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

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| Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)</i> | R-1 Program Element (Number/Name) PE 0603273N / <i>Science & Technology for Nuclear Re-entry Systems</i> |
|---|--|

| COST (\$ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---------------------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 0.000 | 64.132 | 112.329 | 118.624 | - | 118.624 | 124.634 | 117.057 | 119.447 | 121.925 | Continuing | Continuing |
| 3095: <i>Nuclear Delivery Systems</i> | 0.000 | 64.132 | 112.329 | 118.624 | - | 118.624 | 124.634 | 117.057 | 119.447 | 121.925 | Continuing | Continuing |

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 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 investments 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.

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| B. Program Change Summary (\$ in Millions) | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 65.735 | 112.329 | 118.618 | - | 118.618 |
| Current President's Budget | 64.132 | 112.329 | 118.624 | - | 118.624 |
| Total Adjustments | -1.603 | 0.000 | 0.006 | - | 0.006 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.603 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.006 | - | 0.006 |

Change Summary Explanation

No significant changes in FY 2025 from previous President's Budget

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| Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy | | | | | | | | | | Date: March 2024 | | |
| Appropriation/Budget Activity 1319 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603273N / <i>Science & Technology for Nuclear Re-entry Systems</i> | | | | Project (Number/Name) 3095 / <i>Nuclear Delivery Systems</i> | | | |
| COST (\$ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
| 3095: <i>Nuclear Delivery Systems</i> | 0.000 | 64.132 | 112.329 | 118.624 | - | 118.624 | 124.634 | 117.057 | 119.447 | 121.925 | 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.
- Reentry Enablers Advancements - Technology maturation of certain reentry subsystem and SWS subsystems directly in support of reentry 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)

| | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|-----------------------------------|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Enabling Technology | 38.560 | 68.801 | 64.125 | 0.000 | 64.125 |

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

| | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|--|---------|---------|-----------------|----------------|------------------|
| Articles: | - | - | - | - | - |
| <p>Description: 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>FY 2024 Plans:</p> <ul style="list-style-type: none"> - Continue 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. - Continue development of NDS guidance system software to enable reentry Guidance, Navigation and Control (GN&C) technologies to support SWS integration ground testing and future flight tests. - Continue to analyze guidance hardware changes to support further enabling reentry GN&C technologies. - Continue to develop fire control and mission planning software to allow for enabling technology evaluation and support SWS integration ground testing and future flight test opportunities. - Continue studies and evaluation for targeting effectiveness. - Continue studies and evaluation for data transfer capability to flight system components. - Begin long-lead item procurement and preparation for component testing - Begin development of advanced sensor technology for subcomponent parts - Further information can be provided at a higher classification level. <p>FY 2025 Base Plans:</p> <ul style="list-style-type: none"> - Continue 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. - Continue development of NDS guidance system software to enable reentry GN&C technologies to support SWS integration ground testing and future flight tests. - Continue to analyze guidance hardware changes to support further enabling reentry GN&C technologies. - Continue to develop fire control and mission planning software to allow for enabling technology evaluation and support SWS integration ground testing and future flight test opportunities. - Continue studies and evaluation for targeting effectiveness. - Continue studies and evaluation for data transfer capability to flight system components. - Continue long-lead item procurement and preparation for component testing - Continue development of advanced sensor technology for subcomponent parts | | | | | |

UNCLASSIFIED

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| B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| - Further information can be provided at a higher classification level. | | | | | |
| FY 2025 OCO Plans: N/A | | | | | |
| FY 2024 to FY 2025 Increase/Decrease Statement: Decrease from FY 2024 to FY 2025 as enabling technology development ramps down. | | | | | |
| Title: Reentry Capability Demonstration (RCD) 1 | 10.396 | 25.848 | 25.543 | 0.000 | 25.543 |
| Articles: | - | - | - | - | - |
| Description: RCD 1 and RCD 2 have different objectives and require different S&T efforts to achieve their specific objectives which are captured under the respective RCDs. | | | | | |
| FY 2024 Plans: Reentry Capability Demonstration 1 - Continue development of Aeroshell technologies to support future threats and flexibility. - Continue development and integration concepts of Fuzing technologies to support future threats and flexibility. - Continue design and conduct early integration assessments for Trident flight test and strategic warhead/ Reentry Body (RB) design concepts. - Continue development of system architecture models. - Maintain program execution plan for the experiment. - Begin Long lead procurement of hardware to support flight testing - Begin development of detailed technical design of experiment and preparation for preliminary design review (PDR) - Further information can be provided at a higher classification level. | | | | | |
| FY 2025 Base Plans: Reentry Capability Demonstration 1 - Continue development of Aeroshell technologies to support future threats and flexibility. - Continue development and integration concepts of Fuzing technologies to support future threats and flexibility. - Continue design and conduct early integration assessments for future Trident flight tests. - Continue the development of system architecture models. - Maintain program execution plan for the experiment. - Continue Long lead procurement of hardware to support flight testing - Initiate and complete Critical Design Review (CDR) following completion of PDR in late FY 2024 | | | | | |

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| B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| <ul style="list-style-type: none"> - Continue material procurements for RCD1 aeroshell design to include antenna windows, substrates, nosetips, heatshield fabrication and material - Continue material characterization work for primary and two backup components for RCD1. - Initiate material buy to support guidance hardware purchases (Inertial Measurement Unit (IMU), flight computer, sensors). - Initiate test equipment procurement to include Special Test Equipment (STE), tooling, handling gear, etc. to support flight testing. - Further information can be provided at a higher classification level. <p>FY 2025 OCO Plans: N/A</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: Decrease from FY 2024 to FY 2025 is due to completion of one time buy of Guidance hardware (IMU, flight computer and sensors) in FY 2024.</p> | | | | | |
| <p>Title: Reentry Capability Demonstration (RCD) 2</p> <p align="right">Articles:</p> <p>Description: RCD 1 and RCD 2 have different objectives and require different S&T efforts to achieve their specific objectives which are captured under the respective RCDs.</p> <p>FY 2024 Plans: Reentry Capability Demonstration 2</p> <ul style="list-style-type: none"> - Continue development of Aeroshell technologies to support future threats and flexibility. - Continue development and integration concepts of Fuzing technologies to support future threats and flexibility. - Continue design and conduct early integration assessments for future Trident flight test. - Continue development of system architecture models. - Maintain program execution plan for the experiment. - Begin Long lead procurement of hardware to support flight testing - Begin development of detailed technical design of experiment and preparation for preliminary design review (PDR) - Further information can be provided at a higher classification level. <p>FY 2025 Base Plans: Reentry Capability Demonstration 2</p> | 10.516 | 17.680 | 26.831 | 0.000 | 26.831 |
| | - | - | - | - | - |

UNCLASSIFIED

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| B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) | | | | | |
| | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
| <ul style="list-style-type: none"> - Continue development of Aeroshell technologies to support future threats and flexibility. - Continue development and integration concepts of Fuzing technologies to support future threats and flexibility. - Continue design and conduct early integration assessments for future Trident flight tests. - Continue the development of system architecture models. - Maintain program execution plan for the experiment. - Conintue Long lead procurement of hardware to support flight testing - Begin development of detailed technical design of experiment and preparation for preliminary design review (PDR) - Conduct PDR in FY 2025 - Conduct CDR in FY 2025 - Continue procurement of hardware and special test equipment for flight testing - Further information can be provided at a higher classification level. <p>FY 2025 OCO Plans: N/A</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: Increase from FY 2024 to FY 2025 is due to the ramping up for support for PDR and CDR in FY 2025 of RCD2.</p> | | | | | |
| Title: Advanced Technology Demonstration | | | | | |
| | 4.660 | 0.000 | 2.125 | 0.000 | 2.125 |
| | Articles: - | - | - | - | - |
| <p>FY 2024 Plans: No ATD efforts in FY 2024.</p> <p>FY 2025 Base Plans: - Following conclusion of ATD concept study and survivability assessment effort from FY 2023 and FY 2024 enabling technology efforts, FY 2025 efforts initiate investments in technical maturation on selected advanced technology demonstration areas. - Further information can be provided at a higher classification level.</p> <p>FY 2025 OCO Plans: N/A</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement:</p> | | | | | |

UNCLASSIFIED

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| B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| Increase from FY 2024 to FY 2025 as investment into specific advanced technology demonstration areas is initiated. | | | | | |
| Accomplishments/Planned Programs Subtotals | 64.132 | 112.329 | 118.624 | 0.000 | 118.624 |

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

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