| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Defense Threat Reduction Agency | Date: March 2024 |
|---|---|
| **Appropriation/Budget Activity**<br>0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support* | **R-1 Program Element (Number/Name)**<br>PE 0605502BR / *SMALL BUSINESS INNOVATION RESEARCH* |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 126.607 | 16.591 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| RA: *Information Sciences and Applications* | 126.607 | 16.591 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

**Note**

Funding for the SBIR Program is consolidated in this program element during the year of execution.

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

The Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs provide the means for stimulating technological innovation in the private sector, strengthens the role of small business in meeting the Department of Defense (DoD) research and development needs; fosters and encourages participation of minority and disadvantaged businesses in technological innovation; and increases the commercial application of the DoD supported research and development results. These efforts are responsive to Public Law 106-554 and the SBIR and STTR Extension Act of 2022 (Public Law 117-183).

| B. Program Change Summary ($ in Millions) | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 16.591 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | 16.591 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | 16.591 | - | | | |

**Change Summary Explanation**

Funding for the SBIR program is consolidated in this program element during the year of execution.

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency | | | Date: March 2024 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 6 | R-1 Program Element (Number/Name)<br>PE 0605502BR / *SMALL BUSINESS INNOVATION RESEARCH* | Project (Number/Name)<br>RA / *Information Sciences and Applications* | |

| COST ($ in Millions) | Prior Years | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RA: *Information Sciences and Applications* | 126.607 | 16.591 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding for the SBIR Program is consolidated in this program element during the year of execution. Funding is not allocated until the year-of-execution. Program Element 0605502BR “Small Business Innovation Research (SBIR)” is used to report year-end execution. FY 2024 and FY 2025 Plans are provided based on estimated SBIR/STTR funding levels to be determined in accordance with the law and relative to final Agency RDT&E portfolio appropriations.

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

The Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs provide the means for stimulating technological innovation in the private sector, strengthens the role of small business in meeting the Department of Defense (DoD) research and development needs; fosters and encourages participation of minority and disadvantaged businesses in technological innovation; and increases the commercial application of the DoD supported research and development results. These efforts are responsive to Public Law 106-554 and the SBIR and STTR Extension Act of 2022 (Public Law 117-183).

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** RA: Information Sciences and Applications | 16.591 | 0.000 | 0.000 |
| ***Description:*** This project provides the means for stimulating technological innovation in the private sector; strengthens the role of small business in meeting the DoD research and development needs; fosters and encourages participation of minority and disadvantaged businesses in technological innovation; and increases the commercial application of the DoD supported research and development results.These efforts are responsive to Public Law 106-554.<br><br>***FY 2024 Plans:***<br>Counter Weapons of Mass Destruction (CWMD) ($17.380M).<br><br>- The radiation dose advisor project will develop a simple electronic application that is able to run on a handheld electronic device in conjunction take real time radiation sensor data (to include the dose rate and accumulated dose), any optional user input such as any dose restrictions for the responders, and then rapidly run calculations to compare against a set of safety guidelines to then display a recommended stay time limits in the area and display any applicable health warnings based on the dose accumulated.<br>- A pedigree reconstruction for identifying terrorist networks project will be developed a new software platform for pedigree reconstruction that can use DNA profiles from challenging forensic samples to establish familial relationships between individuals and within groups of interest. This included a graphical user interface to provide statistically relevant interpretation of results. This would allow agencies such as intelligence, law enforcement and defense to generate connections among individuals from DNA. | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605502BR / *SMALL BUSINESS INNOVATION RESEARCH* | **Project (Number/Name)**<br>RA / *Information Sciences and Applications* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| - The project to develop use of diagnostics of transient electric fields will advance the state of the art of using transient electric field measurements as a test diagnostics tool, specifically for conventional explosive tests. This includes developing a better understanding of the generation of electric and electromagnetic phenomena from high explosive tests. This also includes determining what the measured signal content represents and the best method to conduct these measurements.<br>- The Nuclear Scintillation Mitigation by Matched Channel Filtering project will develop a new method to mitigate digital communications message errors resulting from communication over nuclear-disturbed RF propagation channels. Such errors can occur on SATCOM links which must pass through magneto-ionic media generated by nuclear weapons detonation in the high atmosphere. This new method defines a “Matched Channel Filter” (MCF)—matched to the then current scintillated communication channel filter function which offers mitigation of communication message errors.<br>- The Radiation-Resistant and Temperature-Insensitive Solid State Photomultipliers project will develop silicon-based photomultipliers that are radiation resistant and insensitive to variations in environmental temperature, suitable to be used in equipment for warfighting missions under nuclear battlefield environments. The new Silicon-based Photomultiplier (SiPM) provides orders of magnitude higher radiation tolerance for both below and above the breakdown voltage over the commercial state-of-the-art SiPMs. The new SiPM demonstrates orders of magnitude reduction in gain sensitivity to the environmental temperature and allows gamma-ray isotope identification without external temperature compensation.<br>- Field Detection of Trace Elements and Chemicals project will develop a capability to collect and provide immediate analysis of trace radiological/nuclear samples of concern in field environments. The developed prototype device will demonstrate reliable gamma-ray (and/or neutron) detection and identification under both low dose rate and fallout conditions. Selected scintillation materials will be optimized for detector use. The detectors will demonstrate improved radioisotope identification capabilities. | | | |
| ***FY 2025 Plans:***<br>FY 2025 Program plans may include the following Counter Weapons of Mass Destruction (CWMD) projects ($16.511M).<br><br>- The radiation-resistant and temperature-insensitive solid-state photomultipliers for radiation project will improve or develop silicon photomultipliers (SiPM) for characterizing radiation that are radiation resistant and insensitive to variations in environmental temperature, suitable to be used in equipment for warfighting missions under nuclear battlefield environments. Another objective to achieve gamma-ray isotope identification without external temperature compensation.<br>- The framework for application lifecycle management and continuous integration for pre-exascale high performance computing architectures is to develop a secure Application Lifecycle Management (ALM) and Continuous Integration / Continuous Delivery (CI/CD) framework for legacy computer codes. This capability would integrate existing tools. Once built and tested, the application code will be deployed on multiple physical systems, and eventually in a “cloud”.<br>- An algorithm that can locally link radiation detectors (of different resolutions) to enhance identification/ localization capability is being developed for network hosted algorithms to link multiple and varied battlefield nuclear and radiation detectors to enable the fusing and processing of raw detector outputs into usable information. | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605502BR / *SMALL BUSINESS INNOVATION RESEARCH* | **Project (Number/Name)**<br>RA / *Information Sciences and Applications* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| - An augmented reality and virtual reality evaluation tool is being developed that allows operators to simulate a walk through challenging life-like nuclear response scenarios (includes anomalies like shadowing, spotlighting, and attenuation effects) with radiation detectors.<br>- A cyclone particulate/aerosol concentrator for radionuclides nuclear weapons test detection and monitoring systems effort adapts single-stage or multi-stage cyclone concentrator(s) used in industrial dust collection and household vacuum cleaning applications to concentrate radioactive particulates for further collection and analysis.<br>- Investigate and develop fast scintillation materials that can be operated under nuclear battlefields for nuclear search, identification, and dose rate estimation. The new scintillators must have ultra-fast decay time, with very limited to no slower decay components, good luminosity, and capable of radioisotope identification. The effort will include development of a cost model and commercial production path.<br>- Develop a capability for field detection of trace elements and chemicals that will collect and provide immediate presumptive analysis of radiological/nuclear samples of concern in field environments.<br>- Develop a method to produce Synthetic Aperture Radar (SAR) data for augmentation into Artificial Intelligence (AI) Automatic Target Recognition (ATR) algorithms and assess improvement compared to current methods. Leverage existing radiative transfer models (RTMs) within the research community to create phased history as well as radar images from which specific features can be exploited for use in current ATR algorithms. Explore the use of state-of-the-art AI methods such as the Generative Adversarial Network (GAN) in producing realizable synthetic SAR data in conjunction with RTM results to further improve ATR training.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>N/A | | | |
| **Accomplishments/Planned Programs Subtotals** | 16.591 | 0.000 | 0.000 |

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

| Line Item | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • BA2/24/0602718BR: *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH* | 29.047 | 37.218 | 21.986 | - | 21.986 | 22.538 | 26.949 | 23.627 | 24.113 | Continuing | Continuing |
| • BA3/35/0603160BR: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT* | 70.234 | 86.415 | 82.711 | - | 82.711 | 76.041 | 76.146 | 86.289 | 88.165 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency | | Date: March 2024 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605502BR / *SMALL BUSINESS INNOVATION RESEARCH* | **Project (Number/Name)**<br>RA / *Information Sciences and Applications* |

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

| Line Item | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • BA4/107/0604551BR: *ATAPULT INFORMATI ON SYSTEM* | 6.953 | 8.328 | 7.475 | - | 7.475 | 7.625 | 7.777 | 7.933 | 8.100 | Continuing | Continuing |

**Remarks**

N/A

**D. Acquisition Strategy**

N/A