Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Office of the Secretary Of Defense	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	1,152.112	69.482	102.345	114.100	0.000	114.100	121.077	126.105	128.559	130.943	Continuing	Continuing
648: *Joint Capability Technology Demonstration (JCTD)*	1,152.112	69.482	102.345	96.537	0.000	96.537	103.647	109.231	111.529	113.760	Continuing	Continuing
649: *Multi-Domain Demonstrations (MDD)*	0.000	0.000	0.000	17.563	-	17.563	17.430	16.874	17.030	17.183	Continuing	Continuing

Note

New Start (Y/N): No

In FY 2022, all funding and investment areas in the Time Sensitive Targeting Defeat (TSTD) project code (P-722 within program element (PE) 0603338D8Z) will be incorporated into the Joint Capability Technology Demonstration PE for proper alignment and execution to support the new priorities of the Under Secretary of Defense for Research and Engineering (USD(R&E)). This project code has been renamed as Multi-Domain Demonstrations (MDD) to better reflect the objectives of the effort. This realignment reflects the FY 2023 Secretary of Defense Planning Guidance to develop a JCTD pathway to exercise and deliver critical capabilities to U.S. Indo-Pacific Command (USINDOPACOM) and U.S. European Command (USEUCOM) to curb peer competition in those regions. This funding realignment is reflected across the Future Years Defense Program (FYDP).

A. Mission Description and Budget Item Justification

This program supports the Department's initiatives to Build Sustainable and Long-Term Advantage, and Build a Resilient Joint Force and Defense Ecosystem.

The mission of the Joint Capability Technology Demonstration (JCTD) Program Element, 0603648D8Z, is to address Combatant Command (CCMD) and Joint Warfighting operational gaps by executing prototypes and experiments, reducing technical risk, and conducting operational demonstrations in order to assess military utility against urgent / emergent warfighter needs. This congressionally mandated program serves as one of the few avenues for CCMDs to address their most pressing priority capability gaps and requirements, which often result from inadequate Service U.S.C. Title 10 investment in joint interoperability that achieve improved mission outcomes.

The JCTD PE puts capabilities into the hands of the Joint Warfighter one to two years sooner than would have been accomplished by the services alone. This is achieved using a CCMD sponsor for each project; leveraging service research and engineering laboratories, academia, and industry expertise; requiring partner funding; and executing the necessary steps for transition with service acquisition partners throughout the project life cycle. This methodology results in a 74 percent transition success rate, and solidifies the program’s role as a technology catalyst, rapid capability provider, and transition-bridge between the USD(R&E) and the Undersecretary of Defense, Acquisition and Sustainment (USD(A&S)) offices.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Office of the Secretary Of Defense	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603648D8Z *I Joint Capability Technology Demonstration (JCTD)*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	71.452	102.669	0.000	0.000	0.000
Current President's Budget	69.482	102.345	114.100	0.000	114.100
Total Adjustments	-1.970	-0.324	114.100	0.000	114.100
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.956	-			
• Adjustments to Budget Year	-	-	93.207	-	93.207
• Other Program Adjustments	-0.014	-	16.957	-	16.957
• Economic Assumption Adjustment	-	-	3.936	-	3.936
• FFRDC Reduction	-	-0.324	-	-	-

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President’s Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Office of the Secretary Of Defense			Date: April 2022
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	Project (Number/Name) 648 / *Joint Capability Technology Demonstration (JCTD)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
648: *Joint Capability Technology Demonstration (JCTD)*	1,152.112	69.482	102.345	96.537	0.000	96.537	103.647	109.231	111.529	113.760	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2022, all funding and investment areas in the Time Sensitive Targeting Defeat (TSTD) project code (P-722 within program element (PE) 0603338D8Z) will be incorporated into the Joint Capability Technology Demonstration PE for proper alignment and execution to support the new priorities of the Under Secretary of Defense for Research and Engineering (USD(R&E)). This project code has been renamed as Multi-Domain Demonstrations (MDD) to better reflect the objectives of the effort. This realignment reflects the FY 2023 Secretary of Defense Planning Guidance to develop a JCTD pathway to exercise and deliver critical capabilities to U.S. Indo-Pacific Command (USINDOPACOM) and U.S. European Command (USEUCOM) to curb peer competition in those regions. This funding realignment is reflected across the Future Years Defense Program (FYDP).

A. Mission Description and Budget Item Justification

JCTD project selection is driven by the ability to accelerate transition of new prototyped capabilities to the Joint Warfighter that have strong CCMD and Joint Staff interest; cost share commitments from the Military Services and Defense Agencies; advanced technical readiness; and a well-defined and affordable transition path for long-term sustainment. Project proposals are selected following a deliberate process that leverages a wide-ranging stakeholder community that includes the CCMDs, Joint Staff, service science and technology communities, academia, industry, the intelligence community, and organizations within the Office of the Secretary of Defense. This selection process and the execution process previously described has resulted in a 74% transition rate, which is defined as a project moving into a new or existing program of record or residual prototypes utilized by the CCMDs and Joint Warfighter for immediate operational use. The final objective for the JCTD program is to maintain the United States' technological superiority across the range of military operations while reducing the cost of operations, facilitating joint interoperability, and allowing for the rapid insertion of new capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Dialable Effects Munition (DEM) ***Description:*** Previously funded JCTD. DEM develops adjustability for air delivered bomb employment to allow adjustment to the munition while the aircraft is in flight. The bomb can be dialed in for localized, low collateral damage, penetration, blast/fragmentation, and area attack. DEM conducted successful flight tests in FY 2021 and received additional funding to expand the DEM technology to a second family of munitions. There is a strong possibility that a third munition will also use DEM technology significantly leveraging the initial DEM investment across the Joint enterprise. DEM will complete in FY 2022.	0.350	-	-	-	-
Title: Expedient and Expeditionary Airfield Damage Repair (E-ADR)	0.600	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Office of the Secretary Of Defense		Date: April 2022
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** 648 / *Joint Capability Technology Demonstration (JCTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Description: Previously funded JCTD. E-ADR supports the National Defense Strategy's focus on resilient agile logistics and forward force maneuver. E-ADR provides an expeditionary low-logistics repair capability that maximizes the use of indigenous materials and readily available equipment. E-ADR also provides an expedient repair capability for aircraft runways in austere and dynamic base locations. In FY 2021, E-ADR conducted successful final military utility assessments. E-ADR transitioned to U.S. Naval Mobile Construction Battalions and the U.S. Air Force Life Cycle Management Center, with plans to pre-position the capability in specific areas of responsibility. E-ADR completed in FY 2021.					
Title: Integrated Manufacturing of Energetic Airframes (IMEA) ***Description:*** Previously funded JCTD. IMEA supports the National Defense Strategy by achieving joint lethality in contested environments. In FY 2021, IMEA completed operational demonstrations and a military utility assessment of the integrated airframe. IMEA will transition to the U.S. Army's Program Executive Office for Missiles and Space Close Combat Weapons Systems. IMEA will complete in FY 2022.	0.900	-	-	-	-
Title: Covert Long-Dwell Stratospheric Architecture (COLD STAR) ***Description:*** Previously funded JCTD. COLD STAR is a Stratospheric High Altitude Balloon capability that supports the National Defense Strategy's focus on command, control, communications, computers, intelligence, surveillance and reconnaissance; and addresses Combatant Command capability as defined by their Integrated Priority Lists. In FY 2021 COLD STAR completed its final operational demonstrations and military utility assessment. COLD STAR completed in FY 2021.	1.725	-	-	-	-
Title: Ultra High Frequency (UHF) Legacy Extension (ULX) ***Description:*** Previously funded JCTD. ULX supports the National Defense Strategy's focus on developing resilient, survivable networks from the tactical level up to strategic planning. ULX will address legacy communication systems across the DoD currently lacking resilience in congested and contested environments. These systems face near-term risk in shortfalls in UHF channel capacity; while wideband code division multiple access radios are fielded. ULX will resolve the legacy UHF shortfall by increasing total legacy UHF channel capacity worldwide. ULX also provides resiliency and eliminates legacy UHF interference through innovative ground signal processing. In FY 2021, ULX conducted two technical demonstrations and conducted a military utility assessment. ULX will transition to the Mobile User Objective System (MUOS) Program of Record. ULX will complete in FY 2022.	0.700	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Office of the Secretary Of Defense		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Directed Energy Survivable Standoff Munitions (DESSM) ***Description:*** Previously funded JCTD. DESSM supports the National Defense Strategy's focus on increased lethality in joint contested environments. DESSM will develop material solutions for protecting standoff munitions against DE countermeasures and weapons. DESSM will also utilize hardened munitions to reduce and eliminate weapon effectiveness zones. In FY 2021, DESSM completed their concept of the operations and tactics, techniques, and procedures; worked on DE hardened residual munitions; assessed performance and cost data; and conducted an operational demonstration as a part of a large-scale U.S. Indo-Pacific Command Exercise. DESSM will complete in FY 2022.	4.000	-	-	-	-
Title: Hoku-Kai ***Description:*** Previously funded JCTD. Hoku Kai addresses the Combatant Command's urgent and emergent needs focused on fully networked command, control, and communications by providing a secure command, control, and communications platform against continuously growing adversarial threats. The JCTD will deliver assured maritime domain access and targeting using resilient undersea networks. In FY 2021, the Hoku-Kai JCTD conducted final critical design reviews, conducted integration tests of the nodes in classified locations, finalized the end-to-end network architecture, prepared and installed the infrastructure at demonstration sites, and completed an operational demonstration as a part of a large-scale U.S. Indo-Pacific Command exercise. Hoku-Kai will complete in FY 2022.	3.200	-	-	-	-
Title: Multi-domain Agile Navigation and timing Network Automation (MANNA) ***Description:*** Previously funded JCTD. MANNA addresses the Combatant Command's urgent and emergent needs focused on fully networked command, control and communications. MANNA will demonstrate a global position, navigation and timing system of laser communications ("lasercom") with secure, high-rate exfiltration of intelligence data from an aerial platform to low earth orbit space assets. In FY 2021, MANNA conducted space-to-air and space-to-ground technical demonstrations and operational demonstrations. MANNA will transition the initial capabilities document, testing results of the military utility assessment, verification of models, and three lasercom terminals to the Big Safari program of record via the U.S. Air Force Research Laboratory. MANNA will complete in FY 2022.	1.600	-	-	-	-
Title: Maritime Centric Skywave Over-the-Horizon Radar (MASOR) ***Description:*** Previously funded JCTD. MASOR supports the National Defense Strategy's focus on the command, control, communications, computers, intelligence, surveillance and reconnaissance, and fully	1.800	1.500	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
networked command, control and communications. MASOR provides a near constant wide-area maritime detection and monitoring capability for both air and maritime targets which will degrade an adversary's ability to remain undetected within the southern approach. In FY 2021, MASOR finalized transit systems plans and began installation of digital receivers. ***FY 2022 Plans:*** MASOR will conduct an operational demonstration and military utility assessment (MUA). Upon successful MUA, MASOR will transition to the existing Relocating Over the Horizon Radar (OTHR) Texas system via Forces Surveillance Support Center. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD will complete in FY 2022.					
Title: Resilient Expeditionary Agile Littoral Logistics (REALL) ***Description:*** Previously funded JCTD. REALL supports the Contested Logistics mission priority area and the National Defense Strategy's focus on forward force maneuver and posture resilience. REALL will demonstrate capabilities to enable a distributed network of fuel distribution and logistics nodes in support of emerging operational concepts. These systems will operate within the arc of enemy fires with significantly less risk than traditional naval platforms due to their distributed nature. In FY 2021, REALL completed systems integration and testing, technical demonstrations, and operational demonstrations. ***FY 2022 Plans:*** REALL will finalize the concept of operations and complete a military utility assessment. REALL will transition the platform, VTOL kit, and fuel subsystem technical documentation to Naval Facilities Engineering Command (NAVFAC) Expeditionary Programs Office Sealift program; Naval Beach Group inventories via NAVFAC Expeditionary Programs Office; and Office of the Chief of Naval Operations, Expeditionary Warfare (OPNAV N95) and Strategic Mobility and Combat Logistics (OPNAV N42). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD will complete in FY 2022.	3.925	3.000	-	-	-
Title: Automating Indications and Warnings (I&W) for Operational Awareness (REDLINE) ***Description:*** Previously funded JCTD. REDLINE supports the National Defense Strategy's focus on military applications of machine learning to gain a competitive military advantage. REDLINE will leverage machine learning to provide CCMDs the ability to conduct automated order of battle in denied areas. In FY 2021,	3.000	2.500	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
REDLINE continued to scale performance to support global event detection and classification, and provided open applications, programming, and interfaces to facilitate interoperability with other command and control systems. ***FY 2022 Plans:*** REDLINE will conduct further operational demonstrations and its military utility assessment (MUA). REDLINE will transition to the Defense Intelligence Agency's Foundational Intelligence Modernization effort as a program of record. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD completes in FY 2022.					
Title: Resilient Logistics ***Description:*** Previously funded JCTD. Resilient Logistics supports the Contested Logistics mission priority area and the National Defense Strategy's focus on forward force maneuver and posture resilience. Resilient Logistics will provide kitted solutions to increase the survivability of expeditionary and permanent logistical support networks in an Anti-Access/Area Denial (A2/AD) environment. Upon completion of the JCTD, residual operational prototype kits for Camouflage, Concealment, and Deception (CC&D) mission requirements will be available for immediate fielding. In FY 2021, the JCTD conducted technical demonstrations (TD) of potential solutions, and executed an operationally-relevant scenario to inform the down-select of optimal solutions to be included in a combined kit. ***FY 2022 Plans:*** Resilient Logistics will Develop the concept of operations and tactics, techniques, and procedures for the kitted solution and conduct a comprehensive Military Utility Assessment (MUA) with operational units at an appropriate exercise venue. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD completes in FY 2022.	2.000	2.250	-	-	-
Title: Analytic Threat Observation, Materialistic Identification, Classification, and Attribution (ATOMICA) ***Description:*** Previously funded JCTD. ATOMICA supports the National Defense Strategy's focus on providing non-intrusive, real time identification of threats to support the Joint Force's secure maneuverability through both land and sea. ATOMICA provides a portable, self-contained sensor system that will provide an unprecedented ability to materialistically determine the contents of an unknown object. The sensor will interrogate objects with	2.500	1.900	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
a short standoff distance without touching, opening, or disturbing the targeted object. The ATOMICA sensor will be integrated onto various unmanned platforms, to include unmanned ground vehicles (UGV) and unmanned, remotely operated vehicles (ROV) for both terrestrial and underwater environments. In FY 2021, the ATOMICA JCTD began developing a ruggedized developmental prototype and completed an initial technical demonstration in a controlled environment. ***FY 2022 Plans:*** In FY 2022, ATOMICA will develop a concept of operations (CONOPS) and tactics, techniques, and procedures (TTP) for fieldable/operational prototypes. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD will conduct their final operational demonstration and Military Utility Assessment in FY 2023, decreasing expenditures requirements for that fiscal year.					
Title: Secure Tactical Advanced Mobile Power (STAMP) ***Description:*** Previously funded JCTD. STAMP supports the National Defense Strategy's mission priority of Contested Logistics. STAMP will integrate power generation, distribution, battery storage, metering, control systems, and on-board vehicle power from mobile tactical platforms into an AC/DC micro-grid to enhance resiliency, mobility, and flexibility of tactical units to execute distributed cross domain maneuvers in multi-domain operations. In FY 2021, STAMP conducted a technical demonstration; confirmed safety test results; and finalized vehicle charging (VC) Integration Design. ***FY 2022 Plans:*** STAMP will conduct Operational Demonstrations for a micro-grid, with mobile tactical charging and energy storage integration; transition integration; and safety confirmation for Family of Medium Tactical Vehicles (FMTV) micro-grid system. STAMP will transition components and other hardware to Programs of Record for Power Distribution Illumination System, Electrical (PDISE) and FMTV. Operational prototypes will be delivered to Program Management (PM) office Terminal High Altitude Area Defense (THAAD) and PM Mission Command. STAMP will complete in FY 2022. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD completes in FY 2022.	4.900	2.500	-	-	-
Title: Autonomous Maritime Patrol Craft (AMPA)	1.235	2.100	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Office of the Secretary Of Defense		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Description: Previously funded JCTD. AMPA supports the National Defense Strategy by developing an unmanned militarized version of the world's largest solar aircraft, the Solar Impulse. The resulting Skydweller aircraft will be designed to stay airborne for more than 90 days with excess electrical power available to simultaneously operate a suite of sensors, communications, Navigation, and Electronic Warfare (EW) sub-systems. This technological leap will allow a single Skydweller aircraft to more effectively perform the mission of numerous manned & unmanned ISR/configurable assets, eliminate risk to human pilots, and provide a level of persistence not available anywhere else in the military inventory. In FY 2021, AMPA completed an aircraft integrity flight test and conducted engineering activities to integrate advanced fly-by-wire technology, autonomous flight control system, and vehicle management systems into the Skydweller aircraft. ***FY 2022 Plans:*** AMPA will obtain appropriate flight authorizations for conducting flight readiness and safety reviews. The JCTD will execute a technical demonstration to demonstrate autonomous, long-endurance flight of the Skydweller aircraft and basic system operations. Evaluation of flight results will culminate in a decision on whether to fund advanced sensor payload integration in the long-endurance aircraft. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** There are no funds requested in FY 2023.					
Title: Automated Construction of Expeditionary Structure (ACES)	2.930	1.300	-	-	-
Description: Previously funded JCTD. ACES provides Combatant Commands the capability to quickly provide mobility and force protection for deployed Joint Warfighters. Military combat engineer units lack the capability to enable rapid construction, route repair and gap crossing to establish and sustain lines of communications. ACES will provide an automated 3D printer to construct gap crossings, obstacles, and force protection positions using locally available concrete and other materials at a pace that adversaries cannot match. In FY 2021, ACES conducted technical and operational demonstrations with multiple services. ***FY 2022 Plans:*** ACES will conduct a Military Utility Assessment (MUA) and deliver fieldable prototypes in theater to support Joint Warfighter battlefield needs. Prototypes will transition to Programs of Record (POR) at U.S. Army Facilities Component Systems, U.S. Navy Engineering Expeditionary Warfare Center (EXWC), and U.S. Marine Corps Systems Command. ***FY 2022 to FY 2023 Increase/Decrease Statement:***					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
The JCTD completes in FY 2022.					
Title: Prometheus Emerald ***Description:*** Prometheus Emerald was a FY 2021 new start JCTD. Prometheus Emerald supports the National Defense Strategy by delivering a proof of concept Artificial Intelligence (AI) collection management and tasking capability to allow Military Intelligence personnel to automate AI workflows. In FY 2021, Prometheus Emerald collected threat imagery, developed AI models, and deployed AI Hardware. ***FY 2022 Plans:*** The JCTD will conduct technical demonstrations of AI hardware and models, conduct an operational demonstration and military utility assessment, and transition to the Army Tactical Intelligence Targeting Access Node (TITAN) program of record. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD completes in FY 2022.	1.500	2.900	-	-	-
Title: Pacific Ecosystem for Cyber (PEcoC) ***Description:*** PEcoC was a FY 2021 new start JCTD. PEcoC supports the cybersecurity requirements identified in the FY 2021 National Defense Authorization Act, and the Combatant Command's Integrated Priority Lists. PEcoC provides an information advantage through application of integrated artificial intelligence (AI) and machine learning (ML) techniques that improves cyber threat identification and response while integrating disparate national cybersecurity programs into the Pacific ecosystem. In FY 2021, PEcoC achieved deployment of prototype high-performance ML algorithms and storage system, establishing a network link between U.S. Cyber Command and U.S. Indo-Pacific Command through a Cloud Data Pipeline. ***FY 2022 Plans:*** PEcoC will incorporate additional threat and malicious behavior into ML algorithms and software models while continuing development and deployment of deep packet inspection models that look for data exfiltration into DoD operational platforms. PEcoC also plans to deploy classified prototype high-performance ML system to Naval Computer and Telecommunications Area Master Station, Pacific. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD completes in FY 2022.	1.400	3.200	-	-	-
Title: Passive Optical Spectrum Control and Exploitation (POSCE)	2.600	2.900	2.640	-	2.640

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Description: Previously funded JCTD. POSCE supports the National Defense Strategy's emphasis on command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) and the OUSD(R&E) prioritization of advanced electronic warfare. Additionally, this novel sensing mechanism will provide ISR updates in response to operational challenges in anti-access/area denial environments – Additional details are CLASSIFIED. In FY 2021, the POSCE JCTD conducted a technical demonstration by utilizing innovative sensing methods to augment persistent Intelligence, Surveillance, & Reconnaissance (ISR) in maritime environments and along terrestrial choke points. ***FY 2022 Plans:*** In FY 2022, POSCE will begin establishing requirements for automated data processing and for packaging of hardware components. The JCTD will also leverage other partner programs to develop Concept of Operations (CONOPS) and system functionality that maps software/hardware to performance requirements, and complete their first operational demonstration. ***FY 2023 Base Plans:*** In FY 2023, POSCE will execute operational demonstrations and a military utility assessment. The JCTD completes in FY 2023. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD completes in early FY 2023.					
Title: Reliable Transmission over HF (NORTH) ***Description:*** Previously funded JCTD. NORTH directly supports the National Defense Strategy's focus on command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) and fully networked command, control and communications. In FY 2021, NORTH conducted a technical demonstration in simulated conditions which will demonstrate an ad hoc high frequency (HF) mesh networking system that operates through a range of contested environments to enhance fully networked C3 (FNC3), including Resilient Command and Control (RC2) and Nuclear Command, Control and Communications (NC3). NORTH will integrate with the Navy's wideband HF mesh networking system and the Air Force's digital HF radios and repeaters to optimize joint information transport datalinks based on sense and respond (S&R) of the spectral environment. All three systems together provide an enterprise solution which will increase operational effectiveness of resilient C3 in anti-access/area-denial environments. ***FY 2022 Plans:***	0.800	2.970	0.840	-	0.840

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
NORTH plans to develop and integrate roll-on/roll-off equipment suites upon joint Service fixed and mobile platforms and demonstrate resilient command and control capability in contested environments. ***FY 2023 Base Plans:*** NORTH will execute its military utility assessment in FY 2023. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This JCTD will complete in the first half of FY 2023, thereby reducing the funding required.					
Title: Quicksink ***Description:*** Quicksink was a FY 2021 new start JCTD. Quicksink is intended to reduce air delivered assets required for anti-surface warfare (ASuW) operations by increasing lethality; decreasing costs, and improving maritime mining capabilities. Quicksink held a kickoff meeting in FY 2021 and is completing the implementation directive that will direct successful completion of the JCTD. Quicksink is also identifying target vessels and exercise opportunities for testing of the capability. ***FY 2022 Plans:*** Quicksink will finish development of the payload and guidance systems and conduct technical demonstrations. ***FY 2023 Base Plans:*** Quicksink will exectue technical and operational demonstrations. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Additional prototype development and operational demonstrations lead to higher costs in FY 2023. The JCTD is scheduled to complete in FY 2024.	1.100	2.400	4.355	-	4.355
Title: Raging Parakeet (RP) ***Description:*** RP was a FY 2021 new start JCTD. Combatant Commands (CCMD) lack the ability to rapidly analyze vast amounts of Intelligence, Surveillance, and Reconnaissance (ISR) data to quickly locate hard-to-find targets with a high degree of accuracy. RP will utilize advanced Artificial Intelligence (AI)/Machine Learning (ML) algorithms and sensor fusion to decrease manpower requirements and simultaneously increase the accuracy of high-priority target identification. In FY 2021, RP completed its Implementation Directive, completed its Management Plan, and identified the integration platform. ***FY 2022 Plans:***	1.550	7.100	5.250	-	5.250

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
RP will gather needed data sets, develop an initial set of algorithms, establish open architecture (OA) standards, complete standards development, develop a prototype processor based on RP standards, create fusion and cross-cueing algorithms, and perform technical demonstrations. ***FY 2023 Base Plans:*** RP will execute operational demonstrations and its military utility assessment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD will complete in FY 2023.					
Title: Stratospheric Capability Architecture Development (SCAD) ***Description:*** SCAD was a FY 2021 new start JCTD. SCAD supports the National Defense Strategy by delivering materiel solutions to the United States Army (USA) and United States Special Operations Command (USSOCOM) for acquisition and sustainment. SCAD will develop, demonstrate, and assess an unmanned aerial systems platform with stratospheric payloads that provide Ground Moving Target Indicator (GMTI) Synthetic Aperture Radar (SAR), Signals Intelligence (SIGINT), and communications relay capabilities. In FY 2021 SCAD developed open-system payload architecture and interface standards, and established Project Agreements (PA) with the United Kingdom (UK) and Australia to demonstrate and share project information. ***FY 2022 Plans:*** SCAD will develop concept of operations and conduct technical and operational demonstrations. ***FY 2023 Base Plans:*** SCAD will execute its military utility assessment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Multiple operational demonstrations and the military utility assessment planned for FY 2023 will result in higher costs. This JCTD will complete in FY 2023.	0.600	1.450	2.100	-	2.100
Title: Pathfinder ***Description:*** Pathfinder was a FY 2021 new start JCTD. Pathfinder supports the National Defense Strategy by delivering U.S. Northern Command (USNORTHCOM) and North American Aerospace Defense Command (NORAD) a prototype Homeland Defense Data Ecosystem (HDDE) that fuses hundreds of Terabytes (TB) of data and provides a synthesized analytical solution. In FY 2021, Pathfinder gathered initial data sets and	0.850	2.000	4.500	-	4.500

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
prototyped artificial intelligence and machine-learning algorithms and processes. The JCTD also participated in the Global Information Dominance Exercise (GIDE) series as a risk reduction event and technical demonstration. ***FY 2022 Plans:*** Pathfinder will codify HDDE architecture and complete machine-learning based pattern of life and course of action algorithm development. ***FY 2023 Base Plans:*** Pathfinder will execute operational demonstrations and its military utility assessment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Multiple technical and operational demonstrations intended for the next fiscal year will increase costs for FY 2023. This JCTD will complete in FY 2023.					
Title: Cybersecurity for Robotic and Autonomous Systems Hardening (CRASH) ***Description:*** CRASH was a FY 2021 new start JCTD. The Department of Defense (DoD)'s deployed Robotic Autonomous Systems (RAS) face pervasive threats to adversary hacking at multiple touch points that, if left unsecured, could potentially allow adversaries to manipulate DoD Forces without Joint Warfighter knowledge and create climates of permanent uncertainty and distrust within the Joint Warfighter community toward RAS assets. CRASH will tailor RAS software solutions to provide deep and layered cyber defenses against multi-vector cyberattacks from existing and emerging threats to allow completion of autonomous missions in contested battlefields. In FY 2021, CRASH completed its Implementation Directive and Management Plan. ***FY 2022 Plans:*** CRASH will develop and cyber-test RAS platforms with integrated secure software, intrusion protection, and secure communications. ***FY 2023 Base Plans:*** CRASH will execute its military utility assessment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD will complete in early FY 2023.	1.700	2.600	2.000	-	2.000
Title: Joint Targeting Support (JTS) ***Description:*** JTS was a FY 2021 new start JCTD. JTS supports the National Defense Strategy's emphasis on increased lethality. JTS will reduce the sensor to shooter timeline and increase the rate of target identification	2.450	6.100	5.655	-	5.655

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
and engagements by leveraging resources across services, agencies, and coalition partners. Additionally, JTS will automate joint target development for deep fires missions by developing and integrating machine learning analytics with joint and service specific information systems and Intelligence, Surveillance, and Reconnaissance (ISR) networks. JTS will simultaneously build and refine numerous user and machine nominated target decks by employing distributed processing and fusion analytics and augmenting the Joint Automated Deep Operations Coordination System (JADOCS) to improve the target development process across echelons and services. In FY 2021, JTS defined requirements, developed a use case, and created and reviewed system design. ***FY 2022 Plans:*** JTS will develop analytics, graphic user interface, and exploitation and correlation of joint forces data and conduct a technical demonstration. ***FY 2023 Base Plans:*** JTS will execute operational demonstrations and conduct its military utility assessment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The JCTD will complete in FY 2023.					
Title: Aerial Port of the Future (APOF) ***Description:*** APOF was a FY 2021 new start JCTD. Aerial ports and air transportation expeditionary operations are constrained by poorly performing and unlinked Information Technology (IT) systems, outdated command, control, and communications networks, and physical handling of critical classes of supply. To solve these problems, APOF will develop, integrate, and test emerging capabilities at Aerial Ports by providing a logistics common operating picture for planning, processing, and managing Joint Force cargo; an integrated automated system to manage personnel, cargo, and munitions; and man/unmanned materiel handling equipment to rapidly load sustainment to global air mobility assets. In FY 2021, APOF integrated automated port management systems and tools to synchronize operations-level planning. ***FY 2022 Plans:*** The JCTD will leverage high-impact improvements to IT infrastructure for tactical awareness of the Aerial Port, complete the spiral for IT Infrastructure Development, and start two new spirals: one for automated systems with portable computing and another for the integration of autonomy and machine learning with advanced data analytics. ***FY 2023 Base Plans:***	1.567	2.700	4.250	-	4.250

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
The JCTD will complete additional spirals, select a package of aerial port capabilities, and execute operational demonstrations. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Additional technical and operational demonstrations in FY 2023 lead to higher costs. This JCTD completes in FY 2024.					
Title: JCTD Concept Development/Developmental and Operational Prototypes	0.000	16.032	45.533	-	45.533
Description: Continually funded effort. This funding allocation is to provide funding for future fiscal year new-start JCTDs. The JCTD program will select new projects as developmental and operational prototypes, in alignment with the National Defense Strategy (NDS) and Combatant Command (CCMD) Integrated Priority Lists (IPL). Senior representatives from each CCMD, Service, and Joint Staff will participate in the submission, initial review, and down-selection of JCTDs. The USD(R&E) executive leadership will review final selections before making a final recommendation for Congressional approval. Selected projects will leverage networks within the global research and engineering enterprise to include government labs and integration facilities, depots, academia, as well as traditional and non-traditional technology providers. Prototypes will utilize best practices to satisfy joint and cross-cutting needs that directly address the CCMDs' technology/capability gaps as identified in their respective IPLs. The JCTD office will work with the Services to identify means to streamline prototype transition into the acquisition systems where appropriate. ***FY 2022 Plans:*** Fund the follow-on efforts for projects started in FY 2021. Select advanced prototyping activities as new starts in FY 2022 that support the NDS and the USD(R&E) priorities. ***FY 2023 Base Plans:*** Fund the follow-on efforts for projects started in FY 2022. Select advanced prototyping activities as new starts in FY 2023 that support the National Defense Strategy and the USD(R&E) priorities. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This line is dedicated to reflect both funding for FY 2023 new-start projects and funding tails from projects begun in FY 2022Once projects are selected, funding is subtracted from this line during the years of execution (FY 2022 / FY 2023) and is accounted for in projects detailed separately throughout the R-2. In previous years,					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
funding for new-starts was approximately 30 percent of the annual appropriation; however, with recent budget reductions to this PE, funding for new-starts is approximately 18 percent of the annual appropriation.					
Title: Combatant Commander (CCMD) Support, Capability Transition and Strategic Project Operational Management ***Description:*** Continuously funded effort. This effort is comprised of three programs that support the entire JCTD Program. The three programs are (1) CCMD direct liaison support, (2) JCTD pre-transition and (3) Program Integration Office for execution of select, classified projects. (1) CCMD direct liaison support: The CCMDs are essential in specifying capability needs, project identification, demonstration venues, military utility assessment, and transition of JCTDs. The JCTD program provides direct support to CCMDs enabling them to provide an on-site JCTD operational manager. (2) JCTD pre-transition: In some cases, Service or Agency partner transition funding is not available for one to two years following the JCTD demonstration phase. In such cases, where there is a clear transition and the need to sustain the capability for a short time prior to availability of Service or Agency transition funds, the JCTD pre-transition funds may be used to meet that need. (3) Program Integration Office: Executes a select number of highly classified projects in areas such as time sensitive targeting (TST), electronic miniaturization, electronic countermeasures, advanced mobile ad hoc network communications, space situational awareness intelligence surveillance and reconnaissance, sensor platforms and communications, and persistence surveillance. ***FY 2022 Plans:*** Provide CCMD direct participation to enable CCMD staff participation in identifying and executing developmental and operational prototypes. Identify and execute projects selected by the prototyping senior steering group. Sustain selected projects until program of record funds are received. Execute a limited number of classified projects' military utility assessments. ***FY 2023 Base Plans:*** Provide CCMD direct participation to enable CCMD staff participation in identifying and executing developmental and operational prototypes. Identify and execute projects selected by the prototyping senior steering group. Sustain selected projects until program of record funds are received. Execute a limited number of classified projects' military utility assessments. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** There is no significant change between FY 2022 and FY 2023.	18.000	18.737	19.414	-	19.414
Title: Time-Sensitive Target Defeat Focus Area (TSTD)	-	14.206	0.000	-	0.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Description: This project addresses the need for distributed, rapidly-deployed capabilities that can provide persistent sensing to Find, Fix, and Finish time-sensitive threats by integrating prototypes and experiments into a series of multi-domain operational demonstrations. Demonstrations focus on evaluating how the Joint Force can leverage modernization technologies, commercial space-based capability, and operationalization of the stratosphere to refine hypersonic and long-range fire kill chains to counter time-sensitive targets. ***FY 2022 Plans:*** In FY 2022, TSTD will execute Joint-Combined Demonstration and Experimentation Campaigns (JCDEC) and TRIPPWIRE into two joint multi-domain demonstrations exercises, such as Valient Shield 22, Talisman Sabre, or Pacific Europe/Pacific Defender to evaluate prototypes and experiments operational utility in operationally relevant environments with direct warfighter involvement and feedback. Two JCDEC and TRIPPWIRE risk reduction demonstration events will be conducted prior to the exercises to ensure the prototypes and experiments are operationally feasible. A Counter-Stratospheric Operations experiment will be conducted within TRIPPWIRE. An all-domain joint demonstration will incorporate prototypes from land, air, sea, cyberspace, space, stratosphere, and electronic warfare to evaluate multi-path kill webs. ***FY 2023 Base Plans:*** In FY 2023, TSTD will be renamed as Multi-Domain Demonstrations (MDD) and will fall under the JCTD program element as project code 649. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funds re-aligned to new project code (P-649) Multi-Domain Demonstrations (MDD) within the JCTD program element 0603648D8Z.					
Accomplishments/Planned Programs Subtotals	69.482	102.345	96.537	-	96.537

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Upon project closeout, a JCTD has three possibilities:

1) Transition as Capability Delivery (Operational Prototype)

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-To a new or existing Program of Record
-As a residual leave behind for immediate operational use
-Or both

2) Transition as Capability Enabler (Developmental Prototype)
-Informs further acquisition programs and/or requirements development

3) No Transition
-Requirements change or no longer valid
-Did not meet deliverables as planned

The integrated management team on a JCTD includes an operational manager from a CCMD, a technical manager from service research and engineering labs, and a transition manager from a program executive office. This ensures that transition is planned for throughout the lifecycle of the project, and is a major reason for the 74% JCTD transition rate.

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COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
649: *Multi-Domain Demonstrations (MDD)*	0.000	0.000	0.000	17.563	-	17.563	17.430	16.874	17.030	17.183	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2022, all funding and investment areas in the Time Sensitive Targeting Defeat (TSTD) project code (P-722 within program element (PE) 0603338D8Z) will be incorporated into the Joint Capability Technology Demonstration PE for proper alignment and execution to support the new priorities of the Under Secretary of Defense for Research and Engineering (USD(R&E)). This project code has been renamed as Multi-Domain Demonstrations (MDD) to better reflect the objectives of the effort. This realignment reflects the FY 2023 Secretary of Defense Planning Guidance to develop a JCTD pathway to exercise and deliver critical capabilities to U.S. Indo-Pacific Command (USINDOPACOM) and U.S. European Command (USEUCOM) to curb peer competition in those regions. This funding realignment is reflected across the Future Years Defense Program (FYDP).

A. Mission Description and Budget Item Justification

This project addresses the need for distributed, rapidly-deployed capabilities that can provide persistent sensing to Find, Fix, and Finish time-sensitive threats by integrating prototypes and experiments into a series of Joint, multi-domain operational experiments. Demonstrations focus on evaluating how the Joint Force can leverage modernization technologies, commercial space-based capability, and operationalization of the stratosphere to refine hypersonic and long-range fire kill chains and Long Range Precision Strike to counter time-sensitive targets. Integrating these prototype capabilities with major exercises enhances the operational military utility assessments in real-world, multi-domain venues and satisfies additional service requirements leading to transition of these capabilities. The project integrates coalition participation within the Pacific to enable coalition warfighting techniques across forces.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Multi-Domain Demonstrations (Project Code 649)	0.000	0.000	17.563	0.000	17.563
Description: This project addresses the need for distributed, rapidly-deployed capabilities that can provide persistent sensing to Find, Fix, and Finish time-sensitive threats by integrating prototypes and experiments into a series of Joint, multi-domain operational demonstrations. Demonstrations focus on evaluating how the Joint Force can leverage operational prototypes, commercial space-based capability, and operationalization of the stratosphere to refine hypersonic and long-range fire kill chains to counter time-sensitive targets. Integrating these prototype capabilities with major exercises enhances the military utility assessments in real-world, multi-domain venues and satisfies additional service requirements leading to transition of these capabilities.					
FY 2022 Plans:					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
N/A. See Project Code 648. ***FY 2023 Base Plans:*** Coordinate with CCMDs and the services to integrate prototypes and experiments with FY 2023 Joint Exercises such as Austere Challenge, Valiant Shield, and Northern Edge. Support assessment and transition activities following completion of the exercises. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase in funds from FY 2022 to FY 2023 due to additional prototype experiments in large scale, multi-domain exercises.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	17.563	0.000	17.563

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This project leverages the DoD's most efficient and effective acquisition approaches for rapid prototyping to align with the Department modernization priorities. Prototyping partners include small businesses and non-traditional performers, industry, Federally Funded Research and Development Centers, and University Affiliated Research Centers.