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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2025 Office of the Secretary Of Defense **Date:** March 2024

<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603662D8Z / <i>Networked Communications Capability</i>
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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	8.611	3.011	11.197	5.234	-	5.234	6.303	7.362	8.427	8.598	Continuing	Continuing
663: <i>Networked Communications Analysis</i>	8.611	3.011	11.197	5.234	-	5.234	6.303	7.362	8.427	8.598	Continuing	Continuing

**Note**

New Start (Y/N): No

**A. Mission Description and Budget Item Justification**

The Networked Communications Capability (NCC) Program Element (PE) plays a vital role in supporting the Department of Defense (DoD) and Defense Industrial Base (DIB) ecosystem. NCC focuses on maturing and demonstrating technologies that foster interoperable, resilient, and capable strategic and Joint Force communications capabilities. Given the critical reliance of DoD missions on command, control, and communications (C3) infrastructure, the NCC PE addresses challenges faced by the DoD's existing C3 infrastructure, including internal system-centric design approaches, as opposed to network- and data-centric ones, and external threats from aggressive adversary actions. The integration of both DoD and commercial embedded, virtualized, and cloud-hosted hybrid systems and networks underscores the increasing importance of the DoD's ability to rapidly reconfigure and reconstitute this infrastructure. Ultimately, the NCC PE envisions C3 that is accessible for anyone, anywhere, anytime, and through any environment.

The NCC PE strategy employs secure and rapidly reconfigurable software-defined/hardware-supported solutions across the layers of the DoD communications stack (physical, network, information, and application layers). The technology integrates these layers to establish a highly agile, adaptable, and resilient C3 infrastructure. This approach ensures the DoD's ability to maintain critical communications in diverse mission domains such as terrestrial, maritime, air, space, and cyberspace. Additionally, it operates effectively in degraded, contested, or denied environments, supporting both tactical edge and strategic contexts. Building upon previous work with Software Defined Radios (SDRs), the NCC PE utilizes adaptive methods to dynamically analyze the operating environment. This includes considering parameter changes within individual waveforms and switching between high-data rate, low probability of detection techniques, and leveraging tunable waveforms for C3 across various scenarios. The integration of Software Defined Network (SDN) protocols facilitates routing the right information to the right users at the optimal speed and quality, aligning with the requirements of diverse warfighting missions. These advancements will leverage commercially available software and hardware where possible.

The NCC PE works in collaboration with the Joint Tactical Networking Center (JTNC) and the Joint Interoperability Test Command (JITC) in collaborative partnership to advocate for the proper testing, evaluation, verification and validation, and certification of all relevant SDR (inclusive of the waveforms) and SDN solutions from DIB partners for the purpose of ensuring enduring interoperability / compatibility, resiliency, and capability advancement for the positive benefit of US DoD warfighters and as well those of Allied Nations.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>
Previous President's Budget	3.125	11.197	5.276	-	5.276
Current President's Budget	3.011	11.197	5.234	-	5.234
Total Adjustments	-0.114	0.000	-0.042	-	-0.042
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.114	-			
• Program Adjustments - Overall DoD Reduction	-	-	-0.053	-	-0.053
• Economic Assumptions	-	-	0.011	-	0.011

**Change Summary Explanation**

FY 2024 NCC PE had an increase of ~\$7.000M to assist in supporting the Integrated Broadcast System Demo (IBS MX Demo) -- the effort was directed by the Deputy Secretary of Defense to assist with continued NCC capabilities and is to be completed by the end of FY 2024.

FY 2025 PB Program Adjustments -- A reduction of \$0.053 million was applied to meet DoD overall funding reductions, which were spread to mitigate impact.  
 FY 2025 PB Program Adjustments -- Funding increase of \$0.011 million for Economic Assumptions.

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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
663: <i>Networked Communications Analysis</i>	8.611	3.011	11.197	5.234	-	5.234	6.303	7.362	8.427	8.598	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Threats to communication systems emanate from a variety of sources, encompassing electromagnetic, cyber, and kinetic elements, among others. The central objective of research and development in network communications is to guide the Services, partners, and industry towards the creation of fully networked and integrated capabilities that exhibit interoperability, resilience, and security. This involves the strategic identification and acceleration of critical technologies, leading to their transition to both strategic and tactical forces. The ultimate goal is to ensure that C3 systems are trusted, accessible, and reliable anywhere, anytime, and under any conditions for tactical to strategic missions, thereby enhancing the lethality of the warfighting force. In the face of peer aggressors armed with advanced kinetic and non-kinetic threats, the imperative for trusted and reliable C3 becomes even more pronounced. This capability is viewed not only as a critical deterrence measure but also as essential for providing a decisive and lethal response when required, spanning tactical to strategic missions.

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

	FY 2023	FY 2024	FY 2025
<p><b>Title:</b> NCC</p> <p><b>Description:</b> Title: Integrated Network System of Systems (INSS) Critical Technology Research and Development Portfolio Analysis (\$1.904) Description: Provides technical leadership and oversight, establishes strategic priorities, and issues guidance relating to the supervision of all INSS related programs and activities across DoD.</p> <p>Title: Integrated Broadcast System (IBS) Operating over MUOS ULX Demonstration (\$0.0) Description: Results of Deputy Secretary of Defense directed FY 2024 IBS Common Waveform demonstration and report to Cost Assessment and Program Evaluation (CAPE). Demonstration and Project completion in FY 2024.</p> <p>Title: Accelerated Networked C3 Technologies Research and Development. (\$3.319) Description: Identify and accelerate rapidly reconfigurable software-defined and hardware-supported solutions across each of the layers of a given DoD communications stack (e.g. physical, network, information, and application layers) and technology that fuses the layers of the stack to provide a truly agile, adaptable, and resilient C3 infrastructure.</p> <p>FY 2023 Accomplishments: Software and hardware developments were successful in demonstrating instrumented performance within existing software elements, particularly information services. These developments showcased effective interaction between elements in the cloud</p>	3.011	11.197	5.234

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>environment and exhibited flexibility across various communications protocols. However, the gains made in hardware were found to be prohibitively expensive and impractical for the Army's transition of X-band capability. In response to this, a more practical and cost-effective UHF capability, aligning with the Army's preferences, is currently in the planning stages and is slated for demonstration in FY 3024. The subsequent transition of the UHF capability is anticipated. Notable accomplishments in FY 2023 also encompassed the successful transition of Universal Command and Control (UC2) to the Test Resource and Management Center (TRMC), preparations for FY 2024 demonstration of the IBS MUOS ULX capability, and planning for a Tactical Adaptive Modem (TAM) supporting Resilient Free Space Optical (FSO). Furthermore, collaborations with Service's tactical networking capability efforts generated opportunity for acceleration of a joint networking optimization demonstration, leveraging the Rapid Defense Experimentation Reserve initiative set for FY 2025.</p> <p><b>FY 2024 Plans:</b>            Software Development:            - Incorporate networking features at both enterprise and tactical edge layer</p> <p>Hardware Development:            - Integrate software and firmware in high speed spatially diverse embedded device</p> <p>Modeling:            - Model interactions between core network and edge networking interface</p> <p><b>FY 2025 Plans:</b>            Continues funding for INSS Critical Technology Research and Development Portfolio Analysis and Accelerated Networked C3 Technology Research and Development, inclusive of the following innovation opportunity initiatives:</p> <ul style="list-style-type: none"> <li>• Support for experimentation and coalition demonstration towards transitioning multi-domain TAM/FSO, LPI/LPD waveforms, SDR and SDN (wrap up to field FY 2024 work with hook to support potential Congressional ask to field FSO capability)</li> <li>• Work with Combatant Commands, Services, and Agencies (CSAs) to identify minimum viable standards necessary for automatic transport maneuverability enabling ubiquitous communication</li> <li>• Support to CSA programs and technology development to rapidly incorporate necessary technology changes to meet necessary standards</li> </ul>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2023	FY 2024	FY 2025
<ul style="list-style-type: none"> <li>To accelerate fielding of critical INSS C3 technologies, NCC PE will identify and champion RDT&amp;E efforts of promising enterprise S&amp;T prototype initiatives from CSA labs and industry partner Independent research and development (IRAD) projects with high potential to transition in 1–3 years</li> </ul> <p><b><i>FY 2024 to FY 2025 Increase/Decrease Statement:</i></b> Decrease due to the completed Deputy Secretary of Defense directed IBS Demo in FY 2024 and returned to NCC PE core baseline funding profile. Additional decreases due to economic inflation and FY 2025 PB programmatic adjustment to meet DoD overall funding reductions.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	3.011	11.197	5.234

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The NCC PE is working together the DoD’s Services/Agencies to integrate advanced SDR and SDN technologies into existing communications infrastructure within both tactical edge and strategic enterprise-level contexts. Interoperable, resilient, and capable C3 infrastructure is critical to addressing current and future threats to DoD warfighting operations, while modernizing the Joint Force in an affordable manner.