

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software
---	---

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	-	163.229	129.974	162.513	-	162.513	156.333	106.957	90.035	81.010	Continuing	Continuing
323: Common Hardware Systems	-	4.695	5.481	4.998	-	4.998	5.029	5.005	4.998	4.995	Continuing	Continuing
C29: Centralized Technical Support Facility (CTSF)	-	8.585	8.637	7.164	-	7.164	0.000	0.000	0.000	0.000	0.000	24.386
C34: Army Tac C2 Sys Eng	-	7.661	9.483	9.706	-	9.706	11.974	11.694	11.075	11.378	Continuing	Continuing
EJ4: COMMAND POST COMPUTING ENVIRONMENT (CPCE)	-	33.693	30.969	27.489	-	27.489	27.470	27.406	27.403	27.515	Continuing	Continuing
EJ5: MOUNTED COMPUTING ENVIRONMENT (MCE)	-	18.463	10.464	18.582	-	18.582	22.145	20.091	17.571	17.887	Continuing	Continuing
EJ6: TACTICAL ENHANCEMENT	-	10.085	0.000	7.860	-	7.860	0.000	0.000	0.000	0.000	0.000	17.945
EK9: TACTICAL NETWORK OPERATIONS AND MANAGEMENT	-	7.631	3.649	3.375	-	3.375	0.000	0.000	0.000	0.000	0.000	14.655
EQ8: Mobile/Handheld Computing Environment (M/HHCE)	-	9.130	4.857	5.155	-	5.155	5.163	5.172	5.180	5.247	Continuing	Continuing
ER9: Expeditionary Army Command Post	-	33.052	28.895	58.436	-	58.436	53.195	20.089	9.998	0.000	0.000	203.665
EW3: Unit Task Reorganization (UTR) Development	-	30.234	27.539	19.748	-	19.748	31.357	17.500	13.810	13.988	Continuing	Continuing

A. Mission Description and Budget Item Justification

This funding line supports the Army Network Modernization Strategy LOE 1, Unified Network, LOE 2 - Common Operating Environment and LOE 4 - Command posts. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Project 323, the Common Hardware Systems (CHS), is an ACAT III program and is a mandated Army Strategic Source that acquires and sustains highly flexible, cost effective, and simplified non developmental C5ISR solutions that integrates the latest and emerging commercial technology onto the Converged Mission Command

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	
<p>Network. This funding line supports the Army Network Modernization Strategy LOE 2, Common Operating Environment. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy. CHS provides technical support, environmental and survivability testing, system design, end of life/configuration management, and strengthens cybersecurity/supply chain risk management across Army tactical programs to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS continuously analyzes and tracks hardware from cradle-to-grave, from emerging technology until end-of-life. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs and agencies including: Mission Command; Tactical Network; Tactical Radios; Distributed Common Ground Station Army; Aviation Systems; Counter Rocket, Artillery, Mortar; Communication Electronics Command; Combat Capabilities Development Command (CCDC), among others. CHS rapidly procures common hardware configurations across the Integrated Tactical Network (ITN), Common Operating Environment (COE), the sustainment community, and tactical programs that enables the continuous modernization in support of all four Network Modernization Lines of Effort and Network Cross Functional Team (CFT) requirements. CHS logistical services include worldwide 72 hour turnaround repair through strategically located support centers for tactical military units, tailorable supply chain and cybersecurity measures, manages customizable warranty, maintenance and failure rate reporting, and technical support services to support specific Army program requirements. CHS supports better buying power initiatives by creating efficiencies through economies of scale, price breaks, streamlined processes, reduced cycle times, and centralized contracting.</p> <p>Project C29, the Central Technical Support Facility (CTSF), is the Army's single strategic facility responsible for executing Army Interoperability Certification (AIC) system of system verification/validation checkout, testing, and configuration management for the Army's LandWarNet Baseline. The Centralized Technical Support Facility (CTSF) funding line supports the Army's Network Modernization Strategy Line of Effort LOE 1B Network Enabling Functions.</p> <p>Project C34, the Army Tac C2 Sys Eng project funds the PEO Command, Control, Communications-Tactical (PEO C3T) the System-of-Systems engineering, Enterprise and Integration efforts. The system engineering efforts are to facilitate the overall network interoperability of all the various programs that must be able to seamlessly connect together while addressing their individual distinct requirements. Efforts address continuing evolution of the network within the PEO C3T portfolio of technology across capability enhancement packages, in line with the Network CFT capability set strategy, to deliver efficient and effective cross-domain technical solution.</p> <p>Project EJ4, the Command Post Computing Environment (CPCE), is one of the computing environments under the Common Operating Environment (COE) initiative, a major Army Network Modernization Strategy Line of Effort of the Network Cross-Functional Team (N-CFT). CPCE provides a common software infrastructure framework (common interface, data, and services) upon which future Warfighter capabilities can be built. CPCE development efforts initially target Movement and Maneuver capability development at tactical echelons that span from Army Service Component Commands (ASCC) to Battalion level. The CPCE will be the central computing environment developed to support command posts and combat operations, and will be interoperable with Mounted and Mobile/Handheld systems.</p> <p>Project EJ5, the Mounted Computing Environment (MCE), is one of the six computing environments (CEs) formalized by the AAE under the Common Operating Environment (COE) initiative. MCE standardizes end-user environments and enables streamlined deployment of new warfighting applications while leveraging existing hardware under the Joint Battle Command - Platform program. Requirements for the MCE are established in the AROC approved COE Information Systems Initial Capability Document (IS ICD) and the approved Mounted Computing Environment Requirements Definition Package (RDP). The MCE will provide incremental improvements with additional application capabilities over time, and will be interoperable with Command Post and Mobile/Handheld systems.</p>		

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	
<p>Project EJ6, Tactical Enhancement supports the evaluation and testing requirements for Terrestrial Transmission (TRILOS) and Troposcatter Transmission (TROPO) capabilities procured and fielded under the Signal Modernization (SIGMOD) funding line, B00010. TRILOS and TROPO will provide redundancy communications in a Satellite denied environment by providing improved Line of Sight and beyond line of sight radio systems. In addition this funding will support development of Network Centric Waveform-Resilient (NCW-R). NCW-R is a critical, near-term set of modifications to the current WIN-T SATCOM waveform that will provide limited protection against our adversaries' ability to jam tactical SATCOM Command and control communications on Wideband Global SATCOM (WGS) satellites. NCW-R will provide anti-jam capability and resiliency to WIN-T Program of Record satellite terminals in contested environments. The NCW-R waveform software will operate on WIN-T satellite modems. NCW-R will provide a bridging capability until the next generation protected satellite constellation is launched by the Air Force (projected FY 2028/2029). The current anti-jam protection is limited to two SMART-T terminals per BCT, division and Corps HQs, leaving battalions vulnerable to being isolated during jamming events.</p> <p>Project EK9, Tactical Networks Operational Management (TNOM)'s purpose is to create Unified Network Operations (UNO). UNO is a software based, integrated NetOps capability being developed, as a rapid prototype - proceeding under Section 804, mid-tier acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM). Enabling common planning, configuration, monitoring, provisioning, management, and defense of the Network, UNO configures and integrates tactical and enterprise networks to allow delivery of information and communications among Soldiers at all echelons utilizing network resources prioritized according to the Commander's intent. In developing UNO, TNOM follows the Army's development operations (DevOps) approach - creating NetOps prototypes, gaining user feedback, making adjustments and ultimately delivering enhanced capabilities to the operational force in the shortest time possible. UNO development incorporates solutions available in industry and through government agencies - assessing them in an adapt and buy approach informed by experimentation, demonstration, and modernization.</p> <p>Project EQ8, Mobile/Handheld Computing Environment, supports the Nett Warrior (NW) Program (named in honor of Medal of Honor recipient Colonel Robert C. Nett), also known as the Ground Soldier System (GSS) Program. The program leverages commercial smart devices and secure Army tactical radios to provide the dismounted leader an integrated mission command and situational awareness system for use during combat operations. The NW system provides leaders electronic real-time information on friendly positions; information about enemy activity and movement; navigational data and map imagery; a collaborative planning tool; and other mission related graphics which effectively puts the power of the entire Army tactical network in the hands of the dismounted leader.</p> <p>Project ER9, Command Post Integrated Infrastructure (CPI2), fields mobile Command Post nodes by integrating mission command solutions to enhance the survivability and mobility of command post formations. CPI2 will replace selected elements of the legacy command post to provide improved expeditionary capability, survivability, agility, and scalability for command post formations at all echelons. By integrating mission command warfighting functions on to formation appropriate vehicle platforms, a dispersed command post construct will enable the battle staff to blend in with the overall maneuver formation while giving the commander the ability to synchronize the close fight on the move.</p> <p>Project EW3, Unit Task Reorganization (UTR) funding line supports the Army Network Plan Framework objective to deliver a Standards Based Network Architecture. This will enable modernizing the Mission Command Network through the coordination of a common set of network operations tools and infrastructure development supporting the unit communication staff's ability to conduct Network Planning, Network Provisioning and Network Management. Network Planning efforts include the development of an integrated planning tool suite to improve Signal Soldiers ability to plan and develop configurations for upcoming operations and deployments.</p>		

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>
--	--

Network Provisioning efforts include development of tools and technology that provide a means to deliver configurations developed during the Network Planning with little to no manual involvement by the Soldier. Network Management efforts replace stove-piped management systems and replaces them with integrated tools that provide a consolidated, as well as detailed, view of the network and its components.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	169.607	140.637	143.727	-	143.727
Current President's Budget	163.229	129.974	162.513	-	162.513
Total Adjustments	-6.378	-10.663	18.786	-	18.786
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-10.663			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-6.378	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	18.786	-	18.786

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: EW3: *Unit Task Reorganization (UTR) Development*
 Congressional Add: *Secure Wireless - Small Form Fit Factor*

	FY 2019	FY 2020
Congressional Add Subtotals for Project: EW3	5.017	-
Congressional Add Totals for all Projects	5.017	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) 323 / Common Hardware Systems			
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
323: Common Hardware Systems	-	4.695	5.481	4.998	-	4.998	5.029	5.005	4.998	4.995	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

CHS is an ACAT III program and is a mandated Army Strategic Source that acquires and sustains highly flexible, cost effective, and simplified non developmental C5ISR solutions that integrates the latest and emerging commercial technology onto the Converged Mission Command Network. This funding line supports the Army Network Modernization Strategy LOE 2, Common Operating Environment. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

CHS provides technical support, environmental and survivability testing, system design, end of life/configuration management, and strengthens cybersecurity/supply chain risk management across Army tactical programs to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS continuously analyzes and tracks hardware from cradle-to-grave, from emerging technology until end-of-life. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs and agencies including: Mission Command; Tactical Network; Tactical Radios; Distributed Common Ground Station Army; Aviation Systems; Counter Rocket, Artillery, Mortar; Communication Electronics Command; Combat Capabilities Development Command (CCDC), among others. CHS rapidly procures common hardware configurations across the Integrated Tactical Network (ITN), Common Operating Environment (COE), the sustainment community, and tactical programs that enables the continuous modernization in support of all four Network Modernization Lines of Effort and Network Cross Functional Team (CFT) requirements. CHS logistical services include worldwide 72 hour turnaround repair through strategically located support centers for tactical military units, tailorable supply chain and cybersecurity measures, manages customizable warranty, maintenance and failure rate reporting, and technical support services to support specific Army program requirements. CHS supports better buying power initiatives by creating efficiencies through economies of scale, price breaks, streamlined processes, reduced cycle times, and centralized contracting.

CHS is a model for modern acquisition strategy that provides hardware solutions including servers, storage, clients, networking devices, tactical radios, ruggedized platforms, hand held end devices, operational transit cases, installation kits, and peripheral devices procured from a mix of numerous small and large businesses. CHS is partnered with the CECOM Integrated Logistics Support Center (ILSC) to develop a model for sustaining COTS IT using the Standard Army Supply System. CHS maintains a Public Private Partnership (P3) with Tobyhanna Army Depot in order to leverage the innovation, resources and leadership skills of both TYAD and CHS in order to provide the best value to the Soldier.

CHS supports Better Buying Power (BBP) initiatives by creating efficiencies on a micro and macro level through volume discounting, economies of scale, the elimination of duplication of effort, reduced barriers to entry, price breaks, streamlined processes, reduced cycle times, and centralized contracting. CHS provides the Army with a highly efficient Return on Investment (ROI), approximately 33:1.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) 323 / Common Hardware Systems		
FY 2021 funds support CHS to continue enabling the streamlined and rapid acquisition and delivery of CHS equipment and associated logistical services in support of customer requirements. It will support technology insertions, enable hardware and systems engineering, evaluations, and CHS-6 contract pre-award activities.				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: Acquisition Support</p> <p>Description: Funding is provided for the following effort.</p> <p>FY 2020 Plans: Will continue acquisition support for CHS and customer programs. CHS rapidly procures common hardware configurations across the Common Operating Environment (COE), the sustainment community, and tactical programs that enables the continuous modernization of a converged network. PMO costs will be covered by OMA funding.</p> <p>FY 2021 Plans: Will continue acquisition support for CHS and customer programs. CHS rapidly procures common hardware configurations across the Common Operating Environment (COE), the sustainment community, and tactical programs that enables the continuous modernization of a converged network. PMO costs will be covered by OMA funding.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Rapid Acquisition and Procurement Integrated Database System (RAPIDS) has been developed; development costs will decrease as future efforts will only include enhancements to the existing baseline system.</p>		2.699	3.250	2.552
<p>Title: Logistical Service Support</p> <p>Description: Funding is provided for the following effort.</p> <p>FY 2020 Plans: CHS logistical services include worldwide 72-hour turnaround repair through strategically located support centers for tactical military units, tailorable supply chain and cybersecurity measures, manages customizable warranty, maintenance and failure rate reporting, and technical support services to support specific Army program requirements.</p> <p>FY 2021 Plans: CHS logistical services include worldwide 72-hour turnaround repair through strategically located support centers for tactical military units, tailorable supply chain and cybersecurity measures, manages customizable warranty, maintenance and failure rate reporting, and technical support services to support specific Army program requirements.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Logistical service support for FY 2020 and FY 2021 has a small decline.</p>		0.439	0.339	0.441
<p>Title: Technical and Test Support</p>		1.557	1.643	1.805

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) 323 / Common Hardware Systems		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Description: Funding is provided for the following effort.</p> <p>FY 2020 Plans: CHS provides technical support, environmental and survivability testing, system design, end of life/configuration management, and strengthens cyber security/supply chain management across Army tactical programs to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs and agencies.</p> <p>FY 2021 Plans: CHS provides technical support, environmental and survivability testing, system design, end of life/configuration management, and strengthens cyber security/supply chain management across Army tactical programs to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs and agencies.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Technical and test support for FY2020 and FY2021 has a small decline.</p>				
<p>Title: Contract Support Services</p> <p>Description: Funding is provided for the following effort.</p> <p>FY 2021 Plans: Contract Support Services are required to provide continuing expedited acquisition support for customer procurements.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Contract Support Services required due to emphases on using commercial IT support for Army Tactical Networks.</p>		-	-	0.200
<p>Title: FY 2020 SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638</p>		-	0.249	-
Accomplishments/Planned Programs Subtotals		4.695	5.481	4.998

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) 323 / <i>Common Hardware Systems</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy CHS is currently executing an approved acquisition strategy to facilitate the procurement of Commercial IT through a single step, full and open competition contract. The CHS-5 contract was awarded on 24 AUG 2018; 5 years/IDIQ. A single prime vendor was selected as the program integrator. The CHS-5 contract provides seamless, rapid, and consolidated procurement of commercial IT, customizable sustainment strategies, non-personal services, and continuous technology upgrades to support tactical programs fielding schedules, configuration management, and ruggedization.		

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) 323 / Common Hardware Systems
--	---	---

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.249		-		-		-	0.000	0.249	-
Subtotal			-	-		0.249		-		-		-	0.000	0.249	N/A

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Support Costs	C/FP	Various : Various	83.563	-		-		-		-		-	0.000	83.563	-
Product Procurement	C/FP	Various : Various	92.177	-		-		-		-		-	0.000	92.177	-
Technology Insertion	C/FP	Various : Various	17.780	-		-		-		-		-	0.000	17.780	-
CHS-5 Non-Recurring Engineering	C/FP	Various : Various	0.472	-		-		-		-		-	0.000	0.472	-
Acquisition Support	C/FP	Various : Various	2.853	2.699	Dec 2018	3.250	Dec 2019	2.552	Dec 2020	-		2.552	Continuing	Continuing	Continuing
Logistical Service Support	C/FP	Various : Various	0.623	0.439	Dec 2018	0.339	Dec 2019	0.441	Dec 2020	-		0.441	Continuing	Continuing	Continuing
Technical & Test Support	C/FP	Various : Various	1.557	1.557	Dec 2018	1.643	Dec 2019	1.805	Dec 2020	-		1.805	Continuing	Continuing	Continuing
Subtotal			199.025	4.695		5.232		4.798		-		4.798	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Contract Support Services	SS/CR	APG, MD : APG, MD	-	-		-		0.200	Dec 2020	-		0.200	0.000	0.200	-
Subtotal			-	-		-		0.200		-		0.200	0.000	0.200	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			199.025	4.695	5.481	4.998	-	4.998	Continuing	Continuing	N/A

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) 323 / Common Hardware Systems

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Technology Insertion & Technical Support (Adding New Hardware)	[Redacted]																															
Environmental and First Article Testing	[Redacted]																															
RESET and Deep Cleaning/Out of Warranty Repair	[Redacted]																															
HW Implementation, Integration and Evaluation	[Redacted]																															
CHS-4 Hardware Deliveries	[Redacted]				[Redacted]																											
CHS-5 Hardware Deliveries	[Redacted]																															
CHS-6 Pre-Contract Award	[Redacted]																															
CHS-6 Award	[Redacted]																															

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) 323 / Common Hardware Systems

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology Insertion & Technical Support (Adding New Hardware to Contract)	1	2007	4	2025
Environmental and First Article Testing	1	2006	4	2025
RESET and Deep Cleaning/Out of Warranty Repair	1	2006	4	2025
HW Implementation, Integration and Evaluation	1	2006	4	2025
CHS-4 Hardware Deliveries	1	2012	4	2019
CHS-5 Contract Award	4	2018	4	2018
CHS-5 Hardware Deliveries	4	2018	3	2023
CHS-6 Pre-Contract Award	2	2020	2	2023
CHS-6 Award	2	2023	2	2023

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software					Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)		
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
C29: Centralized Technical Support Facility (CTSF)	-	8.585	8.637	7.164	-	7.164	0.000	0.000	0.000	0.000	0.000	24.386
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project C29, The Centralized Technical Support Facility (CTSF): The CTSF is the Army's premier test and certification facility for System of Systems interoperability, functioning as CIO/G6's designated independent test agent and Land/WarNet/Mission Command (LWN/MC) configuration manager. The Central Technical Support Facility's (CTSF) directed mission is to perform Army Interoperability Certification (AIC) testing and configuration management for all operational through tactical level Command, Computing, Control, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) systems (individual, family, and system of systems), applications, and hardware prior to release to the field. The CTSF accomplishes this through the enforcement of a standards based architecture while supporting the development and implementation of an integrated computing infrastructure and a converged network. The CTSF provides validated test data to the Department of the Army and Joint agencies to accredit interoperability certifications. The distributed test environment of the CTSF is accomplished through the Federation of Net-centric Sites (FaNS) construct. This FaNS construct addresses distributed integration development and testing using the core infrastructure of the CTSF to harness Army and Joint expertise/resources. Through these federated resources, the CTSF executes or supports interoperability development, integration and certification testing of the systems and system of systems in the Warfighter Mission Area, to include Network Evaluation spinouts, as they become part of the Army's LandWarNet. The cited work is consistent with Strategic Planning Guidance and the Army Modernization and Strategy Plan.

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

	FY 2019	FY 2020	FY 2021
Title: Army Interoperability Certification (AIC) Testing	4.890	4.554	5.058
<p>Description: Conduct Army Interoperability Certification (AIC), planning/coordination/scheduling/ and reporting of Common Operating Environment (COE) and software block testing (local and distributed). Provide stakeholders data collection/data analysis/data dissemination/simulation/stimulation verification/validation. Manage the set-up, configuration, integration, operations and maintenance of the LandWarNet/Mission Command (LWN/MC) systems within the CTSF test environments. Function as the CIO/G-6's Independent Test Agent for Program Managers of LWN/MC systems that have an Acquisition Life Cycle requirement for testing interoperability of software and associated hardware prior to fielding to the Warfighter. Act as the central control node to synchronize for the CIO/G6 accredited Federation of Net-centric Sites (FaNS) distributed AIC testing environment. Report the results of Army Interoperability Certification Tests to the CIO/G-6, PM, and TRADOC communities to support updates to the G-3/5/7 managed baseline.</p> <p>FY 2020 Plans: Continue SWB11-12, and COE v3 and beyond test planning, test case development, test environment architecture set-up, to include cyber security posture assessment and adjustment activities for the systems that comprise the Army's tactical baselines</p>			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Conduct interoperability testing for the SWB11-12 systems that comprise the LWN/MC baseline to ensure the tactical integrated computing infrastructure is interoperable in a System of Systems (SoS) environment and to enable the CIO/G-6 to enforce a standards based architecture.</p> <p>FY 2021 Plans: Continue SWB11-12 test planning, test case development, test environment architecture set-up, for interoperability testing, Geospatial Information Systems (GIS) interoperability assessment, cyber security posture assessment and adjustment activities for the systems that comprise the Army's tactical baselines. Conduct interoperability testing for the SWB11-12 systems that comprise the LWN/MC baseline to ensure the tactical integrated computing infrastructure is interoperable in a System of Systems (SoS) environment and to enable the CIO G6 to enforce a standards based architecture. Mature the capability that assists CIO/ G-6 requirement to support ATEC and AFC by executing interoperability assessments of Cross-Functional Team (CFT) solutions. Execute discreet AIC test events (up to 6x/yr) and maintain an enduring discreet AIC test capability. Implement an AIC Secret Releasable test environment that integrates Army and the Mission Partner Environment and support testing with our FYES, ABCANZ, and G-3 Big Ten Coalition partners.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase support testing.</p>				
<p>Title: Engineering Services</p> <p>Description: Provide network engineering support to establish and maintain tactical architectures on the CTSF test floors and to deploying/fielded units at training centers around the world (JRTC, NTC, JMRC). System engineering support provides hardware virtualization, Army End Point Security System (AESS) support, system validation and integration support to numerous PMs on the integration and risk reduction labs, and assists Army programs with interoperability assessments and AIC rehearsal. Modify and merge army data products for CTSF test architectures. Develop/Maintain Applications for CTSF in-house programs.</p> <p>FY 2020 Plans: Maintain Network Baseline and Modernization in accordance with the Mission Command Network Modernization Implementation Plan to include Network support for integration and test floors, network support to fielded units, and systems engineering and analysis support to system of systems integration activities. Plan and conduct engineering evaluations for AIC testing and data collection in the Capability Integration Evaluation (CIE) to leverage the operational environment and CIE resources. Work with Network Cross Functional Team on Network modernization. Support AIC Integration and Testing. Continue Network Integration Checkout prior to each AIC. Continue support to PMs for tactical network availability of future COE insertions and integration. Provide CTSF network and systems engineering for validation of end-to-end sensor and platform communications and interoperability. Continue to modernize network equipment and capabilities, research wireless networks and tactical feasibility. Identify and incorporate software tools to monitor network performance and assist in issue resolution. Application Programmers</p>		0.156	0.094	0.162

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>continue to develop and modify Configuration Management Tool Suite version 3 (CMTS3) modules. Assist PMs with integrating systems into the CTSF tactical Network. Integrate and implement Army End Point Security System (AESS) technology, assist PMs in the development of AESS policies. Update CTSF Standard Operating Procedures (SOPs) for CTSF controls ensuring that all users, information systems, and networks that reside within the CTSF Test Floor Network have a strong cybersecurity posture and CTSF is in compliance for Risk Management Framework (RMF) accreditation and continuous monitoring. As part of the CTSF Information Assurance Vulnerability Management (IAVM) Plan, all Network and systems devices are updated with the latest Information Assurance Vulnerability Alerts (IAVA) and Security Technical Implementation Guides (STIGs) on a quarterly schedule. Support Army Warfighting Exercises and Combatant Commands with interoperability technical support as required.</p> <p>FY 2021 Plans: Provide Network support for integration and test floors, network support to fielded units, and systems engineering and analysis support to system of systems integration activities. Integrate and implement Army End Point Security System (AESS) technology, assist PMs in the development of AESS policies. Plan and conduct engineering evaluations for AIC testing and data collection in the Joint Warfighter Assessment (JWA)/Capability Integration Evaluation (CIE) to leverage the operational environment and JWA/CIE resources. Work with Network Cross Functional Team on Network modernization and Integrated Tactical Network (ITN) design and testing. Assist integration and test architecture development to include Program of Record (POR) and non-POR radio communications devices to provide PMs and Materiel Developers testing in realistic environments. Conduct radio Verification and Validation. Support Army Test and Evaluation Command (ATEC) and Army Futures Command interoperability assessments of Cross-Functional Team (CFT) solutions. Continue efforts to implement an AIC Secret Releasable test environment network that integrates Army and the Unified Action Partners (UAP).</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase due to inflation factor.</p>				
<p>Title: Configuration Management</p> <p>Description: As the CTSF Configuration Management Office, provide CM functional and physical configuration management and change management to the CTSF Army Interoperability Certification test floor environment. Additionally, as the Army Configuration Management Office (ACMO), establish and maintain oversight control of the Army Master Library for the Army Interoperability Certified Fielded Baseline (AICFB). Archive system software and data products, correlated with their associated documentation, for the Army LandWarNet Mission Command Baseline (ALWNMCB), a subset of the AICFB. Establish and maintain the configuration and change management to the AICFB and the ALWNMCB for Lifecycle Software Management (LCSM). Provide support to the Army Staff (ARSTAF), Materiel Developers (MATDEV), Project Managers (PM), and System Owners (SO) through the orderly management of product configuration information and product change management (ChM), which enables capability revisions, improved reliability and maintainability, extended life, and reduced cost. Maintain and improve the Configuration Management Tracking System version 3 (CMTSIII), the Army's authoritative database management system</p>		2.487	2.705	1.482

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>(DBMS) for configuration management (CM) of the systems comprising Coalition Interoperability Assurance and Validation (CIAV), and the Warfighter Mission and Business Mission Areas of the Army Information Technology (IT) portfolio. Assist the CIO/G6 in conducting accreditation inspections and training for Federation of Net-centric Sites (FaNS) locations.</p> <p>FY 2020 Plans: Provide CM functional and physical configuration management and change management to the CTSF Army Interoperability Certification test floor environment. Provide CM functional and physical configuration management and change management to the AICFB, to include archiving the required system software, data products and documentation, while correlating the relevant data within the CMTSIII DBMS for visibility to users Army wide. Provide baseline reconciliation to the four quarterly CIO/G6 AICFB reports, identifying to commanders and their G-3/G-6 staff the Army's AIC certified, Interoperability Capability and Limitations assessed, AIC waived, and AIC exempted system software that is authorized to connect to the Army's network. Assist the CIO/G6 in conducting accreditation inspections and training for Federation of Net-centric Sites (FaNS) locations.</p> <p>FY 2021 Plans: Provide CM functional and physical configuration management and change management to the CTSF Army Interoperability Certification test floor environment. Provide CM functional and physical configuration management and change management to the AICFB, to include archiving the required system software, data products and documentation, while correlating the relevant data within the CMTSIII DBMS for visibility to users Army wide. Provide baseline reconciliation to the four quarterly CIO/G6 AICFB reports, identifying to commanders and their G-3/G-6 staff the Army's AIC certified, Interoperability Capability and Limitations assessed, AIC waived, and AIC exempted system software that is authorized to connect to the Army's network. Assist the CIO/G6 in conducting accreditation inspections and training for Federation of Net-centric Sites (FaNS) locations.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to reduction in Configuration Management workload.</p>				
<p>Title: Management Operations/Program Office</p> <p>Description: Provide management operations consisting of planning, programming and executing funds; planning and programming for required personnel; planning, programming and executing contracts supporting AIC testing processes; identifying reimbursable tests and collecting/allocating appropriate funds; planning and programming logistics activities, managing/controlling/documenting physical assets and inventories; and perform oversight and coordination of physical security with hosting installation.</p> <p>FY 2020 Plans: Program and execute funding. Plan and program manpower, identify contracting requirements and develop strategy for implementation in conjunction with CECOM Acquisition Center. Track testing schedule, prepare/coordinate/track customer funding for AIC testing activities and infrastructure support. Continue to provide field support coordination for unit training and</p>		1.052	1.028	0.462

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>exercises upon request. Maintain existing infrastructure while continuing to develop coordinate planning/engineering activities associated with transition to permanent facility; continue to enhance physical security, access control, force protection, COOP and EAP activities and exercises. Continue inventory accountability programs and asset control.</p> <p>FY 2021 Plans: Program and execute funding. Plan and program manpower, identify contracting requirements and develop strategy for implementation in conjunction with CECOM Acquisition Center. Track testing schedule, prepare/coordinate/track customer funding for AIC testing activities and infrastructure support. Continue to provide field support coordination for unit training and exercises upon request. Maintain existing infrastructure while transitioning to permanent facility; continue to enhance physical security, access control, force protection, COOP and EAP activities and exercises. Continue inventory accountability programs and asset control.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to reduced EXORD mission workload.</p>			
<p>Title: FY 2020 SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638</p>	-	0.256	-
Accomplishments/Planned Programs Subtotals	8.585	8.637	7.164

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

N/A

Remarks

D. Acquisition Strategy

Transition from executing a single test event at a time to multiple simultaneous test events using new universal mission threads, providing speed and efficiency to the test/acquisition timeline. Execute system of systems interoperability testing and certification through the use of Government and Systems Engineering and Technical Analysis (SETA) contract personnel experienced in product development and interoperability testing. Testing and certification occurs in a cyclical fashion, with an expectation of an annual Software Block/Capability Set test followed with cyclical multiple test events to ensure integrity of software baselines to the Warfighter. Engineering Services provides strategic integration of software into a system of systems/family of systems environment to support interoperability testing. Establish and

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) C29 / <i>Centralized Technical Support Facility (CTSF)</i>

maintain Configuration Management and version control of the Army's Interoperable Battle Command LandWarNet Baseline. Distributed testing capability uses local assets and leverages other federated test facilities to create synergy and realize efficiencies.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				C29 / Centralized Technical Support Facility (CTSF)							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.256		-		-		-	0.000	0.256	-
Subtotal			-	-		0.256		-		-		-	0.000	0.256	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MITRE Corp	FFRDC	Engineering Services : Fort Hood, TX	17.178	-		-		-		-		-	0.000	17.178	-
In-House	Allot	Engineering Services : Fort Hood, TX	2.548	-		-		-		-		-	0.000	2.548	-
Subtotal			19.726	-		-		-		-		-	0.000	19.726	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
CECOM Matrix	Allot	Program and Budget Analysis Support : Fort Hood, TX/ Aberdeen Proving Grounds, MD	4.482	0.741		0.713		0.142		-		0.142	0.000	6.078	-
In-House Support	Allot	Management Operations, Logistics Support : Fort Hood, TX	9.928	-		-		-		-		-	0.000	9.928	-
ISSA/Training/TDY	Allot	Site Support Activities : Fort Hood, TX	0.307	0.250		0.230		0.257		-		0.257	0.000	1.044	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)
--	---	---

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Supplies	C/UCA	Management Operations, Logistics Support : Fort Hood, TX	1.434	0.061		0.020		0.063		-		0.063	0.000	1.578	-
Moving Costs	Allot	Management Operations, Logistics Support : Fort Hood, TX	-	-		0.001		0.001		-		0.001	0.000	0.002	-
Subtotal			16.151	1.052		0.964		0.463		-		0.463	0.000	18.630	N/A

Remarks
 Under "open-the-door" cost model, all In-house support efforts are included under Test & Evaluation.
 Moving Costs associated with transitioning to permanent facility beginning in FY18.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
CECOM R2 3G/ RS3	C/CPFF	Test, Configuration Management : Fort Hood, TX	11.181	3.473	Sep 2019	2.836	May 2020	3.730	Sep 2021	-		3.730	0.000	21.220	-
CECOM S3/ SB SITE SUPPORT SERVICES	C/CPFF	Facilities, Maintenance, Security : Fort Hood, TX	10.226	1.227	Sep 2019	1.218	Aug 2020	1.328	Sep 2021	-		1.328	0.000	13.999	-
ISSA	MIPR	Utilities & NEC Support : Fort Hood, TX	4.945	-		-		-		-		-	0.000	4.945	-
ARL Matrix	MIPR	Test : Fort Hood, TX	6.374	-		-		-		-		-	0.000	6.374	-
In-House Support	Allot	Test : Fort Hood, TX	7.416	2.827		3.357		1.557		-		1.557	0.000	15.157	-
Instrumentation	C/UCA	Test Equipment Infrastructure : Fort Hood, TX	3.185	0.006		0.006		0.086		-		0.086	0.000	3.283	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)
--	---	---

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Subtotal			43.327	7.533		7.417		6.701		-		6.701	0.000	64.978	N/A

Remarks
 ARL Matrix effort became a "reimbursable" effort under Open-the-Door cost model effective in FY17; no longer "Direct" funded.
 ISSA no longer funded at CTSF level.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	79.204	8.585	8.637	7.164	-	7.164	0.000	103.590	N/A

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
11-21 AIC Test event	■																											
19.1 Universal Test Environment AIC Test event			■		Transition to Universal Test Environment																							
19.2 Universal Test Environment AIC Test event				■																								
Baseline Updates 1st QTR FY20				■																								
20.1 Universal Test Environment AIC Test event						■																						
Baseline Updates 3rd QTR FY20							■																					
20.2 Universal Test Environment AIC Test event								■																				
Baseline Updates 1st QTR FY21											■																	
21.1 Universal Test Environment AIC Test event											■																	
Baseline Updates 3rd QTR FY21												■																
21.2 Universal Test Environment AIC Test event															■													
Baseline Updates 1st QTR FY22																■												
22.1 Universal Test Environment AIC Test event																			■									

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Baseline Updates 3rd QTR FY22																												
22.2 Universal Test Environment AIC Test event																												
Baseline Updates 1st QTR FY23																												
23.1 Universal Test Environment AIC Test event																												
Baseline Updates 3rd QTR FY23																												
23.2 Universal Test Environment AIC Test event																												
Baseline Updates 1st QTR FY24																												
24.1 Universal Test Environment AIC Test event																												
Baseline Updates 3rd QTR FY24																												
24.2 Universal Test Environment AIC Test event																												
Baseline Updates 1st QTR FY25																												
25.1 Universal Test Environment AIC Test event																												
Baseline Updates 3rd QTR FY25																												

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army			Date: February 2020		
Appropriation/Budget Activity 2040 / 5		R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software		Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
25.2 Universal Test Environment AIC Test event																																
Configuration Management (CM)																																
Configuration Management (CM)																																
Engineering Services (ES) Test and Integration																																
Engineering Services (ES) Test and Integration																																

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C29 / Centralized Technical Support Facility (CTSF)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
11-21 AIC Test event	1	2019	1	2019
19.1 Universal Test Environment AIC Test event	2	2019	3	2019
19.2 Universal Test Environment AIC Test event	4	2019	4	2019
Baseline Updates 1st QTR FY20	4	2019	1	2020
20.1 Universal Test Environment AIC Test event	2	2020	2	2020
Baseline Updates 3rd QTR FY20	2	2020	3	2020
20.2 Universal Test Environment AIC Test event	4	2020	4	2020
Baseline Updates 1st QTR FY21	4	2020	1	2021
21.1 Universal Test Environment AIC Test event	2	2021	2	2021
Baseline Updates 3rd QTR FY21	2	2021	3	2021
21.2 Universal Test Environment AIC Test event	4	2021	4	2021
Baseline Updates 1st QTR FY22	4	2021	1	2022
22.1 Universal Test Environment AIC Test event	1	2022	2	2022
Baseline Updates 3rd QTR FY22	2	2022	3	2022
22.2 Universal Test Environment AIC Test event	3	2022	4	2022
Baseline Updates 1st QTR FY23	4	2022	1	2023
23.1 Universal Test Environment AIC Test event	1	2023	2	2023
Baseline Updates 3rd QTR FY23	2	2023	3	2023
23.2 Universal Test Environment AIC Test event	3	2023	4	2023
Baseline Updates 1st QTR FY24	4	2023	1	2024
24.1 Universal Test Environment AIC Test event	1	2024	2	2024
Baseline Updates 3rd QTR FY24	2	2024	3	2024

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) C29 / <i>Centralized Technical Support Facility (CTSF)</i>
--	--	--

Events	Start		End	
	Quarter	Year	Quarter	Year
24.2 Universal Test Environment AIC Test event	3	2024	4	2024
Baseline Updates 1st QTR FY25	4	2024	1	2025
25.1 Universal Test Environment AIC Test event	1	2025	2	2025
Baseline Updates 3rd QTR FY25	2	2025	3	2025
25.2 Universal Test Environment AIC Test event	3	2025	4	2025
Configuration Management (CM)	1	2019	4	2024
Engineering Services (ES) Test and Integration	1	2019	4	2024

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) C34 / Army Tac C2 Sys Eng			
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
C34: Army Tac C2 Sys Eng	-	7.661	9.483	9.706	-	9.706	11.974	11.694	11.075	11.378	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project C34, Army TAC C2 Sys Eng, supports the Army's Network Modernization Strategy LOE 1, Unified Network. Project C34 coordinates technical efforts across and outside of PEO C3T to ensure integration with the current and future Mission Command Network. Project C34 provides technical support for programs aligned and in support of LOEs 1 through 4 that informs the design and solutions with specific emphasis on the ability for the different efforts to be integrated and interoperable with one another. Efforts support the Network CFT capability set strategy.

Project C34, Army Tactical Command and Control Systems Engineering: This project funds the PEO Command, Control, Communications-Tactical (PEO C3T) System of Systems engineering and integration, experimentation, acquisition management, testing, fielding and sustainment support to ensure interoperability and affordability within the PEO C3T portfolio. The effort focuses on System-of-Systems (SoS) Engineering and Integration for the Mission Command Network with increased emphasis on immediate Warfighter needs as well as leveraging emerging technologies.

Fiscal Year 2021 will focus on the continued development, implementation and integration of the Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) network architectures. This includes maturing the technology enhancement roadmap for SoS capability evolution across the PEO C3T portfolio that incorporates Cross Functional Team initiatives; network integration support and design products for system validation through various N-CFT lead experimentation and integration testing; integration of tactical networked capabilities for all Mission Command Network systems and integration events; integration of tactical information assurance solutions and security measures for consistent cyber protection; and support to N-CFT evaluations.

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

	FY 2019	FY 2020	FY 2021
Title: Mission Command Network Synchronization and Integration Support	0.118	0.084	0.150
Description: Funds are for the following effort:			
FY 2020 Plans:			
Continue the support of current force and the development of future force C5ISR across the tactical network to ensure all Assistant Secretary of the Army (Acquisition, Logistics & Technology) (ASA(ALT)) programs are synchronized and redundancies and overlapping capabilities are reduced across the network and in synchronization with Common Operating Environment.			
FY 2021 Plans:			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Continue the support of current force and the development of future force C5ISR across the tactical network to ensure all Assistant Secretary of the Army (Acquisition, Logistics & Technology) (ASA(ALT)) programs are synchronized and redundancies and overlapping capabilities are reduced across the network and in synchronization with Common Operating Environment. FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continued network synchronization				
Title: Developmental Test and Integration Test Support between Programs of Record (PORs) and platforms / Command Posts (CPs) to execute System-of-Systems (SoS) and Interoperability Description: Funds support the following effort: FY 2020 Plans: Continue to mature/revise the design, configuration and establishment of the system of systems integration test infrastructure architecture and implementation. Continue to provide the infrastructure and support in conducting integration testing and systems engineering for C3T non-program of record and program of record systems, products, technical insertions, and systems under evaluation to ensure integration of capabilities across the network. Maintain support of COE risk reduction testing. Continue the design and coordination of integration testing across the Mission Command Network systems. FY 2021 Plans: Continue to mature/revise the design, configuration and establishment of the system of systems integration test infrastructure architecture and implementation. Continue to provide the infrastructure and support in conducting integration testing and systems engineering for C3T non-program of record and program of record systems, products, technical insertions, and systems under evaluation to ensure integration of capabilities across the network. Maintain support of COE risk reduction testing. Continue the design and coordination of integration testing across the Mission Command Network systems. FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continued development.		1.147	1.357	1.453
Title: Tactical Network Engineering Description: Funds support the following efforts: FY 2020 Plans: Develop effective engineering strategies to integrate tactical applications for use across the C3T enterprise network. Continue to perform network planning and integration activities across all cross-domain system-of-systems future capabilities and technologies. FY 2021 Plans:		0.657	0.752	0.834

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Develop effective engineering strategies to integrate tactical applications for use across the C3T enterprise network. Continue to perform network planning and integration activities across all cross-domain system-of-systems future capabilities and technologies. FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continued engineering.				
Title: Conduct and Support System Interoperability Engineering and Development of System-of-Systems (SoS) Architectural Products Description: Funds support the following efforts: FY 2020 Plans: Within the PEO C3T portfolio and in conjunction with N-CFT activities, continue to assess Emerging Technologies, identify critical integrated test points, monitor developmental testing at integration points, develop architectural data processes and products, and facilitate the transition of Network capabilities to the warfighter. FY 2021 Plans: Within the PEO C3T portfolio and in conjunction with N-CFT activities, continue to assess Emerging Technologies, identify critical integrated test points, monitor developmental testing at integration points, develop architectural data processes and products, and facilitate the transition of Network capabilities to the warfighter. FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continued development efforts.		1.476	1.766	1.872
Title: Development and Implementation of Tactical Information Assurance (IA) Description: Funds support the following efforts: FY 2020 Plans: Continue to implement ARCYBER, CIO/G6 and CYBERCOM guidance for execution of Information Assurance policies and procedures at the tactical level. Continue to document the current tactical IA network architecture with the goal of developing recommendations to eliminate inconsistencies/duplications, increasing the security posture, decreasing complexity of operations, and decreasing costs. Continue to plan and design security measures and IA requirements across the tactical network for future capabilities. FY 2021 Plans: Will continue to implement ARCYBER, CIO/G6 and CYBERCOM guidance for execution of Information Assurance policies and procedures at the tactical level. Continue to document the current tactical IA network architecture with the goal of developing		0.223	0.214	0.283

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>recommendations to eliminate inconsistencies/duplications, increasing the security posture, decreasing complexity of operations, and decreasing costs. Continue to plan and design security measures and IA requirements across the tactical network for future capabilities.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continuing development efforts.</p>				
<p>Title: System of Systems Development</p> <p>Description: Funds support the following efforts:</p> <p>FY 2020 Plans: Continue to effectively manage overall System-of-Systems Engineering, Enterprise, and Integration efforts for the PEO C3T portfolio of technology and capability enhancement programs. Continue to conduct SoS engineering design for capabilities planned to field in FY 2020, FY 2021 and FY 2022 to include Program of Record and emerging LOE technologies.</p> <p>FY 2021 Plans: Continue to effectively manage overall System-of-Systems Engineering, Enterprise, and Integration efforts for the PEO C3T portfolio of technology and capability enhancement programs. Continue to conduct SoS engineering design for capabilities planned to field in FY 2021, FY 2022 and FY 2023 to include Program of Record and emerging LOE technologies.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continued system of system development.</p>		2.628	3.193	3.324
<p>Title: System of Systems (SoS) Engineering and Integration Evolution of the Network</p> <p>Description: Funds support the following efforts:</p> <p>FY 2020 Plans: In Conjunction with LOE and CFT efforts, continue to implement cross PEO System of Systems Engineering and Integration processes, analysis and S&T coordination to ensure successful development Engineering and Testing of current and future systems. Continue to develop streamlined processes to support ASA(ALT) OCE and implement Value Engineering (VE) and Lean Six Sigma initiatives across all PEO C3T capabilities to include the Mission partner Environment.</p> <p>FY 2021 Plans: In Conjunction with LOE and CFT efforts, continue to implement cross PEO System of Systems Engineering and Integration processes, analysis and S&T coordination to ensure successful development Engineering and Testing of current and future</p>		1.412	1.686	1.790

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
systems. Continue to develop streamlined processes to support ASA(ALT) OCE and implement Value Engineering (VE) and Lean Six Sigma initiatives across all PEO C3T capabilities to include the Mission Partner Environment.				
FY 2020 to FY 2021 Increase/Decrease Statement: Increase supports continuing system of system integration efforts.				
Title: FY 2020 SBIR/STTR Transfer		-	0.431	-
Description: Funding transferred in accordance with Title 15 USC ?638				
FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638				
FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638				
Accomplishments/Planned Programs Subtotals		7.661	9.483	9.706
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
Not applicable for this item.				
D. Acquisition Strategy				
This project provides the technical and programmatic disciplines required for systems engineering and integration, experimentation, acquisition management, testing, interoperability, support to fielding and sustainment. It will focus on System-of-Systems (SoS) Systems Engineering and Integration for the tactical network with increased emphasis on immediate Warfighter needs as well as leveraging emerging technologies. Efforts align to support the acquisition strategies of the programs that must connect to the network.				

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				C34 / Army Tac C2 Sys Eng								
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.431		-		-		-	0.000	0.431	-	
Subtotal			-	-		0.431		-		-		-	0.000	0.431	N/A	
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
System of System Engineering & Integration, Current & Strategic Initiative, Architecture Integration	C/CPFF	Bowhead : APG MD	-	2.750	Nov 2018	3.850	Dec 2019	4.055	Nov 2020	-		4.055	Continuing	Continuing	Continuing	
Systems Engineering Support	Various	Various : APG, MD	3.746	0.322	Oct 2018	0.692	Oct 2019	0.820	Oct 2020	-		0.820	Continuing	Continuing	Continuing	
System of System Architectures, Engineering, and Integration	SS/FP	MITRE : Aberdeen Proving Ground, MD/ Eatontown, NJ	98.992	4.089	Oct 2018	4.148	Sep 2020	4.349	Oct 2020	-		4.349	Continuing	Continuing	Continuing	
Subtotal			102.738	7.161		8.690		9.224		-		9.224	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MATRIX	MIPR	CERDEC : Aberdeen Proving Ground, MD	13.602	0.500		0.362		0.482		-		0.482	Continuing	Continuing	Continuing	
Subtotal			13.602	0.500		0.362		0.482		-		0.482	Continuing	Continuing	N/A	
Project Cost Totals			116.340	7.661		9.483		9.706		-		9.706	Continuing	Continuing	N/A	

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mission Command Network S&T					[Blue Bar]				[Blue Bar]																			
S&T Synchronization: Oversee PM Transition Status									Oversee PM Transition Status																			
S&T Synchronization: Develop S&T Gaps & Review									Develop S&T Gaps & Review																			
S&T Synchronization: Develop PM Plans / POM Initiatives									Develop PM Plans / POM Initiatives																			
S&T Synchronization- Oversee PM Transition Status													Oversee PM Transition Status															
S&T Synchronization Develop S&T Gaps & Review													Develop S&T Gaps & Review															
S&T Synchronization- Develop PM Plans / POM Initiatives													Develop PM Plans / POM Initiatives															
Analysis Network Analysis									Network Analysis																			
System of Systems System Engineer, Integration, and Development									[Blue Bar]				[Blue Bar]				[Blue Bar]				[Blue Bar]							
System of System Solutions Year 1									[Blue Bar]																			
SoS PDR					1 PDR																							
SoS CDR					2 CDR																							
System of Systems Solutions Year 2									[Blue Bar]																			

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025										
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4							
SoS PDR									3 PDR																										
SoS CDR												4 CDR																							
System of Systems Solutions Year 3																																			
SoS PDR																					5 PDR														
SoS CDR																								6 CDR											
System of System Integration Risk Reduction																																			
Integration Test Support SoS RR																																			
Integration Test Support SoS RR																																			
Integration Test Support SoS RR																																			

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) C34 / Army Tac C2 Sys Eng

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mission Command Network S&T	1	2020	4	2021
S&T Synchronization: Oversee PM Transition Status	1	2020	4	2020
S&T Synchronization: Develop S&T Gaps & Review	2	2020	3	2020
S&T Synchronization: Develop PM Plans / POM Initiatives	3	2020	4	2020
S&T Synchronization- Oversee PM Transition Status	1	2021	4	2021
S&T Synchronization Develop S&T Gaps & Review	2	2021	3	2021
S&T Synchronization- Develop PM Plans / POM Initiatives	3	2021	4	2021
Analysis Network Analysis	1	2020	4	2021
System of Systems System Engineer, Integration, and Development	1	2020	4	2025
System of System Solutions Year 1	1	2020	1	2021
SoS PDR	2	2020	2	2020
SoS CDR	4	2020	4	2020
System of Systems Solutions Year 2	1	2021	1	2022
SoS PDR	2	2021	2	2021
SoS CDR	4	2021	4	2021
System of Systems Solutions Year 3	1	2022	1	2023
SoS PDR	2	2022	2	2022
SoS CDR	4	2022	4	2022
System of System Integration Risk Reduction	1	2020	4	2021
Integration Test Support SoS RR	1	2020	1	2020
Integration Test Support SoS RR	3	2020	4	2020
Integration Test Support SoS RR	3	2021	4	2021

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)			
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
EJ4: COMMAND POST COMPUTING ENVIRONMENT (CPCE)	-	33.693	30.969	27.489	-	27.489	27.470	27.406	27.403	27.515	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is directly aligned to the Army Network Modernization Strategy LOE 2, Common Operating Environment (COE). Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

The Common Operating Environment (COE) is an approved set of computing technologies and standards that enables secure and interoperable applications to be developed and executed rapidly across a variety of computing environments (i.e., server(s), client, mobile, sensors, and platform). The Command Post Computing Environment (CPCE) is one of the six computing environments under the COE, which provides the movement and maneuver applications, common computing services such as Cyber tools and e-mail, and includes tactical server capabilities within Command Posts at all echelons (Battalion to Army Service Component Commander).

To mitigate potential misalignments with the requirements community, the program increment designations will align with validated requirement documents. Accordingly, the former Increment 2 is now designated as Increment 1 to align with Capability Drop 1. Increment 1, which was approved via Full Deployment Decision in July 2019 and currently fielded, is now designated Increment 0. CPCE Increment 0 requirements are detailed in the Minimum Essential Capabilities document.

The CPCE implements an integrated, interoperable, cyber-secure, cost-effective software infrastructure that serves as the host for a unified set of multiple warfighting functional applications within the command post. This software infrastructure will be central to the COE, allowing interoperability between command posts, mounted platforms, and dismounted handheld devices while supporting collaboration using a common picture with Joint and Unified Action partners. CPCE will provide a core software infrastructure including a common operating picture (COP) tool, common look and feel (user interface), common data strategy, interoperable tactical messaging/chat, and essential movement and maneuver capabilities. CPCE software infrastructure and applications will reside on Tactical Server Infrastructure (TSI) hardware and previously fielded BCCS/TSI servers. The CPCE eliminates "stove-piped" legacy systems, duplicative or redundant implementations, simplifies future application development efforts, and enhances interoperability and data sharing across multiple echelons.

CPCE employs an agile development approach, in two year increments, with capabilities being integrated to support the Army IS COE effort. Increment 0 includes core infrastructure and initial movement and maneuver capabilities. Increment 1 of the program will meet the requirements of the CPCE Requirements Definition Package and Capability Drop 1, and bring enhancements to Increment 0 and initial system convergence. Increment 2 will bring additional warfighting function capabilities and enhancements to existing capability.

FY 2021 funding will support the consolidation, adjudication, and codification of specific technical requirements for CPCE Increment 1 with focus on the support of legacy system infrastructure requirements and begin requirements planning and design phase of CPCE Increment 2. These efforts will extend the capabilities of the Increment

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)		
0 baseline to include infrastructure modification/improvement to facilitate convergence of legacy Mission Command system capabilities, CPCE Capability Drop 1 (CD1) requirements, Cross-Cutting Capabilities (CCC) enhancements and additional Movement and Maneuver capabilities.				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Title: SW Dev - Core Infrastructure		23.021	20.078	16.477
<p>Description: Provides a core software infrastructure that underpins an integrated mission command capability in command posts, from ASCC to Battalion echelons that provides simplicity, intuitiveness, core services and applications, common look and feel, and warfighter functionality in the areas of Fires, Logistics, Intelligence, Airspace Management and Maneuver. Primary software development efforts include development of a simple Common Operating Picture (COP), a Common Geospatial solution (map), a user interface with "common look and feel", common Data Services including an extensible database and data persistence, tactical messaging and translation, and backwards compatibility to previously fielded legacy systems. Software development efforts focus on designing the system to reduce the training burden on the Soldier, and the creation of an Integrated Software Development Kit (ISDK) that allows external developers the ability to integrate new capabilities without rebuilding common components.</p> <p>FY 2020 Plans: Continue to incorporate new capabilities into the CPCE infrastructure, both COTS and Government-developed. Development and integration of new capabilities and features including additional movement and maneuver functions, engineer functions, and mission planning functions including Map-based Planning Services (MBPS), Joint Planning Services (JPS), and direct data ingest from other warfighting systems.</p> <p>This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2021 Plans: Continue to facilitate legacy system capability convergence,incorporate new Commercial off the shelf (COTS) and Government-developed capabilities into the CPCE infrastructure. Development and integration of new capabilities and features including additional movement and maneuver functions, engineer functions, Infrastructure modification/improvement to support legacy system capability convergence, CPCE Capability Drop 1 (CD1) requirements, Cross-Cutting Capabilities (CCC) enhancements and enhancements for Movement and Maneuver.</p> <p>This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to reduced requirements for infrastructure software as the product matures.</p>				
Title: Hardware/Software Integration		3.883	2.713	2.823

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Description: Hardware / Software Integration within CPCE consists of research, development, and engineering efforts required to select, engineer, and field a COTS hardware server and related components. The CPCE software resides on converged Tactical Server Infrastructure (TSI) server stacks, which host multiple software infrastructure components including Microsoft Exchange, SharePoint, Defensive Cyber Operations (DCO) tools, SQL databases, Active Directory, and others. This enterprise software is tightly-coupled with, and engineered for, specific TSI hardware using virtual machine (VM) technology and must serve as the basis for all other warfighting functions and mission command system software loaded on the server.</p> <p>FY 2020 Plans: For FY 2020, efforts will focus on new design requirements for the TSI server architecture to achieve further savings in size, weight, and power. Engineering efforts will continue to refine the automated server provisioning and configuration tool that will allow rapid provisioning of new software capabilities and remote system querying and patching. Additional engineering effort will be required to ensure DCO tools are integrated and unique hardware requirements are accounted for.</p> <p>This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2021 Plans: For FY 2021, efforts will continue to focus on design enhancements for the TSI server architecture to achieve further savings in size, weight, and power. Engineering efforts will continue to refine the automated server provisioning and configuration tool that will allow rapid provisioning of new software capabilities and remote system querying and patching. Additional engineering effort will be required to ensure DCO tools are integrated and unique hardware requirements are accounted for. Engineering of Cyber Situational Understanding (SU) integration will begin.</p> <p>This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease aligns with maturation of integration process and planned requirements for CPCE/TSI server architecture enhancements.</p>				
Title: Test and Evaluation		1.541	4.228	5.691
<p>Description: Test and evaluation efforts include the planning and conduct of Command Post Computing Environment (CPCE) / Mounted Computing Environment (MCE) T&E events including Developmental Test (DT), System Software Acceptance Testing (SSAT), Integration Events, Risk Reduction Events, Initial Operational Test and Evaluation (IOT&E), and Follow-on Test and Evaluation (FOT&E).</p> <p>FY 2020 Plans:</p>				

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>In FY 2020, CPCE will conduct multiple developmental tests, experiments, and user juries as new software capabilities and features are developed. CPCE software will also participate in Army Interoperability Certification (AIC) testing, Joint Warfighter Assessments, and Army Warfighter Exercises (Wfx), requiring technical system support.</p> <p>This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2021 Plans: In FY 2021, CPCE will conduct multiple developmental tests to support CPCE Increment 1 capabilities and features. CPCE software will also participate in Army Interoperability Certification (AIC) testing, and a formal Operational Assessment to inform an Increment 1 fielding decision. This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase required to support continued testing to accommodate convergence of legacy Mission Command Systems, and the formal Increment 1 Operational Assessment.</p>				
<p>Title: Program Management</p> <p>Description: Program management includes overall management of program. Includes participation in program planning meetings and IPTs.</p> <p>FY 2020 Plans: Program office management in the areas of Business, Technical, and Logistics remains a requirement in FY 2020. This support includes personnel covered by Functional Support Agreements between PM Mission Command and various Government support agencies such as the Army Research and Development Center (ARDEC) CECOM Research Development and Engineering Command (CERDEC), and other PEOs (e.g. PEO IEW&S). Program Management efforts in the FY 2020 timeframe will also include business area support to ensure funding and contracts are planned and available for all SW development, system engineering, and DT efforts.</p> <p>This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.</p> <p>FY 2021 Plans: Program office management in the areas of Technical, and Logistics remains a requirement in FY 2021. This support includes personnel covered by Functional Support Agreements between PM Mission Command and various Government support agencies such as the Army Research and Development Center (ARDEC), and Combat Capabilities Development Command (CCDC). Program Management efforts in the FY 2021 timeframe will also include management of all SW development, system engineering, exercise support, DT and Operational Assessment efforts.</p>		5.248	2.543	2.498

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
This effort's funding will be executed by Program Executive Office for Command, Control and Communications-Tactical. FY 2020 to FY 2021 Increase/Decrease Statement: Decrease aligns with manpower requirements for management of CPCE program.			
Title: FY 2020 SBIR/STTR Transfer Description: Funding transferred in accordance with Title 15 USC 7638	-	1.407	-
FY 2020 Plans: Funding transferred in accordance with Title 15 USC 7638 FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC 7638			
Accomplishments/Planned Programs Subtotals	33.693	30.969	27.489

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• B70000: COE Tactical Server Infrastructure (TSI)	20.500	67.533	94.871	-	94.871	94.052	106.057	110.504	110.702	Continuing	Continuing

Remarks
Related to CPCE is the Tactical Server Infrastructure (TSI) funding line, B70000, which funds computer hardware and software servers/hosting platforms for CPCE software.

D. Acquisition Strategy
CPCE is an ACAT II hardware and software Defense Acquisition Program, structured in 2-year Increments (Inc). In accordance with DoD direction that procurement and modification of Commercial Off-the-Shelf (COTS) products is the preferred acquisition approach, CPCE procured a COTS battle management system to serve as the underlying core infrastructure, and is modifying that COTS product to meet additional Army requirements, including backwards compatibility with legacy systems. For development of additional capabilities to be integrated into the COTS system, CPCE follows the Agile development approach (Epics, Iterations, and Sprints) that allows capabilities to be engineered, developed and tested rapidly. The Combat Capabilities Development Command (CCDC) Armaments Center Weapons and Software Engineering Center (WSEC) and the Communications-Electronics Command (CECOM) Software Engineering Center (SEC) are prime Government partners in system development. Commercial suppliers are assigned efforts through GSA Mission Command Engineering Services vehicles and Multiple Award Task Order (MATO) contracts.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) EJ4 / <i>COMMAND POST COMPUTING ENVIRONMENT (CPCE)</i>
<p>Hardware (server) platforms are COTS and procured under the Tactical Services Infrastructure (TSI) funding line through existing vehicles from GSA, Common Hardware Systems (CHS) and the Army Computer Hardware Enterprise Software and Solutions (CHESS).</p> <p>CPCE Inc 0 brings the core software infrastructure and initial movement and maneuver capabilities. Inc 1 will meet the requirements of the CPCE Requirements Definition Package and Capability Drop 1, and focuses on enhancements to Inc 0, and enabling legacy system convergence. Inc 2 will bring additional warfighting function capabilities and enhancements to existing capability.</p> <p>The Milestone Decision Authority (MDA) approved the TSI Acquisition Strategy on 17 May 2019 and issued an Acquisition Decision Memorandum (ADM) approving a Full Deployment Decision (FDD) to field CPCE Increment 0 capability on the TSI. CPCE Inc 0 underwent Initial Operational Test & Evaluation in Nov 2018 and conditional authority to field the capability was granted on 15 Jul 19. The CPCE Inc 1 Milestone B Acquisition Decision Memorandum was signed on 9 Sep 2019 authorizing entry into the Engineering and Manufacturing Development (EMD) Phase of the acquisition lifecycle.</p>		

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)
--	---	---

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
PM Support (Gov't-Core)	Sub Allot	PM Mission Command : APG, MD	5.603	-		-		-		-		-	0.000	5.603	-
PM Support (Gov't-Matrix)	IA	Various Matrix Orgs incl CECOM SEC, LRC, PRD, et al) : APG, MD	5.747	-		-		-		-		-	0.000	5.747	-
PM Support (SETA Contractor)	C/FFP	Multiple incl CSRA and others : APG, MD	12.853	5.248	Nov 2018	2.543	Nov 2019	2.498	Nov 2020	-		2.498	0.000	23.142	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.407		-		-		-	0.000	1.407	-
Subtotal			24.203	5.248		3.950		2.498		-		2.498	0.000	35.899	N/A

Remarks
Funding for Core government support (Management and Oversight of CPCE) transitions to OMA Appropriation in FY19.

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
System Requirements Engineering	Various	SW Dev Contractors and Multiple Matrix Orgs : Various Locations	23.831	-		-		-		-		-	0.000	23.831	-
Software Development - Core Infrastructure	Option/ Various	ARDEC, CCDC, Systematic : Picatinny, NJ APG, MD Centerville, VA	132.441	23.021	Oct 2018	20.078	Oct 2019	16.477	Oct 2020	-		16.477	0.000	192.017	-
Joint and Coalition Interoperability	Various	Multiple : Various	0.296	-		-		-		-		-	0.000	0.296	-
Hardware / Software Integration	IA	Various Matrix Orgs incl CECOM SEC,	19.201	3.883	Oct 2018	2.713	Oct 2019	2.823	Oct 2020	-		2.823	0.000	28.620	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)
--	---	---

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
		ARDEC, LRC, PRD, et al) : APG Md													
Subtotal			175.769	26.904		22.791		19.300		-		19.300	0.000	244.764	N/A

Remarks
Software Development efforts will be managed through a combination of COTS Procurement, PM Mission Command technical staff, Matrix Organizations (CERDEC, AMRDEC) and software development contractor firms (contracts and task orders to be determined and competed as necessary).

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Product Support	C/FFP	SSCI : Austin, TX	2.989	-		-		-		-		-	0.000	2.989	-
Subtotal			2.989	-		-		-		-		-	0.000	2.989	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Develop and Conduct Tests and Assessments	MIPR	Multiple Test Agencies : Multiple Locations (Primary APG)	14.353	1.541	Oct 2018	4.228	Oct 2019	5.691	Oct 2020	-		5.691	0.000	25.813	-
Subtotal			14.353	1.541		4.228		5.691		-		5.691	0.000	25.813	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			217.314	33.693	30.969	27.489	-	27.489	0.000	309.465	N/A

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Integrate Program of Record Functionality	[Redacted]																											
CPCE PoR Test & Integration	[Redacted]																											
Developmental Test Increment 0	[Redacted]																											
CPCE Increment 0 OT	[Redacted]																											
JWA 19.1	[Redacted]																											
Fielding Decision Increment 0	[Redacted]																											
First Unit Equipped V3.0	[Redacted]																											
CPCE Increment 1 Design	[Redacted]																											
CPCE Increment 1 Milestone B	[Redacted]																											
CPCE Increment 1 Development & Integration	[Redacted]																											
Developmental Test Increment 1	[Redacted]																											
JWA 20	[Redacted]																											
CPCE Increment 1 Operational Assessment	[Redacted]																											

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4												
Fielding Decision Increment 1													4 Fielding Decision																											
CPCE Increment 2 Design													Increment 2 Design																											
CPCE Increment 2 Development & Integration													Increment 2 Development and Integration																											
Developmental Test Increment 2													Increment 2 Developmental Test																											
CPCE Increment 2 Operational Assessment													Increment 2 Operational Assessment																											

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Integrate Program of Record Functionality	2	2019	4	2025
CPCE PoR Test & Integration	1	2018	4	2025
JWA 18.1	1	2018	1	2018
Developmental Test Increment 0	4	2018	1	2019
CPCE Increment 0 OT	1	2019	1	2019
JWA 19.1	1	2019	1	2019
Fielding Decision Increment 0	4	2019	4	2019
First Unit Equipped V3.0	4	2019	4	2019
CPCE Increment 1 Design	3	2019	2	2020
CPCE Increment 1 Milestone B	4	2019	4	2019
CPCE Increment 1 Development & Integration	2	2020	4	2021
Developmental Test Increment 1	3	2020	3	2021
JWA 20	3	2020	3	2020
CPCE Increment 1 Operational Assessment	3	2021	4	2021
Fielding Decision Increment 1	4	2021	4	2021
CPCE Increment 2 Design	4	2021	3	2022
CPCE Increment 2 Development & Integration	2	2022	4	2023
Developmental Test Increment 2	3	2022	3	2023
CPCE Increment 2 Operational Assessment	3	2023	4	2023

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)			
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
EJ5: MOUNTED COMPUTING ENVIRONMENT (MCE)	-	18.463	10.464	18.582	-	18.582	22.145	20.091	17.571	17.887	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is directly aligned to the Army Network Modernization Strategy LOE 2, Common Operating Environment. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

The Common Operating Environment (COE) is an approved set of computing technologies and standards that enables secure and interoperable applications to be developed and executed rapidly across a variety of computing environments (i.e., server(s), client, mobile, sensors, and platform). The Mounted Computing Environment (MCE) is one of six computing environments under the COE, which provides standardization of end-user environments and enables streamlined deployment of new war-fighting applications while leveraging existing hardware under the Joint Battle Command-Platform (JBC-P) program.

The MCE supports LOE 2 by utilizing:

- Interoperable data, message, and waveforms
- Sensors and applications that enable operations across domains
- Integration with Joint C5ISR and strike capabilities
- Increased interoperability with the Command Post Computing Environment and Mobile Handheld Computing Environment

Requirements for the MCE are established in the Army Requirements Oversight Council (AROC)-approved COE Information Systems Initial Capability Document (IS ICD) and the Mounted Computing Environment Requirements Definition Package (RDP).

MCE's Materiel Development Decision (MDD) is scheduled for 2QFY20.

MCE employs a Developmental Operations (DevOps) process to incrementally develop capability over time to satisfy requirements and meet fielding decisions. FY 2021 funding will continue DevOps activities to incorporate new capability and enhancements based on user feedback, as well as lay the groundwork to support migration of third-party applications onto the MCE software baseline. Additionally, FY 2021 funding provides for initial test instrumentation and risk reduction events/preparation to support a v3.1 Operational Test (OT) and Army Interoperability Certification (AIC) scheduled for 1QFY22.

MCE's RDT&E resources are used to improve and add software applications while JBC-P RDT&E is used to improve JBC-P hardware, network performance and add network resiliency.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: Software Development</p> <p>Description: Provides an integrated mission command capability across Platforms, through all echelons, that provides simplicity, intuitiveness, core services and applications, common look and feel, and warfighter functionality in the areas of Fires, Logistics, Intelligence, and Maneuver. Primary software development efforts include development of S/A functions and MC applications on a Common Geospatial solution [map], a user interface with "common look and feel", and common Data Services.</p> <p>FY 2020 Plans: Continues to incorporate new capabilities into the MCE infrastructure, core utilities, backwards compatibility, and Warfighter Function (WFF) applications into a holistic system of systems while ensuring that those subsystems function together in accordance with program requirements and specifications.</p> <p>Develops/integrates MCE v3.1 to include development of: 3rd Party Apps, initial logistical capabilities, Over-the-Air (OTA) updates for software patches, Information Assurance (IA), and maps, message standards migration, path diversity for Commercial Solutions for Classified (CSfC), Wi-Fi, and Iridium satellite communications, automated Primary Alternate Contingency Emergency (PACE), Assured-Position/Navigation/Timing (A-PNT) anti-jam and spoofing resilient Global Positioning System (GPS), and route planning/navigation.</p> <p>FY 2021 Plans: Continues to incorporate new capabilities into the MCE infrastructure, core utilities, backwards compatibility, and Warfighter Function (WFF) applications into a holistic system of systems while ensuring that those subsystems function together in accordance with program requirements and specifications.</p> <p>Continues to develop/integrate MCE v3.1 to include development of: 3rd Party Apps, initial logistical capabilities, Over-the-Air (OTA) updates for software patches, Information Assurance (IA), and maps, message standards migration, path diversity for Commercial Solutions for Classified (CSfC), Wi-Fi, and Iridium satellite communications, automated Primary Alternate Contingency Emergency (PACE), Assured-Position/Navigation/Timing (A-PNT) anti-jam and spoofing resilient Global Positioning System (GPS), and route planning/navigation.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase based on incorporation of new capabilities to support additional networks, additional cross-CE interfaces and create new software implementations.</p>		12.632	8.045	13.758
<p>Title: Software/Systems Engineering</p> <p>Description: Perform Software/Systems Engineering in support of the development of MCE capabilities, applications, and services, to include, but not limited to, conducting engineering studies, software architecture development, system analyses,</p>		1.728	0.382	0.851

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>technical readiness assessments, technical interchange meetings/events, and development of related reports and other deliverables. Coordinate the development of common infrastructure components with the CPCE and M/HHCE to define and incorporate the COE cross-cutting capabilities.</p> <p>FY 2020 Plans: In FY 2020, MCE will continue software maturity, integration of 3rd party Program of Record (PoR) applications onto the baseline software architecture, and platform integration onto the Army's wheeled platforms. MCE will also conduct experimentation with Army units in order to receive direct feedback from users of the MCE software. This feedback and unit experimentation will help shape the future software releases of MCE software to the Army.</p> <p>FY 2021 Plans: In FY 2021, MCE will continue systems engineering at a reduced level, integration of 3rd party Program of Record (PoR) applications onto the baseline software architecture, and platform integration onto the Army's wheeled platforms. MCE will also conduct experimentation with Army units in order to receive direct feedback from users of the MCE software. This feedback and unit experimentation will help shape the future software releases of MCE software to the Army.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Systems engineering increases due to integration of the Command of Robotic Systems (CoRS) S&T transition to MCE.</p>				
<p>Title: Test and Evaluation</p> <p>Description: Test and evaluation efforts include the planning and conduct of combined Command Post/Mounted Computing Environment T&E events including Developmental Test, Software Acceptance Testing, Integration Events, Risk Reduction Events, and Initial Operational Test and Evaluation (IOT&E).</p> <p>FY 2020 Plans: In FY 2020, MCE will continue to utilize DevOps to improve the current MCE software baseline as existing and future 3rd party Programs of Record (PoR) developed applications are migrated onto the common MCE software baseline.</p> <p>FY 2021 Plans: In FY 2021, MCE will continue to utilize DevOps to improve the current MCE software baseline as existing and future 3rd party Programs of Record (PoR) developed applications are migrated onto the common MCE software baseline. MCE will fund initial test instrumentation and risk reduction events/preparation to support a v3.1 Operational Test (OT) and Army Interoperability Certification (AIC) scheduled for 1QFY22</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>		2.879	0.653	2.512

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Test and Evaluation funding increased due to funding needed for initial test instrumentation and risk reduction events/preparation to support a v3.1 Operational Test (OT) and Army Interoperability Certification (AIC) scheduled for 1QFY22.				
<p>Title: PM Support (Matrix & Contractor)</p> <p>Description: Program management includes overall management of program execution, major events, reporting, and logistical support. Includes participation in program planning meetings and Integrated Project Teams.</p> <p>FY 2020 Plans: Technical area contract support will include system development and engineering changes to MCE's software, system analysis of Program of Record (PoR) systems and future systems, technical readiness assessments, and stakeholder technical interchange meetings/events. This support includes the creation and implementation of Functional Support Agreements (FSAs) between PM Mission Command and various Government support agencies such as the Combat Capabilities Development Command (CCDC) C5ISR (Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance) Center, and other PEOs (e.g. PEO GCS). Program Management efforts in the FY 2020 timeframe will also include business area support to ensure funding and contracts are planned and available for all SW development, system engineering, and DT efforts.</p> <p>FY 2021 Plans: Technical area contract support will include system development and engineering changes to MCE's software, system analysis of Program of Record (PoR) systems and future systems, technical readiness assessments, and stakeholder technical interchange meetings/events. This support includes the creation and implementation of Functional Support Agreements (FSAs) between PM Mission Command and various Government support agencies such as the Combat Capabilities Development Command (CCDC) C5ISR (Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance) Center, and other PEOs (e.g. PEO GCS). Program Management efforts in the FY 2021 timeframe will also include business area support to ensure funding and contracts are planned and available for all SW development, system engineering, and DT efforts.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: PM Support (Matrix & Contractor) increased to fulfill staffing level required for FY21 requirements.</p>		1.224	0.909	1.461
<p>Title: FY 2020 SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>		-	0.475	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) EJ5 / <i>MOUNTED COMPUTING ENVIRONMENT (MCE)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	18.463	10.464	18.582

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

N/A

Remarks

N/A

D. Acquisition Strategy

The Mounted Computing Environment (MCE) is the Army's initiative to provide simple and intuitive Mission Command on-the-Move (MCOTM) and situational awareness down to the platoon level. It is standards based, protected and supports incremental improvements with additional application capabilities over time. MCE will leverage the existing JBC-P hardware and network, and be deployed as a software upgrade to replace the legacy JBC-P software. It will support a common look and feel and is part of the solution enabling leaders to lead and fight their formations from anywhere they choose.

MCE is utilizing an incremental development approach, leveraging DevOps, to ensure capability satisfies requirements and addresses Warfighter feedback. This agile development process injects enhancements into the baseline software, making it easier to incorporate technological advances. The project office conducts commercial software assessments to determine applicability and suitability for inclusion in the MCE baseline.

Software development increments and fielding decisions will be implemented with an agile 2 year capability set tech insertion construct. Software development will be manageable, tailorable, and scalable in the Capability Assessment Package (CAP) format to enable better management of capability delivery. MCE's v3.1 First Unit Equipped (FUE) is scheduled for 4QFY22; subsequent SW versions are planned to implement over-the-air updates reducing the sustainment footprint necessary to deploy and maintain multiple software baselines.

MCE's Materiel Development Decision (MDD) is scheduled for 2QFY20.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support (Matrix & Contractor)	Various	PM Mission Command : Aberdeen Proving Ground, MD	3.376	1.224	Nov 2018	0.909		1.461	Nov 2020	-		1.461	Continuing	Continuing	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.475		-		-		-	0.000	0.475	-
Subtotal			3.376	1.224		1.384		1.461		-		1.461	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	Various	PM Mission Cmd, Multiple Matrix Orgs and SW Dev Contractors : Aberdeen Proving Ground, MD	16.882	12.632	Dec 2018	8.045		13.758	Dec 2020	-		13.758	Continuing	Continuing	-
Software/Systems Engineering	Various	PM Mission Cmd, Multiple Matrix Orgs and SW Dev Contractors : Aberdeen Proving Ground, MD	19.195	1.728	Nov 2018	0.382		0.851	Nov 2020	-		0.851	Continuing	Continuing	-
Subtotal			36.077	14.360		8.427		14.609		-		14.609	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test, Evaluation and Integration	MIPR	Multiple Test Agencies; Multiple	4.990	2.879	Nov 2018	0.653		2.512	Jan 2021	-		2.512	Continuing	Continuing	-

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025																									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																						
MCE Arch, System Engr & Dev	[Blue bar]																																																	
	MCE v3.1 SE & Dev																																																	
MCE v3 Customer Test	[Blue bar]																																																	
	MCE v3 CT (NIE 18.2)																																																	
Developmental Operations (DevOps)		[Blue bar]																																																
		MCE v3.1: Engineering Releases (ERs) 1-5																																																
Materiel Development Decision (MDD)																																																		
N-CFT's ITN 19 Experimentation Event																																																		
Preliminary Design Review (PDR)																																																		
Developmental Test (DT)																																																		
Critical Design Review (CDR)																																																		
Limited Deployment Decision (LDD)																																																		
System Software Acceptance Test (SSAT)																																																		
MCE Arch, System Engr & Dev 2																																																		
Planned Operational Test (OT)																																																		
Planned Army Interoperability Certification (AIC)																																																		

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Full Deployment Decision (FDD)													5 MCE v3.1 FDD															
First Unit Equipped (FUE)													6 MCE v3.1 FUE															
System Software Acceptance Test (SSAT) 2													MCE v3.2 SSAT															
MCE Arch, System Engr & Dev 3													MCE v3.3 SE & Dev															
Planned Operational Assessment (OA)													MCE v3.2 OA															
Planned Army Interoperability Certification (AIC) 2													MCE v3.2 AIC															
Software Materiel Release (SMR)													7 MCE v3.2 SMR															
MCE Arch, System Engr & Dev 4													MCE v3.4 SE & Dev															
Software Materiel Release (SMR) 2													8 MCE															

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MCE v3 Test & Integration	3	2017	4	2018
MCE Arch, System Engr & Dev	1	2019	4	2021
MCE v3 Customer Test	1	2019	1	2019
Developmental Operations (DevOps)	2	2019	4	2021
Matériel Development Decision (MDD)	2	2020	2	2020
N-CFT's ITN 19 Experimentation Event	2	2020	2	2020
Preliminary Design Review (PDR)	4	2020	4	2020
Developmental Test (DT)	1	2021	1	2021
Critical Design Review (CDR)	2	2021	2	2021
Limited Deployment Decision (LDD)	2	2021	2	2021
System Software Acceptance Test (SSAT)	4	2021	4	2021
MCE Arch, System Engr & Dev 2	1	2022	4	2023
Planned Operational Test (OT)	1	2022	1	2022
Planned Army Interoperability Certification (AIC)	1	2022	2	2022
Full Deployment Decision (FDD)	4	2022	4	2022
First Unit Equipped (FUE)	4	2022	4	2022
System Software Acceptance Test (SSAT) 2	4	2023	1	2024
MCE Arch, System Engr & Dev 3	1	2024	4	2024
Planned Operational Assessment (OA)	1	2024	1	2024
Planned Army Interoperability Certification (AIC) 2	1	2024	3	2024
Software Matériel Release (SMR)	4	2024	4	2024
MCE Arch, System Engr & Dev 4	1	2025	4	2025

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army			Date: February 2020	
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) EJ5 / <i>MOUNTED COMPUTING ENVIRONMENT (MCE)</i>		

Events	Start		End	
	Quarter	Year	Quarter	Year
Software Materiel Release (SMR) 2	4	2025	4	2025

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EJ6 / TACTICAL ENHANCEMENT			
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
EJ6: TACTICAL ENHANCEMENT	-	10.085	0.000	7.860	-	7.860	0.000	0.000	0.000	0.000	0.000	17.945
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is directly aligned to the Army Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Tactical Enhancement supports the evaluation and testing requirements for Troposcatter Transmission (TROPO) capabilities procured and fielded under the Signal Modernization (SIGMOD) funding line, B00010. TROPO will provide redundancy communications in a Satellite denied environment by providing improved Line of Sight and beyond line of sight radio systems.

In addition this funding will support development of Network Centric Waveform-Resilient (NCW-R). NCW-R is a critical, near-term set of modifications to the current Tactical Network SATCOM waveform that will provide limited protection against our adversaries' ability to jam tactical SATCOM Command and control communications on Wideband Global SATCOM (WGS) satellites. NCW-R will provide anti-jam capability and resiliency to Tactical Network satellite terminals in contested environments. The NCW-R waveform software will operate on Tactical Network satellite modems. NCW-R will provide a bridging capability until the next generation protected satellite constellation is launched by the Air Force (projected FY 2028/2029). The current anti-jam protection is limited to two SMART-T terminals per BCT, division and Corps HQs, leaving battalions vulnerable to being isolated during jamming events.

SIGMOD Capabilities:

TROPO: Enables Mission Command in a Satellite Denied environment by providing Beyond Line of Sight (BLOS) capability over longer ranges and at higher throughput than the current BLOS System. TROPO extends the network by utilizing a significantly reduced SWaP radio verses the current system. TROPO will enable Army units to reduce reliance on costly satellite bandwidth.

FY 2021: Funds support TROPO Initial Operational Test & Evaluation efforts to support Full Rate Production Decision in FY 2022

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

	FY 2019	FY 2020	FY 2021
Title: IOT&E for TROPO systems	-	-	7.860
Description: Funds support the following efforts:			
FY 2021 Plans:			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ6 / TACTICAL ENHANCEMENT

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Funds will be used for TROPO IOT&E testing requirement			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Increase (\$7.860M) funds is for TROPO IOT&E testing			
<i>Title:</i> Development of NCW-R <i>Description:</i> Funds are for the following effort.	0.916	-	-
<i>Title:</i> Development of TROPO Planner <i>Description:</i> Funds are for the following effort:	1.392	-	-
<i>Title:</i> Army Withold and Unit Task Reorganization (UTR) Realignment <i>Description:</i> Funds are for the following effort:	7.777	-	-
Accomplishments/Planned Programs Subtotals	10.085	-	7.860

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• B00010: <i>Signal Modernization Program</i>	82.180	128.913	160.469	-	160.469	190.053	224.085	221.048	260.035	Continuing	Continuing

Remarks
B00010 : OPA funding line for Signal Modernization (SIGMOD)

D. Acquisition Strategy
These funds will be used to conduct System Evaluation and Formal Testing of the various Signal Mod capabilities, specifically the TROPO systems. This is in order to facilitate integration into the Tactical Networks. These test events will meet all mandatory testing requirements with full ATEC oversight. This Acquisition Strategy will integrate proven Commercial-Off-The-Shelf (COTS) capabilities into existing Tactical Network nodes to expand and enhance network capacity and user access. The TROPO capabilities are acquired as ACAT III programs to replace legacy equipment in the field while utilizing DoDI 5000.02 standard acquisition approaches, starting with Milestone C Determination for TROPO (4QFY18).

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				EJ6 / TACTICAL ENHANCEMENT								
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Sig Mod	SS/FP	TBD : TBD	-	1.392	Aug 2019	-		-		-		-	0.000	1.392	-	
Army Withhold and Unit Task Reorganization (UTR) Realignment	SS/FFP	Harris Corp : Arlington, VA	-	7.777	Aug 2019	-		-		-		-	0.000	7.777	-	
Subtotal			-	9.169		-		-		-		-	0.000	9.169	N/A	
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
NCW-R	SS/CPFF	CODES1403AALION SCIENCE AND TECHNOLOGY CORPORATION : 202BURR RIDGE IL 60527-0849FACILITY	26.500	0.916	Jan 2019	-		-		-		-	0.000	27.416	-	
Subtotal			26.500	0.916		-		-		-		-	0.000	27.416	N/A	
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
TRILOS Testing	MIPR	ATEC : Aberdeen Proving Ground, MD	19.823	-		-		-		-		-	0.000	19.823	-	
TROPO Testing	MIPR	ATEC : Aberdeen Proving Ground, MD	-	-		-		7.860	Apr 2021	-		7.860	0.000	7.860	-	
Subtotal			19.823	-		-		7.860		-		7.860	0.000	27.683	N/A	
Project Cost Totals			46.323	10.085		0.000		7.860		-		7.860	0.000	64.268	N/A	

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army							Date: February 2020			
Appropriation/Budget Activity 2040 / 5			R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software			Project (Number/Name) EJ6 / TACTICAL ENHANCEMENT				
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EJ6 / TACTICAL ENHANCEMENT

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NCW-R Developmental Testing					NCW-R Developmental Testing																							
NCW-R Certification					NCW-R Certification																							
NCW-R Operational Testing					NCW-R Operational Testing																							
IOT&E for TROPO													IOT&E TROPO															
IOC for TROPO																	1 IOC TROPO											
FRP for TROPO																					2 FRP TROPO							

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) EJ6 / <i>TACTICAL ENHANCEMENT</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NCW-R Developmental Testing	2	2020	1	2021
NCW-R Certification	3	2020	1	2021
NCW-R Operational Testing	4	2020	1	2021
IOT&E for TROPO	1	2022	3	2022
IOC for TROPO	4	2022	4	2022
FRP for TROPO	1	2023	1	2023

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT			
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
EK9: TACTICAL NETWORK OPERATIONS AND MANAGEMENT	-	7.631	3.649	3.375	-	3.375	0.000	0.000	0.000	0.000	0.000	14.655
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Tactical Network Operations (NetOps) Management (TNOM) is the official nomenclature for the funding line. Unified Network Operations (UNO) is the effort that the funding line funds.

A. Mission Description and Budget Item Justification

This funding line supports the Army Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Tactical Network Operations Management's (TNOM) purpose is to create Unified Network Operations (UNO). UNO is a software centric, integrated NetOps capability being developed, as a rapid prototype - proceeding under Section 804, mid-tier acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM). Enabling common planning, configuration, monitoring, provisioning, management, and defense of the Network, UNO configures and integrates tactical and enterprise networks to allow delivery of information and communications among Soldiers at all echelons utilizing network resources prioritized according to the Commander's intent. In developing UNO, TNOM follows the Army's development operations (DevOps) approach - creating Network Operations (NetOps) prototypes, gaining user feedback, making adjustments and ultimately delivering enhanced capabilities to the operational force in the shortest time possible. UNO development incorporates solutions available in industry and through government agencies - assessing them in an adapt-and-buy approach informed by experimentation, demonstration, and modernization.

FY 2021 funding supports MTA (Section 804) rapid prototyping efforts of UNO v1.0 via NetOps capabilities that build upon current efforts, efforts that align with Chief of Staff of the Army (CSA) guidance to provide delivery of a simplified NetOps capabilities across the tactical network, and include emerging capability requirements stemming from Network Cross-Functional Team (CFT) initiatives and directed requirements. UNO will also support the delivery of integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities. Army's approved requirements for UNO are found in the Integrated Tactical Network (ITN) Abbreviated - Capability Definition Document (A-CDD) dated 26 June 2019.

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

	FY 2019	FY 2020	FY 2021
Title: Product Development	7.631	3.484	3.375
Description: Network Planner provides the product development of workflows that guide Soldiers through planning the Tactical Radios, SATCOM Line of Sight (LOS) and TROPO systems, automates the analysis process to recommend locations to place			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

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

	FY 2019	FY 2020	FY 2021
<p>LOS Nodes based on Area of Responsibility, improves Planning accuracy for Antenna & Radio templates, based on updated performance parameters, simplifies configuration operations through the use of a centralized network database and supports Unit Task Reorganization (UTR), and provides consistent look and feel with embedded training.</p> <p>Network Management provides the product development into the Network Common Operational Picture (COP) for all tactical networks systems, management to Tactical Radios, SATCOM Line of Sight (LOS) and TROPO systems, network status information to monitor and adjust the network to meet mission requirements, and consistent look and feel with embedded training.</p> <p>FY 2020 Plans: FY 2020 funding will continue support of MTA (Section 804) rapid prototyping efforts of UNO v1.0 via NetOps capabilities to address CSA priorities, and include emerging capability requirements stemming from Network CFT initiatives and requirements. Support delivering integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities.</p> <p>Capabilities UNO will expand based upon Network CFT initiatives and requirements are Network Management, Integrated Planner, Radio Planner, and Federated Data Repository utilizing the try, buy, decide strategy put forth by Army leadership.</p> <p>Development of UNO's Radio Planner capability provides the ability to plan and create configuration files as well as manage the latest Tactical radio elements of the Department of Defense Information Network ? Army (DoDIN-A) and monitoring focused on the status of mission network services effectivity.</p> <p>Development of the UNO's Network Management function will provide the ability to manage and troubleshoot the network elements that comprise the DoDIN-A, monitor a local node for network health status, performance, location, and security, in addition to displaying monitored data to the local operator. Management elements include, but are not limited to, the Command Post, Brigades, Echelons, etc.</p> <p>UNO's improvement of the Integrated Planner functionality allows NetOps capabilities to plan, manage and operate the Tactical Internet DoDIN-A with common operating picture, automate the planning functions and the resource management to support unit task organization, and interface with managers and monitors.</p> <p>Continued advancement of UNO's Federated Data Repository enables unit task reorganization (UTR) acting as the distributed data store for NetOps data and provide services that will be used by NetOps planning and management systems and a federated</p>			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>data store that operates over existing Army Tactical networks, typically characterized as a Disconnected, Intermittent and Bandwidth Limited (DIL) operating environment.</p> <p>FY 2021 Plans: FY 2021 funding will support MTA (Section 804) rapid prototyping efforts of UNO via NetOps capabilities that build upon current efforts, expand those efforts to address CSA priorities, and include emerging capability requirements stemming from Network CFT initiatives and directed requirements. Support development, assessments, and deliveries of integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities.</p> <p>UNO's MTA will support prototyping of NetOps capabilities that enable command and control of the Tactical Network which will provide simplicity via a Common Operating Picture (COP), a flexible framework enabling rapid integration of future commercial/ government tools, and reliable network information to the Soldiers.</p> <p>The Network Planner and Network Management capabilities will support Network CFT initiatives and directed requirements utilizing the adapt and buy approach, as well as modernization, put forth by Army leadership.</p> <p>Continues product development of the simplified Network Planner functionality, which enables automated NetOps capabilities to plan, manage and operate the Tactical Network via user workflows and reduces the cognitive burden to the Soldiers. Will continue development of Radio Planning capabilities in order to plan and create configuration files for emerging Integrated Tactical Network (ITN) radios and waveforms.</p> <p>Continues product development of the simplified Network Management functionality, which enables the management and troubleshooting of the network elements that comprise the Tactical Network by monitoring local nodes for network health status, performance, location, and security, in addition to displaying monitored data to the local operator. Will continue enhancement and integration of the Federated Data Repository, which reduces time in task to the Soldiers and enables rapid Unit Task Reorganization (UTR).</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: The FY 2020 to FY 2021 decrease of \$274K is from prioritizing all appropriated funding towards Network Planner and Network Management capability development within the MTA rapid prototyping timeline, which began 26 June 2019 after receiving Section 804, Mid-Tier Acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM).</p>				
Title: FY 2020 SBIR/STTR Transfer		-	0.165	-
Description: Funding transferred in accordance with Title 15 USC ?638				

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army	Date: February 2020
--	----------------------------

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT
--	---	--

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<i>FY 2020 Plans:</i> Funding transferred in accordance with Title 15 USC ?638			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	7.631	3.649	3.375

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BA9312: NETWORK MANAGEMENT SYSTEM	6.896	13.534	5.230	-	5.230	5.363	5.524	5.529	5.583	0.000	47.659

Remarks
BA9312 (I-NetOps Trailboss) investments into UNO provide engineering support and integration of Network Planner and Network Management capabilities. Continued investments provide ability to conduct DevOps w/ Soldier feedback via Pilot exercises, e.g. Fifth Generation Technology Insertion (5GTI) and Expeditionary Signal Brigades-Enhanced (ESB-E).

D. Acquisition Strategy
Unified Network Operations (UNO) (EK9) is proceeding under Section 804, mid-tier acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM).

UNO will leverage the MTA (Section 804) Rapid Prototyping acquisition strategy allowing for rapid prototyping of NetOps Solutions using incremental development and employing Commercial Off-The-Shelf (COTS) innovative technologies to demonstrate new Plan, Manage, Provision, and Secure Network capabilities that meet Army modernization and operational needs. UNO will provide adequate experimentation and incorporate Soldier feedback to mitigate cost, schedule, and performance risks early in program lifecycle, receive analysis of technology/design maturity and component integration/interoperability, and provide requirement refinement.

The objective of the MTA (Section 804) is to develop and deliver prototypes into experimentation events for user feedback through FY 2024 within simulated operational environment(s) in order to provide operational capabilities within five years of the development of an approved requirement.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT
--	---	--

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.165		-		-		-	0.000	0.165	-
Subtotal			-	-		0.165		-		-		-	0.000	0.165	N/A

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Product Development	C/BPA	TBD : TBD	-	7.631	Apr 2019	3.484	Feb 2020	3.375	Jan 2021	-		3.375	0.000	14.490	-
Subtotal			-	7.631		3.484		3.375		-		3.375	0.000	14.490	N/A

Remarks
 FY 2021 funding will support MTA (Section 804) rapid prototyping efforts of UNO v1.0 via NetOps capabilities that build upon current efforts, expand those efforts to address CSA priorities, and include emerging capability requirements stemming from Network CFT initiatives and directed requirements. Support delivering integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities. The two capabilities that will be expanded upon based on Network CFT initiatives and directed requirements are Network Management and Network Planner capabilities utilizing the adapt and buy approach put forth by Army leadership.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
FY18 Congressional Rescission	C/TBD	NA : NA	4.655	-		-		-		-		-	0.000	4.655	-
Subtotal			4.655	-		-		-		-		-	0.000	4.655	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		4.655	7.631	3.649	3.375	-	3.375	0.000	19.310	N/A

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
MTA Request to DASM																												
UNO MTA (Section 804) AAE Approval																												
UNO MTA (Section 804) Rapid Prototyping Start																												
UNO v1.0 DevOps, Prototype User Feedback, & Testing																												
UNO v1.0 Transition Pathway Decision																												
UNO v1.0 FQT/OA																												
UNO v1.0 Transition Decision																												
UNO v1.1 Capability Decision Point																												
UNO v1.0 Transitioned to CS21																												
UNO v1.1 DevOps, Prototype User Feedback, & Testing																												
UNO v1.1 Transition Pathway Decision																												
UNO v1.1 FQT/OA																												
UNO v1.1 Transition Decision																												

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
UNO v1.1 Delivered																	██████████											
UNO v1.2 DevOps, Prototype User Feedback, & Testing																	██████████											
UNO v1.1 Transition to CS23																	8											
UNO v1.2 Capability Decision Point																	9											
UNO v1.2 Transition Pathway Decision																	10											
UNO v1.2 FQT/OA																	11											
UNO MTA (Section 804) Rapid Prototyping Completion																	12											
UNO v1.3 Capability Decision Point																	13											
UNO v1.2 Transition Decision																	14											
UNO v1.2 Transition to CS25																												

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) EK9 / <i>TACTICAL NETWORK OPERATIONS AND MANAGEMENT</i>

Note
At each transition pathway decision, all UNO capabilities will be analyzed to determine the best transition from the Section 804, mid-tier acquisition (MTA) rapid prototyping authority. Transition options include, but are not limited to, instituting an Engineering Change Proposal (ECP) into an existing Program of Record (PoR), obtaining authority to utilize the traditional JCIDS acquisition process, or obtain authorization to utilize the Section 804, mid-tier acquisition (MTA) rapid fielding authority.

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MTA Request to DASM	2	2019	2	2019
UNO MTA (Section 804) AAE Approval	3	2019	3	2019
UNO MTA (Section 804) Rapid Prototyping Start	3	2019	3	2019
UNO v1.0 DevOps, Prototype User Feedback, & Testing	4	2019	4	2020
UNO v1.0 Transition Pathway Decision	1	2020	1	2020
UNO v1.0 FQT/OA	4	2020	4	2020
UNO v1.0 Transition Decision	4	2020	4	2020
UNO v1.1 Capability Decision Point	4	2020	4	2020
UNO v1.0 Transitioned to CS21	4	2020	3	2021
UNO v1.1 DevOps, Prototype User Feedback, & Testing	4	2020	4	2022
UNO v1.1 Transition Pathway Decision	1	2022	1	2022
UNO v1.1 FQT/OA	3	2022	3	2022
UNO v1.1 Transition Decision	4	2022	4	2022
UNO v1.1 Delivered	4	2022	3	2023
UNO v1.2 DevOps, Prototype User Feedback, & Testing	4	2022	3	2024
UNO v1.1 Transition to CS23	3	2023	3	2023
UNO v1.2 Capability Decision Point	1	2024	1	2024
UNO v1.2 Transition Pathway Decision	1	2024	1	2024
UNO v1.2 FQT/OA	3	2024	3	2024
UNO MTA (Section 804) Rapid Prototyping Completion	3	2024	3	2024
UNO v1.3 Capability Decision Point	4	2024	4	2024
UNO v1.2 Transition Decision	4	2024	4	2024

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army			Date: February 2020	
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT		

Events	Start		End	
	Quarter	Year	Quarter	Year
UNO v1.2 Transition to CS25	4	2025	4	2025

Note

Program projects MTA (Section 804) approval will support rapid prototyping efforts of UNO via NetOps capabilities that build upon current efforts, expand those efforts to address CSA priorities, and include emerging capability requirements stemming from Network Cross Functional Team (CFT) initiatives and directed requirements. Support delivering integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities. UNO's capabilities will expand on Network CFT initiatives and directed requirements are Network Management, Integrated Planner, Radio Planner, and Federated Data Repository utilizing the try, buy, decide strategy put forth by Army leadership.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)			
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
EQ8: <i>Mobile/Handheld Computing Environment (M/HHCE)</i>	-	9.130	4.857	5.155	-	5.155	5.163	5.172	5.180	5.247	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project EQ8 - The Common Operating Environment (COE) is an approved set of computing technologies and standards that enables secure and interoperable applications to be developed and executed rapidly across a variety of computing environments. The Mobile/Handheld Computing Environment (M/HHCE) is one of the six computing environments under the COE, which provides the standards for all Army hand held applications enabling the use of common End User Devices by Soldiers, thereby eliminating redundant devices and reducing the Soldiers' load.

The M/HHCE is directly aligned to the Army Network Modernization Strategy Line of Effort (LOE) 1 (Unified Network). M/HHCE also supports the Army Network Modernization Strategy LOE 2 (Common Operating Environment). These efforts are aligned to the Army's Tactical Network Capability Set development and fielding plans by utilizing (1) interoperable data, message, and waveforms, (2) sensors and applications that enable operations across domains and (3) integration with Joint C4ISR and strike capabilities. Nett Warrior (NW) and Integrated Visual Augmentation System (IVAS) are the instantiation of the M/HHCE and comply with the technical standards documented by the M/HHCE and provide the dismounted common computational platform for other products relevant to dismounted Soldiers. Through compliance with the M/HHCE, software applications from other programs are integrated with the NW and IVAS systems, reducing the need for duplicate hardware resulting in reduced Soldier Load. NW leverages commercial smart phone devices and secure Army tactical radios to provide the dismounted leader an integrated mission command and situational awareness capability for use during combat operations. NW applied feedback from conventional and Special Operations units to procure and implement Secret and Secure But Unclassified (SBU) networking equipment for BCTs and the Security Force Assistance Brigades to enable faster, more flexible Mission Command data exchanges with Joint and Coalition forces while maintaining the existing integrated mission command capability with Mounted CE (e.g., JBCP) system. NW uses Commercial-Off-The-Shelf (COTS) and Non Developmental (NDI) communications equipment to create a robust and flexible Integrated Tactical Network that enables faster and more accurate decision making in fights at the tactical level.

Requirements for the M/HH CE are established in the AROC approved COE Information Systems Initial Capability Document (IS ICD), the M/HHCE Requirements Definition Package (RDP), and the NW Capability Development Document in lieu of Capability Production Document. This project is in the Army's Top 100 Modernization efforts.

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

	FY 2019	FY 2020	FY 2021
Title: Test and Evaluation	1.971	0.965	1.070
Description: Test and Evaluation including annual Army Expeditionary Warrior Experiment (AEWE) and Joint Warfighting Assessment (JWA) to gain Soldier feedback.			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans: Continue NW test and 3rd party applications evaluation for technical verification at developmental test events and user verification. Conduct a planned assessment of Integrated Tactical Network (ITN) in an IBCT. Support NW as a baseline NIE/JWA system including: Brigade level support, equipping, training, and spares for NW; conduct yearly Army Interoperability Certification; environmental testing; and Information Assurance penetration prevention testing for new commercial smart devices, software and accessories. Support Army Expeditionary Warrior Experiment (AEWE) testing.</p> <p>FY 2021 Plans: Continue NW test and 3rd party applications evaluation for technical verification at developmental test events and user verification. Conduct a planned assessment of Integrated Tactical Network (ITN) in an S/ABCT. Support NW as a baseline JWA system including: Brigade level support, equipping, training, and spares for NW; conduct yearly Army Interoperability Certification; environmental testing; and Information Assurance penetration prevention testing for new commercial smart devices, software and accessories. Support Army Expeditionary Warrior Experiment (AEWE) testing.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: FY 2021 minor increase to support SBCT and ABCT assessment.</p>				
<p>Title: Hardware and Software Integration and Evaluation for Capability Improvements</p> <p>Description: Hardware and Software Integration and Evaluation for Capability Improvements</p> <p>FY 2020 Plans: Continue to evaluate next End User Devices (EUD) and associated hardware components to stay aligned with commercial and Army evolving requirements. Provide NW software / hardware updates to support incorporation of 3rd party software applications onto NW EUD platform, Army Interoperability Certification (AIC) and cyber security testing. Support DARPA Squad X integration and transition. Update software to M/HH CE standards as revised to maintain compliance with COE. Continue integration of Cyber Electromagnetic Activities (CEMA) capability into the NW system to support EW threat detections and location finding.</p> <p>FY 2021 Plans: Continue to evaluate next End User Devices (EUD) and associated hardware components to stay aligned with commercial and Army evolving requirements. Provide NW software / hardware updates to support incorporation of 3rd party software applications onto NW EUD platform, Army Interoperability Certification (AIC) and cyber security testing. Support DARPA integration and transition of future technologies. Update software to M/HHCE standards as revised to maintain compliance with COE. Continue integration of Cyber Electromagnetic Activities (CEMA) capability into the NW system to support EW threat detections and location finding.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>		3.758	1.879	1.420

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
FY 2021 reductions reflect decreased requirement to integrate with 3rd Party Applications.				
<p>Title: Software Development & Integration</p> <p>Description: Funding is provided for the following efforts.</p> <p>FY 2020 Plans: Continue to evaluate next generation NW map engine and Operating System (OS) trade studies and Assured Position, Navigation and Timing (PNT) software development efforts with NW. Update NW Software Development Kit (SDK) with new functionality. Continue software upgrades to ITN component software based on security and operational requirements. Continue incorporating the Army's Common Operating Environment (COE) 3.0 Cross-Cutting Capabilities into NW software. Continue development of NW's next generation Service Oriented Architecture.</p> <p>FY 2021 Plans: Continue to evaluate next generation NW map engine and Operating System (OS) trade studies and Assured Position, Navigation and Timing (PNT) software development efforts with NW. Update NW Software Development Kit (SDK) with new functionality. Continue software upgrades to ITN component software based on security and operational requirements. Continue incorporating the Army's Common Operating Environment (COE) 3.0 Cross-Cutting Capabilities into NW software. Continue development of NW's next generation Service Oriented Architecture and Tactical Assault Kit plug-ins.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Integration of COE 3.0 into SW release build efforts in FY 2021.</p>		1.002	0.469	1.621
<p>Title: Conduct SEPM Support to NW</p> <p>Description: Conduct Systems Engineering and Program Management Support to Nett Warrior</p> <p>FY 2020 Plans: Continue to conduct government systems / software engineering and program management support for NW program. Will collect input from Soldiers to improve NW size, weight, power, fightability, safety and effectiveness via surveys. Will manage system configuration, and execute test, development and integration planning including investigation and analysis of emerging innovative commercial technologies to reduce the size, weight, power, cost, increase NW and ITN functionality.</p> <p>FY 2021 Plans: Continue to conduct government systems / software engineering and program management support for NW program. Will collect input from Soldiers to improve NW size, weight, power, fightability, safety and effectiveness via surveys. Will manage system</p>		1.721	1.024	0.750

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)
--	---	--

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
configuration, and execute test, development and integration planning including investigation and analysis of emerging innovative commercial technologies to reduce the size, weight, power, cost, increase NW and ITN functionality. FY 2020 to FY 2021 Increase/Decrease Statement: Reduction in testing, surveys for Soldier feedback, and fewer agile development cycles.			
Title: M/HHCE Governance Description: Development of the M/HHCE standards and M/HHCE governance. FY 2020 Plans: Continue to provide Mobile Handheld Computing Environment (MHH/CE) governance and standards development for external program integration to eliminate separate handheld devices and reduce Soldier load. Maintain compliance with overarching COE standards. FY 2021 Plans: Continue to provide Mobile Handheld Computing Environment (M/HHCE) governance and standards development for external program integration with NW and IVAS to eliminate separate handheld devices and reduce Soldier load. Maintain compliance with overarching COE standards. FY 2020 to FY 2021 Increase/Decrease Statement: Reduction in the requirement for M/HHCE governance.	0.678	0.299	0.294
Title: FY 2020 SBIR/STTR Transfer Description: Funding transferred in accordance with Title 15 USC ?638 FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638 FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638	-	0.221	-
Accomplishments/Planned Programs Subtotals	9.130	4.857	5.155

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• R80501: Ground Soldier System	36.506	116.265	154.937	-	154.937	182.025	185.295	188.627	190.514	0.000	1,054.169

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army	Date: February 2020
--	----------------------------

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) EQ8 / <i>Mobile/Handheld Computing Environment (M/HHCE)</i>
--	--	---

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
------------------	----------------	----------------	-------------------------------	------------------------------	--------------------------------	----------------	----------------	----------------	----------------	-----------------------------------	-------------------

Remarks

D. Acquisition Strategy

To capitalize on commercial industry's investment in advanced smart device technology as well as innovation and changes within Army, NW requires annual RDT&E funding for integration and evaluation of new technology. Through this process and at low cost, the Army is able to integrate and evaluate for combat utility the hundreds of millions spent in product development by the major commercial device manufactures. The Nett Warrior (NW) program provides situational awareness and mission command to dismounted combat leaders through a secure commercial smart device, power source, cables and the Integrated Tactical Network. NW funds development and evaluation of new technology and software integration through a combination of competitively awarded contracts. Various existing follow on procurement contracts are utilized to procure a combination of COTs and GOTs NW equipment to include supporting services. NW program completed LRIP/MS C in 2012 followed by two LRIP decisions in 2013-14 in preparation for IOT&E under DOT&E oversight in 4QFY14- 1QFY15. This IOT&E event led to an additional NW Low Rate Initial Production (LRIP) decision in 2015 and a Full Rate Production Decision in FY17. Now in production, NW seeks operational feedback and uses the DevOps process to identify and implement new capabilities. M/HHCE standards are updated annually under the M/HHCE governance process.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				EQ8 / Mobile/Handheld Computing Environment (M/HHCE)								
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
System Engineering & Program Management Support	Various	Various : Various	4.656	1.721		1.356		0.750		-		0.750	Continuing	Continuing	-	
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.221		-		-		-	0.000	0.221	-	
Subtotal			4.656	1.721		1.577		0.750		-		0.750	Continuing	Continuing	N/A	
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Hardware/Software Integration & Evaluation	Various	Various : Various	7.819	3.578		1.868		1.420		-		1.420	Continuing	Continuing	-	
MHH Governance	MIPR	Various : Various	8.272	1.758		-		0.294		-		0.294	Continuing	Continuing	-	
Subtotal			16.091	5.336		1.868		1.714		-		1.714	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Software Development and Integration	Various	Various : Various	4.077	1.002		0.458		1.621		-		1.621	Continuing	Continuing	-	
Subtotal			4.077	1.002		0.458		1.621		-		1.621	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Test and Evaluation	Various	Various : Various	4.258	1.071		0.954		1.070		-		1.070	Continuing	Continuing	-	
Subtotal			4.258	1.071		0.954		1.070		-		1.070	Continuing	Continuing	N/A	

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army								Date: February 2020			
Appropriation/Budget Activity 2040 / 5			R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)				
	Prior Years	FY 2019	FY 2020		FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	29.082	9.130	4.857		5.155	-	5.155	Continuing	Continuing	N/A	

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
New EUD test and evaluation + LTE (OT) FY19	█																											
DARPA Squad X transition Phase 1 FY19	█																											
Mech Unit with Nett Warrior DT FY19		█																										
Software Update Testing (CS-18/19) FY19		█	█																									
New Hardware capability testing (Env/CBRNE/Intel) FY19			█																									
3rd Party Integration FY19			█																									
TCAPS Integration FY19				█																								
Mobile Hand Held Compliance Testing (FY19)				█																								
Robotics and Mobile Sensor Testing FY19				█																								
New EUD test and evaluation + LTE (DT) FY20					█																							
New Hardware capability testing (Env/CBRNE/Intel) FY20						█	█																					
Mobile Hand Held Compliance Testing (FY20)																												
Mech Unit with Nett Warrior DT FY20						█																						

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Robotics and Mobile Sensor Testing FY20								■																				
Software Update Integration FY20						■																						
3rd Party Integration FY20							■	■																				
Robotics and Mobile Sensor Testing FY21									■	■	■	■																
New EUD test and evaluation + LTE (OT) FY21										■	■	■																
New Hardware capability testing (Env/CBRNE/Intel) FY21										■	■	■																
Software Update Testing (CS-18/19) FY21										■	■	■																
Mobile Hand Held Compliance Testing (FY21)												■																
Mech Unit with Nett Warrior OT FY21											■	■																
Software Update Integration FY21												■																
Mobile Hand Held Compliance Testing (FY22)														■	■	■												
Software Update Integration FY22															■	■												
Mobile Hand Held Compliance Testing (FY23)																■	■	■	■	■								

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
DARPA Share Transition																												
DARPA Share secure communication evaluation																												
DARPA Share formal testing																												
Software Update Integration FY23																												
New EUD Test and evaluation																												
Mobile Hand Held Compliance Testing																												
Software Update Integration (FY24)																												
3rd Party Integration																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
New EUD test and evaluation + LTE (OT) FY19	1	2019	2	2019
DARPA Squad X transition Phase 1 FY19	1	2019	4	2019
Mech Unit with Nett Warrior DT FY19	2	2019	2	2019
Software Update Testing (CS-18/19) FY19	2	2019	3	2019
New Hardware capability testing (Env/CBRNE/Intel) FY19	3	2019	3	2019
3rd Party Integration FY19	3	2019	3	2019
TCAPS Integration FY19	4	2019	4	2019
Mobile Hand Held Compliance Testing (FY19)	4	2019	4	2019
Robotics and Mobile Sensor Testing FY19	4	2019	4	2019
New EUD test and evaluation + LTE (DT) FY20	1	2020	1	2020
New Hardware capability testing (Env/CBRNE/Intel) FY20	2	2020	3	2020
Mobile Hand Held Compliance Testing (FY20)	4	2020	4	2020
Mech Unit with Nett Warrior DT FY20	2	2020	2	2020
Robotics and Mobile Sensor Testing FY20	4	2020	4	2020
Software Update Integration FY20	2	2020	2	2020
3rd Party Integration FY20	3	2020	4	2020
Robotics and Mobile Sensor Testing FY21	1	2021	3	2021
New EUD test and evaluation + LTE (OT) FY21	2	2021	3	2021
New Hardware capability testing (Env/CBRNE/Intel) FY21	2	2021	3	2021
Software Update Testing (CS-18/19) FY21	2	2021	3	2021
Mobile Hand Held Compliance Testing (FY21)	4	2021	4	2021
Mech Unit with Nett Warrior OT FY21	3	2021	3	2021

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EQ8 / Mobile/Handheld Computing Environment (M/HHCE)
--	---	--

Events	Start		End	
	Quarter	Year	Quarter	Year
Software Update Integration FY21	4	2021	4	2021
Mobile Hand Held Compliance Testing (FY22)	3	2022	3	2022
Software Update Integration FY22	4	2022	4	2022
Mobile Hand Held Compliance Testing (FY23)	3	2022	3	2023
DARPA Share Transition	3	2019	4	2022
DARPA Share secure communication evaluation	3	2020	4	2020
DARPA Share formal testing	3	2021	4	2021
Software Update Integration FY23	4	2022	4	2023
New EUD Test and evaluation	1	2024	2	2024
Mobile Hand Held Compliance Testing	3	2024	3	2024
Software Update Integration (FY24)	3	2024	4	2024
3rd Party Integration	3	2022	4	2025

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) ER9 / Expeditionary Army Command Post			
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
ER9: Expeditionary Army Command Post	-	33.052	28.895	58.436	-	58.436	53.195	20.089	9.998	0.000	0.000	203.665
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is directly aligned to the Army Network Modernization Strategy Line of Effort (LOE) #4 Command Post. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Program will implement capabilities in a two increment approach. Increment 1 will implement prototype capabilities as identified in signed Directed Requirement and Increment 2 will execute the requirements identified in Capability Development Document (CDD) due for review/approval in 2QFY20. These capabilities will enable the Army to employ command posts across the operational spectrum, from early entry to major combat operations that will resolve current command post issues with set up and tear down, survivability, mobility, suitability and footprint.

The Command Post Integrated Infrastructure (CPI2) program addresses the requirements for more mobile, scalable, interoperable, and agile command posts. Currently fielded command posts are deemed too large and take too long to setup and teardown making them vulnerable to near peer detection and targeting technologies. By integrating mission command warfighting functions on to formation appropriate vehicle platforms, a dispersed command post construct will enable the battle staff to blend in with the overall maneuver formation while giving the commander the ability to synchronize the close fight on the move. This dispersed mobile command post consists of Mission Command Platforms (MCPs) and Command Post Support Vehicles (CPSVs). The MCP is a formation appropriate vehicle that provides digital workstations for all mission command warfighting functions. The CPSV is the hub of the dispersed command post; it hosts mission command servers, radios, local area network components and a secure wireless capability. Specific to CORPS/DIV, CPI2 will provide a Mobile Command Group (MCG) consisting of formation appropriate platforms that supports Corps/Div Commanders/Staff with high priority functions while on the move.

FY 2021 initiates Inc 2 portion of the program to address design engineering and prototype development for formation-appropriate MCPs, MCGs, and CPSVs and includes design changes to platform shelters as required based on results of experimentation. Funds will also support integration and testing for Increment 1 with 2 BCT's and a Division Main to obtain user feedback to drive future requirements. Includes funding for engineering changes, test and training, CPI2 program management.

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

	FY 2019	FY 2020	FY 2021
Title: Program Office Management	2.490	2.741	4.178
Description: Contractor/Matrix Labor support and program travel.			
FY 2020 Plans:			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Contract and Matrix personnel to support CPI2 in achieving mission requirements to include managing multiple design/ prototyping efforts, test events and training. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p>FY 2021 Plans: Contract and Matrix personnel to support CPI2 in achieving mission requirements to include managing multiple design/ prototyping efforts, test events and training. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Staff increase to support both the directed requirement (Inc 1) and initiation of CDD program (Inc 2).</p>				
<p>Title: Product Development</p> <p>Description: Includes the costs for design/integration/fabrication and prototyping efforts to address capability gaps identified in current Army command post formations. Costs include ancillary items and platform requirements.</p> <p>FY 2020 Plans: Product Development continues efforts initiated in FY19 for System Design, Development Engineering and Platform Integration/ Assembly to achieve delivery of two Brigade Combat Teams (BCT's) and a Division Main. Includes engineering and prototyping fixes following user assessments to inform the future CPI2 solutions. This efforts funding will be executed by Program Executive Office Command, Control, Communications Tactical.</p> <p>FY 2021 Plans: FY 2021 initiates the funding for the design engineering, and prototype development of formation appropriate platforms (Stryker, FMTV, APMV, JLTV) to meet design requirements for Command Post Mission Command Platform (MCP) , Command Post Support Vehicles (CPSV) and Mobile Command Groups (MCG) . Additional design improvements for platforms to be addressed based on unit feedback. Includes costs to deliver 2 Brigade Combat Teams and a Division Main for unit experimentation for CPI2 Increment 1. Funding includes costs to address engineering change proposals and program management. This efforts funding will be executed by Program Executive Office Command, Control, Communications Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase due to initiating Inc 2 requirements to design/develop formation appropriate MCP, CPSV, MCG platforms, most notably the Stryker platform.</p>		30.562	22.934	49.758
<p>Title: Systems Test and Evaluation</p> <p>Description: Costs required for test activities to inform CPI2 solution set.</p>		-	0.217	3.750

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans: Includes costs for test events in FY 2020 for Health and Hazard assessments as well as initial planning for Safety release and confirmation. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p>FY 2021 Plans: Conduct initial test/safety activities necessary for completion of delivery of two brigade combat teams and a Division main, as well as formation appropriate platform testing (Stryker, FMTV, APMV, JLTV) associated with design improvements for Command Post MCP, CPSV and MCG. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase for testing activities for 2 Brigade Combat Teams and a Division Main not previously executed.</p>			
<p>Title: Support Costs</p> <p>Description: Program costs for training and development of data packages.</p> <p>FY 2020 Plans: Supports development of data packages and New Equipment Training (NET) for planned fielding's in FY 2020. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p>FY 2021 Plans: Funding supports updates necessary to technical data packages and training for test events as well as initial design changes with formation appropriate platforms (Stryker, AMPV, FMTV, JLTV). This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease in FY 2021 due to fact that planning and development models for training are prepared and completed in the fiscal year prior to test events.</p>	-	1.691	0.750
<p>Title: FY 2020 SBIR/STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>	-	1.312	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Funding transferred in accordance with Title 15 USC 7638			
Accomplishments/Planned Programs Subtotals	33.052	28.895	58.436

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

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• B29801: CPI2	2.284	-	49.947	-	49.947	84.442	233.695	395.174	339.057	Continuing	Continuing

Remarks

D. Acquisition Strategy

The CPI2 Materiel Development Decision (MDD) Acquisition Decision Memorandum was signed on 21 June 2018 and directs CPI2 to be executed in a two increment approach. Increment 1 will develop capabilities to address needs identified in the signed Command Post (CP) Directed Requirement (DR) to field 5 Brigade Combat Teams (BCT) , a Division and a platform based Mobile Command Group (MCG) to 1 Division and 1 Corps. Using the buy, try, assess, and decide acquisition model which leverages user experimentation to inform follow-on program requirements. Increment 1 will prototype and integrate available commercial off the shelf (COTS) as well as government programs of record (PORs) equipment that provide mission command and communications functions within the command post. Increment 2 will execute requirements per the CPI2 Capability Development Document (CDD) to replace designated legacy command post systems at Corps, Division, Brigade combat Team's, their subordinate Battalion (BN) formations and select Multi-functional Support Brigades (MFSB).

Increment 1 will work with the government and with industry to capitalize on their experiences with mobile Command Posts to perform risk reduction events on experimental solutions for the Command Post Support Vehicle and Mission Command Platform as outlined in the Command Post Directed Requirement (DR).

CPI2 Inc 1 will develop the BCT #1 through experimentation conducted with Combat Capabilities Development Center (CCDC) via a Functional Support Agreement (FSA) for BCT #1. CPI2 will leverage industry advancements and innovation using full and open competition with the C5SIR Other Transaction Authority (OTA) to design and prototype the MCP/CPSV for the BCT #2. CPI2 will experiment at the Division main executing an Indefinite Delivery Indefinite Quantity (IDIQ) contract. CPI2 will deliver a platform based Mobile Command Group (MCG) to 1 Division via an FSA with Project Manager (PM) Stryker Brigade Combat Team (SBCT). The integration efforts will culminate with test events on all prototype designs, leading to a Milestone in FY21 to select the Command Post (CP) solution set for fielding the remaining 3 BCTs and 1 MCG to a Corps identified in the CP DR.

The CPI2 CDD specifies Increment 2 requirements and is scheduled for AROC review/approval on 7 Feb 2020. A Milestone B in 3QFY20 for Inc 2 will authorize RDTE efforts to focus on design/development of unit appropriate platforms which will be executed via FSA with platform Program of Record (POR) contracts. A Milestone C for Increment 2 in FY23 will initiate the fielding of CPI2 to designated Army units. Future editions of the CDD will incorporate feedback based on prototype experimentation, user feedback and advances in technology. CPI2 plans to compete a contract with industry for the design, engineering, test and production of the CDD solution for CPI2. Additionally, CPI2 will leverage existing contracts managed by Joint Program Office Light Tactical Vehicle (JPO JLTV), Product Manager (PdM) Armored Multi-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) ER9 / <i>Expeditionary Army Command Post</i>
<p>Purpose Vehicle (AMPV) and PM SBCT for integration efforts associated with their respective platforms. This will encompass CPI2 variants at designated Corps, Division, Brigade, Battalion and select Multi-Functional Support Brigades.</p>		

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post
--	---	---

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
PM MC Labor	Allot	PM MC : Aberdeen Proving Ground MD	0.108	-		-		-		-		-	Continuing	Continuing	Continuing
SETA Support	MIPR	CACI : Aberdeen Proving Ground, MD	-	0.770	Mar 2019	1.290	Oct 2019	1.964	Oct 2020	-		1.964	Continuing	Continuing	Continuing
Matrix Support	MIPR	Various : Aberdeen Proving Ground, MD	-	1.720	Feb 2019	1.650	Oct 2019	2.214	Oct 2020	-		2.214	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.312		-		-		-	0.000	1.312	-
Subtotal			0.108	2.490		4.252		4.178		-		4.178	Continuing	Continuing	N/A

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
BCT 1 Design/Fabrication/Installation	MIPR	CCDC-C5ISR : Aberdeen Proving Ground, MD	-	4.296	Mar 2019	2.699	Dec 2019	2.947	Oct 2020	-		2.947	Continuing	Continuing	Continuing
BCT 2 Design/Fabrication/Installation	C/FFP	ELBIT : Ft.Worth, Texas	-	4.129	Sep 2019	8.305	Mar 2020	3.482	Oct 2020	-		3.482	Continuing	Continuing	Continuing
Division Design/Fabrication/Installation	C/IDDQ	BRTRC : Ft.Bliss, Texas	-	1.338	Sep 2019	5.505	Jan 2020	5.736	Oct 2020	-		5.736	Continuing	Continuing	Continuing
Vehicle Platforms	Allot	PdM MPVS : Detroit Aresnal, MI	-	9.764	Feb 2019	0.623	Jan 2020	-		-		-	Continuing	Continuing	Continuing
Ancillary Items	MIPR	Various : Various	-	3.122	Feb 2019	3.477	Oct 2019	1.175	Oct 2020	-		1.175	Continuing	Continuing	Continuing
Vehicle Integrated Power	MIPR	DRS : Hunstville, AL	-	3.514	Aug 2019	-		-		-		-	Continuing	Continuing	Continuing
ISO Containers	Allot	BERG : Spokane, WA	9.493	1.607	Aug 2019	-		-		-		-	Continuing	Continuing	Continuing
Mobile Command Group Development	MIPR	PM SBCT : Warren, MI	-	0.345	Jul 2019	-		3.102	Oct 2020	-		3.102	Continuing	Continuing	Continuing
Secure Wireless Mesh Remote Endpoint Hardware	C/IDIQ	CHS : Aberdeen Proving Ground, MD	-	2.447	Sep 2019	-		-		-		-	Continuing	Continuing	Continuing

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software					ER9 / Expeditionary Army Command Post						
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Network Switches	MIPR	CISCO : San Jose, CA	-	-		0.964	Oct 2019	-		-		-	Continuing	Continuing	Continuing
Unified Voice Management System (UVMS)	MIPR	SCI : Huntsville, AL	-	-		0.964	Oct 2019	-		-		-	Continuing	Continuing	Continuing
Stryker platform Design/ Development	Allot	PM SBCT : Detroit, MI	-	-		-		22.037	Oct 2020	-		22.037	Continuing	Continuing	Continuing
AMPV platform Design/ Development	Allot	PM AMPV : Detroit Aresnal, MI	-	-		-		5.209	Oct 2020	-		5.209	Continuing	Continuing	Continuing
JLTV platform Design/ Development	Allot	PM JLTV : Detroit , MI	-	-		-		2.850	Oct 2020	-		2.850	Continuing	Continuing	Continuing
FMTV platform design/ development	Allot	PdM MPVS : Detroit, MI	-	-		-		1.752	Oct 2020	-		1.752	Continuing	Continuing	Continuing
Rigid Wall Shelters design/ development	MIPR	CCDC-SC : Natick, MI	-	-		-		1.468	Oct 2020	-		1.468	Continuing	Continuing	Continuing
Subtotal			9.493	30.562		22.537		49.758		-		49.758	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Tech Manuals/Training Development Packages	TBD	Multiple : Multiple	-	-		2.008	Feb 2020	0.750	May 2021	-		0.750	Continuing	Continuing	Continuing
Subtotal			-	-		2.008		0.750		-		0.750	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Test and Evaluation	MIPR	Various : Various	-	-		0.098	Mar 2020	3.750	Nov 2020	-		3.750	Continuing	Continuing	Continuing
Subtotal			-	-		0.098		3.750		-		3.750	Continuing	Continuing	N/A

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army							Date: February 2020				
Appropriation/Budget Activity 2040 / 5			R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) ER9 / Expeditionary Army Command Post				
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals	9.601	33.052	28.895	58.436	-	58.436	Continuing	Continuing	N/A		

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Inc 1: MS A	▲ 1																											
Inc 1: MS A																												
Inc 1: Product Development (BCT 1)																												
Inc 1: FSA Prod Dev (BCT 1)																												
Inc 1: BCT 1 Safety Testing																												
Inc 1: Safety BCT 1																												
Inc 1: BCT 1 New Equipment Training																												
Inc 1: NET BCT 1																												
Inc 1: BCT 1 Limited User Test																												
Inc 1: LUT BCT 1																												
Inc 1: Product Development (BCT 2) OTA																												
Inc 1: BCT 2																												
Inc 1: BCT 2 Safety Testing																												
Inc 1: Safety BCT 2																												
Inc 1: New Equipment Training (BCT 2)																												
Inc 1: NET BCT 2																												
Inc 1: Limited User Test (BCT 2)																												
Inc 1: LUT BCT 2																												
Inc 1: Milestone C																												
Inc 1: CPI2 MS C																												
Inc 1: OPA Production (BCT 3-4-5), Revisit BCT 1, 2																												
Inc 1: OTA BCT 3-5, 1-2																												
Inc 1: BCT 3 -4 -5 Fielding																												
Inc 1: OPA Fielding to DR Units																												
Inc 1: Retrofit BCT 1, BCT 2																												
Inc 1: Retrofit BCT 1, 2																												

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Inc 1: Conditional Materiel Release									5 Inc 1: CMR																			
Inc 2 AROC					2 Inc 2 AROC																							
Inc 2 MS B					3 Inc 2 MS B																							
Inc 2: Platform Design/Dev									Inc 2: Platform Design																			
Inc 2: Platform Test Events									Inc 2: Platform Test																			
Inc 2: Technology Updates/Insertions													Inc 2: Tech Updates															
Inc 2: MS C													6 Inc 2: MS C															
Inc 2: Integration/Production													Inc 2: LRIP with FRP Options (Contract)															
Inc 2: Fielding																	Inc 2: Fielding											
Inc 2: Operational Test and Evaluation																					Inc 2: CPI2 OT&E							
Inc 2: FRP																					7 Inc 2: FRP							
Inc 1: MCG Experimentation									Inc 1: MCG																			
Inc 1: MCG New Equipment Training									Inc 1: MCG NET																			

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
Inc 1: MCG Operational Assessment																																				
Inc 1: Division Main Experiment																																				
Inc 1: Division Main Safety Test																																				
Inc 1: Division Main New Equipment Training																																				
Inc 1: Division Limited User Test																																				

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) ER9 / Expeditionary Army Command Post

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Directed Requirement Signed	1	2018	1	2018
CPI2 MDD	3	2018	3	2018
Inc 1: MS A	2	2019	2	2019
Inc 1 Product Development (BCT 1)	2	2019	2	2021
Inc 1: BCT 1 Safety Testing	3	2020	1	2021
Inc 1: BCT 1 New Equipment Training	1	2021	2	2021
Inc 1: BCT 1 Limited User Test	2	2021	2	2021
Inc 1: Product Development (BCT 2) OTA	4	2019	3	2021
Inc 1: BCT 2 Safety Testing	4	2020	2	2021
Inc 1 New Equipment Training (BCT 2)	2	2021	3	2021
Inc 1: Limited User Test (BCT 2)	3	2021	3	2021
Inc 1: Milestone C	4	2021	4	2021
Inc 1: OPA Production (BCT 3-4-5), Revisit BCT 1, 2	4	2021	4	2023
Inc 1: BCT 3 -4 -5 Fielding	4	2022	4	2023
Inc 1: Retrofit BCT 1, BCT 2	2	2022	4	2023
Inc 1: Conditional Materiel Release	4	2021	4	2021
Inc 2 AROC	2	2020	2	2020
Inc 2 MS B	3	2020	3	2020
Inc 2: Platform Design/Dev	1	2021	4	2022
Inc 2: Platform Test Events	2	2021	3	2022
Inc 2: Technology Updates/Insertions	1	2023	4	2025
Inc 2: MS C	1	2023	1	2023

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / <i>Army Tactical Command & Control Hardware & Software</i>	Project (Number/Name) ER9 / <i>Expeditionary Army Command Post</i>
--	--	--

Events	Start		End	
	Quarter	Year	Quarter	Year
Inc 2: Integration/Production	1	2023	1	2028
Inc 2: Fielding	3	2024	4	2035
Inc 2: Operational Test and Evaluation	1	2025	1	2025
Inc 2: FRP	3	2025	3	2025
Inc 1: MCG Experimentation	1	2021	4	2021
Inc 1: MCG New Equipment Training	3	2021	4	2021
Inc 1: MCG Operational Assessment	4	2021	4	2021
Inc 1: Division Main Experiment	4	2019	4	2021
Inc 1: Division Main Safety Test	1	2021	2	2021
Inc 1: Division Main New Equipment Training	3	2021	4	2021
Inc 1: Division Limited User Test	4	2021	4	2021

Note

INC 2 events assume approval of CPI2 CDD that will delineate Inc 2 requirements. The CPI2 CDD is planned for AROC on 7 Feb 2020.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development			
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
EW3: Unit Task Reorganization (UTR) Development	-	30.234	27.539	19.748	-	19.748	31.357	17.500	13.810	13.988	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project EW3, Unit Task Reorganization (UTR), supports the Army's Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

UTR supports the Army Network Plan Framework objective to deliver a Standards Based Network Architecture. This will enable the modernization of the Mission Command Network through the coordination of a common set of network operations tools and infrastructure development supporting the unit communication staff's ability to conduct Network Planning, Network Provisioning and Network Management. Network Planning includes the development of an integrated planning tool suite to improve Signal Soldiers ability to plan and develop configurations for upcoming operations and deployments. Network Provisioning includes the development of tools and technology that provide a means to deliver configurations developed during the Network Planning with little to no manual involvement by the Soldier. Network Management results in the replacement of stove-piped management systems and with integrated tools that provide a consolidated, as well as detailed, view of the network and its components.

FY 2021 UTR funding will be used to continue development of network components that support centralized data, security, and information exchanges; continue development of Network Planning functions to plan the tactical network to continue development of Radio Planning capabilities in order to plan and create configuration files for emerging ITN radios and waveforms; continue development of network device and radio provisioning systems and continue the development of a network manager that monitors and displays network health status, performance, location and security to local operator.

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

	FY 2019	FY 2020	FY 2021
Title: Standards Based Architecture	4.112	6.299	4.248
Description: UTR is supporting the development of various elements to facilitate the commander and staff's ability to execute their wartime functions. This element includes the development of data models, interface standards, and data repositories that enable devices, and network planners, provisioners and managers to communicate network status, security and control data. UTR is leveraging Over the Network (OTN) and Over the Air (OTA) methods to query, load, activate, and monitor network devices.			
FY 2020 Plans: Continue development of network components that support centralized data, security, and information exchanges, enabling Signal Soldier activities.			
FY 2021 Plans:			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Continue development of network components that support centralized data, security, and information exchanges, enabling Signal Soldier activities. Additional developing the use of Over the Network and Over the Air capabilities as well as Direct Connection devices that enable automated provisioning, patching, and monitoring.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease of \$2.3M reflects reduction in development of Federated Data Repository advancements in FY 2020 to enhancements in FY 2021.</p>				
<p>Title: Network Planning</p> <p>Description: UTR is supporting the development of an integrated planning tool suite that will improve the ability of Signal Soldiers to plan and develop configurations for upcoming operations and deployments. This tool suite will provide a holistic planning capability for between the mission command systems and the network planning tools.</p> <p>FY 2020 Plans: Development of analytic and planning tools that support Signal Planning in coordination with Mission Command Systems and Applications.</p> <p>FY 2021 Plans: Continue development of the Network Planning functions that enable automated NetOps capabilities to plan the tactical network, reducing the cognitive burden to Soldiers, as well as development of analytic and planning tools that support Signal Planning in coordination with Mission Command Systems and Applications.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase of \$1.9M reflects reduction of Federated Data Repository advancements in FY 2020 to enhancements in FY 2021.</p>		7.227	2.833	4.982
<p>Title: Network Provisioning</p> <p>Description: UTR is implementing tools and technology to reduce the amount of time and troops required to provision network devices with configurations developed during the planning process. This provides a means to deliver configurations without requiring manual involvement by the Soldier, and for devices to report configuration and operational status IAW Standards Based Architecture.</p> <p>FY 2020 Plans: Continued development of provisioning systems to increase Over the Network and Over the Air capabilities as well as Direct Connection devices that automate provisioning, patching, and updating.</p> <p>FY 2021 Plans:</p>		10.443	7.576	7.956

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Continue development of provisioning systems, and support system integration into use of Standards Based Architecture, including continuing development of Radio capabilities in order to plan and create configuration files for emerging ITN radios and waveforms FY 2020 to FY 2021 Increase/Decrease Statement: Increase of \$.1M reflects minor adjustments associated with escalation.				
Title: Network Management Description: UTR introduces improvements to the way the network is managed, reducing stovepiped management systems and replacing them with integrated tools that provide a consolidated, as well as detailed, view of the network and its components. FY 2020 Plans: - Continue P2P development, eOTAM oversight, API development and test support - Continue development of eOTAM code for data reduction, security updates, and radio reporting - Continue support for On Demand Information Network (ODIN) application development on COE v3 and CERDEC support for testing and potential ramp off. FY 2021 Plans: Continue product development of Network Management functionality enabling the ability to manage and troubleshoot the network devices that comprise the Tactical Network, monitor nodes for network health status, performance, location, and security, in addition to displaying monitored data to the local operator. FY 2020 to FY 2021 Increase/Decrease Statement: \$7.4M of FY 2021 UTR funding was rephased into FY 2022. Decrease of \$7.4M reflects partial deferral of network management efforts until FY 2022.		3.158	8.954	1.764
Title: System of Systems Engineering and Portfolio Management Description: Systems engineering and program management support to include development and maintenance of the NetOps architecture, Systems Engineering Plan, Risk Management Plan, Rapid Prototyping, IPT Management, Requirements Engineering, Integrated Master Schedule, and budget formulation and execution. FY 2020 Plans: Continue Systems of Systems Engineering and program management across NetOps portfolio including establishing Architecture and updates of portfolio Management Plan, Risk Management Plan, Rapid Prototyping, IPT/Working Group Management, Requirements Engineering, synchronization of efforts in Integrated Master Schedule. FY 2021 Plans:		0.277	0.626	0.798

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Continue Systems of Systems Engineering and program management across NetOps portfolio including establishing Architecture and updates of portfolio Management Plan, Risk Management Plan, Rapid Prototyping, IPT/Working Group Management, Requirements Engineering, synchronization of efforts in Integrated Master Schedule.			
FY 2020 to FY 2021 Increase/Decrease Statement: Minor decrease associated with reduced SE/PM requirements.			
Title: FY 2020 SBIR/STTR Transfer Description: Funding transferred in accordance with Title 15 USC ?638	-	1.251	-
FY 2020 Plans: Funding transferred in accordance with Title 15 USC ?638 FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	25.217	27.539	19.748

	FY 2019	FY 2020
Congressional Add: Secure Wireless - Small Form Fit Factor	5.017	-
FY 2019 Accomplishments: Secure Wireless - Small Form Fit Factor		
Congressional Adds Subtotals	5.017	-

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

N/A

Remarks

D. Acquisition Strategy

Unit Task Reorganization (UTR) is an overarching effort that supports the establishment of a standards-based network architecture and integration of requirements across multiple efforts in the tactical network. UTR resources are applied directly to current products which are modified through Engineering Change Proposals and Modified Work Orders to comply with network standards. This enables current systems to share the information, reducing time and task for soldiers as well as new systems to access the network. Efforts are enduring to react to evolving prioritization of requirements. A variety of contracting approaches are used depending on needs, such as Other Transactions, Indefinite Delivery/Indefinite Quantity, or Systems Engineering Technical Assistance.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.251		-		-		-	0.000	1.251	-
Subtotal			-	-		1.251		-		-		-	0.000	1.251	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Standards Based Architecture	Various	MA-IDIQ : Various	0.801	2.211	Aug 2019	3.308	Aug 2020	2.817	Aug 2021	-		2.817	Continuing	Continuing	Continuing
Standards Based Architecture	C/CPFF	GSA BAH : APG MD	0.652	-		-		-		-		-	0.000	0.652	-
Standards Based Architecture	C/BPA	Various : TBD	2.902	1.901	Apr 2019	2.929	Apr 2020	1.431	Jan 2021	-		1.431	Continuing	Continuing	Continuing
Network Planning	Various	Various : Various	2.534	0.610	Nov 2018	-		-		-		-	0.000	3.144	-
Network Planning	C/BPA	To Be Determined : To Be Determined	-	6.617	Apr 2019	2.927	Apr 2020	4.982	Jan 2021	-		4.982	Continuing	Continuing	Continuing
Network Provisioning	C/IDIQ	Microsoft : Redmond, WA	8.663	7.142	Mar 2019	2.815	Mar 2020	3.831	Nov 2020	-		3.831	Continuing	Continuing	Continuing
Network Provisioning	MIPR	Matrix Organizations : APG MD	0.962	2.101	Nov 2018	3.498	Nov 2019	2.925	Nov 2020	-		2.925	Continuing	Continuing	Continuing
Network Provisioning	FFRDC	MITRE : Boston MA	2.400	1.200	Oct 2018	1.044	Oct 2019	1.200	Oct 2020	-		1.200	Continuing	Continuing	Continuing
Network Management	MIPR	WSEC : APG, MD	1.900	-		-		-		-		-	0.000	1.900	-
Network Management	C/BPA	TBD : APG, MD	-	2.638	Apr 2019	9.048	Apr 2020	1.764	Jan 2021	-		1.764	0.000	13.450	-
Network Management	MIPR	PEO Soldier : Arlington VA	0.300	0.520	Mar 2019	-		-		-		-	0.000	0.820	-
Secure Wireless - SFF	C/Various	Various : Various	-	5.017	Jan 2020	-		-		-		-	0.000	5.017	-
Subtotal			21.114	29.957		25.569		18.950		-		18.950	Continuing	Continuing	N/A

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Network Management																																
Network Manager Phase 1																																
Network Manager Phase 2																																
Network Manager Phase 3																																
Network Manager Phase 4																																
Network Manager Phase 5																																
Network Manager Phase 6																																
Network Planning																																
JENM 3.5																																
Radio Planner																																
Radio Planner v1.1																																
Radio Planner v1.2																																
Radio Planner v1.3																																

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Network Planner																												
Network Planner v1.0																												
Network Planner v1.1																												
Network Planner v1.2																												
Network Planner v1.3																												
Network Planner v1.4																												
Network Provisioning																												
Rapid Provisioning System (RPS) 2.4																												
Network Provisioning System 3.0																												
Network Provisioning System 4.0																												
Network Provisioning System 4.1																												
Network Provisioning System 4.2																												
Network Provisioning System 4.3																												

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
Network Provisioning System 4.4																																				
Radio Provisioning																																				
Black Sails 2.0																																				
Black Sails 2.1																																				
Black Sails 2.2																																				
Black Sails 2.3																																				
Radio Provisioner x.1																																				
Radio Provisioner x.2																																				
Radio Provisioner x.3																																				
Radio Provisioner x.4																																				
Radio Provisioner x.5																																				
Standard Based Architecture																																				
Data Repository																																				

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Codex 1.0	▲																											
Codex 1.1																												
Data Repository x.x																												
Radio Standards																												
eOTAM 2.0																												
Radio Standards version x.1																												
Radio Standards version x.x																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Network Management	1	2019	4	2024
Network Manager Phase 1	1	2019	4	2019
Network Manager Phase 2	1	2020	4	2020
Network Manager Phase 3	1	2021	4	2021
Network Manager Phase 4	1	2022	4	2022
Network Manager Phase 5	1	2023	4	2023
Network Manager Phase 6	1	2024	4	2024
Network Planning	1	2020	4	2024
JENM 3.5	1	2019	4	2019
Radio Planner	1	2019	2	2021
Radio Planner v1.0	4	2018	4	2018
Radio Planner v1.1	1	2020	2	2020
Radio Planner v1.2	3	2020	4	2020
Radio Planner v1.3	1	2021	2	2021
Network Planner	1	2020	4	2024
Network Planner v1.0	1	2020	4	2020
Network Planner v1.1	1	2021	4	2021
Network Planner v1.2	1	2022	4	2022
Network Planner v1.3	1	2023	4	2023
Network Planner v1.4	1	2024	4	2024
Network Provisioning	1	2019	4	2024
Rapid Provisioning System (RPS) 2.4	2	2019	2	2019

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software	Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development
--	---	--

Events	Start		End	
	Quarter	Year	Quarter	Year
Network Provisioning System 3.0	3	2020	4	2020
Network Provisioning System 4.0	1	2021	4	2021
Network Provisioning System 4.1	1	2022	4	2022
Network Provisioning System 4.2	1	2023	4	2023
Network Provisioning System 4.3	1	2024	4	2024
Network Provisioning System 4.4	1	2025	4	2025
Radio Provisioning	1	2019	4	2025
Black Sails 2.0	3	2019	3	2019
Black Sails 2.1	4	2019	4	2019
Black Sails 2.2	1	2020	1	2020
Black Sails 2.3	2	2019	4	2020
Radio Provisioner x.1	1	2021	4	2021
Radio Provisioner x.2	1	2022	4	2022
Radio Provisioner x.3	1	2023	4	2023
Radio Provisioner x.4	1	2024	4	2024
Radio Provisioner x.5	1	2025	4	2025
Standard Based Architecture	1	2019	4	2025
Data Repository	1	2019	4	2025
Codex 1.0	1	2019	1	2019
Codex 1.1	1	2020	4	2020
Data Repository x.x	1	2021	4	2025
Radio Standards	1	2019	4	2025
eOTAM 2.0	3	2019	4	2020
Radio Standards version x.1	4	2020	4	2021
Radio Standards version x.x	1	2022	4	2025