Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Office of the Secretary Of Defense	Date: March 2024
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602230D8Z / *Defense Technology Innovation (Beyond 5G)*

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	17.075	18.453	55.160	38.515	-	38.515	47.786	44.336	37.680	38.435	Continuing	Continuing
230: *Defense Technology Innovation (Beyond 5G)*	17.075	18.453	55.160	38.515	-	38.515	47.786	44.336	37.680	38.435	Continuing	Continuing

Note

New Start (Y/N): No

A. Mission Description and Budget Item Justification

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

Today's mobile and tactical communications are stove-piped and limit the force from fully executing the JADC2 concepts of tomorrow. Warfighters require integrated network mission solutions utilizing 5G/FutureG technologies to support the future battle. Beyond 5G delivers unified solutions in mobile and tactical networks to give US DoD an asymmetric advantage. Through key strategically architected innovations being developed by Defense Technology Innovation (Beyond 5G), the future implementation and sustainability of current JADC2 concepts will be supported, enabling DoD to keep pace with warfighter capability requirements. The net benefit will be a reduction in the technical and tactical burden on DoD network operators via implementations of high performing mission solutions which are situationally aware and can rapidly and autonomously adapt to changing battlefield conditions.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	19.067	55.160	72.186	-	72.186
Current President's Budget	18.453	55.160	38.515	-	38.515
Total Adjustments	-0.614	0.000	-33.671	-	-33.671
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.612	-			
• Program Adjustments	-0.002	-	-33.749	-	-33.749
• Economic Assumption	-	-	0.078	-	0.078

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Change Summary Explanation

Decrease of $33.749 million in FY 2025 is due to a reduction of $21.749 million applied to meet DoD overall funding reductions, which were spread to mitigate impact. Realignment of $12.000 million to match program's technical schedule. Funding increase of $0.078 million in FY 2025 for Economic Assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Office of the Secretary Of Defense			Date: March 2024
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602230D8Z / *Defense Technology Innovation (Beyond 5G)*	Project (Number/Name) 230 / *Defense Technology Innovation (Beyond 5G)*	

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
230: *Defense Technology Innovation (Beyond 5G)*	17.075	18.453	55.160	38.515	-	38.515	47.786	44.336	37.680	38.435	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Technology Innovation (Beyond 5G) effort builds upon the technology foundation that underpins fifth-generation / future generation (5G/FutureG) cellular network systems as a basis to create the next generation of wireless cellular network and security technologies for military applications. Working in concert with other U.S. Government science and technology agencies, Beyond 5G is successfully conducting applied research to adopt, adapt, advance, and integrate technologies to create asymmetric advantages. Our approach is to replace cost-prohibitive, single-function stovepipes that limit the force from fully executing the Joint All-Domain Command and Control (JADC2) concepts of tomorrow.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Beyond 5G	18.453	55.160	38.515

Description: In the domain of fifth generation / future generation (5G/FutureG) wireless networks, the warfighter requires complex system-of-systems solutions equipped with features and attributes unique to battlefield challenges. These solutions must be developed with DoD mission-level capability requirements at the foundation of the developmental process.

To address this need, Beyond 5G is inventing automated spectrum management solutions to fill technology gaps in an increasingly important area of DoD cooperation with civilian spectrum use, with specific attention to enabling coexistence between 5G/FutureG and military radars. Other technology areas being addressed include military unmanned aerial system 5G/FutureG payloads to enable deployment of high-performance tactical networks and solutions for secure interoperability between DoD and commercial networks to provide required flexibility and new defensive/offensive capabilities to our warfighters. In addition, Beyond 5G is driving targeted wireless innovations in open-source software, hardware, and standards to provide our soldiers a fully programmable network architecture. The resulting holistic end-to-end mission solution includes mobile end points, telecom base stations, tactical radios, network infrastructure and compute fabric for zero-touch deployments of fully automated DoD network systems. Under this approach, we enable the U.S. to regain leadership in future wireless technologies including sixth generation (6G) and beyond.

FY 2024 Plans:
Through ongoing projects and planned FY 2023 solicitations, DoD will respond to DoD 5G strategy doctrine by continuing to invest in applied research in next generation wireless cellular network and security technologies for military applications and by executing fellowship/training programs to grow national workforce capability in this critical technology domain.

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Additionally, DoD will continue ongoing contracts to invest in analytically oriented research efforts to support participation in the 3rd Generation Partnership Program (3GPP) standards process to evolve FutureG standards in dual-use directions that will benefit DoD missions and strategies. Continue executing projects awarded in FY 2023 in the following topic areas: 1. Dynamic spectrum management/engineering to improve the efficiency, reliability, resiliency, and dual-use coexistence of DoD operation of limited electromagnetic spectrum within frequency bands licensed for 5G and FutureG mobile telecom applications; 2. The use of mobile distributed multi-input multi-output schema and architectures to enable high-value operational mission CONOPS relying on mobile wireless ad-hoc tactical networks within operationally relevant DoD domains within which adversary interception and jamming can be pervasive (e.g., intra-/inter-squad and squad-to-command post networking, long range networking, terrestrial/airborne networking, etc.); 3. Exploitation of emerging 5G features such as open radio access networks, integrated access and backhaul, and non-terrestrial networks to enable a next generation of DoD tactical networks that integrate a commercial terrestrial 5G network with an airborne network segment in order to leverage the ubiquity and cost advantage of commercially available network infrastructure and user equipment for DoD mission benefit by servicing critical objectives such as autonomous, reliable, secure, and resilient low-latency operations. These areas of applied research link directly to DoD 5G strategy doctrine and have been instantiated in a portfolio of multi-phase programs being executed across a diverse set of industry, FFRDC, and academic performers. In FY 2024, this portfolio will be augmented with additional programs in the thrust areas above via new solicitations and contract actions, and current active programs will be funded for follow-on phase options where warranted by early phase execution excellence and the establishment of a strong value proposition requiring additional work and funding. In FY 2024, the Beyond 5G portfolio will also pursue applied research in next generation cellular network systems in three additional strategic technology development focus areas deemed to provide the potential for revolutionary improvements in next generation cellular network systems: 1. The development of Unlimited Software defined Radio (SDR) technologies which remove hardware and prior generation architectural and implementation constraints by enabling full programmability of wireless signal generation and control for spectrum dominance; 2. The development of Hyper-Dimensional Software Defined Networks (SDN) to enable autonomous management of wireless network operations in environments that will be required to accommodate far more heterogeneity in technologies than current constructs, mixing in numerous different wireless modalities across numerous disparate networks;			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
3. The development of Mobile Internet Protocol advances such as time and location-aware protocols, named data networking, and next generation encryption schema which overcome limitations of current static internet protocols to support the dynamics and mobility required for low-power discriminating future DoD capabilities while improving operational security and resiliency. Through these developments, Beyond 5G will build a foundation for the technologies required to support US leadership in the global information infrastructure with embedded US principles and make the DoD more effective, more survivable, and improve readiness in the following ways: Unlimited SDR: - Benefit to the US: Tailored access to more wireless resources for new commercial markets - Benefit to the DoD: Improved spectrum management capabilities at all levels of DoD activities Hyper-Dimensional SDN: -Benefit to the US: Improved deployment models for public and private networks -Benefit to the DoD: Distributed and easy to maintain networks Mobile IP: -Benefit to the US: Lower power, improved performance; trusted, secure, and privacy-enhancing networks -Benefit to the DoD: Improved cyberspace capabilities; EMS and network signature management Building upon a well-established paradigm of program execution processes and controls, multi-phase programs added to the Beyond 5G portfolio in these applied research areas via FY 2023 solicitations will be managed to maximize the probability of beneficial outcomes. Collectively, the applied research focus areas described above represent a body of technology development that promises the evolutionary and revolutionary transformation of wireless cellular network systems which can enable enormous DoD mission benefit while also servicing DoD 5G Strategy dual-use objectives. In developing the applied research portfolio as described, Beyond 5G will continue to adapt the investment strategy and program mix based on the companion Prototyping and Experimentation testbed deployments, driving towards an integrated overall technology maturation process that maximizes the probability of successful technology transition into operations. ***FY 2025 Plans:*** Complete and continue research projects initiated in FY 2023 and FY 2024 with focus on technology transfer and transition commensurate with their technical progress. This includes projects that will establish the following capabilities: 1) Resilient and Open Commercial Solutions (Open 6G Development Environment andDynamic Spectrum Management) 2) Ubiquitous, Secure and Instant Access 3) Expeditionary and Tactical Military Use and 4) Integrated Sensing and Communications.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Projects to be added to the portfolio support needed developments in the following technology focus areas: 1. FutureG for Resilient Logistics in Contested Environments is an emerging challenge. A key feature of contested environments is congested spectrum that can challenge the ability of automated systems to function. Beyond 5G is focusing on research approaches that improve the ability of these systems to operate in an adaptive and agile manner. The resulting asymmetric capability is to be integrated into a robust network architecture that supports sustainment and logistics from the point of origin to the point of need across the competition continuum. 2. Securing 5G/FutureG for Decision Advantage produces open-source software(OSS), such as the Open Radio Access Network (ORAN) Software Community and the Linux Foundation 5G Super Blueprint (SB), that will gain momentum and transition 5G mobile wireless networks to OSS alternatives. Beyond 5G's Open Centralized Unit Distributed Unit (OCUDU) initiative will develop solutions across Software, Hardware and Management domains which will: (1) provide a secure 5G OSS baseline to maintain information and decision advantage in a contested environment, and (2) provide an economically viable alternative for U.S. Allies and partners across the globe to proprietary technology. 3. Multi-site FutureG Experimentation enables an environment to: (1) foster the development of FutureG wireless communications technology for increased battlefield interoperability and ensure a skilled workforce, (2) support the development of new multi-domain operating concepts commensurate with emerging commercial spectrum requirements, and (3) build coalitions to influence the development of international wireless communications standards to U.S. advantage. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Beyond 5G is executing/developing a portfolio of applied research projects according to a defined strategic plan which are urgently required to meet short-term and long-term warfighter needs and to maintain or outpace the capabilities and strategic resolve of our adversaries. The $16.645 million decrease from FY 2024 to FY 2025 reflects a directed reduction that was applied to meet DoD overall funding benchmarks. Beyond 5G ideation, design, prototyping, and integration of novel 5G/FutureG network concepts and components will lead to operationalization of new mission capabilities architected to enable U.S. DoD operations to dominate the future contested networked battlespace, create an asymmetric advantage over our adversaries, and provide a foundation of communications for JADC2.			
Accomplishments/Planned Programs Subtotals	18.453	55.160	38.515

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A