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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing
2094: Unmanned Underwater Vehicle	0.000	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing

## Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Project realigned from PE 0603502N starting in FY 2019.

## A. Mission Description and Budget Item Justification

The Snakehead Large Displacement Unmanned Undersea Vehicle (LDUUV) is the Navy's Large Displacement UUV effort as part of the UUV Family of Systems (FOS). It is the number one Submarine-launched UUV priority due to the additional endurance and capability it will bring to the fleet in support of maintaining the Navy's undersea superiority. In order to accelerate future capability and support steady growth of the fleet's UUV FoS the Snakehead LDUUV program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability.

The Snakehead LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. The Snakehead LDUUV is a CNO/ASN(RDA) approved Accelerated Acquisition phased approach to build capabilities at a manageable level of risk in the Navy's class of Large Displacement Unmanned Undersea Vehicles. It currently consists of two phases of government-led development with significant industry involvement transitioning to industry production of the full vehicles.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	92.613	-	92.613
Total Adjustments	0.000	0.000	92.613	-	92.613
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	92.613	-	92.613

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles	
<div>Change Summary Explanation</div> <div>Program Changes: FY19 +\$92,613K realigned from 0603502N, Project 2094.</div> <div>Technical: Not applicable.</div> <div>Schedule: Not applicable.</div>		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles				Project (Number/Name) 2094 / Unmanned Underwater Vehicle			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2094: Unmanned Underwater Vehicle	0.000	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

FY 2018 and prior funding in Program Element (PE) 0603502N. Project moved from PE 0603502N starting in FY 2019.

**A. Mission Description and Budget Item Justification**

In order to accelerate future capability and support steady growth of the fleet's UUV Family of Systems (FoS) the Snakehead Large Displacement Unmanned Undersea Vehicle (LDUUV) program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability.

The Snakehead LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. The Snakehead LDUUV is a CNO/ASN(RDA) approved Accelerated Acquisition phased approach to build capabilities at a manageable level of risk in the Navy's class of Large Displacement Unmanned Undersea Vehicles. It consists of two phases of government-led development with significant industry involvement transitioning to industry production of the full vehicles.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> LDUUV Product Development	0.000	0.000	81.695	0.000	81.695
<b>Articles:</b>	-	-	-	-	-
<b>FY 2018 Plans:</b> FY 2018 funding in Program Element (PE) 0603502N.					
<b>FY 2019 Base Plans:</b> Complete detailed design for Phase I LDUUV and complete Critical Design Review (CDR) in 1QFY19.					
Procure remaining materials and parts and commence fabrication of two (2) Phase I LDUUVs. Develop data products and analysis for submarine and surface ship integration. Route technical data package for platform integration and adjudicate technical review.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles		Project (Number/Name) 2094 / Unmanned Underwater Vehicle		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Provide engineering services for initial subsystem testing and risk reduction demos. <b>FY 2019 OCO Plans:</b> N/A <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase in funding supports detailed design efforts.						
<b>Title:</b> LDUUV Support  <b>Articles:</b>		0.000 -	0.000 -	8.930 -	0.000 -	8.930 -
<b>FY 2018 Plans:</b> FY 2018 funding in Program Element (PE) 0603502N. <b>FY 2019 Base Plans:</b> Complete final design documentation and drawings, submarine Interface Control Documents, and subsystem test plans to assemble baseline technical data package for platform integration. Support fabrication and material efforts. Support platform integration efforts. Continue supportability analysis.  Support Fleet with demonstration exercises with demo vehicles to develop Tactics, Techniques, and Procedures. <b>FY 2019 OCO Plans:</b> N/A <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase due to additional support for detailed design efforts.						
<b>Title:</b> LDUUV Management  <b>Articles:</b>		0.000 -	0.000 -	1.988 -	0.000 -	1.988 -
<b>FY 2018 Plans:</b> FY 2018 funding in Program Element (PE) 0603502N. <b>FY 2019 Base Plans:</b>						

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy				<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 1319 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0604031N / <i>Large Unmanned Undersea Vehicles</i>		<b>Project (Number/Name)</b> 2094 / <i>Unmanned Underwater Vehicle</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Provide program management support and travel for the LDUUV program. Program management plans include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program.</p> <p><b><i>FY 2019 OCO Plans:</i></b> N/A</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase supports management of detailed design efforts.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	92.613	0.000	92.613

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RD TEN/0603502N/2094: <i>Unmanned Underwater Vehicle</i>	21.945	60.187	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	146.992
<b>Remarks</b> Funding moved to new Program Element in FY2019											
<b>D. Acquisition Strategy</b> Utilizing Navy requirements to insert incremental capability, the LDUUV program will design, build, and test risk-reducing UUVs in two phases followed by competitive award of a production contract.											
<b>E. Performance Metrics</b> LDUUV - Complete Critical Design Review (CDR) 1Q FY19											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles				Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Vehicles, Hardware, & Design	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		12.090	Dec 2018	-		12.090	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	C/CPFF	Various : Various	0.000	0.000		0.000		46.258	Dec 2018	-		46.258	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	NSWC Carderock : West Bethesda, MD	0.000	0.000		0.000		3.254	Dec 2018	-		3.254	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	NSWC Panama City : Panama City, FL	0.000	0.000		0.000		0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	SS/CPFF	ARL PSU : Statte College, PA	0.000	0.000		0.000		5.997	Dec 2018	-		5.997	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	SSC Pacific : San Diego, CA	0.000	0.000		0.000		0.495	Jan 2019	-		0.495	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	NUWC Keyport : Keyport, WA	0.000	0.000		0.000		4.887	Jan 2019	-		4.887	Continuing	Continuing	Continuing
LDUUV Risk Reduction Soanr	SS/CPFF	ARL UT : Austin, TX	0.000	0.000		0.000		0.647	Feb 2019	-		0.647	Continuing	Continuing	Continuing
LDUUV Expirimentation and Risk Reduction - Battery Certification	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		1.000	Dec 2018	-		1.000	Continuing	Continuing	Continuing
LDUUV Platform Integration	Various	Various : Various	0.000	0.000		0.000		6.867	Dec 2018	-		6.867	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		81.695		-		81.695	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles				Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Engineering Support	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		3.390	Dec 2018	-		3.390	Continuing	Continuing	Continuing
LDUUV Launch and Recovery Engineering Support	WR	NSWC Panama City : Panama City, FL	0.000	0.000		0.000		0.510	Feb 2019	-		0.510	Continuing	Continuing	Continuing
LDUUV Hydrodynamics and Propulsion Engineering Support	C/CPFF	Various : Various	0.000	0.000		0.000		1.088	Dec 2018	-		1.088	Continuing	Continuing	Continuing
LDUUV Command and Control Engineering Support	WR	NSWC Carderock : West Bethesda, MD	0.000	0.000		0.000		1.505	Dec 2018	-		1.505	Continuing	Continuing	Continuing
LDUUV Engineering	WR	SSC Pacific : San Diego, CA	0.000	0.000		0.000		0.468	Dec 2018	-		0.468	Continuing	Continuing	Continuing
Need Item Text	SS/CPFF	APL/JHU : Laurel, MD	0.000	0.000		0.000		0.469	Jan 2019	-		0.469	Continuing	Continuing	Continuing
Need Item Text	WR	NUWC Keyport : Keyport, WA	0.000	0.000		0.000		0.750	Dec 2018	-		0.750	Continuing	Continuing	Continuing
Need Item Text	SS/CPFF	Various : Various	0.000	0.000		0.000		0.750	Feb 2019	-		0.750	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		8.930		-		8.930	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Program Management	C/BA	NUWC Newport : Newport, RI	0.000	0.000		0.000		0.698	Dec 2018	-		0.698	Continuing	Continuing	Continuing
LDUUV Program Management	Various	Various : Various	0.000	0.000		0.000		1.115	Dec 2018	-		1.115	Continuing	Continuing	Continuing

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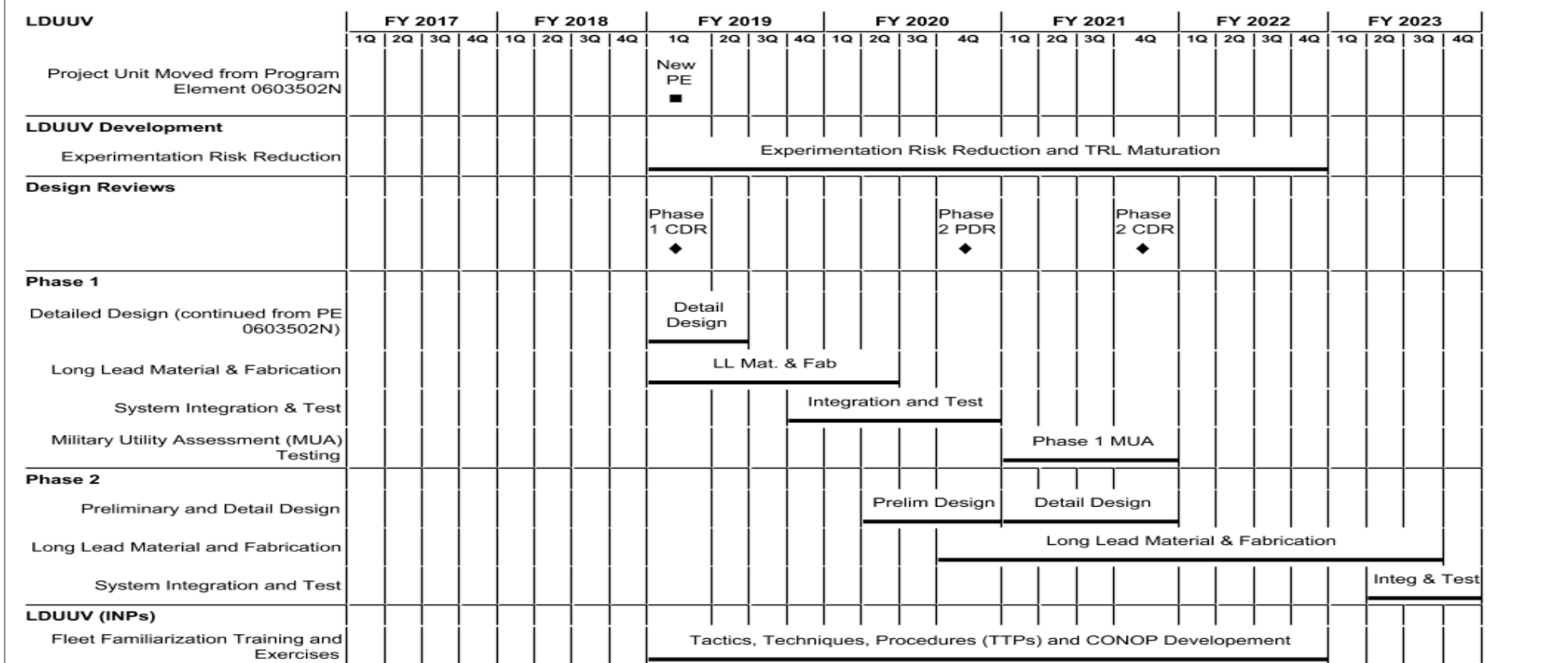
Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles				Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Travel	Various	NAVSEA : Washington, DC	0.000	0.000		0.000		0.175	Dec 2018	-		0.175	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.988		-		1.988	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding in Program Element (PE) 0603502N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		92.613		-		92.613	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding in Program Element (PE) 0603502N.															



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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604031N / <i>Large Unmanned Undersea Vehicles</i>	<b>Project (Number/Name)</b> 2094 / <i>Unmanned Underwater Vehicle</i>
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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0604031N / <i>Large Unmanned Undersea Vehicles</i>	<b>Project (Number/Name)</b> 2094 / <i>Unmanned Underwater Vehicle</i>	

**Schedule Details**

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>LDUUV</b>				
Project Unit Moved from Program Element 0603502N:	1	2019	1	2019
LDUUV Development: Experimentation Risk Reduction:	1	2019	4	2022
Design Reviews: Phase 1 CDR	1	2019	1	2019
Design Reviews: Phase 2 PDR	4	2020	4	2020
Design Reviews: Phase 2 CDR	4	2021	4	2021
Phase 1: Detailed Design (continued from PE 0603502N):	1	2019	2	2019
Phase 1: Long Lead Material & Fabrication:	1	2019	2	2020
Phase 1: System Integration & Test:	4	2019	4	2020
Phase 1: Military Utility Assessment (MUA) Testing:	1	2021	4	2021
Phase 2: Preliminary and Detail Design: Preliminary Design	2	2020	4	2020
Phase 2: Preliminary and Detail Design:	1	2021	4	2021
Phase 2: Long Lead Material and Fabrication:	4	2020	3	2023
Phase 2: System Integration and Test:	2	2023	4	2023
LDUUV (INPs): Fleet Familiarization Training and Exercises:	1	2019	4	2022