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 0304270A / *Electronic Warfare 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**
Total Program Element	-	8.922	18.432	55.855	3.900	59.755	66.861	36.853	28.210	15.819	0.000	234.852
EW5: *Electronic Warfare Development - MIP*	-	1.881	11.001	8.697	3.900	12.597	6.212	6.286	6.352	5.654	0.000	49.983
EW6: *ARAT-TSS - MIP*	-	7.041	7.431	9.053	-	9.053	9.399	9.587	9.768	10.165	0.000	62.444
FJ5: *Terrestrial Layer System (MIP)*	-	0.000	0.000	38.105	-	38.105	51.250	20.980	12.090	0.000	0.000	122.425

A. Mission Description and Budget Item Justification

This Program Element encompasses engineering and manufacturing development for tactical Electronic Warfare (EW) terrestrial (ground) employment applications. The systems under this program provide the Army with the capability to detect, identify, locate, collect/process, report, and engage (disrupt, degrade or deny) hostile forces to prevent their effective use of communications & non-communications networks, counter-mortar/counter-battery radars, surveillance radars, electronically fused munitions and other enemy threats using the Electro-Magnetic Spectrum (EMS).

Project EW5 provides for Prophet Enhanced, the current system under the Prophet Ground acquisition program. Its primary mission is to provide 24-hour Situation Development and Information Superiority to the supported maneuver brigade enabling the most effective engagement of enemy forces. Prophet Enhanced provides a modular, scalable, open architecture based system solution optimized for ease of use in a variety of configurations.

Project EW6 provides for the Army Reprogramming Analysis Team (ARAT), a Department of the Army established project to develop techniques, methods, tools and architecture to reprogram mission software embedded in Army EW systems, Force Protection Systems (FPS), and Target Sensing Systems (TSS) in response to changes in threat signatures. ARAT Research and Development enables continuous development of: 1) automated threat analysis tools to rapidly detect (flag) threat changes within intelligence systems, 2) tools to minimize the time to develop EW Mission Software and Products (MSP) for both air and ground EW systems, 3) tools and technology to minimize the time required to test and validate MSPs, 4) improved communications conduits to transmit mission software changes to field users, and 5) enhanced mission-software uploading tools. These efforts allow for rapid threat analysis, simulation, mission software development, distribution and uploading of mission software changes directly to the supported Soldier in the field. The ARAT project will develop, test and equip an Army-wide infrastructure capable of rapidly reprogramming electronic combat software embedded in offensive and defensive weapon systems.

Project FJ5 is a New Start for this Program Element in FY 2021 that provides for follow on development of the Terrestrial Layer System (TLS), an effort that initiates in FY 2020 (funded with PE 0604021A / AW7). TLS will provide Signals Intelligence (SIGINT), Electronic Warfare (EW), and Cyber-enabling integrated solution to support Multi Domain Battle capability gaps and provide Force Protection, Situational Development, and Information Superiority to the maneuver forces.

FY 2021 funds Electronic Warfare (EW) Development for Prophet Enhanced efforts (Project EW5), the Army Reprogramming Analysis Team (ARAT) efforts (Project EW6) and Terrestrial Layer System efforts (Project FJ5).

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0304270A *I Electronic Warfare Development*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	8.922	22.875	56.417	-	56.417
Current President's Budget	8.922	18.432	55.855	3.900	59.755
Total Adjustments	0.000	-4.443	-0.562	3.900	3.338
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-4.443			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.562	3.900	3.338

Change Summary Explanation

FY 2021 increase of $3.9 million OCO increase for development and integration of Theater Specific Signals of Interest (SOI) into the Prophet Enhanced system (Project EW5).

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW5 / *Electronic Warfare Development - MIP*	

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
EW5: *Electronic Warfare Development - MIP*	-	1.881	11.001	8.697	3.900	12.597	6.212	6.286	6.352	5.654	0.000	49.983
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Prophet Enhanced is the current system under the Prophet Ground acquisition program. Funds provide for development and integration of Technical Insertion upgrades for Next Generation Signals and state-of-the-art Signals Intelligence (SIGINT) exploitation techniques to increase the capabilities of the Prophet Enhanced and maintain operational relevance. The Prophet Enhanced is the tactical commander's organic ground-based SIGINT/Electronic Warfare system for the Multi-Function Teams (MfTs) organic to the Brigade Combat Teams (BCTs) and Expeditionary-Military Intelligence Brigades (E-MIBs). Its primary mission is to provide 24-hour Situation Development and Information Superiority to the supported maneuver brigade to enable the most effective engagement of enemy forces. Prophet Enhanced provides a modular, scalable, open architecture-based system solution optimized for ease of use in a variety of configurations. It also incorporates product modification, integration, evaluation and demonstration events of equipment for rapid integration of Technical Insertions (TI) and product development to ensure operational relevance.

Justification:
FY 2021 Base funding in the amount of $8.697 million will support continuing non-recurring engineering development and evaluation including, but not limited to; enhancements to Prophet Enhanced Signals of Interest (SOI) baseline to support the National Defense Strategy that is Near Peer focused, integration of Intelligence Community (IC) SOI libraries, development of digital receiver upgrades, development of training systems and environments, development of the Technical Data Package (TDP), improvements to Enhanced Signal Processing (ESP) capabilities and Communications kits, and Customer Testing.

FY 2021 OCO funding in the amount of $3.900 million will support the development, integration and testing/accreditation of new, Theater Specific, signal capabilities to ensure that Prophet keeps pace with the constantly changing signal environment and to ensure that Prophet maintains its operational relevance against key enemy threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Program Management	-	0.450	0.450	-	0.450
Description: Engineering, technical and programmatic oversight of the development of next generation signals.					
FY 2020 Plans: Funds will provide for matrix and contractor system engineering and program management support for the Prophet program.					
FY 2021 Base Plans:					

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funds will provide for matrix and contractor system engineering and program management support for the Prophet program.					
Title: Signal of Interest upgrades ***Description:*** The Signal Environment that Prophet Systems exploit is constantly contested with evolving threats. This environment creates gaps in Prophet?s ability to collect and exploit these signals. Prophet must integrate the latest emerging Intelligence Community (IC) and commercial solutions upgrades to remain relevant against these numerous, key, and high-priority emerging threats. ***FY 2020 Plans:*** Continuing, but not limited to development of Next Generation SIGINT capabilities into the Prophet SIGINT Software (PS2). The new signals and libraries of signals address key exploitation gaps in the Prophet system's ability to collect against key tactical near peer signals and emerging threats. ***FY 2021 Base Plans:*** Continuing, but not limited to development and evaluation of Next Generation SIGINT capabilities into the Prophet SIGINT Software (PS2). The new signals and libraries of signals address key exploitation gaps in the Prophet system's ability to collect against key tactical near peer signals and emerging threats. ***FY 2021 OCO Plans:*** Continuing, but not limited to development and evaluation of Next Generation SIGINT capabilities into the Prophet SIGINT Software (PS2) and increased signal processing capabilities for the Enhanced Signals Processing (ESP) kit baseline. The new signals and libraries of signals address key exploitation gaps in the Prophet system's ability to collect against key tactical near peer signals and emerging threats. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Previously Signals of Interest had to integrated one at a time; increased funding in FY 2021 allows for the integration "libraries" of high priority Signals of Interest (SOI), which is a more economical means of increasing the number of signals the Prophet Enhanced system can exploit and enables the Prophet Enhanced system to exploit more near peer and emerging threat signal types.	1.881	4.024	4.747	3.900	8.647
Title: Proficiency Trainer and Target Signature Arrays ***Description:*** The Proficiency Trainer and Target Signature Arrays are required to conduct training to sustain operator proficiency on the Prophet Enhanced at the unit level after the system has been fielded and post New Equipment Training (NET) training.	-	2.000	-	-	-

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: Continued development of Intelligence and Electronic Warfare Tactical Proficiency Trainer and Target Signature Arrays (IEWTPT/TSA) training systems. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** IEWTPT was an one year developmental effort, funding is not required in FY 2021					
Title: Enhanced Signal Processing and Line of Sight Testing ***Description:*** Testing required of the Enhanced Signal Processing kit and Line of Sight Communications kit onto the Prophet Enhanced system. ***FY 2020 Plans:*** Funds provide for, but are not limited to release testing of the system-level Prophet System Software (PS2) to include accreditation and productization of all New Technical Insertion (TI) capabilities. The final release software version is fielded to all the Prophet Systems to upgrade capabilities against Peer Near Peer and emerging threats. ***FY 2021 Base Plans:*** Combined testing of the Enhanced Signal Processing kit and Line of Sight Communication kit. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Majority of testing was completed in the first year, FY 2020.	-	1.044	0.200	-	0.200
Title: Enhanced Signal Processing Integration & Development ***Description:*** Effort to integrate the Enhanced Signal Processing kit into the Prophet Enhanced system. ***FY 2020 Plans:*** Non-recurring engineering included but not limited to integrate the Enhanced Signal Processing kit onto the Prophet Enhanced system. ***FY 2021 Base Plans:*** Development and evaluation of the Enhanced Signal Processing capability. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Majority of effort was completed in FY 2020.	-	3.483	0.550	-	0.550
Title: Customer Testing	-	-	0.785	-	0.785

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: Customer Testing of the Prophet Enhanced system as a result of changes to the baseline. ***FY 2021 Base Plans:*** Customer Testing of the Prophet System baseline after transition to sustainment to support and maintain the PE System Full Material Release ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 is the first year of the Customer Testing effort					
Title: Technical Data Package ***Description:*** Technical Data Package (TDP) for Prophet Enhanced, to be used for sustainment support as well as for follow on systems ***FY 2021 Base Plans:*** Develop Technical Data Package (TDP) for Prophet Enhanced ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 is the first year required for funding	-	-	1.965	-	1.965
Accomplishments/Planned Programs Subtotals	1.881	11.001	8.697	3.900	12.597

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• BZ9753: *Prophet Enhanced Modifications (MIP)*	45.022	57.103	17.079	61.450	78.529	-	-	-	-	Continuing	Continuing
• BZ9751: *SPECIAL PURPOSE SYSTEMS (MIP)*	4.162	4.000	11.479	-	11.479	4.091	4.141	4.190	6.718	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Prophet Research and Development (R&D) Acquisition Strategy is structured to maintain operational relevancy of Prophet Enhanced systems in a dynamic threat environment while reducing risk and streamlining business and engineering processes. Contracting activities are to maintain SIGINT relevance and complete Technical Insertion (TI) to Prophet Enhanced systems to pursue the latest Signals of Interest and design against obsolescence. The Technical Insertion (TI) contract supports R&D and other developmental work.

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW5 / *Electronic Warfare Development - MIP*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PM Electronic Warfare & Cyber : APG, MD	1.611	-		0.450	Dec 2019	0.450	Dec 2020	-		0.450	Continuing	Continuing	Continuing
		Subtotal	1.611	-		0.450		0.450		-		0.450	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Signals of Interst Upgrade	SS/CPFF	GD Mission Systems : Scottsdale, AZ	2.212	1.881	Jan 2019	4.024	Jan 2020	4.747	Jan 2021	3.900		8.647	Continuing	Continuing	Continuing
Trainer/TSA	SS/ Various	GD Mission Systems and Various Supporting Organizations : Scottsdale, AZ	-	-		2.000	Jan 2020	-		-		-	0.000	2.000	-
Enhanced Signal Processing Integration, Development & Evaluation	SS/CPFF	GD Mission Systems : Scottsdale, AZ	-	-		3.483	Jan 2020	0.550	Jan 2021	-		0.550	Continuing	Continuing	Continuing
		Subtotal	2.212	1.881		9.507		5.297		3.900		9.197	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Data Package	SS/CPFF	GD Mission Systems : Scottsdale, AZ	-	-		-		1.965	Mar 2021	-		1.965	0.000	1.965	-
		Subtotal	-	-		-		1.965		-		1.965	0.000	1.965	N/A

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW5 / *Electronic Warfare Development - MIP*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enhanced Signal Processing and Line of Sight Testing	MIPR	Army Test & Evaluation Command : Ft. Huachuca, AZ	-	-		1.044	Mar 2020	0.200	Dec 2020	-		0.200	0.000	1.244	-
Customer Testing	MIPR	Army Test & Evaluation Command : APG, MD	-	-		-		0.785	Jan 2021	-		0.785	0.000	0.785	-
		Subtotal	-	-		1.044		0.985		-		0.985	0.000	2.029	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.823	1.881		11.001		8.697		3.900		12.597	Continuing	Continuing	N/A

Remarks

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development - MIP*

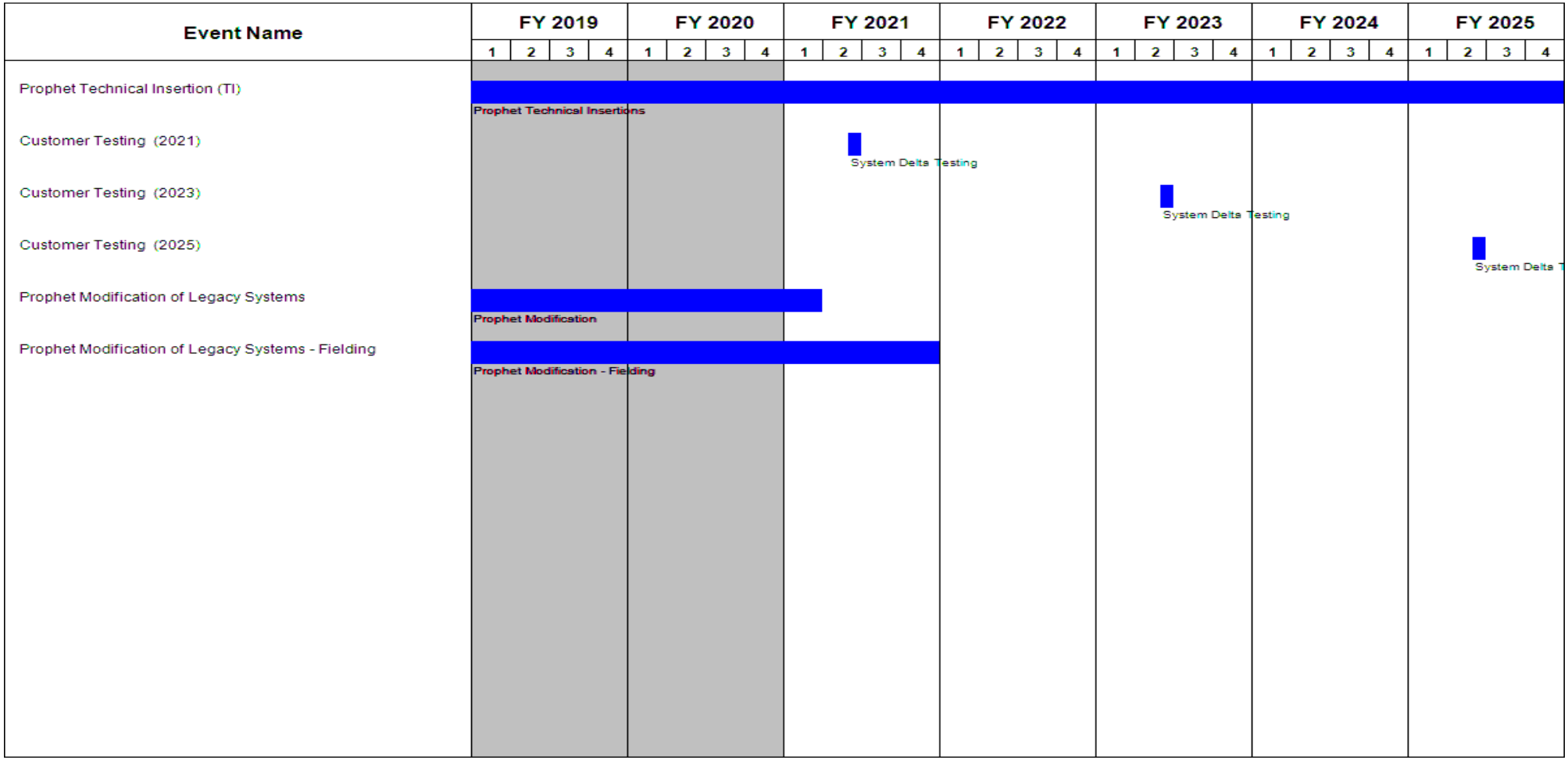

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development - MIP*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Prophet Technical Insertion (TI)	4	2008	4	2025
Customer Testing (2021)	2	2021	2	2021
Customer Testing (2023)	2	2023	2	2023
Customer Testing (2025)	2	2025	2	2025
Prophet Modification of Legacy Systems	3	2017	1	2021
Prophet Modification of Legacy Systems - Fielding	2	2018	4	2021

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW6 / *ARAT-TSS - MIP*	

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
EW6: *ARAT-TSS - MIP*	-	7.041	7.431	9.053	-	9.053	9.399	9.587	9.768	10.165	0.000	62.444
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The Army Reprogramming Analysis Team (ARAT) is a Department of the Army established program to develop techniques, methods, tools, and architecture to rapidly reprogram mission software embedded in Army Electronic Warfare (EW) Force Protection Systems (FPS) in response to changes in threat signatures. The regulatory guidance directing this mission is contained in Army Regulation (AR) 525-15, AR 525-22, and AR 95-1. The ARAT develops integrated technical solutions required to counter increasingly sophisticated EW Signal threats to US Forces. The ARAT mission software reprogramming infrastructure supports the Army Campaign Plan to provide the Regionally Aligned Forces tactical Commander timely rapid-reprogramming capability of EW systems with mission software. The ARAT mission responsibility is to develop and distribute Mission Software and Products to forward deployed combat forces. ARAT identifies and analyzes worldwide threat signature changes which affect EW systems; determines the impact of observed Signal Intelligence (SIGINT) signature changes; rapidly develops new mission software to adapt friendly systems to detect and defeat enemy threats to U.S. Army ground and air platforms; disseminates the Mission Software and Products to forward deployed forces, and provides government developed tools and software to upload new mission software into the affected EW systems.

A. Mission Description and Budget Item Justification

Current military operations are conducted in a rapidly changing threat environment, where Improvised Explosive Devices (IEDs), Infra Red (IR) man-portable air defense systems (MANPADS) seekers, radar guided surface-to-air-missiles (SAM), laser guided weapons, anti-helicopter mines, and targeting sensors are proliferating and evolving. Integrated solutions are required to counter increasingly sophisticated EW threats. The ARAT reprogramming infrastructure supports the tactical Commander by providing timely rapid reprogramming of mission software and information dissemination for Army supported, Joint and allied services. ARAT supports integrated reprogramming of target acquisition, target engagement, vehicle survivability, and Aircraft Survivability Equipment (ASE). ARAT rapid-reprogramming infrastructure supports tactical requirements for deployed aircraft and ground-based (e.g. Counter Radio-Controlled Improvised Explosive Device (CREW)) survivability systems. ARAT identifies and analyzes threat signature changes which affect EW systems; determines the impact of observed signature changes; develops new mission software to adapt the system to the changes; disseminates the mission software; and provides methods to upload the new mission software into the affected EW systems. Each element within the ARAT infrastructure plays a specific role within the program's rapid reprogramming process, providing the Soldier with the capability to install mission and target identification software at the lowest possible level, thus maximizing flexibility for tactical commanders. ARAT participates in the operational and developmental test design of Army EW systems, and supports Joint Service Reprogramming Exercises in all theaters. ARAT Research and Development enables continuous development of: 1) automated threat analysis tools to rapidly detect (flag) threat changes within the intelligence system, 2) tools to minimize the time to develop Mission Software and Products (MSP), 3) tools and technology to minimize the time required to test and validate MSPs, 4) improved communications conduits to rapidly transmit mission software to upload into supported EW systems. These efforts allow for rapid threat analysis, threat modeling and simulation, mission software development and testing, distribution and uploading of mission software directly to the supported Soldier in the field.

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Keeping Pace with the Enemy and Technology	3.722	4.424	4.703	-	4.703
Description: This effort focuses on developing a capability for the Government to rapidly develop and distribute organic mission software solutions for multiple EW systems. The Army must continually modernize and enhance software tools, hardware modernization, and processes counter enemy technology. ARAT EW6 Military Intelligence Program (MIP) executes Research, Development, Test, and Evaluation (RDTE) funding to provide an organic Army capability for this organization to rapidly develop, test and distribute mission software solutions for forward deployed combat forces. ***FY 2020 Plans:*** ARAT's FY 2020 plan will continue to focus on the rapid development, testing, and distribution of mission software for regions worldwide. In support of Air Mission software development, ARAT will continue automating threat simulation development, Radio Frequency automated signal generation, automating threat analysis tools, developing a universal mission software generation tool, and software hardening capability. ***FY 2021 Base Plans:*** ARAT's FY 2021 base plan to keep pace with enemy and technology will focus on gaining a decisive edge on emerging enemy technologies that are evolving rapidly. With the Army's shift to focus on peer and near peer adversaries ARAT must enhance it's ability to rapidly detect a changed or new threat, analyze the threat, develop a rapid mission software solution to detect and defeat the threat, and rapidly distribute the mission software to forward deployed combat forces. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021increased from FY 2020 in support focusing more on enhancing the Air and Ground lab infrastructure to include modernization of threat detection and threat analysis. ARAT must enhance its Air and Ground laboratories to rapidly adapt to emerging and changing threats. Modernizing the infrastructure is imperative to rapidly create mission software solutions that detect and defeat increasingly sophisticated enemy weapon systems.					
Title: Infrastructure Improvements Multispectral	1.104	0.893	1.087	-	1.087
Description: This effort focuses on enhancing the Army's Multispectral Missile Warning System (MWS) software sustainment infrastructure. With the worldwide proliferation of MANPADS the Army must have the capability to rapidly analyze and develop mission software solutions that detect and counter MANPADS to defend Army Aviation platforms against this lethal threat.					

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: ARAT will continue to enhance Multispectral Mission Software development, testing, and distribution infrastructure. ARAT will continue modernization of the multispectral software development environment as well as automation of threat analysis tools and multispectral simulation capabilities. ***FY 2021 Base Plans:*** The FY 2021 plan includes modernization of the infrastructure automated testing of mission software. ARAT will continue to focus on enhancing software tools that aid in speeding up testing time of mission software. Mission software must be rigorously tested and validated prior to release to forward deployed combat forces. ARAT performs testing of thousands of test points within a mission software file. Due to the sophistication of emerging threat weapon systems ARAT will increase the amount of test points required to validate the release of mission software. ARAT will need to continue enhancing it's infrastructure to rapidly develop and test mission software. ARAT has procured new threat simulators that require software to allow the simulators to replicate enemy weapon system radars. Simulation software allows ARAT to replicate sophisticated enemy radar systems that are required to conduct laboratory testing of mission software. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 increased from FY 2020 in support of more enhancing on the Air and Ground lab infrastructure to include modernization of threat detection and threat analysis. ARAT must enhance its Air and Ground laboratories to rapidly adapt to emerging and changing threats. Modernizing the infrastructure is imperative to rapidly create mission software solutions that detect and defeat increasingly sophisticated enemy weapon systems.					
Title: Infrastructure Improvement Radio Frequency General ***Description:*** This effort focuses on enhancing the Army's Radio Frequency (RF) EW system Mission Software and Products (MSP) development and distribution infrastructure. The Army must fight in a contested and congested EW environment. Mission software solutions to defend against RF threats must be rapidly developed, tested, and distributed to Soldiers on an ever changing battlefield. ***FY 2020 Plans:*** In support of Ground Electronic Warfare Radio Frequency Mission Software development, ARAT will develop modernization efforts for the automated testing of mission software, develop laboratory environmental models that replicate actual physical and climatic environments worldwide, and optimize threat automation tools.	1.349	1.263	1.386	-	1.386

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Additionally, ARAT will create a software tool that will control various versions of Radio Frequency (RF) simulators and RF Signal Generators. ***FY 2021 Base Plans:*** ARAT FY 2021 base plan is enhance the Radio Frequency infrastructure. Intended efforts include designing and developing software that emulates radar components to reduce dependency on aging antennas and aircraft processors that are in low inventory across the Army. Emulated aircraft components reduces the maintenance requirement to repair or replace actual aircraft hardware in the ARAT laboratories. Additionally, ARAT will continue enhancing automated testing of mission software. Automated testing decreases the time it takes to validate mission software by utilizing software tools to execute the testing in lieu of having engineers perform the testing functions. ARAT will continue to enhance the Ground Electronic Warfare (Grew) mission software development and testing infrastructure. Grew efforts will include software emulation of operational environments where Grew systems will operate worldwide. The emulation software will allow ARAT to create realistic environments in a laboratory. Realistic environments include the physical and climatological components of where the GrEW systems may operate. Having the capability to model environments in a laboratory provides the ability to rapidly test and validate mission software in lieu of lengthy field testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 increased from FY 2020 in support of enhancing the Radio Frequency infrastructure.					
Title: Threat Flagging and Mission Data Set Reprogramming Tool Development ***Description:*** This effort focuses on enhancing the Army's capability to monitor changes in enemy EW systems that affect system performance of Army detection, declaration, and countermeasure EW systems onboard. The enemy is continuously developing or modifying it's EW systems. For Army platforms to have protection against enemy systems it must have a robust capability to immediately detect changes in threat system performance and rapidly develop, test, and distribute a mission software solution that counters the threat. This effort will enhance the Army's capability bridge detection of a change in enemy threat and the rapid development of MSP. ***FY 2020 Plans:*** ARAT will continue the design and development of the modernized Threat Change Detection (TCD) tool. This tool will provide the enhanced ability for the Army to rapidly detect and analyze National level captured signal intelligence parametric data. The TCD tool will utilize analytical tools to assess the change in threat emitters and to prioritize the lethality of a threat change and its impact to US Forces. Additionally, ARAT will continue with modernization efforts of the mission software generation tools and hardware infrastructure. Planned FY	0.866	0.851	1.877	-	1.877

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS - MIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
2020 effort will include the creation of a Universal Mission Data Set Generation (UMG) tool. The UMG tool will consolidate the current multiple Mission Data Set Generation tools into a single tool. The benefit of a single tool will enhance the Mission Software development process by reducing the sustainment of 5 Generation tools into a single Generation tool. ***FY 2021 Base Plans:*** The FY 2021 Base Plan is to enhance ARAT's ability to rapidly detect threat changes worldwide. Additionally, design and develop software tools that provide the capability to enhance the accuracy and speed of mission software development and testing for Electronic Warfare systems. Planned efforts include enhancing ARAT's Threat Detection and Threat Analysis capability. Enhancing Threat Detection will provide ARAT with the ability to rapidly detect changes in known threats, assess the impact of the change in threat, develop a mission software solution to detect and defeat the threat, and distribute the new mission software to forward deployed forces. ARAT will continue to focus RDT&E efforts on enhancing the mission software development and testing infrastructure. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2020 to FY 2021 increase is $1.026M. This increase is priority based due to available funding in FY 2021. Planned efforts in FY 2021 are discussed in the FY 2021 Base Plans.					
Accomplishments/Planned Programs Subtotals	7.041	7.431	9.053	-	9.053

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The efforts to be funded in this project will require a combination of systems specific and high-tech knowledge. The contractual services portion for the project will be obtained from both the Communications-Electronics Command (CECOM) Software Engineering Center (SEC) competitive omnibus and the Research, Development and Engineering Command (RDECOM) and the Defense Technical Intelligence Center (DTIC) high tech contracts.

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW6 / *ARAT-TSS - MIP*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	CECOM SEC : Aberdeen Proving Ground, MD	9.387	0.161		0.182	Mar 2020	0.188	Mar 2020	-		0.188	Continuing	Continuing	Continuing
		Subtotal	9.387	0.161		0.182		0.188		-		0.188	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USG Labor	Various	CECOM SEC : Various Locations	3.111	0.372		0.383		1.190		-		1.190	0.000	5.056	-
Travel	Various	CECOM SEC : Various Locations	0.838	0.080		0.084		0.088		-		0.088	0.000	1.090	-
		Subtotal	3.949	0.452		0.467		1.278		-		1.278	0.000	6.146	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	Various	CECOM SEC, RDECOM, DTIC : Various Locations	34.726	6.428		6.782	Mar 2020	7.587	Mar 2020	-		7.587	Continuing	Continuing	Continuing
		Subtotal	34.726	6.428		6.782		7.587		-		7.587	Continuing	Continuing	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	48.062	7.041		7.431		9.053		-		9.053	Continuing	Continuing	N/A

Remarks

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS - MIP*

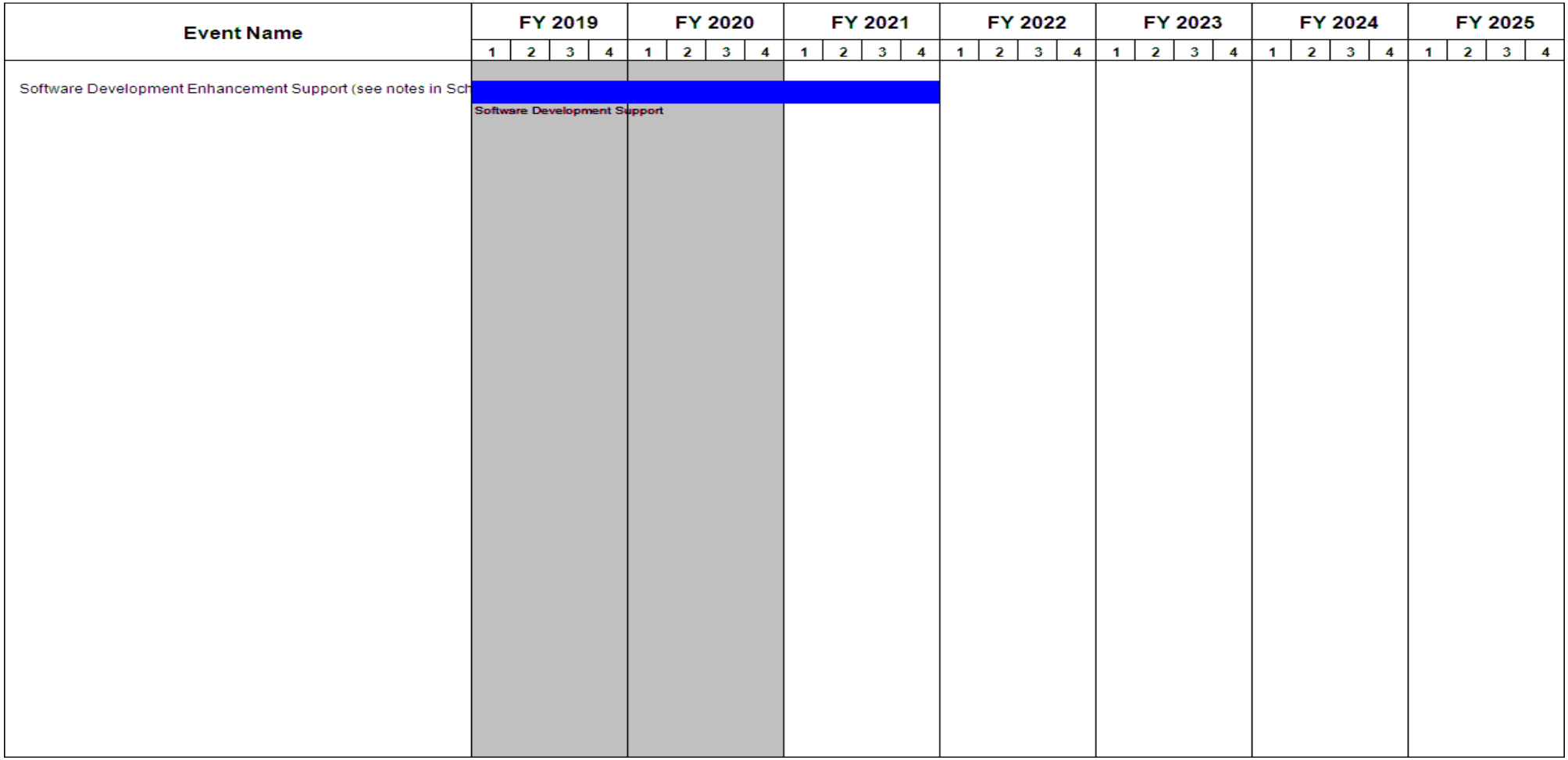

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS - MIP*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Software Development Enhancement Support (see notes in Schedule Detail)	1	2015	4	2021

Note

- Software Test Automation
- Threat Analysis Data Evaluation Tool
- Enhance Data Distribution

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) FJ5 / *Terrestrial Layer System (MIP)*	

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
FJ5: *Terrestrial Layer System (MIP)*	-	0.000	0.000	38.105	-	38.105	51.250	20.980	12.090	0.000	0.000	122.425
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a new start in FY2021.

Terrestrial Layer System (TLS) is a new start effort in FY 2020, and FJ5 is a New Start Project in FY2021.

A. Mission Description and Budget Item Justification

Terrestrial Layer System (TLS) is a new start effort in FY 2020, and FJ5 is a New Start Project in FY2021. TLS provides Army maneuver forces integrated full spectrum Signals Intelligence (SIGINT), Electronic Warfare (EW), and Cyber-enabling non-kinetic offensive operation options to Brigade Combat Team (BCT) and Expeditionary-Military Intelligence Brigade (EMIB) commanders. TLS' information Superiority provides Indications and Warnings, Force Protection and Situational Awareness to influence the commander's decision cycle, improve targeting timeliness and accuracy, and provide the maneuver commander with electronic attack and offensive cyber warfare options to deny, degrade, disrupt, or otherwise manipulate the targeted force. TLS employs technologically advanced systems with a modular open-system approach for multiple configurations that can be efficiently sustained and effectively upgraded to provide capabilities against changing near peer and emerging threats to address multi-domain capability gaps.

Justification:
FY 2021 Base funding in the amount of $38.105 million funds system level prototyping, platform integration and testing efforts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Technical / Program Management ***Description:*** Funds will provide for technical engineering and program management. ***FY 2021 Base Plans:*** FY 2021 technical engineering and program management support for TLS. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 is the first year of funding for the project.	-	-	7.318	-	7.318
Title: Platform Integration and System Development	-	-	28.036	-	28.036

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System (MIP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: Development of System Level Prototypes and integration of TLS mission equipment onto vehicle platform(s). ***FY 2021 Base Plans:*** Development of System Level Prototypes and integration of TLS mission equipment onto vehicle platform(s). ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 is the first year of funding for the Program Element and the effort.					
Title: Test Events ***Description:*** System and Operational test events ***FY 2021 Base Plans:*** Testing of TLS system ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 is the first year of funding for the Program Element and the effort	-	-	2.751	-	2.751
Accomplishments/Planned Programs Subtotals	-	-	38.105	-	38.105

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• B97600: *TERRESTRIAL LAYER SYSTEMS (TLS) (MIP)*	-	-	8.081	-	8.081	39.710	88.133	167.066	186.448	0.000	489.438
• 0604021A: *Electronic Warfare Technology Maturation (MIP)*	-	23.043	22.840	-	22.840	-	-	-	-	0.000	45.883

Remarks

D. Acquisition Strategy

A competitive acquisition approach is planned for TLS development. The TLS program will use a tailored acquisition approach to rapidly deliver an integrated ground intelligence, electronic warfare and cyber capability on multiple platform types to align with maneuver forces. The TLS program will leverage authorities to accelerate delivery through rapid prototyping or rapid fielding approaches.

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 0304270A / *Electronic Warfare Development*	Project (Number/Name) FJ5 / *Terrestrial Layer System (MIP)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical / Program Management	TBD	TBD : TBD	-	-		-		7.318	Feb 2021	-		7.318	Continuing	Continuing	-
		Subtotal	-	-		-		7.318		-		7.318	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Vehicle Integration and System Development	C/CPFF	TBD : TBD	-	-		-		28.036	Mar 2021	-		28.036	0.000	28.036	-
		Subtotal	-	-		-		28.036		-		28.036	0.000	28.036	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Events	MIPR	ATEC : APG, MD	-	-		-		2.751	Mar 2021	-		2.751	0.000	2.751	-
		Subtotal	-	-		-		2.751		-		2.751	0.000	2.751	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		38.105		-		38.105	Continuing	Continuing	N/A

Remarks

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 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System (MIP)*

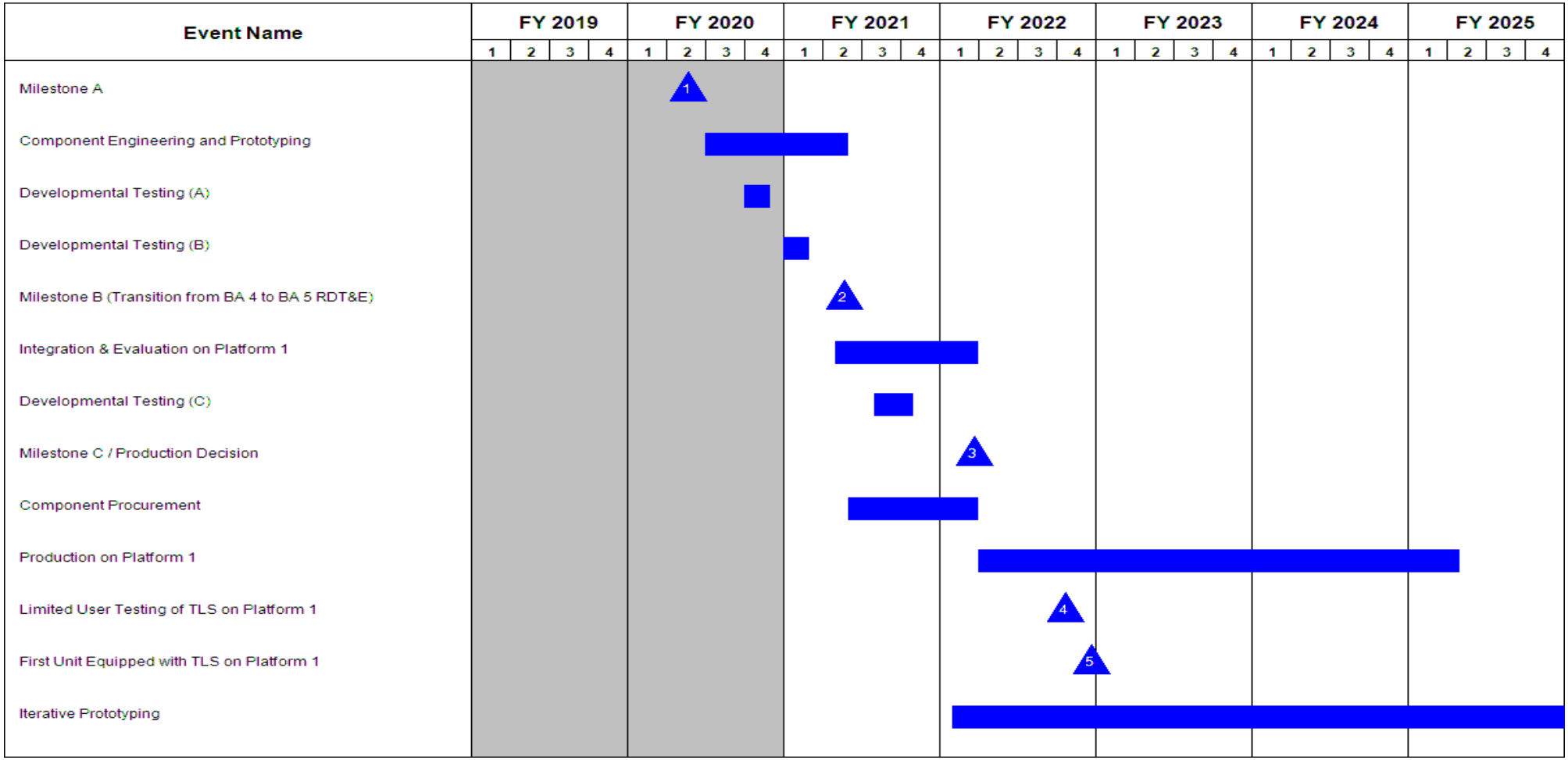

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System (MIP)*

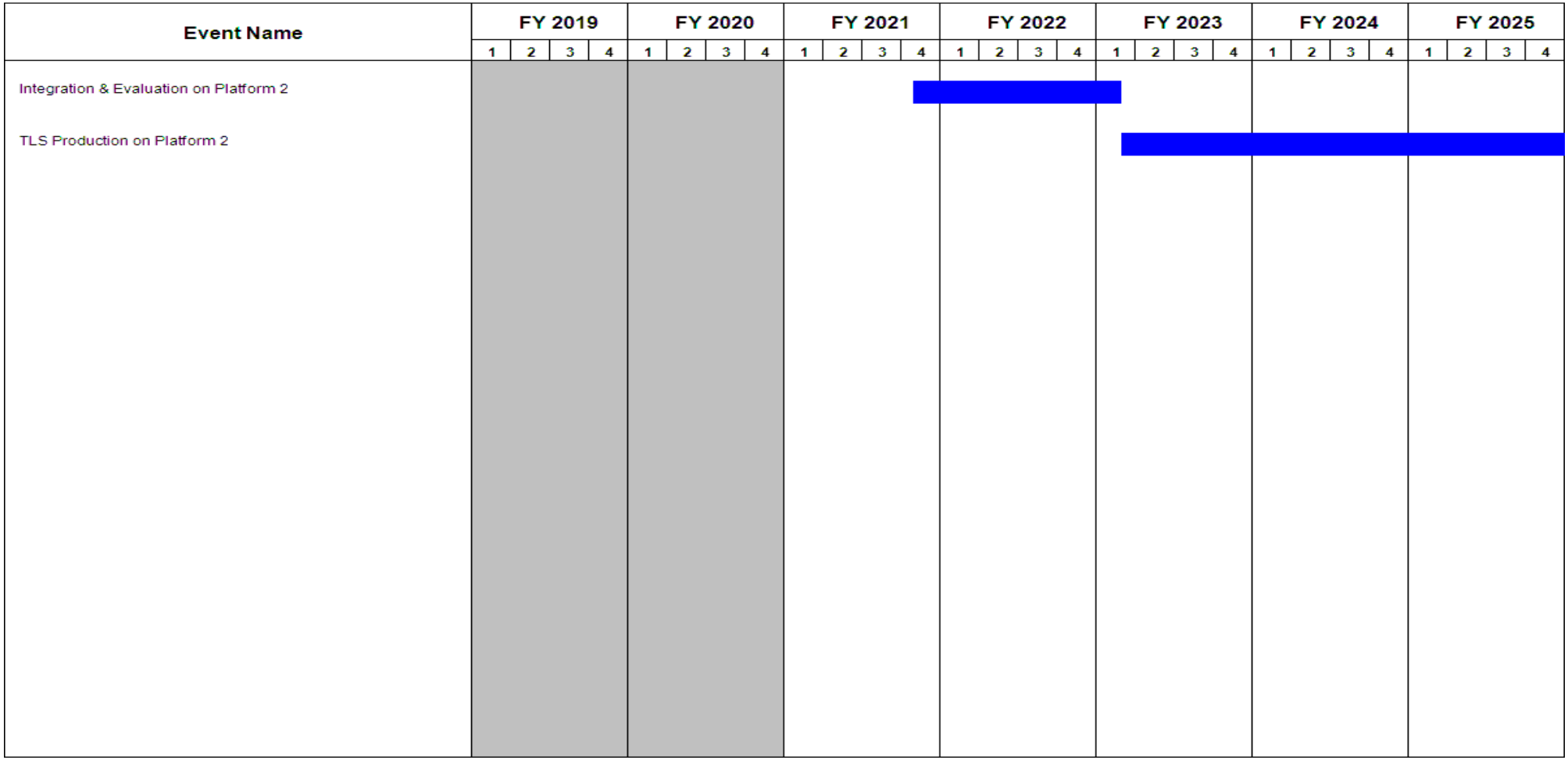

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System (MIP)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Milestone A	2	2020	2	2020
Component Engineering and Prototyping	3	2020	2	2021
Developmental Testing (A)	4	2020	4	2020
Developmental Testing (B)	1	2021	1	2021
Milestone B (Transition from BA 4 to BA 5 RDT&E)	2	2021	2	2021
Integration & Evaluation on Platform 1	2	2021	1	2022
Developmental Testing (C)	3	2021	4	2021
Milestone C / Production Decision	1	2022	1	2022
Component Procurement	2	2021	1	2022
Production on Platform 1	2	2022	2	2025
Limited User Testing of TLS on Platform 1	4	2022	4	2022
First Unit Equipped with TLS on Platform 1	4	2022	4	2022
Iterative Prototyping	1	2022	1	2027
Integration & Evaluation on Platform 2	4	2021	1	2023
TLS Production on Platform 2	1	2023	1	2027