Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force											Date: May 2021	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206761F / *Protected Tactical Service (PTS)*							
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	-	154.237	0.000	0.000	0.000	0.000	-	-	-	-	-	-
643728: *Protected Tactical SATCOM*	-	154.237	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The global threat of electronic warfare attacks against space system will expand in the coming years in both number and types of weapons. Threat development will very likely focus on jamming capabilities against dedicated military satellite communications. To address this critical need, the Air Force is developing the Protected Anti-jam Tactical Satellite Communications (PATS) family-of-systems, of which the Protected Tactical Satellite Communications (PTS) program was a New Start in FY 2018 to fulfill the highest level of anti-jam capabilities to mitigate adversarial jamming effects. PTS provides worldwide and polar, beyond-line-of-sight, Anti-Jam (AJ), low-probability-of intercept communications in benign and highly-contested environments utilizing the Protected Tactical Waveform (PTW). PTS, with its on-board payload processing and antenna design, enables reliable tactical satellite communications within close proximities to adversarial jammers. The system also employs interfaces consistent with Air Force Space Command's on-going resilience initiatives and Enterprise Ground Services (EGS); thereby enhancing mission assurance, resiliency, and interoperability.

The Air Force is utilizing FY 2016 National Defense Authorization Act, Section 804, Middle Tier of Acquisition for Rapid Prototyping authority and Section 815, Other Transaction Authority (OTA), to achieve an affordable, rapid, operational capability for the tactical warfighter. This strategy employs spiral payload development to progressively and incrementally deploy prototypes with residual capabilities demonstrated in an operational environment. These spiral payload prototypes demonstrate innovative anti-jam technologies with modular and scalable payloads to meet validated military needs for protected tactical communications. This includes technical baseline development, systems engineering trade analyses, internal/external system integration and development, candidate system architecture evaluations, risk reduction demonstrations, prototyping concepts development, system testing, and enabling technologies maturation.

PTS includes a space segment, ground segment and gateway segment. For the space segment, the Air Force strategy utilizes a payload-centric focus to enable an affordable, resilient space architecture. This enables hosting and rideshare opportunities with other US government, commercial, International Partner satellites or integration onto a commodity satellite bus. For the ground segment, PTS leverages the EGS for satellite command and control, and the Protected Tactical Enterprise Service (PTES) rapid prototyping activity for mission and key management planning. The PTS gateway segment enables tactical warfighters reach back to global DoD Information Network. The PTS user terminal segment, not included in this PTS acquisition, will be procured by the military Services utilizing low-cost PTW modem upgrades enabled by the Protected Tactical Service Field Demonstration technology demonstration program.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming 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

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force	Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

authorities and contract mechanisms to deliver capability sooner, SMC 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 PTS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	163.694	0.000	0.000	0.000	0.000
Current President's Budget	154.237	0.000	0.000	0.000	0.000
Total Adjustments	-9.457	0.000	0.000	0.000	0.000
• 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	-3.885	0.000			
• SBIR/STTR Transfer	-5.572	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

N/A.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Acquisition Strategy Development & Source Selection	2.022	0.000	0.000
Description: Develop and refine the PTS acquisition strategy for rapid prototyping and fielding of hostable payloads with rideshare opportunities, free-flyer satellite bus configurations, and other potential solutions. This includes developing the request for prototype proposals to enable competitive selection of up to four payload prime contractors. In parallel to preparing for the competitive selection, the Air Force is developing strategies for the acquisition of commodity buses, ground segment software and hardware, gateway segment terminals and equipment, risk reduction projects, and other supporting activities.			
FY 2021 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force	Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
N/A ***FY 2022 Plans:*** N/A			
Title: Technical Baseline Management and System Integration ***Description:*** Perform Government as system integrator function through acquiring, designing, testing, and integrating key prototype segments and interfaces. Mature technical baseline and interface requirements for the prototype system. Conduct architectural engineering and system level integration planning for the PTS space, ground, and gateway segments. Support, configure, and conduct integrated testing of the major PTS subsystems, segments, and end-to-end prototype system. Manage the PTS open system architecture, refine interface requirements, and validate concept of operations through integrated system performance demonstrations. Beginning in FY 2021, the Space Hub End Cryptographic Unit (ECU) will be a separate thrust as a key risk mitigation project. ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** N/A	25.846	0.000	0.000
Title: PTS Rapid Prototype Design and Development ***Description:*** Rapid prototyping of PTS space, ground, and gateway segments and key system components. Develop, demonstrate, test, and evaluate PTS hardware and software systems. Design and develop modular, scalable payloads to support hosted or free-flyer configurations. Demonstrate prototype payload performance on-orbit. Evaluate PTS concept of operations with user participation and enable potential residual operational capability. Mature and validate user requirements. Continue prototyping and risk reduction efforts. ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** N/A	126.369	0.000	0.000
Accomplishments/Planned Programs Subtotals	154.237	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force	Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

The PTS team utilizes the FY 2016 National Defense Authorization Act Section 804 guidance for Rapid Prototyping/Rapid Fielding and Section 815 OTA guidance in developing the acquisition strategy. This strategy places an emphasis on the rapid prototyping, production, and incremental iteration of PTS capability. This strategy takes the form of a series of successively honed and tailored spirals, focusing on payload development and hosting opportunities and incorporating lessons learned from Milstar, Enhanced Polar System (EPS), EPS-Recapitalization, Advanced Extremely High Frequency, PTES, and commercial SATCOM practices.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

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 Tactical SATCOM Rapid Prototyping (up to four contractors)	C/TBD	TBD : TBD	-	102.291	Nov 2019	-		-		-		-	-	-	-
Space Hub End Cryptographic Unit (ECU)	C/CPIF	L3Harris East : Camden, NJ	-	23.905	Jan 2020	-		-		-		-	-	-	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	7.113	Nov 2019	-		-		-		-	-	-	-
Enterprise SE&I	Various	Various : Various	-	10.309	Jan 2020	-		-		-		-	-	-	-
		Subtotal	-	143.618		-		-		-		-	-	-	N/A

Management Services ($ 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
FFRDC	MIPR	Aerospace : El Segundo, CA	-	1.267	Nov 2019	-		-		-		-	-	-	-
Other Support	Various	Various : Various	-	0.024	Nov 2019	-		-		-		-	-	-	-
A&AS	Various	Various : Various	-	9.328	Nov 2019	-		-		-		-	-	-	-
		Subtotal	-	10.619		-		-		-		-	-	-	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	-	154.237		0.000		-		-		-	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

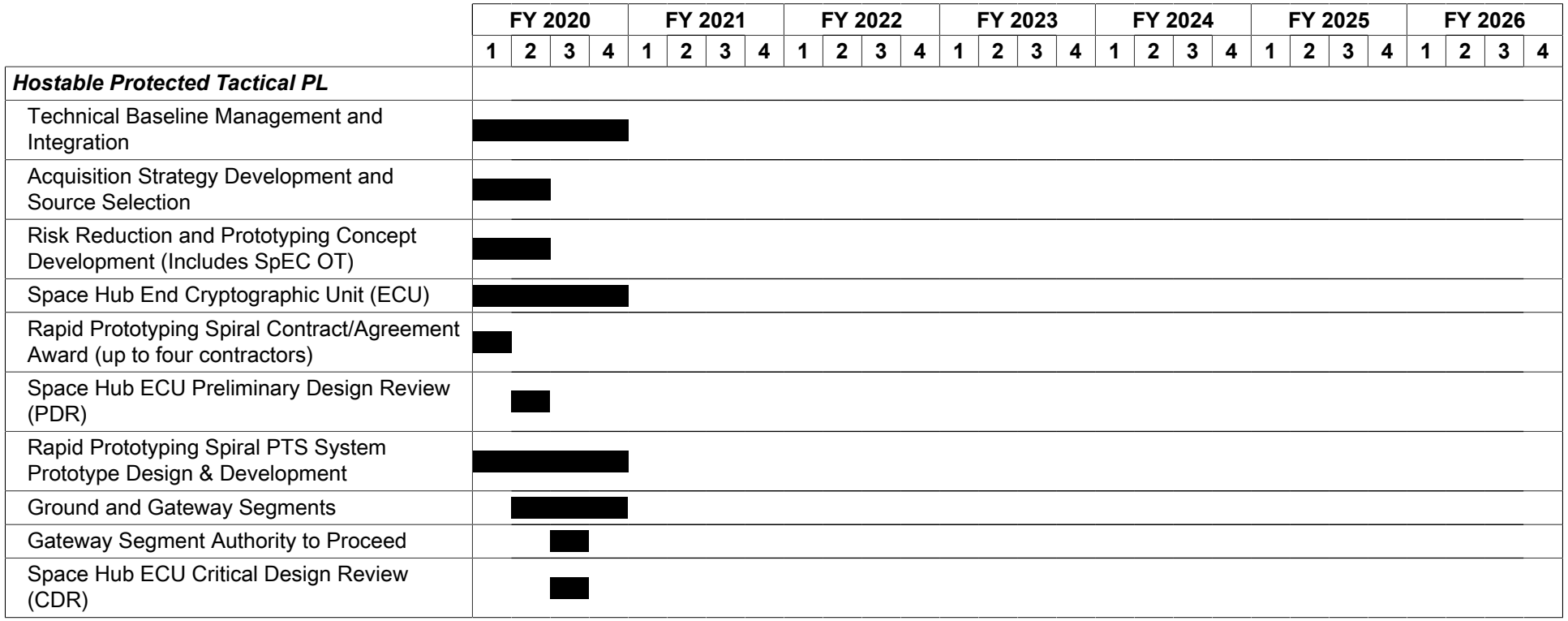

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Hostable Protected Tactical PL				
Technical Baseline Management and Integration	1	2020	4	2020
Acquisition Strategy Development and Source Selection	1	2020	2	2020
Risk Reduction and Prototyping Concept Development (Includes SpEC OT)	1	2020	2	2020
Space Hub End Cryptographic Unit (ECU)	1	2020	4	2020
Rapid Prototyping Spiral Contract/Agreement Award (up to four contractors)	1	2020	1	2020
Space Hub ECU Preliminary Design Review (PDR)	2	2020	2	2020
Rapid Prototyping Spiral PTS System Prototype Design & Development	1	2020	4	2020
Ground and Gateway Segments	2	2020	4	2020
Gateway Segment Authority to Proceed	3	2020	3	2020
Space Hub ECU Critical Design Review (CDR)	3	2020	3	2020

Note

SpEC OT: Space Enterprise Consortium Other Transaction