

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army **Date:** May 2021

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 1203142A / <i>SATCOM Ground Environment (SPACE)</i>							
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	-	32.764	-	-	-	-	-	-	-	-	-	-
FE1: <i>Dscs-Dcs (Phase II)</i>	-	4.085	-	-	-	-	-	-	-	-	-	-
FE2: <i>MILSATCOM System Engineering</i>	-	4.178	-	-	-	-	-	-	-	-	-	-
FI8: <i>Protected Anti-JAM Tactical SATCOM</i>	-	24.501	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The SATCOM Ground Environment (SPACE) funding line supports the Army's Network Modernization Strategy Line Of Effort (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.

FE1: Defense Satellite Communications System (DSCS)/Digital Communications System (DCS) (Phase II):

This project develops Satellite Communication (SATCOM) ground subsystem equipment and software in support of Joint Chiefs of Staff (JCS) validated Mission Command Network and Systems (MCNS) 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.

FE2: Military Satellite Communications (MILSATCOM) System Engineering (SE):

Military Satellite Communications (MILSATCOM) System Engineering (SE) assures that tactical Army Satellite Communications (SATCOM) and SATCOM On-The-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM SE shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM SE represents the Army's tactical interests within DoD, Commercial & 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, development new and emerging S&T projects in conjunction with the N-CFT, and integration of these solutions within the Tactical Network portfolio as part of future Capability Sets. MILSATCOM SE also 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) missions.

Program funding has been realigned to MILSATCOM System Engineering (0303142A/456) beginning in FY 2021.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
---	-----------------------

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203142A / <i>SATCOM Ground Environment (SPACE)</i>
---	--

FE4 / Enroute Mission Command:

Mission Description and Budget Item Justification:

Enroute Mission Command (EMC) supports the Global Response Force (GRF) and other Army units with the requirement to conduct Airborne forced entry operations with the ability to conduct mission command, to include mission planning and rehearsal, while enroute on board US Air Force Air Mobility Command (AMC) aircraft. EMC provides a modernization to enroute communications to enable broadband reach-back data capability utilizing military or commercial networks with adequate bandwidth support required by Mission Command and Intelligence applications. EMC will provide commanders with the ability to obtain and share near real-time information regarding intelligence, situational awareness and command and control information while enroute to their objective. The ability to adjust plans and strategize utilizing the latest Intel data will give the GRF the information dominance needed to execute their mission once they arrive at their objective.

Due to rephasing of FY 2017 OPA funding into FY 2018/2019, program was restructured in Dec 2015. MDA addressed schedule issues (Oct 2016) by authorizing to field a Ku FISA FOC (4QFY17) and complete a Modification Word Order (MWO), adding Ka FISA capability, post Ku FISA FOC.

F18: Protected Anti-jam Tactical SATCOM (Protected SATCOM) will fill a critical protected 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 potentially 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. The effort includes development of a critical Protected Tactical Waveform (PTW) modem which will be integrated into Army tactical SATCOM terminals to provide higher throughputs, protection (anti-jam) against Electronic Warfare (EW), and resiliency in a contested environment; development of a dual small form factor modem that can run the PTW and the current Network Centric Waveform (NCW) to Army tactical wideband SATCOM terminals at Expeditionary Signal Battalions - Enhanced (ESB-Es), Corps, Division, and Brigade Combat Teams; and development, testing and certification of the NCW - Resilient waveform, which serves as a bridging solution to the PTW. The PTW efforts are synchronized with the Air Force and DoD's plans for PTW on Wideband Global SATCOM (WGS) the Protected Tactical Satellite (PTS), and commercial SATCOM systems.

Program funding has been realigned to MILSATCOM System Engineering (0303142A/456) beginning in FY 2021 to support Protected Anti-jam Tactical SATCOM development, engineering, test and evaluation.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	34.169	0.000	0.000	-	0.000
Current President's Budget	32.764	0.000	0.000	-	0.000
Total Adjustments	-1.405	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.405	-			

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE1 / 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
FE1: Dscs-Dcs (Phase II)	-	4.085	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project FE1, Defense Satellite Communications System - Digital Communications System (DSCS-DCS) 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.

This project 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 (IF) Implementation Analysis	2.536	-	-
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.			
Title: Electromagnetic Interference Mitigation Analysis	1.549	-	-
Description: 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.			
Accomplishments/Planned Programs Subtotals	4.085	-	-

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE1 / Dscs-Dcs (Phase II)
--	---	---

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BB8500: <i>Defense Enterprise Wideband Satcom Systems</i>	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.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 7				PE 1203142A / SATCOM Ground Environment (SPACE)				FE1 / Dscs-Dcs (Phase II)								
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	0.194		-		-		-		-	0.000	0.194	-	
Subtotal			-	0.194		-		-		-		-	0.000	0.194	N/A	
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SATCOM Terminal Digital IF Implementation Analysis	MIPR	TBD : APG, MD	4.730	1.595		-		-		-		-	Continuing	Continuing	Continuing	
Electromagnetic Interference Mitigation Analysis	MIPR	TBD : APG, MD	3.202	1.786		-		-		-		-	Continuing	Continuing	Continuing	
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	0.155	-		-		-		-		-	0.000	0.155	-	
Subtotal			8.087	3.381		-		-		-		-	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
In-house Support	Allot	PdM WESS : Ft. Belvoir, VA	1.653	0.006		-		-		-		-	Continuing	Continuing	Continuing	
Contractor Support	C/CPPF	ACC, MD : APG, MD	0.864	0.504	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing	
Subtotal			2.517	0.510		-		-		-		-	Continuing	Continuing	N/A	
Project Cost Totals			10.604	4.085		0.000		-		-		-	Continuing	Continuing	N/A	
Remarks																

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)		Project (Number/Name) FE1 / Dscs-Dcs (Phase II)	

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
SATCOM Terminal Digital IF Implementation Analysis	[Redacted]																											
Electromagnetic Interference Mitigation Analysis	[Redacted]																											
	[Redacted]																											

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE1 / Dscs-Dcs (Phase II)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
SATCOM Terminal Digital IF Implementation Analysis	1	2019	4	2025
Electromagnetic Interference Mitigation Analysis	1	2019	4	2025

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)				Project (Number/Name) FE2 / 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
FE2: MILSATCOM System Engineering	-	4.178	-	-	-	-	-	-	-	-	-	-
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.

FE2: Military Satellite Communications (MILSATCOM) System Engineering (SE) assures that tactical Army Satellite Communications (SATCOM) and SATCOM On-The-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM SE shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM SE represents the Army's tactical interests within DoD, Commercial & 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, developing new and emerging S&T projects in conjunction with the N-CFT, and integration of these solutions within the Tactical Network portfolio as part of future Capability Sets. MILSATCOM SE also 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) missions.

FY 2019-2020 funds the systems engineering required to support technology maturation, systems analysis, and planning associated with joint SATCOM development efforts including complying with the implementation of the recommendations from the Protected SATCOM Communications Systems (PSCS) Analysis of Alternatives (AoA). This line continues to fund the systems architecture and analysis for current and future SATCOM efforts in both wideband and protected satellite communications. This effort includes collaborative work with the Air Force on the prototype Protected Tactical Service Field Demo (PTSFD) development and associated modem testing.

In addition, FY 2019-2020 funding covers the Narrowband Mobile User Objective System (MUOS) follow-on study efforts, Network Centric Waveform Tool (NCWT) Development and Testing and other efforts that have impact on tactical Army use of military and commercial satellite constellations. These efforts have a direct impact in reducing technical and programmatic risk for the acquisition efforts for tactical Army SATCOM systems using these constellations.

FY 2021 funding was realigned to 0303142A - SATCOM Ground Environment (SPACE) / 456 - MILSATCOM System Engineering.

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

	FY 2020	FY 2021	FY 2022
Title: Protected Communications System Engineering and WGS Communications	1.128	-	-

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE2 / MILSATCOM System Engineering

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Systems engineering support relating to the technology maturation, development and planning associated with joint SATCOM development efforts including Network Centric Waveform Tool (NCWT), Protected Tactical Service Field Demo (PTSFD) and the implementation of the recommendations from the Protected SATCOM Communications Systems (PSCS) Analysis of Alternatives (AoA).</p> <p>Title: Systems Architecture and Analysis Support</p> <p>Description: Systems engineering support relating to the architecture and analysis of the Network Centric Waveform Tool (NCWT) and the collaborative SATCOM development Protected Tactical Service Field Demo (PTSFD) effort as well as other efforts, such as research, analysis, technical engineering and integration services for Analysis of Alternatives 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 a 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.</p>	2.507	-	-
<p>Title: Testing and certification of critical SATCOM and Satellite-On-The-Move (SOTM) communication and network technologies</p> <p>Description: Testing and certification of the prototype Protected Tactical Service Field Demo modem.</p>	0.543	-	-
Accomplishments/Planned Programs Subtotals	4.178	-	-

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

Remarks
FY 2017 and prior funding was aligned to 0303142A/456.

FY 2021 and future funding is realigned to 0303142A/456.

D. Acquisition Strategy
This project funds advanced systems engineering, research, development, test and evaluation, 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.

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE2 / MILSATCOM System Engineering
--	---	--

Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Protected Communications and WGS Communications SE	TBD	Various : APG, MD	1.802	1.128	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing
Subtotal			1.802	1.128		-		-		-		-	Continuing	Continuing	N/A

Remarks
FY 2019 funding was reduced by \$161K to support FY 2019 SBIR/STTR funds transfers.

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering (In House)	MIPR	PM WIN-T : APG, MD	1.848	1.151	Sep 2020	-		-		-		-	Continuing	Continuing	-
Engineering Contractors Support	C/CPFF	PM WIN-T : APG, MD	1.826	1.137	Mar 2020	-		-		-		-	Continuing	Continuing	-
System Architecture & Analysis	Various	CERDEC : APG, MD	0.348	0.218	Apr 2020	-		-		-		-	Continuing	Continuing	-
Subtotal			4.022	2.506		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Terminal Testing and Evaluation System Engineering	FFRDC	PEO C3T : TBD	0.304	0.193	Dec 2019	-		-		-		-	0.000	0.497	-
Test Support	MIPR	Matrix : APG, MD	0.248	0.158	Apr 2020	-		-		-		-	0.000	0.406	-
Testing, Certification	MIPR	TBD : APG, MD	0.305	0.193	Jul 2020	-		-		-		-	0.000	0.498	-
Subtotal			0.857	0.544		-		-		-		-	0.000	1.401	N/A

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)				Project (Number/Name) FE2 / 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	6.681	4.178	0.000		-	-	-	Continuing	Continuing	N/A	

Remarks
 FY 2019 funding was reduced by \$161K to support FY 2019 SBIR/STTR funds transfers.

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE2 / MILSATCOM System Engineering

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
Protected Tactical Service Field Demo Modem Testing	[Redacted]				[Redacted]																							
	PTSFD Modem Testing																											
Narrowband (MUOS) Follow-on Studies	[Redacted]				[Redacted]																							
	Narrowband (MUOS) Follow-on Studies																											
Protected Tactical Service Field Demo	[Redacted]				[Redacted]																							
	PTSFD																											
NCW Tool Development and Testing	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
	NCW Tool Dev and Testing																											
SATCOM Systems Architecture & Analysis	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
	SATCOM Systems Architecture and Analysis																											

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE2 / MILSATCOM System Engineering

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Wideband AoA	4	2016	2	2018
Protected Tactical Service Field Demo Modem Testing	1	2018	4	2020
Narrowband (MUOS) Follow-on Studies	3	2019	4	2021
Protected Tactical Service Field Demo	4	2015	2	2021
NCW Tool Development and Testing	1	2015	4	2025
SATCOM Systems Architecture & Analysis	1	2018	4	2025

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)				Project (Number/Name) F18 / Protected Anti-JAM Tactical SATCOM			
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
F18: Protected Anti-JAM Tactical SATCOM	-	24.501	-	-	-	-	-	-	-	-	-	-
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 capability set approach to achieve the network modernization strategy.

F18: Protected Anti-jam Tactical SATCOM (Protected SATCOM) will fill a critical protected 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 potentially 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. The effort includes development of a critical Protected Tactical Waveform (PTW) modem which will be integrated into Army tactical SATCOM terminals to provide higher throughputs, protection (anti-jam) against Electronic Warfare (EW), and resiliency in a contested environment; development of a dual small form factor modem that can run the PTW and the current Network Centric Waveform (NCW) to Army tactical wideband SATCOM terminals at Expeditionary Signal Battalions - Enhanced (ESB-Es), Corps, Division, and Brigade Combat Teams. The PTW efforts are synchronized with the Air Force and DoD's plans for PTW on Wideband Global SATCOM (WGS), the Protected Tactical Satellite (PTS), and commercial SATCOM systems.

FY 2020 funds will continue collaborative development, testing and certification with the US Air Force and Navy of a PTW modem and a Protected Tactical Satellite (PTS). The prototype of a protected modem and protected satellite were previously funded under the FE2 MILSATCOM Systems Engineering during the Protected Tactical Service Field Demo (PTSFD). The PTW modem and the accompanying satellite constellation continue the spiral development of critical protected communications capabilities. The funding on F18 Protected SATCOM incorporates the Army specific requirements to be included in these efforts.

FY 2020 funds will support NCW-Resilient (NCW-R) software development, which serves as a bridging solution to PTW. The NCW-R software will increase resiliency of currently fielded NCW across Army SATCOM terminals which address critical protected communications gap for anti-jam SATCOM capability in electronically contested environments until PTW reaches FOC in FY33.

FY 2021 funding was realigned to 0303142A - SATCOM Ground Environment (SPACE) / 456 - MILSATCOM System Engineering to support Protected Anti-jam Tactical SATCOM development, engineering, test and evaluation.

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

	FY 2020	FY 2021	FY 2022
Title: Protected Tactical Waveform Modem Development	13.901	-	-
Description: Development of Protected Tactical Waveform modem incorporating tactical Army specific requirements.			

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) F18 / Protected Anti-JAM Tactical SATCOM

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: NCW-R Development Description: Development effort to provide bridging solution for Protected Anti-jam Tactical SATCOM. Software development to increase resiliency of fielded NCW waveforms and modems.	5.407	-	-
Title: COVID-19 Relief Description: Funding provided for COVID-19 relief efforts.	5.193	-	-
Accomplishments/Planned Programs Subtotals	24.501	-	-

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

N/A

Remarks

D. Acquisition Strategy

This project funds advanced systems engineering, research, development, test and evaluation of emerging protected Satellite Communications technologies to provide resilience and anti-jam protection against Electronic Warfare (EW). The program will leverage contracts established by the Air Force for the development of Protected Tactical Waveform (PTW) modems, including development of a dual small form factor modem capable of running the PTW and Network Centric Waveform - Resilient (NCW-R), beginning in FY2020. Production and Fielding of the PTW modems will begin in FY2023 under the Protected Anti-JAM Tactical SATCOM procurement line (B34002).

This project also funds the development and testing of NCW-R software as a bridging solution to PTW. Funding supports the completion of development activities on existing contracts by 4QFY21, with software deployment beginning in 1QFY22.

Program funding was realigned to MILSATCOM System Engineering (0303142A/456) beginning in FY2021 to support Protected Anti-jam Tactical SATCOM development, engineering, test and evaluation.

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) F18 / Protected Anti-JAM Tactical SATCOM
--	---	--

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
COVID-19 Relief	TBD	PEO C3T : TBD	-	5.193		-		-		-		-	0.000	5.193	-
Subtotal			-	5.193		-		-		-		-	0.000	5.193	N/A

Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Protected Tactical Waveform Modem Development	C/IDIQ	Various : Various	-	13.901	Mar 2020	-		-		-		-	0.000	13.901	Continuing
NCW-R Development	SS/CPFF	PM WIN-T : Various	-	5.407	Aug 2020	-		-		-		-	0.000	5.407	-
Subtotal			-	19.308		-		-		-		-	0.000	19.308	N/A

Remarks
 Protected Tactical Satellite Development (\$3,565K): Activity was not funded from this line in FY20. \$3,565K was realigned to support PTW Modem development.





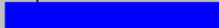
 AEHF Protected SATCOM Terminal Prototype Development (\$10,600K): Activity was not executed due to lack of requirements documentation. \$5,407K re-allocated to provide funds for NCW-R Development. \$5,193K re-allocated to provide funds for COVID-19 relief.

	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	-	24.501	0.000	-	-	-	0.000	24.501	N/A

Remarks
 Program funding was realigned to 0303142A - SATCOM Ground Environment (SPACE) / 456 - MILSATCOM System Engineering to support Protected Anti-jam Tactical SATCOM development, engineering, test and evaluation beginning in FY2021.

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) F18 / Protected Anti-JAM Tactical SATCOM

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026											
	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								
Protected Tactical Waveform (PTW) Modem Development																																				
	<i>PTW Modem Development</i>																																			
Protected Tactical Waveform (PTW) Modem Testing																																				
																	<i>PTW Modem Testing</i>																			
Protected Tactical Waveform (PTW) Production Decision																																				
																	<i>PTW Production Decision</i>																			
Army Dual Waveform Modem Development																																				
																					<i>Army Dual Waveform Development</i>															
NCW-R Software Development																																				
					<i>NCW-R Software Development</i>																															

UNCLASSIFIED

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 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) F18 / Protected Anti-JAM Tactical SATCOM

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Protected Tactical Waveform (PTW) Modem Development	2	2020	1	2023
Protected Tactical Waveform (PTW) Modem Testing	1	2022	3	2022
Protected Tactical Waveform (PTW) Production Decision	4	2022	4	2022
Army Dual Waveform Modem Development	2	2023	4	2025
NCW-R Software Development	4	2020	4	2021

Note

PTW Modem Development dates updated based on current contract periods of performance from Mar 2020 - Oct 2022.

PTW Modem Test activities are scheduled to begin 2QFY22 through 4QFY22 to support a production decision in 4QFY22/1QFY23.

Protected Tactical Satellite (PTS) development activities were not funded under this line.

AEHF Development activities were not executed due to lack of requirements documentation.

NCW-R Development activities aligned with period of performance from Aug 2020 to Aug 2021.