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

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206760F / <i>Protected Tactical Enterprise Service (PTES)</i>
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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	-	101.583	0.000	0.000	0.000	0.000	-	-	-	-	-	-
643726: <i>PTES</i>	-	101.583	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 systems 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 (MILSATCOM). To address this critical need, the Department of the Air Force (DAF) is developing the Protected Tactical Enterprise Service (PTES) ground system to provide worldwide, anti-jam, Low Probability of Intercept (LPI) communications for tactical warfighters. PTES will utilize the Protected Tactical Waveform (PTW) to provide anti-jam communications via military and commercial satellite systems for tactical users in all Services. Initially, PTES will utilize the Wideband Global SATCOM (WGS) system and may be expanded later to include commercial satellites and the Protected Tactical SATCOM (PTS) system.

The PTES program is developing a mission management system (MMS), a key management system (KMS) and hub system to enable PTW via transponded WGS satellites, with future extension to commercial SATCOM. Production-representative PTW modems for user terminals are being developed by the Protected Tactical Service Field Demonstration (PTSFD) and will be separately acquired by each Service and by international partners.

To meet the warfighter requirements for protected tactical MILSATCOM and the capability gaps identified in these studies, RDT&E funding is required for architectural development, acquisition strategy development, system requirements and system trades analysis, and engineering, manufacturing, developing, testing and evaluating PTES systems and segments.

The PTES rapid prototype addresses an urgent operational need in the Pacific region by achieving Initial Operational Capability (IOC) in 2023. IOC provides ground elements for PTW over WGS and consists of PTES installation at two WGS Gateway sites utilizing one WGS satellite. The Navy Wideband Anti-Jam Modem System (WAMS) relies on PTES to provide PTW ground infrastructure. The DAF is utilizing FY 2016 National Defense Authorization Act, Section 804, Middle Tier of Acquisition for Rapid Prototyping authority to deliver a PTES Operational Demonstration meeting the Navy's Minimum Viable Product in FY 2022. At Full Operational Capability (FOC) PTES will provide worldwide PTW operations using up to all WGS satellites.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) 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, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

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This program element may include necessary civilian pay expenses required to manage, execute, and deliver PTES 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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	105.003	0.000	0.000	0.000	0.000
Current President's Budget	101.583	0.000	0.000	0.000	0.000
Total Adjustments	-3.420	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	0.000	0.000			
• SBIR/STTR Transfer	-3.420	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> PTES Prototype Development	101.583	0.000	0.000
<b>Description:</b> After competitive contract award, the PTES team will develop a prototype consisting of three segments: a MMS, a KMS, and joint hubs integrated into existing SATCOM gateways. PTES will enable an anti-jam communications capability via PTW over WGS for tactical users in all Services and International Partners. The PTES team will be responsible for developing all PTES segments and performing all system integration, including end-to-end tests of the complete PTES prototype.			
<b>FY 2021 Plans:</b> N/A.			
<b>FY 2022 Plans:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	101.583	0.000	0.000

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

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<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>
3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	PE 1206760F / <i>Protected Tactical Enterprise Service (PTES)</i>

**D. Other Program Funding Summary (\$ in Millions)**

**Remarks**

Associated WAMS funding is contained within Navy Multiband Terminal (NMT) program.

**E. Acquisition Strategy**

PTES was designated as a rapid prototype in June 2018 under section 804 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92). The objective of the PTES ground system is to provide an operational anti-jam communications capability via WGS using PTW. The PTES acquisition approach is to competitively award a single contract to develop and field PTES, through declaration of IOC. Boeing and sub-contractors will be responsible for developing all PTES segments (MMS, KMS, and Hub) and performing all system integration, including end-to-end tests of the complete PTES prototype. The 45th Test Squadron is planned to be the PTES Developmental Test organization and Air Force Operational Test and Evaluation Center (AFOTEC) is planned to be the Operational Test organization.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3600 / 4				PE 1206760F / Protected Tactical Enterprise Service (PTES)				643726 / PTES								
<b>Product Development (\$ in Millions)</b>				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	
Protected Tactical Enterprise Service Prototype Development	C/CPIF	Boeing : El Segundo, CA	-	74.920	Oct 2019	-		-		-		-	-	-	-	
Data Center	Various	Various : Various	-	0.305	Feb 2020	-		-		-		-	-	-	-	
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	6.525	Jan 2020	-		-		-		-	-	-	-	
Enterprise SE&I	Various	Various : Various	-	9.928	Oct 2019	-		-		-		-	-	-	-	
<b>Subtotal</b>			-	91.678		-		-		-		-	-	-	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				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	
Test Planning & Execution DT/OT	Various	Various : Various	-	5.456	Nov 2019	-		-		-		-	-	-	-	
<b>Subtotal</b>			-	5.456		-		-		-		-	-	-	N/A	
<b>Management Services (\$ in Millions)</b>				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	
FFRDC	MIPR	Aerospace : El Segundo, CA	-	0.132	Jan 2020	-		-		-		-	-	-	-	
A&AS	Various	Various : Various	-	4.167	Oct 2019	-		-		-		-	-	-	-	
Other Support	Various	Various : Various	-	0.150	Oct 2019	-		-		-		-	-	-	-	
<b>Subtotal</b>			-	4.449		-		-		-		-	-	-	N/A	
<b>Project Cost Totals</b>			-	101.583		0.000		-		-		-	-	-	N/A	



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206760F / <i>Protected Tactical Enterprise Service (PTES)</i>	<b>Project (Number/Name)</b> 643726 / <i>PTES</i>

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

<b>PTES</b>	
PTES Prototype Development	
Software Build 1	
Software Build 2	
Preliminary Design Review (PDR)	
Developmental/Operational Testing (to include Planning)	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206760F / <i>Protected Tactical Enterprise Service (PTES)</i>	<b>Project (Number/Name)</b> 643726 / <i>PTES</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>PTES</b>				
PTES Prototype Development	1	2020	4	2020
Software Build 1	1	2020	3	2020
Software Build 2	3	2020	4	2020
Preliminary Design Review (PDR)	4	2020	4	2020
Developmental/Operational Testing (to include Planning)	1	2020	4	2020