Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army												Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0303142A *I SATCOM Ground Environment (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	-	18.002	15.247	-	15.247	-	-	-	-	-	-
253: *Dscs-Dcs (Phase II)*	-	-	4.212	4.105	-	4.105	-	-	-	-	-	-
456: *MILSATCOM System Engineering*	-	-	13.790	11.142	-	11.142	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project 253, Dscs-Dcs (Phase II), SATCOM Ground Environment (SPACE) supports the Army's Network Modernization Strategy Line of Effort (LOE) 1 - Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Fiscal Year 2022 (FY22) Base funding in the amount of $4.105 million develops Satellite Communication (SATCOM) ground subsystem equipment and software in support of Joint Chiefs of Staff (JCS) validated Mission Command Network and Systems requirements for the worldwide Defense Enterprise Wideband SATCOM System (DEWSS). DEWSS is composed of the Super High Frequency (SHF) Defense Satellite Communications System (DSCS) and Wideband Global SATCOM (WGS) programs, which are required to support legacy, interim and emerging communication space architectures and future force requirements. Expansion of the WGS constellation and upgrades to both DSCS and WGS are vital to support the Army's emerging power projection and rapid deployment role. DSCS and WGS provide multiple channels of tactical end-to-end connectivity and interoperability with strategic networks and national decision-makers, satisfying JCS network operations in support of the President, JCS, combatant commanders, military departments, Department of State and other government departments and agencies.

Project 456, MILSATCOM System Engineering supports the Army Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network Cross-Functional Team (N-CFT) capability set approach to achieve the network modernization strategy.

MILSATCOM System Engineering assures the tactical Army satellite communications (SATCOM) and SATCOM On-the-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM System Engineering shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM System Engineering represents the Army's tactical interests within Department of Defense (DoD), Commercial and International forums to ensure affordable and scalable future SATCOM capabilities for maneuver forces. These efforts ensure that the Army continues to evaluate evolving technologies for the planning and designing of SATCOM solutions that reduce technical and programmatic impacts. MILSATCOM System Engineering also provides the technical and programmatic expertise to facilitate the Unified Network Capabilities and Integration (UNCI) integration mission of transport convergence and integration of N-CFT emerging solutions within the Tactical Network portfolio as part of future Capability Sets. MILSATCOM SE provides the programmatic and technical expertise to coordinate the UNCI mission to align and integrate elements of the Tactical Network portfolio in support of the Expeditionary Signal Battalion (ESB) and Multi Domain Task Force (MDTF).

Project 456 also includes Protected Anti-jam Tactical SATCOM efforts, which fill a critical communications gap for anti-jam SATCOM capability for mobile ground forces conducting expeditionary operations in electronically contested environments. It provides the ability for the tactical Army to be resilient in a contested environment and

protect against catastrophic loss of situational awareness and command and control during critical battle movement. It will offer the tactical Army protection against interference that is either intentional or unintentional. These efforts are synchronized with the Space Force and DoD's plans for Protected Tactical Waveforms (PTW) on Wideband Global SATCOM (WGS), the Protected Tactical Satellite (PTS), and commercial SATCOM systems.

Protected Anti-jam Tactical SATCOM is a continuation of efforts previously funded under the MILSATCOM System Engineering (1203142A/FE2) and Protected Anti-jam Tactical SATCOM (1203142A/FI8) lines. MILSATCOM System Engineering supported development and testing of prototype PTW modems during the Protected Tactical Service Field Demo (PTSFD) in FY 2019. Protected Tactical Anti-jam SATCOM supported initial development, testing and certification of production representative PTW modems, incorporating Army specific requirements, to support continued spiral development of critical protected communications capabilities to address resiliency in jamming environments in FY 2020.

FY 2022 funding supports the systems engineering required to support technology maturation, systems analysis, experimentation and planning associated with Joint SATCOM development efforts. This line continues to fund the systems architecture and analysis for current and future SATCOM efforts in both wideband and protected satellite communications. It also funds system engineering efforts associated with the Protected Tactical Enterprise Service (PTES) program which will develop, test and enable the PTW modem over Wideband Global SATCOM (WGS) as well as Protected Tactical SATCOM (PTS), which is the next generation satellite constellation. Funding includes the Network Centric Waveform Tool (NCWT) development and testing and other efforts that have impacts on tactical Army use of military and commercial satellite constellations.

FY 2022 funding also supports continued collaborative development, testing and certification with Space Force of critical protected tactical capabilities.

MILSATCOM System Engineering (0303142A/456) funding is a realignment of funding from MILSACTOM System Engineering (1203142A/FE2) and Protected Anti-jam Tactical SATCOM (1203142A/FI8).

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	0.000	18.684	21.707	-	21.707
Current President's Budget	0.000	18.002	15.247	-	15.247
Total Adjustments	0.000	-0.682	-6.460	-	-6.460
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-0.682			
• Adjustments to Budget Years	-	-	-6.460	-	-6.460

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0303142A *I SATCOM Ground Environment (SPACE)*

Change Summary Explanation

In FY 2022, program funding was realigned for higher priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / *SATCOM Ground Environment (SPACE)*	Project (Number/Name) 253 / *Dscs-Dcs (Phase II)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
253: *Dscs-Dcs (Phase II)*	-	-	4.212	4.105	-	4.105	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

1203142A (FE1) - SATCOM Ground Environment (SPACE) funding has been realigned to 0303142A (253) - SATCOM Ground Environment (SPACE) in FY 2021 and out. This is not a new start.

A. Mission Description and Budget Item Justification

Project 253, Dscs-Dcs (Phase II), SATCOM Ground Environment (SPACE) supports the Army's Network Modernization Strategy Line of Effort (LOE) 1 - Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Fiscal Year 2022 (FY22) Base funding in the amount of $4.105 million develops Satellite Communication (SATCOM) ground subsystem equipment and software in support of Joint Chiefs of Staff (JCS) validated Mission Command Network and Systems requirements for the worldwide Defense Enterprise Wideband SATCOM System (DEWSS). DEWSS is composed of the Super High Frequency (SHF) Defense Satellite Communications System (DSCS) and Wideband Global SATCOM (WGS) programs, which are required to support legacy, interim and emerging communication space architectures and future force requirements. Expansion of the WGS constellation and upgrades to both DSCS and WGS are vital to support the Army's emerging power projection and rapid deployment role. DSCS and WGS provide multiple channels of tactical end-to-end connectivity and interoperability with strategic networks and national decision-makers, satisfying JCS network operations in support of the President, JCS, combatant commanders, military departments, Department of State and other government departments and agencies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: SATCOM Terminal Digital Intermediate Frequency Implementation Analysis	-	2.190	1.299
Description: SATCOM Terminal Digital Intermediate Frequency (IF) implementation analysis aimed at improving bandwidth efficiency of gateway terminals while providing an additional layer of resiliency through terminal redundancy. These analyses include various evaluations for digital terminal components to replace current, less efficient, analog components. These analyses also include assessment of terrestrial connectivity among SATCOM terminals to enable Continuity Of Operations (COOP) and failover scenarios required for resiliency.			
FY 2021 Plans: Continue to demonstrate SATCOM Gateway resiliency through path diversity; use SATCOM terminals at different geographical locations to support any SATCOM mission.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 253 / *Dscs-Dcs (Phase II)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Integrate Digital IF Solutions for the Interconnect Facility (ICF) Replacement into the Prototyping, Integration, Test, Training (PITT) facility at Tobyhanna Army Depot (TYAD). Perform technical assessments and Wideband Global SATCOM (WGS) delta certification tests. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease due to use of satellite and network simulators in lieu of satellite airtime procurement. Test equipment procured in FY21 will be used to conduct tests in FY22.			
Title: Electromagnetic Interference Mitigation Analysis ***Description:*** Continue to assess multiple interference mitigation/cancellation technologies for effectiveness in improving reliability/ resiliency of strategic and tactical communications. Mature technology to software/firmware that will improve protected SATCOM modem/terminal performance in a electro-magnetic interference contested environment. Technology will also improve terminal performance against adversary and friendly satellite link jamming resources. ***FY 2021 Plans:*** Continue to transition performance specifications to be implemented into next generation SATCOM modem. Mature and demonstrate gateway resiliency by using satellite links and terrestrial connectivity simultaneously to support SATCOM missions. ***FY 2022 Plans:*** Assess multiple interference mitigation/cancellation technologies for effectiveness in improving reliability/resiliency of strategic and tactical communications. Mature technology to software/firmware that will improve protected SATCOM modem/terminal performance in a electro-magnetic interference contested environment. Technology will also improve terminal performance against adversary and friendly satellite link jamming resources. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease since the Interference Cancellation development contract concludes in FY21. Remaining efforts will be focused on in house testing and analysis of alternatives.	-	2.022	1.495
Title: Low Earth Orbit (LEO)/Medium Earth Orbit (MEO) Satellite Service Integration ***Description:*** Investigate the availability of LEO/MEO Satellite Services in the commercial market place and assess their viability for use at Department of Defense (DoD) SATCOM gateways. ***FY 2022 Plans:***	-	-	1.311

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 253 / *Dscs-Dcs (Phase II)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Based on previously conducted studies and analyses, assess technology readiness for supporting DoD Gateway users in conjunction with Geosynchronous Earth Orbit (GEO) satellite services. Conduct analyses of alternatives and provide a recommendation on how to integrate these services into the DoD SATCOM Gateways. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Analysis of Alternatives will be required based on previously conducted market surveillance conducted in FY21. Multiple services will need to be integrated and assessed at Prototyping, Integration, Test, Training (PITT) Lab. This is not a new start.			
Accomplishments/Planned Programs Subtotals	-	4.212	4.105

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• BB8500: *Defense Enterprise Wideband Satcom Systems*	98.399	101.498	97.369	-	97.369	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

This finances Project Manager, Defense Communications and Army Transmission Systems (PM DCATS) netcentric systems engineering, modem risk mitigation, and risk management framework support. Funding provides for SATCOM terminal upgrades, enhancement of baseband throughput capabilities, technology insertion and upgrades which improves SATCOM gateway resiliency while allowing for full utilization of Wideband Global SATCOM (WGS) capabilities. Both the Wideband SATCOM Operational Management System (WSOMS) and the Enterprise Wideband SATCOM Terminal System (EWSTS) Capability Production Documents (CPDs) contain Netcentric-Ready Key Performance Parameters (NR-KPPs) as required by CJCSI 6212.01C. Netcentric efforts are required to facilitate the migration from the current trunk-based communications systems to Internet Protocol (IP) based systems and to engineer, test and integrate IP based capabilities into WSOMS and EWSTS systems. Studies, risk mitigation, system integration and advanced demonstrations for Netcentric baseband and policy based control will accommodate technology insertion, data sharing, remote operations, architecture efforts and use of commercial technology, thus ensuring the life of the Defense Enterprise Wideband Satellite System (DEWSS) terminal family beyond 2025 and reducing lifecycle costs and enterprise requirements on the WGS and Defense Satellite Communication System (DSCS) satellites in the future. Contracting approach for new technology is through the use of Broad Agency Announcements (BAA) and Other Transaction Authority (OTA) contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / *SATCOM Ground Environment (SPACE)*	Project (Number/Name) 253 / *Dscs-Dcs (Phase II)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SATCOM Terminal Digital IF Implementation Analysis	MIPR	Aberdeen Proving Ground : MD	-	-		1.885	Jan 2021	1.299	Jan 2021	-		1.299	Continuing	Continuing	Continuing
Electromagnetic Interference Mitigation Analysis	MIPR	Aberdeen Proving Ground : MD	-	-		1.666	Jan 2021	1.095	Jan 2021	-		1.095	Continuing	Continuing	Continuing
Low Earth Orbit/Medium Earth Orbit (LEO/MEO)	MIPR	Aberdeen Proving Ground : MD	-	-		-		1.116	Jan 2021	-		1.116	Continuing	Continuing	Continuing
		Subtotal	-	-		3.551		3.510		-		3.510	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
In-house Support	Allot	PdM WESS : Ft. Belvoir, VA	-	-		0.060		0.045		-		0.045	Continuing	Continuing	Continuing
Contractor Support	MIPR	ACC : Rock Island, IL	-	-		0.601	Jan 2021	0.550	Jan 2021	-		0.550	Continuing	Continuing	Continuing
		Subtotal	-	-		0.661		0.595		-		0.595	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		4.212		4.105		-		4.105	Continuing	Continuing	N/A

Remarks

SATCOM Terminal Digital Intermediate Frequency (IF) demonstrations with multi-vendor equipment will be conducted using live satellite links between Tobyhanna Army Depot (TYAD) and Joint SATCOM Engineering Center (JSEC) at Aberdeen Proving Grounds. All components demonstrated will be at Technology Readiness Level (TRL) 6.

Electromagnetic Interference Algorithms at TRL 6 will be hosted on a stand-alone hardware platform and tested at JSEC using live satellite links. All verified algorithms and performance specifications will transition to the Enterprise Digital IF Multi-Carrier (EDIM) modem program during 4Q FY 2021.

For the Low Earth Orbit/Medium Earth Orbit (LEO/MEO) effort, market surveillance of available services will be followed by Analyses of Alternatives. One or more options will be procured, integrated and tested at the Prototype Integration Test and Training (PITT) facility at Tobyhanna Army Depot.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 253 / *Dscs-Dcs (Phase II)*

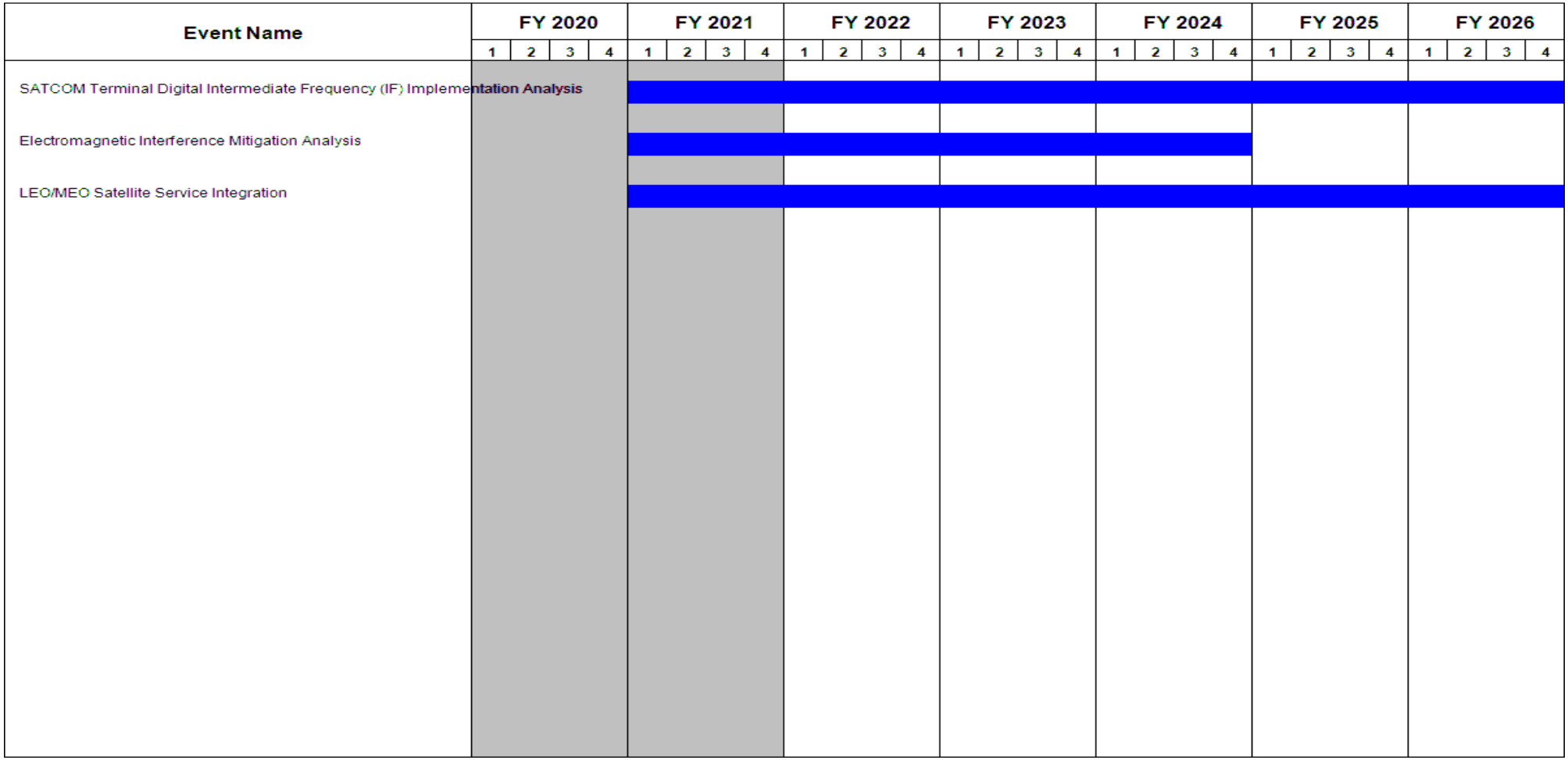

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 253 / *Dscs-Dcs (Phase II)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SATCOM Terminal Digital Intermediate Frequency (IF) Implementation Analysis	1	2021	4	2026
Electromagnetic Interference Mitigation Analysis	1	2021	4	2024
LEO/MEO Satellite Service Integration	1	2021	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army												Date: May 2021
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303142A / *SATCOM Ground Environment (SPACE)*				Project (Number/Name) 456 / *MILSATCOM System Engineering*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
456: *MILSATCOM System Engineering*	-	-	13.790	11.142	-	11.142	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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

MILSATCOM System Engineering assures the tactical Army satellite communications (SATCOM) and SATCOM On-the-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM System Engineering shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM System Engineering represents the Army's tactical interests within Department of Defense (DoD), Commercial and International forums to ensure affordable and scalable future SATCOM capabilities for maneuver forces. These efforts ensure that the Army continues to evaluate evolving technologies for the planning and designing of SATCOM solutions that reduce technical and programmatic impacts. MILSATCOM System Engineering also provides the technical and programmatic expertise to facilitate the Unified Network Capabilities and Integration (UNCI) integration mission of transport convergence and integration of N-CFT emerging solutions within the Tactical Network portfolio as part of future Capability Sets. MILSATCOM SE provides the programmatic and technical expertise to coordinate the UNCI mission to align and integrate elements of the Tactical Network portfolio in support of the Expeditionary Signal Battalion (ESB) and Multi Domain Task Force (MDTF).

MILSATCOM System Engineering includes Protected Anti-jam Tactical SATCOM efforts, which fill a critical communications gap for anti-jam SATCOM capability for mobile ground forces conducting expeditionary operations in electronically contested environments. It provides the ability for the tactical Army to be resilient in a contested environment and protect against catastrophic loss of situational awareness and command and control during critical battle movement. It will offer the tactical Army protection against interference that is either intentional or unintentional. These efforts are synchronized with Space Force and DoD's plans for Protected Tactical Waveforms (PTW) on Wideband Global SATCOM (WGS), the Protected Tactical Satellite (PTS), and commercial SATCOM systems.

Protected Anti-jam Tactical SATCOM is a continuation of efforts previously funded under the MILSATCOM System Engineering (1203142A/FE2) and Protected Anti-jam Tactical SATCOM (1203142A/FI8) lines. MILSATCOM System Engineering supported development and testing of prototype PTW modems during the Protected Tactical Service Field Demo (PTSFD) in FY 2019. Protected Tactical Anti-jam SATCOM supported initial development, testing and certification of production representative PTW modems, incorporating Army specific requirements, to support continued spiral development of critical protected communications capabilities to address resiliency in jamming environments in FY 2020.

FY 2022 funding supports the systems engineering required to support technology maturation, systems analysis, experimentation and planning associated with Joint SATCOM development efforts. This line continues to fund the systems architecture and analysis for current and future SATCOM efforts in both wideband and protected satellite communications. It also funds the system engineering efforts associated with the Protected Tactical Enterprise Service (PTES) program, which will develop,

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 456 / *MILSATCOM System Engineering*

test, and enable PTW communications over Wideband Global SATCOM (WGS) as well as Protected Tactical SATCOM (PTS), which is the next generation satellite constellation.

FY 2022 funding also supports continued collaborative development, testing and certification with Space Force of critical protected tactical capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Protected communications system engineering and WGS communications	-	0.896	0.752
Description: Provides systems engineering support relating to the technology maturation, development and planning associated with joint SATCOM development efforts including Network Centric Waveform Tool (NCW-T), Protected Tactical Enterprise Service (PTES) and Protected Tactical SATCOM (PTS). ***FY 2021 Plans:*** Funding supports continued systems engineering and analysis for Protected Communications and WGS Communications, as well as development and technology maturation of NCW-T. ***FY 2022 Plans:*** Funding supports continued systems engineering and analysis for Protected Communications and WGS Communications, as well as development and technology maturation of NCW-T. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** $0.144 million reduction in system engineering support for Protected and WGS communications were realigned for higher priorities.			
Title: Systems architecture and analysis support	-	1.997	1.598
Description: Provides systems engineering support relating to the architecture and analysis of NCWT and the collaborative SATCOM, PTES, and PTS efforts as well as other efforts, such as research, analysis, technical engineering and integration services for bandwidth studies, and future technology insertions, that have impact on tactical Army use of military and commercial satellite constellations and integration of enabling technologies. These efforts have direct impact in reducing technical and programmatic risk for the acquisition efforts for tactical Army SATCOM systems using the WGS, commercial and military (Protected Tactical Satellites) constellations. ***FY 2021 Plans:*** Funding supports continued in house engineering support, contractor support and system architecture and analysis. ***FY 2022 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 456 / *MILSATCOM System Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Funding supports continued in house engineering support, contractor support, and system architecture and analysis. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** $0.399 million reductions in system engineering support relating to architecture and analysis of NCWT and joint DoD SATCOM efforts (including PTES and PTS efforts) were realigned for higher priorities.			
Title: Testing and certification of critical SATCOM and SATCOM On-the-Move communication and network technologies ***Description:*** Provides testing and certification of the critical SATCOM and SATCOM On-the-Move (SOTM) communication and network technologies. ***FY 2021 Plans:*** Funding supports continued testing and certification of critical SATCOM and SOTM communication and network technologies. ***FY 2022 Plans:*** Funding supports continued testing and certification of critical SATCOM and SATCOM On-the-Move communication and network technologies. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** $0.010 million increase due to minor scope adjustments for testing and certification of critical SATCOM and SOTM communications and network technologies.	-	0.425	0.435
Title: Protected Tactical Waveform (PTW) Modem Development and Testing ***Description:*** Development of large form factor and small form factor Protected Tactical Waveform (PTW) modems incorporating Army specific requirements. ***FY 2021 Plans:*** Funding supports the development and engineering of Army specific requirements for the PTW modem that will be utilized for protected tactical communications. ***FY 2022 Plans:*** Funding supports development and engineering of Army specific requirements for the PTW modem that will be utilized for protected tactical communications. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** $2.115 million reduction in development and engineering of PTW-capable modems in collaboration with USSF PATS program were realigned for higher priorities.	-	10.472	8.357
Accomplishments/Planned Programs Subtotals	-	13.790	11.142

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 456 / *MILSATCOM System Engineering*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

In FY 2021 funding was realigned from PE 1203142A / FE2 and 1203142A / FI8 to PE 0303142A / 456 line.

D. Acquisition Strategy

MILSATCOM System Engineering provides advanced systems engineering, research, development, test, evaluation (RDTE) and integration of new and emerging technologies to optimize terminal performance and communications control. Once the technologies are mature and deemed feasible, funding and management responsibility for implementation and integration of the technology will transition to PM Tactical Network and related Programs of Record.

Additionally, MILSATCOM System Engineering will provide RDTE of emerging protected SATCOM technologies to provide resilience and anti-jam protection against electronic warfare (EW), to include denial of geolocation transmissions, secure classified communications in a jamming environment, and a Protected Tactical Waveform (PTW). The program will leverage contracts established by Space Force beginning in FY 2020.

FY 2022 contract award will support the continued development, testing, experimentation and certification of a production representative large form factor PTW modem. Early development of PTW modems will enable Army preparedness to meet the Space Force's Protected Tactical Enterprise Service (PTES) Initial Operational Capability (IOC) planned for 1Q FY 2024.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / *SATCOM Ground Environment (SPACE)*	Project (Number/Name) 456 / *MILSATCOM System Engineering*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Protected Communications and WGS Communications	TBD	Various : APG, MD	-	-		0.896	Apr 2021	0.752	Apr 2022	-		0.752	0.000	1.648	-
Protected Tactical Waveform (PTW) Modem Development	C/IDDQ	To Be Determined : To Be Determined	-	-		9.289	Apr 2021	7.710	Mar 2022	-		7.710	0.000	16.999	-
		Subtotal	-	-		10.185		8.462		-		8.462	0.000	18.647	N/A

Remarks

New contract award for Protected and WGS Communications development anticipated in Apr 2021.

Leveraging Space Force competitive Indefinite Delivery Indefinite Quantity (IDIQ) contracts to support PTW modem development, engineering, and testing.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering (In House)	MIPR	PM WIN-T : APG, MD	-	-		1.766	Dec 2020	0.647	Dec 2021	-		0.647	0.000	2.413	-
Engineering Contractor Support	C/CPFF	PM WIN-T : APG, MD	-	-		1.143	Jan 2021	1.598	Dec 2021	-		1.598	0.000	2.741	-
System Architecture and Analysis	MIPR	CERDEC : APG, MD	-	-		0.177	Sep 2021	-		-		-	0.000	0.177	-
		Subtotal	-	-		3.086		2.245		-		2.245	0.000	5.331	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support	MIPR	CERDEC : APG, MD	-	-		0.519	Aug 2021	0.435	Dec 2021	-		0.435	0.000	0.954	-
		Subtotal	-	-		0.519		0.435		-		0.435	0.000	0.954	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / *SATCOM Ground Environment (SPACE)*	Project (Number/Name) 456 / *MILSATCOM System Engineering*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		13.790		11.142		-		11.142	0.000	24.932	N/A

Remarks

FY 2021 funding is a realignment from MILSATCOM System Engineering (1203142A/FE2) and Protected Anti-jam Tactical SATCOM (1203142A/FI8).

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 456 / *MILSATCOM System Engineering*

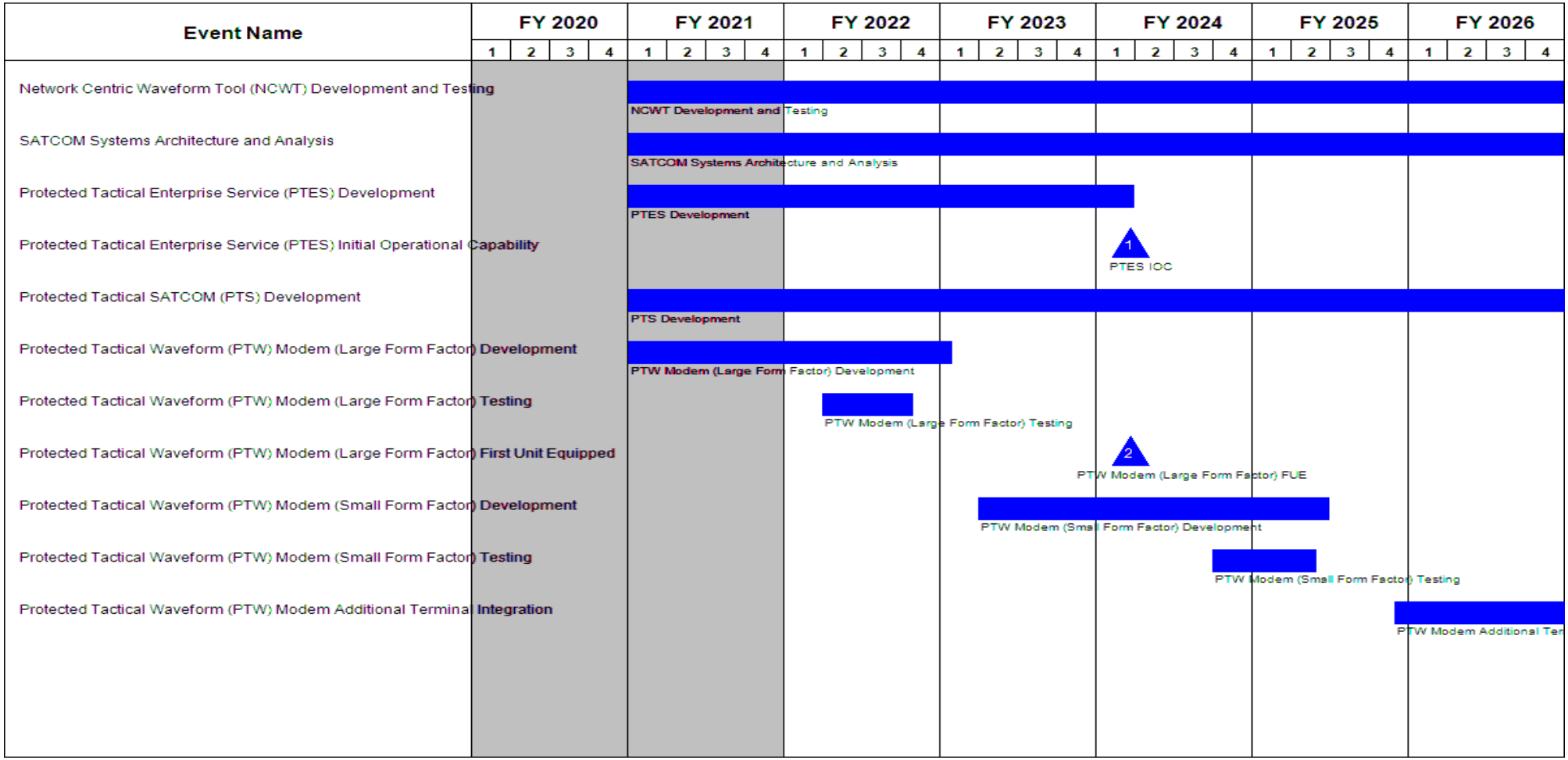

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0303142A / *SATCOM Ground Environment (SPACE)*	**Project (Number/Name)** 456 / *MILSATCOM System Engineering*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Network Centric Waveform Tool (NCWT) Development and Testing	1	2021	4	2026
SATCOM Systems Architecture and Analysis	1	2021	4	2026
Protected Tactical Enterprise Service (PTES) Development	1	2021	1	2024
Protected Tactical Enterprise Service (PTES) Initial Operational Capability	1	2024	1	2024
Protected Tactical SATCOM (PTS) Development	1	2021	4	2028
Protected Tactical Waveform (PTW) Modem (Large Form Factor) Development	1	2021	1	2023
Protected Tactical Waveform (PTW) Modem (Large Form Factor) Testing	2	2022	4	2022
Protected Tactical Waveform (PTW) Modem (Large Form Factor) First Unit Equipped	1	2024	1	2024
Protected Tactical Waveform (PTW) Modem (Small Form Factor) Development	2	2023	2	2025
Protected Tactical Waveform (PTW) Modem (Small Form Factor) Testing	4	2024	2	2025
Protected Tactical Waveform (PTW) Modem Additional Terminal Integration	4	2025	4	2027