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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy **Date:** March 2019

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| Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i> | R-1 Program Element (Number/Name) PE 0604727N / <i>Joint Standoff Weapon Systems</i> |
|--|--|

| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 63.677 | 89.741 | 87.761 | 40.170 | 3.005 | 1,202.659 |
| 2068: <i>Joint Standoff Weapon (JSOW)</i> | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 63.677 | 89.741 | 87.761 | 40.170 | 3.005 | 1,202.659 |

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 766

A. Mission Description and Budget Item Justification

JSOW Extended Range (ER) development commences in FY 2020 providing a JSOW variant with powered flight, avionics upgrades, and improved software enabling operations at tactically significant ranges of greater than 200nm, to kinetically engage adversary surface combatants and land targets. Additionally, the JSOW ER capability fundamentally supports Navy's strategy of intelligent, Network Enabled Weapons in order to apply effective and lethal firepower from secure positions. The FY 2020 budget request supports Engineering, Manufacturing, and Development (EMD) phase beginning in FY 2020 and Initial Operational Capability (IOC) in FY 2025 for F/A-18E/F. This effort leverages demonstration funding from OSD in FY 2018 and FY 2019, transitioning capability to the Navy.

The Joint Standoff Weapon (JSOW) is an air-to-ground weapon designed to attack a variety of targets during day, night, and adverse weather conditions. JSOW will enhance aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch aircraft to standoff outside the range of most target area surface-to-air threat systems. The JSOW launch-and-leave capability will allow several target kills per aircraft sortie. The JSOW program first developed a baseline weapon for use against fixed area targets. JSOW is a Navy led joint Navy/Air Force program. JSOW utilizes a "common truck" for both AGM-154A and AGM-154C variants. Through adherence to international standards for weapons interfaces, weight, and dimension considerations, JSOW is compatible with Air Force and North Atlantic Treaty Organization aircraft.

The JSOW Unitary (AGM-154C-1) variant includes a Network Enabled Weapon moving maritime target capability. The AGM-154C-1 capability enables the weapon to be integrated with the network and attack sea moving maritime targets via real-time pre-and post-launch targeting updates. JSOW will continue to conduct analysis and development of solutions to system integration challenges, and continual enhancement of warfighter effectiveness in the employment of the JSOW weapon system. The FY 2019 funding included the integration of new functionality into the joint mission planning systems and precision guided munitions planning system. JSOW C-1 Initial Operational Capability was achieved in June 2016. JSOW C-1 Full Operational Capability was achieved in August 2017.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

UNCLASSIFIED

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| Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i> | R-1 Program Element (Number/Name) PE 0604727N / <i>Joint Standoff Weapon Systems</i> |
|--|--|

| B. Program Change Summary (\$ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 0.435 | 0.441 | 0.439 | - | 0.439 |
| Current President's Budget | 0.418 | 0.441 | 18.725 | - | 18.725 |
| Total Adjustments | -0.017 | 0.000 | 18.286 | - | 18.286 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.017 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 18.286 | - | 18.286 |

Change Summary Explanation

The FY 2020 funding request was increased to support the development of the ER configuration in conjunction with funded demonstration efforts.

The FY2020 funding request was reduced by \$.218M to account for the availability of prior year execution balances.

Schedule:

Incorporate JSOW ER events.

Technical: N/A

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|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 1319 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604727N / Joint Standoff Weapon Systems | | | | Project (Number/Name) 2068 / Joint Standoff Weapon (JSOW) | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 2068: Joint Standoff Weapon (JSOW) | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 63.677 | 89.741 | 87.761 | 40.170 | 3.005 | 1,202.659 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

Project MDAP/MAIS Code: 766

A. Mission Description and Budget Item Justification

JSOW Extended Range (ER) development commences in FY 2020 providing a JSOW variant with powered flight, avionics upgrades, and improved software enabling operations at tactically significant ranges of greater than 200nm, to kinetically engage adversary surface combatants and land targets. Additionally, the JSOW ER capability fundamentally supports Navy's strategy of intelligent, Network Enabled Weapons in order to apply effective and lethal firepower from secure positions. The FY 2020 budget request supports Engineering, Manufacturing, and Development (EMD) phase beginning in FY 2020 and Initial Operational Capability (IOC) in FY 2025 for F/A-18E/F. This effort leverages demonstration funding from OSD in FY 2018 and FY 2019, transitioning capability to the Navy.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| Title: JSOW-ER | 0.000 | 0.000 | 18.286 | 0.000 | 18.286 |
| Articles: | - | - | - | - | - |
| Description: JSOW ER program development efforts include activities to support the development and incorporation of an Extended Range (ER) variant of the JSOW into the US Navy's operational inventory. | | | | | |
| FY 2019 Plans: N/A | | | | | |
| FY 2020 Base Plans: The System Design and Development (SDD) phase will begin in FY 2020 to support the development of the JSOW ER configuration, in conjunction with funded demonstration efforts, to conduct engineering support activities, and leverage demonstration results to develop the JSOW ER design. Efforts include the SRR milestone review; system architecture and design work and evaluation; hardware and software planning, integration, and qualification; and verification and validation of critical design attributes. | | | | | |
| FY 2020 OCO Plans: | | | | | |

UNCLASSIFIED

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| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
| Appropriation/Budget Activity 1319 / 5 | R-1 Program Element (Number/Name) PE 0604727N / Joint Standoff Weapon Systems | Project (Number/Name) 2068 / Joint Standoff Weapon (JSOW) |

| B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| N/A | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: The FY 2020 funding request was increased to support the development of the Extended Range configuration in conjunction with funded demonstration efforts. | | | | | |
| Title: JSOW Mission Planning Systems | 0.418 | 0.441 | 0.439 | 0.000 | 0.439 |
| Articles: | - | - | - | - | - |
| Description: JSOW program development efforts include new mission planning functionality required for Network Enabled Weapon (NEW) moving target capability for the JSOW-C-1. | | | | | |
| FY 2019 Plans: Continue interoperability efforts for JSOW C-1. | | | | | |
| FY 2020 Base Plans: Legacy JSOW C-1 efforts include JSOW baseline C-1 integration and interoperability path forward; continued network interoperability efforts for JSOW C-1; continue software improvement efforts; initiate efforts to migrate JSOW mission planning software from the contractor owned Common Weapon Planning Environment (CWPE) to the Government owned Precision Guidance Mission Planning System (PGMPS) common component. | | | | | |
| FY 2020 OCO Plans: N/A | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 to FY 2020 decrease of \$.002 is due to service miscellaneous. | | | | | |
| Accomplishments/Planned Programs Subtotals | 0.418 | 0.441 | 18.725 | 0.000 | 18.725 |

| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
|--|---|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • USN WP,N BLI 2230: JSOW | 5.487 | 1.330 | 0.000 | - | 0.000 | 0.000 | 64.300 | 85.100 | 122.800 | 261.228 | 2,810.006 |
| Remarks | FY2020 - BLI 2230. No funding is required as Telemetry Instrumentation Kit (TIK) 2.0 component assembly certification will be complete. | | | | | | | | | | |

UNCLASSIFIED

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| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
| Appropriation/Budget Activity 1319 / 5 | R-1 Program Element (Number/Name) PE 0604727N / Joint Standoff Weapon Systems | Project (Number/Name) 2068 / Joint Standoff Weapon (JSOW) |

D. Acquisition Strategy

The JSOW-ER acquisition strategy includes the development, integration, test, qualification and production of a moving maritime target (MMT), Stationary Land Target (SLT) and Relocatable Land Target (RLT) capability. This program will utilize the rapid acquisition interim approach Section 804 middle tier acquisition process to apply innovative technologies to rapidly develop and field the new JSOW-ER capability with separate cost, schedule, and performance measurements as an ACAT II program. The contracting strategy for JSOW line of weapons is planned to be sole source for the life of the program. JSOW-ER will use cost-type contracts to rapidly transition the already-prototyped Extended Range variant of the AGM-154 into a production configuration via the Middle Tier Acquisition framework. The schedule is phased to leverage the existing engineering team that conducted successful powered-flight demonstrations, and affordably transition of the production line from its current operations supporting foreign sales to domestic Extended Range quantities. Fixed-price contracts will be used for procurement.

E. Performance Metrics

Primary metrics for JSOW-ER will be program schedule, range, and unit cost.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy **Date:** March 2019

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| Appropriation/Budget Activity 1319 / 5 | R-1 Program Element (Number/Name) PE 0604727N / Joint Standoff Weapon Systems | Project (Number/Name) 2068 / Joint Standoff Weapon (JSOW) |
|--|---|---|

| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | | | |
| JSOW System Engineering | MIPR | National Security Agency : Fort Meade, MD | 1.259 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.259 | - |
| JSOW Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 802.617 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 802.617 | - |
| JSOW ER Product Development | SS/CPIF | Raytheon Missile Systems : Tucson, AZ | 0.000 | 0.000 | | 0.000 | | 13.046 | Mar 2020 | - | | 13.046 | 194.820 | 207.866 | 139.180 |
| Subtotal | | | 803.876 | 0.000 | | 0.000 | | 13.046 | | - | | 13.046 | 194.820 | 1,011.742 | N/A |

Remarks
 Product development was added in support of JSOW-ER Integration.
 Primary Hardware Development was added in support of JSOW-ER. Currently evaluating a pool of mature technical solutions for weapon warhead to select a final payload solution.

| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | | | |
| JSOW Software Development | SS/CPFF | Various : Various | 6.414 | 0.418 | Feb 2018 | 0.441 | Mar 2019 | 0.439 | Mar 2020 | - | | 0.439 | 4.816 | 12.528 | 12.526 |
| JSOW Prior year Support no longer funded in the FYDP | Various | Various : Various | 8.007 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.007 | - |
| JSOW ER Government Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 1.500 | Nov 2019 | - | | 1.500 | 15.000 | 16.500 | - |
| JSOW ER Government Support | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 3.000 | Nov 2019 | - | | 3.000 | 20.000 | 23.000 | - |
| Subtotal | | | 14.421 | 0.418 | | 0.441 | | 4.939 | | - | | 4.939 | 39.816 | 60.035 | N/A |

Remarks
 Government support was added in support of JSOW-ER.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy **Date:** March 2019

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| Appropriation/Budget Activity 1319 / 5 | R-1 Program Element (Number/Name) PE 0604727N / Joint Standoff Weapon Systems | Project (Number/Name) 2068 / Joint Standoff Weapon (JSOW) |
|--|---|---|

| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | | | |
| JSOW Oper Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 20.886 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 20.000 | 40.886 | - |
| JSOW Prior year T&E no longer funded in the FYDP | WR | NAWCWD : China Lake, CA | 34.034 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 25.000 | 59.034 | - |
| Subtotal | | | 54.920 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 45.000 | 99.920 | N/A |

| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | | | |
| JSOW Prior year Mgmt no longer funded in the FYDP | Various | Various : Various | 25.504 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.504 | - |
| JSOW ER Government Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.500 | Nov 2019 | - | | 0.500 | 2.000 | 2.500 | - |
| JSOW ER Project Management Support | C/CPFF | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.200 | Nov 2019 | - | | 0.200 | 2.000 | 2.200 | 2.200 |
| JSOW ER Travel | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.040 | Nov 2019 | - | | 0.040 | 0.500 | 0.540 | - |
| Subtotal | | | 25.504 | 0.000 | | 0.000 | | 0.740 | | - | | 0.740 | 4.500 | 30.744 | N/A |

Remarks
Government Support, Project Management and Travel added in support of JSOW-ER.

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| Project Cost Totals | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 284.136 | 1,202.441 | N/A |

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy **Date:** March 2019

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| Appropriation/Budget Activity 1319 / 5 | R-1 Program Element (Number/Name) PE 0604727N / Joint Standoff Weapon Systems | Project (Number/Name) 2068 / Joint Standoff Weapon (JSOW) |
|--|---|---|

| Joint Standoff Weapon | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|---|---|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|
| | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q |
| Acquisition Milestones | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Milestones | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Systems Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Software Development | JSOW-ER SDD | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| JSOW C-1 Integration & Interoperability | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test and Evaluation | JSOW-ER IM/DT/OT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| JSOW C-1 OT Final Report | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Production Milestones | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contract Awards | JSOW C-1 Production Shutdown ● JSOW ER Development ◆ JSOW ER Production Lot 1 ◆ JSOW ER Production Lot 2 ◆ JSOW ER Production Lot 3 ◆ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deliveries | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| JSOW C-1 FRP-11 | JSOW-ER Lot 1 JSOW-ER Lot 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2020PB - 0604727N - 2068

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
| Appropriation/Budget Activity 1319 / 5 | R-1 Program Element (Number/Name) PE 0604727N / <i>Joint Standoff Weapon Systems</i> | Project (Number/Name) 2068 / <i>Joint Standoff Weapon (JSOW)</i> |

Schedule Details

| Events by Sub Project | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| Joint Standoff Weapon | | | | |
| Systems Development: JSOW-ER System Design and Development | 1 | 2020 | 4 | 2024 |
| Systems Development: Software Development: JSOW C-1 Integration and Interoperability | 1 | 2018 | 4 | 2024 |
| Test and Evaluation: Test and Evaluation: AGM-154C-1 JSOW Operational Test Agency Follow-On Evaluation Report OT-IIIB Final Report | 3 | 2018 | 3 | 2018 |
| Test and Evaluation: Test and Evaluation: JSOW - ER Insensitive Munition Testing, Developmental Test and Operational Test | 1 | 2021 | 4 | 2024 |
| Production Milestones: Contract Awards: Production Shutdown Awards Phase 2 Raytheon (part 2) | 4 | 2018 | 4 | 2018 |
| Production Milestones: Contract Awards: JSOW ER Design and Development Award | 2 | 2020 | 2 | 2020 |
| Production Milestones: Contract Awards: Production Lot 1 Award | 1 | 2022 | 1 | 2022 |
| Production Milestones: Contract Awards: Production Lot 2 Award | 1 | 2023 | 1 | 2023 |
| Production Milestones: Contract Awards: Production Lot 3 Award | 4 | 2024 | 4 | 2024 |
| Deliveries: FRP-11 Deliveries- AGM-154C-1 | 1 | 2018 | 1 | 2018 |
| Deliveries: JSOW-ER Lot 1 Deliveries | 1 | 2023 | 4 | 2023 |
| Deliveries: JSOW-ER Lot 2 Deliveries | 1 | 2024 | 4 | 2024 |