

UNCLASSIFIED

| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army | | | | | | | | | | | Date: March 2023 | |
|--|-------------|---------|---------|--------------|---|---------------|---------|---------|---------|---------|------------------|------------|
| Appropriation/Budget Activity | | | | | R-1 Program Element (Number/Name) | | | | | | | |
| 2040: Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD) | | | | | PE 0603463A / Network C3I Advanced Technology | | | | | | | |
| 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 | - | 205.576 | 177.917 | 105.549 | - | 105.549 | 107.608 | 118.061 | 131.174 | 126.981 | 0.000 | 972.866 |
| AM7: Modular RF Communications Advanced Technology | - | 8.931 | 10.440 | - | - | - | 1.989 | 13.293 | 12.777 | 12.917 | 0.000 | 60.347 |
| AM9: Protected SATCOM Advanced Technology | - | 24.561 | 31.599 | 14.200 | - | 14.200 | - | 14.171 | 15.600 | 18.007 | 0.000 | 118.138 |
| AN2: Narrowband SATCOM Advanced Technology | - | 11.166 | - | - | - | - | - | - | - | - | 0.000 | 11.166 |
| AN4: Non Traditional Waveforms Advanced Technology | - | 8.960 | 5.905 | 5.215 | - | 5.215 | 20.286 | 11.615 | 11.590 | 17.211 | 0.000 | 80.782 |
| AN8: COE - Every Receiver is a Sensor Advanced Tech | - | 2.782 | 1.371 | 6.539 | - | 6.539 | 6.469 | 6.477 | 6.482 | 3.244 | 0.000 | 33.364 |
| AO1: UNT - Every Receiver is a Sensor Advanced Tech | - | 2.837 | - | 3.170 | - | 3.170 | 3.171 | 3.175 | 3.176 | - | 0.000 | 15.529 |
| AOT7: EW for Maneuver Operations (EMO) Adv Tech | - | 5.557 | 6.125 | 3.152 | - | 3.152 | - | - | 3.700 | 3.735 | 0.000 | 22.269 |
| AP9: Next Generation HF Advanced Technology | - | 7.444 | - | - | - | - | - | - | - | - | 0.000 | 7.444 |
| AQ5: Sensor CE-Integrated Sensor Architecture Adv Tech | - | 1.585 | 0.625 | 1.955 | - | 1.955 | 1.977 | 1.976 | 1.977 | 1.999 | 0.000 | 12.094 |
| AQ8: High Tempo Data Driven Decision Tools Adv Tech | - | 2.985 | 6.611 | 3.602 | - | 3.602 | 3.783 | 3.924 | 3.927 | 3.970 | 0.000 | 28.802 |
| AR4: Intelligent Env Battlefield Awareness Adv Tech | - | 3.927 | - | - | - | - | - | - | - | - | 0.000 | 3.927 |
| AR6: Understanding the Environment as a Threat Adv Tech | - | 2.432 | 2.767 | - | - | - | 1.691 | - | 2.017 | 2.523 | 0.000 | 11.430 |
| AR8: Sensing in Contested Environments Adv Tech | - | 1.552 | - | - | - | - | - | - | - | - | 0.000 | 1.552 |

UNCLASSIFIED

| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army | | | | | | | | | | | Date: March 2023 | |
|--|---|--------|--------|--------|---|--------|--------|--------|--------|--------|------------------|---------|
| Appropriation/Budget Activity | | | | | R-1 Program Element (Number/Name) | | | | | | | |
| 2040: Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD) | | | | | PE 0603463A / Network C3I Advanced Technology | | | | | | | |
| AS9: Persistent Geophysical Sensing-Infrasound Adv Tech | - | 2.359 | - | - | - | - | - | - | - | - | 0.000 | 2.359 |
| AT3: Subterranean Detection and Monitoring Adv Tech | - | 2.136 | - | - | - | - | - | - | - | - | 0.000 | 2.136 |
| AT8: Network-Enabled GeoSpatial-GEOINT Services AdvTech | - | 2.947 | 4.603 | 4.760 | - | 4.760 | 4.201 | 5.451 | 6.188 | 4.576 | 0.000 | 32.726 |
| AU1: Tactical GeoSpatial Information Capabilities ATech | - | 4.053 | 5.996 | 2.112 | - | 2.112 | 2.717 | 4.476 | 7.674 | 4.713 | 0.000 | 31.741 |
| AU2: Optimization of Geospatial Data for Visualization | - | 2.092 | - | - | - | - | - | - | - | - | 0.000 | 2.092 |
| AU4: Geospatially Enabled Operational Design Adv Tech | - | 7.665 | 12.197 | 10.953 | - | 10.953 | 10.791 | 5.123 | 6.422 | 8.178 | 0.000 | 61.329 |
| AV1: GEOInt/Ops Logistics Integration-Planning Adv Tech | - | 3.726 | - | - | - | - | - | - | - | - | 0.000 | 3.726 |
| AV4: Foundational S&T for Network C3I Advanced Tech | - | 7.468 | 0.851 | - | - | - | - | - | - | - | 0.000 | 8.319 |
| AV8: Navigation Warfare (NAVWAR) Advanced Technology | - | 1.856 | 1.949 | 6.029 | - | 6.029 | 3.980 | 6.024 | - | 3.465 | 0.000 | 23.303 |
| AW6: Modular GPS Independent Sensors Advanced Tech | - | 6.542 | 10.131 | 12.343 | - | 12.343 | 14.732 | 6.459 | 12.491 | 4.784 | 0.000 | 67.482 |
| BP4: ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA) | - | 55.500 | 52.500 | - | - | - | - | - | - | - | 0.000 | 108.000 |
| CF9: Automated IPB Adv Tech | - | 0.953 | - | - | - | - | - | - | - | - | 0.000 | 0.953 |
| C17: Mobile & Survivable Command Post (MASCP) Adv Tech | - | 7.524 | 13.119 | 18.691 | - | 18.691 | 16.424 | 19.857 | 19.871 | 20.087 | 0.000 | 115.573 |
| CJ8: Assured PNT Communications Advanced Tech | - | 16.036 | 11.128 | 11.783 | - | 11.783 | 13.411 | 14.052 | 14.141 | 14.296 | 0.000 | 94.847 |

UNCLASSIFIED

| | | | | | | | | | | | | | |
|---|---|---|---|-------|--|-------|-------|-------|-------|-------------------------|-------|--------|--|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | | |
| Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i> | | | | | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | | | | | | | | |
| DB6: <i>Pathfinder 3D Advanced Technology</i> | - | - | - | 1.045 | - | 1.045 | 1.986 | 1.988 | 3.141 | 3.276 | 0.000 | 11.436 | |

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates technologies to provide an Army tactical network and enabling infrastructure that support operations in any environment, to include where the electromagnetic spectrum is denied or degraded. This is accomplished through the exploitation and optimization of components and systems for robust, low signature communications and data networks; assured positioning, navigation, and timing in contested environments; converged and coordinated cyber and electronic warfare activities; resilient mission command on the move; and the collection, processing, and dissemination of information for intelligence, surveillance, and reconnaissance in a common operating picture.

Work in this PE complements PE 0602146A (Network C3I Technology), PE 0602143A (Soldier Lethality Technology), PE 0602145A (Next Generation Combat Vehicle Technology), PE 0602147A (Long Range Precision Fires Technology), PE 0602148A (Future Vertical Lift Technology), PE 0602150A (Air and Missile Defense Technology), PE 0602213A (C3I Applied Cyber), PE 0603118A (Soldier Lethality Advanced Technology), PE 0603462A (Next Generation Combat Vehicle Advanced Technology), PE 0603464A (Long Range Precision Fires Advanced Technology), PE 0603465A (Future Vertical Lift Advanced Technology), and PE 0603466A (Air and Missile Defense Advanced Technology).

This PE is directly aligned with the Network and Assured Positioning, Navigation, and Timing (APNT) Army Modernization priorities.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research is performed by the United States (U.S.) Army Futures Command (AFC), the U.S. Army Space and Missile Defense Command (SMDC) and U.S. Army Engineer Research and Development Center (ERDC).

| B. Program Change Summary (\$ in Millions) | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 211.068 | 125.565 | 107.766 | - | 107.766 |
| Current President's Budget | 205.576 | 177.917 | 105.549 | - | 105.549 |
| Total Adjustments | -5.492 | 52.352 | -2.217 | - | -2.217 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 52.500 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -5.492 | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Adjustments to Budget Years | - | - | -2.217 | - | -2.217 |

UNCLASSIFIED

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

| | |
|---|--|
| Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i> | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> |
|---|--|

| | | | | | |
|------------------|---|--------|---|---|---|
| • FFRDC Transfer | - | -0.148 | - | - | - |
|------------------|---|--------|---|---|---|

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: BP4: *ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)*

Congressional Add: *Program Increase - Assured Position, Navigation, and Timing Technology*

Congressional Add: *Program Increase - Advanced Materials for Resilient Sensors*

Congressional Add: *Program Increase - Tactical Geospatial Information Capabilities*

Congressional Add: *Program Increase - Alternative Navigation for GPS-Denied Landing Environments*

Congressional Add: *Edge-High Performance Computing for Multi-Domain Operations*

Congressional Add: *HALITE*

Congressional Add: *Program Increase - Next Generation Command Posts*

Congressional Add: *Receiver-Sensor Technology for Tactical Networks*

Congressional Add: *Program Increase - ADVANCE MATERIALS FOR COMMAND POST OF THE FUTURE*

Congressional Add: *Program Increase - ADVANCED PRECISION, NAVIGATION AND TIMING FOR LANDING ENVIRONMENTS*

Congressional Add: *Program Increase - HUMAN GEOGRAPHY REPOSITORY FOR COMMERCIAL CIVIL AFFAIRS*

Congressional Add: *Program Increase - MULTI-PLATFORM RECEIVER-SENSOR TECHNOLOGY*

Congressional Add: *Program Increase - SMALL SATELLITE HIGH ALTITUDE LAUNCH, INTEGRATION, TEST, AND EVALUATION*

Congressional Add Subtotals for Project: BP4

Congressional Add Totals for all Projects

| | FY 2022 | FY 2023 |
|--|---------|---------|
| | 4.000 | 5.000 |
| | 5.000 | - |
| | 5.000 | - |
| | 4.500 | 4.500 |
| | 5.000 | - |
| | 7.000 | - |
| | 10.000 | 7.000 |
| | 15.000 | - |
| | - | 1.500 |
| | - | 2.500 |
| | - | 5.000 |
| | - | 20.000 |
| | - | 7.000 |
| Congressional Add Subtotals for Project: BP4 | 55.500 | 52.500 |
| Congressional Add Totals for all Projects | 55.500 | 52.500 |

Change Summary Explanation

Decreased funding to support higher Army priorities.

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AM7 / Modular RF Communications Advanced Technology | | | |
| 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 |
| AM7: Modular RF Communications Advanced Technology | - | 8.931 | 10.440 | - | - | - | 1.989 | 13.293 | 12.777 | 12.917 | 0.000 | 60.347 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

In Fiscal Year (FY) 2024 funding in this Project experiences a Skip Year.

A. Mission Description and Budget Item Justification

This Project optimizes autonomous networking protocols to automate the Primary, Alternate, Contingency, and Emergency (PACE) communication plan to initialize, adapt, and continue operations under changing environments and threats.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AM6 (Modular RF Communications Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Modular Radio Frequency (RF) Communications Advanced Technology | 8.931 | 10.059 | - |
| Description: This effort optimizes autonomous networking protocols to automate the PACE communication plan to initialize, adapt, and continue operations under changing environments and threats. | | | |
| FY 2023 Plans: Demonstrate automated PACE capabilities in simulated laboratory and field test environments. Demonstrate integrated PACE capabilities with various nodes; dismounted, mounted, command post and interface to Warfighter Information Network-Tactical (WIN-T) (dismounted and command post node variants completed in Fiscal Year 2020 (FY20), mounted node variant to be completed in FY21/FY22, WIN-T interface to be completed in FY23). Mature automated PACE decision engine features and demonstrated integration with other protected terrestrial and space-based radios/waveforms and external systems to provide input to the decision engine. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: | | | |

UNCLASSIFIED

| | | | | |
|--|---|---|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AM7 / Modular RF Communications Advanced Technology | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Funding decrease reflects planned conclusion of this effort. | | | | |
| Title: SBIR/STTR Transfer | | - | 0.381 | - |
| Description: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638 | | | | |
| Accomplishments/Planned Programs Subtotals | | 8.931 | 10.440 | - |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AM9 / Protected SATCOM Advanced Technology | | | |
| 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 |
| AM9: Protected SATCOM Advanced Technology | - | 24.561 | 31.599 | 14.200 | - | 14.200 | - | 14.171 | 15.600 | 18.007 | 0.000 | 118.138 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies and components to increase resiliency of Wideband Satellite Communications (SATCOM) in contested and congested electromagnetic environments. This Project improves resiliency through science & technology investigation. Will compliment technologies that provide obfuscation of radio frequency (RF) spectrum signature in order to counter enemy electronic surveillance capabilities.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Projects AM8 (Protected SATCOM Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Protected SATCOM Advanced Technology and Resilient Tactial Networking and Comms | 24.368 | 30.859 | 14.200 |
| Description: This effort matures and demonstrates technologies and components to increase resiliency of Wideband SATCOM in contested and congested electromagnetic environments. This effort improves resiliency through science & technology investigation. Will compliment technologies that provide obfuscation of RF spectrum signature in order to counter enemy electronic surveillance capabilities. | | | |
| FY 2023 Plans: Mature and optimize select SATCOM technologies that contribute to SATCOM resiliency; mature OTM satellite ground terminal technology that supports operation over multiple satellite constellations with low available SWAP, leading to Army communications resiliency through diversity for tactical vehicles; and will mature ATH satellite ground terminal technology that supports operation over multiple satellite constellations simultaneously, leading to Army communications resiliency through diversity for Army TOCs. | | | |
| FY 2024 Plans: Will mature, optimize, and demonstrate select SATCOM technologies that contribute to SATCOM resiliency; will mature and demonstrate OTM satellite ground terminal technology that supports operation over multiple satellite constellations with low available SWAP, leading to Army communications resiliency through diversity for tactical vehicles; and mature and demonstrate | | | |

UNCLASSIFIED

| | | | | |
|--|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AM9 / Protected SATCOM Advanced Technology | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| ATH satellite ground terminal technology that supports operation over multiple satellite constellations simultaneously, leading to Army communications resiliency through diversity for Army TOCs. FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects the support required for technology maturation and optimization efforts related to OTM / ATH satellite ground terminals in the final funded year of this effort. | | | | |
| Title: High Altitude: Wideband Global Satellite Communications (WGS) Ka Band Surrogate Payload / Aerial Tier Networking Description: Demonstrate a WGS surrogate payload for usage on a High Altitude Platform (HAP) with seamless transition to existing ground terminals by modifying existing solutions to support Capability Sets (CS), beginning with CS 23: Capacity & Resiliency. | | 0.193 | - | - |
| Title: SBIR/STTR Transfer Description: Funding transferred in accordance with Title 15 USC §638 FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638 | | - | 0.740 | - |
| Accomplishments/Planned Programs Subtotals | | 24.561 | 31.599 | 14.200 |
| C. Other Program Funding Summary (\$ in Millions) N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy N/A | | | | |

UNCLASSIFIED

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

| | | |
|--|---|---|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AN2 / Narrowband SATCOM Advanced Technology |
|--|---|---|

| 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 |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| AN2: <i>Narrowband SATCOM Advanced Technology</i> | - | 11.166 | - | - | - | - | - | - | - | - | 0.000 | 11.166 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project validates and demonstrates technologies to enable gateway communications across disparate Narrowband Satellite Communications (SATCOM) networks, enabling resiliency in contested environments. The Narrowband SATCOM network is the largest tactical network operated by the Army to provide situational understanding across all echelons. This Project also optimizes technologies and protocols to enable risk mitigation solution sets and awareness through adaptive learning capabilities.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project BZ6 (Narrowband SATCOM Technology).

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|---------|---------|---------|
| Title: Narrowband SATCOM Advanced Technology | 11.166 | - | - |
| Description: This effort validates and demonstrates technologies to enable gateway communications across disparate Narrowband SATCOM networks, enabling resiliency in contested environments. | | | |
| Accomplishments/Planned Programs Subtotals | 11.166 | - | - |

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AN4 / Non Traditional Waveforms Advanced Technology | | | |
| 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 |
| AN4: Non Traditional Waveforms Advanced Technology | - | 8.960 | 5.905 | 5.215 | - | 5.215 | 20.286 | 11.615 | 11.590 | 17.211 | 0.000 | 80.782 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project demonstrates non-traditional waveforms and technologies for resilient communications in contested environments providing anti-jam, low probability of intercept, and low probability of detection for the dismounted and vehicular user. This Project also optimizes technologies not typically applied to the tactical environment, such as millimeter wave communications and directional networking with coherent combining of radio frequency signals, to maintain networked communications in and under contested and congested electromagnetic spectrum environments.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AN3 (Non Traditional Waveforms Technology) and Project AO4 (Energy Efficient Devices Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Non Traditional Waveforms Advanced Technology | 8.960 | 5.823 | - |
| Description: This effort demonstrates non-traditional waveforms and technologies for resilient communications in contested environments providing anti-jam, low probability of intercept, and low probability of detection for the dismounted and vehicular user. This effort optimizes technologies not typically applied to the tactical environment, such as millimeter wave communications and directional networking with coherent combining of radio frequency signals, to maintain networked communications in and under contested and congested electromagnetic spectrum environments. | | | |
| FY 2023 Plans: Mature tactical millimeter wave communications to technology readiness level (TRL) 6. Will mature the robustness of the solution for increased reliability in on-the-move scenarios including support for vehicular (ground based) relay nodes. Develop and integrate improved hybrid beamforming (or active electronically scanned array) antennas to increase line-of-sight range and further reduce low probability of intercept/low probability of detection capability. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: | | | |

UNCLASSIFIED

| | | | | |
|---|---|---|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AN4 / Non Traditional Waveforms Advanced Technology | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Funding decrease reflects planned lifecycle efforts to advance tactical millimeter wave communications technology, maturation to TRL 6 and completion of this effort. | | | | |
| Title: SBIR/STTR Transfer | | - | 0.082 | - |
| Description: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638 | | | | |
| Title: Relay for Aerial to Non-line-of-sight Ground Environments (RANGE) | | - | - | 5.215 |
| Description: This effort matures and demonstrates the use of aerial platforms as communications relays ensuring communications coverage is maintained in Non-Line-of-Sight (NLOS) environments, while considering communications resiliency such as anti-jam and low probability of detection. This effort optimizes technologies not typically applied to aerial networks, such as millimeter wave communications and directional networking, to maintain networked communications in and under contested and congested electromagnetic spectrum environments. | | | | |
| FY 2024 Plans: Will mature and demonstrate small form factor aerial relay communications payloads capable of enabling both low-band (e.g. L/S/C) and high-band (e.g. millimeter-wave) operations; optimize communications components for directional systems and demonstrate communications relay performance while reducing size, weight, and power of the aerial communications payload by aligning with Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Modular Open Suite of Standards (CMOSS) standards. | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned initiation of this effort. | | | | |
| Accomplishments/Planned Programs Subtotals | | 8.960 | 5.905 | 5.215 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |

UNCLASSIFIED

| | | |
|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) AN4 / <i>Non Traditional Waveforms Advanced Technology</i> |

D. Acquisition Strategy
N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AN8 / COE - Every Receiver is a Sensor Advanced Tech | | | |
| 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 |
| AN8: COE - Every Receiver is a Sensor Advanced Tech | - | 2.782 | 1.371 | 6.539 | - | 6.539 | 6.469 | 6.477 | 6.482 | 3.244 | 0.000 | 33.364 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project optimizes automated exploitation and fusion analysis tools, applications, and software services that harvest, correlate and fuse tactical receiver sources with new and emerging data sources to improve understanding of the threat picture and more efficiently support near-real time Situational Understanding of the battlefield.

Work in this Project complements Program Element (PE) 0603463A (Network C3I Advanced Technology) / Project AO1 (UNT - Every Receiver is a Sensor Advanced Tech) and PE 0602146A (Network C3I Technology) / Project AN7 (COE - Every Receiver is a Sensor Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Advanced Data Analytics for Situational Awareness | 2.782 | - | - |
| Description: This effort improves software technologies for intelligence/mission command (MC) mission collaboration to provide faster and higher quality decision-making support for the commander and his key staff. Specific efforts focus on integrating intelligence, surveillance and reconnaissance (ISR) planning and execution at the Task Force/Battalion through troop-level, as well as efforts that provide the capability to identify, fuse, and trace/track specific targets in an asymmetric environment. | | | |
| Title: Intelligence, Surveillance and Reconnaissance Optimization for Multi-Domain Operations Support Advanced Tech | - | 1.371 | 6.539 |
| Description: This effort will use automated threat process to focus sensor collection requirements. Collection plans are to be synchronized across echelons optimizing scheduling and placement of sensor assets from both national and joint capabilities. | | | |
| FY 2023 Plans: Evaluate sensor optimization algorithms. Evaluate external interfaces of Program of Record (PoR) collection management platforms. | | | |
| FY 2024 Plans: Will mature and integrate sensor optimization algorithms with collection orchestration tools to reduce timeline for sensor selection and tasking; mature and demonstrate standardized messaging and interfaces for tasking Army, national, and joint sensor assets; | | | |

UNCLASSIFIED

| | | | | |
|--|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AN8 / COE - Every Receiver is a Sensor Advanced Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| mature Intelligence Surveillance and Recognizance (ISR) collection orchestration software tools to enable near-real-time cross-cueing of sensors to improve target detection, tracking, and identification. | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects primary development phase, which includes development and integration of multiple subsystems necessary to demonstrate collection optimization across Army, national, and joint assets. | | | | |
| Accomplishments/Planned Programs Subtotals | | 2.782 | 1.371 | 6.539 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AO1 / UNT - Every Receiver is a Sensor Advanced Tech | | | |
| 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 |
| AO1: UNT - Every Receiver is a Sensor Advanced Tech | - | 2.837 | - | 3.170 | - | 3.170 | 3.171 | 3.175 | 3.176 | - | 0.000 | 15.529 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project demonstrates high fidelity Cyber-Electromagnetic Activity (CEMA) situational understanding by exploiting tactical receivers with sufficient capabilities as sensors. This Project also optimizes real-time radio frequency mapping of the tactical environment in support of network operation and decision making.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Projects AN9 (UNT - Every Receiver is a Sensor Technology) and Project AN7 (COE - Every Receiver is a Sensor Technology); and PE 0603463A (Network C3I Advanced Technology) / Project AN8 (COE Every Receiver is a Sensor Advanced Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Multi Intelligence Modernization supporting Multifunction Operations | 2.837 | - | - |
| Description: This effort will optimize Intelligence Community investments in software frameworks and exploits against threat signals of interest (SOI) to mature a library of open, modular, and scalable software solutions that address identified capability gaps and to provide the commander with electronic situational awareness while at the same time protecting his assets from enemy deception and jamming. | | | |
| Title: Multi Int Modernization Combined Architecture (MIMCA) Advanced Technology | - | - | 3.170 |
| Description: This effort develops technologies and methodologies to overcome the interference experienced in current co-located, multifunction systems that hinders the efficient, effective execution of simultaneous Electronic Warfare (EW), signals intelligence and cyber missions. This effort will improve resourcing, scheduling and collaboration so that sensor systems can self-optimize, identify spectrum conflicts and fully utilize all available assets scheduling to enable simultaneous use of the spectrum on a threat dense battlefield. | | | |
| FY 2024 Plans: | | | |

UNCLASSIFIED

| | | | | |
|--|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AO1 / UNT - Every Receiver is a Sensor Advanced Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Will leverage advanced machine language-based resource schedulers to dynamically optimizes resource allocation on EW platforms to increase simultaneity; leverage advanced Radio Frequency (RF) payload that can accommodate an advanced scheduler, implement novel interference mitigation components, and can self-optimize based on real-time feedback from shared resources to compensate for Battle Damage Assessment (BDA) or adaptive Electronic Attack (EA). FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned initiation of this effort. | | | | |
| Accomplishments/Planned Programs Subtotals | | 2.837 | - | 3.170 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AO7 / EW for Maneuver Operations (EMO) Adv Tech | | | |
| 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 |
| AO7: EW for Maneuver Operations (EMO) Adv Tech | - | 5.557 | 6.125 | 3.152 | - | 3.152 | - | - | 3.700 | 3.735 | 0.000 | 22.269 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies that understand contested spectrum features, sense, locate, and cue fires missions to create windows of opportunity in Anti-Access/ Area Denial (A2/AD) environments, restore network capabilities, and enable maneuver and fires.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / AP5 (Electronic Warfare Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: Electronic Warfare (EW) for Maneuver Ops | 1.672 | - | - |
| Description: This effort matures and demonstrates hardware and software to conduct EW for intelligence, surveillance, and reconnaissance (ISR) in support of Army tactical operations. | | | |
| Title: Stand-in Advanced RF Effects Advanced Technology | 2.698 | 2.991 | - |
| Description: This effort matures and demonstrates highly advanced hardware and software to improve power-on-target for EW systems against certain threat systems. | | | |
| FY 2023 Plans: Will demonstrate Array Control Payload synchronization capabilities for distributed EW techniques. Will demonstrate complex waveforms capability at a technology readiness level (TRL) 6. Will deliver an engineering design unit for cooperative networked electronic warfare. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding change reflects planned conclusion of this effort. | | | |
| Title: Tactical Force Signature Effects (TFForSE) Advanced Technology - Counter ISR Techniques | 1.187 | 2.976 | 3.152 |

UNCLASSIFIED

| | | |
|--|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AO7 / EW for Maneuver Operations (EMO) Adv Tech |

| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| <p>Description: This effort matures and demonstrates Electronic Warfare capabilities against adversary counter-fire sensors and Intelligence, Surveillance, and Reconnaissance (ISR) systems leveraging high fidelity hardware-in-the-loop, modeling and simulation (M&S), and representative systems.</p> <p>FY 2023 Plans: Will integrate advanced apertures and decoy techniques into complex modeling and simulation scenarios to prove efficacy in a contested operating environment. Will demonstrate advanced aperture and decoy techniques via a field validation exercise to be determined</p> <p>FY 2024 Plans: Will use representative adversary sensor systems in a field demonstration environment, validate combined performance of decoy hardware and countermeasure techniques to reduce the effectiveness of adversary ISR and counterfire capabilities, impacting their ability to localize blue emissions and therefore target blue platforms for kinetic weapons engagements; demonstrate and document tactical placement of EW platforms to optimize countermeasure effects and to create larger regions of uncertainty.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle of this effort.</p> | | | |
| <p>Title: SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638</p> | - | 0.158 | - |
| Accomplishments/Planned Programs Subtotals | 5.557 | 6.125 | 3.152 |

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

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

| | | |
|--|---|--|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AP9 / Next Generation HF Advanced Technology |
|--|---|--|

| 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 |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| AP9: Next Generation HF Advanced Technology | - | 7.444 | - | - | - | - | - | - | - | - | 0.000 | 7.444 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project improves performance of technologies to provide assured and resilient reach-back communications in satellite denied or degraded environments. This Project optimizes performance of new high frequency (HF) technology to provide low probability of detection and anti-jam capabilities to overcome emerging electronic warfare threats.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|---------|---------|---------|
| Title: Next Generation HF Advanced Technology | 7.444 | - | - |
| Description: This effort improves performance of technologies to provide assured and resilient reach-back communications in satellite denied or degraded environments. This effort optimizes performance of HF technology to provide low probability of detection and anti-jam capabilities to overcome emerging electronic warfare threats. | | | |
| Accomplishments/Planned Programs Subtotals | 7.444 | - | - |

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AQ5 / Sensor CE-Integrated Sensor Architecture Adv Tech | | | |
| 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 |
| AQ5: Sensor CE-Integrated Sensor Architecture Adv Tech | - | 1.585 | 0.625 | 1.955 | - | 1.955 | 1.977 | 1.976 | 1.977 | 1.999 | 0.000 | 12.094 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a sensor interoperability architecture consisting of standards, interfaces, and services.

Work in this Project complements the Army Science and Technology Network, Next Generation Combat Vehicle, Soldier Lethality, Air and Missile Defense, Long Range Precision Fires and Future Vertical Lift modernization priorities.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Sensor CE - Integrated Sensor Architecture | 1.585 | 0.625 | 1.955 |
| <p>Description: This effort matures and demonstrates an agile and adaptive interoperability sensor architecture that allows a system to dynamically discover and leverage other systems on a network without any specific or prior knowledge across limited, heterogeneous resources and against a peer adversary. The goal of this effort is to develop standards, models, and protocols that provide a common language for sensor systems to connect, publish their capabilities and needs, and interact with other systems, even on disadvantaged networks. The benefits of this effort are increased sensor collaboration, reduced decision timelines, reduced soldier load, and reduced integration costs.</p> <p>FY 2023 Plans: Demonstrate intelligent subscription services and effect on data distribution to show reduced time for a sensor to be discovered on a network. Optimize approaches for sensor to shooter data confidence to enable validation and de-confliction of multiple target indicators.</p> <p>FY 2024 Plans: Will mature the subscription services and demonstrate scalability to multiple sensors across a disadvantaged network; improve upon performance metrics; mature and optimize approaches to de-conflict multiple target indicators; validate de-confliction approach of sensors and shooter across a network representing Multi Domain Operations (MDO).</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement:</p> | | | |

UNCLASSIFIED

| | | | | |
|---|--|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) AQ5 / <i>Sensor CE-Integrated Sensor Architecture Adv Tech</i> | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Funding increase reflects investments required to demonstrate the scalability and effectiveness of the services across multiple sensors, shooters, and disadvantaged networks and to optimize and validate the approaches in a MDO network. | | | | |
| Accomplishments/Planned Programs Subtotals | | 1.585 | 0.625 | 1.955 |
| C. Other Program Funding Summary (\$ in Millions) N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AQ8 / High Tempo Data Driven Decision Tools Adv Tech | | | |
| 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 |
| AQ8: High Tempo Data Driven Decision Tools Adv Tech | - | 2.985 | 6.611 | 3.602 | - | 3.602 | 3.783 | 3.924 | 3.927 | 3.970 | 0.000 | 28.802 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates data driven decision tools that help develop cyber Situational Understanding (SU) for Commanders. It enhances decision-making and accurately assesses and integrates cyber impacts with all of the domains in Multi-Domain Operations (MDO) and thereby enhances mission effectiveness by improving decision cycles.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AQ7 (High Tempo Data Driven Decision Tools Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: High Tempo Data Driven Decision Tools Advanced Technology | 2.985 | 3.239 | - |
| <p>Description: This effort matures and demonstrates data driven decision tools tailored to reflect specific mission / information needs of the commander and individual staff members comprised of the following: software that facilitates the exchange of cyber data and mission information between the cyber electromagnetic activities (CEMA) cell, the S-6 and other staff officers (e.g., S-3, S-2, Fire Support Officer (FSO)), helping to assess higher-level impacts of lower-level events, and capturing the information as part of models for possible re-use; and software that dynamically populates the Common Operating Picture (COP) with visualizations designed for exploration and understanding of the impact of the cyber domain on the current mission.</p> <p>FY 2023 Plans: Develop software that connects to available and live data sources in a field environment for a soldier Collaborative Cyber Understanding demonstration. Further mature existing and new cyber data sources, cyber avenues of approach and the cyber data visualization tool based on experimentation feedback. Demonstrate that the Collaborative Cyber Understanding software dynamically updates the COP Visualizations and cyber decision models; Conduct a soldier demonstration of cyber decision model (cyber workflow/decision making process).</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement:</p> | | | |

UNCLASSIFIED

| | | | | |
|---|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AQ8 / High Tempo Data Driven Decision Tools Adv Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Funding change reflects planned lifecycle conclusion of this effort | | | | |
| <p>Title: RoadRunner Advanced Technology</p> <p>Description: This effort matures and demonstrates stakeholder prioritized capabilities that fuse intel and ops perspectives that drive decisions to enable dominance in complex Multi-Domain Operations.</p> <p>FY 2023 Plans: Engagements with peer/near-peer and highly technical adversaries will reveal new vulnerabilities and opportunities. Using a concurrent Development, Security and Operations (DEVSECOPS) environment, develop and demonstrate optimal strategies in friendly versus enemy engagements using digitized plans and real-time decision support providing exposure to non-obvious insights, vulnerabilities, and opportunities during planning and execution phases.</p> <p>FY 2024 Plans: Will validate and provide improved strategies for friendly versus enemy engagements while reducing cognitive burden with minimal impact to time constrained force on force interactions; exploit non-obvious insights, self and adversary vulnerabilities, and tactical opportunities using real time decision support tools during planning and execution phases.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle of this effort</p> | | - | 3.237 | 3.602 |
| <p>Title: SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638</p> | | - | 0.135 | - |
| Accomplishments/Planned Programs Subtotals | | 2.985 | 6.611 | 3.602 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AR4 / Intelligent Env Battlefield Awareness Adv Tech | | | |
| 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 |
| AR4: Intelligent Env Battlefield Awareness Adv Tech | - | 3.927 | - | - | - | - | - | - | - | - | 0.000 | 3.927 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project demonstrates and optimizes technologies to allow Soldiers to maneuver faster around or through existing environmental (urban/industrial) conditions and physical landscape constraints. This Project also matures and demonstrates web modules/software tools delivering crucial geo-chemical resources and advanced knowledge of geo-environmental infrastructure to mission planners.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AR3 (Intelligent Environmental Battlefield Awareness).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Geo-Forensics for Reconnaissance Exploitation | 1.247 | - | - |
| Description: This effort provides unique terrestrial patterns to describe and predict the geological, biological, and overall ecological information associated with anti-access/area denial (A2/AD) sites from the continental U.S. (CONUS) analogs. | | | |
| Title: Arctic Threat Demonstrations | 1.190 | - | - |
| Description: This effort matures and demonstrates visualization tools which enable geospatial decisions based on anticipated physical threats, hazards and dependencies posed by terrain and weather extremes in cold regions. | | | |
| Title: Predictive Geographic Information System (GIS) Mapping (physical) Demonstration | 1.490 | - | - |
| Description: This effort reduces the impact of unknown and changing terrain conditions by automating the integration of disparate datasets and overlays of terrain obstacles producing a high-fidelity map that integrates soil composition, vegetation, hydrology, and permafrost/ice data. | | | |
| Accomplishments/Planned Programs Subtotals | 3.927 | - | - |

UNCLASSIFIED

| | | |
|--|--|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) AR4 / <i>Intelligent Env Battlefield Awareness Adv Tech</i> |

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

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AR6 / Understanding the Environment as a Threat Adv Tech | | | |
| 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 |
| AR6: <i>Understanding the Environment as a Threat Adv Tech</i> | - | 2.432 | 2.767 | - | - | - | 1.691 | - | 2.017 | 2.523 | 0.000 | 11.430 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates tools that provide capability to inform the Soldier of different routes through a complex urban landscape. Optimizes tools that balance exposure to environmental threats with mission constraints to provide a risk versus reward capability of operating in different areas of the urban theater. This Project matures and demonstrates predictive software accurately integrating the risks of physical, chemical, and biological threats in an urban environment into route planning tools.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AR5 (Understanding the Environment as a Threat Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| <p>Title: Environmental Threat Technology Demonstrations for route planning</p> <p>Description: This effort matures and demonstrates a software tool that informs and balances the risk of exposure to environmental threats with maneuver constraints along potential routes. The software integrates the risks associated with different environmental matrices in complex urban environments and includes the capability for routing in off-road scenarios.</p> <p>FY 2023 Plans: Demonstrate the next-phase capability of minimally-viable weighted risk course forecasting algorithms based on sorption/ degradation products in air, water and soil.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects the planned lifecycle of this effort as work transitions to PE 0603042A, C3I Advanced Technology, Project DE7 Understanding Environment as a Threat Adv Tech for maturation and demonstration.</p> | 1.240 | 1.008 | - |
| <p>Title: Hazard Prediction Demonstration</p> | 1.000 | 1.001 | - |

UNCLASSIFIED

| | | | | |
|--|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AR6 / Understanding the Environment as a Threat Adv Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| <p>Description: This effort matures and demonstrates a mission planning platform that provides Soldiers with a predictive visualization technology to identify, track and plan for industrial or commercial chemical/environmental threats in operational environments.</p> <p>FY 2023 Plans: Demonstrate next-phase capability based on review and critiques of minimally-viable hazard prediction models of TIC/Ms in air, water, and soil in denied urban terrain.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects the planned lifecycle of this effort as work transitions to PE 0603042A, C3I Advanced Technology, Project DE7 Understanding Environment as a Threat Adv Tech for maturation and demonstration.</p> | | | | |
| <p>Title: Subsurface Forensics Demonstration</p> <p>Description: This effort matures and demonstrates sensing technologies for TIC/Ms to detect illicit activities with authentic wastewater treatment influent.</p> <p>FY 2023 Plans: Demonstrate sensor communication systems through sewer structures to determine minimal autonomous viable robotic platform for sensor suite.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects the planned lifecycle of this effort as work transitions to PE 0603042A, C3I Advanced Technology, Project DE7 Understanding Environment as a Threat Adv Tech for maturation and demonstration.</p> | | 0.192 | 0.700 | - |
| <p>Title: SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638</p> | | - | 0.058 | - |
| Accomplishments/Planned Programs Subtotals | | 2.432 | 2.767 | - |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | |
|--|--|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) AR6 / <i>Understanding the Environment as a Threat Adv Tech</i> |

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

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AR8 / Sensing in Contested Environments Adv Tech | | | |
| 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 |
| AR8: Sensing in Contested Environments Adv Tech | - | 1.552 | - | - | - | - | - | - | - | - | 0.000 | 1.552 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced sensor technologies that characterize hazards posed to warfighters by non-weaponized biological hazards in subterranean environments. The Project will demonstrate adaptive commercial off the shelf sensor technologies on existing unmanned ground vehicles (UGV) platforms to gather end-user feedback.

Work in this Project complements PE 0602146A (Network C3I Technology) / Project AR7 (Sensing in Contested Environments Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Non-Traditional Threat Detection Advance Technology | 1.552 | - | - |
| Description: This effort matures and demonstrates combined commercial off the shelf capabilities from multiple sources as an integrated robotic-operable expeditionary kit for accurate detection of biological hazards for early warning in subterranean environments from point of ingress/egress prior to exposure. | | | |
| Accomplishments/Planned Programs Subtotals | 1.552 | - | - |

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

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

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

| | | |
|--|---|--|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AS9 / Persistent Geophysical Sensing-Infrasound Adv Tech |
|--|---|--|

| 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 |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| AS9: Persistent Geophysical Sensing-Infrasound Adv Tech | - | 2.359 | - | - | - | - | - | - | - | - | 0.000 | 2.359 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates kitted hardware and software solutions that persistently monitor (through non-line-of-sight sensing including infrasound) critical infrastructure conditions and threat activities in dynamic battlefields. These technologies provide near real time data collection, processing, and alerts of infrastructure go/no-go condition required for maneuver planning. This Project also matures and demonstrates methodologies to assign maneuver relevant engineering attributes to geospatial feature data such as bridge load classification, road condition, and bathymetry.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AR9 (Persistent Geophysical Sensing-Infrasound Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|---------|---------|---------|
| Title: Battlefield Intelligence by Geophysical Sensing (BIGS) Demonstration | 2.359 | - | - |
| Description: This effort matures and demonstrates geophysical and geo-sensing technologies to persistently assess battlefield elements to include infrastructure (algorithm refinements) and additional sources of interest, such as explosive and fires events and various threats. Optimization of the array sensors and geometry to improve array performance for new sources of interest while reducing logistics will also be matured and demonstrated. New detection and classification signal processing algorithms will be validated throughout the life of the task in a phased demonstration schedule. | | | |
| Accomplishments/Planned Programs Subtotals | 2.359 | - | - |

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

N/A

Remarks

N/A

UNCLASSIFIED

| | | |
|--|--|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) AS9 / <i>Persistent Geophysical Sensing-Infrasound Adv Tech</i> |

D. Acquisition Strategy
N/A

UNCLASSIFIED

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

| | | |
|--|---|--|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AT3 / Subterranean Detection and Monitoring Adv Tech |
|--|---|--|

| 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 |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| AT3: Subterranean Detection and Monitoring Adv Tech | - | 2.136 | - | - | - | - | - | - | - | - | 0.000 | 2.136 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project validates and demonstrates advanced subterranean monitoring and vulnerability assessment technologies providing mobile and man-portable solutions to enhance survivability and threat awareness during urban operations and negate enemy subterranean operation advantage. This Project also optimizes and demonstrates enhanced technologies to detect tunnels and tunneling activity in complex and varied environments.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AT2 (Subterranean Detection and Monitoring Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|---------|---------|---------|
| Title: Subterranean Threat Assessment by Real-time Sensing Demonstrations | 2.136 | - | - |
| Description: This effort validates and demonstrates integrated suite of tunnel detection and persistent surveillance technologies, mobile and man-portable solutions to detect underground municipal infrastructure, voids, and other subterranean vulnerabilities in urban and complex domains. | | | |
| Accomplishments/Planned Programs Subtotals | 2.136 | - | - |

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

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AT8 / Network-Enabled GeoSpatial-GEOINT Services AdvTech | | | |
| 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 |
| AT8: Network-Enabled GeoSpatial-GEOINT Services AdvTech | - | 2.947 | 4.603 | 4.760 | - | 4.760 | 4.201 | 5.451 | 6.188 | 4.576 | 0.000 | 32.726 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project accelerates and exploits the tactical value of emerging field generated, mission relevant 3-dimensional (3D) geospatial data supporting mission planning, mission rehearsal and tactical situational awareness. Integrates and demonstrates the geo-registration, feature extraction, change detection, data visualization and transmission capabilities developed in the applied research portion of this Project. Tools developed for the exploitation of 3D datasets will be integrated into a streamlined workflow requiring low levels of expertise, putting advanced processing capabilities in the hands of the Soldier. This Project also includes demonstrations of tactical enhancements and the integrated ability to rapidly share mission critical 3D information in support of planning and execution.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AT7 (Network-Enabled GeoSpatial and GEOINT Services Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: 3D Terrain Automated Geospatial Co-Registration and Change Detection | 2.947 | 2.703 | - |
| Description: This effort matures, integrates and demonstrates the design and formulation of new urban terrain data models, frameworks and processes to automate the transformation of tactical unit generated source data (e.g. Light Detection and Ranging (LiDAR), imagery, and full motion video derived data) to new model constructs for rapid and accurate geo-registration of features (manmade infrastructure). | | | |
| FY 2023 Plans: Demonstrate advanced change detection algorithms achieving on average less than 10% of errors in matching varied data sources to achieve standard and shareable geospatial foundation data. Demonstrate 2.5D and 3D data co-registration software in | | | |

UNCLASSIFIED

| | | | | |
|---|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AT8 / Network-Enabled GeoSpatial-GEOINT Services AdvTech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| a relevant implementation environment for real-time processing, analytics, dissemination of tactical field collections to archived 3D geospatial data. FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects planned lifecycle completion of this effort and transition of technologies. | | | | |
| Title: Optimization of Geospatial Data for Tactical Visualization-Demonstration Description: This effort matures and demonstrates new open source software, data models and processes to generate a vision based geospatial foundation layer to enable end-users systems to visualize real-time mission critical geospatial content at the required level-of-detail (LOD) and enable position-navigation self-localization capability applicable to end-user devices at required accuracies optimized for the device, application, and mission. FY 2023 Plans: Mature and demonstrate delivery of optimized 3D geospatial data for visualization on end-user-devices. Demonstrate Position Navigation (PN) solutions extracted from field generated sources and delivered on to handheld devices through auto-generation of Level-of-Detail (LOD) 3D data. FY 2024 Plans: Will demonstrate advanced delivery of vision-based Position Navigation (PN) self localization from optimized geospatial data on end user devices at required accuracies. Will demonstrate reduced network bandwidth requirements though implementation of 3D Level-of-Detail (LOD) architectures and provide rigorous Figure of Merit assessment for integration to vision-based position/navigation methods. FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects the planned lifecycle of this effort. | | - | 1.798 | 1.838 |
| Title: SBIR/STTR Transfer Description: Funding transferred in accordance with Title 15 USC §638 FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638 | | - | 0.102 | - |
| Title: Geospatial - Intelligence Community Merge Demonstration | | - | - | 2.138 |

UNCLASSIFIED

| | | | | |
|--|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AT8 / Network-Enabled GeoSpatial-GEOINT Services AdvTech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| <p>Description: This effort matures an approach to automatically search Intelligence Community (IC) databases to discover and extract relevant attributes to be added as new metadata to adaptively scaled 3D terrain features and/or geographic areas. Geospatial and relevant intelligence data will be merged together, discoverable, and capable of user-selected query from a single computing environment. An enhanced 3D common operating picture will be demonstrated.</p> <p>FY 2024 Plans: Will advance Application Programming Interface (API) connectivity to relevant selected Intelligence Community (IC) databases to complement and enrich 3D terrain by extracting relevant attributed added as new metadata to adaptively scaled 3D terrain features and/or geographic areas.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle initiation of this effort.</p> | | | | |
| <p>Title: Geospatially Relevant Intuitive Propagation Services for Complex Environments Demonstration</p> <p>Description: This effort matures and demonstrates a novel expert propagation framework for assessing sensor performance in complex terrain, with integrated battlefield sensor data and environmental predictive modeling (weather and terrain influences) into intuitive displays for analysts, planners, and collection managers.</p> <p>FY 2024 Plans: Will advance use cases within the Common Operating Environment to enable an automated and integrated system to predict and visualize sensor performance caused by environmental conditions effects.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects the planned lifecycle initiation of this effort.</p> | | - | - | 0.784 |
| Accomplishments/Planned Programs Subtotals | | 2.947 | 4.603 | 4.760 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| N/A | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AU1 / Tactical GeoSpatial Information Capabilities ATech | | | |
| 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 |
| AU1: <i>Tactical GeoSpatial Information Capabilities ATech</i> | - | 4.053 | 5.996 | 2.112 | - | 2.112 | 2.717 | 4.476 | 7.674 | 4.713 | 0.000 | 31.741 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates next generation geospatial analytical tools for three-dimensional (3D) complex environments applicable to low echelon and tactical edge exploitation. These new capabilities will allow deployed units to enhance/update provisioned (baseline) standard, sharable, geospatial foundation (SSGF) data through automated analytics on multi-sourced spatial data resulting in streamlined, high fidelity terrain analysis products. Reducing data gaps and processing timelines will greatly increase Soldier situational awareness and support faster decision making in complex terrain.

Work in this Project complements Program Element (PE) 0602146A Network C3I Technology / Project AT9 (Tactical GeoSpatial Information Capabilities Techn).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: 3D Terrain Analysis | 2.220 | 3.819 | - |
| Description: This effort integrates and demonstrates software models and workflows provisioned on the geospatial and GEOINT workstations for improved capabilities to generate, process and exploit terrain products enabling situational awareness and rapid decision making at the tactical edge. | | | |
| FY 2023 Plans: Demonstrate mature enhanced terrain processing and feature layer generation tools for Program Manager (PM) Intelligence Systems and Analytics (IS&A) (formerly DCGS-A), providing high resolution, highly accurate feature information to support situational awareness, actionable maneuver and force protection in highly dynamic operational environments. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects the planned lifecycle conclusion of this effort and transition of technologies. | | | |
| Title: Previously Advanced Airborne Light Detection and Ranging (LIDAR) | 1.833 | 2.050 | - |
| Description: This effort integrates and demonstrates enhanced Geiger-mode LiDAR hardware/software, for advanced testing of protocols, equipment, and products for enhanced high-altitude/wide area terrain data collection, to support tactical operations. | | | |

UNCLASSIFIED

| | | |
|--|---|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AU1 / Tactical GeoSpatial Information Capabilities ATech |

| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| <p>FY 2023 Plans: Demonstrate integrated system of hardware components with system-specific calibration and optimized signal processing to inform system requirements enabling long-standoff airborne 3D remote sensing.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects planned lifecycle conclusion of this effort with a supporting insertion to the United States Army Combat Capabilities Development Command, C5ISR Center.</p> | | | |
| <p>Title: SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638</p> | - | 0.127 | - |
| <p>Title: Geospatial Analytics and Prediction Demonstration</p> <p>Description: This effort integrates and demonstrates automated/semi-automated geospatial tools implementing spatial/temporal data analysis, creation of predictive scenarios, anomaly detection and cross-scale and local-scale analysis of terrain.</p> <p>FY 2024 Plans: Will advance high-resolution 3D building-scale mapping workflow including interiors, exteriors and surrounding urban terrain. Will initiate designs for preliminary software tools for spatial, temporal and cross-scale analysis of terrain.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects the planned lifecycle initiation of this effort.</p> | - | - | 2.112 |
| Accomplishments/Planned Programs Subtotals | 4.053 | 5.996 | 2.112 |

| |
|---|
| <p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks N/A</p> |
|---|

UNCLASSIFIED

| | | |
|--|--|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) AU1 / <i>Tactical GeoSpatial Information Capabilities ATech</i> |

D. Acquisition Strategy
N/A

UNCLASSIFIED

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

| | | |
|--|---|---|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AU2 / Optimization of Geospatial Data for Visualization |
|--|---|---|

| 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 |
|--|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| AU2: Optimization of Geospatial Data for Visualization | - | 2.092 | - | - | - | - | - | - | - | - | 0.000 | 2.092 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project develops and demonstrates new open source software defined data models, and establishes an architecture to provide correct (mission context) geospatial content to the end-user consistent with device, tactical assessment/need, available bandwidth, and user movement. Advanced software and processes will reduce file size and network requirements, enabling near real-time updates to Soldiers. Resulting three-dimension 3D foundation data and associated accuracy information will enable position and navigation determination, through analysis with a variety of Soldier and vehicle borne sensors.

Work in this Project complements PE 0602146A (Network C3I Technology) / Project AT7 (Network-Enabled GeoSpatial-GEOINT Services Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|---------|---------|---------|
| Title: Optimization of Geospatial Data for Tactical Visualization-Demonstration | 2.092 | - | - |
| Description: This effort matures and demonstrates new open source software, data models and processes to generate a vision-based geospatial foundation layer to enable end-users systems to visualize real-time mission critical geospatial content at the required level-of-detail (LOD) and enable position-navigation self-localization capability applicable to end-user devices at required accuracies optimized for the device, application, and mission. | | | |
| Accomplishments/Planned Programs Subtotals | 2.092 | - | - |

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

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AU4 / Geospatially Enabled Operational Design Adv Tech | | | |
| 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 |
| AU4: Geospatially Enabled Operational Design Adv Tech | - | 7.665 | 12.197 | 10.953 | - | 10.953 | 10.791 | 5.123 | 6.422 | 8.178 | 0.000 | 61.329 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project demonstrates, integrates and transitions to the Army Command Post Computing Environment, a geospatially enabled collaborative planning environment, accessible across echelons, with capabilities that support Army Design Methodology (ADM) by providing the ability to perform conceptual planning and problem framing, supporting a greater understanding and visualization of the dynamic operational environment, a shared understanding of the operations purpose across echelons, and enhanced products to drive detailed budget planning and operational assessment processes, enhancing the collaborative interaction between commanders, staffs, and unified action partners.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AU3 (Geospatially Enabled Operational Design Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Geospatially Operational Design (GEOD) - Demonstration | 7.665 | 5.076 | - |
| Description: This effort integrates and demonstrates automation technologies to digitally visualize, create and assess critical elements of the Operational Environment required to inform the Operational Design functions, including collaborative conceptual framing of the problem. | | | |
| FY 2023 Plans: Demonstrate and transition a set of advanced strategic and operational planning tools to support ADM, and digitally create, visualize, assess, and brief the design framework, critical elements, and their interrelationships inside the Operational Environment in geospatial and geopolitical context. Will be transitioned to the Command Post Computing Environment (CPCE) Program of Record. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects the planned lifecycle conclusion of this effort with a Technical Readiness Level (TRL) 6 demonstration and transition of capabilities. | | | |
| Title: Integration of intel and logistics Multi Echelon Planning | - | 4.035 | 3.109 |

UNCLASSIFIED

| | | | | |
|--|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AU4 / Geospatially Enabled Operational Design Adv Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| <p>Description: This effort demonstrates a suite of analytical and visualization tools designed to facilitate analysis of multiple courses of action through modeling and simulation (M&S) and wargames to support development of alternate Courses of Action (COAs) and approval of the operational plan.</p> <p>FY 2023 Plans: Integrate and demonstrate an advanced suite of automated tools to facilitate development of COAs, to include initial assessments of their viability and set up of wargames and M&S that support further analysis.</p> <p>FY 2024 Plans: Will demonstrate advanced suite of analytical and visualization tools to facilitate Courses of Action (COA) analysis through modeling and simulation (M&S) and wargames to improve coordination and increase efficiencies in the Military Decision Making Process (MDMP).</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects planned lifecycle of this effort completing in Fiscal Year 2024.</p> | | | | |
| <p>Title: Automated intelligence Preparation of the Battlefield (IPB) Demonstrations</p> <p>Description: This effort develops and demonstrates a collaborative, adaptive planning capability that allows planners to employ resources leveraging geospatial, terrain, environmental effects, and authoritative data from distributed information databases in order to collaborate in the development and assessment of courses of action, visualize potential outcomes, make decisions and develop and disseminate plans and orders.</p> <p>FY 2023 Plans: Develop and demonstrate advanced capabilities for multi-domain visualization of IPB products, and automates integration of those products into the military planning process.</p> <p>FY 2024 Plans: Will demonstrate analytical tools within Joint Planning Services (JPS) platform for the generation of digestible Intelligence Preparation of the Battlefield (IPB) information to increase understanding of operational environment and threats in support of the military planning process.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects the planned lifecycle of this effort.</p> | | - | 3.075 | 3.160 |
| <p>Title: SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC §638</p> | | - | 0.011 | - |

UNCLASSIFIED

| | | | | |
|---|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AU4 / Geospatially Enabled Operational Design Adv Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638 | | | | |
| Title: GEOInt Ops Integration of tactical operational and strategic orders | | - | - | 4.684 |
| Description: This effort will demonstrate a suite of automated tools designed to facilitate rapid and efficient dissemination of orders and real-time visibility of subordinate planning as it relates to key tasks from higher echelons and desired end state down to Battalion. | | | | |
| FY 2024 Plans: Will demonstrate through agile design reviews with Program of Record automated tools within Joint Planning Services (JPS) platform to allow rapid creation and dissemination of digital orders and reduce cognitive burden and gain efficiencies in the military planning process. | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle initiation of this effort. | | | | |
| Accomplishments/Planned Programs Subtotals | | 7.665 | 12.197 | 10.953 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| N/A | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AV1 / GEOInt/Ops Logistics Integration-Planning Adv Tech | | | |
| 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 |
| AV1: GEOInt/Ops Logistics Integration-Planning Adv Tech | - | 3.726 | - | - | - | - | - | - | - | - | 0.000 | 3.726 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a suite of analytical and visualization tools designed to facilitate analysis of courses of action (COAs) through modeling and simulation (M&S) and wargames to support development of alternate COAs and approval of the operational plan (OPLAN). This Project will integrate existing M&S and wargaming applications (One Semi-Automated Forces; Infantry Warrior Simulation ; Logistics Composite Model), to assess multiple courses of action to be analyzed in a multi-domain environment.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: Integration of intel and logistics Multi Echelon Planning | 3.726 | - | - |
| Description: This effort demonstrates a suite of analytical and visualization tools designed to facilitate analysis of multiple courses of action through M&S and wargames to support development of alternate COAs and approval of the operational plan. | | | |
| Accomplishments/Planned Programs Subtotals | 3.726 | - | - |

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

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AV4 / Foundational S&T for Network C3I Advanced Tech | | | |
| 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 |
| AV4: Foundational S&T for Network C3I Advanced Tech | - | 7.468 | 0.851 | - | - | - | - | - | - | - | 0.000 | 8.319 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

In Fiscal Year (FY) 2024 this Project is terminated.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates underlying technologies applicable to artificial intelligent agents and holistic network integration as applied to, but not limited to autonomous manned-unmanned teaming for ground and air platforms. This Project also matures and demonstrates emerging research leading to potential technology development in areas of strategic importance to the Army in network technologies, by bringing competitively selected Universities with research teams into Technical Alliances.

This work complements Program Element (PE) 0602146A (Network C3I Technology) / Project AV3 (Foundational S&T for Network C3I Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: Demonstration of Disruptive, Innovative Research for Emerging (DIRE) Advanced Network Capabilities | 7.468 | 0.820 | - |
| Description: This effort demonstrates innovative network capabilities using a rapid and agile methodology to evaluate the feasibility of incorporation into Army network problem sets. | | | |
| FY 2023 Plans: Completing innovative technology pilot for experimenting and demonstrating innovative and disruptive network capabilities in the space of network resiliency, artificial intelligence, and autonomy. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease to support Army high priority effort for agile acceleration of Directed Energy in the Air and Missile Defense Advanced Technology (0603466A) Project CV6. | | | |
| Title: SBIR/STTR Transfer | - | 0.031 | - |

UNCLASSIFIED

| | | | | |
|---|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AV4 / Foundational S&T for Network C3I Advanced Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Description: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased in accordance transfer complying with Title 15 USC §638 | | | | |
| Accomplishments/Planned Programs Subtotals | | 7.468 | 0.851 | - |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AV8 / Navigation Warfare (NAVWAR) Advanced Technology | | | |
| 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 |
| AV8: Navigation Warfare (NAVWAR) Advanced Technology | - | 1.856 | 1.949 | 6.029 | - | 6.029 | 3.980 | 6.024 | - | 3.465 | 0.000 | 23.303 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates capabilities allowing the Army to monitor, understand, and control the Navigation Warfare (NAVWAR) environment. This requires an integrated approach to Electronic Protection (EP), Electronic Support (ES), and Electronic Attack (EA) to rapidly characterize the NAVWAR environment, deny Positioning, Navigation, and Timing (PNT) based capabilities to our adversaries, and maintain Army capabilities.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AW1 (Autonomous Navigation Technology) complements this Project.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: PNT Situational Awareness (SA) Advanced Technology | 1.856 | 1.949 | - |
| Description: This effort demonstrates real time PNT Situational Awareness for a Common Operating Picture (COP) on selected Computing Environment (CE); improves fusion algorithms for at least two types of PNT SA sensors (terrestrial, air, space); generates an Interface Control Document (ICD) for PNT SA messages; allow open integration and reference implementation for PNT SA stored data for distribution on various platforms. | | | |
| FY 2023 Plans: Mature and validate integration of aerial sensor data into data fusion software and demonstrate an integrated system of systems approach at a field demonstration. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding decrease reflects planned lifecycle conclusion of this effort | | | |
| Title: Intelligent Electronic Protect (IEP) Advanced Technology | - | - | 6.029 |

UNCLASSIFIED

| | | |
|--|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AV8 / Navigation Warfare (NAVWAR) Advanced Technology |

| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| <p>Description: This effort matures and demonstrates hardware and software capabilities that will enable an Assured Position Navigation and Timing (APNT) system to function as a Navigation Warfare (NAVWAR) sensor. The IEP enabled APNT system will be able to detect and identify information about jamming and spoofing threats in the Global Positioning System (GPS) environment, protecting units from spoofing and increasing the number and availability of NAVWAR sensors in the field. The proliferation of NAVWAR sensors allows Electronic Warfare Planning and Management Tool (EWPMT) to create a NAVWAR Common Operating Picture with greater accuracy and coverage, allowing Commanders to make more informed decisions about maneuver and allowing for more accurate and successful fires missions.</p> <p>FY 2024 Plans: Will mature machine learning (ML) techniques to enable detection and classification capabilities in an IEP enabled APNT system for use on ground vehicle platforms; exploit the machine learning techniques to allow use of existing GPS receiver hardware as a NAVWAR sensor; optimize artificial intelligence (AI)/ML techniques to understand the changes in the environment and utilize appropriate modes to counter interference events; mature the APNT system (hardware and software) to exploit this new NAVWAR data to improve overall anti-spoof protection; demonstrate initial machine learning techniques and hardware improvements at end of FY24 field test event.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle initiation of this effort.</p> | | | |
| Accomplishments/Planned Programs Subtotals | 1.856 | 1.949 | 6.029 |

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) AW6 / Modular GPS Independent Sensors Advanced Tech | | | |
| 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 |
| AW6: Modular GPS Independent Sensors Advanced Tech | - | 6.542 | 10.131 | 12.343 | - | 12.343 | 14.732 | 6.459 | 12.491 | 4.784 | 0.000 | 67.482 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a resilient, soldier-integrated precision navigation and timing solution, providing precision geolocation, geospatial survey information, global positioning system (GPS) spoofing awareness and countermeasures to dismounted warfighters in GPS-denied/degraded environments.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AW1 (Autonomous Navigation Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: Soldier-Integrated Positioning, Navigation, and Timing (PNT) | 6.542 | 2.476 | 3.003 |
| Description: This effort implements a standards-based, open PNT architecture solution for rapid commercial of the shelf (COTS) and emerging technology integration; incorporates artificial intelligence approaches to aggregate multiple organic and networked sensor inputs for improved PNT accuracy and reliability; demonstrates Simultaneous Localization and Mapping (SLAM) based-algorithms incorporating alternative PNT inputs; and demonstrates alternative PNT sensors and approaches, including radio frequency time differencing, signals of opportunity, inertial, gravimetric, and imagery. | | | |
| FY 2023 Plans: Exploit and provide technology discovery for network ranging, flexible and modular Radio Frequency (RF) antenna designs. Execute demonstrations and soldier touch points with anti-jam technologies. Finalize fabrication and packaging. | | | |
| FY 2024 Plans: Will continue to exploit and provide technology discovery for network ranging, flexible and modular Radio Frequency (RF) antenna designs. Will incorporate artificial intelligence approaches and will mature alternate PNT sensors to improve PNT accuracy and reliability. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: | | | |

UNCLASSIFIED

| | | | | |
|---|---|---|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) AW6 / Modular GPS Independent Sensors Advanced Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Funding increase reflects maturation activities of artificial intelligence approaches and alternate PNT sensors. | | | | |
| Title: Soldier Integrated Positioning Navigation and Timing - Modular Architecture & Integrated Demonstrators | | - | 7.655 | 9.340 |
| Description: This effort optimizes, improves, and demonstrates the modular architecture for PNT capabilities; matures and integrates alternative PNT sensors and approaches, including radio frequency time differencing, signals of opportunity, inertial, gravimetric, and imagery; matures, integrates, demonstrates and validates a final Modular Handheld; integrates and demonstrates PNT technologies with Soldier interface systems. | | | | |
| FY 2023 Plans: Optimize and validate the Initial Modular Handheld and PNT technologies, including the PNT open architecture; optimize and validate sensor integration for new PNT algorithms, anti-jam capability, vision aided navigation, network ranging and other alternate navigation technologies. Fabricate and demonstrate PNT open architecture, PNT technologies and validated sensors in SWAP optimized integrated demonstrator. Execute soldier touch points with the integrated demonstrator. | | | | |
| FY 2024 Plans: Will integrate PNT sensors, algorithms, anti-jam capabilities, vision aided navigation, network ranging and other alternative navigation technologies with existing Soldier-borne device and demonstrate capability at a Soldier touch-point in a relevant environment; assess performance and mature interfaces and messaging necessary to distribute accurate position and timing across wirelessly connected Soldier-borne devices; integrate low-cost timing technologies into a modular open systems architecture Soldier Integrated technology demonstrator. | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects maturation of additional alternative PNT sources and integration of components in advance of field test for component validation and demonstration in relevant environment. | | | | |
| Accomplishments/Planned Programs Subtotals | | 6.542 | 10.131 | 12.343 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| D. Acquisition Strategy | | | | |
| N/A | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) BP4 / ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA) | | | |
| 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 |
| BP4: ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA) | - | 55.500 | 52.500 | - | - | - | - | - | - | - | 0.000 | 108.000 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

Congressional Interest Item funding provided for Electronic Warfare Advanced Technologies.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Electronic Warfare Advanced Technologies.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

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

| | FY 2022 | FY 2023 |
|---|----------------|----------------|
| Congressional Add: Program Increase - Assured Position, Navigation, and Timing Technology | 4.000 | 5.000 |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for APNT Technology | | |
| FY 2023 Plans: Congressional Interest Item funding provided for APNT Technology | | |
| Congressional Add: Program Increase - Advanced Materials for Resilient Sensors | 5.000 | - |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for Advanced Materials for Resilient Sensors | | |
| Congressional Add: Program Increase - Tactical Geospatial Information Capabilities | 5.000 | - |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for Tactical Geospatial Information Capabilities | | |
| Congressional Add: Program Increase - Alternative Navigation for GPS-Denied Landing Environments | 4.500 | 4.500 |

UNCLASSIFIED

| | | |
|--|---|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) BP4 / ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA) |

| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2022 | FY 2023 |
|--|----------------|----------------|
| FY 2022 Accomplishments: Congressional Interest Item funding provided for Alternative Navigation for GPS-Denied Landing Environments | | |
| FY 2023 Plans: Congressional Interest Item funding provided for Alternative Navigation for GPS-Denied Landing Environments | | |
| Congressional Add: Edge-High Performance Computing for Multi-Domain Operations | 5.000 | - |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for Edge-High Performance Computing for Multi-Domain Operations | | |
| Congressional Add: HALITE | 7.000 | - |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for HALITE | | |
| Congressional Add: Program Increase - Next Generation Command Posts | 10.000 | 7.000 |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for Next Generation Command Posts | | |
| FY 2023 Plans: Congressional Interest Item funding provided for Next Generation Command Posts | | |
| Congressional Add: Receiver-Sensor Technology for Tactical Networks | 15.000 | - |
| FY 2022 Accomplishments: Congressional Interest Item funding provided for Receiver-Sensor Technology for Tactical Networks | | |
| Congressional Add: Program Increase - ADVANCE MATERIALS FOR COMMAND POST OF THE FUTURE | - | 1.500 |
| FY 2023 Plans: Congressional Interest Item funding provided for ADVANCE MATERIALS FOR COMMAND POST OF THE FUTURE | | |
| Congressional Add: Program Increase - ADVANCED PRECISION, NAVIGATION AND TIMING FOR LANDING ENVIRONMENTS | - | 2.500 |
| FY 2023 Plans: Congressional Interest Item funding provided for ADVANCED PRECISION, NAVIGATION AND TIMING FOR LANDING ENVIRONMENTS | | |
| Congressional Add: Program Increase - HUMAN GEOGRAPHY REPOSITORY FOR COMMERCIAL CIVIL AFFAIRS | - | 5.000 |
| FY 2023 Plans: Congressional Interest Item funding provided for HUMAN GEOGRAPHY REPOSITORY FOR COMMERCIAL CIVIL AFFAIRS | | |
| Congressional Add: Program Increase - MULTI-PLATFORM RECEIVER-SENSOR TECHNOLOGY | - | 20.000 |

UNCLASSIFIED

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

| | | |
|--|--|--|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) BP4 / <i>ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)</i> |
|--|--|--|

| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2022 | FY 2023 |
|---|----------------|----------------|
| <i>FY 2023 Plans:</i> Congressional Interest Item funding provided for MULTI-PLATFORM RECEIVER-SENSOR TECHNOLOGY | | |
| <i>Congressional Add:</i> Program Increase - SMALL SATELLITE HIGH ALTITUDE LAUNCH, INTEGRATION, TEST, AND EVALUATION | - | 7.000 |
| <i>FY 2023 Plans:</i> Congressional Interest Item funding provided for SMALL SATELLITE HIGH ALTITUDE LAUNCH, INTEGRATION, TEST, AND EVALUATION | | |
| Congressional Adds Subtotals | 55.500 | 52.500 |

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

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

| | | |
|--|---|--|
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) CF9 / Automated IPB Adv Tech |
|--|---|--|

| 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 |
|-----------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| CF9: Automated IPB Adv Tech | - | 0.953 | - | - | - | - | - | - | - | - | 0.000 | 0.953 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project will mature and demonstrate advanced algorithms for multi-domain visualization of explicit and implicit relationships between the populace and the theater environment. Capabilities resulting from this effort will directly and substantially support Army and Joint Global Integration Planning requirements, provide a globally accessible web based digital intelligence preparation of the battlefield (IPB) platform supporting collaborative product development, and help facilitate a shared understanding of the operational environment. Automated IPB provides an integrated Intelligence Community planning data platform for Joint Global Integration Planning requirements.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|---------|---------|---------|
| Title: Automated IPB Demonstrations | 0.953 | - | - |
| Description: This effort develops and demonstrates a collaborative, adaptive planning capability that allows planners to employ resources leveraging geospatial, terrain, environmental effects, and authoritative data from distributed information databases in order to collaborate in the development and assessment of courses of action, visualize potential outcomes, make decisions and develop and disseminate plans and orders. | | | |
| Accomplishments/Planned Programs Subtotals | 0.953 | - | - |

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

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) C17 / Mobile & Survivable Command Post (MASCP) Adv Tech | | | |
| 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 |
| C17: Mobile & Survivable Command Post (MASCP) Adv Tech | - | 7.524 | 13.119 | 18.691 | - | 18.691 | 16.424 | 19.857 | 19.871 | 20.087 | 0.000 | 115.573 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

The Project matures and demonstrates technologies to support scalable, survivable, mobile Command Posts (CP). Technologies addressed will use the Brigade CP as a baseline while providing the opportunity for solutions to scale up or down to Army tactical echelons. Research in this Project includes integrating anti-jam (AJ) and low probability of intercept (LPI)/low probability of detection (LPD) communications focused on enabling the CP to disperse, form & reform, and employ technologies for signal remoting; optimizing power generation and storage for distributed CP operations; reducing computing infrastructure footprint, size, weight, and power (SWAP), manpower, and complexity; maturing technologies to reduce CP emissions and have situational awareness of those signatures to improve CP node employment; maturing electro-magnetic spectrum (EMS) emulation technologies to improve survivability options; and optimizing emerging electronic-textiles and composite materials for CP structures.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project C13 (Mobile and Survivable Command Post (MASCP) Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: CP Modularity and Dispersion Advanced Technology | 3.350 | 2.331 | 9.741 |
| Description: Increases the ability for Commanders to move and disperse the CP through improved intra-CP communications, modular CP hardware to include distributed power systems, and network solutions leveraging open systems architectures to support information flow in distributed, intermittent, and latent (DIL) environments. This effort will eliminate centralized points of failure and critical nodes that constrain CP mobility and survivability. Areas of technology development include be distributed tactical cloud architecture, mesh network security architecture, high performance computing, integrated power, and distributed collaborative technologies. | | | |
| FY 2023 Plans: | | | |

UNCLASSIFIED

| | | | | |
|--|---|---|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) C17 / Mobile & Survivable Command Post (MASCP) Adv Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| <p>Begin demonstrations of a wireless antenna remoting capability and Command Post specific communications systems that are effective with Dispersed Command Post configurations; demonstrate initial capabilities for dispersed collaboration; mature the vehicle mounted power systems using open standard interfaces to accurately measure and respond to changing power demands of dispersed command post operations.</p> <p>FY 2024 Plans: Will continue demonstration of wireless antenna remoting capability, specifically for Internet Protocol (IP) and legacy radio systems; optimize modulation and de-modulation performance of antenna remoting for both legacy and IP systems; mature and demonstrate advanced directional communications transport for congested and contested environments, improving anti-jam and low probability of detection of the dispersed command post; improve performance of dispersed collaboration for multi-node command post operations; improve the performance of vehicle mounted power systems and control mechanisms to provide efficient electrical power for dispersed command post operations; exploit Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Electronic Warfare (EW) Open Suite of Standards (CMOSS) capable systems for compatibility and to reduce size, weight, and power.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects increase in scope of wireless antenna remoting capabilities to include both IP and non-IP legacy systems.</p> | | | | |
| <p>Title: Signature Management and Reduction Advanced Technology</p> <p>Description: Provides advanced technologies to reduce and manage electromagnetic spectrum signatures of CP platforms and command post components.</p> <p>FY 2023 Plans: Demonstrate initial proof-of-concept hardware and software to provide real time situational awareness of Command Post radio frequency emissions; demonstrate solutions to decrease CP signature in ultraviolet, visible, thermal, infrared, radar, and radio frequency spectra.</p> <p>FY 2024 Plans: Will improve real-time spectrum situation awareness of radio frequency emissions at each command post node; optimize coordination of collected spectrum emissions from each command post node during dispersed operations to validate spectrum operating picture; improve software application performance across multiple command post nodes providing situational awareness of CP emission status.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement:</p> | | 0.392 | 6.693 | 5.068 |

UNCLASSIFIED

| | | | | |
|---|---|---|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) C17 / Mobile & Survivable Command Post (MASCP) Adv Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| Funding decrease reflects decreased scope for the development of CP centric sensors | | | | |
| Title: Advanced Technology Supporting Camouflage, Concealment, and Deception | | 3.782 | 3.789 | 3.882 |
| Description: This effort demonstrates innovative camouflage, concealment and deception technologies, for expeditionary assets (i.e. mission command platforms, battle management centers and supporting equipment), in order to defeat advanced and emerging adversary Intelligence, Surveillance and Reconnaissance (ISR) threats, and to reduce the probability of detection in multi-domain operations. Matures physics-based models for material and system performance that support probability of detection metrics in the multi-domain operational environment. | | | | |
| FY 2023 Plans: Validate and verify ability to address signature management performance in a relevant environment; demonstrate deployable command post solutions on targeted mobile platforms; perform analysis of sensor demonstration data to inform command post situational awareness; demonstrate increased survivability for multi-domain operations. | | | | |
| FY 2024 Plans: Will demonstrate large format advanced camouflage solutions to include material and deployment solutions to conceal high value assets from detection against peer threats and a LiDAR detection capability; validate and verify ability to address signature management performance in a relevant environment. | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle of this effort. | | | | |
| Title: SBIR/STTR Transfer | | - | 0.306 | - |
| Description: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638 | | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638 | | | | |
| Accomplishments/Planned Programs Subtotals | | 7.524 | 13.119 | 18.691 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |

UNCLASSIFIED

| | | |
|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) C17 / <i>Mobile & Survivable Command Post (MASCP) Adv Tech</i> |

D. Acquisition Strategy
N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) CJ8 / Assured PNT Communications Advanced Tech | | | |
| 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 |
| CJ8: Assured PNT Communications Advanced Tech | - | 16.036 | 11.128 | 11.783 | - | 11.783 | 13.411 | 14.052 | 14.141 | 14.296 | 0.000 | 94.847 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

This Project will provide prototyping, development, and experimentation of High Altitude (HA) sensors and Tactical Space Layer (TSL) sensors (electro-optical, synthetic aperture radar (SAR), and radio frequency) which are designed to provide wide-area, responsive deep area sensing required for beyond line of sight (BLOS) targeting and force maneuver, significantly reducing Sensor to Shooter (S2S) timelines. This Project matures, demonstrates, and integrates lightweight materials, hardware components with reduced power consumption, and advanced data collection, processing, and dissemination capabilities. This Project also improves algorithms that process space and near space sensor data in real and near real time for integration into battlefield operating systems. The payoff of this work will be demonstrated advanced technologies for Alternative Navigation assistance and more secure, rapid communications along with deep target sensing for deep strike lethality. Demonstrated work will be ready for transition to advanced prototypes.

Work in this project complements Program Element (PE) 0602146A (Network C3I Technology) / Projects CK1 (Assured PNT Enabling Technologies) and Project CG3 (Assured PNT Communications Applied Research).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Space and Missile Defense Command.

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

| | FY 2022 | FY 2023 | FY 2024 |
|---|----------------|----------------|----------------|
| Title: Assured Positioning Navigation and Timing (APNT) Communications Advanced Technology | 16.036 | 10.933 | 11.783 |
| Description: This effort matures and demonstrates technologies required for smaller, more responsive and direct access to space and HA deep-sensing sensors and tactical communication capabilities for soldiers at the tactical edge. Research will augment, improve, exploit, and optimize existing commercial and Department of Defense (DoD) technologies and networks. | | | |
| This effort will validate software, hardware, and algorithms used to enable Space-Based and HA platform based capabilities in support of the Army's Modernization Priorities. This effort will exploit commercial advances and opportunities in integrating Space/HA sensors or Deep Sensing capabilities and payload management toward future Army concepts. Develop/demonstrate critical technical elements for a LEO-based global high-speed network backbone enabling highly networked, resilient, and persistent DoD payloads to provide over the horizon sensing, signals, and communication, with continuous surveillance of ground, surface, and air domains. | | | |

UNCLASSIFIED

| | | | | |
|---|---|--|----------------|----------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) CJ8 / Assured PNT Communications Advanced Tech | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2022 | FY 2023 | FY 2024 |
| <p>FY 2023 Plans: Will develop and demonstrate small satellite capabilities, which include classified payloads, to provide APNT services to the tactical ground component Warfighters; exploit a constellation of space-based sensors that provide Tactical ISR (Intelligence, Surveillance, and Reconnaissance) and Situational Awareness (SA) to the ground force commander to support MDO; develop and demonstrate optical communications using classical and Quantum Entanglement (QE) technologies; develop and demonstrate QE including site-to-site communications from a small satellite in Space, High Altitude platform, or ground based/launched platform; and mature the QE technology and demonstrate optical and quantum signals passed between small spacecraft, HA platforms, Space (or HA), and/or ground launched assets. Will complete assembly, integration, testing, and conduct a QE technology demonstration event tied to Army warfighter communications requirements. Will begin design and development of including long lead component orders of classified capabilities and high altitude platforms and associated payloads to support tactical ground component Warfighters with advanced APNT capabilities.</p> <p>FY 2024 Plans: Will develop High Altitude (HA) data communications payload with ability to communicate with Proliferated Low Earth Orbit (P-LEO) satellite constellation. Will continue toward demonstration of classified capability with preparation for military utility assessment. For Alternate Navigation capability development, will delivery payload and integrate with satellite bus.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle of this effort.</p> | | | | |
| <p>Title: SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC 638.</p> <p>FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638.</p> | | - | 0.195 | - |
| Accomplishments/Planned Programs Subtotals | | 16.036 | 11.128 | 11.783 |
| C. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |

UNCLASSIFIED

| | | |
|--|--|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / <i>Network C3I Advanced Technology</i> | Project (Number/Name) CJ8 / <i>Assured PNT Communications Advanced Tech</i> |

D. Acquisition Strategy
N/A

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | | | | | | | | | Date: March 2023 | | |
| Appropriation/Budget Activity 2040 / 3 | | | | | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | | | | Project (Number/Name) DB6 / Pathfinder 3D Advanced Technology | | | |
| 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 |
| DB6: Pathfinder 3D Advanced Technology | - | - | - | 1.045 | - | 1.045 | 1.986 | 1.988 | 3.141 | 3.276 | 0.000 | 11.436 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

Pathfinder 3D Advanced Technology is a new start within the Network C3I Advanced Technology program in FY 2024.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a geospatial rapid position and navigation solution in Global Positioning System (GPS) degraded and denied environments. Research focuses on using onboard sensors and high-resolution digital terrain geospatial alternative solution based upon Visual Three-Dimensional (3-D) Terrain Referencing and Navigation (VTRAN). This Project will result in the linkage of air and ground assets integrating sensory and (One World Terrain and Reference) geospatial data within the modular GPS Independent Sensors architecture. This Project provides critical alternatives to maneuver forces for position and navigation in a multi-domain operational environment.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project CV4 (Pathfinder 3d Applied Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

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

| | FY 2022 | FY 2023 | FY 2024 |
|--|----------------|----------------|----------------|
| Title: PATHFINDER 3D Demonstration | - | - | 1.045 |
| Description: This effort will demonstrate and integrate novel Visual Terrain Reference & Navigation (VTRAN) algorithms, onboard sensors, and 3-Dimensional digital terrain to derive position and orientation estimates and apply those to modular Position Navigation and Timing (PNT) integrators. | | | |
| FY 2024 Plans: Will demonstrate local routing capabilities, sensors and a basic inertial accuracy for Visual Terrain Reference and Navigation (VTRAN) to test integrated foundation geospatial data including One World Terrain and analogs, sensory sources (from both air and ground) to derive state estimation for a robotic semi-autonomous system. | | | |
| FY 2023 to FY 2024 Increase/Decrease Statement: | | | |

UNCLASSIFIED

| | | |
|--|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2024 Army | | Date: March 2023 |
| Appropriation/Budget Activity 2040 / 3 | R-1 Program Element (Number/Name) PE 0603463A / Network C3I Advanced Technology | Project (Number/Name) DB6 / Pathfinder 3D Advanced Technology |

| | | | |
|---|----------------|----------------|----------------|
| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2022 | FY 2023 | FY 2024 |
| This is a New Start in FY 2024 | | | |
| Accomplishments/Planned Programs Subtotals | - | - | 1.045 |

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

N/A

Remarks

D. Acquisition Strategy

N/A