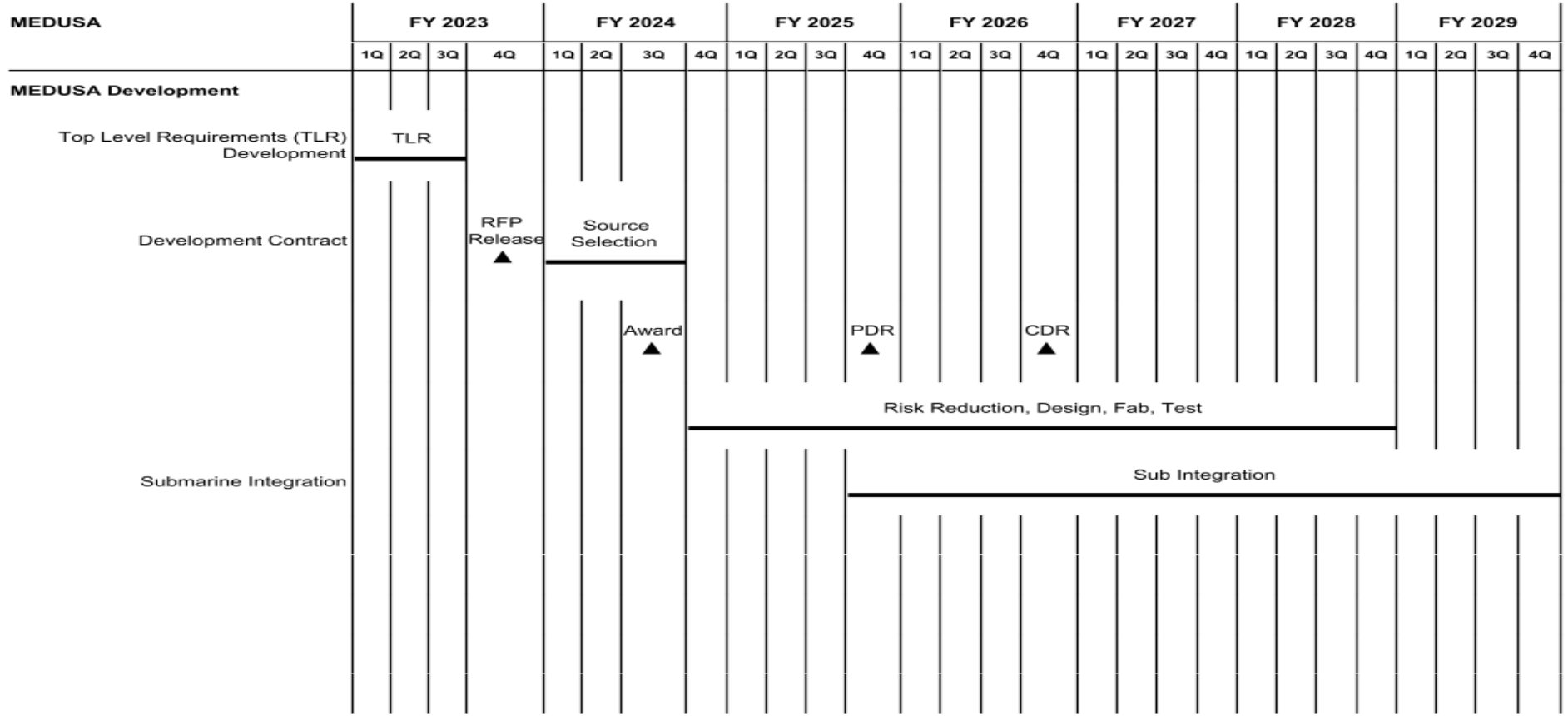


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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 2483 / *Medusa*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MEDUSA				
MEDUSA Development: Top Level Requirements (TLR) Development:	1	2023	3	2023
MEDUSA Development: Development Contract: RFP	4	2023	4	2023
MEDUSA Development: Development Contract: Source Selection	1	2024	3	2024
MEDUSA Development: Development Contract: Contract Award	3	2024	3	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	2029

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
3123: *SMCM UUV*	78.031	19.198	9.025	1.888	-	1.888	1.870	1.866	1.857	0.000	0.000	113.735
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-Q3FY24. 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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Knifefish Development	13.614	9.025	1.888	0.000	1.888
Articles:	-	-	-	-	-
FY 2024 Plans: Knifefish System Acceptance ($4.0M) - Complete Factory Acceptance Test (FAT) and Sea 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. 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 ($5.025M): - 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- 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 2025 Base Plans:*** Continue 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. - Formal Reporting of ERT Findings to include an action plan for capability reinvestment that is achievable within the FYDP - Update Requirements Documentation as Applicable - Develop Acquisition Approach - Initiate Formal Program Transition ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease due to expected completion of Knifefish System Acceptance in FY 2024. Change in effort to support Engineering Review Team and Program Transition in FY 2025.					
Title: Knifefish Support	2.514	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2024 Plans: N/A ***FY 2025 Base Plans:*** N/A ***FY 2025 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
N/A					
Title: Knifefish Test and Evaluation	2.210	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2024 Plans: N/A					
FY 2025 Base Plans: N/A					
FY 2025 OCO Plans: N/A					
Title: Knifefish Management Services	0.860	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2024 Plans: N/A					
FY 2025 Base Plans: N/A					
FY 2025 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	19.198	9.025	1.888	0.000	1.888

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• OPN/1601: *LCS MCM Mission Modules*	92.495	93.961	118.247	-	118.247	101.172	62.758	60.396	57.096	1,508.277	2,716.433
• OPN/1611: *Small & Medium UUV*	49.763	61.951	48.780	-	48.780	76.046	103.448	111.665	122.321	Continuing	Continuing

Remarks

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

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

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 2025 Navy		Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 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	0.000	10.723	-
Knifefish Block 1 Development Contractor	C/CPIF	GDMS : McLeansville, NC	39.364	9.862	Nov 2022	4.000	Nov 2023	0.000		-		0.000	0.000	53.226	-
Knifefish Block 1 Development	C/CPIF	Various : Various	4.379	0.971	Nov 2022	0.000		0.000		-		0.000	0.000	5.350	-
LFBB technology improvements	WR	NRL : Washington DC	0.000	0.781	Nov 2022	0.000		0.000		-		0.000	0.000	0.781	-
Knifefish Engineering Review Team	WR	NSWC PC : Panama City, FL	0.000	0.000		5.025	Nov 2023	1.888	Nov 2024	-		1.888	0.000	6.913	-
		Subtotal	54.466	11.614		9.025		1.888		-		1.888	0.000	76.993	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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	WR	NSWC, PC : Panama City, FL	6.659	1.734	Nov 2022	0.000		0.000		-		0.000	0.000	8.393	-
Engineering Support	WR	NUWC, Newport : Newport, RI	3.650	0.530	Nov 2022	0.000		0.000		-		0.000	0.000	4.180	-
Engineering Support	WR	Various : Various	3.621	0.250	Nov 2022	0.000		0.000		-		0.000	0.000	3.871	-
		Subtotal	13.930	2.514		0.000		0.000		-		0.000	0.000	16.444	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy		Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	Various : Various	0.737	0.850	Dec 2022	0.000		0.000		-		0.000	0.000	1.587	-
Operational Test & Evaluation (OT&E)	WR	COMOPTEVFOR : Norfolk, VA	1.330	0.408	Nov 2022	0.000		0.000		-		0.000	0.000	1.738	-
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	NSWC, PC : Panama City, FL	4.104	2.952	Nov 2022	0.000		0.000		-		0.000	0.000	7.056	-
		Subtotal	6.171	4.210		0.000		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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	Various : Washington, DC	3.164	0.810	Dec 2022	0.000		0.000		-		0.000	0.000	3.974	-
Travel	WR	NAVSEA : WNY, DC	0.300	0.050	Nov 2022	0.000		0.000		-		0.000	0.000	0.350	-
		Subtotal	3.464	0.860		0.000		0.000		-		0.000	0.000	4.324	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	78.031	19.198		9.025		1.888		-		1.888	0.000	108.142	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

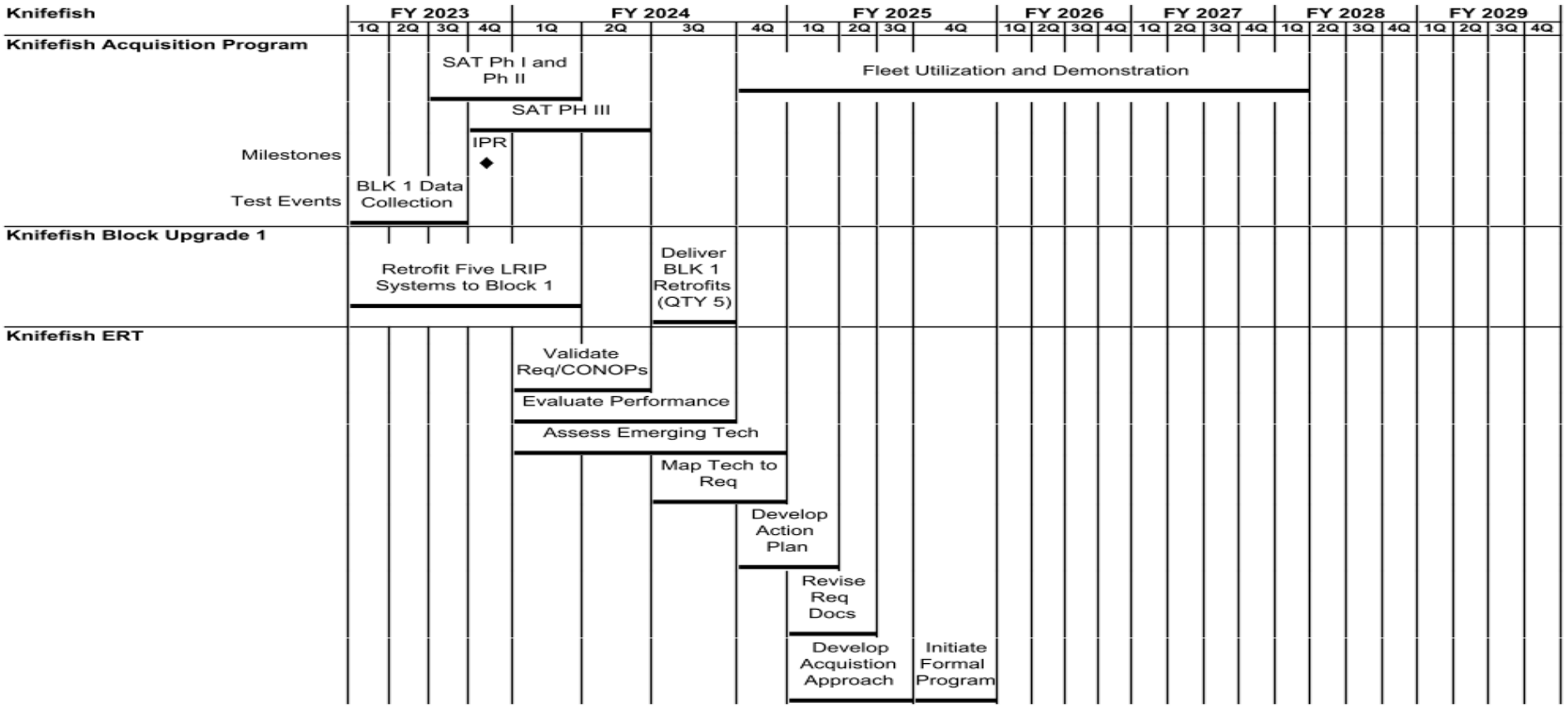

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3123 / *SMCM UUV*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Knifefish				
Knifefish Acquisition Program: Fleet Utilization and Demonstration	4	2024	1	2028
Knifefish Acquisition Program: SAT Ph I and Ph II	3	2023	1	2024
Knifefish Acquisition Program: SAT Ph III	4	2023	2	2024
Knifefish Acquisition Program: Milestones: In Progress Review (IPR)	4	2023	4	2023
Knifefish Acquisition Program: Test Events: Block 1 Data Collection	1	2023	3	2023
Knifefish Block Upgrade 1: Retrofit Five LRIP Systems to Block 1	1	2023	1	2024
Knifefish Block Upgrade 1: Deliver Block 1 Retrofits (QTY 5)	3	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
Knifefish ERT: Validate Requirements and CONOPs with Fleet	1	2024	2	2024
Knifefish ERT: Evaluate Knifefish Performance Against Requirements	1	2024	3	2024
Knifefish ERT: Assess Existing / Emerging Technologies	1	2024	4	2024
Knifefish ERT: Map Potential Technologies to Requirements	3	2024	4	2024
Knifefish ERT: Develop Action Plan for Capability Reinvestment	4	2024	1	2025
Knifefish ERT: Revise Requirements Documentation	1	2025	2	2025
Knifefish ERT: Develop Acquisition Approach	1	2025	3	2025
Knifefish ERT: Initiate Formal Program Transition	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy											Date: March 2024	
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 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
3785: *Razorback*	55.454	30.837	37.091	17.820	-	17.820	23.191	11.278	10.097	11.395	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. SAFECAP is being transferred to PE 0604029 PU 4053 beginning in FY25

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. The Razorback has two variants, the Razorback MK19, formerly referred to as Razorback Dry Deck Shelter (DDS), and the Razorback Torpedo Tube Launch and Recovery (TTL&R). The Razorback MK19 deployed variant has been procured beginning in FY 2017 with Fleet operational deployments planned for FY 2021-FY 2027. Development of requirements and submarine integration efforts commenced in FY 2019 for the torpedo tube launch and recover (TTL&R) variant, which was competitively sourced to industry in FY 2022. 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. SAFECAP effort is being transferred from PE0604028N PU3785 to PE0604029 PU4053 beginning in FY25.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**
Title: Product Development - Razorback	21.116	24.926	14.962	0.000	14.962
Articles:	-	-	-	-	-
FY 2024 Plans: Continue EDM fabrication. Continue data products development and analysis for submarine integration including Temporary Alteration (TEMPALT) and Li-ion battery certification efforts. Continue submarine combat system					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
integration development. Initiate training development to include curriculum, Virtual Reality Courseware, simulator and other training devices to satisfy Fleet Operator and Maintainer requirements. ***FY 2025 Base Plans:*** Complete EDM fabrication. Initiate 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. EDM testing is Contractor and Government DVT which occurs prior to Navy acceptance from the Contractor and is not formal Developmental or Operational Testing (DT/OT). ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease is due to transition from EDM fabrication into DVT.					
Title: Product Development - SAFECAP	7.994	8.921	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2024 Plans: Increase capsule production levels to support planned submarine-based UxS demonstrations and operations. ***FY 2025 Base Plans:*** SAFECAP Transferred to PE0604029 PU4053 ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** SAFECAP Transferred to PE0604029 PU4053					
Title: Management Services	0.895	0.912	0.526	0.000	0.526
Articles:	-	-	-	-	-
FY 2024 Plans: Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2025 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Provide technical guidance, project planning, program management, financial and contracting management, and travel for contract administration and submarine integration efforts. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change					
Title: Support	0.832	2.332	2.332	0.000	2.332
Articles:	-	-	-	-	-
FY 2024 Plans: Provided 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 2025 Base 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 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change.					
Accomplishments/Planned Programs Subtotals	30.837	37.091	17.820	0.000	17.820

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• OPN 1611: *Small & Medium UUV (Razorback only)*	10.306	16.120	17.817	-	17.817	39.511	55.674	57.420	59.163	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 2025 Navy		Date: March 2024
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 is 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 MK19 Razorback Dry Deck Shelter variant. Requirements generation and initial submarine integration efforts began in FY 2019, followed by Request for Proposal (RFP) release to industry in FY 2020, and an award in FY 2022 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 2025 Navy		Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RAZORBACK Product Development -	WR	NUWC NPT : Newport, RI	10.522	1.544	Nov 2022	3.580	Nov 2023	2.500	Nov 2024	-		2.500	Continuing	Continuing	Continuing
RAZORBACK EDM Contract	C/CPIF	Leidos : Reston, VA	10.115	12.151	Jun 2023	11.433	Nov 2023	6.162	Nov 2024	-		6.162	Continuing	Continuing	Continuing
RAZORBACK Product Development	C/CPFF	ARL/UT : Austin, TX	13.980	0.757	Nov 2022	3.977	Nov 2023	1.200	Dec 2024	-		1.200	Continuing	Continuing	Continuing
RAZORBACK Product Development	WR	Various : Various	3.502	6.664	Nov 2022	5.936	Nov 2023	5.100	Nov 2024	-		5.100	Continuing	Continuing	Continuing
Product Development - SAFECAP	WR	NUWC NPT : Newport RI	2.191	4.483	Nov 2022	4.335	Nov 2023	0.000		-		0.000	0.000	11.009	-
Product Development - SAFECAP	C/CPFF	Inventus Power : Woodridge, IL	3.150	0.652	Dec 2022	3.260	Dec 2023	0.000		-		0.000	0.000	7.062	-
Product Development - SAFECAP	WR	NSWC CD : West Bethesda, MD	0.585	0.815	Nov 2022	0.168	Nov 2023	0.000		-		0.000	0.000	1.568	-
Product Development - SAFECAP	WR	NSWC Crane : Crane, Indiana	0.521	1.570	Nov 2022	0.184	Nov 2023	0.000		-		0.000	0.000	2.275	-
Product Development - SAFECAP	C/CPAF	HII Undersea : TBD	0.996	0.368	Dec 2022	0.655	Dec 2023	0.000		-		0.000	0.000	2.019	-
Product Development - SAFECAP	C/CPAF	HII (Advex) : Norfolk, VA	1.330	0.106	Dec 2022	0.319	Dec 2023	0.000		-		0.000	0.000	1.755	-
		Subtotal	46.892	29.110		33.847		14.962		-		14.962	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support - RAZORBACK	WR	NUWC Newport : Newport, RI	6.548	0.832	Nov 2022	2.332	Nov 2023	2.332	Nov 2024	-		2.332	Continuing	Continuing	Continuing
		Subtotal	6.548	0.832		2.332		2.332		-		2.332	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management - SAFECAP	Various	Various : Washington DC	0.676	0.395	Nov 2022	0.400	Nov 2023	0.000		-		0.000	0.000	1.471	-
Travel - RAZORBACK	Various	NAVSEA HQ : Washington DC	0.130	0.085	Nov 2022	0.085	Nov 2023	0.086	Nov 2024	-		0.086	Continuing	Continuing	Continuing
Management - RAZORBACK	Various	Various : Various	1.208	0.415	Nov 2022	0.427	Nov 2023	0.440	Nov 2024	-		0.440	Continuing	Continuing	Continuing
		Subtotal	2.014	0.895		0.912		0.526		-		0.526	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	55.454	30.837		37.091		17.820		-		17.820	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

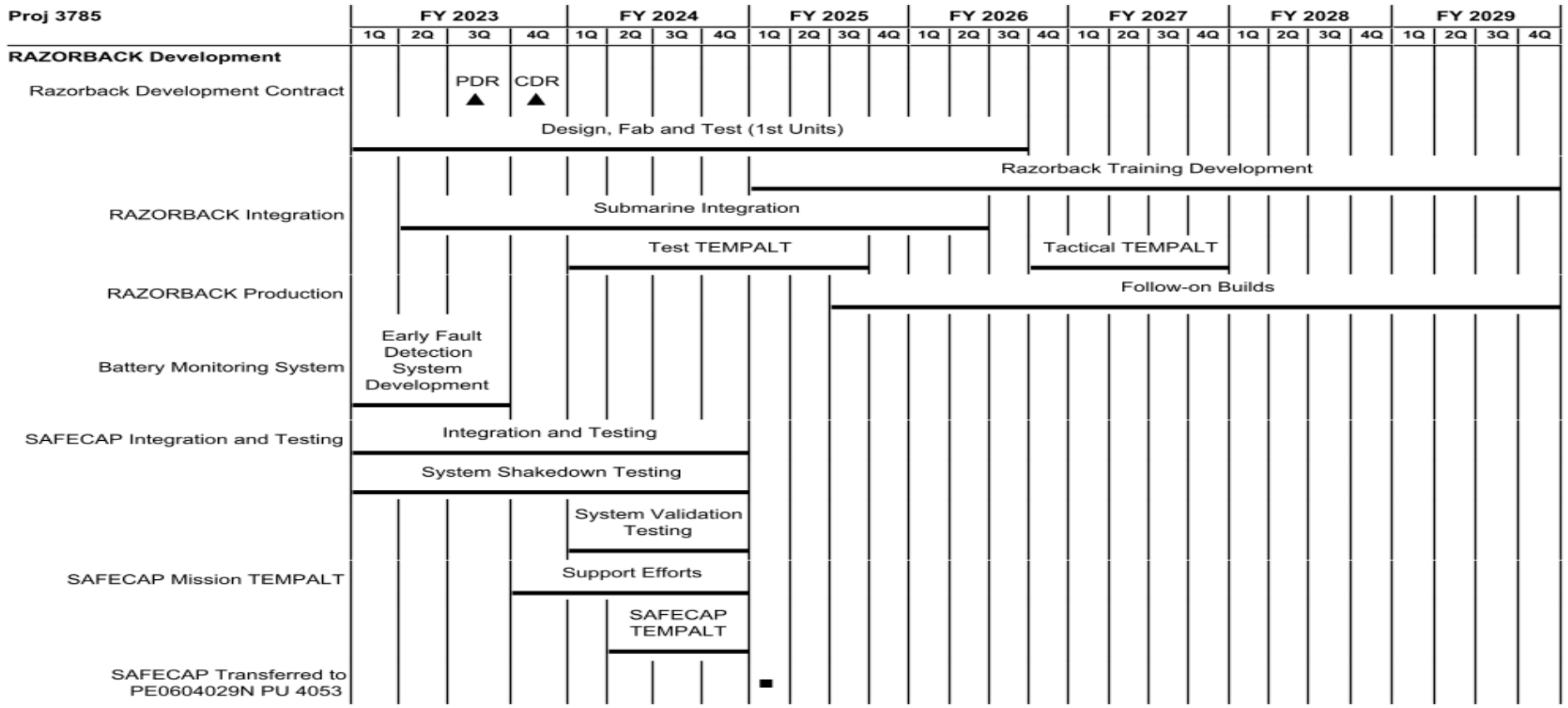

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 3785 / *Razorback*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3785				
RAZORBACK Development: Razorback Development Contract: Preliminary Design Review	3	2023	3	2023
RAZORBACK Development: Razorback Development Contract: Critical Design Review	4	2023	4	2023
RAZORBACK Development: Razorback Development Contract: Design, Fabricate, and Test	1	2023	3	2026
RAZORBACK Development: Razorback Development Contract: Razorback Training Development	1	2025	4	2029
RAZORBACK Development: RAZORBACK Integration: Submarine Integration	2	2023	2	2026
RAZORBACK Development: RAZORBACK Integration: Test TEMPALT	1	2024	3	2025
RAZORBACK Development: RAZORBACK Integration: Tactical TEMPALT	4	2026	4	2027
RAZORBACK Development: RAZORBACK Production: Follow-on Builds	3	2025	4	2029
RAZORBACK Development: Battery Monitoring System: Early Fault Detection System Development	1	2023	3	2023
RAZORBACK Development: SAFECAP Integration and Testing: Procurement and Integration	1	2023	4	2024
RAZORBACK Development: SAFECAP Integration and Testing: System Shakedown Testing	1	2023	4	2024
RAZORBACK Development: SAFECAP Integration and Testing: System Validation Testing	1	2024	4	2024
RAZORBACK Development: SAFECAP Mission TEMPALT: TEMPALT Support Efforts	4	2023	4	2024
RAZORBACK Development: SAFECAP Mission TEMPALT: TEMPALT	2	2024	4	2024
RAZORBACK Development: SAFECAP Transferred to PE0604029N PU 4053: SAFECAP Transferred to PE0604029N PU4053	1	2025	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy											Date: March 2024	
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 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
4023: *Expeditionary Underwater Systems*	171.153	13.935	23.175	12.396	-	12.396	12.748	12.493	12.142	12.331	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 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 MK 18 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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Expeditionary UUV Family of Systems	13.935	23.175	12.396	0.000	12.396
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 2024 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
FY 2024 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. 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. Funding provides 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." Viperfish FY24 efforts will include finishing the design of the MUUV, the commencement of Engineering Design Model fabrication of 4 MUUVs, Expeditionary Mission Support Equipment validation testing, and software development. ***FY 2025 Base Plans:*** Viperfish FY 2025 efforts will include continuing testing and evaluation, continued software development, and Automated Target Recognition development. MK18 FY 2025 efforts will include continued development and evaluation of artificial intelligence/machine learning algorithms and advanced autonomy behaviors. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** FY 2025 decrease is attributed to initial Viperfish plan of a natural reduction of testing from FY 2024 to FY 2025. Viperfish testing was to commence in FY 2024 and be completed at Q3 FY 2025.					
Accomplishments/Planned Programs Subtotals	13.935	23.175	12.396	0.000	12.396

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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: 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 2025 Navy		Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	Various : Various	33.260	3.325	Nov 2022	5.855	Nov 2023	2.976	Nov 2024	-		2.976	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	52.496	4.040	Nov 2022	6.698	Nov 2023	3.686	Nov 2024	-		3.686	Continuing	Continuing	Continuing
		Subtotal	101.994	7.365		12.553		6.662		-		6.662	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	Various : Various	7.823	0.523	Nov 2022	0.925	Nov 2023	0.509	Nov 2024	-		0.509	Continuing	Continuing	Continuing
		Subtotal	7.823	0.523		0.925		0.509		-		0.509	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	Various : Various	51.730	5.922	Nov 2022	9.461	Nov 2023	5.120	Nov 2024	-		5.120	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NSWCIHEODTD : Indian Head, MD	1.424	0.000	Nov 2022	0.000		0.000		-		0.000	0.000	1.424	-
		Subtotal	53.154	5.922		9.461		5.120		-		5.120	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 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	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
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*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Miscellaneous	WR	Various : Various	2.814	0.125	Nov 2022	0.236	Nov 2023	0.105	Nov 2024	-		0.105	Continuing	Continuing	Continuing
DAWDF	WR	Not Specified : Not Specified	0.018	0.000		0.000		0.000		-		0.000	0.000	0.018	-
		Subtotal	8.182	0.125		0.236		0.105		-		0.105	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	171.153	13.935		23.175		12.396		-		12.396	Continuing	Continuing	N/A

Remarks

FY 2025 decrease supports testing, integration, and evaluation of the Viperfish system.

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
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*

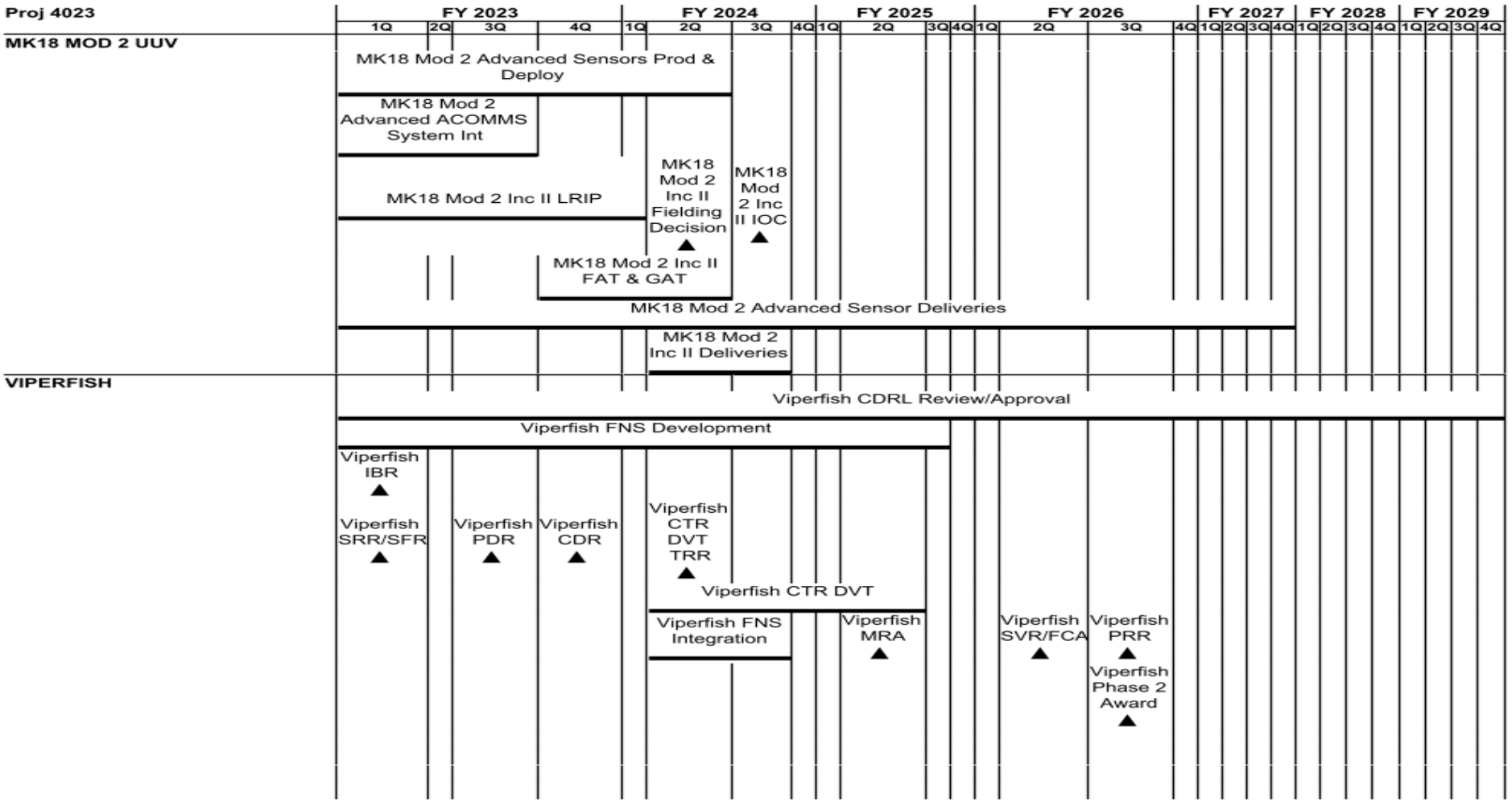

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604028N / *Small/Medium Unmanned Undersea Vehicles*	**Project (Number/Name)** 4023 / *Expeditionary Underwater Systems*

2025OSD - 0604028N - 4023

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
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	2023	2	2024
MK18 MOD 2 UUV: Engineering Change & System Integration (Inc II, Advanced ACOMMS)	1	2023	3	2023
MK18 MOD 2 UUV: Low Rate Initial Production (Inc II)	1	2023	1	2024
MK18 MOD 2 UUV: Fielding Decision (Inc II)	2	2024	2	2024
MK18 MOD 2 UUV: IOC (Inc II)	3	2024	3	2024
MK18 MOD 2 UUV: Factory and Government Acceptance Testing (Inc II)	4	2023	2	2024
MK18 MOD 2 UUV: Advanced Sensor Deliveries	1	2023	4	2026
MK18 MOD 2 UUV: Inc II Deliveries	2	2024	3	2024
MK18 MOD 2 UUV: IOC Supportability Assessment	2	2024	2	2024
VIPERFISH: Viperfish (Medium MEMUUV) CDRL Review/Approval	1	2023	4	2029
VIPERFISH: Viperfish (Medium MEMUUV) FNS Development	1	2023	3	2025
VIPERFISH: Viperfish (Medium MEMUUV) IBR	1	2023	1	2023
VIPERFISH: Viperfish (Medium MEMUUV) SRR/SFR	1	2023	1	2023
VIPERFISH: Viperfish (Medium MEMUUV) PDR	3	2023	3	2023
VIPERFISH: Viperfish (Medium MEMUUV) CDR	4	2023	4	2023
VIPERFISH: Viperfish (Medium MEMUUV) CTR DVT TRR	2	2024	2	2024
VIPERFISH: Viperfish (Medium MEMUUV) DVT	2	2024	2	2025
VIPERFISH: Viperfish (Medium MEMUUV) FNS Integration	2	2024	3	2024
VIPERFISH: Viperfish (Medium MEMUUV) MRA	2	2025	2	2025
VIPERFISH: Viperfish (Medium MEMUUV) SVR/FCA	2	2026	2	2026

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
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) PRR	3	2026	3	2026
VIPERFISH: Viperfish (Medium MEMUUV) Phase 2 Award	3	2026	3	2026