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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army										Date: March 2019		
Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army I BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0604805A I Command, Control, Communications Systems - Eng Dev							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	9.559	15.950	12.595	-	12.595	8.622	22.390	22.722	19.648	0.000	111.486
593: Joint Battle Command - Platform (JBC-P)	-	9.559	15.950	12.595	-	12.595	8.622	22.390	22.722	19.648	0.000	111.486

A. Mission Description and Budget Item Justification

Joint Battle Command - Platform (JBC-P) supports the Army Network Modernization Strategy Line of Effort 1, Unified Network which includes: The development of a standards-based network architecture that unifies enterprise and deployed network capabilities and features a unified transport layer, network operations and other enabling functions that allows integration of disparate networks. The network provides resiliency through path diversity and dynamic routing to ensure tactical units can communicate in hostile environments. It fully incorporates cyber and electronic warfare capabilities that support the employment of the network as a weapon system.

JBC-P also supports the Army Network Modernization Strategy Line of Effort 2, Common Operating Environment by utilizing:

- Interoperable data, message, and waveforms
- Integration with Joint C4ISR and strike capabilities
- Sensors and applications that enable operations across domains

The Joint Battle Command - Platform program is the cornerstone of Joint Forces Command and Control (C2) Situational Awareness (SA) and communications. JBC-P includes a network which enables the movement of data and provides secure Blue Force Tracking (BFT) capability in Platforms and Command Posts, providing soldiers and commanders a map-based Common Operating Picture of the battlefield, as a result, reducing fratricide.

PdM JBC-P, under PM Mission Command (MC), is collaborating with the Communications-Electronics Research, Development and Engineering Center's (CERDEC) Space and Terrestrial Communications Directorate (S&TCD) on evolving the BFT network. Systems engineering studies/planning activities are underway to develop the evolution path of the BFT network, and the introduction of a Modular Open Systems Architecture (MOSA). In addition, there are two RDT&E contractual efforts underway for FY 2018 (assess the feasibility of reusing existing BFT-2 transceivers (hardware) and replacing it third party or government owned waveforms), and FY 2019 (assess the feasibility of introducing BFT network resiliency components to existing BFT network). The goal is for all the R&D & experimentation efforts mentioned above, to inform a BFT-3 full and open solicitation (RFP) to industry FY 2020.

JBC-P RDT&E resources are used to improve JBC-P hardware, network performance and add network resiliency while Mounted Computer Environment RDT&E is used to improve and add software applications.

To better understand how potential changes to the BFT network would affect overall operations, funding was increased in both FY 2017 and FY 2018 to assist PdM JBC-P to fully model the operational BFT network; S&TCD is working on developing a model of the current BFT-2 waveform to test in the BFT portion of their Network Test

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Lab. This Test Lab provides the Government the ability to test proposed fixes, conduct regression testing of future Software and Firmware releases, and replicate any problems the system may experience without impacting the operational network.					
FORSCOM users have identified a need for an expeditionary JBC-P capability to better connect the Lower Tactical Internet (LTI) to the BFT network when dismounted; there is an RDT&E contractual effort underway for FY 2019 to develop a reduced Size Weight and Power (SWaP) dismounted BFT transceiver. PdM JBC-P has partnered with CERDEC's Command, Power and Integration Directorate to develop this capability, along with new power solutions.					
B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	9.910	15.970	12.595	-	12.595
Current President's Budget	9.559	15.950	12.595	-	12.595
Total Adjustments	-0.351	-0.020	0.000	-	0.000
• Congressional General Reductions	-0.007	-0.020			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.344	-			

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Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604805A / Command, Control, Communications Systems - Eng Dev				Project (Number/Name) 593 / Joint Battle Command - Platform (JBC-P)			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
593: Joint Battle Command - Platform (JBC-P)	-	9.559	15.950	12.595	-	12.595	8.622	22.390	22.722	19.648	0.000	111.486
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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PdM JBC-P, under PM Mission Command (MC), is collaborating with the Communications-Electronics Research, Development and Engineering Center's (CERDEC) Space and Terrestrial Communications Directorate (S&TCD) on evolving the BFT network. Systems engineering studies/planning activities are underway to develop the evolution path of the BFT network, and the introduction of a Modular Open Systems Architecture (MOSA). In addition, there are two RDT&E contractual efforts underway for FY 2018 (assess the feasibility of reusing existing BFT-2 transceivers (hardware) and replacing it third party or government owned waveforms), and FY 2019 (assess the feasibility of introducing BFT network resiliency components to existing BFT network). The goal is for all the R&D & experimentation efforts mentioned above, to inform a BFT-3 full and open solicitation (RFP) to industry FY 2020.

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Lab. This Test Lab provides the Government the ability to test proposed fixes, conduct regression testing of future Software and Firmware releases, and replicate any problems the system may experience without impacting the operational network.							
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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Software Development			0.145	-	-	-	-
Description: Develop capabilities, product applications, platform interoperability, and system services across the JBC-P family of systems, to include the development of capabilities to meet Key Performance Parameters (KPPs), and other system attributes. Develop Multi-Level Security Domains for Network, Users, and Information.							
Title: Software/Systems Engineering			5.582	13.927	11.095	-	11.095
Description: Perform Software/Systems Engineering in support of the development of JBC-P capabilities, applications, and services, to include, but not limited to, conducting engineering studies, architecture development (both software and network), system analyses, technical readiness assessments, technical interchange meetings/events, and development of related reports and other deliverables.							
FY 2019 Plans: Continued system engineering efforts for JBC-P balance of CDD threshold requirements and support of the Mission Command product line. Conduct Systems Engineering, open systems architecture design, and Component Characterization & Validation for next generation BFT; to include the integration & interoperability of the BFT 2.0 Transceiver, Satellite Network Control Center (SNCC), Satellite Ground Station (SGS), and Waveform/Network Virtualization for the BFT 2 network.							
FY 2020 Base Plans: Development solicitation package for BFT 3 satellite ground station full and open competition.							
Continue to conduct Systems Engineering, open systems architecture design, and Component Characterization & Validation for next generation BFT; to include the integration & interoperability of the BFT 2.0 Transceiver, Satellite Network Control Center (SNCC), Satellite Ground Station (SGS), and Waveform/Network Virtualization for the BFT 2 network.							

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.						
FY 2019 to FY 2020 Increase/Decrease Statement: BFT 3 HUB Systems Engineering development, studies, and open systems architecture design efforts are nearing completion, in preparation for BFT 3 HUB full and open competition.						
Title: Test, Evaluation and Integration		2.508	0.413	0.500	-	0.500
Description: Plan and conduct system Integration test & experimentation events, in support of the JBC-P family of systems, to include Risk Reduction Events, vulnerability testing, and Army Interoperability Certification (AIC) testing.						
FY 2019 Plans: Will continue to conduct testing on enhancements to the BFT/JBC-P network, to include third party component (transceiver) characterization, and validation of the next generation BFT. Continue to develop a lab based operational risk reduction of the currently fielded BFT 1 & BFT 2 network, to Include the Satellite Network Control Center (SNCC), Satellite Ground Station (SGS), and Waveform Virtualization.						
FY 2020 Base Plans: Will continue to conduct testing enhancements to the BFT/JBC-P network, to include third party component (transceiver) characterization, validation of the BFT 3 satellite ground station components, and validation of the FY18 Rapid Innovation Funding (RIF) Resilient BFT deliverable.						
Continue to develop a lab based operational risk reduction of the currently fielded BFT 1 & BFT 2 network, to Include the Satellite Network Control Center (SNCC), Satellite Ground Station (SGS), and Waveform Virtualization. This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical.						
FY 2019 to FY 2020 Increase/Decrease Statement: Slight increase in validations and related costs.						
Title: PM Support (Matrix & Contractor)		1.324	1.026	1.000	-	1.000
Description: JBC-P matrix and contractor support, including technical, logistics, and business staff oversight.						
FY 2019 Plans:						

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B. Accomplishments/Planned Programs (\$ in Millions)							FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Will continue to provide technical, logistical, and business oversight for JBC-P architecture development and system engineering activities. Program Management includes funds execution, contract management, and logistical support for the BFT-3 (Previously BFT Network Evolving and eXtending Transport (NEXT)) integrated planning team (IPT) & consortium (industry & academia).											
FY 2020 Base Plans: Will continue to provide technical, logistical, and business oversight for JBC-P architecture development and system engineering activities. Program Management includes funds execution, contract management, and logistical support for the BFT-3 integrated planning team (IPT) & consortium (industry & academia). This effort?s funding will be executed by Program Executive Office for Command, Control and Communications-Tactical											
FY 2019 to FY 2020 Increase/Decrease Statement: Reducing CERDEC gov't engineering team, due to completion of major BFT-3 satellite ground station systems engineering development efforts; remaining engineering team will continue BFT-3 transceiver development efforts.											
Title: FY 2019 SBIR/STTR Transfer							-	0.584	-	-	-
FY 2019 Plans: FY 2019 SBIR/STTR Transfer											
FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR/STTR Transfer											
Accomplishments/Planned Programs Subtotals							9.559	15.950	12.595	-	12.595
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• W61990: JOINT BATTLE COMMAND - PLATFORM (JBC-P)	342.649	401.991	265.667	25.568	291.235	246.166	183.106	160.856	154.461	0.000	1,780.464
Remarks Procurement funding in FY 2016 through 2023 (Base funding) is designated for the procurement, fielding, and program management of JBC-P Family of Systems including JBC-P and JBC-P Log.											

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<u>D. Acquisition Strategy</u> The JBC-P Capabilities Development Document in lieu of Capabilities Production Document (CDD ILO CPD) was Joint Requirements Oversight Council (JROC) approved March 2013. Completed Initial Operational Test & Evaluation (IOT&E) as part of Network Integration Evaluation (NIE) 13.2 in 3rd Quarter FY 2013. The IOT&E tested the JBC-P system software on existing FBCB2 hardware (non-dismountable vehicle systems) and future production-representative hardware. On completion of Army Interoperability Certification (AIC) and Joint Interoperability Test Certification (JITC), MDA authorized Full Rate Production (FRP) in 1st Quarter FY 2014. First unit equipped (FUE) was successfully conducted 3rd Quarter FY 2015. Developmental efforts are being performed through intra-government collaboration. System engineering efforts are being performed by CERDEC's Space and Terrestrial Communications Directorate (S&TCD); Command, Power and Integration (CP&I) & the Intelligence and Information Warfare Directorate (I2WD). The goal is for all R&D & experimentation efforts to inform a BFT-3 full and open solicitation (RFP) to industry FY 2020. Hardware along with fielding, training and field support efforts are obtained through existing competitively awarded contracts. <u>E. Performance Metrics</u> N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604805A / Command, Control, Communications Systems - Eng Dev				Project (Number/Name) 593 / Joint Battle Command - Platform (JBC-P)					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
JBC-P Software Development	Various	Multiple : Multiple	67.318	0.145		-		-		-		-	Continuing	Continuing	-
JBC-P Software/System Engineering	Various	Multiple (Government and industry) : Multiple	39.815	5.582		13.927		11.095		-		11.095	Continuing	Continuing	-
FY 2019 SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.584		-		-		-	0.000	0.584	-
Subtotal			107.133	5.727		14.511		11.095		-		11.095	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 / SETA Contractor)	Sub Allot	PM JBC-P : Aberdeen Proving Ground (APG), MD	6.930	1.324		1.026		1.000		-		1.000	Continuing	Continuing	-
Subtotal			6.930	1.324		1.026		1.000		-		1.000	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Develop and Conduct Tests and Assessments	MIPR	Multiple : Multiple	26.393	2.508		0.413		0.500		-		0.500	Continuing	Continuing	-
Subtotal			26.393	2.508		0.413		0.500		-		0.500	Continuing	Continuing	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			140.456	9.559		15.950		12.595		-		12.595	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army

Date: March 2019

Appropriation/Budget Activity

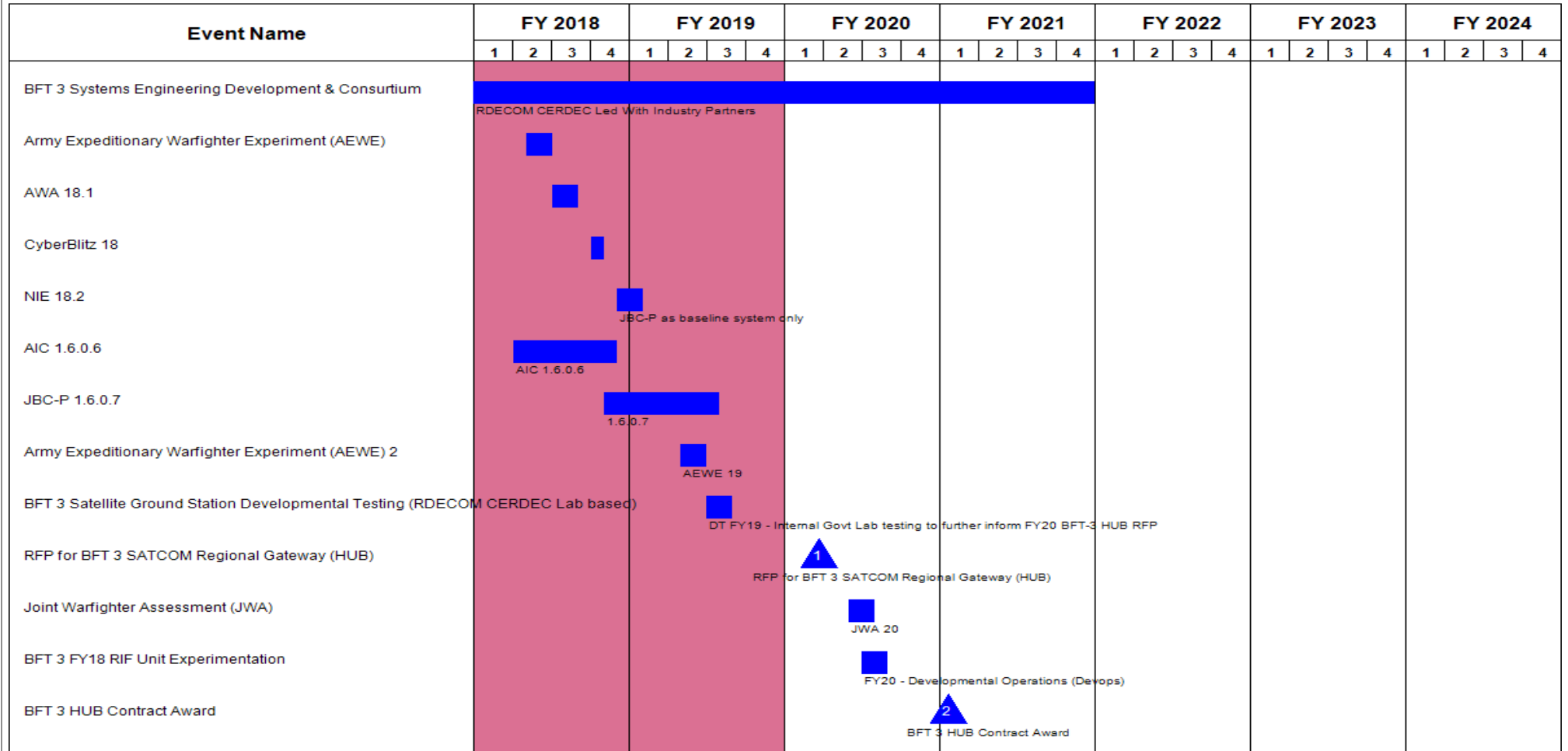
2040 / 5

R-1 Program Element (Number/Name)

PE 0604805A / *Command, Control,
Communications Systems - Eng Dev*

Project (Number/Name)

593 / *Joint Battle Command - Platform
(JBC-P)*



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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019																					
Appropriation/Budget Activity 2040 / 5										R-1 Program Element (Number/Name) PE 0604805A / Command, Control, Communications Systems - Eng Dev								Project (Number/Name) 593 / Joint Battle Command - Platform (JBC-P)																			
Event Name										FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
										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
BFT 3 Transceiver Developmental Testing (RDECOM CERDEC Lab based)																						■ DT FY21 - Internal Govt Lab testing to further inform FY20 BFT-3				▲ 3 RFP for BFT 3 Transceiver				▲ 4 BFT 3 Transceiver Contract Award				■ Planned OT - FY23/24			
RFP for BFT 3 Transceiver																																					
BFT 3 Transceiver Contract Award																																					
BFT 3/Next Gen HW OT																																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BFT 3 Systems Engineering Development & Consurtium	2	2017	4	2021
Army Expeditionary Warfighter Experiment (AEWE)	2	2018	2	2018
AWA 18.1	3	2018	3	2018
CyberBlitz 18	4	2018	4	2018
NIE 18.2	4	2018	1	2019
AIC 1.6.0.6	2	2018	4	2018
JBC-P 1.6.0.7	4	2018	3	2019
Army Expeditionary Warfighter Experiment (AEWE) 2	2	2019	2	2019
BFT 3 Satellite Ground Station Developmental Testing (RDECOM CERDEC Lab based)	3	2019	3	2019
RFP for BFT 3 SATCOM Regional Gateway (HUB)	1	2020	1	2020
Joint Warfighter Assessment (JWA)	2	2020	3	2020
BFT 3 FY18 RIF Unit Experimentation	3	2020	3	2020
BFT 3 HUB Contract Award	1	2021	1	2021
BFT 3 Transceiver Developmental Testing (RDECOM CERDEC Lab based)	3	2022	3	2022
RFP for BFT 3 Transceiver	4	2022	4	2022
BFT 3 Transceiver Contract Award	3	2023	3	2023
BFT 3/Next Gen HW OT	3	2023	4	2023