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 1206427F / *Space Systems Prototype Transitions (SSPT)*							
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	-	137.470	0.000	0.000	0.000	0.000	-	-	-	-	-	-
645601: *Space System Prototype Transition*	-	137.470	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Per FY 2016 National Defense Authorization Act, the Evolved Expendable Launch Vehicle (EELV) program was renamed National Security Space Launch (NSSL) program. In association with the NSSL name change direction, the Air Force has renamed the Long Duration Propulsive (EELV Secondary Payload Adapter (ESPA)) (LDPE) program to be the ROOSTER program. Pre-existing LDPE-1, LDPE-2 and LDPE-3A mission names will remain unchanged.

A. Mission Description and Budget Item Justification

In FY2021, PE 1206427F, Space Systems Prototype Transitions (SSPT) efforts were transferred to Appropriation 3620F, Research, Development, Test & Evaluation, Space Force, PE 1206427SF, Space Systems Prototype Transitions (SSPT) from Appropriation 3600F, Budget Activity 04 due to the creation of a new Appropriation for Space Force.

$8.787M is included in FY 2021 in the request for Appropriation 3600, Research, Development, Test & Evaluation, Air Force, PE 1206427F; these funds should have been requested under Appropriation 3620 Research, Development, Test & Evaluation, Space Force, PE 1206427SF.

The Space System Prototype Transition (SSPT) Program will identify and address space technology and capability gaps in order to facilitate technology transition to military space prototypes and programs of record. It will conduct a wide array of activities to model, integrate, test, and provide launch integration and support on-orbit testing of prototype technologies. The supported activities include: systems engineering, technology planning, development, demonstrations and testing, as well as modeling, simulations and exercises to support the development and maturation of tactics and procedures. This includes the development and prototyping of critical technology within the Department of Defense, across other government agencies, academic institutions and industry partners that are identified and the necessary systems engineering to effectively employ such systems.

Specifically the SSPT project will include a cost-effective framework to identify, mature and transition demonstrations and prototypes to:

- Rapidly address identified technology or capability gaps
- Accelerate the maturation of systems intended for demonstrations/prototypes that enhance/compliment/replace an existing capability
- Support a more reliable, available, maintainable and survivable military space enterprise
- Energize the space industrial base supporting U.S. national security
- Focus S&T Innovation and facilitate its transition to military space programs of record

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 1206427F / *Space Systems Prototype Transitions (SSPT)*

This program includes efforts for Rapid On-Orbit Space Technology Evaluation Ring (ROOSTER), Tetra, Blackjack, Quasi-Zenith Satellite System (QZSS)-Hosted Payload (HP) and Military Application of the Space Environment (MASE):

ROOSTER is designated to provide a flexible orbit capability to host and deploy numerous prototypes and payloads utilizing excess payload margin available on AFSPC launch missions.

Tetra will provide training platform for operators to develop and demonstrate tactics, techniques and procedures for prototype missions. The experiment directly supports the evolution of U.S. space situational awareness and control.

Blackjack is a joint technology demonstration project by DARPA and the Air Force to evaluate military utility and concepts of operation for a Proliferated Low Earth Orbit (P-LEO) satellite constellation. The project leverages industry innovation in commercial P-LEO concepts by integrating military payloads onboard commercial commoditized satellite vehicles, demonstrating onboard data processing and autonomous tasking, and transmitting encrypted data through a mesh network of satellites in LEO with the goals of augmenting existing warfighter capability, increasing national security space resiliency, and decreasing per-unit satellite costs.

QZSS-HP is a "pacesetter" hosted payload that is a high priority for the U.S. and Japan, paving the way for future Allied collaborations. It enhances Geostationary Earth Orbit (GEO) Space Situational Awareness capabilities over the Eurasian theater and facilitates resilient capabilities in the Space Surveillance Network (SSN).

MASE effort will demonstrate mature space environment technology to improve combat operations. MASE will enhance regional ionospheric specification (nowcasts) and predictions (forecasts) affecting signal propagation paths. MASE uses traditional and non-traditional ionospheric measurements in advanced space environment models to forecast and predict impacts to weapon systems. It contributes to satisfying Gaps 4 and 7 of the Space-Based Environmental Monitoring (SBEM) requirements. MASE was a new start in FY 2019 in the Weather System Follow-On Program, PE 1206422F, and transferred to the Space Systems Prototype Transitions (SSPT) program PE 1206427F in FY 2021.

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.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SSPT 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.

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 1206427F / *Space Systems Prototype Transitions (SSPT)*

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	142.045	8.787	0.000	0.000	0.000
Current President's Budget	137.470	0.000	0.000	0.000	0.000
Total Adjustments	-4.575	-8.787	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	-8.787			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.575	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

FY 2021: $142.808M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

FY 2021: $8.787M: Adjustment to fund MASE effort; funds did not transferred properly from RDT&E, Air Force to RDT&E, Space Force R-1 Line #5.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Technology Maturation and Prototype Development	114.696	0.000	0.000
Description: Plan, develop, test and transition advanced technologies into space system prototypes and capabilities to meet known and emerging threats. Conduct architecture studies, modeling and simulation, technical development, integration and test activities in preparation for transition of critical technologies into prototypes or space programs of record. Develop advanced capabilities for rapid prototyping and integration into space system programs of record and, if requested, to war-fighter Urgent Operational Needs (UONs) and Joint Urgent Operational Needs (JUONs). ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** N/A			
Title: Prototype Integration, Test and On-Orbit Prototype Demonstration	22.774	0.000	0.000
Description: Provide rideshare opportunities for prototypes and experiments, fund mission-unique payload integration to the rideshare or launch system, and conduct launch base integration, testing and launch operations. Conduct prototype integration			

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 1206427F / *Space Systems Prototype Transitions (SSPT)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
and testing into the designated Command and Control system and provide operational support to conduct prototype testing, demonstration and operations. ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** N/A			
Title: Military Application of the Space Environment (MASE) ***Description:*** MASE is not a new start as it was previously funded in Appropriation 3600, RDT&E, Air Force, PE 1206422F, Weather System Follow-on. FY21 funds for the MASE effort did not transfer properly from RDT&E, Air Force to RDT&E, Space Force R-1 Line #5. MASE demonstrates a sensor-to-shooter solution to improve mission effectiveness by providing commanders an operational risk assessment tool. MASE will deliver a capability comprised of weapon system tailored visualizations/decision aids to allow warfighter integration into operational plans and tactics, techniques, and procedures. MASE products and services will be evaluated using quantitative standard measures of performance, effectiveness and outcome against theater operational requirements. ***FY 2021 Plans:*** Continue to conduct studies and perform technical analysis for external data sources and system integration, optimal sensor laydown, and system development. Continue to enhance and improve MASE-related prototypes and models while maintaining Risk Management Framework (RMF) compliance. Conduct field campaigns to validate scientific algorithms, provision cloud services, and deploy ionospheric ground sensors. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Project transferred to Appropriation 3620	-	0.000	-
Accomplishments/Planned Programs Subtotals	137.470	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 1206427F / *Space Systems Prototype Transitions (SSPT)*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. The SSPT program consists of numerous small projects in which the program office will leverage rapid prototyping authorities to the maximum extent possible.

In May 2019 the first three LDPE systems were awarded competitively. The LDPE Acquisition Strategy was amended to include the addition of LDPE-3A. LDPE-3A was justified to be awarded sole source as an option to the existing contract. The acquisition strategy for the follow-on effort to LDPE, called ROOSTER is in work, but expected to be competitively awarded.

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 1206427F / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space System Prototype Transition*	

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
Tetra-1,2 & 3 Integration & On-Orbit Prototype Demonstration	C/FFP	Various : Various	-	8.307	Nov 2019	-		-		-		-	-	-	-
Tetra-3 & 4 Development	C/FFP	York Space Systems : Denver, CO	-	7.226	Nov 2019	-		-		-		-	-	-	-
Sensor XVI	C/FFP	Viasat : Carlsbad, CA	-	1.350	Jan 2020	-		-		-		-	-	-	-
LDPE-1, 2 & 3A Launch Vehicle Integration & Ops	C/CPFF	Northrop Grumman Inno Sys : Dulles, VA	-	14.468	Nov 2019	-		-		-		-	-	-	-
LDPE-3A Development	SS/FFP	Northrop Grumman Inno Sys : Dulles, VA	-	22.692	Feb 2020	-		-		-		-	-	-	-
Blackjack Development	MIPR	Various : Various	-	48.721	Nov 2019	-		-		-		-	-	-	-
QZSS-HP Development	Various	Various : Various	-	24.240	Nov 2019	-		-		-		-	-	-	-
MASE Development	C/Various	Various : CO	-	-		0.000	Nov 2020	-		-		-	-	-	-
		Subtotal	-	127.004		0.000		-		-		-	-	-	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	RO	Various : Various	-	6.185	Jan 2020	-		-		-		-	-	-	-
A&AS	Various	Various : Various	-	3.686	Feb 2020	-		-		-		-	-	-	-
Other Support	Various	Various : El Segundo, CA	-	0.595	Oct 2019	-		-		-		-	-	-	-
		Subtotal	-	10.466		-		-		-		-	-	-	N/A

	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
Project Cost Totals	-	137.470		0.000		-		-		-	-	-	N/A

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 1206427F / *Space Systems Prototype Transitions (SSPT)*	Project (Number/Name) 645601 / *Space System Prototype Transition*	

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract

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 1206427F / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space System Prototype Transition*

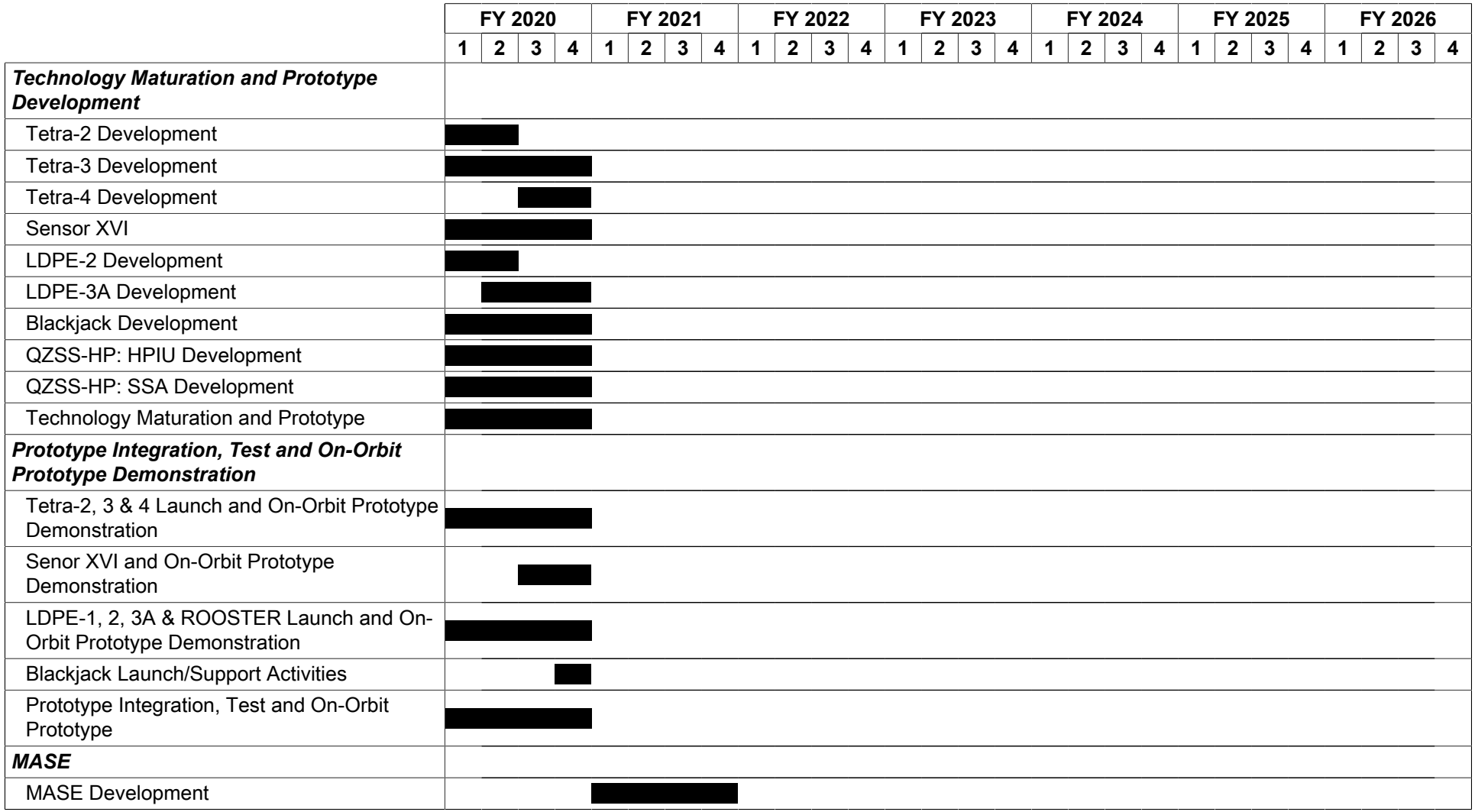

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206427F / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space System Prototype Transition*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Technology Maturation and Prototype Development				
Tetra-2 Development	1	2020	2	2020
Tetra-3 Development	1	2020	4	2020
Tetra-4 Development	3	2020	4	2020
Sensor XVI	1	2020	4	2020
LDPE-2 Development	1	2020	2	2020
LDPE-3A Development	2	2020	4	2020
Blackjack Development	1	2020	4	2020
QZSS-HP: HPIU Development	1	2020	4	2020
QZSS-HP: SSA Development	1	2020	4	2020
Technology Maturation and Prototype	1	2020	4	2020
Prototype Integration, Test and On-Orbit Prototype Demonstration				
Tetra-2, 3 & 4 Launch and On-Orbit Prototype Demonstration	1	2020	4	2020
Senor XVI and On-Orbit Prototype Demonstration	3	2020	4	2020
LDPE-1, 2, 3A & ROOSTER Launch and On-Orbit Prototype Demonstration	1	2020	4	2020
Blackjack Launch/Support Activities	4	2020	4	2020
Prototype Integration, Test and On-Orbit Prototype	1	2020	4	2020
MASE				
MASE Development	1	2021	4	2021