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**Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy** **Date:** March 2023

|                                                                                                                                                              |                                                                                                  |
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| <b>Appropriation/Budget Activity</b><br>1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 5: System Development &amp; Demonstration (SDD)</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> |
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| COST (\$ in Millions)                                    | Prior Years | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total | FY 2025 | FY 2026 | FY 2027 | FY 2028 | Cost To Complete | Total Cost |
|----------------------------------------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element                                    | 643.848     | 92.274  | 135.500 | 229.668      | -           | 229.668       | 224.086 | 121.631 | 76.150  | 71.654  | Continuing       | Continuing |
| 1412: <i>HAAWC</i>                                       | 19.868      | 0.199   | 2.726   | 18.340       | -           | 18.340        | 21.303  | 19.330  | 15.630  | 9.946   | Continuing       | Continuing |
| 2234: <i>Lightweight Hybrid Torpedo</i>                  | 412.916     | 12.071  | 12.244  | 13.997       | -           | 13.997        | 15.458  | 14.793  | 15.093  | 15.400  | Continuing       | Continuing |
| 3418: <i>Advanced Anti-Submarine Lightweight Torpedo</i> | 211.064     | 80.004  | 120.530 | 197.331      | -           | 197.331       | 187.325 | 87.508  | 45.427  | 46.308  | Continuing       | Continuing |

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

The Lightweight Torpedo (LWT) program designs, integrates and tests the MK 54 LWT and supports an incremental developmental acquisition approach combining hardware and Advanced Processor Build (APB) software upgrades to enable rapid fielding of improvements to the fleet. The program will focus on common LWT and Heavyweight Torpedo (HWT) hardware and software architecture enhancements that will provide improvements to the array, warhead, propulsion, and APB software to address capability gaps against challenging adversary submarines and environments. Future APB software builds will utilize common torpedo software to deliver capability and tactics improvements to the MK 54 LWT. The program will also support development of enhanced weapon delivery methods, including the high altitude launch of the MK 54 from the P-8A Maritime Patrol and Reconnaissance Aircraft (MPRA) with the HAAWC Air Launch Accessory (ALA) and development of a common HAAWC capability compatible with the MK 54 MOD 2 Advanced LWT (ALWT).

The HAAWC development program provides the P-8A MPRA with the ability to release LWTs from high altitude to prosecute enemy submarine threats. Operational Testing (OT) was conducted at the end of FY 2020, and the Commander Operational Test & Evaluation Force (COMOPTEVFOR) report was issued in FY 2021, recommending fielding. Follow-on T&E (FOT&E) was conducted in FY 2022 with updated flight control software and the program delivered the HAAWC capability to the fleet in Q3 FY 2022 with Commander Patrol and Reconnaissance Group (CPRG) declaring Initial Operating Capability (IOC) in Q1 FY 2023. The current HAAWC design was developed to deploy the MK 54 MOD 0/1. The MK 54 MOD 2 is not compatible with HAAWC due to having different mass properties and outer mold line from the MK 54 MOD 0/1 LWT. The HAAWC development program will focus on development of a new HAAWC design, starting in FY 2024, that will be compatible, at a minimum, with the MK 54 MOD 2 ALWT, aligned with the MK 54 MOD 2 fleet delivery schedule and investigate the potential for a common HAAWC design for all MK 54 MODs.

The MK 54 MOD 1 provides significant performance improvements compared to MK 54 MOD 0 for challenging littoral, shallow water environments and adversary countermeasures. The MOD 1 program is split into 2 increments: Increment 1 focusing on the updated sonar hardware and associated APB 5 common software to provide an improved LWT to the Fleet to replace the MK 54 MOD 0s; Increment 2 is the APB 6 software (SW) only upgrade to fully take advantage of the improved sonar hardware developed under Increment 1, update the platform interface to reduce Fleet Operator workload, and provide new potential capabilities such as Salvo and terminal homing improvements. APB 6 will run on MOD 1 but also serves as the SW baseline for the MK 54 MOD 2 and the MOD 2 program will leverage development and testing under the MOD 1 Increment 2 program to reduce the scope of the test and evaluation required for the MOD 2.

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2024 Navy | <b>Date:</b> March 2023 |
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| <b>Appropriation/Budget Activity</b><br>1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 5: System Development &amp; Demonstration (SDD)</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> |
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The MK 54 MOD 2 improves the lethality and speed of the LWT by upgrading the Warhead and Propulsion system to counter challenging near-peer adversary submarines that are faster and deeper diving, leveraging the sonar hardware improvements developed under the MOD 1 program. The program awarded four Other Transaction Authority (OTA) agreements to industry partners in FY 2020 for the design of the Guidance and Control (G&C) section, Warhead, Stored Chemical Energy Propulsion System (SCEPS) afterbody sections, and All Up Round (AUR) system integrator. Industry partners are focused primarily on the development of torpedo hardware and support equipment while the USN maintains the responsibility of developing the software under the APB process and will develop specific software modules for the MK 54 MOD 2 variant. The program is working on awarding an OTA in FY 2023 for the completion of the development of the AUR and procuring up to 48 Proof of Manufacture (POM) AUR test assets to be used in Developmental and Operational Test and Evaluation. The AUR Industry partner will be responsible for managing the subsystem and system level qualification, AUR assembly, and platform integration.

| <b>B. Program Change Summary (\$ in Millions)</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> | <b>FY 2024 Total</b> |
|---------------------------------------------------|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget                       | 94.386         | 142.000        | 157.296             | -                  | 157.296              |
| Current President's Budget                        | 92.274         | 135.500        | 229.668             | -                  | 229.668              |
| Total Adjustments                                 | -2.112         | -6.500         | 72.372              | -                  | 72.372               |
| • Congressional General Reductions                | -              | -              |                     |                    |                      |
| • Congressional Directed Reductions               | -              | -6.500         |                     |                    |                      |
| • Congressional Rescissions                       | -              | -              |                     |                    |                      |
| • Congressional Adds                              | -              | -              |                     |                    |                      |
| • Congressional Directed Transfers                | -              | -              |                     |                    |                      |
| • Reprogrammings                                  | -              | -              |                     |                    |                      |
| • SBIR/STTR Transfer                              | -2.112         | 0.000          |                     |                    |                      |
| • Program Adjustments                             | 0.000          | 0.000          | 71.269              | -                  | 71.269               |
| • Rate/Misc Adjustments                           | 0.000          | 0.000          | 1.103               | -                  | 1.103                |

**Change Summary Explanation**

Funding increases from FY 2023 to FY 2024 in Project Units 1412, 2234, and 3418 for the following:

(1)PU 1412 HAAWC: Increase of \$15.614M for award to contractor for development of a new High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) that will be compatible with the MK 54 MOD 2 Advanced Lightweight Torpedo (ALWT) and aligned with MK 54 MOD 2 fleet delivery schedule.

(2)PU 2234 Lightweight Hybrid Torpedo: Increase of \$1.753M for APB 6 SW development to implement the Enhanced Digital Fire Control Interface (eDFCI) in the torpedo and upgrade models in the WAF.

(3)PU 3418 Advanced Lightweight Torpedo: Increase of \$76.801M for the procurement of material to support assembly, integration, and test of up to 48 AUR Proof of Manufacture (POM) hardware, which includes the G&C, WH, Fleet Exercise System (FES), and SCEPS afterbody subsystems required to support the in-water Developmental Test (DT) program that begins in FY 2025. Critical materials to support the subsystems, such as parts for SCEPS afterbody, that include the

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2024 Navy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                  | <b>Date:</b> March 2023 |
| <b>Appropriation/Budget Activity</b><br>1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 5: System Development &amp; Demonstration (SDD)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> |                         |
| <p>Heat Exchanger System (feedwater components, boiler assembly, injectors) and Tail Section will be procured in FY 2024. Increase also required to support shift from land-based testing to in-water testing which requires additional support and equipment.</p> <p>Total Program Adjustments to FY 2024 funding \$72.372M:</p> <p>(1)PU 1412 HAAWC: Program Adjustment increase of \$14.898M for industry award to design and develop a High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) compatible with the MK 54 MOD 2 Advanced Lightweight Torpedo (ALWT), aligned with MK 54 MOD 2 fleet delivery schedule.</p> <p>(2)PU 2234 Lightweight Hybrid Torpedo: Program Adjustment reduction of \$1.885M to correct excess carryover from prior years and inflation realignment.</p> <p>(3)PU 3418 Advanced Lightweight Torpedo: Total program adjustment increase of \$59.359M for MK 54 MOD 2 Phase II contract POM subsystem hardware procurements to support AUR builds and program testing requirements and rate adjustments.</p> |                                                                                                  |                         |

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Navy **Date:** March 2023

|                                                  |                                                                                                  |                                              |
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| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>1412 / HAAWC |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------|

| COST (\$ in Millions)      | Prior Years | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total | FY 2025 | FY 2026 | FY 2027 | FY 2028 | Cost To Complete | Total Cost |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| 1412: HAAWC                | 19.868      | 0.199   | 2.726   | 18.340       | -           | 18.340        | 21.303  | 19.330  | 15.630  | 9.946   | Continuing       | Continuing |
| Quantity of RDT&E Articles |             | -       | -       | -            | -           | -             | -       | -       | -       | -       |                  |            |

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

The program will design, develop, and procure a High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Air Launch Accessory (ALA) for the MK 54 MOD 2 Lightweight Torpedo (LWT). This capability will allow fixed-wing employment of the MK 54 MOD 2 torpedo in the same manner as the HAAWC allows for the MK 54 MOD 0/1 Torpedoes: at high altitude, with stand-off ranges, and the ability for precision guidance to the intended water entry point (WEP) without affecting the in-water operation of the torpedo. The HAAWC program will focus on development of a HAAWC that will be compatible with the MK 54 MOD 2 ALWT, aligned with the MK 54 MOD 2 fleet delivery schedule. The program will investigate the potential for a common HAAWC design for all MK 54 MODs.

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

|                                                                                                                                                                                                                                                                                                                                        | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|--------------|-------------|---------------|
| <b>Title:</b> High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Development                                                                                                                                                                                                                                               | 0.199   | 2.726   | 18.340       | 0.000       | 18.340        |
| <b>Articles:</b>                                                                                                                                                                                                                                                                                                                       | -       | -       | -            | -           | -             |
| <b>FY 2023 Plans:</b><br>Continue HAAWC assessment and requirements review for MOD 2<br>Update specifications and create Statement of Work and other pre-solicitation documents<br>Continue Market Research and Industry engagement<br>Preparation of HAAWC development for use on MOD 2 solicitation for initial award                |         |         |              |             |               |
| <b>FY 2024 Base Plans:</b><br>Solicit Proposals and complete evaluation(s) for Award of development contract for HAAWC for MOD 2<br>Conduct Kick Off meeting and Integrated Baseline Review (IBR)<br>Conduct Systems Requirement Review (SRR)                                                                                          |         |         |              |             |               |
| <b>FY 2024 OCO Plans:</b><br>N/A                                                                                                                                                                                                                                                                                                       |         |         |              |             |               |
| <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br>Increase of \$15.614M for award to contractor for development of a new High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) that will be compatible with the MK 54 MOD 2 Advanced Lightweight Torpedo (ALWT) and aligned with MK 54 MOD 2 fleet delivery schedule. |         |         |              |             |               |
| <b>Accomplishments/Planned Programs Subtotals</b>                                                                                                                                                                                                                                                                                      | 0.199   | 2.726   | 18.340       | 0.000       | 18.340        |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy |                                                                                                  | <b>Date:</b> March 2023                      |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                   | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>1412 / HAAWC |

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

| <u>Line Item</u>                      | <u>FY 2022</u> | <u>FY 2023</u> | <u>FY 2024</u><br><u>Base</u> | <u>FY 2024</u><br><u>OCO</u> | <u>FY 2024</u><br><u>Total</u> | <u>FY 2025</u> | <u>FY 2026</u> | <u>FY 2027</u> | <u>FY 2028</u> | <u>Cost To</u><br><u>Complete</u> | <u>Total Cost</u> |
|---------------------------------------|----------------|----------------|-------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------|----------------|-----------------------------------|-------------------|
| • WPN/3215: <i>MK-54 Torpedo Mods</i> | 94.168         | 103.372        | 104.086                       | -                            | 104.086                        | 107.452        | 137.334        | 139.061        | 142.100        | Continuing                        | Continuing        |

**Remarks**

LI 3215 FYDP funds MK 54 MOD 0, MK 54 MOD 1, MK 54 MOD 2, and HAAWC procurements.

**D. Acquisition Strategy**

The Engineering and Manufacturing Development (EMD) contract was completed by Boeing Company supports an incremental approach to delivering full HAAWC capability, Air Launch Accessory (ALA) assets and equipment, as well as associated engineering services and support. HAAWC compatible with MK 54 MOD 0/1 is in full rate production in a sole source follow on award to Boeing. The MK 54 MOD 2 compatible HAAWC developmental contract award is planned for FY 2024 based on technical studies and market research activities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

|                                                  |                                                                                                  |                                              |
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| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>1412 / HAAWC |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------|

| <b>Product Development (\$ in Millions)</b>  |                        |                                |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                           | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Hardware Development - HAAWC                 | C/CPFF                 | Boeing : St. Louis, MO         | 6.848       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | Continuing       | Continuing | Continuing               |
| Hardware Development - HAAWC                 | WR                     | NSWC : Indian Head, MD         | 0.040       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.040      | -                        |
| Hardware Development - HAAWC                 | WR                     | NSWC : Carderock, MD           | 0.015       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.015      | -                        |
| Hardware Development - HAAWC                 | WR                     | NUWC : Newport, RI             | 0.107       | 0.199   | Nov 2021   | 1.000   | Nov 2022   | 0.000        |            | -           |            | 0.000         | 0.000            | 1.306      | -                        |
| Hardware Development - HAAWC                 | WR                     | NUWC : Keyport, WA             | 0.000       | 0.000   |            | 0.997   | Nov 2022   | 0.000        |            | -           |            | 0.000         | 0.000            | 0.997      | -                        |
| Systems Engineering - HAAWC                  | WR                     | NAWC : Pax River, MD           | 1.226       | 0.000   |            | 0.544   | Nov 2022   | 0.000        |            | -           |            | 0.000         | 0.000            | 1.770      | -                        |
| Systems Engineering - HAAWC                  | WR                     | NAWC : China Lake, CA          | 0.740       | 0.000   |            | 0.185   | Nov 2022   | 0.000        |            | -           |            | 0.000         | 0.000            | 0.925      | -                        |
| Hardware Development - HAAWC for MK 54 MOD 2 | C/CPFF                 | Contractor TBD : Location TBD  | 0.000       | 0.000   |            | 0.000   |            | 15.598       | Jan 2024   | -           |            | 15.598        | 0.000            | 15.598     | -                        |
| Hardware Development - HAAWC for MK 54 MOD 2 | WR                     | NUWC : Newport, RI             | 0.000       | 0.000   |            | 0.000   |            | 1.000        | Nov 2023   | -           |            | 1.000         | 0.000            | 1.000      | -                        |
| Hardware Development - HAAWC for MK 54 MOD 2 | WR                     | NUWC : Keyport, WA             | 0.000       | 0.000   |            | 0.000   |            | 1.000        | Nov 2023   | -           |            | 1.000         | 0.000            | 1.000      | -                        |
| Hardware Development - HAAWC for MK 54 MOD 2 | C/BA                   | NAWC : Pax River / China Lake  | 0.000       | 0.000   |            | 0.000   |            | 0.742        | Nov 2023   | -           |            | 0.742         | 0.000            | 0.742      | -                        |
| <b>Subtotal</b>                              |                        |                                | 8.976       | 0.199   |            | 2.726   |            | 18.340       |            | -           |            | 18.340        | Continuing       | Continuing | N/A                      |

**Remarks**  
 Increase from FY 2023 to FY 2024 for industry award for hardware development of a High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) design that will be compatible with the MK 54 MOD 2. NUWC and NAWC will provide oversight of industry development contract.

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy            |                        |                                |             |                                                      |            |         |            |                       |            |             |            | Date: March 2023 |                  |            |                          |
|-------------------------------------------------------------------|------------------------|--------------------------------|-------------|------------------------------------------------------|------------|---------|------------|-----------------------|------------|-------------|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity                                     |                        |                                |             | R-1 Program Element (Number/Name)                    |            |         |            | Project (Number/Name) |            |             |            |                  |                  |            |                          |
| 1319 / 5                                                          |                        |                                |             | PE 0604610N / <i>Lightweight Torpedo Development</i> |            |         |            | 1412 / HAAWC          |            |             |            |                  |                  |            |                          |
| Support (\$ in Millions)                                          |                        |                                |             | FY 2022                                              |            | FY 2023 |            | FY 2024 Base          |            | FY 2024 OCO |            | FY 2024 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 |
| Program Management Support - HAAWC                                | WR                     | NUWC : Keyport                 | 1.373       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 1.373      | -                        |
| <b>Subtotal</b>                                                   |                        |                                | 1.373       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 1.373      | N/A                      |
| Test and Evaluation (\$ in Millions)                              |                        |                                |             | FY 2022                                              |            | FY 2023 |            | FY 2024 Base          |            | FY 2024 OCO |            | FY 2024 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 |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | C/CPFF                 | Boeing : St. Louis, MO         | 4.124       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 4.124      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NUWC : Keyport, WA             | 1.058       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 1.058      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NUWC : Newport, RI             | 1.488       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 1.488      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NAWC : China Lake, CA          | 0.425       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 0.425      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NAWC : Pax River, MD           | 0.825       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 0.825      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | OPTEVFOR : Norfolk, VA         | 1.504       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 1.504      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NAVAIR : China Lake, CA        | 0.025       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 0.025      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NSWC : Indian Head, MD         | 0.070       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 0.070      | -                        |
| <b>Subtotal</b>                                                   |                        |                                | 9.519       | 0.000                                                |            | 0.000   |            | 0.000                 |            | -           |            | 0.000            | 0.000            | 9.519      | N/A                      |

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| <b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2024 Navy |                    |                |                                                                                                  |                     |                    |                      | <b>Date:</b> March 2023                      |                   |                                 |  |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                  |                    |                | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> |                     |                    |                      | <b>Project (Number/Name)</b><br>1412 / HAAWC |                   |                                 |  |  |
|                                                                   | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b>                                                                                   | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> | <b>FY 2024 Total</b> | <b>Cost To Complete</b>                      | <b>Total Cost</b> | <b>Target Value of Contract</b> |  |  |
| <b>Project Cost Totals</b>                                        | 19.868             | 0.199          | 2.726                                                                                            | 18.340              | -                  | 18.340               | Continuing                                   | Continuing        | N/A                             |  |  |

**Remarks**



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|                                                               |                                                                                                  |                                              |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Navy |                                                                                                  | <b>Date:</b> March 2023                      |
| <b>Appropriation/Budget Activity</b><br>1319 / 5              | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>1412 / HAAWC |

Schedule Details

| Events by Sub Project                                                    | Start   |      | End     |      |
|--------------------------------------------------------------------------|---------|------|---------|------|
|                                                                          | Quarter | Year | Quarter | Year |
| <b>Proj 1412</b>                                                         |         |      |         |      |
| HAAWC Design/Development/Qualification: HAAWC IOC                        | 3       | 2022 | 3       | 2022 |
| HAAWC Design/Development/Qualification: HAAWC FOT&E                      | 2       | 2022 | 2       | 2022 |
| HAAWC Design/Development/Qualification: HAAWC on MK 54 MOD 2 Development | 3       | 2022 | 4       | 2028 |

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|                                                                    |                    |                |                |                     |                                                                                                  |                      |                |                |                                                                          |                         |                         |                   |
|--------------------------------------------------------------------|--------------------|----------------|----------------|---------------------|--------------------------------------------------------------------------------------------------|----------------------|----------------|----------------|--------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy |                    |                |                |                     |                                                                                                  |                      |                |                |                                                                          | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                   |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> |                      |                |                | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>                                       | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>                                                                               | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>                                                           | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 2234: <i>Lightweight Hybrid Torpedo</i>                            | 412.916            | 12.071         | 12.244         | 13.997              | -                                                                                                | 13.997               | 15.458         | 14.793         | 15.093                                                                   | 15.400                  | Continuing              | Continuing        |
| Quantity of RDT&E Articles                                         |                    | -              | -              | -                   | -                                                                                                | -                    | -              | -              | -                                                                        | -                       |                         |                   |

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

The program designs, integrates and tests the LWT MK 54. The LWT provides performance improvements in shallow water, counter-measure environments. The MK 54 MOD 1 program consists of two increments: (1) Increment 1 consisting of Advanced Processor Build (APB) 5 / Tech Insertion 1 (TI-1); and (2) Increment 2, consisting of APB-6 software upgrade.

FY 2024 funding is for continued development of MK 54 MOD 1 Increment 2 APB 6 engineering builds, conducting in-water engineering test runs, and Weapons Analysis Facility (WAF) system testing. FY 2024 funding also for continued development of a Fleet Exercise Section (FES) instrumentation subsystem to be compatible with the MK 54 MOD 1 obsolescence upgraded hardware being produced under BLI 3215.

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

|                                                                                                                    | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> | <b>FY 2024 Total</b> |
|--------------------------------------------------------------------------------------------------------------------|----------------|----------------|---------------------|--------------------|----------------------|
| <b>Title:</b> MK 54 Pre-Planned Product Improvement                                                                | 12.071         | 12.244         | 13.997              | 0.000              | 13.997               |
| <b>Articles:</b>                                                                                                   | -              | -              | -                   | -                  | -                    |
| <b>FY 2023 Plans:</b>                                                                                              |                |                |                     |                    |                      |
| Continue Fleet Exercise Section (FES) development                                                                  |                |                |                     |                    |                      |
| Continue Environmentally Centric Weapons Facility (EC WAF) Integration                                             |                |                |                     |                    |                      |
| Continue APB 6 (INC 2) software development                                                                        |                |                |                     |                    |                      |
| Conduct Engineering In Water Testing for APB 6 (INC 2)                                                             |                |                |                     |                    |                      |
| <b>FY 2024 Base Plans:</b>                                                                                         |                |                |                     |                    |                      |
| Continue Fleet Exercise Section (FES) development                                                                  |                |                |                     |                    |                      |
| Continue Environmentally Centric Weapons Facility (EC WAF) Integration Continue APB 6 (INC 2) software development |                |                |                     |                    |                      |
| Conduct Engineering In Water Testing for APB 6 (INC 2)                                                             |                |                |                     |                    |                      |
| Initiated Developmental Testing for APB 6 (INC 2)                                                                  |                |                |                     |                    |                      |
| Conduct initial platform integration of APB 6 (INC 2) with launch platforms (P-8A, MH-60R, CRUDES)                 |                |                |                     |                    |                      |
| <b>FY 2024 OCO Plans:</b>                                                                                          |                |                |                     |                    |                      |
| N/A                                                                                                                |                |                |                     |                    |                      |
| <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>                                                             |                |                |                     |                    |                      |

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|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy |                                                                                                  | <b>Date:</b> March 2023                                                  |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                   | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>                                                                      | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024<br/>Base</b> | <b>FY 2024<br/>OCO</b> | <b>FY 2024<br/>Total</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-------------------------|------------------------|--------------------------|
| Increase of \$1.753M for APB 6 SW development to implement the Enhanced Digital Fire Control Interface (eDFCI) in the torpedo and upgrade models in the WAF. |                |                |                         |                        |                          |
| <b>Accomplishments/Planned Programs Subtotals</b>                                                                                                            | 12.071         | 12.244         | 13.997                  | 0.000                  | 13.997                   |

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

| <b>Line Item</b>                      | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024<br/>Base</b> | <b>FY 2024<br/>OCO</b> | <b>FY 2024<br/>Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b> | <b>FY 2028</b> | <b>Cost To<br/>Complete</b> | <b>Total Cost</b> |
|---------------------------------------|----------------|----------------|-------------------------|------------------------|--------------------------|----------------|----------------|----------------|----------------|-----------------------------|-------------------|
| • WPN/3215: <i>MK-54 Torpedo Mods</i> | 94.168         | 103.372        | 104.086                 | -                      | 104.086                  | 107.452        | 137.334        | 139.061        | 142.100        | Continuing                  | Continuing        |

**Remarks**

LI 3215 FYDP funds MK 54 MOD 0, MK 54 MOD 1, MK 54 MOD 2 and HAAWC procurements.

**D. Acquisition Strategy**

Leveraging a Phase III SBIR, a MK 54 MOD 1 LRIP contract was awarded to Progeny in 2016, for the delivery of MOD 1 assets to support Operational Testing (OT). EOC approved by MDA in Dec 2021 and IOC has been delayed to 2Q FY 2023 due to lack of target availability to conduct OT events. Continuing on with the SBIR contractor, a second LRIP contract was awarded to Progeny for MOD 1 kits in 2018, with an option for Full Rate Production in FY 2022. A new Sole Source FRP contract award is planned for FY 2023 and will incorporate the completion of the development and qualification of the FES that is compatible with the obsolescence upgrade that is being produced in the second LRIP contract and subsequent FRP contract(s). In conjunction with these MK 54 MOD 1 hardware procurements, APB software upgrades will provide significant torpedo performance improvements. APB 5 and APB 6 software development and testing is performed by NUWC Division Newport. The APB software maximizes commonality between HWTs and LWTs and the APB 6 variant that is being developed under MK 54 MOD 1 INCREMENT 2 is the baseline SW for the MK 54 MOD 2 ALWT.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

|                                                  |                                                                                                  |                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|

| <b>Product Development (\$ in Millions)</b>  |                        |                                 |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 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 |
| Hardware Development - PRIOR YEAR            | WR                     | NUWC : Newport/ Keyport         | 47.640      | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 47.640     | -                        |
| Hardware Development - MK 54 MOD 1           | WR                     | NUWC : Newport                  | 7.469       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 7.469      | -                        |
| Hardware Development - MK 54 MOD 1           | SS/FP                  | Progeny Systems : Not Specified | 24.394      | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 24.394     | -                        |
| Hardware Development - HAAWC                 | WR                     | NSWCCD : Carderock, MD          | 0.050       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.050      | -                        |
| Hardware Development - HAAWC                 | C/CPAF                 | Boeing : St. Louis, MO          | 98.216      | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 98.216     | -                        |
| Hardware Development - HAAWC                 | WR                     | NSWCDD : Dahlgren, VA           | 0.400       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.400      | -                        |
| Hardware Development - INSENSITIVE MUNITIONS | WR                     | NUWC : Newport                  | 0.950       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | Continuing       | Continuing | Continuing               |
| Hardware Development - INSENSITIVE MUNITIONS | WR                     | NSWC : Indian Head, MD          | 0.971       | 0.150   | Nov 2021   | 0.150   | Nov 2022   | 0.150        | Nov 2023   | -           |            | 0.150         | Continuing       | Continuing | Continuing               |
| Hardware Development - INSENSITIVE MUNITIONS | WR                     | NUWC : Keyport                  | 0.470       | 0.749   | Nov 2021   | 0.196   | Nov 2022   | 0.053        | Nov 2023   | -           |            | 0.053         | Continuing       | Continuing | Continuing               |
| Hardware Development - MK 54 MOD 1           | WR                     | NSWC : Indian Head, MD          | 6.950       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 6.950      | -                        |
| Hardware Development - MK 54 MOD 1           | MIPR                   | DMEA : McClellan, CA            | 0.520       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.520      | -                        |
| Software Development - PRIOR YEAR            | WR                     | NUWC : Newport/ Keyport         | 20.454      | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 20.454     | -                        |
| Software Development - MK 54 MOD 1           | WR                     | NUWC : Newport                  | 3.032       | 2.697   | Nov 2021   | 2.862   | Nov 2022   | 0.000        |            | -           |            | 0.000         | 0.000            | 8.591      | -                        |
| Software Development - MK 54 MOD 1           | MIPR                   | MIT : Boston, MA                | 1.358       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 1.358      | -                        |
| Software Development - MK 54 MOD 1           | C/BA                   | ARL/PSU : State College, PA     | 1.441       | 0.814   | Jan 2022   | 0.500   | Jan 2023   | 0.000        |            | -           |            | 0.000         | 0.000            | 2.755      | -                        |

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

|                                                  |                                                                                                  |                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|

| <b>Product Development (\$ in Millions)</b> |                        |                                         |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------------------------------|------------------------|-----------------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                          | Contract Method & Type | Performing Activity & Location          | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Systems Engineering - VLA                   | SS/FP                  | Lockheed Martin: VLA : Akron, OH        | 7.606       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 7.606      | -                        |
| Systems Engineering - HAAWC                 | WR                     | NSWC PMA 290 : Patuxent, MD             | 9.582       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 9.582      | -                        |
| Systems Engineering - HAAWC                 | WR                     | NAWCWD : China Lake                     | 6.606       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 6.606      | -                        |
| Systems Engineering - HAAWC                 | C/CPFF                 | John Hopkins University : Baltimore, MD | 0.050       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.050      | -                        |
| System Test & Evaluation - HAAWC            | WR                     | NUWC : Newport/ Keyport                 | 21.931      | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 21.931     | -                        |
| Hardware Development - ADV LWT              | WR                     | NUWC : Newport                          | 1.218       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 1.218      | -                        |
| Hardware Development - ADV LWT              | WR                     | NUWC : Keyport                          | 0.300       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.300      | -                        |
| Hardware Development - ADV LWT              | WR                     | NSWC : Indian Head, MD                  | 0.270       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.270      | -                        |
| Hardware Development - ADV LWT              | WR                     | NAVSEA : Washington, DC                 | 0.025       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.025      | -                        |
| Hardware Development - ADV LWT              | WR                     | NAVAIR : Pax River, MD                  | 0.025       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.025      | -                        |
| Software Development - APB 6                | WR                     | NUWC : Newport                          | 3.415       | 2.222   | Nov 2021   | 1.947   | Nov 2022   | 6.955        | Dec 2023   | -           |            | 6.955         | 0.000            | 14.539     | -                        |
| Software Development - APB 6                | C/CPFF                 | Sonalyt : Waterford, CT                 | 0.704       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.704      | -                        |
| Software Development - FCT program          | C/BA                   | NUWC : Newport/ Keyport                 | 1.150       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 1.150      | -                        |
| <b>Subtotal</b>                             |                        |                                         | 267.197     | 6.632   |            | 5.655   |            | 7.158        |            | -           |            | 7.158         | Continuing       | Continuing | N/A                      |

**Remarks**  
Increase from FY 2023 to FY 2024 for APB 6 SW development to implement the Enhanced Digital Fire Control Interface (eDFCI) in the torpedo and upgrade models in the WAF.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

|                                                  |                                                                                                  |                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|

| <b>Support (\$ in Millions)</b> |                        |                                |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item              | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Hardware Development            | WR                     | NUWC : Newport/ Keyport        | 5.532       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 5.532      | -                        |
| System Engineering Support      | WR                     | NUWC : Newport/ Keyport        | 11.991      | 1.302   | Nov 2021   | 1.328   | Nov 2022   | 1.825        | Nov 2023   | -           |            | 1.825         | 0.000            | 16.446     | -                        |
| Program Management Support      | C/BA                   | ARL/PSU : State College, PA    | 0.441       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.441      | -                        |
| Program Management Support      | Various                | NAVSEA : Not Specified         | 0.168       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.168      | -                        |
| Systems Engineering             | WR                     | NUWC : Newport/ Keyport        | 0.120       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.120      | -                        |
| System Test and Evaluation      | WR                     | NUWC : Newport/ Keyport        | 32.306      | 1.834   | Nov 2021   | 1.870   | Nov 2022   | 1.896        | Nov 2023   | -           |            | 1.896         | 0.000            | 37.906     | -                        |
| System Test and Evaluation      | WR                     | NSWC : Carderock, MD           | 0.008       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.008      | -                        |
| System Test and Evaluation      | WR                     | NSWC : Dahlgren, VA            | 0.069       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.069      | -                        |
| System Test and Evaluation      | WR                     | NAVFAC LANT : Washington, DC   | 0.056       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.056      | -                        |
| <b>Subtotal</b>                 |                        |                                | 50.691      | 3.136   |            | 3.198   |            | 3.721        |            | -           |            | 3.721         | 0.000            | 60.746     | N/A                      |

**Remarks**  
FY 2024 increase for ABP 6 system engineering and Test and Evaluation to support Engineering In-Water Runs.

| <b>Test and Evaluation (\$ in Millions)</b>                       |                        |                                |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------------------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                                                | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NSWC : Carderock               | 1.259       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 1.259      | -                        |

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

|                                                  |                                                                                                  |                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|

| <b>Test and Evaluation (\$ in Millions)</b>                       |                        |                                     |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------------------------------------------------|------------------------|-------------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                                                | Contract Method & Type | Performing Activity & Location      | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NUWC : Newport/ Keyport             | 32.191      | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 32.191     | -                        |
| Operational Test & Evaluation (OT&E)                              | WR                     | NUWC : Keyport                      | 18.108      | 1.763   | Nov 2021   | 0.450   | Nov 2022   | 1.964        | Dec 2023   | -           |            | 1.964         | 0.000            | 22.285     | -                        |
| Operational Test & Evaluation (OT&E)                              | WR                     | NUWC : Newport                      | 23.017      | 0.211   | Nov 2021   | 1.651   | Nov 2022   | 0.256        | Dec 2023   | -           |            | 0.256         | 0.000            | 25.135     | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NSWC : Indian Head, MD              | 1.676       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 1.676      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | C/CPIF                 | ARL/PSU : State College, PA         | 2.029       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 2.029      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | Aberdeen Test Center : Aberdeen, MD | 0.731       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.731      | -                        |
| Operational Test & Evaluation (OT&E)                              | WR                     | OPTEVFOR : Norfolk, VA              | 4.422       | 0.039   | Nov 2021   | 1.000   | Nov 2022   | 0.598        | Dec 2023   | -           |            | 0.598         | 0.000            | 6.059      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | OPTEVFOR : Norfolk, VA              | 4.240       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 4.240      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NSWC : Dalgren, VA                  | 0.091       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.091      | -                        |
| Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E) | WR                     | NUWC : Keyport                      | 0.618       | 0.000   |            | 0.000   |            | 0.000        |            | -           |            | 0.000         | 0.000            | 0.618      | -                        |
| <b>Subtotal</b>                                                   |                        |                                     | 88.382      | 2.013   |            | 3.101   |            | 2.818        |            | -           |            | 2.818         | 0.000            | 96.314     | N/A                      |

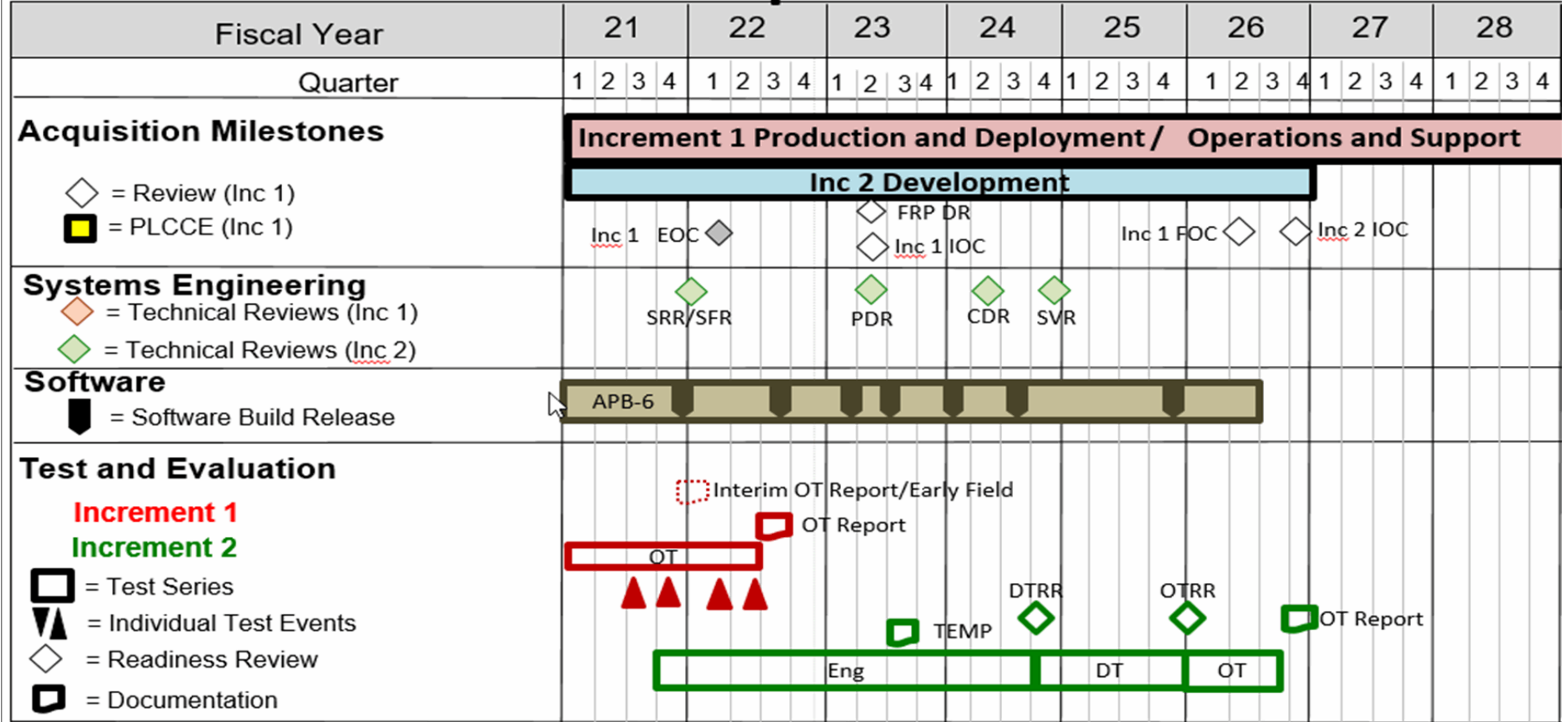
**Remarks**  
Reduced requirement for T&E as focus shifts to APB 6 development and T&E planning for APB 6.



Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy Date: March 2023

|                                                  |                                                                                                  |                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |
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# MK 54 MOD 1 Acquisition Schedule



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|                                                               |                                                                                                  |                                                                          |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Navy |                                                                                                  | <b>Date:</b> March 2023                                                  |
| <b>Appropriation/Budget Activity</b><br>1319 / 5              | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>2234 / <i>Lightweight Hybrid Torpedo</i> |

Schedule Details

| Events by Sub Project                                  | Start   |      | End     |      |
|--------------------------------------------------------|---------|------|---------|------|
|                                                        | Quarter | Year | Quarter | Year |
| <b>Proj 2234</b>                                       |         |      |         |      |
| MK 54 MOD 1 Inc 1: APB 5 / TI-1 Inc 1 OT               | 1       | 2022 | 2       | 2022 |
| MK 54 MOD 1 Inc 1: APB 5 / TI-1 Inc 1 EOC              | 1       | 2022 | 1       | 2022 |
| MK 54 MOD 1 Inc 1: APB 5 / TI-1 Inc 1 IOC              | 2       | 2023 | 2       | 2023 |
| MK 54 MOD 1 Inc 2: APB 6 Tactical Software Development | 1       | 2022 | 2       | 2026 |
| MK 54 MOD 1 Inc 2: Engineering Testing                 | 1       | 2022 | 3       | 2024 |
| MK 54 MOD 1 Inc 2: DT                                  | 4       | 2024 | 4       | 2025 |
| MK 54 MOD 1 Inc 2: OT                                  | 1       | 2026 | 3       | 2026 |
| MK 54 MOD 1 Inc 2: APB 6 IOC                           | 4       | 2026 | 4       | 2026 |

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|--------------------------------------------------------------------|--------------------|----------------|----------------|---------------------|--------------------------------------------------------------------------------------------------|----------------------|----------------|----------------|-------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy |                    |                |                |                     |                                                                                                  |                      |                |                |                                                                                           | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                   |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> |                      |                |                | <b>Project (Number/Name)</b><br>3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>                                       | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>                                                                               | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>                                                                            | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 3418: <i>Advanced Anti-Submarine Lightweight Torpedo</i>           | 211.064            | 80.004         | 120.530        | 197.331             | -                                                                                                | 197.331              | 187.325        | 87.508         | 45.427                                                                                    | 46.308                  | Continuing              | Continuing        |
| Quantity of RDT&E Articles                                         |                    | -              | -              | -                   | -                                                                                                | -                    | -              | -              | -                                                                                         | -                       |                         |                   |

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

The MK 54 MOD 2 (ALWT) is developing capability to improve the lethality and speed of the LWT by upgrading the Warhead and Propulsion system to counter challenging near- peer adversary submarines that are faster and deeper diving, leveraging the sonar hardware improvements developed under the MOD 1 program. The Analysis of Alternatives (AoA) (FY 2017) and Capability Development Document (CDD) (FY 2018) have been completed and approved. The program is leveraging UARCs and Government Agencies for requirements definition and early development, and the use of Other Transactional Authority (OTA)s for system and subsystem detailed design. The MOD 2 program will leverage development and testing under the MOD 1 Increment 2 program to reduce the scope of the test and evaluation required for the MOD 2.

FY 2024 funding will focus towards transitioning hardware development from the POD phase Other Transaction Authority (OTA) to the new All Up Round (AUR) Proof of Manufacture (POM) phase OTA, to develop and procure POM quantities, associated test spares, test sets and support equipment. FY 2024 funding will be used primarily for awarding subcontracts to the major subsystems (G&C, WH, FES, SCEPS Afterbody) for material procurements under the AUR POM contract that is planned for award in late FY 2023. Long Lead Materials are being procured in FY 2023 under the POD subsystem OTAs ahead of the POM effort to meet the aggressive schedule and the remaining critical materials to support the G&C, WH, FES, and SCEPS afterbody subsystems will be procured in FY 2024 under the AUR system OTA. The AUR/POM phase OTA is required to complete hardware development and provide the tests assets needed to execute engineering, qualification, developmental and operational test programs in preparation for the follow-on LRIP and deployment phases. The program will also execute a shift from land-based testing to in-water pre-engineering and engineering testing with the POD Hardware towards the end of FY 2024. Operational software development, modeling and simulation verification, platform integration, live warhead testing, and fleet exercise section development efforts will continue in FY 2024 to support engineering and qualification efforts.

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

|                                                              | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> | <b>FY 2024 Total</b> |
|--------------------------------------------------------------|----------------|----------------|---------------------|--------------------|----------------------|
| <b>Title:</b> ALWT Development                               | 80.004         | 120.530        | 197.331             | 0.000              | 197.331              |
| <b>Articles:</b>                                             | -              | -              | -                   | -                  | -                    |
| <b>FY 2023 Plans:</b>                                        |                |                |                     |                    |                      |
| -Conduct Subsystem Level Critical Design Reviews (CDR)       |                |                |                     |                    |                      |
| -Continue MOD 2 APB software development                     |                |                |                     |                    |                      |
| -Continue Fleet Exercise Section (FES) development           |                |                |                     |                    |                      |
| -Continue test set (Warhead/Engine/All up Round) development |                |                |                     |                    |                      |
| -Continue ship integration interface design                  |                |                |                     |                    |                      |

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------|--------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                  | <b>Date:</b> March 2023                                                                   |                     |                    |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i> |                     |                    |
| <b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>FY 2022</b>                                                                                   | <b>FY 2023</b>                                                                            | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> |
| <ul style="list-style-type: none"> <li>-Continue hardware development for Warhead section, Guidance &amp; Control section, and Propulsion</li> <li>-Continue EC WAF modeling and simulation accreditation</li> <li>-Continue Propulsion Section Proof of Design testing and delivery</li> <li>-Continue Guidance and Control (G&amp;C) Section Proof of design testing and delivery</li> <li>-Continue Warhead section Proof of Design testing and delivery</li> <li>-Continue system test bed development</li> <li>-Continue MH-60R/P-8A Integration Interface Design (hardware updates and interface software development)</li> <li>-Continue Air Launch Accessory (ALA) Initial System Design</li> <li>-Continue to Procure Long Lead Material supporting Phase II Proof of Manufacture Design</li> <li>-Award AUR Phase II OTA for completing design and development</li> </ul> <p><b>FY 2024 Base Plans:</b></p> <ul style="list-style-type: none"> <li>-Conduct System Level Critical Design Review (CDR)</li> <li>-Continue MOD 2 APB software development</li> <li>-Complete Propulsion Section Proof of Design delivery</li> <li>-Complete Guidance and Control (G&amp;C) Section Proof of Design delivery</li> <li>-Complete Warhead section Proof of Design delivery</li> <li>-Contiue AUR Phase II OTA for completing AUR design and development</li> <li>-Continue Fleet Exercise Section (FES) development</li> <li>-Continue test set (Warhead/Engine/All up Round) development</li> <li>-Continue ship integration interface design</li> <li>-Continue hardware development for Warhead section, Guidance &amp; Control section, and Propulsion</li> <li>-Continue EC WAF modeling and simulation accreditation</li> <li>-Continue system test bed development</li> <li>-Continue MH-60R/P-8A Integration Interface Design (hardware updates and interface software development)</li> <li>-Continue Air Launch Accessory (ALA) Initial System Design</li> <li>-Conduct procurement non-Long Lead Material supporting Phase II Proof of Manufacture Design</li> <li>-Conduct initial in-water engineering runs</li> <li>-Conduct qualification testing</li> </ul> <p><b>FY 2024 OCO Plans:</b><br/>N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b></p> |                                                                                                  |                                                                                           |                     |                    |

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|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy |                                                                                                  | <b>Date:</b> March 2023                                                                   |
| <b>Appropriation/Budget Activity</b><br>1319 / 5                   | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> | <b>FY 2024 Total</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|---------------------|--------------------|----------------------|
| Increase of \$76.801M for the procurement of material to support assembly, integration, and test of up to 48 AUR Proof of Manufacture (POM) hardware, which includes the G&C, WH, Fleet Exercise System (FES), and SCEPS afterbody subsystems required to support the in-water Developmental Test (DT) program that begins in FY 2025. Critical materials to support the subsystems, such as parts for SCEPS afterbody, that include the Heat Exchanger System (feedwater components, boiler assembly, injectors) and Tail Section will be procured in FY 2024. Increase also required to support shift from land-based testing to in-water testing which requires additional support and equipment. |                |                |                     |                    |                      |
| <b>Accomplishments/Planned Programs Subtotals</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 80.004         | 120.530        | 197.331             | 0.000              | 197.331              |

| <b>C. Other Program Funding Summary (\$ in Millions)</b> |                |                |                     |                    |                      |                |                |                |                |                         |                   |
|----------------------------------------------------------|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| <u>Line Item</u>                                         | <u>FY 2022</u> | <u>FY 2023</u> | <u>FY 2024 Base</u> | <u>FY 2024 OCO</u> | <u>FY 2024 Total</u> | <u>FY 2025</u> | <u>FY 2026</u> | <u>FY 2027</u> | <u>FY 2028</u> | <u>Cost To Complete</u> | <u>Total Cost</u> |
| • WPN/3215: <i>MK-54 Torpedo Mods</i>                    | 94.168         | 103.372        | 104.086             | -                  | 104.086              | 107.452        | 137.334        | 139.061        | 142.100        | Continuing              | Continuing        |

**Remarks**  
LI 3215 FYDP funds MK 54 MOD 0, MK 54 MOD 1, MK 54 MOD 2 and HAAWC procurements.

**D. Acquisition Strategy**  
The Acquisition Strategy is to use University Affiliated Research Centers (UARCs), Warfare Centers, and competitive Other Transactional Authority (OTA) agreements with industry to prototype a new Advanced Lightweight Torpedo. The program will then pursue accelerated acquisition LRIP opportunities while preparing for full and open FRP competition. This accelerated approach requires full initial funding and funding to procure long lead materials to ensure all prototyping efforts deliver a fully integrated and production-ready weapon. Scope of effort includes weapon, launch platform integration, and all associated subsystems and supporting capabilities. Four OTAs awarded and executing Proof of Design (POD) phase:  
 (1) Northrop Grumman - Warhead Section  
 (2) Aerojet - Afterbody Section  
 (3) Progeny - G&C Section  
 (4) Raytheon - All-Up-Round (AUR), Test Sets, Test Shapes, Air Launch Accessories, and Fleet Exercise Sections (FES)  
 Following the POD phase, a competitive Proof of Manufacturing (POM) OTA will be awarded to a single prime contractor to complete system and subsystem level prototype development and delivery AUR POM units starting in FY 2025. These POM units will be used to validate performance through land-based testing and in-water qualification, development, and operational testing. Upon satisfactory completion of the POM OTA, a sole-source FAR-based Low-Rate Initial Production (LRIP) contract will be awarded to the POM phase prime contractor to provide initial deliveries to the fleet. This will be followed by a competitively awarded FAR-based full-rate production contract.

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy |                        |                                                          |             |                                                      |            |         |            |                                                           |            |             |            | Date: March 2023 |                  |            |                          |
|--------------------------------------------------------|------------------------|----------------------------------------------------------|-------------|------------------------------------------------------|------------|---------|------------|-----------------------------------------------------------|------------|-------------|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity                          |                        |                                                          |             | R-1 Program Element (Number/Name)                    |            |         |            | Project (Number/Name)                                     |            |             |            |                  |                  |            |                          |
| 1319 / 5                                               |                        |                                                          |             | PE 0604610N / <i>Lightweight Torpedo Development</i> |            |         |            | 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i> |            |             |            |                  |                  |            |                          |
| Product Development (\$ in Millions)                   |                        |                                                          |             | FY 2022                                              |            | FY 2023 |            | FY 2024 Base                                              |            | FY 2024 OCO |            | FY 2024 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 |
| Software Development                                   | WR                     | NUWC NPT : Newport, RI                                   | 7.636       | 7.131                                                | Nov 2021   | 7.877   | Nov 2022   | 7.975                                                     | Nov 2023   | -           |            | 7.975            | 0.000            | 30.619     | -                        |
| Hardware Development                                   | WR                     | NUWC NPT : Newport, RI                                   | 9.848       | 2.846                                                | Nov 2021   | 3.860   | Nov 2022   | 1.141                                                     | Nov 2023   | -           |            | 1.141            | Continuing       | Continuing | Continuing               |
| Hardware Development                                   | WR                     | NUWC KPT : Keyport, WA                                   | 10.046      | 5.005                                                | Nov 2021   | 9.831   | Nov 2022   | 8.469                                                     | Nov 2023   | -           |            | 8.469            | 0.000            | 33.351     | -                        |
| Hardware Development                                   | WR                     | NSWC, IH : Indian Head, MD                               | 4.703       | 0.625                                                | Nov 2021   | 3.409   | Nov 2022   | 1.581                                                     | Nov 2023   | -           |            | 1.581            | 0.000            | 10.318     | -                        |
| Hardware Development - AUR                             | C/CPFF                 | ARL/PSU : State College, PA                              | 36.904      | 3.076                                                | Nov 2021   | 10.578  | Nov 2022   | 9.459                                                     | Nov 2023   | -           |            | 9.459            | 0.000            | 60.017     | -                        |
| Hardware Development                                   | WR                     | PEO-IWS : Washington, DC                                 | 2.869       | 0.250                                                | Nov 2021   | 0.276   | Nov 2022   | 0.000                                                     |            | -           |            | 0.000            | 0.000            | 3.395      | -                        |
| Software Development - Platform Integration            | WR                     | NAVAIR : Pax River, MD                                   | 10.524      | 9.659                                                | Nov 2021   | 4.293   | Nov 2022   | 11.089                                                    | Nov 2023   | -           |            | 11.089           | 0.000            | 35.565     | -                        |
| Hardware Development - G&C                             | C/CPIF                 | OTA - Progeny : Manassas, VA                             | 5.864       | 7.600                                                | Dec 2021   | 5.984   | Dec 2022   | 0.000                                                     |            | -           |            | 0.000            | 0.000            | 19.448     | -                        |
| Hardware Development - New engine                      | C/CPIF                 | OTA - Aerojet Rocketdyne : Huntsville, AL                | 57.141      | 17.020                                               | Jan 2022   | 13.312  | Jan 2023   | 0.000                                                     |            | -           |            | 0.000            | 0.000            | 87.473     | -                        |
| Hardware Development - Warhead                         | C/CPIF                 | OTA - Northrop Grumman Innovation Systems : Plymouth, MN | 28.149      | 8.504                                                | Jan 2022   | 16.016  | Jan 2023   | 0.000                                                     |            | -           |            | 0.000            | 0.000            | 52.669     | -                        |
| Hardware Development - AUR                             | C/CPIF                 | OTA - Raytheon : Portsmouth, RI                          | 29.007      | 15.858                                               | Jan 2022   | 23.412  | Jan 2023   | 0.000                                                     |            | -           |            | 0.000            | 0.000            | 68.277     | -                        |
| Hardware Development                                   | WR                     | NSWC Philadelphia : Philadelphia, PA                     | 0.000       | 0.000                                                |            | 0.346   | Nov 2022   | 0.243                                                     | Nov 2023   | -           |            | 0.243            | 0.000            | 0.589      | -                        |
| Software Development                                   | WR                     | NSWCCD : Carderock, MD                                   | 0.000       | 0.000                                                |            | 1.168   | Nov 2022   | 0.040                                                     | Nov 2023   | -           |            | 0.040            | 0.000            | 1.208      | -                        |
| Hardware Development Phase II AUR                      | C/CPIF                 | OTA - TBD : Location TBD                                 | 0.000       | 0.000                                                |            | 6.500   | Jan 2023   | 127.065                                                   | Dec 2023   | -           |            | 127.065          | 0.000            | 133.565    | -                        |
| Software Development - Platform Integration            | C/CPIF                 | CTR - TBD : Location TBD                                 | 0.000       | 0.000                                                |            | 9.315   | Dec 2023   | 17.898                                                    | Dec 2023   | -           |            | 17.898           | 0.000            | 27.213     | -                        |

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

|                                                  |                                                                                                  |                                                                                           |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Appropriation/Budget Activity</b><br>1319 / 5 | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i> |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|

| <b>Product Development (\$ in Millions)</b> |                        |                                |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                          | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| <b>Subtotal</b>                             |                        |                                | 202.691     | 77.574  |            | 116.177 |            | 184.960      |            | -           |            | 184.960       | Continuing       | Continuing | N/A                      |

**Remarks**

- Increase of \$6.796M to NAVAIR/Pax River required to support P-8A and MH-60 platform integration support
- Increase of \$8.583M to development contractor for P-8A and MH-60 platform integration
- Increase of \$120.310M to Phase II AUR contractor for subcontractor awards and to begin subsystem (G&C, WH, FES, SCEPS afterbody) POM hardware procurement to support up to 48 AUR units required for Developmental and Operational Testing

| <b>Support (\$ in Millions)</b> |                        |                                |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item              | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Systems Engineering             | WR                     | NUWC NPT : Newport, RI         | 2.427       | 0.960   | Nov 2021   | 1.788   | Nov 2022   | 1.292        | Nov 2023   | -           |            | 1.292         | 0.000            | 6.467      | -                        |
| <b>Subtotal</b>                 |                        |                                | 2.427       | 0.960   |            | 1.788   |            | 1.292        |            | -           |            | 1.292         | 0.000            | 6.467      | N/A                      |

| <b>Test and Evaluation (\$ in Millions)</b> |                        |                                |             | FY 2022 |            | FY 2023 |            | FY 2024 Base |            | FY 2024 OCO |            | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                          | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| Developmental Test & Evaluation (DT&E)      | WR                     | NUWC : Newport, RI             | 4.277       | 0.570   | Nov 2021   | 1.410   | Nov 2022   | 2.116        | Nov 2023   | -           |            | 2.116         | 0.000            | 8.373      | -                        |
| Developmental Test & Evaluation (DT&E)      | WR                     | OPTEVFOR : Norfolk, VA         | 0.000       | 0.000   |            | 0.255   | Nov 2022   | 0.207        | Nov 2023   | -           |            | 0.207         | 0.000            | 0.462      | -                        |
| Developmental Test & Evaluation (DT&E)      | WR                     | NUWC : Keyport, WA             | 0.000       | 0.000   |            | 0.000   |            | 5.014        | Nov 2023   | -           |            | 5.014         | 0.000            | 5.014      | -                        |
| Developmental Test & Evaluation (DT&E)      | C/BA                   | NSWC : Indian Head, MD         | 0.000       | 0.000   |            | 0.000   |            | 2.824        | Nov 2023   | -           |            | 2.824         | 0.000            | 2.824      | -                        |
| <b>Subtotal</b>                             |                        |                                | 4.277       | 0.570   |            | 1.665   |            | 10.161       |            | -           |            | 10.161        | 0.000            | 16.673     | N/A                      |

**Remarks**

- Increase of \$5.014M to NUWC KPT to support shift from land-based testing to in-water testing

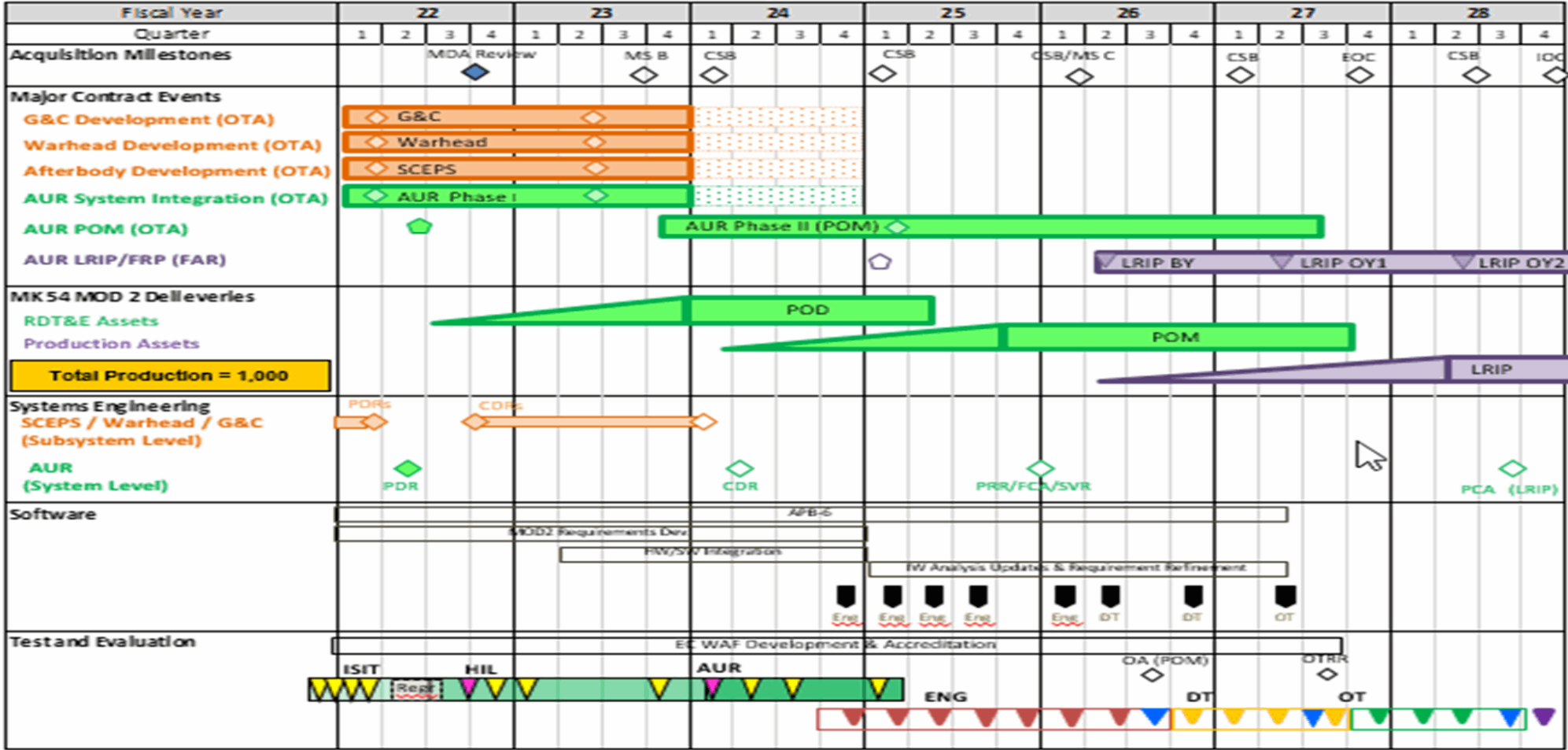


Appropriation/Budget Activity  
1319 / 5

R-1 Program Element (Number/Name)  
PE 0604610N / Lightweight Torpedo Development

Project (Number/Name)  
3418 / Advanced Anti-Submarine  
Lightweight Torpedo

### MK 54 MOD 2 Acquisition Schedule



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|                                                               |                                                                                                  |                                                                                           |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Navy |                                                                                                  | <b>Date:</b> March 2023                                                                   |
| <b>Appropriation/Budget Activity</b><br>1319 / 5              | <b>R-1 Program Element (Number/Name)</b><br>PE 0604610N / <i>Lightweight Torpedo Development</i> | <b>Project (Number/Name)</b><br>3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i> |

Schedule Details

| Events by Sub Project                                                         | Start   |      | End     |      |
|-------------------------------------------------------------------------------|---------|------|---------|------|
|                                                                               | Quarter | Year | Quarter | Year |
| <b>Proj 3418</b>                                                              |         |      |         |      |
| Advanced Lightweight Torpedo (ALWT): ALWT MS-B                                | 3       | 2023 | 3       | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT SCEPS Development                   | 1       | 2022 | 4       | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT Warhead Development                 | 1       | 2022 | 4       | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT G&C Hardware / Software Development | 1       | 2022 | 4       | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT AUR Development Integration         | 1       | 2022 | 4       | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT Land Based Testing                  | 1       | 2022 | 1       | 2025 |
| Advanced Lightweight Torpedo (ALWT): Engineering Testing                      | 4       | 2024 | 3       | 2026 |
| Advanced Lightweight Torpedo (ALWT): Development Testing                      | 4       | 2026 | 3       | 2027 |
| Advanced Lightweight Torpedo (ALWT): Operational Testing                      | 4       | 2027 | 4       | 2028 |
| Advanced Lightweight Torpedo (ALWT): IOC                                      | 4       | 2028 | 4       | 2028 |