

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army **Date:** May 2021

| Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development | | | | | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| COST (\$ in Millions) | Prior Years | FY 2020 | FY 2021 | FY 2022 Base | FY 2022 OCO | FY 2022 Total | FY 2023 | FY 2024 | FY 2025 | FY 2026 | Cost To Complete | Total Cost |
| Total Program Element | - | - | - | 56.681 | - | 56.681 | - | - | - | - | - | - |
| BY8: AN/TPQ-53 Counterfire Target Acquisition Radar Sys | - | - | - | 56.681 | - | 56.681 | - | - | - | - | - | - |

Note

This is a new start in FY 2022.

In Fiscal Year (FY) 2022, continuity of efforts transition from Program Element (PE) 0604823A Enhanced AN/TPQ 36 to PE 0607148A AN/TPQ-53 Counterfire Target Acquisition Radar System.

A. Mission Description and Budget Item Justification

The AN/TPQ-53 Counterfire Target Acquisition Radar System is a highly mobile radar set that automatically detects, classifies, tracks, and locates the point of origin of projectiles fired from mortar, artillery, and rocket systems with sufficient accuracy for first round fire for effect. It mitigates close combat radar coverage gaps by providing a 90 degree search sector (stare mode) as well as 360 degree coverage (rotating) and replaces the AN/TPQ-36 and AN/TPQ-37 Firefinder Radars. The AN/TPQ-53 system interoperates with mission command systems to provide the maneuver commander increased counterfire radar flexibility. The AN/TPQ-53 is deployed as part of the Counter-Rocket, Artillery, Mortar (C-RAM) system of systems. It provides data to the Forward Area Air Defense Command and Control (FAAD C2) node for the sense and warn force protection capability. The AN/TPQ-53 currently supports contingency operations to include Operation Inherent Resolve (OIR) and is fielded to Brigade Combat Teams (BCTs), Field Artillery Brigades (FABs) and Division Artilleries (DIVARTYs).

Fiscal year (FY) 2022 modification-in-service research, development, test and evaluation (RDT&E) funds in the amount of \$56.882 million supports the design and development of a hardware/software Multi Domain Operation (MDO) digitization upgrade kit to enhance system survivability (electronic protection (EP)) in a peer/near-peer threat environment and development, integration, testing, and fielding of a capability beyond the current range and location accuracy requirements. Funding also supports efforts required to counter indirect fire and improve survivability against electronic warfare threats identified in the Validated Online Lifecycle Threat (VOLT).

UNCLASSIFIED

| | |
|---|-----------------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army | Date: May 2021 |
|---|-----------------------|

| | |
|---|---|
| Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i> | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System |
|---|---|

| B. Program Change Summary (\$ in Millions) | FY 2020 | FY 2021 | FY 2022 Base | FY 2022 OCO | FY 2022 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 0.000 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 0.000 | 0.000 | 56.681 | - | 56.681 |
| Total Adjustments | 0.000 | 0.000 | 56.681 | - | 56.681 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Adjustments to Budget Years | - | - | 56.681 | - | 56.681 |

Change Summary Explanation

Starting in FY 2022, funds are provided to address MDO digitization development and emerging threats in this modification-in-service line.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army **Date:** May 2021

| | | | | | | | | | | | | |
|---|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|----------------|-------------------------|-------------------|
| Appropriation/Budget Activity 2040 / 7 | | | | | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | | | | Project (Number/Name) BY8 / AN/TPQ-53 Counterfire Target Acquisition Radar Sys | | | |
| COST (\$ in Millions) | Prior Years | FY 2020 | FY 2021 | FY 2022 Base | FY 2022 OCO | FY 2022 Total | FY 2023 | FY 2024 | FY 2025 | FY 2026 | Cost To Complete | Total Cost |
| BY8: AN/TPQ-53 Counterfire Target Acquisition Radar Sys | - | - | - | 56.681 | - | 56.681 | - | - | - | - | - | - |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

This is a new start in FY 2022.

In Fiscal Year (FY) 2022, continuity of efforts transition from Program Element (PE) 0604823A Enhanced AN/TPQ 36 to PE 0607148A AN/TPQ-53 Counterfire Target Acquisition Radar System.

A. Mission Description and Budget Item Justification

The AN/TPQ-53 Counterfire Target Acquisition Radar System is a highly mobile radar set that automatically detects, classifies, tracks, and locates the point of origin of projectiles fired from mortar, artillery, and rocket systems with sufficient accuracy for first round fire for effect. It mitigates close combat radar coverage gaps by providing a 90 degree search sector (stare mode) as well as 360 degree coverage (rotating) and replaces the AN/TPQ-36 and AN/TPQ-37 Firefinder Radars. The AN/TPQ-53 system interoperates with mission command systems to provide the maneuver commander increased counterfire radar flexibility. The AN/TPQ-53 is deployed as part of the Counter-Rocket, Artillery, Mortar (C-RAM) system of systems. It provides data to the Forward Area Air Defense Command and Control (FAAD C2) node for the sense and warn force protection capability. The AN/TPQ-53 currently supports contingency operations to include Operation Inherent Resolve (OIR) and is fielded to Brigade Combat Teams (BCTs), Field Artillery Brigades (FABs) and Division Artilleries (DIVARTYs).

Fiscal year (FY) 2022 modification-in-service research, development, test and evaluation (RDT&E) funds in the amount of \$56.882 million supports the design and development of a hardware/software Multi Domain Operation (MDO) digitization upgrade kit to enhance system survivability (electronic protection (EP)) in a peer/near-peer threat environment and development, integration, testing, and fielding of a capability beyond the current range and location accuracy requirements. Funding also supports efforts required to counter indirect fire and improve survivability against electronic warfare threats identified in the Validated Online Lifecycle Threat (VOLT).

B. Accomplishments/Planned Programs (\$ in Millions)

| | FY 2020 | FY 2021 | FY 2022 |
|---|----------------|----------------|----------------|
| Title: MDO Digitization / Distributed Digital Receiver Exciter (DDREX) | - | - | 44.488 |
| Description: MDO Digitization / Distributed Digital Receiver Exciter (DDREX) is a mod-in-service Engineering Change Proposal (ECP) that provides increased force protection by addressing emerging and evolving electronic attack threats, improving electronic protection capabilities against Cyber Electromagnetic Activity (CEMA), and improving performance in a congested spectrum/environment via waveform diversity, spectrum agility and broadening the operational bandwidth. The system is also less susceptible to directed energy, jamming and anti-radiation missiles and provides improved extended range capability to enable timely and accurate targetable data in support of Long Range Precision Fires (LRPF). | | | |

UNCLASSIFIED

| | | | | |
|---|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2022 Army | | Date: May 2021 | | |
| Appropriation/Budget Activity 2040 / 7 | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | Project (Number/Name) BY8 / AN/TPQ-53 Counterfire Target Acquisition Radar Sys | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2020 | FY 2021 | FY 2022 |
| <p>FY 2022 Plans: FY 2022 modification-in-service research, development, test and evaluation (RDT&E) funds in the amount of \$48.429 million supports the DDREX modification kit system design, architecture and interface definition, hardware/software design and development, initial system integration and test and material required for engineering development models. This DDREX development effort also includes associated government engineering and program management support.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Starting in FY 2022, modernization efforts including requirements addressing MDO digitization will take place in this modification-in-service line.</p> | | | | |
| <p>Title: Modernization Development Efforts and Emerging Threats</p> <p>Description: Modernization Development Efforts and Emerging Threats provides the ability to address upcoming threats on the battlefield by countering indirect fire and improving survivability against electronic warfare threats identified in the Validated Online Lifecycle Threat (VOLT).</p> <p>FY 2022 Plans: FY 2022 funding of \$8.453 supports software updates to counter new and emerging indirect fire munitions and improve survivability against electronic warfare threats identified in the VOLT.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Starting in FY 2022, modernization efforts including requirements addressing new and emerging threats will take place in this modification-in-service line.</p> | | - | - | 8.453 |
| <p>Title: Program Management Support</p> <p>Description: Funding is provided for all program management efforts on the AN/TPQ-53 Counterfire Target Acquisition Radar System.</p> <p>FY 2022 Plans: FY22 funding of \$3.740 supports program management requirements.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Starting in FY 2022, program management requirements will take place in this modification-in-service line.</p> | | - | - | 3.740 |
| Accomplishments/Planned Programs Subtotals | | - | - | 56.681 |

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army **Date:** May 2021

| | | |
|--|---|--|
| Appropriation/Budget Activity 2040 / 7 | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | Project (Number/Name) BY8 / AN/TPQ-53 Counterfire Target Acquisition Radar Sys |
|--|---|--|

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

| <u>Line Item</u> | <u>FY 2020</u> | <u>FY 2021</u> | <u>FY 2022</u> <u>Base</u> | <u>FY 2022</u> <u>OCO</u> | <u>FY 2022</u> <u>Total</u> | <u>FY 2023</u> | <u>FY 2024</u> | <u>FY 2025</u> | <u>FY 2026</u> | <u>Cost To</u> <u>Complete</u> | <u>Total Cost</u> |
|---|----------------|----------------|-------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------|----------------|-----------------------------------|-------------------|
| • 0604823A: <i>Firefinder</i> | 16.583 | 18.278 | - | - | - | - | - | - | - | - | - |
| • B05310: <i>AN/TPQ-53 Counterfire Target Acquisition Radar</i> | 16.416 | 71.404 | - | - | - | - | - | - | - | - | - |
| • BA5315: <i>AN/TPQ-53 MOD-IN-SERVICE LINE</i> | - | - | 31.694 | - | 31.694 | - | - | - | - | - | - |

Remarks

D. Acquisition Strategy

The AN/TPQ-53 leverages technology developed in the multi-mission radar advanced technology objective (ATO) program. A Full Rate Production (FRP) decision was obtained in December 2015. The FRP contract to fill the remainder of the Army Acquisition Objective (AAO) was awarded in March 2017. Additionally, all initial production systems will be retrofitted to the FRP configuration. The AAO was increased from 174 to 189 systems in May 2017; the program has procured the AAO of 189 systems. Army approved a Total Army Analysis (TAA) force structure change in FY 2020. The AN/TPQ-53 system replaces all of the AN/TPQ-36 and AN/TPQ-37 systems in the fleet.

The AN/TPQ-53 multi-domain operations digitization effort full-up development begins in FY 2022. This effort will build upon ongoing full rate production (FRP) configuration risk mitigation activities and upgrades such as Gallium Nitride (GaN), signal data processor (SDP), extended range (ER), electronic protection, and secure contractor facilitization efforts. The initial development task order will take place on the follow-on FRP Indefinite Delivery Indefinite Quantity (IDIQ) contract in FY 2022 and will include engineering development, design, prototyping, and assessments. Initial production representative assets to include initial survivability capability are planned for FY 2023 and will undergo integration and testing leading to an operational assessment in FY 2024 to support a procurement decision for 60 digitization mod kits. The program will utilize FY 2024-2026 procurement funds to support the mod kit buys, depot facilitization, updates to technical manuals, and training materials. Supply transition and full material release are planned for FY 2026. The program will utilize procurement funds to retrofit and re-field systems with digitization mod kits beginning in FY 2026. In FY 2027, the digitization configuration transitions to depot support and its software transitions to sustainment.

The AN/TPQ-53 program will develop nascent capability and support Army demonstration and test initiatives to increase integrated offensive and defensive capability across warfighter functions and multiple domains.

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|---|-------------------|----------------|-------------------|--|-------------------|--------------------|-------------------|-----------------------|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army | | | | | | | | | | | | Date: May 2021 | | | |
| Appropriation/Budget Activity 2040 / 7 | | | | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | | | | Project (Number/Name) BY8 / AN/TPQ-53 Counterfire Target Acquisition Radar Sys | | | | | | | |
| Product Development (\$ in Millions) | | | | FY 2020 | | FY 2021 | | FY 2022 Base | | FY 2022 OCO | | FY 2022 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 |
| Modernization Development Efforts and Emerging Threats | SS/CPFF | Lockheed Martin : Syracuse, NY | - | - | | - | | 8.453 | Dec 2021 | - | | 8.453 | 0.000 | 8.453 | Continuing |
| MDO Digitization / Distributed Digital Receiver Exciter (DDREX) | SS/CPFF | Lockheed Martin : Syracuse, NY | - | - | | - | | 44.488 | Dec 2021 | - | | 44.488 | 0.000 | 44.488 | Continuing |
| Subtotal | | | - | - | | - | | 52.941 | | - | | 52.941 | 0.000 | 52.941 | N/A |
| Support (\$ in Millions) | | | | FY 2020 | | FY 2021 | | FY 2022 Base | | FY 2022 OCO | | FY 2022 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 - Government | Various | Various : Various | - | - | | - | | 1.907 | | - | | 1.907 | 0.000 | 1.907 | Continuing |
| Program Management Support - Contractor | Various | Various : Various | - | - | | - | | 1.833 | | - | | 1.833 | 0.000 | 1.833 | Continuing |
| Subtotal | | | - | - | | - | | 3.740 | | - | | 3.740 | 0.000 | 3.740 | N/A |
| Project Cost Totals | | | - | - | | 0.000 | | 56.681 | | - | | 56.681 | 0.000 | 56.681 | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|--|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army | | Date: May 2021 |
| Appropriation/Budget Activity 2040 / 7 | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | Project (Number/Name) BY8 / AN/TPQ-53 Counterfire Target Acquisition Radar Sys |

| Event Name | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | | FY 2025 | | | | FY 2026 | | | | | | | | | | | |
|--|---------|---|---|---|---------|---|---|---|------------------|---|---|---|------------------|---|---|---|------------------|--------------|---|---|------------------|--------------|---|---|------------------|--------------|---|---|------------------|--------------|--|--|------------------|--|--|--|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | | | | | | | | |
| DDREX System, Hardware and Software Development | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | | | | | | | | |
| DDREX System Integration and Test | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | | | | |
| DDREX Modkit Critical Design Review | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ▲ 1 | ████████████ | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | | | | |
| DDREX Operational Assessment | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ▲ 2 | ████████████ | | | ████████████████ | | | | ████████████████ | | | | | | | |
| DDREX Operational Test | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ▲ 3 | ████████████ | | | ████████████████ | | | | | | | |
| DDREX Supply Transition | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ▲ 4 | ████████████ | | | ████████████████ | | | |
| DDREX Full Material Release | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ▲ 5 | ████████████ | | | ████████████████ | | | |
| Modernization, Emerging Threats and Testing - FY 2021 VOLT | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | |
| Modernization, Emerging Threats and Testing - FY 2023 VOLT | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | |
| Modernization, Emerging Threats and Testing - FY 2025 VOLT | | | | | | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | | ████████████████ | | | |

UNCLASSIFIED

| | | |
|---|---|--|
| Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army | | Date: May 2021 |
| Appropriation/Budget Activity 2040 / 7 | R-1 Program Element (Number/Name) PE 0607148A / AN/TPQ-53 Counterfire Target Acquisition Radar System | Project (Number/Name) BY8 / AN/TPQ-53 Counterfire Target Acquisition Radar Sys |

Schedule Details

| Events | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| DDREX System, Hardware and Software Development | 1 | 2022 | 3 | 2025 |
| DDREX System Integration and Test | 3 | 2023 | 4 | 2025 |
| DDREX Modkit Critical Design Review | 4 | 2022 | 4 | 2022 |
| DDREX Operational Assessment | 3 | 2024 | 3 | 2024 |
| DDREX Operational Test | 3 | 2025 | 3 | 2025 |
| DDREX Supply Transition | 2 | 2026 | 2 | 2026 |
| DDREX Full Material Release | 2 | 2026 | 2 | 2026 |
| DDREX Organic Repair Transition | 1 | 2028 | 1 | 2028 |
| DDREX Software Transition | 1 | 2028 | 1 | 2028 |
| Modernization, Emerging Threats and Testing - FY 2021 VOLT | 1 | 2022 | 2 | 2023 |
| Modernization, Emerging Threats and Testing - FY 2023 VOLT | 2 | 2023 | 2 | 2025 |
| Modernization, Emerging Threats and Testing - FY 2025 VOLT | 2 | 2025 | 2 | 2027 |