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 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0208006F / *Mission Planning Systems*							
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	0.000	69.232	91.601	92.557	0.000	92.557	-	-	-	-	-	-
675302: *Precision Aerial Delivery Systems (PADS)*	0.000	7.021	3.084	1.865	0.000	1.865	-	-	-	-	-	-
675380: *Mission Planning Systems (MPS) Modernization*	0.000	62.211	88.517	90.692	0.000	90.692	-	-	-	-	-	-
Program MDAP/MAIS Code: 509												

Note

- Mission Planning Systems (MPS) software is a layered software, designed with open architected standards and modular construction. The core of the MPS Legacy Joint Mission Planning Systems (JMPS) software is the Framework software (FW) used by all MPS platforms and the Navy. Common Components are distinct services that are used by a select number of platforms. An example would be weapon specific capability that fighters share. The Unique Planning Component (UPC) is the platform specific software and associated software (install etc.) that is delivered to the users in the form of a mission planning environment. Traditionally, the MPS Systems Program Office had allocated FW funding to other Platform Operational Flight Program (OFP) development programs. Beginning in FY20, FW became a separate program code within the MPS Modernization BPAC.

- As part of MPS Modernization, the Mission Planning program is updating the current JMPS architecture with an Open Mission Systems architecture to improve system extensibility, expand the suite of services to meet operational requirements for the warfighter, improve the user interface and overall user experience, improve system performance, and address security vulnerabilities and cybersecurity mandates. MPS is also transitioning its software development processes to incorporate best practice Agile DevOps methodologies which will speed the development and delivery of capabilities to the user as well as improve our ability to address changing threats and cybersecurity requirements. This transition will drive changes in organizational and programmatic structures in the future to align with the Agile DevOps processes and practices. The integration of the agile development methodology will require some program office organizational restructuring into Agile Release Trains (ARTs). This is expected to commence in the FY21 timeframe.

A. Mission Description and Budget Item Justification

Mission planning involves the creation of a flight plan based on multiple inputs including threats, targets, terrain, weather, aircraft performance capability, and configuration. It is an essential task that must be completed prior to any fixed- or rotary wing aircraft sortie. The planner must have the ability to plan weapon, cargo, passenger, and/or fuel delivery, calculate fuel requirements, and assess the route based on known enemy threat location and type. Mission planners must be able to optimize and de-conflict flight routes with other aircraft; review, print, and brief the plan; download pertinent flight information to on-board aircraft avionics; and, conduct dynamic/in-flight re-planning as applicable.

The MPS program is a collaborative program with the Navy to leverage technical solutions and business practices for most Department of Defense (DoD) platforms. It provides automated mission planning tools and support for fixed- and rotary wing aircraft and guided munitions. It replaces two closed architecture legacy mission

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 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*

planning systems (UNIX-based MPS (UNIX-MPS) and the PC-based Portable Flight Planning Software (PFPS)), with a single multi-service, open architecture system, frequently referred to as JMPS. MPS has continually compressed the mission planning cycle by providing an improved integrated planning environment, reducing the time required to respond to changing situations and urgent needs such as striking time sensitive/critical targets and conducting combat search and rescue. MPS products have the potential to support all DoD fixed-wing and rotary wing aircraft and are shared with the selected programs in the Navy. MPS delivers significant benefits to command and control performance by enhancing information superiority for the warfighter and by providing unique capabilities in support of both precision engagement and dominant maneuver.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Mission Planning System capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 $0.000M was expended for civilian pay expenses in this program element, and in FY21 $0.046M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	71.465	91.768	93.950	0.000	93.950
Current President's Budget	69.232	91.601	92.557	0.000	92.557
Total Adjustments	-2.233	-0.167	-1.393	0.000	-1.393
• 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	-2.233	-0.167	-1.393	0.000	-1.393

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208006F / *Mission Planning Systems*	Project (Number/Name) 675302 / *Precision Aerial Delivery Systems (PADS)*	

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
675302: *Precision Aerial Delivery Systems (PADS)*	0.000	7.021	3.084	1.865	0.000	1.865	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission planning involves the creation of a flight plan based on multiple inputs including threats, targets, terrain, weather, aircraft performance capability, and configuration. It is an essential task that must be completed prior to any fixed- or rotary wing aircraft sortie. The planner must have the ability to plan weapon, cargo, passenger, and/or fuel delivery, calculate fuel requirement and assess the route based on known enemy threat location and type. Mission planners must be able to optimize and de-conflict flight routes with other aircraft; review, print and brief the plan; download pertinent flight information to on-board aircraft avionics; and, conduct dynamic/in-flight re-planning as applicable.

This project continues the development of a Joint Precision Airdrop System-Mission Planner (JPADS-MP) capability in conjunction with the Army. JPADS provides a planning capability for DoD airdrop requirements. It is the primary airdrop mission planning system for all ballistic airdrop missions as well as precision guided airdrops that are required when the mission profile or surface-to-air threat assessment warrants a high-altitude and/ or standoff precision delivery. It enables high-altitude, precise airdrop delivery to forward ground forces, while mitigating surface-to-air threats, reducing risk of exposure to Improvised Explosive Devices (IEDs) and insurgent attack on ground convoys. JPADS allows the warfighter to consider weather, terrain, aircraft capabilities, threat, and other data to accurately deliver payloads to U.S. and other friendly forces.

Consolidated Airdrop Tool (CAT) is the key JPADS-MP software deliverable. It will increase the accuracy of airdrop mission planning by improving aircraft, payload, and chute specific calculations along with weather analysis visualization tools specifically adapted for airdrop. Future initiatives are designated to achieve automation of airdrop planning and execution to reduce task saturation in the cockpit and support Air Mobility Command's (AMC) objective of moving to a two-man cockpit. These efforts include the ability to automatically receive and use real-time winds in any location, calculation of a release point and airdrop in a single pass, the ability to conduct real-time objective area analysis to calculate probable damage estimates and execute dynamic re-tasking, the ability to conduct post-drop assessments, and the implementation of new technologies (e.g. Service Oriented Architecture (SOA) Touch Screen environment).

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: JPADS-MP Phase I	7.021	3.084	1.865
Description: Continues development of a JPADS capability for precise, high altitude delivery of material to forward ground forces.			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2021 Plans: - Increase JPADS capability to meet MAJCOM critical operational needs for conventional, precision, HALO/HAHO and Dynamic High Speed airdrops. Moreover, increasing JPADS ability to support Battlefield Illumination and CSAR requirements. Requirements from the Army, Navy and Special Operation continue to add to JPADS operational capabilities. This development is for the continued tablet capabilities along with potential C-130 and C-17 data exchange of airdrop weather, navigation and flight performance information. - Release numbers as shown in the R-4 schedule were changed from Major releases (long term developments) to quarterly Program Increments reflecting the agile software development process - Will continue the refinement of precision and conventional airdrop capabilities including but not limited to, Airdrop Damage Estimate (ADE), 3D Hazard and obstruction data for guided delivery system navigation, automation for aircrew in-flight airdrop workflow, Extracted Container Delivery Systems (ExCDS), data services to multiple mission planning devices, and calculations to maximize payload impact success on drop zones. ***FY 2022 Plans:*** Continue agile development with quarterly releases. The scope of each release will be determined at a planning session based on the warfighter prioritized requirements identified in the approved requirements document as well as enhancements identified in field performance. Each release will be incorporated into a Mobility Based Mission Planning Environment (MPE) for use by Air Mobility Command and Air Combat Command Aircraft. The Micro Services Oriented Architecture evolution will evolve to align with the JOMS/NOM architecture. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** There is a decrease in FY 22 primarily due to the timing of the cadence release cycle and completion of the primarily Agile Global Mobility requirements.			
Accomplishments/Planned Programs Subtotals	7.021	3.084	1.865

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
• OPAF 03 Line Item 833170: *Mission Planning Systems*	14.508	15.132	14.871	-	14.871	-	-	-	-	-	-

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

D. Acquisition Strategy

The MPS PADS efforts are developed and fielded using a variety of contracting instruments. Efforts to accomplish activities such as SAFe Agile software development methodology, systems engineering and integration, training, and support are completed using competitively awarded contracts (e.g. Cost Plus Award Fee (CPAF), Fixed Price (FP)). With expiration of MPEC II in June 2021, Mission Planning will utilize established GWAC ID/IQ schedules, with a larger pool of vendors, to competitively award future Task or Delivery Orders. These vehicles will be utilized to establish agile contracts to support transformation to agile devops approach.

Program Management Administration (PMA) contracts are awarded competitively and consist of various types of contracts at various locations. MITRE, a Federally Funded Research and Development Center (FFRDC) contractor, provides technical support via a no fee for service contract. The Systems Engineering & Integration Contract (SEIC) is a competitively awarded ID/IQ. Other efforts are accomplished using Purchase Orders (PO) and Military Interdepartmental Purchase Requests (MIPR).

For the efforts listed above, the Air Force Life Cycle Management Center at Hanscom AFB (AFLCMC/HB) is the Contracting Authority and provides Contracts, Legal, and Comptroller Support.

Air Force Program Executive Officer (PEO) for Digital (AFPEO/BM) is the PEO and Milestone Decision Authority (MDA) for the PADS program.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

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
Software Development	C/CPIF	Various : Various	0.000	5.766	Nov 2019	2.543	Nov 2020	1.533	Nov 2021	-		1.533	-	-	-
Systems Engineering and Integration	C/CPAF	Leidos, Inc. : Reston, VA	0.000	0.870	Jan 2020	0.175	Jan 2021	0.090	Jan 2022	-		0.090	-	-	-
		Subtotal	0.000	6.636		2.718		1.623		-		1.623	-	-	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
Cost Estimating	C/T&M	Quantech Services : Lexington, MA	0.000	0.015	Nov 2019	0.016	Nov 2020	0.017	Nov 2021	-		0.017	-	-	-
		Subtotal	0.000	0.015		0.016		0.017		-		0.017	-	-	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
Responsible Test Organization (RTO)	PO	96CTG: Eglin AFB, FL : TBD	0.000	0.370	Dec 2019	0.350	Dec 2020	0.225	Dec 2021	-		0.225	-	-	-
		Subtotal	0.000	0.370		0.350		0.225		-		0.225	-	-	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	0.000	7.021		3.084		1.865		-		1.865	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

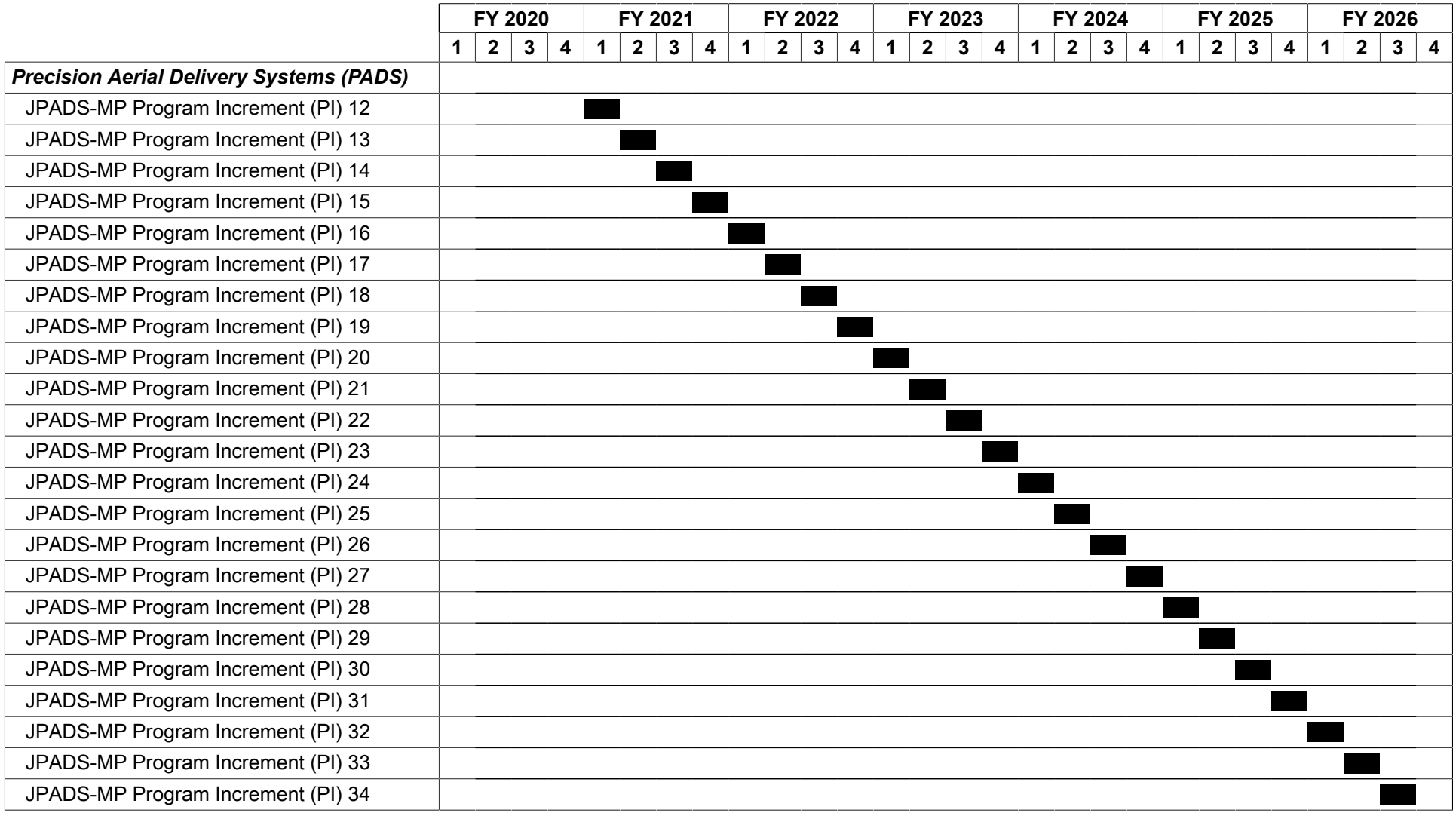

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

	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
JPADS-MP Program Increment (PI) 35																												

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Precision Aerial Delivery Systems (PADS)				
JPADS-MP Program Increment (PI) 12	1	2021	1	2021
JPADS-MP Program Increment (PI) 13	2	2021	2	2021
JPADS-MP Program Increment (PI) 14	3	2021	3	2021
JPADS-MP Program Increment (PI) 15	4	2021	4	2021
JPADS-MP Program Increment (PI) 16	1	2022	1	2022
JPADS-MP Program Increment (PI) 17	2	2022	2	2022
JPADS-MP Program Increment (PI) 18	3	2022	3	2022
JPADS-MP Program Increment (PI) 19	4	2022	4	2022
JPADS-MP Program Increment (PI) 20	1	2023	1	2023
JPADS-MP Program Increment (PI) 21	2	2023	2	2023
JPADS-MP Program Increment (PI) 22	3	2023	3	2023
JPADS-MP Program Increment (PI) 23	4	2023	4	2023
JPADS-MP Program Increment (PI) 24	1	2024	1	2024
JPADS-MP Program Increment (PI) 25	2	2024	2	2024
JPADS-MP Program Increment (PI) 26	3	2024	3	2024
JPADS-MP Program Increment (PI) 27	4	2024	4	2024
JPADS-MP Program Increment (PI) 28	1	2025	1	2025
JPADS-MP Program Increment (PI) 29	2	2025	2	2025
JPADS-MP Program Increment (PI) 30	3	2025	3	2025
JPADS-MP Program Increment (PI) 31	4	2025	4	2025
JPADS-MP Program Increment (PI) 32	1	2026	1	2026

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675302 / *Precision Aerial Delivery Systems (PADS)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JPADS-MP Program Increment (PI) 33	2	2026	2	2026
JPADS-MP Program Increment (PI) 34	3	2026	3	2026
JPADS-MP Program Increment (PI) 35	4	2026	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208006F / *Mission Planning Systems*	Project (Number/Name) 675380 / *Mission Planning Systems (MPS) Modernization*	

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
675380: *Mission Planning Systems (MPS) Modernization*	0.000	62.211	88.517	90.692	0.000	90.692	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission planning involves the creation of a flight plan based on multiple inputs including threats, targets, terrain, weather, aircraft performance capability, and configuration. It is an essential task that must be completed prior to any fixed- or rotary wing aircraft sortie. The planner must have the ability to plan weapon, cargo, passenger, and/or fuel delivery, calculate fuel requirements, and assess the route based on known enemy threat location and type. Mission planners must be able to optimize and de-conflict flight routes with other aircraft; review, print and brief the plan; download pertinent flight information to on-board aircraft avionics; and conduct dynamic/in-flight re-planning as applicable. The MPS Modernization project, following a multi-year strategic roadmap to migrate mission planning capabilities as discussed above into a services-based open architecture, focuses on delivering JMPS Open Mission Systems (JOMS) environment for mission planning supporting Combat Air Forces (CAF) and Mobility Air Forces (MAF), which includes the development, test and support of Mission Planning Environments (MPEs) to support the B-1, C-5, C-17, C-130, HC-130, EC-130, E-3 DRAGON, E-3/E-8, F-15, F-22A, KC-10, KC-46, KC-135, RC-135, HH-60 other platforms, Framework (FW) and all Common Component (CCs) software tools for mission requirements. Activities also include studies and analysis to support both current program planning and execution and future program planning. MPS Modernization efforts that support modernizing the system architecture to JOMS are as follows:

1) CAF MPS Modernization: These development efforts modernize CAF Mission Planning Environments (MPEs). The modernization effort will provide new and improved mission planning capability for individual OFP requirements, such as new weapons, avionics upgrades, communications systems, etc. The OFPs requiring MPE updates under the CAF modernization effort include, but are not limited to, B-1 (Sustainment Blocks 17a, 17b, 17c, 18 and 19),F-15 (Suites 9, 9.1 and 9.2) and F-22 Increments 3.2B, update Release One, Release Two, and Release Three. CAF modernization also includes updates to mission planning capabilities supporting associated weapons including, but not limited to, Small Diameter Bomb (SDB-II), Joint Direct Attack Munitions (JDAM) and the Joint Air-to-Surface Standoff Missile (JASSM). A key piece of the CAF modernization effort involves interfacing between the CAF platforms and the weapons using tools such as, but not limited to, Universal Armament Interface (UAI) and Mission Planning Certification Tool (MPCT). Finally, CAF modernization will address required improvements to CAF related JMPS MPE CCs, including Weapon Planning Software (WPS), Electronic Warfare CC (EWCC), GPS Crypto (including GPS M-code), Weather CC, etc. CAF MPE Modernization includes, but is not limited to, the following platform efforts:

a. F-15 Modernization Phase II & III: This modernization program consists of multiple software development efforts driven by OFP updates for F-15 Suites 9, 9.1, and 9.2. Suite 9 MPE capabilities include, but are not limited to, Data Transfer Device (DTD) improvements, updates for new features in weapons such as Joint Direct Attack Munition (JDAM), Small Diameter Bomb I and II (SDB I and II), AIM-9X, AIM-120D, and Network Enable Weapon support elements (e.g. key handling, weapon data link and Link 16). It will also include enhancements to the synthetic aperture radar planning tool (SAR-PT) and the global area reference tool as well as radar modernization updates (e.g. combat identification, radar planning tool enhancements) and a variety of updates and enhancements for weapons and aircraft systems to include, but are not limited to, Eagle Passive Active Warning Survivability System (EPAWSS), a new Advanced Dual Core Process II (ADCP-II) computer as well as Digital Transfer Device/Modules (DTD/DTM) modernization.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675380 / *Mission Planning Systems (MPS) Modernization*

b. F-22 Modernization Phase I: The F-22 Modernization program includes OFP-driven software updates v13.1, v14.0, v14.1, and v14.2. These enhancements include, but are not limited to, the addition of improved capabilities for the AIM-9X and AIM-120D, the incorporation of additional electronic protection tasks, combat identification improvements, addition of an Inter-flight Data Link Gateway, Mode 5 IFF and Combat ID updates, Link 16 updates, and incorporation of the synthetic aperture radar planning tool. Additionally, other new and emerging OFP-generated requirements will be addressed as identified by the operational user(s). Other Common Component (CC) updates will also be completed as required.

c. B-1 Modernization Phase I: The B-1 Modernization program includes OFP-driven software updates for Releases 9.1.3, 11.0, 11.1 and 11.2. It will incrementally update the platform MPE and provide updates to the aircraft mission capabilities, including JASSM and LRASM weapon updates, and incorporation of the crypto modernization LINK 16 network enabled weapons. Additionally, B-1 MPE will complete migration to a native 64-bit environment, replace the mass storage unit where pre-recorded map and mission data is stored and begin transition to microservices development in JMPS Open Mission Systems (JOMS) to modernize the software architecture.

2) MAF MPS Modernization: These development efforts modernize MAF MPEs for all Air Mobility Command platforms. The modernization effort will provide new and improved mission planning capability to support Aircraft individual Operational Flight Programs (OFP), Global C2, and AMC fuel efficiency requirements incorporating Mobility Air Forces Automated Flight Planning Service into the deployed squadron mission planning suite. It includes, but is not limited to, enhanced capabilities to accommodate avionics upgrades, precision airdrop improvements for increased combat battlefield airdrop accuracy, improved communications systems, interfaces with command and control systems, and improved weather data ingestion/utilization for various MAF platforms. Development efforts also include, but are not limited to, integrating improvements to MAF related CCs. Examples of these CCs include, but are not limited to, MAF tools, such as Assault Zone CC and the Air Refueling Tool (ART) CC, Consolidated Airdrop Tool (CAT), and the Weather CC.

3) The SMACC Modernization Program includes development, testing, and fielding of MP software for the E-3 DRAGON, E-3/E-8, RC-135 and EC-130. Combat Search and Rescue (CSAR) provides enhanced stability performance over the legacy mission planning system through enhanced architecture and baseline development, such as the improved transfer of mission data from the unique planning component to the HC-130J avionics suite and the 12 critical Digital Aeronautical Flight Information Files to integrate onto the smart multifunction color display for the HH-60G, resulting in mature JMPS mission planning environment for both CSAR platforms.

4) In FY20, MPS Framework was established as an independent ACAT III Program of Record (POR). The funding for MPS Framework has historically been accomplished through an allocation to the platform budgets in Mission Planning. The Program office has segregated MPS Framework for future oversight. MPS Framework initiated a one year agile pathfinder effort that represents the basic core functions of the JMPS Software developed as microservices in a Common Development Environment (CDE). MPS Framework will be renamed to Core Mission Planning (CMP) and continue core modernization efforts utilizing the JMPS Open Mission Systems (JOMS) architecture to continuously develop and deploy core mission capabilities.

Test, Training, and Certification: Continues all MPS-related integration, test, and certification activities for all CAF and MAF platforms.

Program Support: Continues all program office management operations and support activities to ensure the timely development, testing, and delivery of mission planning systems to the warfighter.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675380 / *Mission Planning Systems (MPS) Modernization*

The platform efforts include work associated with updates to the Framework and associated services.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: F-15 Modernization Phase II and III	8.396	10.734	3.018
Description: Continues the modernization of previously fielded F-15 Mission Planning Environments (MPEs) to enable efficient use of new and improved capabilities being developed in platform Operational Flight Programs (OFPs). ***FY 2021 Plans:*** - Will complete FQT, DT/OT and begin fielding v6.1 capabilities that include Data Transfer Device (DTD) improvements, updates for new features in weapons such as Joint Direct Attack Munition (JDAM), Small Diameter Bomb I and II (SDB I and II), AIM-9X, AIM-120D, and Network Enable Weapon support elements (e.g. key handling, weapon data link and Link 16). It will also include enhancements to the synthetic aperture radar planning tool (SAR-PT) and the global area reference tool as well as radar modernization updates (e.g. combat identification, radar planning tool enhancements) and a variety of updates and enhancements for weapons and aircraft systems to include, but are not limited to, Eagle Passive Active Warning Survivability System (EPAWSS), a new Advanced Dual Core Process II (ADCP-II) computer as well as Digital Transfer Device/Modules (DTD/DTM) modernization. ***FY 2022 Plans:*** - Will continue quarterly builds/releases until v6.1 fielding ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease due to contract award timing and implementation of agile cadence.			
Title: F-22 Modernization Phase I and II	16.178	17.461	18.060
Description: Continues the modernization of previously fielded F-22 MPEs to enable efficient use of new and improved capabilities being developed in the OFPs. ***FY 2021 Plans:*** - Will complete FQT, DT/OT and begin fielding v14.2 capabilities that include the incorporation of additional electronic protection tasks, combat identification improvements and the addition of an Inter-flight Data Link Gateway. - Begin development of v14.3 capabilities that include the addition of improved capabilities for the AIM-9X and AIM-120D Weapons, Mode 5 IFF and Combat ID updates, Link 16 updates, and incorporation of the synthetic aperture radar planning tool. ***FY 2022 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0208006F / *Mission Planning Systems*	**Project (Number/Name)** 675380 / *Mission Planning Systems (MPS) Modernization*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Complete development, FQT, DT/OT and Field v14.3 to support OFP Release 3 ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Slight increase due to program adapting agile cadence and awarding new contract.			
Title: B-1 Modernization Phase I and II ***Description:*** Continues the modernization of previously fielded B-1 MPEs to enable efficient use of new and improved capabilities being developed in the OFPs. ***FY 2021 Plans:*** - Field B-1 Rel 11.2 capabilities that will complete migration to a native 64-bit environment, replace the mass storage unit where pre-recorded map and mission data is stored and begin transition to microservices development in JMPS Open Mission Systems (JOMS) to modernize the software architecture in support of B-1 SB18 OFP requirements. - Begin development of B-1 Rel 11.3 capabilities that provide updates to the JASSM and LRASM weapon systems, and incorporation of the crypto modernization LINK 16 network enabled weapons in support of B-1 SB19 OFP requirements. ***FY 2022 Plans:*** - Continue quarterly builds/releases until final Rel 11.3 fielding. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Slight increase as sustainment work will be transitioned from Industry to Organic with reach back to Industry.	6.298	11.491	12.637
Title: MAF Modernization ***Description:*** Continues the development, testing, and fielding of the Agile Global Mobility (AGM) effort for the modernization of the JMPS Mission Planning Environment (MPE) for the C-5, C-17, C-130, KC-10, KC 135 and KC-46 to account for changes in aircraft Operational Flight Program (OFP) and Global Command as well as operational mission requirements. ***FY 2021 Plans:*** - AGM will fully transition to agile development/operations through a new contract structure. A major release of the software will occur in the middle of the FY for Air Mobility Command (AMC). Following this release, FY 2021 activities will continue with integration of the Mobility Air Forces Automated Flight Planning Service (MAFPS) Global Flight Planning Common Component (GFPCC), Aero Advisory Common Component (AACC) as well as other prioritized AMC elements. Each software program increment within quarterly releases will provide full and/or interim capabilities made available to the using command for fielding and resolve critical software issues. The KC-46 mission planning software will be upgraded to a 64-bit capability and integrated with the other AMC aircraft into one software planning package. ***FY 2022 Plans:***	14.155	17.387	11.531

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Based on prioritized warfighter enhancements development of follow on releases will be conducted concurrently via agile development with multiple Program Increments (PIs) and Common Components. Major improvements include architectural updates/refactoring of current capabilities into next generation micro-services, test automation, implementation of rapid deployment processes, and instantiation of a cross-contractor integrated development environment. Each of the PIs provide full and/or interim capabilities made available to the using command for fielding. Software will be updated based on user feedback to improve usability and efficiency. Software updates will ultimately support transition to the JMPS Open Mission System (JOMS). ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is fairly constant across FYs as capabilities are added on a set cadence. There is a decrease in FY 22 primarily due to the timing of the cadence release cycle.			
Title: Special Mission ACC (SMACC) ***Description:*** Continues the modernization of previously fielded mission planning software environments for the E-3 DRAGON, E-3/E-8, EC-130, and RC-135. In addition, this effort continues modernization efforts for SMACC Combat Search and Rescue (CSAR) component for the HH-60G helicopters and the HC-130J. ***FY 2021 Plans:*** Software will be staged for deployment on a 3-month cadence as the system transitions to a 64 bit capability and incorporates the Global Area Reference System (GARS), Degraded Visual Environment System (DVES), advanced debrief tools, and the Situational Awareness Communications Upgrade. This is in addition to enhancement of fielded capabilities such as Bird Dog (Intel), Counter Listener Acoustical Warfare (CLAW) and Survivor Broadcast Overlay Tool (SBOT). ***FY 2022 Plans:*** Software release will continue on the 3 month agile cadence and include enhanced mission planning capabilities in support of an all-glass digital cockpit upgrade. The target list of other top priority items will be finalized through program increment planning sessions with Air Combat Command based on the backlog of items identified through agile software development/operations. FY 2022 also brings the conversion to an open mission system architecture to modernize the software base for increased speed of operation and increased efficiency of software maintenance. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY22 increase due to CSAR Mission Planning Environment SW being released on a three month cadence to support HH-60G and HC-130J including ITAS, SBOT and CLAW upgrades, NOM/JOMs architecture transition to Block 8.1 upgrade on the HC-130J and MPE development to support the HH-60G transition to the W-Model (Combat Rescue Helicopter).	8.506	16.299	23.913
Title: MPS Framework (FW)	7.878	15.145	21.533

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Description: MPS Framework, and the follow-on renamed Core Mission Planning (CMP), is the set of core Mission Planning services that all platforms and common capabilities utilize. It is the bottom layer of the software architecture. It provides the core services utilized by both MAF and CAF platforms to include transit route planning, weather services and airfield data. MPS FW includes the infrastructure and interfaces required to be integrated into the various platforms and weapons systems as well as addresses data access, services, integrity and real-time operational communication. ***FY 2021 Plans:*** Will establish a follow-on program of record, known as Core Mission Planning (CMP) at the conclusion of the FY20 Pathfinder development effort. CMP will continue development of services, modernizing from legacy development to micro-services in an Open Mission Systems/Service Oriented Architecture environment and improving quality, security, and automation of data supplied to mission planning systems. ***FY 2022 Plans:*** Will continue CMP development and deployment of services, modernizing from legacy development to micro-services in an Open Mission Systems/Service Oriented Architecture environment and improving quality, security, and automation of data supplied to mission planning systems. Deployments will include initial capability releases of improved transit route planning functionality, dynamic fuel usage, filing and collaborative planning functionality. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase enables building upon the Minimum Viable Product (MVP) of Transit Route Planner, the planned development will deliver capabilities for the operational Minimum Viable Capability Release (MVCR) in line with the ACC CD-1 requirements. Other capabilities driving a cost increase include Non-Flyable Route Warnings, NOTAMS, Alerts & Diverts, Refueling (On-load & Off-load), Full Route Editing, Electronic Filing of Flight Plans, Diplomatic Clearances, Take-Off and Landing Data (TOLD), Common Forms/Cards, Weight & Balance Form, FLIP, FPMs for all operational aircrafts and Weather Forecast Overlays.			
Title: MAF Automated Flight Planning Service (MAFPS)Phase II	0.800	0.000	0.000
Description: Develops a centralized/net-centric global mobility flight planning capability, which will provide significant fuel savings through automated flight route, airspeed, and altitude optimization utilizing aircraft performance, air traffic management, weather, and other data. The Web-based Global Flight Planning (Web-GFP) portion modernizes a second MAFPS client enabling GM MPE users with access to the same MAFPS capabilities in order to facilitate fuel and cost efficiencies across the MAF. ***FY 2021 Plans:*** Program will be in sustainment with no more development funding required. ***FY 2022 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	62.211	88.517	90.692

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
• OPAF 03 Line Item 833170: *Mission Planning Systems*	14.508	15.132	14.871	-	14.871	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

MPS Modernization consists of multiple capability upgrades across multiple platforms that are developed and fielded using a variety of contracting instruments. The Air Force Life Cycle Management Center at Hanscom AFB AFLCMC/HB) competitively awarded multiple (Indefinite Delivery/Indefinite Quantities) (ID/IQ) contracts for software development. Currently there are five (5) contractors, one of which is Small Business set aside, who are qualified sources. Each Delivery Order (DO) is competed among the five contractors. With expiration of this ID/IQ in June 2021, Mission Planning will utilize established GWAC ID/IQ schedules, with a larger pool of vendors, to competitively award future Task or Delivery Orders. These vehicles will be utilized to establish agile contracts to support transformation to agile devops approach. Efforts to accomplish program activities such as software development, systems engineering and integration, training, and support are competitively awarded using a variety of contract types to support agile development efforts.

Program Management Administration (PMA) contracts are awarded competitively and consist of various types of contracts at various locations. MITRE, a Federally Funded Research and Development Center (FFRDC) contractor provides technical support on a no fee for service contract.
The Systems Engineering & Integration Contract (SEIC) is a competitively awarded ID/IQ. Other efforts are accomplished via Purchase Orders (PO) and Military Interdepartmental Purchase Requests (MIPR). For the efforts listed above, the Air Force Life Cycle Management Center at Hanscom AFB (AFLCMC/HB) provides the program management, contracts, legal, and financial management support. The Air Force Program Executive Officer (PEO) for Digital (AFPEO/HB) is the Milestone Decision Authority (MDA) for all MPS Modernization projects. Performance Metrics
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
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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
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Mission Planning Software Development	C/Various	Various : Various	0.000	23.763	Nov 2019	35.287	Nov 2020	29.427	Nov 2021	-		29.427	-	-	-
A-10 Modernization	PO	Organic : Hill AFB, UT	0.000	-		-		-		-		-	-	-	-
F-16 Modernization	PO	Organic : Hill AFB, UT	0.000	-		-		-		-		-	-	-	-
EC-130H Modernization	PO	Organic : Robins AFB, GA	0.000	0.775	Jan 2020	0.850	Jan 2021	0.702	Jan 2022	-		0.702	-	-	-
F-22 MilCloud SIL	MIPR	GSA : Washington, DC	0.000	-		-		-		-		-	-	-	-
MAF AMC Transition Tools	MIPR	AMCOM : Redstone Arsenal, AL	0.000	-		-		-		-		-	-	-	-
SMACC CSAR Tools	MIPR	Various : Various	0.000	0.514	Jan 2020	0.529	Jan 2021	0.544	Jan 2022	-		0.544	-	-	-
Systems Engineering and Integration	C/CPAF	Leidos, Inc. : Reston, VA	0.000	9.178	Jan 2020	10.484	Jan 2021	13.262	Jan 2022	-		13.262	-	-	-
Framework	C/FPIF	Northrop Grumman : Herndon, VA	0.000	10.479	Jan 2020	15.490	Jan 2021	21.533	Jan 2022	-		21.533	-	-	-
Common Components	C/Various	Various : Various	0.000	8.046	Nov 2019	15.395	Nov 2020	14.396	Nov 2021	-		14.396	-	-	-
		Subtotal	0.000	52.755		78.035		79.864		-		79.864	-	-	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
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Software Engineering	C/T&M	SEI : Pittsburgh, PA	0.000	-		-		-		-		-	-	-	0.080
Cost Estimating	C/T&M	Tecolote Inc : Goleta, CA	0.000	0.140	Nov 2019	0.145	Nov 2020	0.164	Nov 2021	-		0.164	-	-	-
		Subtotal	0.000	0.140		0.145		0.164		-		0.164	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
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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 and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Responsible Test Organization (RTO)	PO	96CTG : Eglin AFB, FL	0.000	4.126	Dec 2019	4.511	Dec 2020	4.943	Dec 2021	-		4.943	-	-	-
Certification and Accreditation	MIPR	JITC : Fort Huachuca, AZ	0.000	0.089	Feb 2020	0.092	Feb 2021	0.094	Feb 2022	-		0.094	-	-	-
Type I Training	PO	96CTG : Eglin AFB, FL	0.000	1.545	Jul 2020	1.825	Jul 2021	2.149	Jul 2022	-		2.149	-	-	-
Field Representative Hardware	C/Various	Various : Various	0.000	0.302	Nov 2019	0.374	Nov 2020	0.453	Nov 2021	-		0.453	-	-	-
		Subtotal	0.000	6.062		6.802		7.639		-		7.639	-	-	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
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Engineering and Technical Support	RO	MITRE Corp : Bedford, MA	0.000	3.254	Oct 2018	3.535	Oct 2020	3.025	Oct 2021	-		3.025	-	-	-
		Subtotal	0.000	3.254		3.535		3.025		-		3.025	-	-	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	0.000	62.211		88.517		90.692		-		90.692	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
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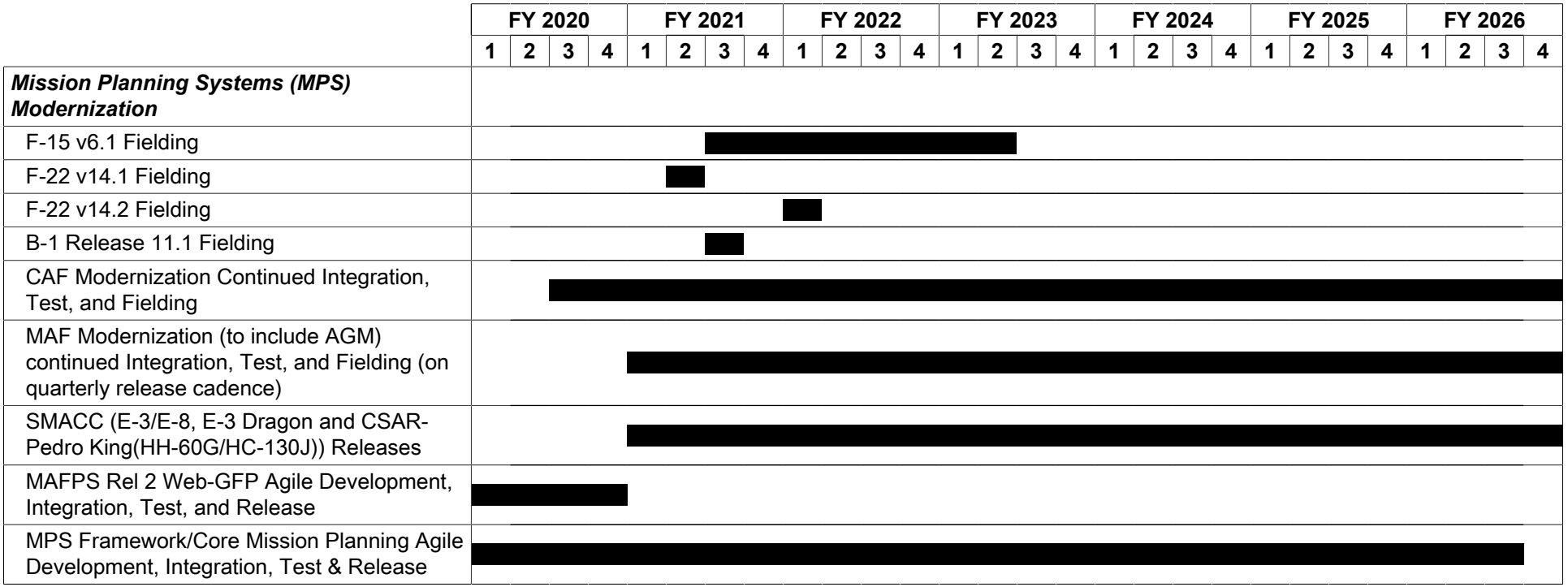

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Mission Planning Systems (MPS) Modernization				
F-15 v6.1 Fielding	3	2021	2	2023
F-22 v14.1 Fielding	2	2021	2	2021
F-22 v14.2 Fielding	1	2022	1	2022
B-1 Release 11.1 Fielding	3	2021	3	2021
CAF Modernization Continued Integration, Test, and Fielding	3	2020	4	2026
MAF Modernization (to include AGM) continued Integration, Test, and Fielding (on quarterly release cadence)	1	2021	4	2026
SMACC (E-3/E-8, E-3 Dragon and CSAR-Pedro King(HH-60G/HC-130J)) Releases	1	2021	4	2026
MAFPS Rel 2 Web-GFP Agile Development, Integration, Test, and Release	1	2020	4	2020
MPS Framework/Core Mission Planning Agile Development, Integration, Test & Release	1	2020	3	2026