Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
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 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	59.755	75.520	56.938	-	56.938	36.427	12.633	11.887	12.003	0.000	265.163
CK3: *TLS Echelon Above Brigade (EAB)*	-	-	19.505	29.657	-	29.657	18.165	6.665	5.846	5.903	0.000	85.741
EW5: *Electronic Warfare Development*	-	12.597	-	-	-	-	-	-	-	-	0.000	12.597
EW6: *ARAT-TSS*	-	9.053	5.391	5.813	-	5.813	5.843	5.968	6.041	6.100	0.000	44.209
FJ5: *Terrestrial Layer System*	-	38.105	50.624	21.468	-	21.468	12.419	-	-	-	0.000	122.616

A. Mission Description and Budget Item Justification

A portion of this funding line is a key enabler of the Army Modernization Priorities in support of Terrestrial Layer System. 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 CK3 supports the development of the Middle Tier of Acquisition (MTA), Terrestrial Layer System Echelons Above Brigade (TLS EAB). TLS EAB 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 Army Divisions, Corps and Multi-Domain Task Forces.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
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*

The total cost of TLS BCT Middle Tier of Acquisition effort is $168.43 million from FY21 to FY25 in RDTE, and procurement ($43.04M) of prototype units. TLS BCT is fully funded across the Future Years Defense Program.

FY 2023 funds the Terrestrial Layer System Echelons Above Brigade (TLS EAB) efforts (Project CK3), Army Reprogramming Analysis Team (ARAT) efforts (Project EW6) and Terrestrial Layer System Brigade Combat Team (TLS BCT) efforts (Project FJ5).

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	59.755	75.520	0.000	-	0.000
Current President's Budget	59.755	75.520	56.938	-	56.938
Total Adjustments	0.000	0.000	56.938	-	56.938
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	56.938	-	56.938

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) CK3 / *TLS Echelon Above Brigade (EAB)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
CK3: *TLS Echelon Above Brigade (EAB)*	-	-	19.505	29.657	-	29.657	18.165	6.665	5.846	5.903	0.000	85.741
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is a key enabler of the Army Modernization Priorities in support of Terrestrial Layer System Echelons Above Brigade (TLS EAB). The TLS EAB will provide Army Divisions, Corps and Multi-Domain Task Forces (MDTF) extended range, integrated full spectrum Signals Intelligence (SIGINT), Electronic Warfare (EW), and Cyber-enabling non-kinetic offensive capabilities to support large scale combat operations. TLS EAB's information Superiority provides Indications and Warnings, Force Protection and Situational Awareness to influence the commander's decision cycle, improve targeting timeliness and accuracy, and provides electronic attack and offensive cyber warfare options to deny, degrade, disrupt, or otherwise manipulate the targeted force. TLS EAB 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 joint all domain capability gaps.

Justification:
FY23 RDT&E funds in the amount of $29.657 million will fund PMO support, TLS EAB Integration, and Demonstration/Experimentation/Prototyping.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: TLS EAB Integration	-	14.300	29.657
Description: TLS Echelons Above Brigade (EAB) is fulfilling distinct capabilities to support Division, Corps and Multi-Domain Task Force commanders. TLS EAB will be integrated onto different prime mover platforms than TLS Brigade Combat Team (BCT) and will employ different technologies and hardware to fulfill the unique extended range capabilities to support large scale combat operations.			
FY 2022 Plans: Initiates development of System Level Prototypes and integration of TLS EAB mission equipment.			
FY 2023 Plans: In FY 2023, TLS EAB will continue System Level Prototypes development, platform integration, technical system testing and solider touchpoints.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** CK3 / *TLS Echelon Above Brigade (EAB)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
In FY 2023, TLS EAB will experience an increase in funding, to support ramping up of System Level Prototypes development, platform integration, technical system testing and solider touchpoints.			
Title: TLS PMO ***FY 2022 Plans:*** Initiates PMO support for TLS EAB. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** In FY 2023, TLS EAB will experience an increase in funding for PMO support.	-	5.105	-
Title: Demonstration, Experimentation, and Prototyping ***FY 2022 Plans:*** Initiates Demonstration, Experimentation, and Prototyping of TLS EAB mission equipment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** In FY 2023, TLS EAB will experience an increase in funding, to support Demonstration, Experimentation, and Prototyping of TLS EAB mission equipment.	-	0.100	-
Accomplishments/Planned Programs Subtotals	-	19.505	29.657

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

A competitive acquisition approach is planned for TLS EAB development. The TLS EAB program will use a Middle Tier Acquisition (MTA) approach to rapidly deliver an integrated ground intelligence, electronic warfare and cyber capability on multiple platform types to align with maneuver forces. The TLS EAB program will leverage authorities to accelerate delivery through rapid prototyping with rapid fielding authorities or a Milestone C Decision Point.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** CK3 / *TLS Echelon Above Brigade (EAB)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMO	C/TBD	TBD : TBD	-	-		5.105	May 2022	1.847	Nov 2022	-		1.847	0.000	6.952	-
		Subtotal	-	-		5.105		1.847		-		1.847	0.000	6.952	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TLS EAB Integration	C/TBD	TBD : TBD	-	-		14.300	Apr 2022	25.964	Mar 2023	-		25.964	0.000	40.264	-
Demonstration, Experimentation, and Prototyping	C/TBD	TBD : TBD	-	-		0.100	May 2022	1.846	Apr 2023	-		1.846	0.000	1.946	-
		Subtotal	-	-		14.400		27.810		-		27.810	0.000	42.210	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		19.505		29.657		-		29.657	0.000	49.162	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** CK3 / *TLS Echelon Above Brigade (EAB)*

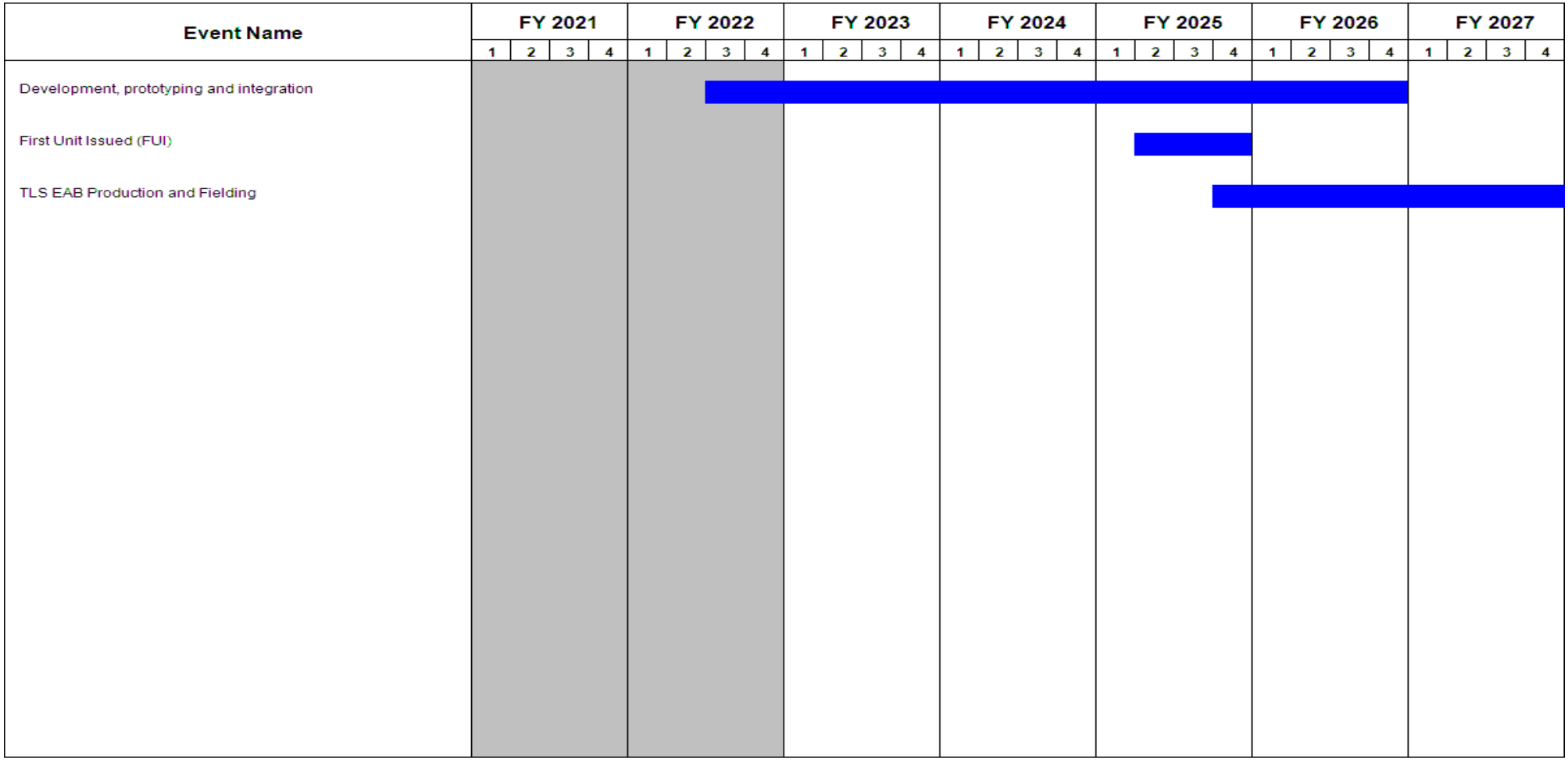

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** CK3 / *TLS Echelon Above Brigade (EAB)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Development, prototyping and integration	3	2022	4	2026
First Unit Issued (FUI)	2	2025	4	2025
TLS EAB Production and Fielding	4	2025	4	2030

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW5 / *Electronic Warfare Development*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EW5: *Electronic Warfare Development*	-	12.597	-	-	-	-	-	-	-	-	0.000	12.597
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0304270A/EW5 has no FY 2023 funding request.

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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Program Management ***Description:*** Engineering, technical and programmatic oversight of the development of next generation signals.	0.450	-	-
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.	8.647	-	-
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.	0.200	-	-
Title: Enhanced Signal Processing Integration & Development	0.550	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: Effort to integrate the Enhanced Signal Processing kit into the Prophet Enhanced system.			
Title: Customer Testing ***Description:*** Customer Testing of the Prophet Enhanced system as a result of changes to the baseline.	0.785	-	-
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	1.965	-	-
Accomplishments/Planned Programs Subtotals	12.597	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• BZ9753: *PROPHET ENHANCED MODIFICATIONS*	116.025	47.300	26.200	-	26.200	-	-	-	-	Continuing	Continuing
• BZ9751: *SPECIAL PURPOSE SYSTEMS*	11.479	3.739	4.224	-	4.224	4.254	6.823	6.844	6.841	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 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW5 / *Electronic Warfare Development*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PM Electronic Warfare & Cyber : APG, MD	2.061	0.450	Dec 2020	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	2.061	0.450		-		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Signals of Interst Upgrade	SS/CPFF	GD Mission Systems : Scottsdale, AZ	8.117	8.647	Jan 2021	-		-		-		-	Continuing	Continuing	Continuing
Trainer/TSA	SS/ Various	GD Mission Systems and Various Supporting Organizations : Scottsdale, AZ	2.000	-		-		-		-		-	0.000	2.000	-
Enhanced Signal Processing Integration, Development & Evaluation	SS/CPFF	GD Mission Systems : Scottsdale, AZ	3.483	0.550	Jan 2021	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	13.600	9.197		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 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	-		-		-		-	0.000	1.965	-
		Subtotal	-	1.965		-		-		-		-	0.000	1.965	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW5 / *Electronic Warfare Development*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 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	0.200	Dec 2020	-		-		-		-	0.000	1.244	-
Customer Testing	MIPR	Army Test & Evaluation Command : APG, MD	-	0.785	Jan 2021	-		-		-		-	0.000	0.785	-
		Subtotal	1.044	0.985		-		-		-		-	0.000	2.029	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	16.705	12.597		-		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development*

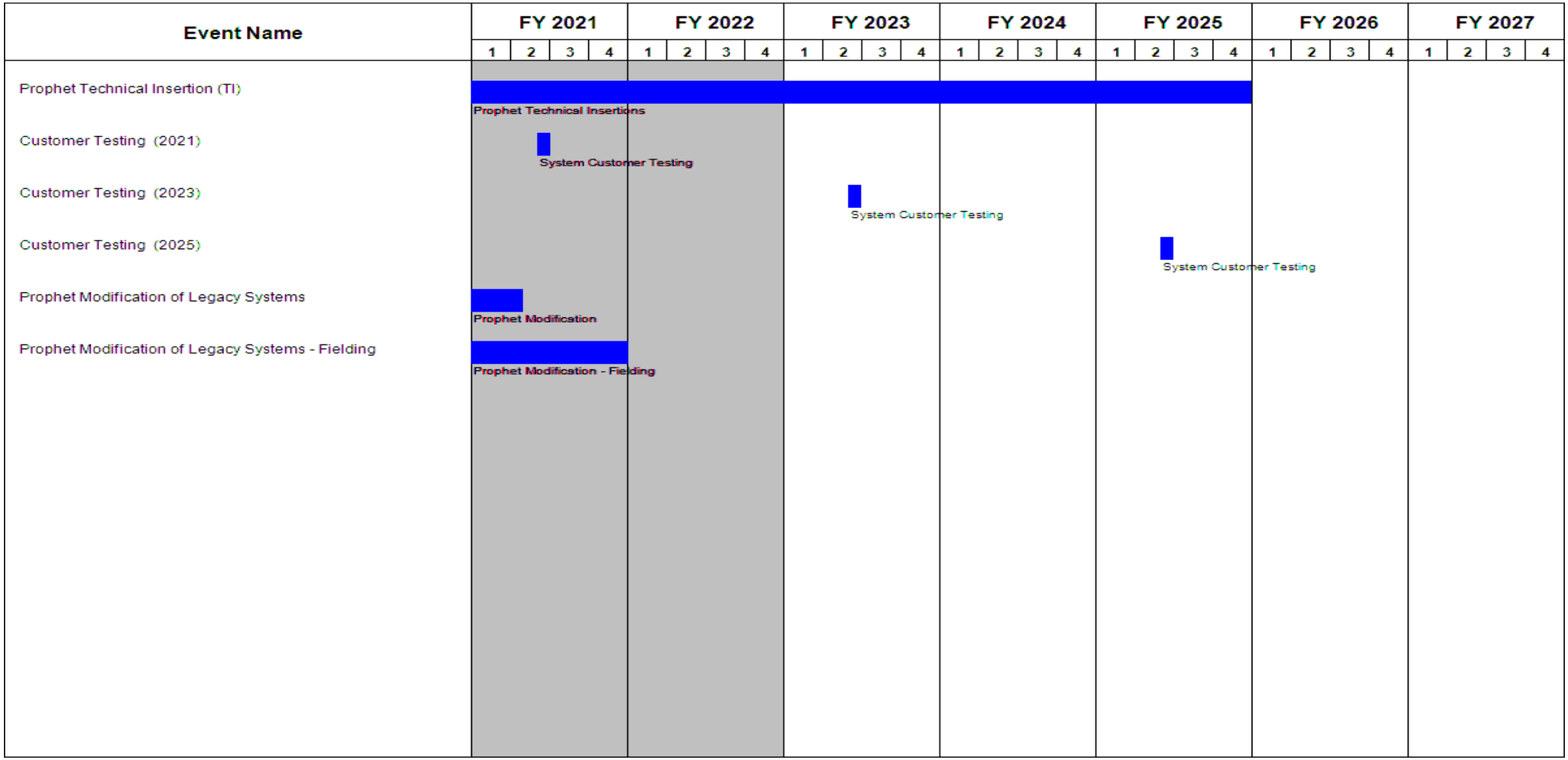

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW5 / *Electronic Warfare Development*

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 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW6 / *ARAT-TSS*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EW6: *ARAT-TSS*	-	9.053	5.391	5.813	-	5.813	5.843	5.968	6.041	6.100	0.000	44.209
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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Keeping Pace with the Enemy and Technology	4.703	2.657	2.758

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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 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 2022 Plans:*** ARAT EW6 will continue infrastructure enhancement activities that will reduce timelines from threat detection to distribution of mission software solutions that detect and defeat enemy Electronic Warfare systems directed against air and ground Army platforms. ***FY 2023 Plans:*** Minor increase based on inflation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Minor cost increase based on inflation.			
Title: Infrastructure Improvements Multispectral ***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. ***FY 2022 Plans:*** ARAT EW6 will continue infrastructure enhancement activities that will reduce timelines from threat detection to distribution of mission software solutions that detect and defeat enemy Electronic Warfare systems directed against air and ground Army platforms. ***FY 2023 Plans:*** Minor cost increase based on inflation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Minor cost increase based on inflation.	1.087	0.616	0.676
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	1.386	1.004	1.251

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
software solutions to defend against RF threats must be rapidly developed, tested, and distributed to Soldiers on an ever changing battlefield. ***FY 2022 Plans:*** ARAT EW6 will continue infrastructure enhancement activities that will reduce timelines from threat detection to distribution of mission software solutions that detect and defeat enemy Electronic Warfare systems directed against air and ground Army platforms. ***FY 2023 Plans:*** Minor cost increase based on inflation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Minor cost increase based on inflation.			
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 2022 Plans:*** ARAT EW6 will continue infrastructure enhancement activities that will reduce timelines from threat detection to distribution of mission software solutions that detect and defeat enemy Electronic Warfare systems directed against air and ground Army platforms. ***FY 2023 Plans:*** Minor cost increase based on inflation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Minor cost increase based on inflation.	1.877	1.114	1.128
Accomplishments/Planned Programs Subtotals	9.053	5.391	5.813

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS*

C. Other Program Funding Summary ($ in Millions)

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 Program Executive Office - Simulation, Training and Instrumentation (PEO STRI), and the Defense Technical Intelligence Center (DTIC) high tech contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) EW6 / *ARAT-TSS*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	CECOM SEC : Aberdeen Proving Ground, MD	9.730	0.188	Mar 2020	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	9.730	0.188		-		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USG Labor	Various	CECOM SEC : Various Locations	3.866	1.190		0.576		0.596		-		0.596	Continuing	Continuing	Continuing
Travel	Various	CECOM SEC : Various Locations	1.002	0.088		0.092		0.096		-		0.096	Continuing	Continuing	Continuing
		Subtotal	4.868	1.278		0.668		0.692		-		0.692	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	Various	CECOM SEC, RDECOM, DTIC : Various Locations	47.936	7.587	Mar 2020	4.723	Mar 2020	5.121	Mar 2020	-		5.121	Continuing	Continuing	Continuing
		Subtotal	47.936	7.587		4.723		5.121		-		5.121	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	62.534	9.053		5.391		5.813		-		5.813	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS*

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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
Software Development Enhancement Support (see notes in Sch	Software Development Support																											

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** EW6 / *ARAT-TSS*

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 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) FJ5 / *Terrestrial Layer System*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FJ5: *Terrestrial Layer System*	-	38.105	50.624	21.468	-	21.468	12.419	-	-	-	0.000	122.616
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is a key enabler of the Army Modernization Priorities in support of Terrestrial Layer System Brigade Combat Team (TLS BCT), a Middle Tier of Acquisition program, which 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) commanders. TLS BCT's 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 BCT 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.

The total cost of TLS BCT Middle Tier of Acquisition effort is $168.43 million from FY21 to FY25 in RDTE, and procurement ($43.04M) of prototype units. TLS BCT is fully funded across the Future Years Defense Program.

Justification:
FY23 total program amount of $21.468M will fund technical/PMO support, vehicle integration and system development, new signal threat integration/signal relevancy, and test events.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Technical / Program Management	7.318	9.216	2.561
Description: Funds will provide for technical engineering and program management. ***FY 2022 Plans:*** FY 2022 technical engineering and program management support for TLS. ***FY 2023 Plans:*** FY 2023 technical engineering and program management support for TLS BCT. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease is the result of the completion of TLS BCT integration engineering and testing on one of the three designated platforms, leaving only two platforms remaining for integration engineering and testing.			
Title: Platform Integration and System Development	28.036	36.467	12.666

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: Development of System Level Prototypes and integration of TLS BCT mission equipment onto vehicle platforms that will enable TLS BCT platforms to match vehicle platforms organic to the unit. ***FY 2022 Plans:*** Development of System Level Prototypes and integration of TLS mission equipment onto at least, but not limited to the Stryker vehicle platform and AMPV vehicle platform. ***FY 2023 Plans:*** Development of System Level Prototypes and integration of TLS BCT mission equipment onto at least, but not limited to the AMPV vehicle platform and IBCT identified vehicle platform. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease is the result of the completion of TLS BCT integration engineering and testing on one of the three designated platforms, leaving only two platforms remaining for integration engineering and testing.			
Title: Test Events ***Description:*** System and Operational test events ***FY 2022 Plans:*** Testing of TLS system ***FY 2023 Plans:*** Continuation of testing of TLS BCT on at least, but not limited to the AMPV platform. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease is the result of the completion of TLS BCT integration engineering and testing on one of the three designated platforms, leaving only two platforms remaining for integration engineering and testing.	2.751	3.000	4.066
Title: New signal threat integration and signal relevancy ***FY 2022 Plans:*** Includes, but is not limited to, development and evaluation of Next Generation SIGINT, EA and Cyber capabilities into the TLS baseline to increase signal processing capabilities for the against key near peer and emerging enemy threat signals. ***FY 2023 Plans:*** Continues, but is not limited to, development and evaluation of Next Generation SIGINT, EA and Cyber capabilities into the TLS BCT baseline to increase signal processing capabilities for the against key near peer and emerging enemy threat signals. ***FY 2022 to FY 2023 Increase/Decrease Statement:***	-	1.941	2.175

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Decrease due to anticipated maturity of development environment and shift of relevancy efforts to 6.7 RDTE line for post production efforts.			
Accomplishments/Planned Programs Subtotals	38.105	50.624	21.468

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• B97600: *TERRESTRIAL LAYER SYSTEMS (TLS)*	8.081	39.240	88.915	-	88.915	201.148	236.954	230.108	229.987	0.000	1,034.433
• 0604021A: *Electronic Warfare Technology Maturation (MIP)*	15.034	-	0.000	-	0.000	-	-	-	-	0.000	15.034

Remarks

D. Acquisition Strategy

A competitive acquisition approach is planned for TLS BCT development; it is a Middle Tier of Acquisition program. The TLS BCT 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 BCT program will leverage authorities to accelerate delivery through rapid prototyping with rapid fielding authorities or a Milestone C Decision Point.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) FJ5 / *Terrestrial Layer System*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical / Program Management	TBD	TBD : TBD	-	7.318	Feb 2021	9.216	Feb 2022	2.561	Feb 2023	-		2.561	Continuing	Continuing	-
		Subtotal	-	7.318		9.216		2.561		-		2.561	Continuing	Continuing	N/A

Remarks

Efforts include FFRDC support from Contract #W56KGU-18-D-0004 to continue developing and managing the Signals processing and compute environment as well as from competitive contract #W15P7T-10-D-D421 for Systems Engineering and Technical Assistance (SETA) support.

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Vehicle Integration and System Development	C/CPFF	Lockheed Martin : Syracuse, NY	-	28.036	Mar 2021	36.467	Apr 2022	12.666	Dec 2022	-		12.666	0.000	77.169	-
New signal threat integration and signal relevancy	C/CPFF	TBD : TBD	-	-		3.000	Jan 2022	2.175	Jan 2023	-		2.175	0.000	5.175	-
		Subtotal	-	28.036		39.467		14.841		-		14.841	0.000	82.344	N/A

Remarks

Competitive OTA #W15QKN-17-9-5555 for development and integration. FY2023 funding supports continued system development and integration on at least, but not limited to the Stryker vehicle platform, the AMPV vehicle platform and the IBCT vehicle platform that will enable TLS fielded systems to match vehicle platforms organic to the fielded unit.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Events	MIPR	ATEC : APG, MD	-	2.751	Mar 2021	1.941	Mar 2022	4.066	Mar 2023	-		4.066	0.000	8.758	-
		Subtotal	-	2.751		1.941		4.066		-		4.066	0.000	8.758	N/A

Remarks

FY2023 Test & Evaluation efforts will be accomplished via a combination of various support contracts and direct Government support.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0304270A / *Electronic Warfare Development*	Project (Number/Name) FJ5 / *Terrestrial Layer System*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	38.105		50.624		21.468		-		21.468	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System*

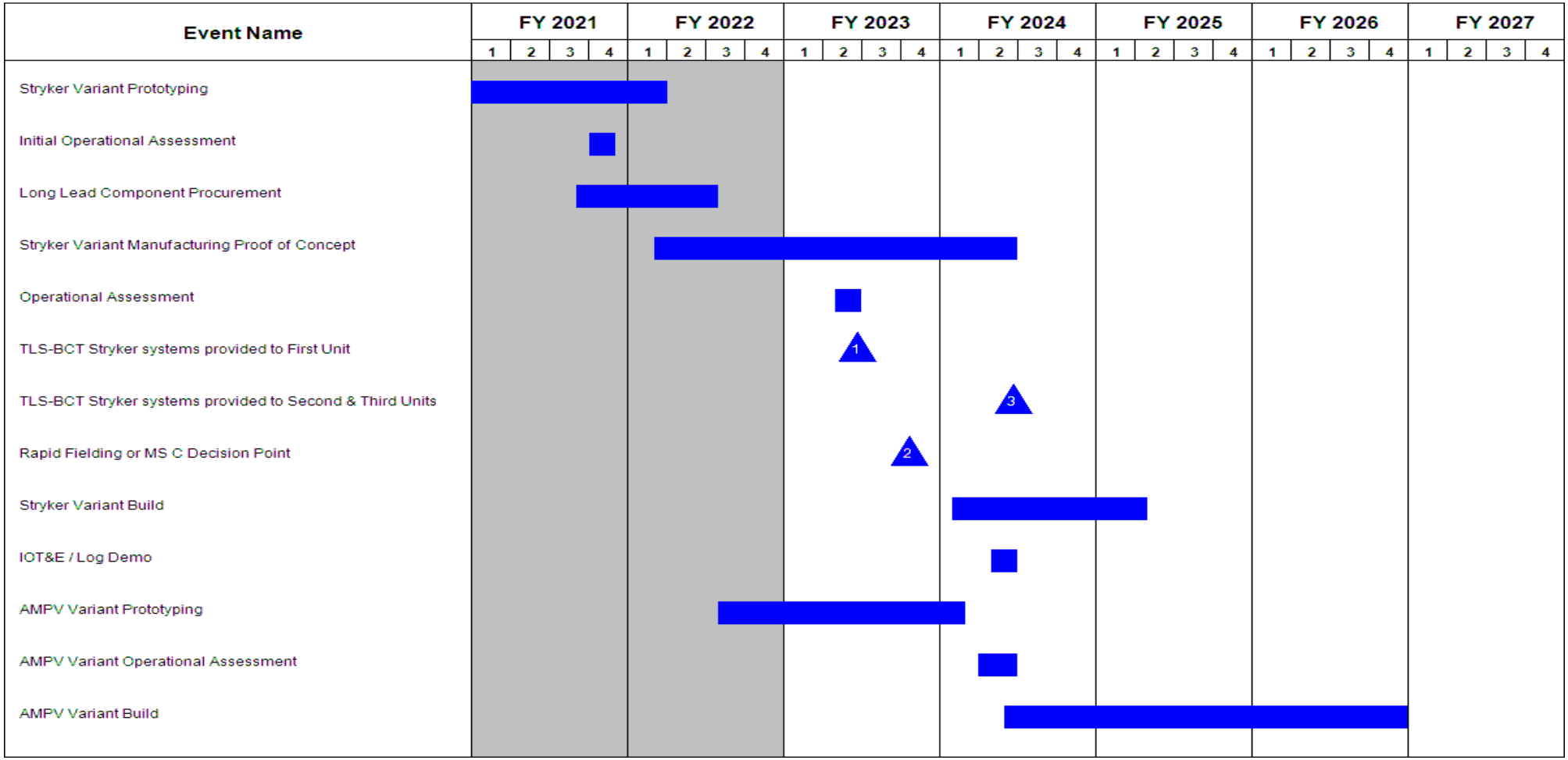

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System*

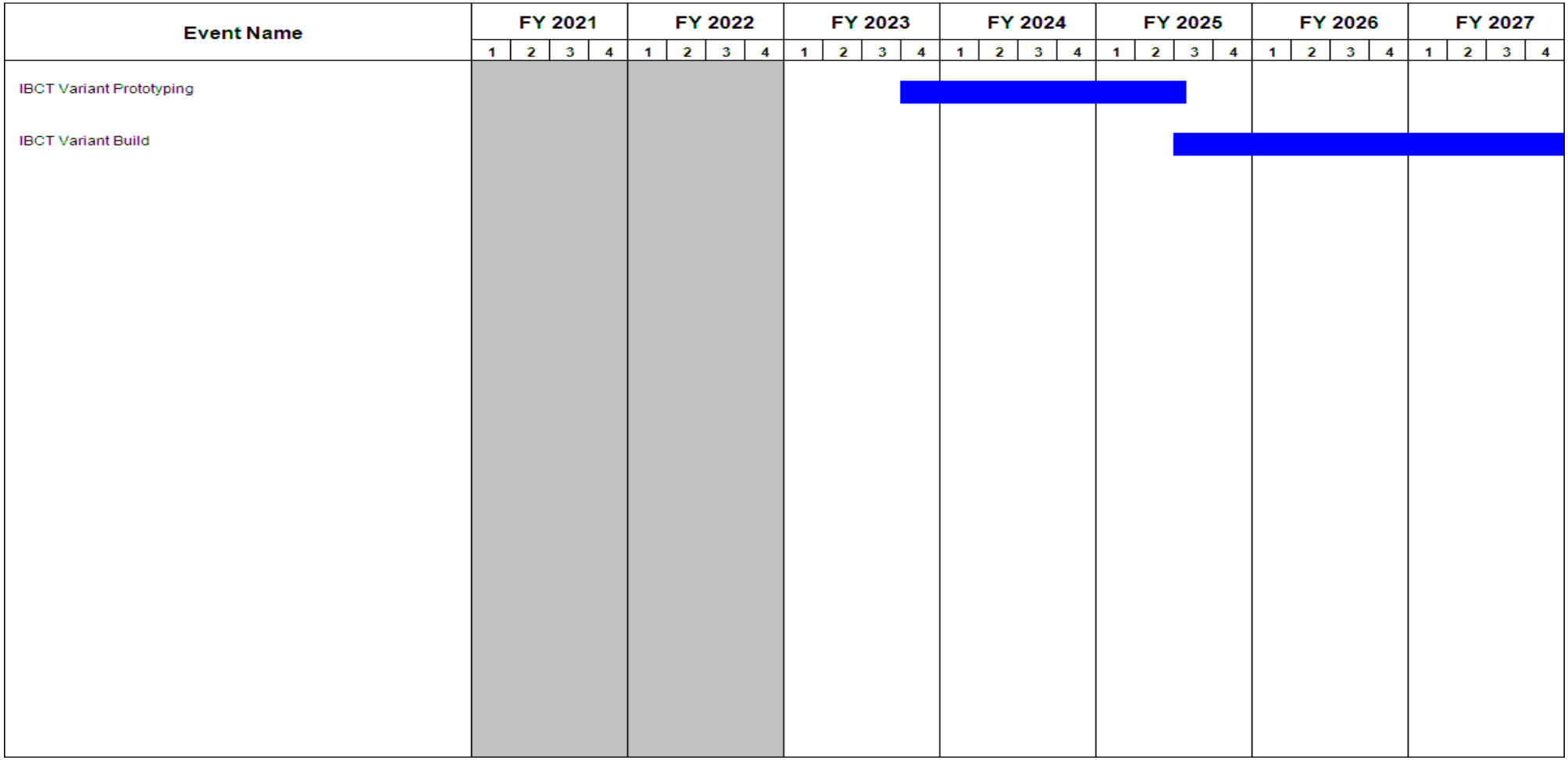

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0304270A / *Electronic Warfare Development*	**Project (Number/Name)** FJ5 / *Terrestrial Layer System*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Milestone A	2	2020	2	2020
Mid Tier Acquistion Approval	3	2020	3	2020
Stryker Variant Prototyping	3	2020	1	2022
Initial Operational Assessment	4	2021	4	2021
Long Lead Component Procurement	3	2021	3	2022
Stryker Variant Manufacturing Proof of Concept	1	2022	2	2024
Operational Assessment	2	2023	2	2023
TLS-BCT Stryker systems provided to First Unit	2	2023	2	2023
TLS-BCT Stryker systems provided to Second & Third Units	2	2024	2	2024
Rapid Fielding or MS C Decision Point	4	2023	4	2023
Stryker Variant Build	1	2024	2	2025
IOT&E / Log Demo	2	2024	2	2024
AMPV Variant Prototyping	3	2022	1	2024
AMPV Variant Operational Assessment	2	2024	2	2024
AMPV Variant Build	2	2024	4	2026
IBCT Variant Prototyping	4	2023	3	2025
IBCT Variant Build	3	2025	4	2027