

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Navy **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>
---	--

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	0.000	0.000	0.000	65.735	-	65.735	84.310	89.948	103.814	106.550	Continuing	Continuing
3095: <i>Nuclear Delivery Systems</i>	0.000	0.000	0.000	65.735	-	65.735	84.310	89.948	103.814	106.550	Continuing	Continuing

**Note**

Project 3095 Nuclear Delivery Systems is a new start in FY 2023.

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

This Program Element and Project supports Department of Defense (DOD) priorities for enduring science and technology (S&T) for nuclear re-entry systems. This effort will provide pre-program of record advanced technology development that will effectively address evolving threats and maintain operational effectiveness while also aligning with the highest level guidance for nuclear forces. This effort will contribute to preserving the viability of the nuclear deterrent in a cost-effective manner by reducing technical and programmatic risk associated with execution of the overall nuclear modernization program. These ends will be reached by developing technologies to inform future system requirements, establishing interagency partnerships for re-entry system test platform development, and coordinating with existing programs for next generation strategic system development.

The Strategic Weapons System (SWS) greatly benefited from steady Research and Development (R&D) investments during a succession of development and production programs between 1955 and 1990. Because development of a Trident D5 missile follow-on system did not begin immediately, as had been done for previous systems (A1, A2, A3, C3, C4), research and development funding for submarine launched ballistic missile (SLBM) systems significantly declined in the early 1990s. As the U.S. moved to a paradigm of nuclear force sustainment, enterprise investments aimed at improving delivery system capability to counter new threats were reduced. Consequently, the pipeline for advanced technology development for nuclear delivery systems atrophied. The Department of Defense (DoD) has recognized the need to begin investing in new delivery systems, but there has been a significant, several decades long reduction in foundational nuclear R&D invests made outside of major acquisition programs. The gap in R&D investments has driven programs, which are often risk averse and schedule driven to mature existing technology as part of the acquisition program to control risk. This approach can result in fielding technologies that are not adequately suited to adapt to future threats. Another consequence of this decade's long reduction has been a reduction in workforce capable of supporting advanced technology development. A workforce with skills and requisite clearances needed to solve next-generation technical challenges and a right-sized technology maturation pipeline remain a common threat of high risk across the nuclear enterprise.

Enabling SWS flexibility and affordability is critical to ensure survivability and credibility of the weapon system. In conjunction with STRATCOM Priorities and collaboration with Air Force, the Nuclear Delivery Systems (NDS) funding will identify and mature technologies for the Reentry System (Aeroshell, Fuzing, and Guidance) and SWS enablers that can be readily incorporated into life-extended or next-generation flight and shipboard systems. These technologies will focus on responding to an evolving target base and develop capabilities for changes in missions, adversaries, war-fighting priorities, or emergent deterrence requirements.

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
---	-------------------------

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>
---	--

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	65.735	-	65.735
Total Adjustments	0.000	0.000	65.735	-	65.735
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	65.735	-	65.735

**Change Summary Explanation**

FY 2023 increase is due to the new start of PE 0603273N - Science & Technology for Nuclear Reentry Systems.

---

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

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>				<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3095: <i>Nuclear Delivery Systems</i>	0.000	0.000	0.000	65.735	-	65.735	84.310	89.948	103.814	106.550	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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

This S&T effort will focus on development of modern technologies, subsystems and components for reentry systems and the demonstration and maturation of those technologies to a Technology Readiness Level of 6 in relevant ground and flight test environments. These activities will reduce the operational, programmatic and technological risk facing modernization of Navy reentry systems.

The Nuclear Delivery Systems funding preserves critical SWS survivability against credible threats such as Ballistic Missile Defense Systems and Anti-Submarine Warfare (ASW) on SSBN (OHIO and COLUMBIA) platforms. SWS efficacy will be less dynamic in responding if technological enhancements and developments do not outpace these corresponding threats. The most significant portion of the funding will focus on investments to develop prototypes for integration and demonstration in FY 2025 through FY 2027 to outpace the threat and de-risk future programs. These technologies are enablers for sustaining and life extending programs, allowing SSP to accomplish the following:

- Technology Maturation - Mature and demonstrate technologies in Reentry (i.e. Aeroshell, Fuzing, and Guidance) that will enable efficient insertion of SWS capability into future programs through the adaptability and flexibility. Aeroshell refinement will be completed to support the capability demonstration.
- SWS Enablers Advancements - Technology maturation of certain SWS subsystem will be investigated to support the adaptability and flexibility needed to support the reentry capability demonstrations.

The SWS NDS R&D also consists of funding to support the demonstration and test of the technologies developed under this project in a relevant environment. Advancing these technologies to a Technology Readiness Level of 6 or greater will allow for the transition into current and future weapon systems. The demonstrations will consist of:

- Ground tests in FY 2024 through FY 2026.
- Advanced ground tests via Hardware in the loop facilities to integrate multiple subsystems across the SWS architecture in FY 2024 through FY 2027.
- Integration cost for Flight Experiments - As part of the SWS yearly flight demonstrations the funding will support the integration of the technologies onto scheduled and funded flight test.

Further information can be provided at a higher classification level.

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

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> Enabling Technology	0.000	0.000	33.935	0.000	33.935

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>	<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<p align="right"><b>Articles:</b></p> <p><b>Description:</b> Develop and mature advanced technologies and concepts to support advanced Nuclear Delivery Systems and SWS requirements and address emerging threats. Rapidly respond to evolving warfighter priorities and emerging requirements via development of SWS enabling technologies, and capability demonstrations.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Base Plans:</b> Enabling Technology</p> <ul style="list-style-type: none"> <li>- Initiate development of advanced fuzing solutions that are able to maintain operational effectiveness against emerging targeting challenges and develop alternative safety and surety features required for nuclear systems.</li> <li>- Initiate development of NDS guidance system software to enable reentry Guidance, Navigation and Control (GN&amp;C) technologies to support SWS integration ground testing and future flight tests.</li> <li>- Analyze guidance hardware changes to support further enabling reentry GN&amp;C technologies.</li> <li>- Develop fire control and mission planning software to allow for enabling technology evaluation and support SWS integration ground testing and future flight test opportunities.</li> <li>- Initiate studies and evaluation for targeting effectiveness.</li> <li>- Initiate studies and evaluation for data transfer capability to flight system components.</li> </ul> <p>Further information can be provided at a higher classification level.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> The FY 2022 to FY2023 increase is due to the new start of PE 0603273N / Science &amp; Technology for Nuclear Reentry Systems.</p>	-	-	-	-	-
<p><b>Title:</b> Reentry Capability Demonstration 1</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Base Plans:</b></p>	0.000	0.000	7.890	0.000	7.890
	-	-	-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>	<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<p>Reentry Capability Demonstration 1</p> <ul style="list-style-type: none"> <li>- Begin development of Aeroshell technologies to support future threats and flexibility.</li> <li>- Begin development of Fuzing technologies to support future threats and flexibility.</li> <li>- Begin design and conduct assessments to Trident flight test and strategic warhead/Reentry Body (RB) design concepts.</li> <li>- Initiate development of system architecture models of the capability demonstration effort.</li> <li>- Develop program execution plan for the experiment.</li> <li>- Models to describe the system architecture of proposed experiment effort.</li> </ul> <p>Further information can be provided at a higher classification level.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> The FY 2022 to FY 2023 increase is due to the new start of PE 0603273N / Science &amp; Technology for Nuclear Reentry Systems.</p>					
<p><b>Title:</b> Reentry Capability Demonstration 2</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Base Plans:</b> Reentry Capability Demonstration 2</p> <ul style="list-style-type: none"> <li>- Conduct assessments of Reentry Body (RB) aeroshell and thermal protection system (TPS) vendors, materials, forgings, and machining tooling.</li> <li>- Begin design and development of flight demonstration reentry body concept including system architecture, power, radio frequency sub-system, telemetry transmitter, and inertial measurement unit.</li> </ul> <p>Further information can be provided at a higher classification level.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b></p>	0.000	0.000	11.600	0.000	11.600
	-	-	-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy				<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 7		<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>		<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>						
The FY 2022 to FY 2023 increase is due to the new start of PE 0603273N / Science & Technology for Nuclear Reentry Systems.						
<b>Title:</b> Advanced Technology Demonstration						
<b>Articles:</b>						
		0.000	0.000	12.310	0.000	12.310
		-	-	-	-	-
<b>FY 2022 Plans:</b> N/A						
<b>FY 2023 Base Plans:</b> Advanced Technology Demonstration - Establish baseline infrastructure for evaluating and integrating technologies for a reentry capability demonstration. - Initiate the NDS Strategic Guidance Hardware independent validation & verification capability in various environments. - Develop NDS performance measures for the modeling and simulation activities to assess capability and performance effectiveness.						
Further information can be provided at a higher classification level.						
<b>FY 2023 OCO Plans:</b> N/A						
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> The FY 2022 to FY 2023 increase is due to the new start of PE 0603273N / Science & Technology for Nuclear Reentry Systems.						
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	0.000	65.735	0.000	65.735
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A						
<b>Remarks</b>						
<b>D. Acquisition Strategy</b> Contracts will be awarded to those sources who were engaged in program and are currently engaged in the production and/or operational support on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3, 4						

**UNCLASSIFIED**

<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2023 Navy</b>											<b>Date: April 2022</b>				
<b>Appropriation/Budget Activity</b> 1319 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0603273N / Science & Technology for Nuclear Re-entry Systems					<b>Project (Number/Name)</b> 3095 / Nuclear Delivery Systems				

<b>Product Development (\$ in Millions)</b>				<b>FY 2021</b>		<b>FY 2022</b>		<b>FY 2023 Base</b>		<b>FY 2023 OCO</b>		<b>FY 2023 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Nuclear Delivery Systems	C/CPIF	LMSS : FL	0.000	0.000		0.000		12.353	Oct 2022	-		12.353	Continuing	Continuing	Continuing
Nuclear Delivery Systems	SS/CPFF	DRAPER : MA	0.000	0.000		0.000		10.630	Oct 2022	-		10.630	Continuing	Continuing	Continuing
Nuclear Delivery Systems	WR	NSWC DAHLGREN : VA	0.000	0.000		0.000		12.110	Oct 2022	-		12.110	Continuing	Continuing	Continuing
Nuclear Delivery Systems	SS/CPIF	LMRMS : NY	0.000	0.000		0.000		0.500	Oct 2022	-		0.500	Continuing	Continuing	Continuing
Nuclear Delivery Systems	C/CPFF	JHU-APL : MD	0.000	0.000		0.000		11.600	Oct 2022	-		11.600	Continuing	Continuing	Continuing
Nuclear Delivery Systems	MIPR	DOE-SNL : NM	0.000	0.000		0.000		3.300	Oct 2022	-		3.300	Continuing	Continuing	Continuing
Nuclear Delivery Systems	Various	Various : Various	0.000	0.000		0.000		4.660	Oct 2022	-		4.660	Continuing	Continuing	Continuing
Nuclear Delivery Systems	TBD	Other Gvmt Agencies* : Various	0.000	0.000		0.000		10.582	Oct 2022	-		10.582	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.000	0.000		0.000		65.735		-		65.735	Continuing	Continuing	N/A

**Remarks**  
\*Further information can be provided at a higher classification level.

	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	0.000	0.000	0.000	65.735	-	65.735	Continuing	Continuing	N/A

**Remarks**

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2023 Navy</b>		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>	<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>

	FY 2023				FY 2024				FY 2025				FY 2026				FY2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Technology Roadmap</b>																				
<b>SWS Enablers: Technology Development, Maturation, &amp; Integration</b>																				
SWS Enablers: Initial Ground Test						◊														
SWS Enablers: Advanced Ground Test							◊													
SWS Enablers: Integrated Test								◊												
<b>Reentry Enablers: Technology Development, Maturation, &amp; Integration</b>																				
Reentry Enablers: Initial Ground Test						◊														
Reentry Enablers: Advanced Ground Test								◊												
<b>Reentry Capability Demonstration 1: Technology Development, Maturation, &amp; Integration</b>																				
Reentry Capability Demonstration 1: Initial Ground Test								◊												
Reentry Capability Demonstration 1: Advanced Ground Test										◊										
Reentry Capability Demonstration 1: Integrated Test															◊					
<b>Reentry Capability Demonstration 2: Technology Development, Maturation, &amp; Integration</b>																				
Reentry Capability Demonstration 2: Initial Ground Test											◊									
Reentry Capability Demonstration 2: Advanced Ground Test															◊					
Reentry Capability Demonstration 2: Integrated Test																			◊	
<b>Advanced Capabilities Demonstration: Technology Development, Maturation, &amp; Integration</b>																				
Advanced Capabilities Demonstration: Initial Ground Test																◊				
Advanced Capabilities Demonstration: Advanced Ground Test																			◊	
Advanced Capabilities Demonstration: Integrated Test																				◊

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2023 Navy</b>		<b>Date: April 2022</b>
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>	<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 3095</b>				
Technology Roadmap: Technology Roadmap	1	2023	4	2023
SWS Enablers: Technology Development, Maturation, & Integration	1	2023	1	2025
SWS Enablers: Initial Ground Test	1	2024	1	2024
SWS Enablers: Integrated/Advanced Ground Test	3	2024	3	2024
SWS Enablers: Flight Test	1	2025	1	2025
Reentry Enablers: Technology Development, Maturation, & Integration	1	2023	1	2025
Reentry Enablers: Initial Ground Test	2	2024	2	2024
Reentry Enablers: Advanced Ground Test	1	2025	1	2025
Reentry Capability Demonstration 1: Technology Development, Maturation, & Integration	1	2023	2	2026
Reentry Capability Demonstration 1: Flight Test	4	2024	4	2024
Reentry Capability Demonstration 1: Advanced Ground Test	2	2025	2	2025
Reentry Capability Demonstration 1: Integrated Demonstration	2	2026	2	2026
Reentry Capability Demonstration 2: Technology Development, Maturation, & Integration	1	2023	2	2027
Reentry Capability Demonstration 2: Initial Ground Test	4	2025	4	2025
Reentry Capability Demonstration 2: Advanced Ground Test	2	2026	2	2026
Reentry Capability Demonstration 2: Integrated Demonstration	2	2027	2	2027
Advanced Capabilities Demonstration: Technology Development, Maturation, & Integration	1	2023	4	2027
Advanced Capabilities Demonstration: Initial Ground Test	4	2026	4	2026
Advanced Capabilities Demonstration: Integrated/Advanced Ground Test	2	2027	2	2027

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0603273N / <i>Science &amp; Technology for Nuclear Re-entry Systems</i>	<b>Project (Number/Name)</b> 3095 / <i>Nuclear Delivery Systems</i>

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Advanced Capabilities Demonstration: Integrated Flight Test	4	2027	4	2027