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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Office of the Secretary Of Defense **Date:** April 2022

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603923D8Z I <i>Coalition Warfare Program (CWP)</i>
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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
Total Program Element	92.288	9.975	5.074	11.154	0.000	11.154	12.266	10.563	10.338	10.546	-	-
923: <i>Coalition Warfare</i>	92.288	9.975	5.074	11.154	0.000	11.154	12.266	10.563	10.338	10.546	-	-

Note

New Start (Y/N): No

A. Mission Description and Budget Item Justification

This program supports the Department's initiatives to Deter Aggression, Defend the Homeland, and Build Sustainable and Long-Term Advantage.

The Coalition Warfare Program (CWP) supports the DoD organizations that: 1) work with foreign partners to collaboratively address strategic technology gaps for current and future missions; 2) develop interoperability solutions for coalition operations; and 3) develop and strengthen defense relationships. It comprehensively supports the 2021 Interim National Security Strategic Guidance that states we will only succeed in advancing American interest and upholding our universal values by working in common cause with our closest allies and partners. We will reinvigorate and modernize our alliances and partnerships; and strengthen and stand behind our allies, work with like-minded partners, and pool our collective strength to advance shared interests and deter common threats. The CWP provides a broad base of technological, operational, and logistical support for military operations and eases the U.S. financial and manpower burdens associated with meeting military goals and objectives. Coalitions and relationships with international partners are high priorities for the nation and the Department of Defense.

The CWP supplements U.S. Government proponents' funding for cooperative efforts, ensuring U.S. funds are sufficient to complete the engagement with the foreign partners. When the CWP funds are used to help fund a cooperative project, that project leverages technical and financial contributions of the foreign partners and accelerates the development and delivery of technical solutions to the warfighter. For every \$1 the CWP has invested in cooperative projects with 81 partners since 2001, the program has leveraged \$3 in foreign partner resources and \$2 in other U.S. Government resources. The CWP funding enables the DoD project teams to transition technology to operational use, further development, or integration into other systems. These projects may also form the basis for future cooperation with international partners.

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B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	10.123	5.103	0.000	0.000	0.000
Current President's Budget	9.975	5.074	11.154	0.000	11.154
Total Adjustments	-0.148	-0.029	11.154	0.000	11.154
• Congressional General Reductions	-	-0.029			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.148	-			
• Adjustments to Budget Year.	-	-	11.154	0.000	11.154

Change Summary Explanation

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

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare Program (CWP)</i>	Project (Number/Name) 923 / <i>Coalition Warfare</i>
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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
923: <i>Coalition Warfare</i>	92.288	9.975	5.074	11.154	0.000	11.154	12.266	10.563	10.338	10.546	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Coalition Warfare Program (CWP) supports the DoD organizations that: 1) work with foreign partners to collaboratively address strategic technology gaps for current and future missions; 2) develop interoperability solutions for coalition operations; and 3) develop and strengthen defense relationships. It comprehensively supports the 2021 Interim National Security Strategic Guidance that states we will only succeed in advancing American interest and upholding our universal values by working in common cause with our closest allies and partners. We will reinvigorate and modernize our alliances and partnerships; and strengthen and stand behind our allies, work with like-minded partners, and pool our collective strength to advance shared interests and deter common threats. The CWP provides a broad base of technological, operational, and logistical support for military operations and eases the U.S. financial and manpower burdens associated with meeting military goals and objectives. Coalitions and relationships with international partners are high priorities for the nation and the Department of Defense.

The CWP supplements U.S. Government proponents' funding for cooperative efforts, ensuring U.S. funds are sufficient to complete the engagement with the foreign partners. When the CWP funds are used to help fund a cooperative project, that project leverages technical and financial contributions of the foreign partners and accelerates the development and delivery of technical solutions to the warfighter. For every \$1 the CWP has invested in cooperative projects with 81 partners since 2001, the program has leveraged \$3 in foreign partner resources and \$2 in other U.S. Government resources. The CWP funding enables the DoD project teams to transition technology to operational use, further development, or integration into other systems. These projects may also form the basis for future cooperation with international partners.

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

	FY 2021	FY 2022	FY 2023
Title: Coalition Warfare Program (Continuing Projects)	9.975	5.074	11.154
<p>Description: The CWP provides funding on a competitive basis to the DoD organizations to conduct cooperative research, development, test, and evaluation projects with foreign partners. The goals of the CWP program are to: collaboratively address strategic technology gaps for current and future missions, develop interoperability solutions for coalition operations, and strengthen current and future defense partnerships. The CWP selects projects for funding through an annual competitive selection process in accordance with Department of Defense and Combatant Command needs.</p> <p>In addition to funding newly selected projects, the program also provides funding to projects that began in earlier selection cycles (for a total of up to three years of funding for each project).</p>			

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

	FY 2021	FY 2022	FY 2023
<p>Currently, the funded portfolio includes projects governed by negotiated/signed international agreements with 21 different foreign partners. Including prior year project selections, the following FY 2022 projects encompass the CWP funding in FY 2022 and FY 2023:</p> <ul style="list-style-type: none"> • Development, Test, and Evaluation of the Binocular Near Infrared Optical Augmentation (NIRO) Device (BINO NIRO) (US Marine Corps) • Chemical Biological Wide Area Decontamination (CBWAD) (US Army) • Solid State High Power Microwave (HPM) Cannon (COMPACT HPM) (US Air Force) • Robust Anti-Submarine Warfare (ASW) Detection & Tracking Capability for High Clutter Environments (ROBUST ASW) (US Navy) • Selective Cyber Information Access (SCIA) (US Air Force) <p>Interoperability and Collaboration Initiatives: Program provides funds in support of new or planned acquisition programs with the aim of 1) promoting coalition interoperability early in the requirements or technical development phases, 2) harmonizing common goals between U.S. and foreign partners, 3) improving management of collaborative efforts. These funds support workshops, risk reduction efforts, standards development, architecture analysis, and information management initiatives.</p> <p>FY 2022 Plans: Completion of efforts that will:</p> <ul style="list-style-type: none"> • Develop ultra-compact Space Situation Awareness (SSA) sensor to fit on nanosats and track space objects and debris in real-time (SAND); • Develop prototype communication protocols to test systems controlling multiple Unmanned Underwater Vehicles from a single Unmanned Surface Vehicle (USV) mothership and enhance navigation accuracy of fielded UUVs (USV-MOTHER) • Develop/validate new class of multirole 5000 series aluminum-magnesium alloys for improved welded strength, ballistics, and marine corrosion resistance in ground, amphibious, and sea systems (AL-MG ALLOYS) • Advance previously developed small scalable kinetic weapons demonstrator hardware to a robust all-weather/night time, moving target munition and demonstrate in-ground and flight test (SSKW-2) • Improve Coalition exploitation of Weapons of Mass Destruction underground facilities (ATE) • Develop a low light level, digital fused goggle with augmented reality for enhanced soldier mobility and lethality (DELTA-I) • Develop terrestrial laser-communications network system to provide uninterrupted, ant-jam, real-time data/video links and Intelligence, Surveillance, and Reconnaissance (ISR) operations (LASER COMM NET) • Develop microsattellites with onboard automated identification system and imagery based ship detection fused to provide maritime domain awareness (MICROSAT) • Establish capability for space solar cell calibration to enable accurate calculation on orbit power for all military and commercial spacecraft (SOLARCELLCAL) 			

UNCLASSIFIED

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<ul style="list-style-type: none"> • Develop new rapid bomb crater repair solutions for roads and airfields in extreme cold weather conditions (CRADR) • Develop a gas-generator solid propellant fueled rotating detonation engine for high speed operations and demonstrate tactical missile propulsion system with 2-5x longer range (SPEAR) • Develop revolutionary infrared non-mechanical beam steering (NMBS) devices using operationally-relevant laser sources for low Size, Weight, and Power (SWaP) and high speed applications (ALIS) • Develop a new high-frequency propagation code for correct assessment of impact of short-scale ionospheric density irregularities on geolocation (MPDI) <p>FY 2023 Plans: Completion of efforts that will:</p> <ul style="list-style-type: none"> • Develop launch, recovery, and teaming of Hybrid/Vertical Take-off and Landing Unmanned Aerial Systems (UAS) (VTUAS) with autonomous sea and ground vehicles (VTUAS) • Develop dynamic Resource Allocation Management (RAM) applications and decision aids to allow both coalition warfighters to operate efficiently in the electromagnetic spectrum (EMW RAM) • Develop Long Wavelength Infrared (LWIR)/Very Long Wavelength Infrared (VLWIR) camera for standoff detection of buried Improvised Explosive Devices (IED) (IED CAM) • Develop a standards based Mission Partner Gateway eXtended (MPGW-X) solution to improve the exchange of command and control information during contingency operations (MPGW-X) • Develop automated infrasonic detection and localization software for persistent surveillance (MSAIW) • Advance understanding of near sunset ionospheric structures to improve predictions for space environment disturbance effects that impact operational radio telecommunications, surveillance systems, and GPS signals propagation (SPORT) • Develop a boost to ramjet operation burn of a liquid-fueled integral rocket ramjet in full-scale ground experimentation (THRESHER B2B) • Develop advanced technology demonstration of next-generation air-breathing munition for long-range precision fires to achieve range increase on the order of 3-6 times from existing gun weapon systems (ABLRMD) • Create a distributed contextually aware, heterogeneous collaborative Counter Unmanned Aerial System (CUAS) capability against multi-agent UAS threats (CHCUAS) • Develop space environment sensors and tools for common Space Situational Awareness (SSA) picture enabling a neighborhood watch capability for space attack assessment (Common SSA) • Develop a low-cost, low-weight chemical detection payload for a Black Hornet 3 micro UAS (MACS) • Develop lightweight ceramic armor that exceeds the performance of currently fielded armor materials (NANO B4C ARMOR) • Characterize region-specific threats to coalition warfighters subject to infectious diseases (severe acute respiratory infections (SARI), Middle East Respiratory Syndrome (MERS), and Coronavirus (CoV) and establish clinical trials (SARI) 			

UNCLASSIFIED

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<ul style="list-style-type: none"> • Develop a distributed collaborative development and simulation test bed capability connected to coalition nation defense labs to facilitate rapid prototype testing and experimentation to address warfighter challenges (VIPRE) • Develop a fieldable prototype man portable system that is immune to detection (WARWS) • Develop an air-launched UAS and carriage/launch systems to address extended range communication needs (ALUAS) • Develop an open standards architecture to enable “plug-n-play” insertion of assistive artificial intelligence (AI) agents into coalition intelligence processing systems and build a new generation of AI enabled smart sensors (CATE) • Deploy advanced diagnostics in multiphase reactive blast tests (HMRB) • Deliver real-time hazard awareness using the Mission Partner Environment (MPE) for the automated exchange of digital threat data and analytics in a multinational common operating picture (ITAC) • Develop low-cost non-cooperative space-based maritime surveillance technologies (LLAMDA) • Develop a light weight transparent armor (LWTA) to defeat 7.62X39 threats using revolutionary energy guiding layer concept (LWTA) • Develop ultra-low power sensors for integration into stealth underwater power sources (LPS) • Develop a manufacturing process with a novel high temperature alloy that fabricates small/medium scale turbine engine components for high-speed propulsion (MANTAS) • Test quality assurance Non-destructive Inspection (NDI) surface analysis devices for surface preparation inspections prior to structural adhesive bonding on composites (SAT REVIEW) • Develop AI agent Models that represent allied and enemy forces to assess operation plans, improve course of action development, inform combat decision-making, enhance force structure analysis, accelerate intelligence preparation of the battlefield, and improve realistic training (WARGAMING) <p><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i> The FY 2023 funding request was increased by \$6.051 million to support the Secretary's guidance to streamline operations, increase efficiency, and promote greater affordability within the OSD, Defense Agencies, and Field Activities; and to ensure the Department's optimum alignment to the National Defense Strategy and DoD strategic guidance, with particular focus on building a more lethal, resilient, agile, and ready force while strengthening alliances, prioritizing cyber and space capabilities, and focusing on innovation to maintain the technological advantage.</p>			
Accomplishments/Planned Programs Subtotals	9.975	5.074	11.154

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

Remarks

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D. Acquisition Strategy

The Combatant Commands, Services, Defense Agencies, and the Office of the Secretary of Defense nominate candidate projects on an annual basis. CWP provides selected projects up to three years of funding. The Program selects projects that address DoD priorities and meet the needs and requirements specified by the Joint Staff and the Combatant Commanders. Projects have equitable contributions from international partners, strong potential for transition, Combatant Command endorsement, and contribute to allied interoperability and/or meet a user need.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Office of the Secretary Of Defense **Date:** April 2022

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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Coalition Warfare Program Project Development Costs	Various	Various : Various	68.081	8.234		3.838		9.341		0.000		9.341	-	-	-
Subtotal			68.081	8.234		3.838		9.341		0.000		9.341	-	-	N/A

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Coalition Warfare Program Project Test and Evaluation Costs	Various	Various : Various	13.825	0.896		0.386		0.933		0.000		0.933	-	-	-
Subtotal			13.825	0.896		0.386		0.933		0.000		0.933	-	-	N/A

Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Coalition Warfare Program Project Management Services Costs	Option/ FFP	Analygence, INC. : Fulton, MD	10.382	0.845		0.850		0.880		0.000		0.880	-	-	-
Subtotal			10.382	0.845		0.850		0.880		0.000		0.880	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		92.288	9.975		5.074		11.154		0.000	11.154	-	-	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Office of the Secretary Of Defense		Date: April 2022
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY 2021 CWP Project Execution	1	2021	4	2022
FY 2022 CWP Project Selection	3	2021	3	2021
FY 2022 CWP Project Execution	1	2022	4	2023
FY 2023 CWP Project Selection	2	2022	2	2022
FY 2023 CWP Project Execution	1	2023	4	2024
FY 2024 CWP Project Selection	2	2023	2	2023
FY 2024 CWP Project Execution	1	2024	4	2025
FY 2025 CWP Project Selection	2	2024	2	2024
FY 2025 CWP Project Execution	1	2025	4	2026
FY 2026 CWP project Selection	2	2025	2	2025
FY 2026 CWP Project Execution	1	2026	4	2027
FY 2027 CWP project Selection	2	2026	2	2026
FY 2027 CWP Project Execution	1	2027	4	2027