Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
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 0604536N *I Advanced Undersea Prototyping*

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	345.766	86.011	31.609	116.880	-	116.880	74.620	0.677	0.693	0.707	Continuing	Continuing
3394: *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	345.766	86.011	31.609	116.880	-	116.880	74.620	0.677	0.693	0.707	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Orca Extra Large Unmanned Undersea Vehicle (XLUUV) is the Navy's Extra Large UUV effort as part of the Family of UUVs. The Orca XLUUV effort is established to address a Joint Emergent Operational Need (JEON). Orca XLUUV is a multi-phased accelerated acquisition effort to rapidly deliver capability to the Fleet. Phase 1 was a competitively sourced design effort. Phase 2 down selected to one of the Phase 1 vendors in FY 2019 for fabrication and testing of the vehicle and support elements. Testing and delivery of the vehicles and support elements has been delayed to FY22-23 due to contractor challenges and supplier issues. The Navy is working with Boeing to mitigate schedule delays and execute risk reduction testing through the addition of a designated test and training asset. The Navy is updating facilities at the Naval Base Ventura County site for testing, training, and work-ups, in coordination with large unmanned surface vessel testing for cost efficiencies. Fabrication awards of additional Orca XLUUV systems are planned for FY24 and out, gradually ramping up quantities in future fiscal years, depending on the progress from the first five systems. XLUUV will have a modular payload bay, with defined interfaces that current and future payloads must adhere to for employment from the vehicle. The Orca XLUUV effort will integrate the currently required payload, and potential future payloads will be developed, evaluated, and preliminarily integrated leveraging the Core Technologies Program Element 0604029N. Additional XLUUV technologies/capabilities risk reduction will occur in parallel, leveraging the competitive Industrial base.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	89.296	58.473	0.000	-	0.000
Current President's Budget	86.011	31.609	116.880	-	116.880
Total Adjustments	-3.285	-26.864	116.880	-	116.880
• Congressional General Reductions	-	-0.059			
• Congressional Directed Reductions	-	-26.805			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.285	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	116.880	-	116.880

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
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 0604536N *I Advanced Undersea Prototyping*

Change Summary Explanation

Technical: Not applicable.
Schedule: Not applicable.
Cost:
FY 2021: -$3.285M Small Business Innovative Research
FY 2022: -$26.805M Congressional reductions

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / *Advanced Undersea Prototyping*	Project (Number/Name) 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
3394: *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	345.766	86.011	31.609	116.880	-	116.880	74.620	0.677	0.693	0.707	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Fabrication of first unit complete and commenced testing.

A. Mission Description and Budget Item Justification

The Orca Extra Large Unmanned Undersea Vehicle (XLUUV) is the Navy's Extra Large UUV effort as part of the UUV Family of Systems (FoS). The Orca XLUUV effort has been established to address a Joint Emergent Operational Need (JEON). Orca XLUUV will have a modular payload bay, with defined interfaces that current and future payloads must adhere to for employment from the vehicle. The Orca XLUUV effort will integrate the currently required payload, and additional potential future payloads will be developed, evaluated, and preliminarily integrated under the Core Technologies Program Element 0604029N. Additional XLUUV technologies/ capabilities risk reduction will occur in parallel, leveraging the competitive Industrial base.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: XLUUV Product Development	67.511	11.824	60.696	0.000	60.696
Articles:	-	-	-	-	-
Description: Orca XLUUV Phase 1 design was completed via a full and open competition with two industry teams. Phase 2 fabrication was down selected to one vendor for the fabrication and delivery of 5 Orca vehicles.					
FY 2022 Plans: Continue Phase 2 fabrication of initial vehicles including delivery of a designated test and training vehicle, now designated Vehicle 0 (XLE0). Vehicle 0 to begin contractor in-water risk reduction testing by Q3FY22. Contractor to utilize risk reduction testing to mitigate schedule, manufacturing, and technical risks to vehicles (Vehicles 1-5) to meet the JEON requirement.					
FY 2023 Base Plans: Complete risk reduction testing and conduct test/fix/test period using XLE0. Complete Phase 2 fabrication and integration of Vehicle 1. Continue Phase 2 fabrication and integration of vehicles 2-5. Conduct contractor testing					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
to verify system requirements on Vehicle 1 and prepare system for Government testing. Continue additional XLUUV technologies/capabilities risk reduction leveraging the competitive Industrial base. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase of $48.872M due to contract funding requirements for vehicles 1-5, the addition of test and training Vehicle 0(XLE0), and the purchase of prototype spares and lower level support equipment.					
Title: XLUUV Support	11.664	6.061	19.407	0.000	19.407
Articles:	-	-	-	-	-
FY 2022 Plans: Support engineering and technical oversight of fabrication efforts and engineering services including engineering change proposals. Review and approve CDRLs, final design products, and manufacturing processes. Provide expert oversight and support of subsystem and system testing, including performing final system inspection and acceptance of Vehicle 0. Engage UUVRON to develop and document tactics, techniques, and procedures (TTPs) to create and validate Integrated Logistics Support products. ***FY 2023 Base Plans:*** Support engineering and technical oversight of fabrication efforts and engineering services including engineering change proposals. Review and approve CDRLs, design products, and manufacturing processes. Provide expert oversight and support of subsystem and system testing, including performing final system inspection and acceptance for vehicle 1. Provide support for Government testing as well as Government-furnished facilities and test sites, and complete safety certifications. Engage UUVRON to develop and document tactics, techniques, and procedures (TTPs) to create and validate Integrated Logistics Support products. Continue payload integration efforts. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Increase of $13.287M due to increased support for final inspection and acceptance of vehicle 1 as well as increased support for testing performed at Government facilities, including on-site acoustic testing, battery certifications and engineering studies.					
Title: XLUUV Test and Evaluation	2.790	11.330	33.338	0.000	33.338
Articles:	-	-	-	-	-
FY 2022 Plans: Complete XLUUV contractor testing of vehicle 0. Begin Vehicle 0 risk reduction testing and planning for XLUUV system level and upcoming Navy testing accordingly. Continue planning efforts and infrastructure development initiated in FY20 to support XLUUV basing, testing, training, fleet integration and CONOPs.					
FY 2023 Base Plans: Begin contractor testing for system requirements verification of Vehicle 1. Fabrication contractor to provide support for test events including technical representatives and hardware to conduct events. Commence initial Navy testing and related Fleet training. Begin subsystem testing for payload integration. Continue efforts and infrastructure development to support XLUUV basing, testing, training, fleet integration and CONOPs. Government test support to include planning for and participating at multiple test events, including various Navy test range locations.					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: Increase of $22.008M due to addition of risk reduction planning and testing and increased Government testing to be executed at the XLUUV test site for system requirements verification of Vehicle 1.					
Title: XLUUV Management Services	4.046	2.394	3.439	0.000	3.439
Articles:	-	-	-	-	-
FY 2022 Plans: Provide technical guidance, project planning, program management and travel for Orca fabrication. Provide financial and contracting support, and coordinate work with the Fleet, test support, engineering support, and contractors.					
FY 2023 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Provide technical guidance, project planning, program management and travel for Orca fabrication. Provide financial and contracting support, and coordinate work with the Fleet, test support, engineering support, and contractors. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase of $1.046M due to minor adjustments in program management and technical project planning.					
Accomplishments/Planned Programs Subtotals	86.011	31.609	116.880	0.000	116.880

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• OPN/1613: *Extra Large UUV*	0.000	0.000	0.000	-	0.000	113.557	107.616	226.613	231.145	0.000	678.931

Remarks

D. Acquisition Strategy

Orca XLUUV is a multi-phased accelerated acquisition effort using USC Sec. 2358 authorities to rapidly deliver capability to the Fleet. Phase 1 was a competitively sourced design effort. Two design contracts were awarded to Industry in FY 2017. Phase 2 commenced with a down select in FY 2019 to one of the Phase 1 vendors for fabrication and testing of the vehicle and support elements. Five (5) Orca XLUUV operationally relevant prototype systems (vehicles, mobile C2 equipment, and support equipment) are being fabricated for demonstration and use by the Fleet. An additional test and training asset (Vehicle 0) will be delivered to support early learning, prototyping, and in-water risk reduction testing. Additional XLUUV technologies/capabilities risk reduction will occur in parallel, leveraging the competitive Industrial base. Phase 3 provides the option to fabricate up to four (4) additional systems from the vendor who fabricated vehicles in Phase 2. Fabrication award of these additional Orca XLUUV systems is planned to be no earlier than FY24. Transition to an Acquisition Category (ACAT) Program and production may occur as early as FY24, pending successful completion of Government testing. XLUUV will have a modular payload bay with defined interfaces that current and future payloads must adhere to for employment from the vehicle. The Hammerhead payload is the next payload for integration with Orca XLUUV. Other potential future payloads, advanced energy solutions, and enhanced autonomy and command and control will be developed and evaluated under the Core Technologies PE 0604029N, and/or by other Science and technology organizations, and integrated into Orca XLUUV when ready. The Navy is concurrently updating facilities at the Naval Base Ventura County site for XLUUV testing, training, and work-ups, in coordination with large unmanned surface vessel testing for cost efficiencies. In parallel, the Navy is evaluating options for future far-forward basing locations.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / *Advanced Undersea Prototyping*	Project (Number/Name) 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Payload Design documentation	C/CPIF	Various : Various	3.735	0.000		0.000		0.000		-		0.000	0.000	3.735	-
Design & Long Lead Material, including sub-systems	C/CPIF	Boeing : Huntington Beach, CA	49.558	0.000		0.000		0.000		-		0.000	0.000	49.558	-
Design & Long Lead Material, including sub-systems	C/CPIF	Lockheed Martin : Riviera Baech, FL	43.349	0.000		0.000		0.000		-		0.000	0.000	43.349	-
Fabrication of XLUUVs	C/FPIF	Boeing : Huntington Beach, CA	214.215	67.511	Dec 2020	11.215	Dec 2021	55.380	Dec 2022	-		55.380	Continuing	Continuing	Continuing
XLUUV Spares/ Maintenance	C/CPIF	Boeing : Huntington Beach, CA	0.000	0.000		0.609	Dec 2021	5.316	Dec 2022	-		5.316	Continuing	Continuing	Continuing
		Subtotal	310.857	67.511		11.824		60.696		-		60.696	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RFP/PSPED Dev	SS/CPFF	APL/JHU : Laurel, MD	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	-
Source Selection	WR	NSWC CD : West Bethesda, MD	1.518	0.000		0.000		0.000		-		0.000	0.000	1.518	-
Source Selection	WR	SSC PAC : San Diego, CA	0.517	0.000		0.000		0.000		-		0.000	0.000	0.517	-
Engineering Support	WR	NSWC CD : West Bethesda, MD	2.820	2.606	Nov 2020	1.317	Nov 2021	9.020	Dec 2022	-		9.020	Continuing	Continuing	Continuing
Engineering Support	WR	NSWC IH : Indian Head, MD	1.950	2.613	Nov 2020	0.880	Nov 2021	2.010	Dec 2022	-		2.010	Continuing	Continuing	Continuing
Engineering and Logistic Support	WR	NUWC KPT : Keyport, WA	4.060	2.541	Nov 2020	1.802	Nov 2021	3.862	Dec 2022	-		3.862	Continuing	Continuing	Continuing
Technical Warrant Holder Support	Various	NAVSEA Activities : Washington, DC	0.920	0.782	Nov 2020	0.280	Nov 2021	0.930	Dec 2022	-		0.930	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / *Advanced Undersea Prototyping*	Project (Number/Name) 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Support	Various	Various : Various	9.974	3.122	Nov 2020	1.782	Nov 2021	3.585	Dec 2022	-		3.585	Continuing	Continuing	Continuing
		Subtotal	22.059	11.664		6.061		19.407		-		19.407	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test support	WR	Naval Base Ventura County : Port Hueneme, CA	0.000	0.000		1.190	Dec 2021	3.837	Dec 2022	-		3.837	Continuing	Continuing	Continuing
Test support	WR	NSWC, CD : West Bethesda, MD	0.000	1.100	Dec 2020	0.722	Dec 2021	3.150	Dec 2022	-		3.150	Continuing	Continuing	Continuing
Test safety support	WR	NSWC, IH : Indian Head, MD	0.000	0.000		0.173	Dec 2021	1.080	Dec 2022	-		1.080	Continuing	Continuing	Continuing
Test Ranges and support equipment	WR	Various : Various	0.000	0.000		0.593	Dec 2021	3.480	Dec 2022	-		3.480	Continuing	Continuing	Continuing
Test support, hardware and support equipment	C/CPFF	Boeing : Hunting Beach, CA	0.000	1.690	Dec 2020	1.415	Dec 2021	8.053	Dec 2022	-		8.053	Continuing	Continuing	Continuing
XLUUV Test Site	WR	Naval Base Ventura County : Point Mugu, CA	0.000	0.000		7.237	Dec 2021	13.738	Dec 2022	-		13.738	Continuing	Continuing	Continuing
		Subtotal	0.000	2.790		11.330		33.338		-		33.338	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mgmt & Techncal Efforts	WR	NAVSEA Activities : WASHINGTON, D.C.	12.850	4.046	Nov 2020	2.394	Nov 2021	3.439	Dec 2022	-		3.439	Continuing	Continuing	Continuing
		Subtotal	12.850	4.046		2.394		3.439		-		3.439	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / *Advanced Undersea Prototyping*	Project (Number/Name) 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	345.766	86.011		31.609		116.880		-		116.880	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

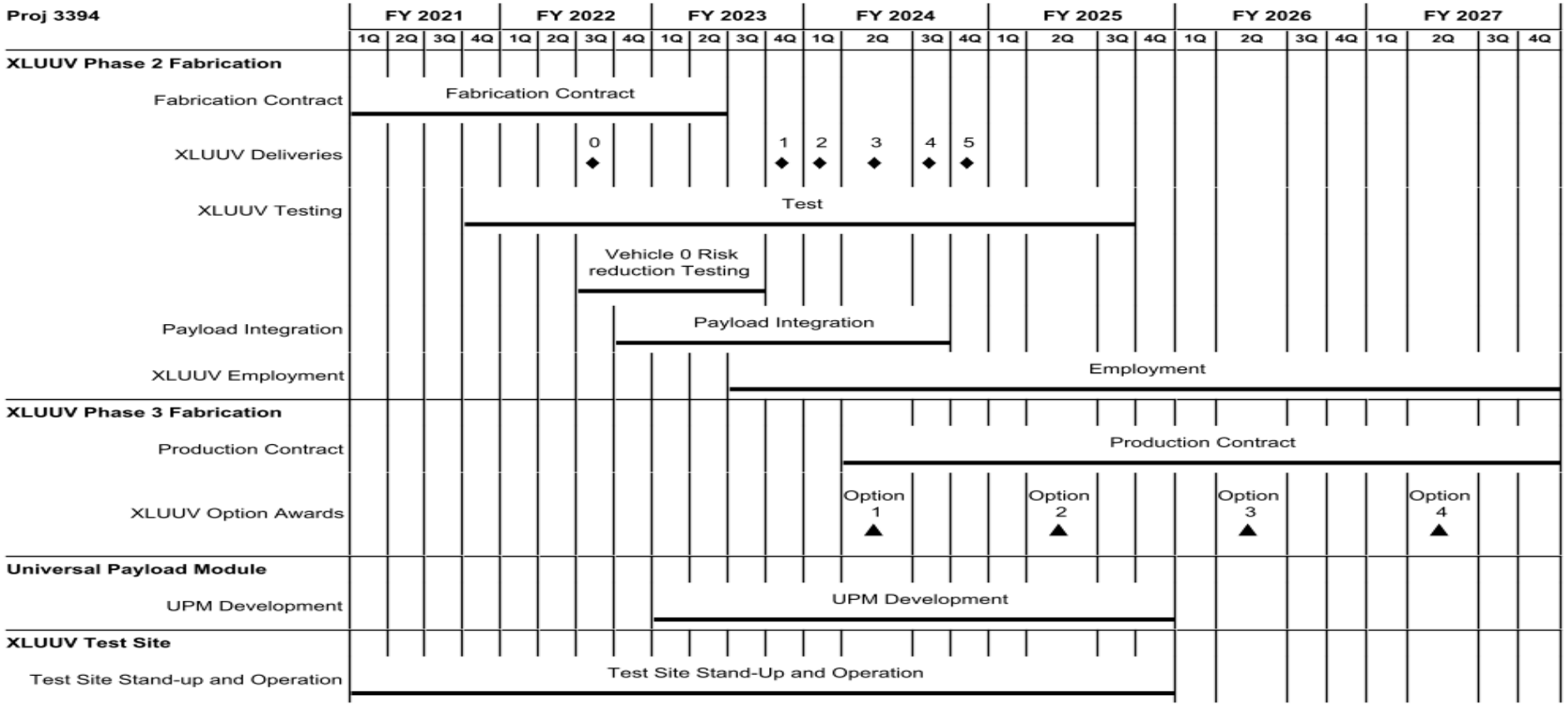

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3394				
XLUUV Phase 2 Fabrication: Fabrication Contract: Fabrication Contract	1	2021	2	2023
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 0	3	2022	3	2022
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 1	4	2023	4	2023
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 2	1	2024	1	2024
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 3	2	2024	2	2024
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 4	3	2024	3	2024
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 5	4	2024	4	2024
XLUUV Phase 2 Fabrication: XLUUV Testing: Test	4	2021	3	2025
XLUUV Phase 2 Fabrication: XLUUV Testing: Vehicle 0 Risk reduction Testing	3	2022	3	2023
XLUUV Phase 2 Fabrication: Payload Integration: Integration	4	2022	3	2024
XLUUV Phase 2 Fabrication: XLUUV Employment:	3	2023	4	2027
XLUUV Phase 3 Fabrication: Production Contract: Production	2	2024	4	2027
XLUUV Phase 3 Fabrication: XLUUV Option Awards: Additional system option 1	2	2024	2	2024
XLUUV Phase 3 Fabrication: XLUUV Option Awards: Additional system option 2	2	2025	2	2025
XLUUV Phase 3 Fabrication: XLUUV Option Awards: Additional system option 3	2	2026	2	2026
XLUUV Phase 3 Fabrication: XLUUV Option Awards: Additional system option 4	2	2027	2	2027
Universal Payload Module: UPM Development: UPM Development	1	2023	4	2025
XLUUV Test Site: Test Site Stand-up and Operation: XLUUV Test Site:	1	2021	4	2025