Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy												Date: March 2019
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 (U)Advanced Undersea Prototyping*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	39.850	64.038	112.669	181.967	-	181.967	126.106	33.463	229.887	235.984	Continuing	Continuing
3393: *UxS Autonomy, C2,*	1.486	2.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.486
3394: *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	36.644	59.124	87.669	181.967	-	181.967	126.106	33.463	229.887	235.984	Continuing	Continuing
3395: *UxS Payloads*	1.220	1.936	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.156
3396: *UxS Endurance*	0.500	0.978	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.478
9999: *Congressional Adds*	0.000	0.000	25.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	25.000

Note

FY 2019 and future funding for Projects 3393, 3395 and 3396 are in Program Element (PE) 0604029N.
These three projects realigned from PE 0604536N starting in FY 2019; this PE will only focus on the XLUUV class of vehicles.

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 is a multi-phased accelerated acquisition effort to rapidly deliver capability to the Fleet. Phase 1 is a competitively sourced design effort. Phase 2 is a down select to one, possibly both, of the Phase 1 vendors in FY 2019 for fabrication and testing of the vehicle and support elements. Fabrication award of additional Orca XLUUV systems is planned for FY 2023 and FY 2024. 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 in the Core Technologies Program Element 0604029N.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
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 (U)Advanced Undersea Prototyping*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	66.543	87.669	95.267	-	95.267
Current President's Budget	64.038	112.669	181.967	-	181.967
Total Adjustments	-2.505	25.000	86.700	-	86.700
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	25.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.506	0.000			
• Program Adjustments	0.000	0.000	86.773	-	86.773
• Rate/Misc Adjustments	0.001	0.000	-0.073	-	-0.073

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *Updated Acquisition Strategy*	0.000	25.000
Congressional Add Subtotals for Project: 9999	0.000	25.000
Congressional Add Totals for all Projects	0.000	25.000

Change Summary Explanation

Program Changes:
FY18: -$2,506K SBIR/STTR Reduction, +$1K Miscellaneous Adjustments
FY19: +$25,000K Congressional Add (Updated Acquisition Strategy)
FY20: +$87,773K Balance UUV portfolio, -$1,000K under execution reduction, -$73K miscellaneous adjustments

Technical: Not applicable.
Schedule: Not applicable.

The FY 2020 funding request was reduced by $1.000 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604536N / *(U)Advanced Undersea Prototyping*				Project (Number/Name) 3393 / *UxS Autonomy, C2,*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
3393: *UxS Autonomy, C2,*	1.486	2.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.486
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N. Project realigned from PE 0604536N starting in FY 2019.

A. Mission Description and Budget Item Justification

Advanced Undersea energy efforts will leverage existing independent research and development in energy-dense technology that could meet power requirements for Unmanned Undersea Vehicle (UUV) missions, which are limited by the amount of power that they can carry. Efforts under this program element include research, development, test, and evaluation of advanced energy solutions initially applicable to XLUUVs for increased energy endurance and efficiency to extend the reach of unmanned undersea systems.

The Common Control/Autonomy portion of this project funds risk reduction and developmental efforts of autonomy systems and architectures to work to develop common standards, interfaces, and systems to support cross-domain applications. This includes advanced development prototyping and demonstrations to accelerate the design and development of commonality and interoperability capabilities for the cross-domain (Surface and Sub-Surface, Aviation and Ground) requirements of the Navy.

Coordinating with the Common Control System where applicable, these efforts will demonstrate scalable, adaptable and interoperable warfighting capabilities across various unmanned systems. The advanced development emphasis will be to encourage innovation and enable rapid integration of UxS capabilities across domains while working to develop common standards, interfaces, and systems. These efforts will define, develop and demonstrate capability that advance new technology, hardware and software of Control Systems that could be used to operate multiple and dissimilar Naval UxSs. Supports Advanced Development and Prototyping of PE 0305205N: UAS Integration and Interoperability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Product Development	1.460	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 funding in Program Element (PE) 0604029N.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3393 / *UxS Autonomy, C2,*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A					
Title: Support ***Articles:*** ***FY 2019 Plans:*** FY 2019 funding in Program Element (PE) 0604029N. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A	0.390 -	0.000 -	0.000 -	0.000 -	0.000 -
Title: Management Services ***Articles:*** ***FY 2019 Plans:*** FY 2019 funding in Program Element (PE) 0604029N. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A	0.150 -	0.000 -	0.000 -	0.000 -	0.000 -
Accomplishments/Planned Programs Subtotals	2.000	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Design Advanced Energy components to reach Preliminary Design Review in FY18. Develop and build advanced energy prototype and integrate system when ready. Test advanced energy prototype starting in FY21. Develop requirements, standards, interfaces, and architecture for Autonomy and Common Control System (CCS) unmanned system software components to support common prototyping and experimentation.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3393 / *UxS Autonomy, C2,*

Design and develop CCS unmanned system software components for common cross domain prototyping and system integration with surrogate systems starting in FY22. Coordination with UxS platforms will eliminate redundant efforts, encourage innovation, and improve coordination of unmanned systems across multiple domains. Schedules were updated to align with updated funding profiles.
Leveraging the available applicable portions of the Common Control System (CCS) capabilities and products, the effort will work to reduce risk with advanced development efforts across Naval operating domains. The advanced energy efforts will leverage resources and prototype expertise to encourage industry innovation and allow for rapid integration into unmanned systems. Coordinate with other UxS Programs and Systems on the development of UUV autonomy standards, architectures, and systems, defining and focusing autonomy efforts. Develop algorithms and models and simulations for testing autonomy that could be inserted into UUVs.

E. Performance Metrics

Demonstrate use of advanced UUV Energy technology in an Advanced Development Model prototype. Demonstrate CCS & autonomy software through surrogate systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3393 / *UxS Autonomy, C2,*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Contract	SS/CPFF	ARL PSU : State College, PA	0.600	0.677	Jan 2018	0.000		0.000		-		0.000	0.000	1.277	-
Common Control System (CCS) Cross-Domain Architecture Development	Various	Various : Various	0.200	0.370	Jan 2018	0.000		0.000		-		0.000	0.000	0.570	-
Autonomy	Various	Various : Various	0.500	0.413	Dec 2017	0.000		0.000		-		0.000	0.000	0.913	-
		Subtotal	1.300	1.460		0.000		0.000		-		0.000	0.000	2.760	N/A

Remarks

FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Engineering Support 1	SS/CPFF	ARL PSU : State College, PA	0.035	0.152	Jan 2018	0.000		0.000		-		0.000	0.000	0.187	-
Auontomy Support	Various	NAVSEA Activities : Washington, DC	0.020	0.135	Dec 2017	0.000		0.000		-		0.000	0.000	0.155	-
Common Control System (CCS) Engineering Support	Various	Various : Various	0.038	0.103	Dec 2017	0.000		0.000		-		0.000	0.000	0.141	-
		Subtotal	0.093	0.390		0.000		0.000		-		0.000	0.000	0.483	N/A

Remarks

FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3393 / *UxS Autonomy, C2,*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Management	Various	Various : Various	0.035	0.050	Dec 2017	0.000		0.000		-		0.000	0.000	0.085	-
Autonomy	Various	NAVSEA Activities : Washington, DC	0.020	0.050	Dec 2017	0.000		0.000		-		0.000	0.000	0.070	-
Common Control System (CCS)	Various	NAVAIR : Pax River, MD	0.038	0.050	Feb 2018	0.000		0.000		-		0.000	0.000	0.088	-
		Subtotal	0.093	0.150		0.000		0.000		-		0.000	0.000	0.243	N/A

Remarks

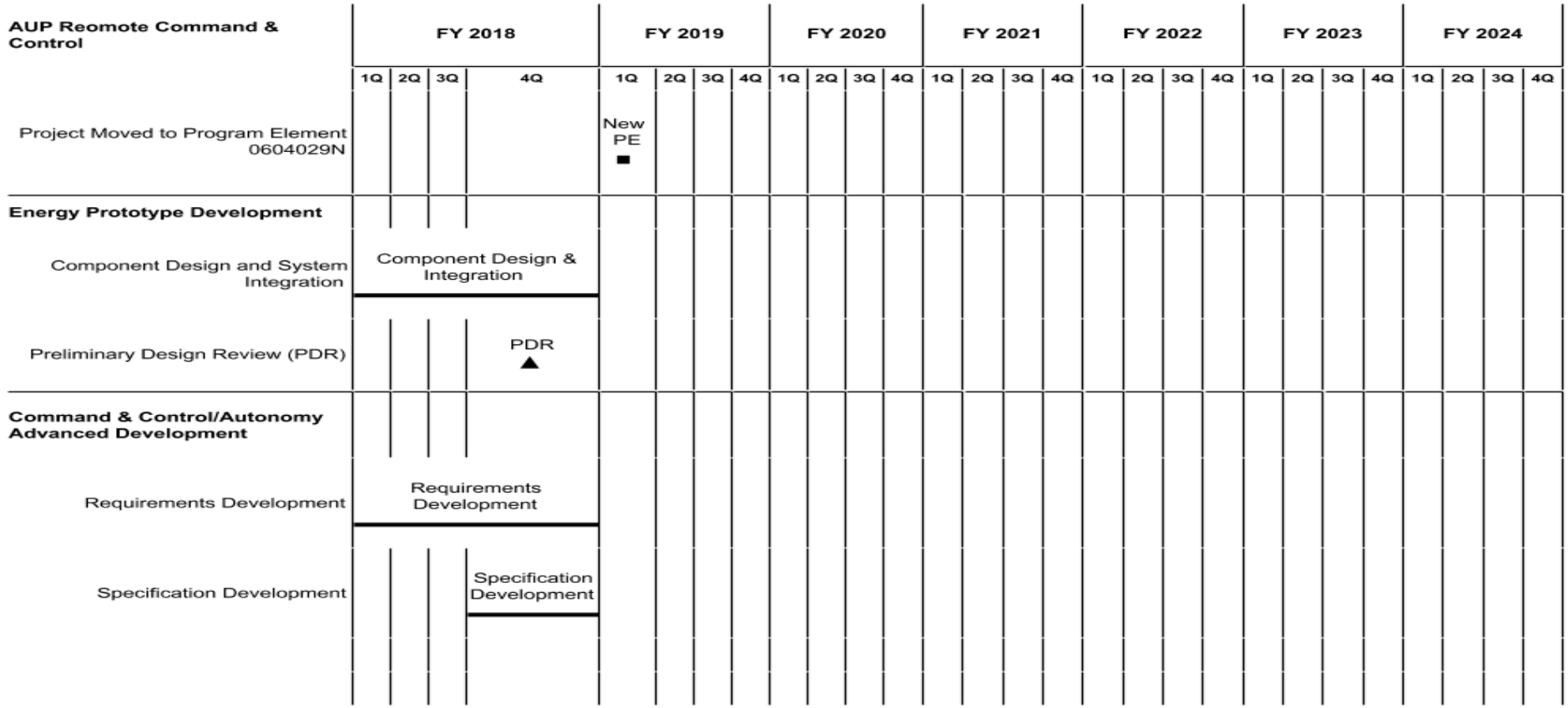
FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N.

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.486	2.000		0.000		0.000		-		0.000	0.000	3.486	N/A

Remarks

FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3393 / *UxS Autonomy, C2,*



2020DON - 0604536N - 3393

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3393 / *UxS Autonomy, C2,*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AUP Reomote Command & Control				
Project Moved to Program Element 0604029N:	1	2019	1	2019
Energy Prototype Development: Component Design and System Integration: Component Design and System Integration	1	2018	4	2018
Energy Prototype Development: Preliminary Design Review (PDR): Preliminary Design Reveiw (PDR)	4	2018	4	2018
Command & Control/Autonomy Advanced Development: Requirements Development: Requirements Development	1	2018	4	2018
Command & Control/Autonomy Advanced Development: Specification Development: Specification Development	4	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / *(U)Advanced Undersea Prototyping*	Project (Number/Name) 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3394: *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*	36.644	59.124	87.669	181.967	-	181.967	126.106	33.463	229.887	235.984	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

The FY 2020 funding request was reduced by $1.000 million to account for the availability of prior year execution balances.

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.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: XLUUV Product Development	49.850	77.577	168.435	0.000	168.435
Articles:	-	-	-	-	-
Description: Orca XLUUV is being developed via a full and open competition to two industry teams to design systems (with possible down select to one vendor or a dual selection of both vendors for fabrication).					
FY 2019 Plans: Completed Phase 1 design efforts and conducted CDRs early in FY19 for both industry teams. Received Proposals from both vendors for Phase 2 fabrication. Conducting down select to one industry partner (or make a dual selection) and award contract for fabrication of up to five (5) Orca XLUUVs. Begin vehicle fabrication, including procurement of remaining materials (long lead materials previously procured in FY18), initial assembly, bench and subsystem testing, and integration of the first vehicles (possibly from both vendors).					
FY 2020 Base Plans: Continue Phase 2 fabrication of initial vehicles (possibly from both vendors). Vehicle integration of subsystems, includes propulsion, sensors, payload, communications, and control systems. First vehicle(s) to begin in water testing by the end of FY 2020. Continue fabrication for follow-on vehicles and material purchasing.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase due to a full year of fabrication of 5 vehicles and beginning in water testing, possibly from two vendors.					
Title: XLUUV Support	5.344	6.110	9.422	0.000	9.422
Articles:	-	-	-	-	-
FY 2019 Plans: Engineering support in completion of detailed design. Review and approve CRDLs, design products, and complete critical design review. Engineering and acquisition support of the source selection for the Phase 2 fabrication contract(s). Supported development of government test planning, life cycle planning, and payload integration certification. Oversee and provide expert support of fabrication efforts, and bench and subsystem testing. ***FY 2020 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. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase due to full year of support for Orca XLUUV design fabrication of up to five (5) vehicles and the beginning of in water testing.					
Title: XLUUV Management Services	3.930	3.982	4.110	0.000	4.110
Articles:	-	-	-	-	-
FY 2019 Plans: Provide technical guidance, project planning, program management and travel for Orca prototyping. Provide financial and contracting support, and coordinated work with Fleet, test support, engineering support, and contractors. ***FY 2020 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Provide technical guidance, project planning, program management and travel for Orca prototyping. Provide financial and contracting support, and coordinated work with Fleet, test support, engineering support, and contractors. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase due to full year of management of XLUUV vehicle fabrication and in water testing.					
Accomplishments/Planned Programs Subtotals	59.124	87.669	181.967	0.000	181.967

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Orca XLUUV is a multi-phased accelerated acquisition effort to rapidly deliver capability to the Fleet. Phase 1 is a competitively sourced design effort. Two design contracts were awarded to Industry in FY 2017. Phase 2 commences with a down select in FY 2019 to one, possibly both, of the Phase 1 vendors for fabrication and testing of the vehicle and support elements. Up to five (5) Orca XLUUV systems (vehicles, mobile C2 equipment, and support equipment) are to be fabricated for demonstration and use by the Fleet. Phases 3 and 4 provide the option to fabricate up to four (4) additional systems via competitive sourcing from the vendor(s) who fabricated vehicles in Phase 2. Fabrication award of these additional Orca XLUUV systems is planned for FY 2023 and FY 2024. Transition to a program of record may occur in FY 2023 or FY 2024 should the Navy issue follow on requirements for the XLUUV with new payload capabilities.
XLUUV will have a modular payload bay, with defined interfaces that current and future payloads must adhere to for employment from the vehicle. 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 integrated into Orca XLUUV when ready.

E. Performance Metrics

CDR completion in 1Q FY 2019. Phase 2 award in 2Q FY 2019. First vehicle delivery by end FY 2020.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Payload Design documentation	C/CPIF	Various : Various	0.085	3.650	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Design & Long Lead Material, including sub-systems	C/CPIF	Boeing : Huntington Beach, CA	16.554	23.100	Dec 2017	9.904	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Design & Long Lead Material, including sub-systems	C/CPIF	Lockheed Martin : Riviera Baech, FL	16.554	23.100	Dec 2017	3.695	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Fabrication of up to 5 XLUUVs, including sub-systems	C/FPIF	TBD : TBD	0.000	0.000		63.978	Jan 2019	168.435	Dec 2019	-		168.435	Continuing	Continuing	Continuing
		Subtotal	33.193	49.850		77.577		168.435		-		168.435	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 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 : Carderock, MD	1.090	0.000		0.428	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Source Selection	WR	SSC PAC : San Diego, CA	0.205	0.000		0.312	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Support	WR	NSWC CD : Bethesda, MD	0.000	0.000		1.200	Nov 2018	2.105	Nov 2019	-		2.105	0.000	3.305	-
Engineering Support	WR	NSWC IH : Indian Head, MD	0.000	0.000		0.900	Nov 2018	1.303	Nov 2019	-		1.303	0.000	2.203	-
Engineering and Logistic Support	WR	NUWC KPT : Keyport, WA	0.000	0.000		1.500	Nov 2018	2.860	Nov 2019	-		2.860	0.000	4.360	-
Technical Warrant Holder Support	Various	NAVSEA Activities : Washington, DC	0.000	0.000		0.500	Nov 2018	0.632	Nov 2019	-		0.632	0.000	1.132	-
Oversight of Efforts	Various	VAR : Various	1.028	5.344	Mar 2018	1.270	Nov 2018	2.522	Nov 2019	-		2.522	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	2.623	5.344		6.110		9.422		-		9.422	Continuing	Continuing	N/A

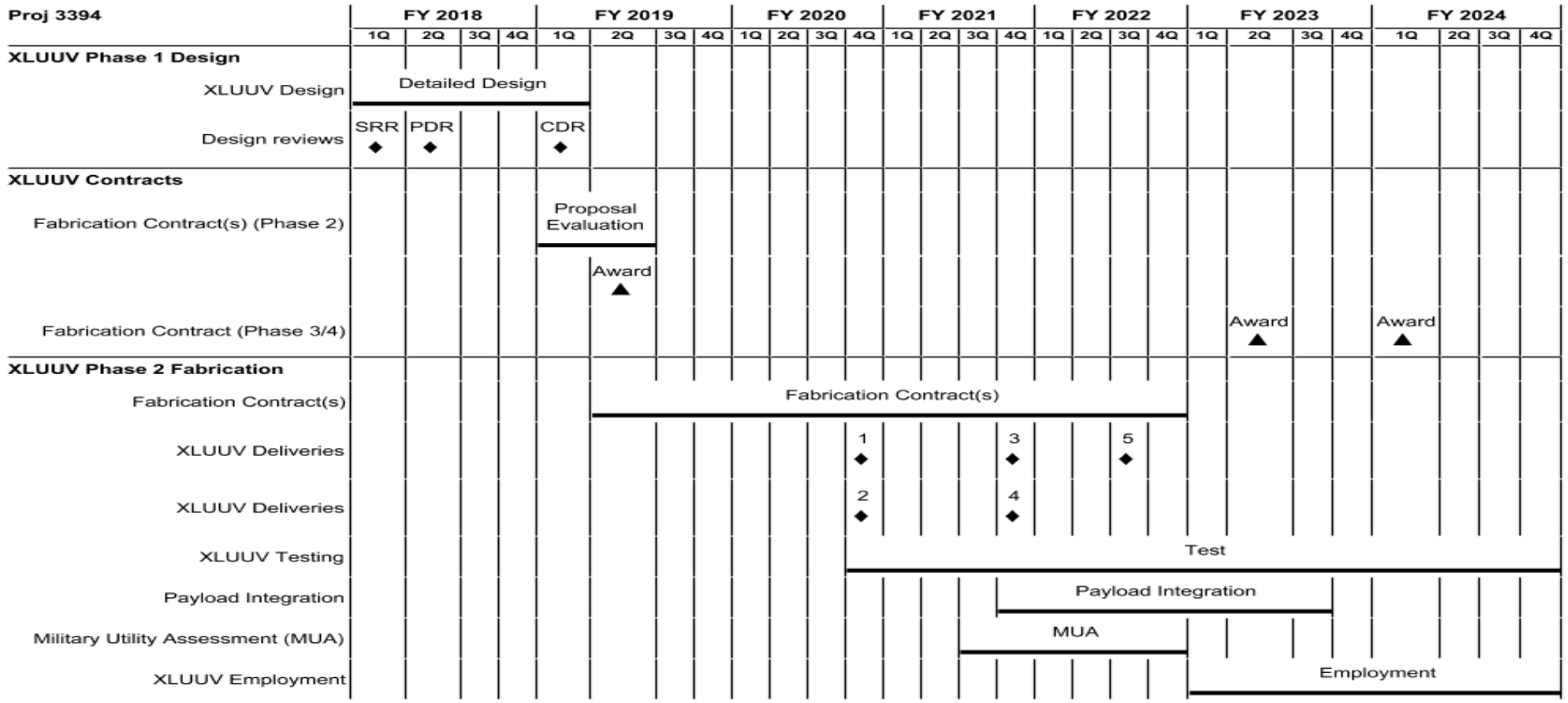
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mgmt & Techncal Efforts	WR	NAVSEA Activities : WASHINGTON, D.C.	0.828	3.930	Oct 2017	3.982	Nov 2018	4.110	Nov 2019	-		4.110	Continuing	Continuing	Continuing
		Subtotal	0.828	3.930		3.982		4.110		-		4.110	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	36.644	59.124		87.669		181.967		-		181.967	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3394 / *Adv Undersea Prototyping-Vehicles, Propulsion & Navigation*



2020PB - 0604536N - 3394

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)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 1 Design: XLUUV Design: Design	1	2018	1	2019
XLUUV Phase 1 Design: Design reviews: SRR	1	2018	1	2018
XLUUV Phase 1 Design: Design reviews: PDR	2	2018	2	2018
XLUUV Phase 1 Design: Design reviews: CDR	1	2019	1	2019
XLUUV Contracts: Fabrication Contract(s) (Phase 2): Proposal Evaluation	1	2019	2	2019
XLUUV Contracts: Fabrication Contract(s) (Phase 2): Contract Award	2	2019	2	2019
XLUUV Contracts: Fabrication Contract (Phase 3/4): Award(Phase 3/4)	2	2023	2	2023
XLUUV Contracts: Fabrication Contract (Phase 3/4): Award	1	2024	1	2024
XLUUV Phase 2 Fabrication: Fabrication Contract(s): Fabrication Contract(s)	2	2019	4	2022
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 1	4	2020	4	2020
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 3	4	2021	4	2021
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 5	3	2022	3	2022
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 2	4	2020	4	2020
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 4	4	2021	4	2021
XLUUV Phase 2 Fabrication: XLUUV Testing: Test	4	2020	4	2024
XLUUV Phase 2 Fabrication: Payload Integration: Integration	4	2021	3	2023
XLUUV Phase 2 Fabrication: Military Utility Assessment (MUA): Schedule Detail	3	2021	4	2022
XLUUV Phase 2 Fabrication: XLUUV Employment: Schedule Detail	1	2023	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604536N / *(U)Advanced Undersea Prototyping*				Project (Number/Name) 3395 / *UxS Payloads*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
3395: *UxS Payloads*	1.220	1.936	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.156
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for Project 3395 is in Program Element (PE) 0604029N. Project realigned from PE 0604536N starting in FY 2019.

A. Mission Description and Budget Item Justification

Funding supports advanced undersea prototyping of undersea explosive payloads from XLUUVs. This program leverages the developments at ONR and other activities for undersea weapons, work to complete analysis of feasibility, policy, lethality, and performance of integrating undersea weapons systems on XLUUVs. The program will design new hardware, investigate and develop new interfaces/systems to increase lethality in both the undersea and surface targets. New C2 algorithms will be developed for advanced targeting.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Explosive Payloads	1.936	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 funding in Program Element (PE) 0604029N.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	1.936	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Leverage the knowledge base at the Naval Research and Development Enterprise to complete the feasibility studies that will then lead to the development of critical technology. The effort will heavily use the experience resident in the undersea weapons industrial base.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3395 / *UxS Payloads*

E. Performance Metrics

Successful launch of undersea weapons from an Orca XLUUV.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3395 / *UxS Payloads*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XL Payload Interface Design & Fabrication	C/CPIF	Various : Various	0.741	0.967	Mar 2018	0.000		0.000		-		0.000	0.000	1.708	-
COMMAND AND CONTROL	WR	Various : Various	0.100	0.302	Jan 2018	0.000		0.000		-		0.000	0.000	0.402	-
Tech Support	C/CPFF	Various : Various	0.189	0.204	Jan 2018	0.000		0.000		-		0.000	0.000	0.393	-
Management	WR	Various : Various	0.190	0.133	Nov 2017	0.000		0.000		-		0.000	0.000	0.323	-
Safety	WR	NSWC Indian Head : Indian Head, MD	0.000	0.330	Jan 2018	0.000		0.000		-		0.000	0.000	0.330	-
		Subtotal	1.220	1.936		0.000		0.000		-		0.000	0.000	3.156	N/A

Remarks

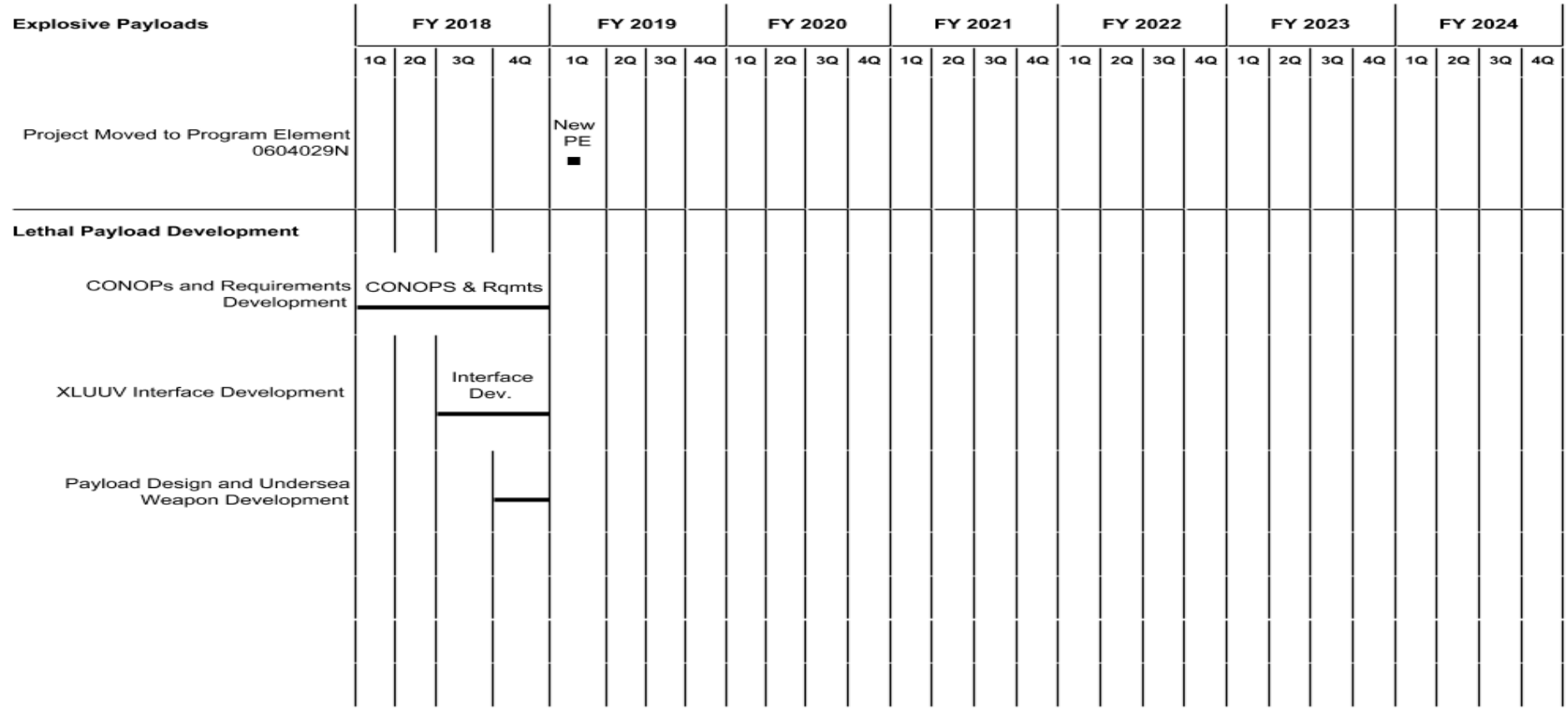
FY 2019 and future funding for Project 3395 is in Program Element (PE) 0604029N.

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.220	1.936		0.000		0.000		-		0.000	0.000	3.156	N/A

Remarks

FY 2019 and future funding for Project 3395 is in Program Element (PE) 0604029N.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3395 / *UxS Payloads*



2020DON - 0604536N - 3395

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3395 / *UxS Payloads*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Explosive Payloads				
Project Moved to Program Element 0604029N:	1	2019	1	2019
Lethal Payload Development: CONOPs and Requirements Development: CONOPs and Requirements	1	2018	4	2018
Lethal Payload Development: XLUUV Interface Development: Schedule Detail	3	2018	4	2018
Lethal Payload Development: Payload Design and Undersea Weapon Development: Phase A concept design- XL UUV Interface development	4	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604536N / *(U)Advanced Undersea Prototyping*				Project (Number/Name) 3396 / *UxS Endurance*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
3396: *UxS Endurance*	0.500	0.978	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.478
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for Project 3396 is in Program Element (PE) 0604029N. Project realigned from PE 0604536N starting in FY 2019.

A. Mission Description and Budget Item Justification

Advanced undersea prototyping will experiment and demonstrate non-lethal payloads on Orca XLUUVs for use on Orca XLUUV and other FoS UUVs. This effort will investigate the possibilities of employing non-lethal payloads from the XLUUV to support ISR and strike missions. Non-kinetic payloads provide the warfare commander an option to stop aggressive behavior without escalating the conflict. Non-lethal payloads that will be considered include jamming, EO/IR dazzling, microwave, aerial assets, and other methods.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Non Lethal Payloads	0.978	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 funding in Program Element (PE) 0604029N.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.978	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

A technology study and market research will be completed in the first 12 months to examine the options available and the impact to the warfighter the different technology options bring. This will use a group of experts throughout the advanced undersea industry. Initial design efforts of a prototype system for the development

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3396 / *UxS Endurance*

of a non-kinetic payload will start in late FY18 for preliminary efforts with main efforts occurring after the study is completed. The payload will be integrated and demonstrated on the Orca XLUUV.

E. Performance Metrics

Non-kinetic payload integrated onto an XLUUV. Detailed metrics are classified.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3396 / *UxS Endurance*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology study	Various	Various : Various	0.470	0.000		0.000		0.000		-		0.000	0.000	0.470	-
Design, Material, & Fabrication Efforts	WR	Various : Various	0.000	0.828	Nov 2017	0.000		0.000		-		0.000	0.000	0.828	-
		Subtotal	0.470	0.828		0.000		0.000		-		0.000	0.000	1.298	N/A

Remarks

FY 2019 and future funding for Project 3396 is in Program Element (PE) 0604029N.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DESIGN ANALYSIS	WR	NRL : WASHINGTON, D.C.	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Program Support	C/FFP	Various : Arlington, VA	0.030	0.150	Dec 2017	0.000		0.000		-		0.000	0.000	0.180	-
		Subtotal	0.030	0.150		0.000		0.000		-		0.000	0.000	0.180	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.500	0.978		0.000		0.000		-		0.000	0.000	1.478	N/A

Remarks

FY 2019 and future funding for Project 3396 is in Program Element (PE) 0604029N.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3396 / *UxS Endurance*

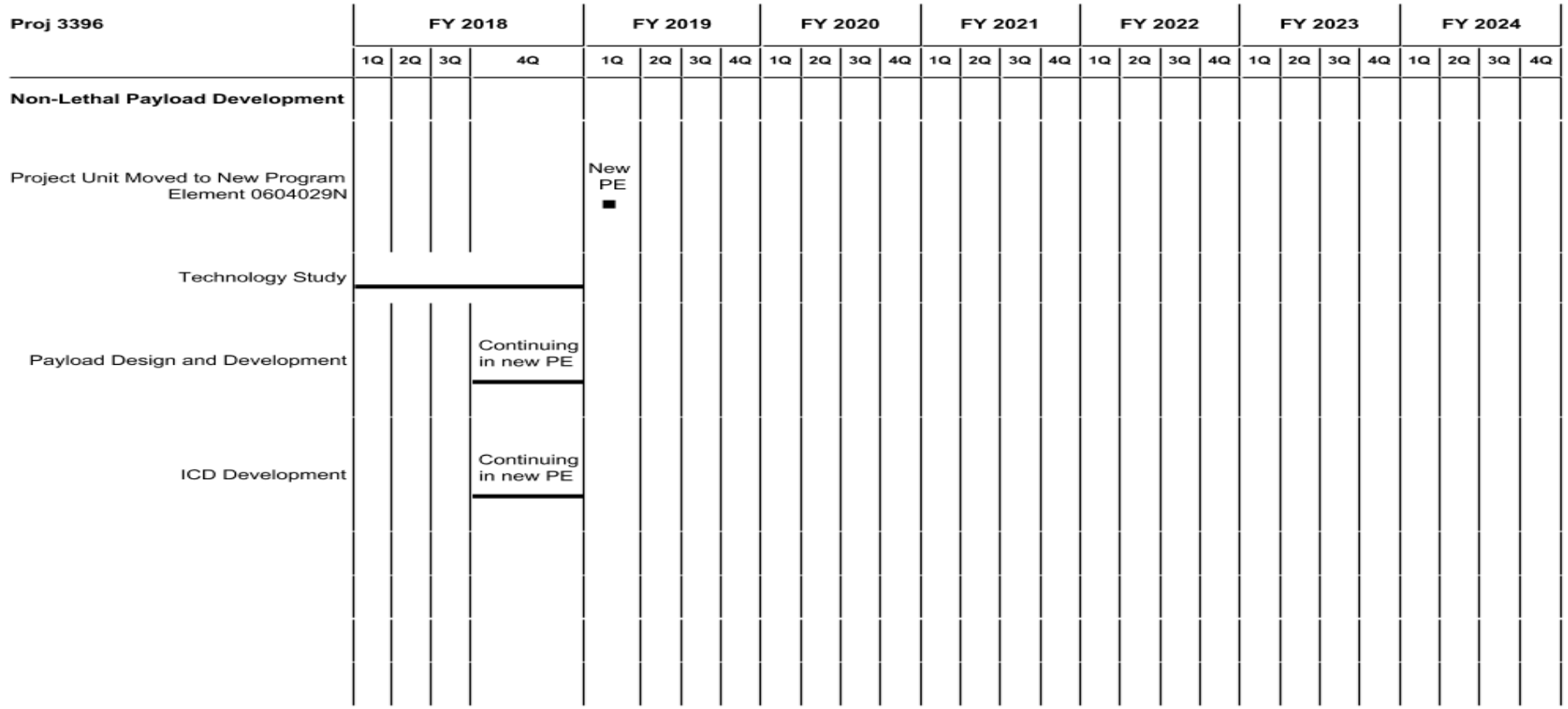


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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 3396 / *UxS Endurance*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3396				
Non-Lethal Payload Development: Project Unit Moved to New Program Element 0604029N:	1	2019	1	2019
Non-Lethal Payload Development: Technology Study:	1	2018	4	2018
Non-Lethal Payload Development: Payload Design and Development:	4	2018	4	2018
Non-Lethal Payload Development: ICD Development:	4	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / *(U)Advanced Undersea Prototyping*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	0.000	25.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	25.000
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: Updated Acquisition Strategy	0.000	25.000
FY 2018 Accomplishments: N/A		
FY 2019 Plans: Conducting down select to one industry partner (or make a dual selection) and award contract for fabrication of up to five (5) Orca XLUUVs. Begin vehicle fabrication, including purchase of remaining vehicle materials (long lead materials previously authorized in FY18), initial assembly, bench and subsystem testing, and integration of the first vehicles (possibly from both vendors).		
Congressional Adds Subtotals	0.000	25.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Orca XLUUV is a multi-phased accelerated acquisition effort to rapidly deliver capability to the Fleet. Phase 1 is a competitively sourced design effort. Two design contracts were awarded to Industry in FY 2017. Phase 2 commences with a down select in FY 2019 to one, possibly both, of the Phase 1 vendors for fabrication and testing of the vehicle and support elements. Up to five (5) Orca XLUUV systems (vehicles, mobile C2 equipment, and support equipment) are to be fabricated for demonstration and use by the Fleet.

E. Performance Metrics

Phase 2 award in 2Q FY 2019.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fabrication Contract(s)	C/FPIF	TBD : TBD	0.000	0.000		25.000	Mar 2019	0.000		-		0.000	0.000	25.000	-
		Subtotal	0.000	0.000		25.000		0.000		-		0.000	0.000	25.000	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		25.000		0.000		-		0.000	0.000	25.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 9999 / *Congressional Adds*

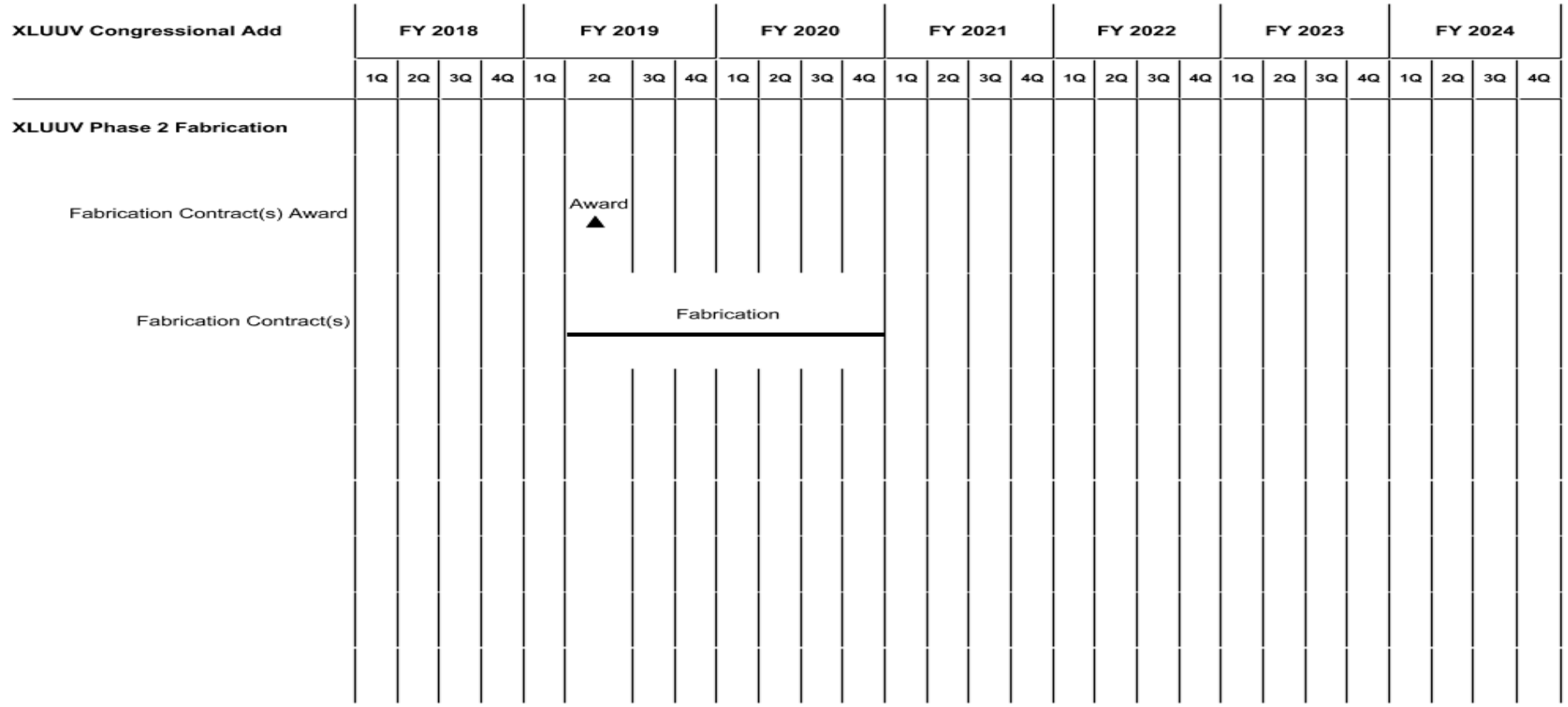

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604536N / *(U)Advanced Undersea Prototyping*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
XLUUV Congressional Add				
XLUUV Phase 2 Fabrication: Fabrication Contract(s) Award: Schedule Detail	2	2019	2	2019
XLUUV Phase 2 Fabrication: Fabrication Contract(s):	2	2019	4	2020