Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force											Date: April 2022	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206433SF *I Wideband Global SATCOM (SPACE)*							
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	-	0.000	0.000	48.438	0.000	48.438	49.549	0.000	0.000	0.000	Continuing	Continuing
657107: *WGS Space Systems Resiliency Upgrade*	-	0.000	0.000	48.438	0.000	48.438	49.549	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 1206433SF, project 657107, WGS 11+ Beam Optimization & Operational Management (BOOM), is a new start.

A. Mission Description and Budget Item Justification

The Wideband Global SATCOM (WGS) System provides the DoD with high data rate military satellite communication (MILSATCOM) services in accordance with the Joint Space Management Board-approved MILSATCOM architecture (August 1996), the Joint Requirements Oversight Council (JROC)-approved MILSATCOM Capstone Requirements Document (October 1997), and JROC-approved WGS Operational Requirements Document (May 2000). This program was originally conceived to augment the near-term "bandwidth gap" in warfighter communications needs. Dual-frequency WGS satellites augment, then replace the DoD's Defense Satellite Communications System X-band service and augment one-way Global Broadcast Service Ka-band capabilities. In addition, WGS provides a high capacity two-way Ka-band Service.

WGS Block I consists of satellites 1-3, Block II consists of satellites 4-6 and Block II Follow-on (B2FO) includes satellites 7-10 and WGS 11+. WGS satellites 1-10 have been funded, procured and launched in previous budget cycles.

In the Consolidated Appropriations Act, FY 2018, Congress added $600.0M SPAF in FY 2018 for "full funding for WGS 11 and 12." A sole source Request for Proposal was released to Boeing in June 2018. A final decision was made to procure a single satellite (WGS 11+) with twice the operational capacity of WGS 10 as the best approach to delivering the directed additional WGS capacity in a cost effective manner. Total WGS 11+ 3021/3022 funds are $670.859M.

International Partners (IPs) receive constellation-wide WGS resources commensurate with their financial contributions to the WGS system. Investment from IPs to cooperatively enhance the system started in November 2007 through a bilateral Memorandum of Understanding (MOU) with Australia to fund WGS space vehicle (SV)-6, launch and launch services. Five countries (Canada, Denmark, Netherlands, Luxembourg, New Zealand) signed a new multilateral WGS MOU in 2012 and funded the procurement of WGS SV-9. In 2017, Amendment One to the WGS MOU leveraged additional funding for resiliency enhancements from two new IPs (Czech Republic and Norway). There is an International Agreement via the State Department regarding IP collaboration with WGS 11+. In Amendment Two to the multilateral MOU (adds Belgium and United Kingdom, but does not include Australia), IPs agree to cover necessary ground upgrades and launch costs for WGS 11+ not covered by the 2018 Congressional add, with Space Systems Command (SSC) providing program management, integration, and engineering expertise through FY 2026.

The DoD has procured a more advanced single WGS 11+ satellite enhancing support to the US military, DoD, and allied nations with more flexibility to support dispersed users than previous WGS spacecraft. WGS 11+ produces more beams (over 1500) than the entire existing WGS constellation and will provide twice the mission

capability. The new capabilities allow operators to create unique coverage anywhere within the satellite's field of view and custom designed for the mission at hand. The objective of this effort is for the development, integration, and test of advanced beam management to enhance legacy beam management tools in support of rapid planning and control. This effort will develop and deploy capabilities across the WGS enterprise to provide WGS 11+ management and control (M&C) ground enhancements with responsive end-to-end mission planning, protection, and terminal synchronized capabilities. Funding the engineering and development for enhanced element M&C will provide greater routing complexity and mission planning flexibility to support 80 times more X and Ka-band spot beams on WGS 11+ than on WGS 1-10 spacecraft. This funding will be used to develop and integrate WGS-11+ advanced beam management capabilities facilitating contested and mobile operations on tactically relevant timescales. Definition and deployment of machine-to-machine interfaces between resource request and planning software facilitates rapid beam management and reduces planning and operations timelines. Updated WGS 11+ M&C interfaces will improve planning data responsiveness through access to automated equipment configuration registries and enable WGS 11+ integration into the broader DoD SATCOM Enterprise. External WGS-11+ interfaces may be leveraged to support planning, situational awareness, power control, and real time equipment orchestration.

Space acquisition must respond with speed and agility to emerging adversary threats. The SSC has transformed the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/ project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver WGS 11+ for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	48.438	0.000	48.438
Total Adjustments	0.000	0.000	48.438	0.000	48.438
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	48.438	0.000	48.438

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Change Summary Explanation

FY 2023: +$48.438M; Funds New Start WGS 11+ primary planning and control interfaces to utilize beam optimization, to include ground architecture, site surveys, and terminal development.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: WGS 11+ Beam Optimization & Operational Management (BOOM)	-	0.000	48.438
Description: Develop and integrate WGS 11+ advanced beam management capabilities driving improved warfighter ability to rapidly re-plan WGS 11+ expanded coverage. ***FY 2022 Plans:*** N/A ***FY 2023 Plans:*** In FY 2023, WGS 11+ BOOM is a New Start. FY 2023 funding commences development and initial integration of advanced beam management facilitating contested and mobile operations in tactically relevant timelines, updates to architecture models, and identifies software functions required to update WGS 11+ ground and terminal components. Mission planning and development focus is on defining and implementing software specifications to program the configuration of shaped beams supporting MILSATCOM service topologies. Integration focus will be on the publication and deployment of equipment configuration data elements into a Unified Data Library for access by planners and the integration and test of planning beam management products within the DoD SATCOM Enterprise. Efforts will also include using external platforms for integration and test. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding increased compared to FY 2022 due to the program being a New Start in FY 2023. Initiates activities to update WGS legacy ground terminal to enhance legacy beam management tools.			
Accomplishments/Planned Programs Subtotals	-	0.000	48.438

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Leverage existing contracts and government relationships (to include but not limited to USSF, Army, and DISA) to provide WGS enterprise enhancements. Contracts may be competitively awarded, utilizing a to-be-determined contract type.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206433SF / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

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
WGS 11+ Beam Planning Development	Various	Various : Various	-	-		-		43.390	Jan 2023	-		43.390	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	-		-		1.429	Jan 2023	-		1.429	Continuing	Continuing	-
SE&I	C/FP	Linquest : El Segundo, CA	-	-		-		1.900	Jan 2023	-		1.900	Continuing	Continuing	-
		Subtotal	-	-		-		46.719		-		46.719	Continuing	Continuing	N/A

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
A&AS	Various	Various : Various	-	-		-		0.700	Jan 2023	-		0.700	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		1.019	Jan 2023	-		1.019	Continuing	Continuing	-
		Subtotal	-	-		-		1.719		-		1.719	Continuing	Continuing	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	-	-		-		48.438		-		48.438	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206433SF / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

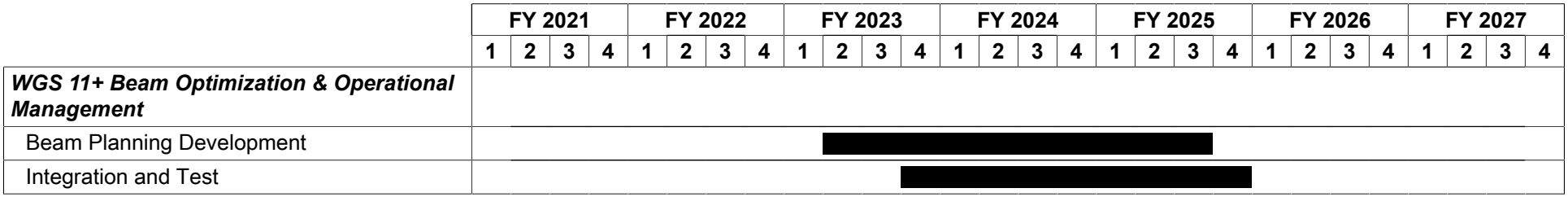

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206433SF / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
WGS 11+ Beam Optimization & Operational Management				
Beam Planning Development	2	2023	3	2025
Integration and Test	4	2023	4	2025