Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Office of the Secretary Of Defense	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	258.262	88.004	89.091	79.046	-	79.046	80.101	84.448	85.676	87.390	Continuing	Continuing
087: *JMETC Distributed Test*	178.460	16.558	15.157	14.819	-	14.819	15.279	15.950	16.402	16.730	Continuing	Continuing
088: *JMETC National Cyber Range (NCR) Complex*	79.802	71.446	73.934	64.227	-	64.227	64.822	68.498	69.274	70.660	Continuing	Continuing

Note

Project 100 Activities realigned under Project 88: JMETC National Cyber Range (NCR) Complex.

A. Mission Description and Budget Item Justification

The Joint Mission Environment Test Capability (JMETC) program provides a Department of Defense (DoD) enterprise-wide test capability to support system-to-system interoperability testing, mission-level environment testing, and cyber event operations, including cyber testing, cyber training, cyber experimentation, and cyber mission rehearsal. The JMETC program implements the infrastructure capabilities defined in the DoD "Testing in a Joint Environment Roadmap" to provide acquisition program managers a robust nation-wide capability to "test like we fight." The JMETC program provides a persistent, distributed test and evaluation (T&E) capability that supports system development to measure and improve interoperability performance and cyber resiliency, which otherwise would not be readily available to Service/Component acquisition programs. The JMETC program is funded within the Research, Development, Test and Evaluation (RDT&E) Management Support Budget Activity because it provides test capability in support of RDT&E programs. By linking distributed facilities, as well as providing the necessary tools, services and subject matter expertise, the JMETC program allows acquisition programs to efficiently evaluate their warfighting capability in a realistic joint mission environment. The JMETC Program has been aligned to advance the National Defense Strategy (NDS), to test the development of resilient, survivable, federated networks and information ecosystems from the tactical level up to strategic planning, as well as test and assess cyber defenses, building a more lethal force.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	88.184	83.091	79.125	-	79.125
Current President's Budget	88.004	89.091	79.046	-	79.046
Total Adjustments	-0.180	6.000	-0.079	-	-0.079
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	6.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.165	-			
• Other Adjustments	-0.015	-	-	-	-
• Economic Assumptions	-	-	-0.079	-	-0.079

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Office of the Secretary Of Defense	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605100D8Z *I Joint Mission Environment Test Capability (JMETC)*

Change Summary Explanation

FY 2019: Congressional add of $4.000 million provided in Department of Defense Appropriation Bill (P.L. 115-245) accommodates a program increase, to include funding for cyber range capability and development. All additional funds included in Project 088 Joint Mission Environment Test Capability National Cyber Range (NCR) Complex.

FY 2020: Congressional add of $6.000 million is for a JMETC program increase.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense			Date: February 2020
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	Project (Number/Name) 087 / *JMETC Distributed Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
087: *JMETC Distributed Test*	178.460	16.558	15.157	14.819	-	14.819	15.279	15.950	16.402	16.730	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Mission Environment Test Capability (JMETC) program provides a Department of Defense (DoD) enterprise-wide test capability to support system-to-system interoperability testing, mission-level environment testing, and cyber event operations, including cyber testing, cyber training, cyber experimentation, and cyber mission rehearsal. The JMETC program implements the infrastructure capabilities defined in the DoD "Testing in a Joint Environment Roadmap" to provide acquisition program managers a robust nation-wide capability to "test like we fight." The JMETC program provides a persistent, distributed test and evaluation (T&E) capability that supports system development to measure and improve interoperability performance and cyber resiliency, which otherwise would not be readily available to Service/Component acquisition programs. The JMETC program is funded within the Research, Development, Test and Evaluation (RDT&E) Management Support Budget Activity because it provides test capability in support of RDT&E programs. By linking distributed facilities, as well as providing the necessary tools, services and subject matter expertise, the JMETC program allows acquisition programs to efficiently evaluate their warfighting capability in a realistic joint mission environment. The JMETC Program has been aligned to advance the National Defense Strategy (NDS), to test the development of resilient, survivable, federated networks and information ecosystems from the tactical level up to strategic planning, as well as test and assess cyber defenses, building a more lethal force.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: JMETC Distributed Test	16.558	15.157	14.819
Description: The JMETC Distributed Test project continued expansion of the JMETC Secret Network (JSN) infrastructure to meet requirements. The JMETC Distributed Test project supported DoD distributed test and training events to include: system interoperability certification; system interoperability assessments; command and control systems; air and missile defense; 5th Generation Aircraft; unmanned aircraft; precision-guided bombs; munitions; missile tracking and guidance; infrared countermeasures; Joint Fires; Joint Close Air Support; and coalition exercises. The JMETC Distributed Test project provided test planning support to users and organizations to conduct interoperability testing on numerous DoD systems including: command and control systems; information warfare; air and missile defense; intelligence, surveillance, and sensor systems; surface ships; anti-surface warfare; anti-submarine warfare; tactical radar systems; precision-guided bombs; unmanned aircraft; autonomous aircraft; manned fixed wing aircraft; helicopters; and business systems. The JMETC Distributed Test project provided strategic planning efforts to engage new acquisition programs that must demonstrate compliance with Net-Ready Key Performance Parameter. The JMETC Distributed Test project assisted customers with the use of distributed test tools and troubleshooting of the end-to-end network infrastructures. In addition, the JMETC team provided on-site support for the execution of large-scale, complex distributed events.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 087 / *JMETC Distributed Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
The JMETC Distributed Test project updated the Data Architecture Reference Document (ARD) and investment roadmap that codifies needs and resource requirements for adopting an enterprise approach to T&E Knowledge Management and Big Data Analytics. ***FY 2020 Plans:*** The JMETC Distributed Test project will continue to optimize the JMETC Secret Network (JSN) infrastructure to meet requirements, adding additional sites to meet requirements. The JMETC Distributed Test project will continue supporting DoD distributed test and training events to include: system interoperability certification; system interoperability assessments; command and control systems; air and missile defense; 5th Generation Aircraft; unmanned aircraft; precision-guided bombs; munitions; missile tracking and guidance; infrared countermeasures; Joint Fires; Joint Close Air Support; and coalition exercises. The JMETC Distributed Test project will continue providing test planning support to users and organizations to conduct interoperability testing on numerous DoD systems including: command and control systems; information warfare; air and missile defense; intelligence, surveillance, and sensor systems; surface ships; anti-surface warfare; anti-submarine warfare; tactical radar systems; precision-guided bombs; unmanned aircraft; autonomous aircraft; manned fixed wing aircraft; helicopters; and business systems. The JMETC Distributed Test project will continue to assist customers with the use of distributed test tools and troubleshooting of the end-to-end network infrastructures. In addition, the JMETC team will provide on-site support for the execution of large-scale, complex distributed events. The JMETC Distributed Test project will expand post-test enterprise service capabilities, to include Knowledge Management and Big Data Analytics tools and technologies, in support of JMETC customer needs and requirements. ***FY 2021 Plans:*** The JMETC Distributed Test project will continue to optimize the JMETC Secret Network (JSN) infrastructure to meet requirements, adding or removing sites as necessary. The JMETC Distributed Test project will continue supporting DoD distributed test and training events. The JMETC Distributed Test project will continue providing test planning support to users and organizations to conduct interoperability testing on numerous DoD systems. The JMETC Distributed Test project will continue to assist customers with the use of distributed test tools and troubleshooting of the end-to-end network infrastructures. In addition, the JMETC team will provide on-site support for the execution of large-scale, complex distributed events. The JMETC Distributed Test project will continue to modernize post-test enterprise service capabilities, to include Knowledge Management and Big Data Analytics tools and technologies, in support of JMETC customer needs and requirements.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 087 / *JMETC Distributed Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
The JMETC Distributed Test project will continue to support new and emerging acquisition programs. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Program Adjustments			
Accomplishments/Planned Programs Subtotals	16.558	15.157	14.819

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense			Date: February 2020
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	Project (Number/Name) 088 / *JMETC National Cyber Range (NCR) Complex*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
088: *JMETC National Cyber Range (NCR) Complex*	79.802	71.446	73.934	64.227	-	64.227	64.822	68.498	69.274	70.660	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The National Cyber Range Complex (NCRC) is comprised of cyber ranges and a secure distributed network infrastructure to service the cyber range user community. The NCRC currently consists of five functional cyber ranges, including the National Cyber Range in Florida as well as four Regional Service Delivery Points (RSDP) located in Hawaii, Alabama, Maryland, and Massachusetts. To enhance DoD cyber range test and training capability and capacity, the NCRC is being expanded with additional cyber ranges co-located with key Service organizations to support an increase of cyber testing of DoD systems as well as training of cyber warfighters. The JMETC Multiple Independent Level of Security (MILS) Network (JMN) currently links 58 sites across the DoD, industry, and academia, providing secure access between cyber ranges, laboratories, and facilities. Both the cyber ranges and the network infrastructure are accredited to support multiple levels of security classifications, specifically configured to meet particular cyber event requirements. The NCRC investments have been aligned to support the National Defense Strategy in improving cyber defense, cyber resilience, and the continued integration of cyber capabilities into the full spectrum of military operations.

The NCRC conducts cyberspace test and training events for the full spectrum of DoD customers including research, development, acquisition, testing, training and operational Cyber Mission Forces (CMF). The NCRC executes wide variety of event types including science and technology (S&T) demonstrations, developmental test and evaluation (DT&E), operational test and evaluation (OT&E), security controls assessments, cyberspace operations training, refinement of cyberspace tactics, techniques, and procedures (TTP) Development, forensics/malware analysis) and cyberspace operations mission rehearsal. The NCRC enables acquisition programs to conduct cybersecurity test and evaluation in an operationally representative cyberspace environment enabling identification, validation and mitigation of vulnerabilities. The NCRC also supports training, mission rehearsal and certification of the CMF in support of US Cyber Command by enabling operational forces to efficiently evaluate cyber warfighting capability in a realistic joint mission environment.

The NCRC provides secure facilities, technology, processes, and workforce to rapidly create hi-fidelity, mission-representative friendly, neutral, and adversarial cyberspace environments.

The NCRC also facilitates integration of distributed organizations with different missions and workforce relevant to cyber operations (e.g., cyber operators, penetrations testers, cyber assessors, cyber observers, cyber analysts, etc.). The NCRC supports cyber activities across of a full spectrum of DoD systems, including weapon platforms, C4I systems, business systems, network devices, and other systems vulnerable to a cyber-attack. The NCRC extensively utilizes automation to minimize human error, to reduce the time required to set-up for a cyber event, and to ensure repeatable results. In addition, the NCRC employs post-event sanitization techniques on all assets after exposure to malicious code to restore back to a known, clean state, which allows for reuse in future events.

The NCRC has a multidisciplinary workforce with software, systems, network, virtualization, automation, system administration, and cybersecurity subject matter expertise. In support of successful planning and execution of hosted events, the NCRC workforce helps users define and refine their event objectives, assists with identifying and prioritizing potential vulnerabilities, designs virtualized cyber environments, develops customized traffic generation and instrumentation solutions, integrates 3rd party hardware and software, executes cyber events on behalf of the user, provides cooperative vulnerability and penetration assessments, performs detailed cyber analysis, and delivers detailed reports on the results. In addition, the NCRC workforce supports both the Executive Agent for Cyber Test Ranges and

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 088 / *JMETC National Cyber Range (NCR) Complex*

the Executive Agent for Cyber Training Ranges, to identify and address relevant needs, define and promulgate standards, and seek efficiencies through focused investments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: JMETC National Cyber Range (NCR) Complex	71.446	73.934	64.227
Description: The NCRC continued support for hundreds of cyber events, providing cybersecurity T&E support to Major Defense Acquisition Programs (MDAP), Major Automated Information Systems (MAIS) Acquisition Programs, and smaller acquisition programs. The NCRC continued support for cyber testing of systems and subsystems across multiple domains (land, air, sea, and space) relevant to manned and unmanned aircraft, surface ships, command and control systems, data management platforms, weapons platforms, satellites, radars, and missile defense systems. The NCRC continued support to Service Cyber Mission Forces (CMF) with training, certification, mission rehearsal and TTP development focused events. The NCRC continued support to numerous DoD organizations in cyber activities, including US Cyber Command; Joint Staff J-7; Director, Operational Test & Evaluation (DOT&E); Director, Developmental Test & Evaluation (DT&E); Army PEO Command Control Communications Tactical (PEO C3T); Naval Air Systems Command (NAVAIR); Naval Information Warfare Systems Command (NAVWARSYSCOM); Naval Sea Systems Command (NAVSEA); PEO Ships; Air Force Space and Missile Command; Army Intelligence and Information Warfare Directorate; Office of Naval Intelligence; Marine Corps Tactical Systems Support Activity; the Army Combat Capabilities Development Command (CCDC) C5ISR Center; and several partner nations. ***FY 2020 Plans:*** The NCRC will continue to implement improvements needed to increase capacity and support increased demand at the current and future cyber ranges. The NCRC will continue to build out additional dedicated Persistent Testing and Training Environments to support testing and training customers. The NCRC will continue to operate in support of the growing acquisition program cybersecurity T&E requirements. The NCRC will continue to provide Cyber Table Top support for acquisition programs to help assess and address cyber security as early as possible in development. The NCRC will continue to provide support to US Cyber Command, Joint Staff, and other training and certification events by developing representative blue, red and gray environments. The NCRC will continue to support DOT&E cyber assessments. The NCRC will continue to support US Cyber Command cyber activities. The NCRC will continue to expand testing of Industrial Control Systems and Avionics Systems test beds. The NCRC will increase capacity by establishing additional cyber ranges in support of both cyber T&E and training requirements.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 088 / *JMETC National Cyber Range (NCR) Complex*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
The NCRC will conduct engineering activities to plan for technical refresh of emerging end of life and end of service computing assets. The NCRC will continue to assess cyber range requirements in close cooperation with the Executive Agents for Cyber Test Ranges and Cyber Training Ranges to build priority cyber range capability and capacity to meet identified RDT&E community and CMF needs. The NCRC will continue analyses of capability to determine requirements and standards needed to join these cyber test facilities with existing acquisition system hardware-in-the-loop, software-in-the-loop, and systems integration laboratories to test systems in a realistic cyber contested environment. The NCRC will continue to expand the JMN connectivity as needed to provide access to cyber range resources.			
FY 2021 Plans: The NCRC will continue to implement improvements needed to increase capacity and support increased demand at the current and future cyber ranges. The NCRC will continue to build out additional dedicated Persistent Testing and Training Environments to support testing and training customers. The NCRC will continue to operate in support of the growing acquisition program cybersecurity T&E requirements. The NCRC will continue to provide Cyber Table Top support for acquisition programs to help assess and address cyber security as early as possible in development. The NCRC will continue to provide support to US Cyber Command, Joint Staff, and other training and certification events by developing representative blue, red and gray environments. The NCRC will continue to support DOT&E cyber assessments. The NCRC will continue to support US Cyber Command cyber activities. The NCRC will increase capacity by establishing additional cyber ranges in support of both cyber T&E and training requirements. The NCRC will conduct engineering activities to plan for technical refresh of emerging end of life and end of service computing assets. The NCRC will continue to assess cyber range requirements in close cooperation with the Executive Agents for Cyber Test Ranges and Cyber Training Ranges to build priority cyber range capability and capacity to meet identified RDT&E community and CMF needs. The NCRC will continue analyses of capability to determine requirements and standards needed to join these cyber test facilities with existing acquisition system hardware-in-the-loop, software-in-the-loop, and systems integration laboratories to test systems in a realistic cyber contested environment. The NCRC will continue to expand the JMN connectivity as needed to provide access to cyber range resources.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Office of the Secretary Of Defense		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 088 / *JMETC National Cyber Range (NCR) Complex*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Initiate new cyber range capability and development to directly address United States Army Cyber Command test and training needs. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Program Adjustments			
Accomplishments/Planned Programs Subtotals	71.446	73.934	64.227

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A