Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	363.207	34.457	0.000	0.000	-	0.000	-	-	-	-	-	-
828: *Rapid Reaction Fund*	347.879	32.106	0.000	0.000	-	0.000	-	-	-	-	-	-
833: *Strategic Multi-Layered Assessment (SMA) Support*	15.328	2.351	0.000	0.000	-	0.000	-	-	-	-	-	-

Note

In FY 2021, all funding and project investment areas in the Quick Reaction Special Projects (QRSP) Program Element (PE) transitioned to PE 0603338D8Z Defense Modernization and Prototyping.

A Congressional rescission of $9.000 million was enacted as part of the FY 2021 Appropriation reducing the available FY 2020 budget to $25.457 million.

A. Mission Description and Budget Item Justification

The Quick Reaction Special Projects (QRSP) Program Element (PE) funds the development of risk-reducing prototypes and accelerates capability innovation to deliver performance to the joint warfighter at the speed of relevance. QRSP prototypes increase warfighter lethality, affordably counter emerging technological threats, and help address the immediate needs of the Combatant Commands (CCMD). Due to the relatively low average cost of projects, QRSP is able to explore higher-risk opportunities with potentially higher reward. Project selection is guided by Department-level strategies and priorities, such as the National Defense Strategy, the Chairman's Capability Gap Assessment, the Department of Defense's (DoD) modernization priorities, and the CCMD's Integrated Priority Lists (IPLs).

The QRSP Program supports two major project codes that expedite development and transition of new capabilities to the warfighter. These project codes are: 1) Rapid Reaction Fund (RRF), and 2) Strategic Multi-Layered Assessment (SMA). Efforts within these project codes align to DoD science and technology priorities, address challenges identified in the National Defense Strategy, and support the DoD's modernization priorities.

RRF develops prototypes to counter emerging threats; anticipates adversaries' exploitation of new technologies; and, expedites delivery of effective, affordable, and critically needed capabilities to the warfighter. RRF initiatives accelerate innovation by rapidly developing high-risk prototypes with the potential for immediate and impactful transition of warfighter capabilities. RRF leverages emerging capabilities, such as machine learning algorithms and software intelligence, to enable novel prototypes with agile technology insertion paths. Funded projects also leverage existing capabilities from the traditional industrial base and non-traditional suppliers in the commercial sector, academia, international arenas, and small businesses.

SMA supports senior leadership within the CCMDs, Joint Force Commanders, and other government agencies by assessing complex operational and technical challenges, which require collaborative multi-agency and multi-disciplinary approaches. With input from across the U.S. Government, academia, and the private sector, the SMA develops options to Joint Staff and CCMD-generated challenging problems to inform senior leadership. Each assessment is initiated at the request of CCMD senior leadership. The Joint Staff Deputy Director for Global Operations (DDGO) sets priorities for SMA programs. SMA products are typically generated within six to nine months and directly contribute to the decision-making process of the Joint Staff and CCMD senior leadership.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603826D8Z *I Quick Reaction Special Projects (QRSP)*

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	35.647	0.000	0.000	-	0.000
Current President's Budget	34.457	0.000	0.000	-	0.000
Total Adjustments	-1.190	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.184	-			
• Program Adjustments	-0.006	-	-	-	-

Change Summary Explanation

A Congressional rescission of $9.000 million was enacted as part of the FY 2021 Appropriation reducing the available FY 2020 budget to $25.457 million.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense											Date: May 2021	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*				Project (Number/Name) 828 / *Rapid Reaction Fund*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
828: *Rapid Reaction Fund*	347.879	32.106	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, the Rapid Reaction Fund (RRF) transitioned to PE 0603338D8Z Defense Modernization and Prototyping.

$9.000 million of the Congressional rescission was applied to Project Code 828 Rapid Reaction Fund reducing the available FY 2020 budget to $23.106 million.

A. Mission Description and Budget Item Justification

The Rapid Reaction Fund (RRF) produces innovative prototypes with a high potential for disruptive improvement and transitions them to joint warfighters and Combatant Commands (CCMDs). RRF's streamlined business processes address mission gaps through partnerships with small and non-traditional companies, Service labs, Federally Funded Research and Development Centers (FFRDCs), allied nations, and transition partners within the warfighter user community. RRF anticipates adversaries' exploitation of technology, including current and emerging commercial capabilities, and rapidly responds to new threats and opportunities. Project selection is guided by department-level strategies and priorities, such as the National Defense Strategy and the DoD's modernization areas. Needs are identified and prototype projects are funded within the year of execution to demonstrate the feasibility of new technologies, enable integration into larger systems, and deliver affordable capabilities faster than standard acquisition cycles. RRF prototypes inform future acquisition or transition through rapid technology refresh and insertion into joint mission capabilities. These lower-cost prototypes and innovative business processes give the Under Secretary of Defense for Research and Engineering (USD(R&E)) the agility to quickly explore new, higher-risk technology areas that have the potential for immediate, game-changing impacts.

In prior years, RRF supported the creation of novel sensing systems; provided low-cost capabilities for small-footprint operations; expanded human, social, and cultural knowledge relevant to military decision making; increased small unit situational awareness; produced advanced biometrics and forensics capabilities; performed strategic multi-layer assessments; and, established a prototyping through non-traditional pathways outreach effort that facilitates better interactions with small, non-traditional companies developing innovative technologies. In FY 2020, RRF continued to support the USD(R&E) and provided a hedge against technology risk by identifying and delivering near-term capabilities to support irregular warfare operations.

Recent success stories and significant transitions of note include:
• The Towed Airborne Lift of Naval Systems (TALONS) Greenough Advanced Rescue Craft (GARC) provides an autonomous, towed system that can fly large payloads at significant altitudes. TALONS/GARC can loft intelligence, surveillance, and reconnaissance (ISR) payloads to increase the situational awareness of unmanned systems; and, can loft communications payloads to extend coverage beyond line of sight (LOS). The project successfully transitioned to the United States Special Operations Command (USSOCOM) and the United States Marine Corps (USMC).
• Storm delivered a highly innovative warhead design that reduces collateral damage and simultaneously increases lethality against small, light targets by focusing the fragmentation pattern. The program successfully transitioned to USSOCOM and the USMC.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*	**Project (Number/Name)** 828 / *Rapid Reaction Fund*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: FY 2020 Congressional Rescission ***Description:*** Congressional rescission applied to Project Code 828 Rapid Reaction Fund.	9.000	-	-
Title: Low Cost Innovative Projects (Projects less than one million dollars each) ***Description:*** Typical Rapid Reaction Fund (RRF) projects are completed with a single year of funding and at a cost less than $1.000 million to deliver conceptual prototypes for evaluation or assessment by warfighters and interagency users. In FY 2020, RRF selected, executed, and transitioned multiple low cost projects, including: • Millimeter-Wave Signal Processor (MMWSP): This project developed a microwave subsystem comprising a high-performance integrated circuit (IC) and associated control electronics to enhance traditional radio frequency (RF) front ends. This project successfully transitioned to the U.S. Navy. • High Performance Solid Rocket Propellant: This project developed a novel, aluminum-lithium alloy to be evaluated as a fuel in solid rocket propellant. This new ingredient could increase munition performance, and removes a dangerous emission common in alternative formulations. This project was transitioned to the U.S. Army. • SATURN Waveform: An enhanced waveform for use in SATURN transceivers. This technology supports effective Fully Networked Command, Control, and Communications (FNC3) channels in heavily-contested environments. This project was transitioned to the U.S. Air Force. • Magnetic Navigation: This project developed and tested an innovative navigation capability for GPS-denied environments. This capability successfully transitioned to the U.S. Air Force and U.S. Navy. • Smart Sensor: An autonomous sensor platform that significantly accelerates object identification, target recognition, and placement of effects on target. This capability transitioned to the U.S. Air Force. • Canine Head Mounted Display: A prototype head-mounted display (HMD) for military working dogs that allows the canine handler to maintain greater stand-off from hazardous situations. This project successfully transitioned to USSOCOM for further development. • Advanced Security Tag: A novel capability to mark, scan, and catalog military components that will be 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 successfully transitioned to the U.S. Navy. • Vector Sensor: A novel line of bearing system for radio frequency signals from an airborne platform. The sensor enables enhanced geolocation from operational standoffs and altitudes. This prototype transitioned to the U.S. Army. • Lightweight Transparent Armor: Developed a cost-effective, lightweight, ballistic armor to counter and protect against small arms calibers. This program successfully transitioned to the U.S. Army. • Weapon System Virtual Reality (VR): Developed a virtual reality training program for pilots that uses machine learning to analyze performance, identify trends, and adjust curriculum to optimize performance. The system is focused on building pilot proficiency when simulators or instructors are not available. This program successfully transitioned to the U.S. Air Force.	13.887	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*	**Project (Number/Name)** 828 / *Rapid Reaction Fund*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
• High Performance Propulsion System for Picosatellites: A novel, low-cost nanoscale electrospray propulsion system that provides high thrust density of small satellites. The prototype technology transitioned to multiple U.S. Government agencies. • Smart Probe: Developed tools and software for executing a novel approach to protocol modeling and analysis that will revolutionize how the DoD recognizes vulnerabilities and takes corrective countermeasures. This project successfully transitioned to the U.S. Navy. • Swift QUiet Airfield Assessment Device (SQUAAD): SQUAAD developed a novel prototype to assess the suitability of airfields for aircraft operations. The project transitioned to the U.S. Air Force. • BANSHEE: A solution for analyzing document data streams using a suite of machine learning algorithms and interactive visualizations to provide fast and optimized document triage and understanding for the novice user. This project successfully transitioned to DoD end users. • Red Claw: Developed and demonstrated the capability to detect, classify, locate, and track signals of interest. The capability transitioned to the U.S. Navy, U.S. Army, and USSOCOM. • Single Tag: Developed and demonstrated a data-triage tool that uses data-processing algorithms to rapidly clean, sort, and label data. This technology is currently in use by DoD analysts. • Enhanced Low Resource Language Identification: Developed novel tools and algorithms to identify low-resource/low-density languages in austere environments. This technology successfully transitioned to DoD agencies in support of the United States Africa Command (USAFRICOM). • Jaded Unicorn: Developed and demonstrated an innovative electronic-warfare capability, easily deployable on existing platforms, to address modern challenges. The capability successfully transitioned to the U.S. Army, U.S. Navy, and U.S. Air Force. • Mid-wave infrared (MWIR) fiber laser: A novel fiber laser design demonstrating a 10x increase in optical power compared to the current state of art. Prototype successfully transitioned to the U.S. Navy for further development.			
Title: Advanced Tactical SIGINT System (ATSS) ***Description:*** The ATSS project prototyped scalable, extremely high performance electronic warfare/signals intelligence (EW/SIGINT) capability modules with a small footprint. ATSS enhances Electronic Warfare Officers' (EWOs) capabilities to identify and classify signals in dense electromagnetic environments. Three Tactical SIGINT kits were prototyped and transitioned to the U.S. Army for operational evaluation.	1.387	-	-
Title: Tactical Grade-Inertial Measurement Unit (TG-IMU) ***Description:*** The TG-IMU project developed and demonstrated a millimeter-scale, tactical grade IMU providing a 1,000x reduction in volume and 10,000x reduction in power compared to existing IMUs. TG-IMU enables improved navigation in GPS-contested environments for small caliber munitions such as the Army Precision Guidance Kit–Anti-Jam (PGK-AJ), XM1155, and	1.156	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*	**Project (Number/Name)** 828 / *Rapid Reaction Fund*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Excalibur HTK, along with the Navy Moving Target Artillery Round (MTAR). TG-IMU transitioned to the U.S. Army and U.S. Navy for further development.			
Title: Silver Dart ***Description:*** The Silver Dart project rapidly developed and demonstrated a low-cost, air-launched, supersonic munition prototype. In FY 2020, the Silver Dart prototype design was refined and completed a series of flight tests to validate prototype performance against predicted results. Work continues in FY 2021 to refine the prototype prior to a final ground launch flight test series to demonstrate prototype performance at speeds and altitudes analogous to air launch conditions. The Silver Dart prototype transitioned to the U.S. Air Force for further development.	1.000	-	-
Title: Strategic Multi-Layered Assessment (SMA) Reach Back Cell ***Description:*** The SMA Cell supports senior leadership in the Combatant Commands (CCMDs) and at U.S. Government agencies with actionable assessments of complex operational and technical challenges. These assessments help maintain our competitive advantage in an increasingly complex global environment. The SMA Cell was established by the Joint Staff Deputy Director for Global Operations at the request of the Commander, U.S. Central Command (USCENTCOM). SMA efforts leverage multiagency, multi-disciplinary approaches to address requirements that are not within the customer organization's core competency. SMA assessments are framed during the year of execution and are in response to specific tasking from senior leadership in the CCMDs. The SMA Cell identifies options from 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 Office of the Under Secretary of Defense, Research and Engineering. The SMA Cell provides USCENTCOM with population-based and regional expertise in support of ongoing operations in the USCENTCOM area of responsibility.	2.301	-	-
Title: Automated Mitigation of Disinformation Amplifiers (AMDA) ***Description:*** The AMDA project is developing and demonstrating safe and reliable autonomous software agents that can effectively counter malicious botnet implants and similar large-scale malware. In FY 2020, AMDA completed research and development to investigate the performance, effectiveness, and scale of botnets. Work continues in FY 2021 using FY 2020 funds to complete development and execute a final demonstration of the AMDA capability. The AMDA prototype will transition to the U.S. Air Force.	1.425	-	-
Title: Quicksilver ***Description:*** Quicksilver prototyped and matured an adaptable solution for Counter Radio Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW) systems. The developed solution will reduce U.S. combat fatalities and protect	1.950	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*	**Project (Number/Name)** 828 / *Rapid Reaction Fund*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
equipment and facilities from improvised explosive devices, augmenting CREW system performance and effectiveness. Quicksilver transitioned to the U.S. Navy.			
Accomplishments/Planned Programs Subtotals	32.106	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RRF leverages the Services' and Defense Agencies' most efficient and effective acquisition approach for rapid prototyping. This includes using Other Transaction Authorities and new or existing contract vehicles.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense											Date: May 2021	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*				Project (Number/Name) 833 / *Strategic Multi-Layered Assessment (SMA) Support*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
833: *Strategic Multi-Layered Assessment (SMA) Support*	15.328	2.351	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, the Strategic Multi-Layered Assessment (SMA) Support transitioned to PE 0603338D8Z Defense Modernization and Prototyping.

A. Mission Description and Budget Item Justification

The mission of SMA is to provide traditional and non-traditional planning and decision support to CCMDs and other U.S. Government departments and agencies on a case-by-case basis. SMA products are designed to expand the Commanders' operational and strategic horizons and choices when facing complex environments by introducing the power of cognitive diversity from Subject Matter Experts (SMEs) and researchers employing varied paradigms and methodologies. SMA frames options, but does not make specific policy or strategy recommendations. SMA receives formal requests for support from the CCMDs at the senior Flag Officer level. These requests are reviewed by Joint Staff J-39 Deputy Director for Global Operations (DDGO) and USD(R&E) for validation based on the following criteria: (1) The problem requires multi-agency, multi-disciplinary approaches; and (2) Expertise required for the assessment does not lie within the core competencies of a single command or agency but instead, requires the collective inputs from across the U.S. Government, academia, policy centers, and the private sector. SMA is also supported by the Rapid Reaction Fund (RRF).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Strategic Multi-Layered Assessment (SMA)	2.351	-	-
Description: The SMA Cell supports the CCMDs and U.S. Government agencies with actionable assessments of complex operational and technical challenges, to help maintain our competitive advantage in an increasingly complex global environment. Challenges addressed with SMA efforts require multi-agency and multi-disciplinary approaches that are not within the customer organization's core competency. SMA started a strategic analysis effort at the request of the U.S. Security Coordinator for Israel and the Palestinian Authority. The effort evaluated strategic risks and identified knowledge gaps to provide an increased understanding of potential security environments and their implications for Palestinian security sector reform. The United States European Command (USEUCOM) subsequently asked SMA to apply the same methodology to identify emerging Russian threats and opportunities in Eurasia. SMA efforts are facilitated by the Joint Chiefs of Staff/J-3 Operations and are executed by the Office of the Under Secretary of Defense, Research and Engineering.			
Accomplishments/Planned Programs Subtotals	2.351	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reaction Special Projects (QRSP)*	**Project (Number/Name)** 833 / *Strategic Multi-Layered Assessment (SMA) Support*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A