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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy Date: February 2018

| Appropriation/Budget Activity<br>1319: Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development |             |         |         |              | R-1 Program Element (Number/Name)<br>PE 0101226N / Submarine Acoustic War Dev |               |         |         |         |         |                  |            |
|---|-------------|---------|---------|--------------|---|---------------|---------|---------|---------|---------|------------------|------------|
| COST (\$ in Millions)   | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO   | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
| Total Program Element   | 41.943      | 7.300   | 12.053  | 11.311       | -   | 11.311        | 9.309   | 13.436  | 13.697  | 13.997  | Continuing       | Continuing |
| 1265: Sub Defensive Warfare   | 41.943      | 7.300   | 12.053  | 11.311       | -   | 11.311        | 9.309   | 13.436  | 13.697  | 13.997  | Continuing       | Continuing |

## A. Mission Description and Budget Item Justification

The FY 2019 funding request was reduced by \$.046 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

The Submarine Acoustic Warfare Development program element is comprised of the Submarine Defensive Warfare Program. The objective is to maintain and improve the survivability of all U.S. submarine classes in response to torpedo attack. Efforts include Submarine Torpedo Defense System Program (SubTDS), the Torpedo Defense Working Group (TDWG), Technical Direction Agent (TDA) and In-Service Engineering Agent (ISEA) hardware and software development support for Acoustic Devices Countermeasures (ADCs), Countermeasures Set, Acoustic (CSA) systems and Acoustic Augmentation Support Systems (AASS) in the Acoustic Augmentation Support Program (AASP), including component level technical insertion. SubTDS is comprised of the ADC MK5 Devices (formally known as the Next Generation Countermeasure (NGCM) Program), a tactical decision aid (TacDA) and a SABOT that permits the ADC MK5 to be employed from the external countermeasure launcher (ECL). Also, this program transitions the research and development of new technologies and capabilities developed under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives to the SubTDS. Additionally, this effort also includes product development and improvements for Submarine Acoustic Warfare systems (SAWS) including but not limited to AASP and SubTDS.

In FY2018 the SubTDS TEMP is planned to be completed and in FY2018 the ADC MK5 Contract will award in the second quarter.

In FY2019 funding will primarily support on-going ADC MK5 development including component and subsystem design, design and delivery of three Engineering Development Model (EDM) variants, and the start of joint contractor/government Developmental Testing (DT). Governmental development of the SABOT and TacDA will continue to include initial integration with the contractor developed ADC MK5 device and SABOT DT.

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|--|---------|--|--------------|---------------------|---------------|
| Appropriation/Budget Activity  |         | R-1 Program Element (Number/Name)        |              |                     |               |
| 1319: Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development   |         | PE 0101226N I Submarine Acoustic War Dev |              |                     |               |
| B. Program Change Summary (\$ in Millions)   | FY 2017 | FY 2018                                  | FY 2019 Base | FY 2019 OCO         | FY 2019 Total |
| Previous President's Budget  | 9.329   | 12.053                                   | 9.330        | -                   | 9.330         |
| Current President's Budget   | 7.300   | 12.053                                   | 11.311       | -                   | 11.311        |
| Total Adjustments  | -2.029  | 0.000                                    | 1.981        | -                   | 1.981         |
| • Congressional General Reductions   | -       | -  |              |                     |               |
| • Congressional Directed Reductions  | -       | -  |              |                     |               |
| • Congressional Rescissions  | -       | -  |              |                     |               |
| • Congressional Adds   | -       | -  |              |                     |               |
| • Congressional Directed Transfers   | -       | -  |              |                     |               |
| • Reprogrammings   | -1.825  | 0.000                                    |              |                     |               |
| • SBIR/STTR Transfer   | -0.205  | 0.000                                    |              |                     |               |
| • Program Adjustments  | 0.000   | 0.000                                    | 2.154        | -                   | 2.154         |
| • Rate/Misc Adjustments  | 0.001   | 0.000                                    | -0.173       | -                   | -0.173        |
| <b>Change Summary Explanation</b>  |         |  |              |                     |               |
| Schedule: The developmental effort will include torpedo threat analysis and integration, Concept of Operations (CONOPS) for fleet tactics evaluation, Tactical Decision Aid (TacDA) development, and sabot development for External Countermeasure Launcher (ECL) capability. A single, new development contract resulting in fully functional EDM device variants will be awarded in FY2018. The developmental contract will consist of a 4 year development effort and the 5th year will provide Low-Rate Initial Production (LRIP) units for accomplishing operational testing (OT) in FY2022-2023. Milestone C is notionally planned for FY2022. |         |  |              |                     |               |
| In FY2019 the program will deliver three ADC MK5 Engineering Development Model (EDM) variants and begin Development Testing (DT).  |         |  |              |                     |               |
| Financial:   |         |  |              |                     |               |
| FY2017 decrease of \$1.825 million for reprogramming for higher navy priorities.   |         |  |              |                     |               |
| The Department added additional FY2019 funding (2.200 million) to maintain SubTDS schedule.  |         |  |              |                     |               |

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| Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy |             |         |         |              |   |               |         |         |   | Date: February 2018 |                  |            |
|---|-------------|---------|---------|--------------|---|---------------|---------|---------|---|---------------------|------------------|------------|
| Appropriation/Budget Activity<br>1319 / 7               |             |         |         |              | R-1 Program Element (Number/Name)<br>PE 0101226N / Submarine Acoustic War Dev |               |         |         | Project (Number/Name)<br>1265 / Sub Defensive Warfare |                     |                  |            |
| COST (\$ in Millions)                                   | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO   | FY 2019 Total | FY 2020 | FY 2021 | FY 2022   | FY 2023             | Cost To Complete | Total Cost |
| 1265: Sub Defensive Warfare                             | 41.943      | 7.300   | 12.053  | 11.311       | -   | 11.311        | 9.309   | 13.436  | 13.697  | 13.997              | Continuing       | Continuing |
| Quantity of RDT&E Articles                              |             | -       | -       | 32           | -   | 32            | 43      | 90      | 75  | -                   |                  |            |

## A. Mission Description and Budget Item Justification

This project supports the Submarine Acoustic Warfare System (SAWS) program to maintain and improve the survivability of all U.S. submarine classes in response to torpedo attack. This program funds:

1. Submarine Torpedo Defense System (SubTDS) program, (ACAT III) currently is in Engineering and Manufacturing Development (E&MD). The ADC MK5 Device Developmental Contract will be awarded in FY18, through a full and open competition, Cost Plus Incentive Fee (CPIF) contract, and government development in SABOT and Tactical Decision Aid development. The ADC MK5 development contract will result in delivering fully functional test units and EDM variants that include: (4) Configuration Control Tools(CCT), (4) Special Test Units(STU), (4) STU Electronics Boards for WAF, (17) EDM-1 devices, (10) Launchable Inerts EDM-2, (20) EDM-2 Environmental Qualification Testing(EQT) devices, (3) EDM-2T devices, (75)Low-Ray Initial Production (LRIP) devices. The key new capabilities ADC MK5 brings are: adaptive countermeasure (ACM) technology with full duplex capability and mobility packaged in a three inch diameter body. Milestone C is nominally 2022. Increment 2 of the Submarine Torpedo Defense System (SubTDS) will start in FY2023.
2. The Torpedo Defense Working Group (TDWG). A working group comprised of fleet, resource sponsor, and acquisition community representatives to assess countermeasure effectiveness against fleet threats, both known and projected, with associated studies, models, and simulations.
3. The Technical Direction Agent (TDA) and In-Service Engineering Agent (ISEA) hardware and software development support for Acoustic Devices Countermeasure (ADC) (ADC MK 2, 3 & 4) as well as Countermeasures Set, Acoustic (CSA) MK 2, MK 3, MK 4 systems, future ADC variants and Acoustic Augmentation Support Systems (AASS) in the Acoustic Augmentation Support Program (AASP), including component level technical insertion.
4. Research and development of new technologies and capabilities developed under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives. New and emerging hardware and software are evaluated in representative acoustic environments, against projected threats through both digital and hardware-in-the-loop simulations, to determine their effectiveness and impact on improving submarine survivability. The technology is then incorporated into the appropriate product line.

FY 2019 funding will primarily support on-going SubTDS development including component and subsystem design, design and delivery of three Engineering Development Model (EDM) variants, and joint contractor/government Development Testing (DT). Governmental development of the SABOT and Tactical Decision Aid (TacDA) will continue to include initial integration with the contractor developed ADC MK5 device and SABOT DT.

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

|                                    | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> |
|------------------------------------|----------------|----------------|---------------------|--------------------|----------------------|
| <b>Title:</b> Sub Acoustic Warfare | 7.300          | 12.053         | 11.311              | 0.000              | 11.311               |
| <b>Articles:</b>                   | -              | -              | 32                  | -                  | 32                   |
| <b>FY 2018 Plans:</b>              |                |                |                     |                    |                      |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy |  |   | <b>Date:</b> February 2018 |   |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                   |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0101226N / <i>Submarine Acoustic War Dev</i> |                            | <b>Project (Number/Name)</b><br>1265 / <i>Sub Defensive Warfare</i> |  |

| <b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>   | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019<br/>Base</b> | <b>FY 2019<br/>OCO</b> | <b>FY 2019<br/>Total</b> |
|---|----------------|----------------|-------------------------|------------------------|--------------------------|
| <ul style="list-style-type: none"> <li>- Award ADC MK5 New Development Contract.</li> <li>- Continue ADC MK5 Engineering and Manufacturing Development Phase under development contract</li> <li>- Begin first three EDM variant designs and prepare for ADC MK5 Critical Design Review</li> <li>- Continue M&amp;S for known and projected torpedo threats</li> <li>- Continue development of required program documentation</li> <li>- Continue development of Concept of Operations (CONOPS) and TacDA for fleet tactics</li> <li>- Continue SABOT development for external launch</li> <li>- Conduct SABOT Preliminary Design Review</li> <li>- Continue assessment of threat by TDWG and WAF with updated vulnerability assessments</li> <li>- Complete SubTDS TEMP</li> </ul> <p><b><i>FY 2019 Base Plans:</i></b></p> <ul style="list-style-type: none"> <li>- Continue EDM designs and builds</li> <li>- Deliver three ADC MK5 Engineering Development Model (EDM) variants</li> <li>- Begin DT</li> <li>- Continue M&amp;S for known and projected torpedo threats</li> <li>- Continue development of required program documentation</li> <li>- Continue development of CONOPS and TacDA for fleet tactics</li> <li>- Continue SABOT Development and Conduct Critical Design Review</li> <li>- Continue assessment of threat by TDWG and WAF with updated vulnerability assessments</li> </ul> <p><b><i>FY 2019 OCO Plans:</i></b><br/>N/A</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b><br/>Decrease from FY 18 to FY 19 based on phasing of planned development events.</p> |                |                |                         |                        |                          |
| <b>Accomplishments/Planned Programs Subtotals</b>   | 7.300          | 12.053         | 11.311                  | 0.000                  | 11.311                   |

| <b>C. Other Program Funding Summary (\$ in Millions)</b> |                |                |                         |                        |                          |                |                |                |                |                             |                   |
|--|----------------|----------------|-------------------------|------------------------|--------------------------|----------------|----------------|----------------|----------------|-----------------------------|-------------------|
| <b>Line Item</b>   | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019<br/>Base</b> | <b>FY 2019<br/>OCO</b> | <b>FY 2019<br/>Total</b> | <b>FY 2020</b> | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>Cost To<br/>Complete</b> | <b>Total Cost</b> |
| • OPN/2210: <i>Submarine Acoustic Warfare System</i>     | 21.291         | 21.449         | 23.815                  | -                      | 23.815                   | 25.156         | 25.309         | 26.065         | 26.600         | Continuing                  | Continuing        |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy  |                |                |                |   |                |                |                |   |                | <b>Date:</b> February 2018 |                   |
| <b>Appropriation/Budget Activity</b><br>1319 / 7  |                |                |                | <b>R-1 Program Element (Number/Name)</b><br>PE 0101226N / <i>Submarine Acoustic War Dev</i> |                |                |                | <b>Project (Number/Name)</b><br>1265 / <i>Sub Defensive Warfare</i> |                |                            |                   |
| <b>C. Other Program Funding Summary (\$ in Millions)</b>  |                |                |                |   |                |                |                |   |                |                            |                   |
|   |                |                | <u>FY 2019</u> | <u>FY 2019</u>  | <u>FY 2019</u> |                |                |   |                | <u>Cost To</u>             |                   |
| <u>Line Item</u>  | <u>FY 2017</u> | <u>FY 2018</u> | <u>Base</u>    | <u>OCO</u>  | <u>Total</u>   | <u>FY 2020</u> | <u>FY 2021</u> | <u>FY 2022</u>  | <u>FY 2023</u> | <u>Complete</u>            | <u>Total Cost</u> |
| <b>Remarks</b>  |                |                |                |   |                |                |                |   |                |                            |                   |
| <b>D. Acquisition Strategy</b>  |                |                |                |   |                |                |                |   |                |                            |                   |
| <p>Submarine Acoustic Warfare System (SAWS) develops Undersea Defensive Warfare technologies to improve the survivability of all U.S. Submarine classes. The integration of technology into the ADC MK5 and the ADC MK5-capable CSA MK 3/4 external countermeasure launcher system will continue through FY2023. The ADC MK5 development contract will be awarded in FY2018, through a full and open competition, Cost Plus Incentive Fee (CPIF) contract. Engineering Development Model (EDM) variants, Technical Data Packages (TDP), and Low-Rate Initial Production (LRIP) units for accomplishing Operational Testing, will be delivered to the Navy under this contract. ADC MK5 contractor subsystem testing will occur in FY2018 through FY2022 and joint contractor/Navy Development Testing (DT) will be in FY2019 through FY2021, with Navy Operational Testing (OT) in FY2022 through FY2023. Milestone C is nominally in FY2022. Initial Operational Capability (IOC) is nominally FY2024 for both the Internal Countermeasure Launcher (ICL) and External Countermeasure Launcher (ECL) capability of the ADC MK5. The production contract solicitation will be issued in FY2023. After successfully completing OT and Full Rate Production Decision Review (FRP DR) approval, award production contract in FY2024, as a full and open competition, build to print approach with either a single producer or leader/follower production contract.</p> |                |                |                |   |                |                |                |   |                |                            |                   |
| <b>E. Performance Metrics</b>   |                |                |                |   |                |                |                |   |                |                            |                   |
| <p>Progress Reviews</p> <p>Execution Reporting and Reviews</p> <p>Milestone Reviews</p>   |                |                |                |   |                |                |                |   |                |                            |                   |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy |                        |                                |             |         |            |   |            |              |            |   |            | Date: February 2018 |                  |            |                          |
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| Appropriation/Budget Activity<br>1319 / 7              |                        |                                |             |         |            | R-1 Program Element (Number/Name)<br>PE 0101226N / Submarine Acoustic War Dev |            |              |            | Project (Number/Name)<br>1265 / Sub Defensive Warfare |            |                     |                  |            |                          |
| Product Development (\$ in Millions)                   |                        |                                |             | FY 2017 |            | FY 2018   |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 Total       |                  |            |                          |
| Cost Category Item                                     | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost  | Award Date | Cost         | Award Date | Cost  | Award Date | Cost                | Cost To Complete | Total Cost | Target Value of Contract |
| WAF ANALYSIS TDWG                                      | WR                     | NUWC : NEWPORT, RI             | 11.814      | 0.700   | Dec 2016   | 0.275   | Dec 2017   | 0.280        | Dec 2018   | -   |            | 0.280               | Continuing       | Continuing | Continuing               |
| SubTDS SYSYTEM ENGINEERING                             | WR                     | NUWC : NEWPORT, RI             | 9.940       | 1.700   | Dec 2016   | 1.566   | Dec 2017   | 1.095        | Dec 2018   | -   |            | 1.095               | Continuing       | Continuing | Continuing               |
| ADC MK5 New Development                                | C/CPIF                 | TBD : TBD                      | 0.000       | 0.000   |            | 5.100   | Jan 2018   | 5.266        | Dec 2018   | -   |            | 5.266               | Continuing       | Continuing | Continuing               |
| CSA MK5 SYSTEM ENGINEERING                             | WR                     | NUWC : KEYPORT, WA             | 1.995       | 1.020   | Dec 2016   | 1.200   | Dec 2017   | 0.700        | Dec 2018   | -   |            | 0.700               | Continuing       | Continuing | Continuing               |
| Modeling And Simulation                                | WR                     | NUWC : NEWPORT, RI             | 2.662       | 1.200   | Dec 2016   | 1.332   | Dec 2017   | 1.100        | Dec 2018   | -   |            | 1.100               | Continuing       | Continuing | Continuing               |
| Tactical Decision Aid                                  | WR                     | NUWC : NEWPORT, RI             | 0.600       | 1.800   | Dec 2016   | 1.300   | Dec 2017   | 1.300        | Dec 2018   | -   |            | 1.300               | Continuing       | Continuing | Continuing               |
| Sabot Development                                      | WR                     | NUWC : NEWPORT, RI             | 0.879       | 0.400   | Dec 2016   | 0.800   | Dec 2017   | 1.000        | Dec 2018   | -   |            | 1.000               | Continuing       | Continuing | Continuing               |
| NGCM DEVELOPMENT 1                                     | C/CPAF                 | Argon ST : Fairfax, VA         | 5.757       | 0.000   |            | 0.000   |            | 0.000        |            | -   |            | 0.000               | 0.000            | 5.757      | -                        |
| NGCM DEVELOPMENT 2                                     | C/CPAF                 | Ultra : Braintree, MA          | 5.484       | 0.000   |            | 0.000   |            | 0.000        |            | -   |            | 0.000               | 0.000            | 5.484      | -                        |
| AASP SBIR Phase 2.5                                    | SS/CPFF                | HAI : Cohasset, MA             | 0.435       | 0.000   |            | 0.000   |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.435      | -                        |
| Subtotal   |                        |                                | 39.566      | 6.820   |            | 11.573  |            | 10.741       |            | -   |            | 10.741              | Continuing       | Continuing | N/A                      |
| Management Services (\$ in Millions)                   |                        |                                |             | FY 2017 |            | FY 2018   |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 Total       |                  |            |                          |
| Cost Category Item                                     | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost  | Award Date | Cost         | Award Date | Cost  | Award Date | Cost                | Cost To Complete | Total Cost | Target Value of Contract |
| TRAVEL   | WR                     | NAVSEA : Washington, DC        | 0.612       | 0.080   | Oct 2016   | 0.080   | Oct 2017   | 0.070        | Oct 2018   | -   |            | 0.070               | Continuing       | Continuing | Continuing               |
| PROGRAM MANAGEMENT SUPPORT                             | C/CPAF                 | TECH MARINE : Washington, DC   | 0.900       | 0.000   |            | 0.000   |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.900      | -                        |
| PROGRAM MANAGEMENT SUPPORT                             | C/CPAF                 | BOOZ ALLEN : Washington, DC    | 0.865       | 0.400   | Jun 2017   | 0.400   | Dec 2017   | 0.500        | Dec 2018   | -   |            | 0.500               | Continuing       | Continuing | Continuing               |

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| <b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Navy |  |  |  |  |  |   |  |  |  |   |  | <b>Date:</b> February 2018 |  |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                  |  |  |  |  |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0101226N / <i>Submarine Acoustic War Dev</i> |  |  |  | <b>Project (Number/Name)</b><br>1265 / <i>Sub Defensive Warfare</i> |  |                            |  |  |

| Management Services (\$ in Millions) |                        |                                |             | FY 2017 |            | FY 2018 |            | FY 2019 Base |            | FY 2019 OCO |            | FY 2019 Total |                  |            |                          |
|--------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                   | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          | Cost To Complete | Total Cost | Target Value of Contract |
| <b>Subtotal</b>                      |                        |                                | 2.377       | 0.480   |            | 0.480   |            | 0.570        |            | -           |            | 0.570         | Continuing       | Continuing | N/A                      |

|                            | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| <b>Project Cost Totals</b> | 41.943      | 7.300   | 12.053  | 11.311       | -           | 11.311        | Continuing       | Continuing | N/A                      |

**Remarks**

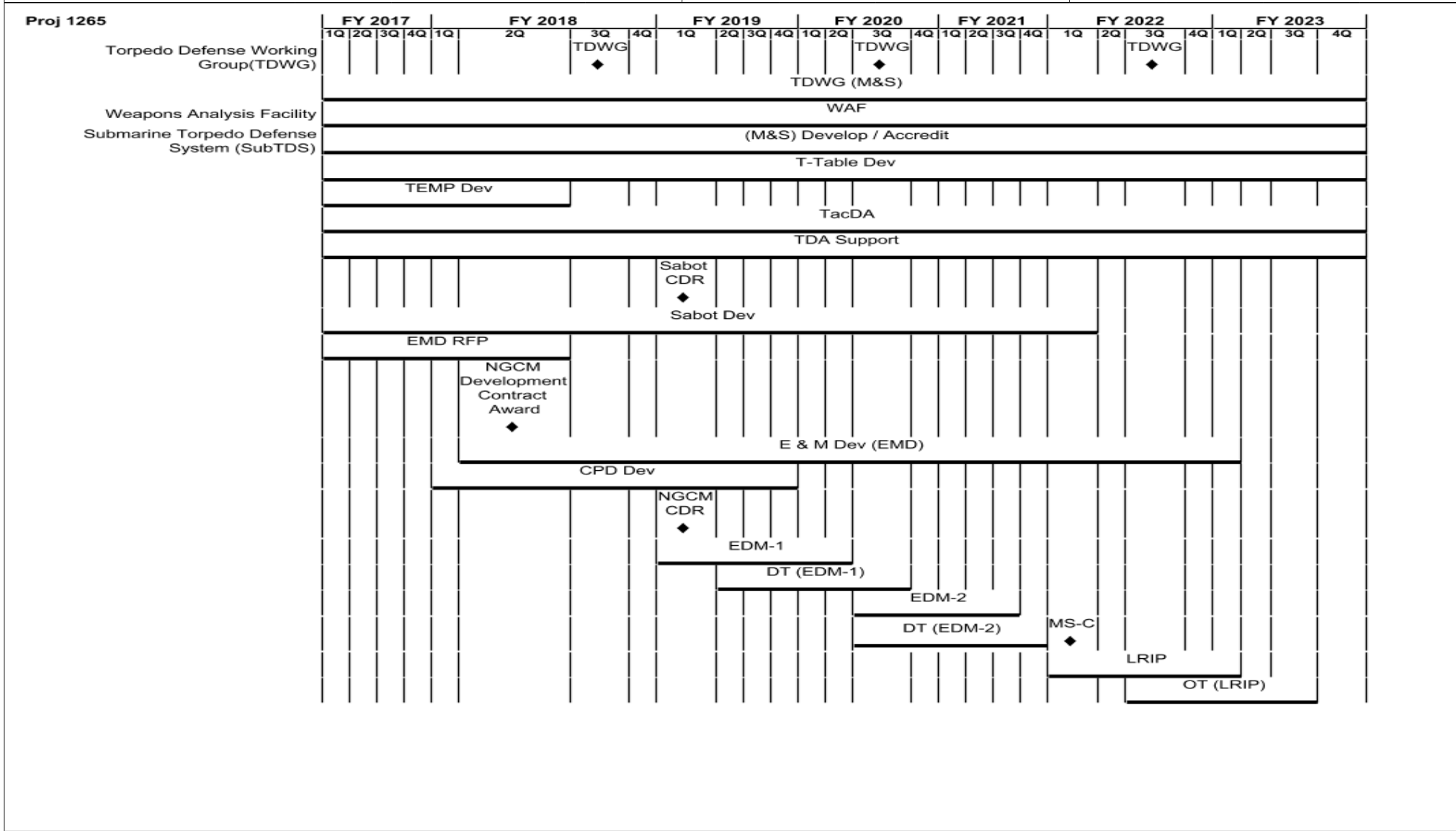
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PE 0101226N: *Submarine Acoustic War Dev*  
Navy

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| <b>Appropriation/Budget Activity</b><br>1319 / 7 | <b>R-1 Program Element (Number/Name)</b><br>PE 0101226N / <i>Submarine Acoustic War Dev</i> |
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| Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Date: February 2018 |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
| Appropriation/Budget Activity<br>1319 / 7         |  |  |  |  |  |  |  |  |  | R-1 Program Element (Number/Name)<br>PE 0101226N / Submarine Acoustic War<br>Dev |  |  |  |  |                     |  |  |  |  | Project (Number/Name)<br>1265 / Sub Defensive Warfare |  |  |  |  |  |  |  |  |  |
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| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy |   |   | <b>Date:</b> February 2018 |
| <b>Appropriation/Budget Activity</b><br>1319 / 7              | <b>R-1 Program Element (Number/Name)</b><br>PE 0101226N / <i>Submarine Acoustic War Dev</i> | <b>Project (Number/Name)</b><br>1265 / <i>Sub Defensive Warfare</i> |                            |

**Schedule Details**

| Events by Sub Project   | Start   |      | End     |      |
|---|---------|------|---------|------|
|   | Quarter | Year | Quarter | Year |
| <b>Proj 1265</b>  |         |      |         |      |
| Torpedo Defense Working Group(TDWG): FY18 TDWG  | 3       | 2018 | 3       | 2018 |
| Torpedo Defense Working Group(TDWG): FY20 TDWG  | 3       | 2020 | 3       | 2020 |
| Torpedo Defense Working Group(TDWG): FY22 TDWG  | 3       | 2022 | 3       | 2022 |
| Torpedo Defense Working Group(TDWG): TDWG Modeling & Simulation (M&S)                                     | 1       | 2017 | 4       | 2023 |
| Weapons Analysis Facility: COUNTERMEASURE (CM) EFFECTIVENESS/WEAPON ANALYSIS FACILITY (WAF) VULNERABILITY | 1       | 2017 | 4       | 2023 |
| Submarine Torpedo Defense System (SubTDS): SubTDS (M&S) Develop / Accredited                              | 1       | 2017 | 4       | 2023 |
| Submarine Torpedo Defense System (SubTDS): ADC MK5 T-Table Development                                    | 1       | 2017 | 4       | 2023 |
| Submarine Torpedo Defense System (SubTDS): SubTDS TEMP Development  | 1       | 2017 | 2       | 2018 |
| Submarine Torpedo Defense System (SubTDS): Tactical Decision Aid (TacDA)                                  | 1       | 2017 | 4       | 2023 |
| Submarine Torpedo Defense System (SubTDS): Technical Direction Agent (TDA) Support                        | 1       | 2017 | 4       | 2023 |
| Submarine Torpedo Defense System (SubTDS): Sabot CDR  | 1       | 2019 | 1       | 2019 |
| Submarine Torpedo Defense System (SubTDS): Sabot Development  | 1       | 2017 | 1       | 2022 |
| Submarine Torpedo Defense System (SubTDS): EMD RFP  | 1       | 2017 | 2       | 2018 |
| Submarine Torpedo Defense System (SubTDS): ADC MK5 Development Contract Award                             | 2       | 2018 | 2       | 2018 |
| Submarine Torpedo Defense System (SubTDS): Engineering & Manufacturing Development (EMD)                  | 2       | 2018 | 1       | 2023 |
| Submarine Torpedo Defense System (SubTDS): ADC MK5 CPD Development  | 1       | 2018 | 4       | 2019 |
| Submarine Torpedo Defense System (SubTDS): ADC MK5 Critical Design Review (CDR)                           | 1       | 2019 | 1       | 2019 |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy            |  |   | Date: February 2018 |   |
| Appropriation/Budget Activity<br>1319 / 7                     |  | R-1 Program Element (Number/Name)<br>PE 0101226N / Submarine Acoustic War Dev |                     | Project (Number/Name)<br>1265 / Sub Defensive Warfare |
|   |  | Start   |                     | End   |
| Events by Sub Project   |  | Quarter   | Year                | Quarter<br>Year                                       |
| Submarine Torpedo Defense System (SubTDS): EDM-1              |  | 1   | 2019                | 2<br>2020   |
| Submarine Torpedo Defense System (SubTDS): DT (EDM-1)         |  | 2   | 2019                | 3<br>2020   |
| Submarine Torpedo Defense System (SubTDS): EDM-2              |  | 3   | 2020                | 3<br>2021   |
| Submarine Torpedo Defense System (SubTDS): DT (EDM-2)         |  | 3   | 2020                | 4<br>2021   |
| Submarine Torpedo Defense System (SubTDS): MS-C               |  | 1   | 2022                | 1<br>2022   |
| Submarine Torpedo Defense System (SubTDS): LRIP               |  | 1   | 2022                | 1<br>2023   |
| Submarine Torpedo Defense System (SubTDS): OT (LRIP)          |  | 3   | 2022                | 3<br>2023   |
| Submarine Torpedo Defense System (SubTDS): SubTDS Increment 2 |  | 3   | 2023                | 4<br>2023   |