Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Office of the Secretary Of Defense	Date: March 2023
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*

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	127.390	93.463	-	-	-	-	-	0.000	-	-	-	-
720: *Quick Reaction Special Projects (QRSP)*	40.432	47.470	-	-	-	-	-	-	-	-	-	-
721: *Emerging Capabilities Tech Dev (ECTD)*	86.958	45.993	-	-	-	-	-	-	-	-	-	-

Note

New Start (Y/N): N

In FY 2023, all funding and project investment areas in the Defense Modernization and Prototyping (DM&P) Program Element (PE) transitioned to PE 0603838D8Z Defense Innovation Acceleration (DIA).

A. Mission Description and Budget Item Justification

The Defense Modernization and Prototyping (DM&P) Program Element (PE) is an innovation accelerator that rapidly identifies, prototypes, and transitions solutions that help fill capability gaps in priority technology areas and maintain our Nation's technological superiority and military advantage. DM&P identifies innovative solutions that fall into the seams, gaps, and fissures of Service development programs and aligns with the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) critical technology areas and strategic priorities. Through targeted prototyping, DM&P rapidly matures and transitions capabilities that fill gaps within Joint Warfighting Concepts, increase interoperability between Service programs, and inform multi-Service joint experimentation and demonstration efforts such as the Rapid Defense Experimentation Reserve (RDER), Project Convergence, and Warfighting Lab Incentive Fund (WLIF). DM&P achieves this through a tailored execution model that:

- Encourages innovation from small businesses and non-traditional performers by addressing DoD "pain points";
- Identifies and funds prototyping efforts within the year of execution to accelerate the rate of innovation and address emerging opportunities and threats;
- Leverages Services, defense agency, and industry investments through partnerships that share risk and increase alignment with OUSD priorities;
- Incorporates transition sponsor participation during project development, prototyping, and evaluation;
- Is informed by Department-level strategies and priorities, including the National Defense Strategy, OUSD(R&E) critical technology areas, and the Combatant Commands' (CCMD) Integrated Priority Lists (IPLs);
- Coordinates with other defense innovation partners, including Service Labs, Federally Funded Research and Development Centers/University Affiliated Research Centers, academia, and the private sector; thereby increasing impact and reducing duplication; and
- Maximizes value by balancing innovation with operational requirements, achieving an average transition rate of approximately 80 percent to Programs of Record or Service and defense agency partners.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Office of the Secretary Of Defense	Date: March 2023
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*

DM&P includes two project codes that fund innovative and emerging technologies to mature and transition solutions that close key capability gaps in OUSD(R&E) priority areas. Quick Reaction Special Projects (QRSP) focuses on innovation discovery with a strong emphasis on small businesses and non-traditional partners. Emerging Capabilities Technology Development (ECTD) focuses on maturing innovative capabilities into integrated solutions that address emerging gaps. Activities within these projects include early exploration of potentially game-changing technologies and concepts, harnessing small and non-traditional business innovation to address Department of Defense (DoD) leap-ahead technology challenges, and mission-focused capability development of advanced systems to address DoD modernization needs. DM&P emphasizes fully transitioning these innovations and emerging technologies as enduring capabilities to the Services, CCMDs, and other end users.

With funds available throughout the year of execution, DM&P enables the OUSD(R&E) to identify, accelerate, and rapidly transition innovation from small businesses and non-traditional performers that otherwise would not be realized through traditional research and development pathways. Accordingly, DM&P programs can be responsive and flexible to the DoD and Warfighter needs, supporting rapid prototyping to meet immediate capability needs or game-changing technologies that maintain technological superiority. This execution model causes the DM&P PE to lag traditional RDT&E PE obligation and execution benchmarks; however, since inception, both the QRSP and ECTD programs have achieved an unbroken 100 percent obligation rate.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	96.579	141.561	140.554	-	140.554
Current President's Budget	93.463	0.000	0.000	-	0.000
Total Adjustments	-3.116	-141.561	-140.554	-	-140.554
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-141.561			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.101	-			
• Program Adjustments	-0.015	-	-	-	-
• DIA Re-alignment to 0603838D8Z	-	-	-140.554	-	-140.554

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 721: *Emerging Capabilities Tech Dev (ECTD)*		
Congressional Add: *Open Source Supply Chain Analytics Resource (OSSCAR)*	3.000	-
Congressional Add: *Hypersonic Modeling and Simulation Center of Excellence*	4.600	-
Congressional Add: *Ship–Based Multi–Sensor Prototype Development and Demonstration*	8.000	-
Congressional Add Subtotals for Project: 721	15.600	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Office of the Secretary Of Defense	Date: March 2023
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603338D8Z *I Defense Modernization and Prototyping*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Congressional Add Totals for all Projects	15.600	-

Change Summary Explanation

FY 2023 and out-year funding in the Defense Modernization and Prototyping (DM&P) Program Element (PE) transitioned to PE 0603838D8Z Defense Innovation Acceleration (DIA).

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense											Date: March 2023	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603338D8Z / *Defense Modernization and Prototyping*				Project (Number/Name) 720 / *Quick Reaction Special Projects (QRSP)*			
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**
720: *Quick Reaction Special Projects (QRSP)*	40.432	47.470	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2023, all resources in this project were transferred to the Defense Innovation Acceleration Program Element (0603838D8Z).

A. Mission Description and Budget Item Justification

Quick Reaction Special Projects (QRSP) funds the development of risk-reducing prototypes to expedite the delivery of effective, affordable, and critically needed technologies. These lower-cost prototypes and QRSP's innovative business processes give OUSD(R&E) the agility to quickly identify new disruptive technologies that have the potential for near-term, game-changing impacts. QRSP also enables the DoD to directly engage with small businesses and non-traditional performers not typically engaged, thus leveraging commercial investment and fostering innovation.

QRSP's focus on innovation discovery leads to smaller efforts supported by joint and interagency partnerships with clearly defined milestones and risk reduction. Prototyping efforts are identified throughout the year leveraging "Innovation Discovery and Demonstration" venues and other engagements with industry, Service Labs, Federally Funded Research and Development Centers (FFRDCs), and other innovation centers. This approach enables QRSP to rapidly mature innovative technologies; quickly identifying technological dead ends, and prioritizing investments that deliver affordable capabilities faster than standard acquisition cycles. Individual projects generally span 12 to 24 months, typically costing less than $1.000 million per phase.

Recent success stories and significant transitions of note include:

- Advanced Security Tag – DUST Identity, a small business, was able to pivot its commercial tagging technology to solve a DoD contested logistics problem after connecting with DoD entities at a DM&P Innovation Outreach event. The two-year prototyping effort developed, tested, and integrated DUST's unique tagging technology into platforms of interest and successfully transitioned to the U.S. Navy.
- ALITEC – Adranos Inc., a small business, upon winning the U.S. Army's inaugural xTechSearch, partnered with QRSP to accelerate development of a novel solid rocket propellant formulation incorporating an aluminum-lithium alloy. The two-year prototyping effort accelerated formulations development, which provides higher performance, and reduced emission of corrosive environmental contaminates compared to traditional solid rocket propellants. The ALITEC propellant successfully transitioned to the U.S. Army.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Low Cost Innovative Projects (Projects less than $1.000 million per phase)	26.720	-	-
Description: Investing in prototypes with the potential to deliver rapid capabilities, QRSP identifies, matures, and transitions innovative technologies. In FY 2022, QRSP selected, executed, and transitioned multiple low-cost projects, including:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
• Endless Diver: This project developed enhanced capabilities for Unmanned Undersea Vessels (UUVs). The prototype transitioned to U.S. Special Operations Command (USSOCOM). • Mulligan: This effort developed and tested a low probability of detection radio frequency communication system. The prototype transitioned to USSOCOM for testing and validation. • Hefted Blade: This microelectronics effort developed a prototype antenna system. The prototype system completed testing and demonstration before transitioning to DoD partners. • Perched Mantlet: This effort developed an unattended ground sensor prototype to detect low and medium altitude threats. Additional details are classified. In FY 2023, development of the prototype capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to DoD partners. • Single Tag: This project created a software prototype that leveraged artificial intelligence (AI) to drastically reduce analyst time required to label data and identify anomalies over hundreds or thousands of images at once. The software transitioned to the intelligence community. • Advanced Security Tag: This project developed a novel capability to mark, scan, and catalog military components used to track and control inventories while eliminating or mitigating the risks associated with parts tracking, quality control, and security management within maintenance and operational chains. This project transitioned to the U.S. Navy. • Automated Network Inference and Fusion: The tool enabled more robust effects-based analysis and course of action development for selected networks and nodes that allow its customers to carry out national security and military strategies. In FY 2023, development of the software toolset transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to the U.S. Air Force. • Identity Warrior: This project leveraged advances in optics, cloud computing, and artificial intelligence/machine learning (AI/ML) to passively capture and analyze human signatures at a distance and screen individuals against known adversaries in real-time on existing Android computing platforms located throughout the Joint Force. In FY 2023, development of the prototype capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to the U.S. Army. • Automated Threat Identification and Classification Module: This project leveraged advances in AI, advanced analytics, and deep learning to automate the analysis of large, diverse data sets from disparate sources to quickly prioritize identified threat information and deliver actionable information across Joint All Domain Operations. This project transitioned to the U.S. Army. • Undersea and Surface Obstacle Avoidance System: This project leveraged an existing autonomous underwater and surface vehicle technology to research, test, develop, and evaluate a revolutionary integrated dual-modality undersea and surface obstacle avoidance system. This system transitioned to the U.S. Navy. • Interpretable Machine Learning: This project developed interpretability algorithms that “bolt on” to existing neural networks and provide explanations of a network’s prediction. These explanations confirm that the network uses reasonable and robust features, building trust in the neural network and mitigating fragility. The algorithms transitioned to the U.S. Navy.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
• Expeditionary Water Obstacle Crossing: This project designed, built, tested, and demonstrated a waterborne logistics platform prototype capable of transporting materials from ship to shore and in open ocean conditions. The ease of manufacture, low observability, ruggedness, and low cost of the platform provided an innovative logistics solution to enable expeditionary advanced basing operations. A full-scale prototype and accompanying autonomy software transitioned to the U.S. Marine Corps (USMC) Systems Command. • Weapon System Virtual Reality: This project developed a human-machine interface to enhance student training and provide critical feedback to instructors. The project transitioned to the U.S. Air Force for joint and international training of MQ-9, F-16, and F-35 aircrew. • AGES: This project developed and demonstrated a battery storage and tactical generator microgrid capability that meets critical operational requirements in extreme cold weather environments; emphasizing scalable, flexible, and high-power quality for continuous and high energy demands. In FY 2023, development of the prototype transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development and evaluation with final transition to the Joint Services. • ISAAC: This project leveraged small business innovators in the artificial AI/ML space to further develop non-traditional intelligence, surveillance, and reconnaissance (ISR) collection and better understand Diplomatic, Informational, Military, Economic, Financial, Intelligence, and Law Enforcement (DIMEFIL) actions. In FY 2023, development of the prototype capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to multiple Combatant Commands. • Non-Traditional Sensors: This project integrated and demonstrated a novel method of sensor cueing using a payload as a non-traditional sensor. Reports from this weapon system were used to cue various national and theater-level ISR capabilities. The ground components developed by this project transitioned to a DoD partner. • USSOCOM Ignite: This annual program is a low-cost innovation accelerator that combines the ingenuity and out-of-the-box thinking of military students with real-world military problems curated by USSOCOM. Students from multiple universities worked together to develop prototype solutions to relevant challenges like drone autonomy, sensor and data fusion, and casualty care at the tactical edge. In FY 2023, development of prototypes transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition into operational capabilities. • JUNU: This project developed and demonstrated an innovative electronic-warfare capability extensible to existing ground and air platforms to address modern challenges. In FY 2023, development of the capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to the U.S. Army and U.S. Air Force. • Dark Skies: This is a classified program. Additional information is available upon request. In FY 2023, development of the prototype capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development. • Project 2106: This is a classified program. Additional information is available upon request. • DRAGON: This project delivered a cost-effective solution for incoming threat detection by incorporating advancements across multiple technology focus areas including improved sensors, machine learning, and edge processing. In FY 2023, development			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
of the technology transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development and evaluation with final transition to U.S. Navy. • Aircrew Alert: This project developed the first wearable personal communicator for aircrew alerting. This capability enables a new set of communication services built to address the challenges of ensuring resilient communications in all environments. This capability transitioned to the U.S. Air Force and is expected to have a variety of applications across the DoD. • Golden Apple: This spiral development effort leveraged the success of a previous Capability Prototypes project to ensure ISR sensors continue to perform threat detection and tracking in future scenarios. Additional details of this program are classified. Golden Apple transitioned to the U.S. Navy. • AJME: This project designed and developed a prototype software that automates the exchange of specific messages across joint systems, improving the clarity and speed of communications necessary for coordinated fires support. In FY 2023, development of the technology transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to the U.S. Air Force. • SDT: This is a classified program. Additional information is available upon request. In FY 2023, development of the prototype capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development. • Future Technology Threat Understanding: This project established a metric-based analysis methodology and rapid prototyping approach developed to scope, prioritize, and empirically evaluate how the confluence of a wide range of advancing technologies may lead to future threats. In FY 2023, development of the threat prototype transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to USSOCOM. • SQUAAD: This project developed a measurement system to determine the ground strength of a geographical area. This system will allow deployed forces to characterize the state of the ground accurately and rapidly. The SQUAAD capability transitioned to the U.S. Air Force. • High-Performance Micropropulsion System for Picosatellites: This project developed a cost-effective, high-thrust propulsion system. The system was incorporated into a flight unit for an on-orbit demonstration as part of the transition to an interagency partner. • PhASP: This project demonstrated and delivered a novel laser protection capability for sensors. The capability transitioned to the U.S. Navy for testing and integration. • Project 6312: This is a classified program. Additional information is available upon request. • 3D Printed Radiation Shielding of Electronic Components: This project investigated and developed a novel approach to mitigate radiation damage in extreme environments to microelectronic systems using unique additive manufacturing techniques. In FY 2023, development of the prototype capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to DoD and interagency partners. • Activated Aluminum Fuel for Dismounted Troops: This project developed a novel energy solution that is safer and more cost-effective than existing alternatives while remaining compatible with existing fuel cells. The capability transitioned to the USMC for testing and integration.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
• DLOFTS: This project delivered an innovative transportable refueling system to transfer fuel to shore-based units rapidly. In FY 2023, development of the capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to the U.S. Navy and U.S. Air Force. • TMS ECU: This project developed a tactical microgrid standard-compliant controller for environmental conditioning units enabling networked capability to optimally operate heating and cooling equipment, reducing power demand and fuel consumption. In FY 2023, development of the capability transitions to Program Element 0603838D8Z Defense Innovation Acceleration for continued development with final transition to the U.S. Army. • JADOTS: This project is developing a new software capability to enable analysis and planning of kinetic and non-kinetic fires for multi-domain effects. Prototype development was initiated in FY 2022. In FY 2023, JADOTS transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development. • El Camino: This project is developing a novel capability to enhance unmanned aerial systems (UAS) navigation in adverse conditions. Prototype development was initiated in FY 2022. Additional details are classified. In FY 2023, El Camino transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development. • Kestrel: This project is developing, testing, and demonstrating several technologies that will improve the Warfighter's ability to execute undersea missions, bringing immediate benefit to the operational force. In FY 2022, the project-initiated design and manufacturing of select components. In FY 2023, Kestrel transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development. • MeTRA: This small business-led effort is developing a model-based systems engineering environment and knowledge management collaboration platform to reduce cyber knowledge gaps and support agile analysis for data-driven security decisions. In FY 2022, MeTRA initiated modeling and process assessments. In FY 2023, MeTRA transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.			
Title: Direct to Retina ***Description:*** This small business-led project developed the first and only augmented reality/virtual reality (AR/VR) eyewear glasses that project images directly onto the retina. This revolutionary technology will replace current mixed reality technology, which requires organic light-emitting diodes (OLED) screens, heavy headgear, and bulky lenses. By projecting the image directly onto the retina, the operator will have an entire 220-degree field of view, infinite depth of view, reduced lag time, and increased battery life. In FY 2022, the project completed design and fabrication of critical elements required to develop the initial prototype. Work continues in FY 2023 using FY 2022 funds to finalize development and demonstrate the prototype before transitioning to a formal Program of Record within the U.S. Air Force.	1.000	-	-
Title: Tactical Agency Capability - Human/Machine Team (TAC-H)	1.050	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: This project is developing human-machine collaborative decision-making tools to provide ground units with faster-than-human responses to threats. As battlefield environments become more complex and lethal, the Joint Force requires capabilities that reduce cognitive burden and accelerate decision-making by leveraging autonomous platforms and human-machine collaborative systems at the tactical edge. TAC-H will develop and demonstrate a real-time decision-making engine fusing disparate data sources and providing the Warfighter with recommended courses of action based on the current operating environment. In FY 2022, the project completed a preliminary design review for software components and conducted initial tests to improve the accuracy and efficiency of the software. In FY 2023, the TAC-H project transitioned to operational units for operational use.			
Title: Next Generation Hypersonic Testing (NiGHT) ***Description:*** This project tested and assessed the utility of a novel technology developed by an innovative start-up company. Details of this technology and its applications are classified. Additional information is available upon request. In FY 2023, NiGHT transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.700	-	-
Title: The Gates ***Description:*** This is a classified program. Additional information is available upon request.	1.500	-	-
Title: Project 3567 ***Description:*** This is a classified program. Additional information is available upon request.	2.000	-	-
Title: Intelligence, Reconnaissance, Surveillance, and Targeting (ISRT) ***Description:*** This project is developing laser target designators (LTD) for integration onto a small form factor gimbal to support ISR and targeting missions. This project will reduce the size, weight, and power (SWaP) of the gimbal, integrate tracking and targeting algorithms, and optimize optical and laser performance. These improvements will enable precision fires while conducting ISR missions with a small unmanned aerial system (UAS). Design of the ISRT prototype initiated in FY 2022. In FY 2023, ISRT transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.000	-	-
Title: EXACT ***Description:*** This project develops a low-SWaP capability to provide accurate, robust, and reliable positioning, navigation, and timing (PNT) information. Additional details are classified. In FY 2023, EXACT transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.000	-	-
Title: Autonomous Low-Profile Vessel (ALPV) Project	1.500	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: This project designs, develops, and tests an autonomous maritime surface logistics platform prototype capable of transporting up to a 10-ton payload across large distances of the ocean with minimal visibility and possibility of detection. The low-profile and low cost of the platform provides an innovative logistics solution to support expeditionary advanced basing operations. Prototype development was initiated in FY 2022. In FY 2023, ALPV transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.			
Title: Autonomous Amphibious Response Vehicle (A2RV) ***Description:*** The A2RV project delivered a novel amphibious robotic system for hazards in littoral waters. Prototype development continues in FY 2023 using FY 2022 funds to finalize development and demonstrate the prototype prior to transitioning to the U.S. Marine Corps Littoral Explosive Ordnance Neutralization (LEON) Program of Record for procurement and field insertion.	1.000	-	-
Title: Big Blue ***Description:*** This is a classified program. Additional information is available upon request. In FY 2023, Big Blue transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.000	-	-
Title: Low-Cost Precision Delivery ***Description:*** This project develops a low-cost precision delivery capability with a modular, multi-purpose payload carrier for a variety of applications. The project-initiated prototype development and completed an initial demonstration in FY 2022. In FY 2023, Low-Cost Precision Delivery transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.000	-	-
Title: Innovation Discovery and Demonstration Venues (IDD) ***Description:*** Agile and flexible experimentation and demonstration venues for innovation discovery enable the DoD to rapidly identify nascent and novel technologies and emerging capabilities, particularly from small businesses and non-traditional performers. IDD supports multi-domain venues and demonstrations that enable system developers to engage directly with Warfighters supporting the rapid discovery and transition of emerging technologies to Services, defense agencies and CCMDs. In FY 2022, 12 demonstration and early experimentation events were conducted featuring over 380 innovative technologies from focus areas including autonomous technologies, virtual reality, machine learning, signature management, and cybersecurity. 137 of the technologies transitioned directly to DoD operational users or were leveraged by formal Programs of Record. The venues also provided over 300 small businesses and non-traditional innovators with Warfighter feedback critical to rapidly mature their technologies into viable prototypes.	5.000	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 720 / *Quick Reaction Special Projects (QRSP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Strategic Multi-Layered Assessment (SMA) Reach Back Cell	2.000	-	-
Description: The SMA Cell supports senior leadership in the CCMDs with actionable assessments of complex operational and technical challenges. SMA efforts leverage multi-agency, multi-disciplinary approaches to answer the Combatant Commanders' key strategic questions not within the DoD's core competency. The assessments help maintain a competitive advantage in an increasingly complex global environment. The Joint Staff Deputy Director established the SMA Cell for Global Operations at the request of the Commander, U.S. Central Command (USCENTCOM). SMA assessments are framed during the year of execution and are in response to specific tasks from senior leadership in the CCMDs. The SMA Cell identifies options across the U.S. Government, academia, and the private sector. SMA efforts are facilitated by the Joint Chiefs of Staff/J-3 Operations and are executed by the OUSD(R&E). The SMA Cell provides USCENTCOM with population-based and regional expertise supporting ongoing operations in the USCENTCOM area of responsibility. In FY 2023, the SMA Reach Back Cell funding is realigned to support the development of prototypes that address the Joint Warfighting Concepts and other DoD priorities.			
Accomplishments/Planned Programs Subtotals	47.470	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Quick Reaction Special Projects (QRSP) will support performance metrics to transition projects to the joint Warfighter and enable DoD modernization capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense			Date: March 2023
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603338D8Z / *Defense Modernization and Prototyping*	Project (Number/Name) 721 / *Emerging Capabilities Tech Dev (ECTD)*	

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
721: *Emerging Capabilities Tech Dev (ECTD)*	86.958	45.993	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2023, all resources in this project were transferred to the Defense Innovation Acceleration Program Element (0603838D8Z).

A. Mission Description and Budget Item Justification

Emerging Capabilities Technology Development (ECTD) funding supports the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) mission to accelerate the development and fielding of overmatch capabilities to the Warfighter by rapidly identifying, maturing, and exploiting emerging technologies. Prototyping activities focus on achieving capabilities that transition to fill challenging gaps in defense capabilities, such as the Joint Warfighting Concept. Project selection is informed by Joint Staff and OUSD(R&E) leadership priorities. ECTD prototype activities enable developers to showcase new and maturing capabilities in realistic environments and against realistic threats with operational user involvement. Efforts are designed to encourage teaming between organizations to generate integrated concepts that result in leap-ahead warfighting capabilities. Executed in close coordination with the Services, Combatant Commands (CCMDs), and the Joint Staff, ECTD activities refine future warfighting concepts, inform Service Program of Record capability requirements, and provide residual joint warfighting capability through leave-behind prototypes. Individual projects generally span two to three years, typically costing less than $15.000 million.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Fully Networked Command, Control, and Communications (FNC3) Universal Command & Control (UC2)	6.305	-	-
Description: The UC2 data-centric, machine-to-machine (M2M) messaging standard provides an efficient, evolvable, and broadly applicable interface that connects any sensor in any domain to any shooter. The FNC3 UC2 project addresses a Secretary of Defense priority for integrated communications and networking. By focusing on a DoD-wide standard for the information layer, the project seeks to enable independent development, separate from the technologies and capabilities within the other FNC3 layers. FNC3 U2 untangles the restrictive dependencies within the command-and-control communications stacks and increases legacy and future weapon systems' flexibility, interoperability, and resiliency. Aligned with the Joint All-Domain Command & Control (JADC2) concept, UC2-conformant weapon systems will enable Warfighters to respond dynamically to unanticipated, asymmetric, and evolving threats. Further, the FNC3 UC2 project will provide Warfighters faster access to new capabilities while simplifying development and sustainment life cycles and lower operating and training costs. In FY 2022, the FNC3 UC2 project completed an integrated, Joint Service experimentation and demonstration activity set within a DoD testing range environment that assessed the interconnected performance of the UC2-adapted interfaces now resident within participating Service weapon systems. FNC3 U2 transitioned into the OUSD(R&E) Test Resources Management Center (TRMC) for further development.			
Title: Advanced Tactical Communications (ATC)	0.500	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603338D8Z / *Defense Modernization and Prototyping*	**Project (Number/Name)** 721 / *Emerging Capabilities Tech Dev (ECTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: The ATC project is developing a low-size, weight, and power (SWaP) communications capability, leveraging novel technologies that operate outside the traditional radio frequency (RF) spectrum. The developed capability will provide up to a 100-fold increase in communication bandwidth, enabling new and novel warfighting capabilities on SWaP-constrained platforms such as tactical ground vehicles and small-unmanned aerial systems. In FY 2022, ATC completed the initial system design and began subcomponent development. In FY 2023, ATC transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.			
Title: Cyber-Electromagnetic Camouflage ***Description:*** This project prototyped an advanced capability to preserve freedom to maneuver and protect ground-based forces from advanced threats. The prototype leverages advancements in artificial intelligence and advanced radiofrequency (RF) microelectronic technologies to provide performance advantages over existing solutions in a reduced SWaP form factor. In FY 2022, technical architecture development and initial design packages for the final prototype were completed. Work continues in FY 2023 using FY 2022 funds to complete prototype development and evaluation before transitioning to the U.S. Army and USSOCOM. Additional details are classified.	2.500	-	-
Title: Phantom ***Description:*** Phantom delivered a tool suite and end-user training applications that modernized DoD capabilities to keep pace with future RF spectrum technologies. In FY 2022, mission planning, classroom training, configuration tools, and analytics solutions were completed. Work continues in FY 2023 using FY 2022 funds to complete prototype development and operational utility assessment before transitioning to various DoD customers. Additional details are classified.	3.530	-	-
Title: Polar Skywave Radar (PSR) ***Description:*** The PSR project matured RF hardware and advanced radar processing algorithms to validate that over-the-horizon skywave radar is viable for a future surveillance system in the polar region. PSR focused on ten major tasks to extend skywave radar to the polar region, including deploying high frequency (HF) radar hardware for a scaled model and refining signal processing techniques. In FY 2022, PSR deployed transmit and receive equipment. Experiments were conducted to measure ionospheric backscatter of the polar ionosphere and begin development of processing techniques. Ionospheric models were compared to collected data for model verification and improvement. Work continues in FY 2023 with FY 2022 funds to perform additional data collections to assess the seasonal ionospheric conditions and their impact on performance. Techniques will be tested and improved against data from varying ionospheric conditions. Results will be used to improve system performance predictions before transitioning to the U.S. Air Force Life Cycle Management Center (AFLCMC) for further development.	2.500	-	-
Title: Flying Self Emplacement Sea Glider	0.500	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Flying Self Emplaced Sea Glider merges two unmanned systems: Unmanned Undersea Vehicle (UUVs) and Unmanned Aerial Vehicles (UAVs), resulting in a hybrid unmanned system capable of autonomous flight followed by a transition to underwater operation. Flying emplacement allows these UUVs to avoid adverse ocean currents and long transit times to arrive at a needed location quickly and without the logistical burden of traditional manned deployment. This effort includes vehicle operation with a newly developed multi-mode avionics suite capable of command and control in both operating regimes, new power management architecture, and representative payloads. In FY 2022, the project completed development and integration of a representative payload. In FY 2023, Flying Self Emplacement Sea Glider transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.			
Title: Echelon ***Description:*** This project develops a common digital twin technical framework capable of supporting a wide variety of military RF systems. Echelon will support virtual testing of digital twin prototypes, enabling the DoD to evaluate the effectiveness of prototype systems or subsystems in realistic environments and against red threats early in development. The developed high-fidelity, multi-physics framework will enable Service research and acquisition programs to mature digital twin prototypes before purchasing extensive hardware, enabling programs to shorten the development lifecycle of current system upgrades and next-generation systems. This effort includes the hardware and software implementation of the first instantiation of the Echelon technical framework. In FY 2022, the Echelon project completed development and delivery of the initial Echelon framework increment and framework validation methodology. Leveraging this initial framework, U.S. Army and U.S. Air Force transition partners initiated development of their respective Echelon-enabled digital twins. In late FY 2022, initial work began to validate the framework leveraging these Echelon-enabled digital twins simulated within an Echelon-enabled, high-fidelity multi-physics environment. In FY 2023, Echelon transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	4.558	-	-
Title: DISARM ***Description:*** This project develops and validates a low-cost concept pairing an emerging sensing technology with an already-fielded capability to provide a novel low-cost system to intercept airborne threats. In FY 2022, initial modeling and simulation were completed to confirm interoperability; an initial physics-based assessment was conducted to assess how the new capability could augment current air defense capabilities and confirm the performance and cost benefits. Additional details are classified. In FY 2023, DISARM transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	0.500	-	-
Title: Eris ***Description:*** This project rapidly prototypes and tests a novel, low-cost concept to enhance Joint Force resilience in the presence of modern threats. In FY 2022, technical architecture development and initial system design were completed. Additional	1.000	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
details are classified. In FY 2023, Eris transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.			
Title: Aided Target Recognition (AiTR) ***Description:*** This project accelerates developing and demonstrating a modular processing component that enables automatic threat detection capabilities on size, weight, and power (SWaP) constrained platforms. AiTR provides embedded capabilities for existing and next-generation sensors, resulting in approximately 50 percent improvement in target identification range. Prototype development in FY 2022 ensured that AiTR met the SWaP requirements for effective use. In FY 2023, AiTR transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.500	-	-
Title: Extended Range Threat Detection ***Description:*** This project rapidly prototypes and integrates new capabilities into an existing radar system, leveraging novel improvements to counter advanced peer threats. Once developed and tested, the capability will significantly increase threat detection and tracking ranges, affording the Joint Force more time to facilitate target engagements. In FY 2022, initial system design and operational architecture were developed. Additional details are classified. In FY 2023, Extended Range Threat Detection transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	2.000	-	-
Title: Chariot ***Description:*** Chariot is a Machine Learning Operations Platform that reduces the time and lowers the costs to build, deploy, retrain, and redeploy AI/ML models specific to the requirements of decision-makers. Chariot delivers AI-enabled outcomes at operationally relevant speeds for decision-makers to enable critical processes like kill chains, logistics, transportation, intelligence (multi-domain and cross-domain), operational processes, and strategic planning across the Joint Force. In FY 2022, Chariot successfully integrated the capability across four U.S. Government sites leveraging an interim authority to test. Work continues in FY 2023 with FY 2022 funds to obtain full authority to operate (ATO). Chariot will transition to U.S. Special Operations Command (USSOCOM), Special Operations Command Central (SOCCENT), Special Operations Command Europe (SOCEUR), and Special Operations Command Pacific (SOCPAC) for operational use upon acceptance and receipt of ATO.	2.500	-	-
Title: FADE ***Description:*** FADE assesses the potential to leverage commercial low-cost autonomous platforms for airlift resupply missions when outfitted with additional technologies and capabilities required to operate in military environments. Findings from FADE will transition into the decision-making process for evaluation, demonstration, and procurement of future airlift platforms. In FY 2023, FADE transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	0.500	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Artemis ***Description:*** Artemis develops and demonstrates a sensor package optimized for high-altitude operations. The multi-mode sensors are packaged to minimize size and power requirements and to protect electronics from environmental interference. Design of the sensor package initiated in FY 2022, with a demonstration of the sensor package during stratospheric flight planned for FY 2024, before transition to the U.S. Army for qualification testing. In FY 2023, Artemis transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	1.500	-	-
Title: RAGNAR ***Description:*** This project develops and demonstrates multi-function radiofrequency systems. RAGNAR will leverage 'best of breed' commercial-off-the-shelf (COTS) components, along with advancements in AI, and integrate the selected elements into a modular platform. Development efforts will collaborate with non-traditional performers to drive innovation and deliver a low-cost, modular capability to the U.S. Army, U.S. Air Force, and U.S. Navy. RAGNAR leverages a partnership with the U.S. Army and uses innovative contracting mechanisms to access multiple small business while reducing development risk. Details about the functionality and application of RAGNAR are classified. Market research was initiated in FY 2022 to understand vendor capability and identify the optimal COTS components to use during development. In FY 2023, RAGNAR transitions to Program Element 0603838D8Z Defense Innovation Acceleration for further development.	0.500	-	-
Accomplishments/Planned Programs Subtotals	30.393	-	-

	FY 2022	FY 2023
Congressional Add: Open Source Supply Chain Analytics Resource (OSSCAR) ***FY 2022 Accomplishments:*** In FY 2022, OSSCAR developed a capability that enables planners and operators to rapidly analyze and leverage open-source supply chain data to adapt to a dynamic operational environment. Quickly accessing and assessing publicly available information provides insights for developing distribution and sustainment courses of action and allows for vetting critical suppliers to the U.S. or adversary supply chains. Work continues in FY 2023 with FY 2022 funds for integration into fielded hardware to enable display on end-user devices. In FY 2023, a proof-of-concept prototype will be delivered to the U.S. Army and USSOCOM for demonstration and assessment before transition. This technology area is a Congressional interest item, and additional resources were provided above the President's budget.	3.000	-
Congressional Add: Hypersonic Modeling and Simulation Center of Excellence ***FY 2022 Accomplishments:*** In FY 2022, the project established a Hypersonics Research Center of Excellence focused on experimental and computational analysis of hypersonic flows, thermal protection systems, and other	4.600	-

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	FY 2022	FY 2023
hypersonic phenomenology to support advanced hypersonic technology prototyping. Specific demonstrations and activities will be finalized within the project execution period of performance. This technology area is a Congressional interest item, and additional resources were provided above the President's budget.		
Congressional Add: Ship–Based Multi–Sensor Prototype Development and Demonstration	8.000	-
FY 2022 Accomplishments: In FY 2022, the project identified novel sensor technologies for integration into a multimodal sensor prototype. Combining multiple sensor technologies will enable the prototype to provide a more accurate and robust capability to detect, identify, classify, and track targets in a maritime environment. An at-sea demonstration of the prototype is anticipated to evaluate its performance in operationally-relevant environments. Demonstrations and activities will be finalized within the project execution period of performance. This technology area is a Congressional interest item, and additional resources were provided above the President's budget.		
Congressional Adds Subtotals	15.600	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

ECTD leverages the DoD's most efficient and effective acquisition approaches for rapid prototyping. These approaches include using Other Transaction Authorities, Broad Area Announcements, and new or existing contract vehicles.