Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Space Development Agency											Date: May 2021	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*							
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	75.216	194.694	636.179	0.000	636.179	-	-	-	-	-	-
001: *Transport*	0.000	0.000	0.000	260.481	0.000	260.481	-	-	-	-	-	-
002: *Sensing*	0.000	0.000	0.000	287.112	0.000	287.112	-	-	-	-	-	-
003: *Integration and Battle Management*	0.000	0.000	0.000	88.586	0.000	88.586	-	-	-	-	-	-
033: *Transport Layer Architecture and Standards*	0.000	15.000	14.891	0.000	0.000	0.000	-	-	-	-	-	-
034: *Space Situational Awareness and Launch*	0.000	10.000	24.740	0.000	0.000	0.000	-	-	-	-	-	-
039: *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	0.000	30.216	39.709	0.000	0.000	0.000	-	-	-	-	-	-
191: *Space-Based Interceptors*	0.000	15.000	0.000	0.000	0.000	0.000	-	-	-	-	-	-
193: *Space-Based Discrimination*	0.000	5.000	0.000	0.000	0.000	0.000	-	-	-	-	-	-
196: *Space Technology Development*	0.000	0.000	115.354	0.000	0.000	0.000	-	-	-	-	-	-

Note

In accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021, effective on October 1, 2022, the Space Development Agency (SDA) will be an element of the U.S. Space Force (USSF), and report to Assistant Secretary of the Air Force (ASAF) for Space Acquisition and Integration (ASAF/SA&I) with respect to acquisition decisions and directly to the Chief of Space Operations with respect to requirements decisions, personnel decisions, and any other matter not covered by ASAF/SA&I.

A. Mission Description and Budget Item Justification

SDA is responsible for developing and demonstrating the next generation space architecture to enable U.S. military operations to be responsive to emerging multi-domain threats against our national security. To achieve that goal, SDA will help inform the Department of Defense (DoD)'s decision to develop and implement a proliferated architecture enabled by lower-cost, mass-produced spacecraft and routine space access; shift the DoD to a development organization focused on experimentation, prototyping, and accelerated fielding. SDA will manage, direct, and execute the development of the space capabilities for the joint warfighter in accordance with DoD's Space Vision and field space capabilities at speed and scale, with the following goals:

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Space Development Agency	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*

• Bold breakthroughs designed to out-pace our competitors,
• Technology maturation and systems engineering,
• Lean engineering, manufacturing, and support,
• Industrial base expansion; streamlined development and acquisition process, and
• Increased acquisition cooperation with the National Reconnaissance Office (NRO).

SDA will rapidly deploy critical elements of next-generation space capabilities, initially focusing on these essential capabilities:

• Persistent global surveillance for advanced missile targeting,
• Indications, warnings, targeting, and tracking for defense against advanced missile threats,
• Alternate position, navigation, and timing (PNT) for a GPS-denied environment,
• Global and near-real time space situational awareness,
• Responsive, resilient, common ground-based space support infrastructure (e.g., ground stations and launch capability),
• Cross-domain, networked, node-independent battle management command, control, and communications (BMC3), and
• Highly-scaled, low-latency, persistent, artificial intelligence-enabled global surveillance.

The establishment of a data transport layer in Low Earth Orbit (LEO) is essential to developing a new, responsive space architecture, and will be SDA's primary initial focus within the National Defense Space Architecture (NDSA). SDA will develop an initial set of sub-constellations on this Transport Layer to provide additional capabilities, such as advanced missile warning.

This program element funds efforts to develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations in support of the DoD Space Vision.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	75.000	215.994	681.898	0.000	681.898
Current President's Budget	75.216	194.694	636.179	0.000	636.179
Total Adjustments	0.216	-21.300	-45.719	0.000	-45.719
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-11.300			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-10.000			
• Reprogrammings	0.216	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustment	-	-	-10.719	-	-10.719

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Space Development Agency	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206410SDA *I Space Technology Development and Prototyping*

• Transfer to MDA PE 1206895C	-	-	-35.000	-	-35.000

Change Summary Explanation

FY 2021 Directed Reduction in the amount of $11.300 million was for unjustified launch costs. The $10.000 million Directed Transfer moved funding to the Missile Defense Agency (MDA) for the Hypersonic and Ballistic Tracking Space Sensor (HBTSS) program. The FY 2022 Economic Assumption / Inflation Adjustment is an adjustment for non-pay, non-fuel purchases based on the revised Gross Domestic Product (GDP) rates provided by the Office of Management and Budget. The $35.000 million reduction in FY 2022 reflects a transfer to fund the HBTSS program under the MDA Program Element (PE) 1206895C. This transfer of funds impacts the Optical Intersatellite Link (OISL) interoperability testing and tracking demonstration plans increasing schedule and technical risk of the Transport and Tracking Tranche 0 effort.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 001 / *Transport*	

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
001: *Transport*	0.000	0.000	0.000	260.481	0.000	260.481	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding was realigned from Project 033 (Transport Layer Architecture and Standards) and Project 196 (Space Technology Development) into this new project code (Project 001) to continue the development and fielding of the National Defense Space Architecture (NDSA). This project code was established to better align budget exhibits with the current Space Development Agency (SDA) construct. Funding in FY 2023 and future years has been transferred to a new Program Element (PE) under the U.S. Space Force (USSF), 1206410SF.

A. Mission Description and Budget Item Justification

SDA is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including low-latency tactical communication enabling beyond line of sight targeting and advanced missile tracking. SDA will orchestrate the rapid development and fielding of the National Defense Space Architecture (NDSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver low-latency data transport and alternate position, navigation, and timing capabilities to U.S. joint warfighting forces in two-year tranches, beginning as early as FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Transport	0.000	0.000	260.481
Description: Develop and demonstrate prototypes that enable a resilient and unified military data transport layer, sensor capabilities, and alternate position, navigation, and timing (APNT) capabilities enabled by a proliferated Low Earth Orbit (pLEO) architecture. This effort will define, demonstrate, and deliver the architectures and standards necessary to rapidly prototype and field new satellite capabilities in LEO.			
FY 2021 Plans: N/A			
FY 2022 Plans: - Develop plans for and begin development of enabling technologies for initial Transport warfighting capability. - Develop 20 Transport Tranche 0 space vehicles. - Complete Tranche 0 interoperability verification testing at Government hardware-in-the-loop (HWIL) test facility. - Conduct flight missions for initial tranche operations. - Develop plans for Tranche 0 capstone demonstrations.			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 001 / *Transport*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
- Launch Transport Tranche 0 satellites. - Develop plans for follow-on tranche capabilities. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding was realigned from Project 033 (Transport Layer Architecture and Standards) and Project 196 (Space Technology Development) into this new project code to continue the development and fielding of the National Defense Space Architecture (NDSA), particularly with Transport activities. The increase will fund Tranche 0 capabilities and follow-on tranche development efforts. Note that this project line includes a $35.000 million transfer to MDA, which will impact the Optical Intersatellite Link (OISL) interoperability testing and tracking demonstration plans increasing schedule and technical risk of the Transport and Tracking Tranche 0 effort.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	260.481

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space and Missile Systems Center (SMC), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 001 / *Transport*	

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
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	0.000		0.000		120.027		0.000		120.027	-	-	-
Transport Tranche 0	C/FFP	York Space Systems : Denver, CO	0.000	0.000		0.000		57.174		0.000		57.174	-	-	-
Multi-Domain Agile Navigation and Timing Network Automation (MANNA) Tranche 0	C/BA	Naval Research Laboratory (NRL) : Washington, DC	0.000	0.000		0.000		0.150		0.000		0.150	-	-	-
Launch Tranche 0	C/CS	SpaceX : Hawthorne, CA	0.000	0.000		0.000		83.130		0.000		83.130	-	-	-
		Subtotal	0.000	0.000		0.000		260.481		0.000		260.481	-	-	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	0.000		0.000		260.481		0.000		260.481	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 001 / *Transport*

	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
Transport																												
Complete the development of Transport Tranche 0 space vehicles.																												
Launch and early operations of Tranche 0 Transport satellites.																												
Begin planning activities for follow-on tranche Transport Layer capabilities.																												

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 001 / *Transport*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Transport				
Complete the development of Transport Tranche 0 space vehicles.	1	2022	4	2022
Launch and early operations of Tranche 0 Transport satellites.	3	2022	4	2023
Begin planning activities for follow-on tranche Transport Layer capabilities.	1	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 002 / *Sensing*	

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
002: *Sensing*	0.000	0.000	0.000	287.112	0.000	287.112	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding was realigned from Project 039 (Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration) and Project 196 (Space Technology Development) into this new project code (Project 002) to continue the development and fielding of the National Defense Space Architecture (NDSA). This project code was established to better align budget exhibits with the current Space Development Agency (SDA) construct. Funding in FY 2023 and future years has been transferred to a new Program Element (PE) under the U.S. Space Force (USSF), 1206410SF.

A. Mission Description and Budget Item Justification

SDA is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including advanced missile tracking and global surveillance enabling beyond-line-of-sight targeting. SDA will orchestrate the rapid development and fielding of the National Defense Space Architecture (NDSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver advanced missile tracking, global surveillance and surface moving target custody, and enhanced space domain awareness and deterrence capabilities to U.S. joint warfighting forces in two-year tranches, beginning as early as FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Sensing	0.000	0.000	287.112
Description: Develop and demonstrate payload prototypes compatible with a proliferated Low Earth Orbit (pLEO) architecture. This effort will focus on developing and demonstrating sensors for beyond-line-of-sight targeting, space-to-space data links, space-to-tactical data links, and advanced missile warning capabilities to enable enhanced space domain awareness, and leveraging small-to-medium launch service access to demonstrate responsive constitution and replenishment. On-orbit demonstrations will be tied to existing mission-specific ground infrastructure, when it exists. Ground infrastructure will be linked or developed to support payload integration and data processing.			
FY 2021 Plans: N/A			
FY 2022 Plans: - Develop Tracking Tranche 0 comprised of up to eight Wide Field of View (WFOV) Overhead Persistent Infrared (OPIR) satellites.			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 002 / *Sensing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
- Integrate Tracking space vehicles with one another and with Transport space vehicles to enable low-latency transport of advanced missile tracking data. - Launch Tracking Tranche 0 satellites. - Demonstrate the performance of the OPIR payloads to detect dim targets with stressing background scenes. - Demonstrate capability to transfer data from tracking layer to existing Joint OPIR Ground (JOG) in standardized formats. - Develop and conduct ground-based demonstration of multi-intelligence (multi-INT) data fusion algorithms on flight-like systems and in flight-like environments; validate on orbit via Transport Tranche 0 to maximum extent possible. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding was realigned from Project 039 (Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration) and Project 196 (Space Technology Development) into this new project code (Project 002) to continue the development and fielding of the National Defense Space Architecture (NDSA). The increase will fund the ramp-up of Tranche 0 Sensing activities and follow-on tranche development efforts.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	287.112

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space and Missile Systems Center (SMC), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 002 / *Sensing*	

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
Tracking Tranche 0	C/FFP	L3Harris : Palm Bay, FL	0.000	0.000		0.000		130.157		0.000		130.157	-	-	-
Tracking Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		0.000		99.947		0.000		99.947	-	-	-
Tranche 1	C/TBD	TBD : TBD	0.000	0.000		0.000		57.008		0.000		57.008	-	-	-
		Subtotal	0.000	0.000		0.000		287.112		0.000		287.112	-	-	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	0.000		0.000		287.112		0.000		287.112	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 002 / *Sensing*

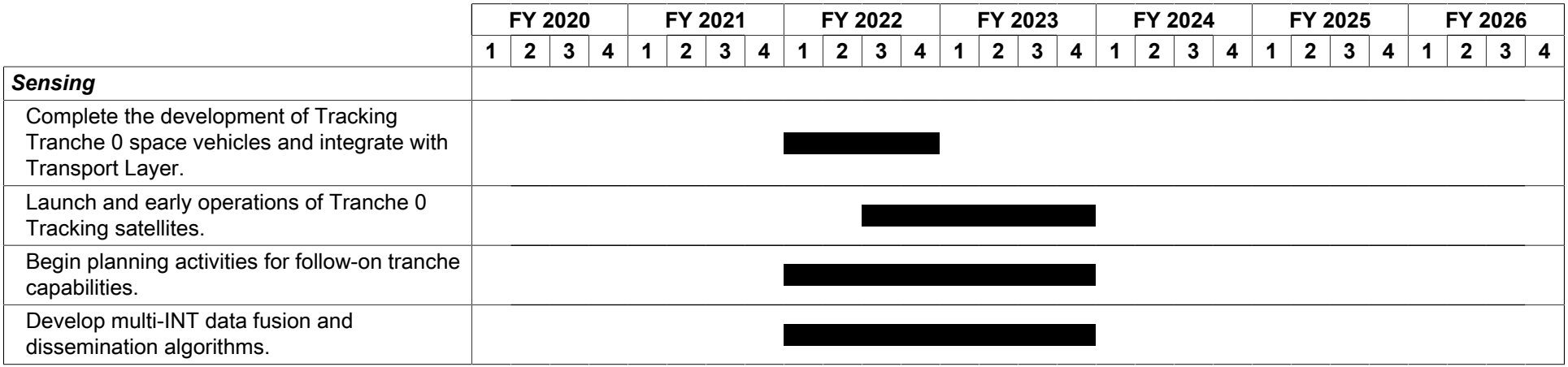

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 002 / *Sensing*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Sensing				
Complete the development of Tracking Tranche 0 space vehicles and integrate with Transport Layer.	1	2022	4	2022
Launch and early operations of Tranche 0 Tracking satellites.	3	2022	4	2023
Begin planning activities for follow-on tranche capabilities.	1	2022	4	2023
Develop multi-INT data fusion and dissemination algorithms.	1	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 003 / *Integration and Battle Management*	

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
003: *Integration and Battle Management*	0.000	0.000	0.000	88.586	0.000	88.586	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding was realigned from Project 034 (Space Situational Awareness and Launch) and Project 196 (Space Technology Development) into this new project code (Project 003) to continue the development and fielding of the National Defense Space Architecture (NDSA). This project code was established to better align budget exhibits with the current Space Development Agency (SDA) construct. Funding in FY 2023 and future years has been transferred to a new Program Element (PE) under the U.S. Space Force (USSF), 1206410SF.

A. Mission Description and Budget Item Justification

SDA is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including space-based battle management and a ground support infrastructure. SDA will orchestrate the rapid development and fielding of the National Defense Space Architecture (NDSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver space-based command and control, tasking, mission processing and dissemination capabilities, as well as an integrated, resilient network of ground support capabilities, to U.S. joint warfighting forces in two-year tranches, beginning as early as FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Integration and Battle Management	0.000	0.000	88.586
Description: Deliver capabilities to U.S. joint warfighting forces in two-year enhanced capability tranches, beginning as early as FY 2022. Products include but are not limited to performing trade studies, technical analyses, or modeling and simulation; identifying and maturing enabling technologies; defining and conducting ground-based and on-orbit risk reduction demonstrations, prototyping hardware or software systems; and exploring novel concepts for future warfighting capabilities augmented by a resilient proliferated Low Earth Orbit (pLEO) satellite architecture. ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** - Conduct hardware-in-the-loop operations to validate Battle Management solutions. - Prepare Naval Research Laboratory's Blossom Point ground station for Tranche 0 satellite operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 003 / *Integration and Battle Management*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
- Complete validation and verification of the Government-owned hardware-in-the-loop testbed capability. - Establish initial SDA ground capability and prepare for Tranche 0 satellite operations. - Launch Tranche 0 satellites. - Develop plans for follow-on tranche capabilities. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding was realigned from Project 034 (Space Situational Awareness and Launch) and Project 196 (Space Technology Development) into this new project code (Project 003) to continue the development and fielding of the National Defense Space Architecture (NDSA). The increase will fund the ramp-up of Tranche 0 integration and battle management activities and follow-on tranche development efforts.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	88.586

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space and Missile Systems Center (SMC), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 003 / *Integration and Battle Management*	

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
Mission Systems Engineering and Integration (MSE&I) Tranche 0	C/FFP	Perspecta : Chantilly, VA	0.000	0.000		0.000		10.066		0.000		10.066	-	-	-
Integration/Support Tranche 0	C/BA	Naval Research Laboratory (NRL) : Washington, DC	0.000	0.000		0.000		10.200		0.000		10.200	-	-	-
Launch Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		0.000		51.287		0.000		51.287	-	-	-
Tranche 1	C/TBD	TBD : TBD	0.000	0.000		0.000		17.033		0.000		17.033	-	-	-
		Subtotal	0.000	0.000		0.000		88.586		0.000		88.586	-	-	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	0.000	0.000		0.000		88.586		0.000		88.586	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 003 / *Integration and Battle Management*

	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
Integration and Battle Management																												
Complete the development of an initial battle management architecture.																												
Complete the development of Tranche 0 ground support infrastructure.																												
Manage Tranche 0 constellation operations.																												
Begin planning activities for follow-on tranche capabilities.																												

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 003 / *Integration and Battle Management*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Integration and Battle Management				
Complete the development of an initial battle management architecture.	1	2022	4	2023
Complete the development of Tranche 0 ground support infrastructure.	1	2022	4	2023
Manage Tranche 0 constellation operations.	1	2022	4	2023
Begin planning activities for follow-on tranche capabilities.	1	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 033 / *Transport Layer Architecture and Standards*	

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
033: *Transport Layer Architecture and Standards*	0.000	15.000	14.891	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 is transferred to the new Transport Project 001. Funding in FY 2023 and future years has been transferred to a new Program Element (PE) under the U.S. Space Force (USSF), 1206410SF.

A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and its sub-constellations to provide the eight capabilities outlined in the Department of Defense (DoD) Space Vision. The Space Development Agency (SDA) will rapidly develop and field the next generation space architecture that will enable the U.S. to deploy space capabilities that out-pace adversarial threats. This architecture is underpinned by common satellite buses, common interfaces between payloads and buses, and common data interfaces and standards. SDA will develop these standards for high power and lower power buses. SDA will develop standard interfaces across these two classes of satellite buses. SDA, in collaboration with other Space stakeholders, will develop communication standards and a ground architecture including user equipment that supports satellites utilizing these standardized products.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Transport Layer Architecture and Standards	15.000	14.891	0.000
Description: Develop and demonstrate prototypes that enable a resilient and unified military data transport layer and sensor capabilities, enabling a pLEO architecture. This effort will define and deliver the architectures and standards necessary to rapidly prototype and field new satellite capabilities in Low Earth Orbit (LEO). ***FY 2021 Plans:*** - Perform technology development and in-flight demonstrations to test and demonstrate optical intersatellite link technologies. ***FY 2022 Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding in FY 2022 is transferred to the new Transport Project, 001.			
Accomplishments/Planned Programs Subtotals	15.000	14.891	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 033 / *Transport Layer Architecture and Standards*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

Partners for these activities include DoD research centers, large defense contractors, and commercial space providers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 033 / *Transport Layer Architecture and Standards*	

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
Transport Tranche 0	C/FFP	York Space Systems : Denver, CO	0.000	6.264	Aug 2020	0.000		0.000		0.000		0.000	-	-	-
MANDRAKE 2	C/FFP	Lockheed Martin : Sunnyvale, CO	0.000	1.900	Jul 2020	0.000		0.000		0.000		0.000	-	-	-
Optical Intersatellite Links (OISL)	SS/FFP	General Atomics : San Diego, CA	0.000	5.490	Jun 2020	0.000		0.000		0.000		0.000	-	-	-
Multi-Domain Agile Navigation and Timing Network Automation (MANNA)	MIPR	Naval Research Laboratory : Washington, DC	0.000	1.346	Jun 2020	0.000		0.000		0.000		0.000	-	-	-
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	0.000		5.750	Feb 2021	0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/FFP	TBD : TBD	0.000	0.000		9.141		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	15.000		14.891		0.000		0.000		0.000	-	-	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	0.000	15.000		14.891		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 033 / *Transport Layer Architecture and Standards*

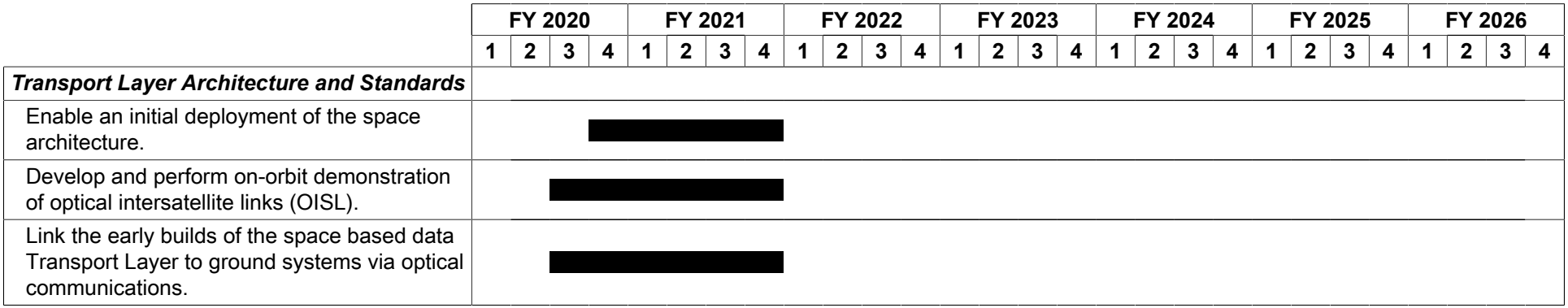

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 033 / *Transport Layer Architecture and Standards*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Transport Layer Architecture and Standards				
Enable an initial deployment of the space architecture.	4	2020	4	2021
Develop and perform on-orbit demonstration of optical intersatellite links (OISL).	3	2020	4	2021
Link the early builds of the space based data Transport Layer to ground systems via optical communications.	3	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 034 / *Space Situational Awareness and Launch*	

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
034: *Space Situational Awareness and Launch*	0.000	10.000	24.740	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 is transferred to the new Integration and Battle Management Project, 003. Funding in FY 2023 and future years has been transferred to a new Program Element (PE) under the U.S. Space Force (USSF), 1206410SF.

A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and its sub-constellations to provide the eight capabilities outlined in the Department of Defense (DoD) Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. The Space Situational Awareness (SSA) and Launch project will further support this vision of enhanced resilience. Global and near real-time SSA will provide a detailed understanding of the space order of battle and a responsive launch capability needed to enable rapid constitution or replenishment of space capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Space Situational Awareness and Launch	10.000	24.740	0.000
Description: Develop transport layer to provide critical data transfer capabilities, such as dissemination of space situational awareness data. In addition, this effort will identify and contract for launch of small-to-medium size payloads, to demonstrate responsive constitution and replenishment. ***FY 2021 Plans:*** - Identify launch opportunities for Space Transport Layer demonstration. - Design and develop initial pLEO data transport capabilities. - Improve architecture resilience by developing advanced beyond-line-of-sight communications systems. - Develop deep space surveillance plans. ***FY 2022 Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding in FY 2022 is transferred to the new Integration and Battle Management Project, 003.			
Accomplishments/Planned Programs Subtotals	10.000	24.740	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 034 / *Space Situational Awareness and Launch*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

Partners for these activities include commercial space providers and Federally Funded Research and Development Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 034 / *Space Situational Awareness and Launch*	

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
Transport Tranche 0	C/FFP	York Space Systems : Denver, CO	0.000	9.600	Aug 2020	0.000		0.000		0.000		0.000	-	-	-
Battle Management Command, Control, and Communication (BMC3) Tasks	FFRDC	CMU/SEI : Pittsburgh, PA	0.000	0.400	Jul 2020	0.000		0.000		0.000		0.000	-	-	-
Integration Tranche 0	MIPR	NRL : Washington, DC	0.000	0.000		2.554	Oct 2020	0.000		0.000		0.000	-	-	-
Launch Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		4.207	Dec 2020	0.000		0.000		0.000	-	-	-
Tranche 1	C/Various	TBD : TBD	0.000	0.000		15.763		0.000		0.000		0.000	-	-	-
Laser Interconnect and Communications System (LINCS) Rideshare Integration	C/IDIQ	Perspecta Engineering : Chantilly, VA	0.000	0.000		1.788	Feb 2021	0.000		0.000		0.000	-	-	-
Launch Tranche 0 Options	Option/ FFP	SpaceX : Hawthorne, CA	0.000	0.000		0.425		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	10.000		24.737		0.000		0.000		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
Interest Payment	MIPR	WHS : Washington, DC	0.000	0.000		0.003	Nov 2020	0.000		0.000		0.000	-	-	-
		Subtotal	0.000	0.000		0.003		0.000		0.000		0.000	-	-	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	10.000		24.740		0.000		0.000		0.000	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 034 / *Space Situational Awareness and Launch*	

	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 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 034 / *Space Situational Awareness and Launch*

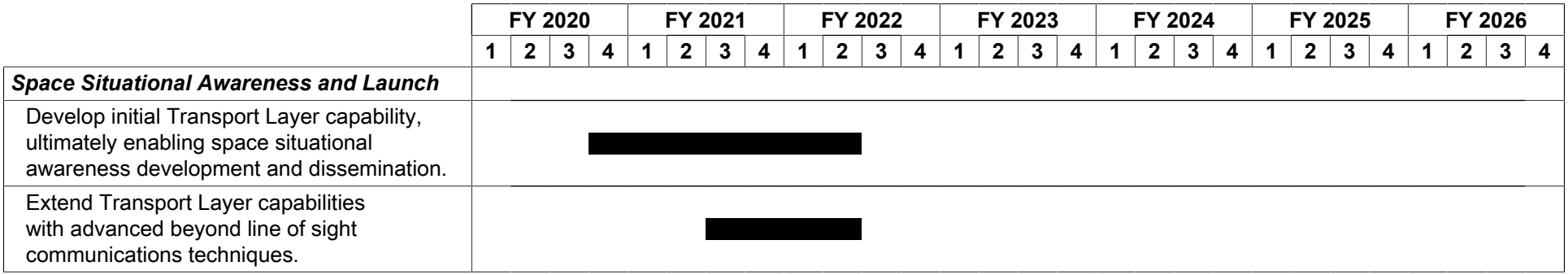

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 034 / *Space Situational Awareness and Launch*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Situational Awareness and Launch				
Develop initial Transport Layer capability, ultimately enabling space situational awareness development and dissemination.	4	2020	2	2022
Extend Transport Layer capabilities with advanced beyond line of sight communications techniques.	3	2021	2	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 039 / *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	

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
039: *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	0.000	30.216	39.709	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 is transferred to the new Sensing Project, 002. Funding in FY 2023 and future years has been transferred to a new Program Element (PE) under the U.S. Space Force (USSF), 1206410SF.

A. Mission Description and Budget Item Justification

The proliferated Low Earth Orbit (pLEO) Payload and Ground Integration project will enable a persistent global surveillance capability, enabled by a pLEO data communications transport layer that will provide indications, warnings, targeting, and tracking to support the defeat of advanced missile threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: pLEO Missile Warning Ground Integration	30.216	39.709	0.000
Description: Develop and demonstrate payload prototypes compatible with a pLEO architecture. This effort will focus on developing and demonstrating sensors for beyond-line-of-sight targeting, space-to-space data links, space-to-tactical data links, and advanced missile warning capabilities. On-orbit demonstrations will be tied to existing mission specific ground infrastructure, when it exists. Ground infrastructure will be linked or developed to support payload integration and data processing. ***FY 2021 Plans:*** - Develop multi-band wide field of view (WFOV) overhead persistent infrared (OPIR) payload to evaluate OPIR detection and tracking methods from Low Earth Orbit (LEO). - Integrate payload with satellite bus, launch satellite, and conduct tracking experiments in LEO. - Develop medium field of view (MFOV) OPIR experiment to reduce technical risk of hybrid WFOV/MFOV missile tracking architecture. ***FY 2022 Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding in FY 2022 is transferred to the new Sensing Project, 002.			
Accomplishments/Planned Programs Subtotals	30.216	39.709	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 039 / *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

Partners for these activities include Department of Defense (DoD) research centers, large defense contractors, and commercial space providers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 039 / *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	

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
Transport Tranche 0	C/FFP	York Space Systems : Denver, CO	0.000	0.302	Aug 2020	0.000		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	L3Harris : Melbourne, FL	0.000	4.240	Sep 2020	19.214		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	4.906	Sep 2020	19.505		0.000		0.000		0.000	-	-	-
Support Tranche 0	C/FFP	Space X : Hawthorne, CA	0.000	1.053	Dec 2020	0.000		0.000		0.000		0.000	-	-	-
Transport Tranche 0	C/CPFF	Lockheed Martin : Littleton, CO	0.000	0.808	Mar 2021	0.000		0.000		0.000		0.000	-	-	-
Payload Mods & Flight Units	C/FFP	Collins Aerospace : Danbury, CT	0.000	1.380	Mar 2020	0.000		0.000		0.000		0.000	-	-	-
Multi-Band OPIR Payload (MBOP)	SS/CR	Collins Aerospace : Danbury, CT	0.000	5.148	May 2020	0.000		0.000		0.000		0.000	-	-	-
Prototype Infrared Payload (PIRPL)	SS/CPFF	Northrop Grumman : Huntsville, AL	0.000	3.811	Jun 2020	0.794		0.000		0.000		0.000	-	-	-
MQ9 Integration	C/TBD	General Atomics : San Diego, CA	0.000	6.002		0.000		0.000		0.000		0.000	-	-	-
Commercial Tranche 0 Optical Intersatellite Links (OISL) Demo	C/TBD	Capella : San Francisco, CA	0.000	2.466		0.000		0.000		0.000		0.000	-	-	-
MANDRAKE 2	C/FFP	Lockheed Martin : Sunnydale, CA	0.000	0.100		0.000		0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/TBD	TBD : TBD	0.000	0.000		0.196		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	30.216		39.709		0.000		0.000		0.000	-	-	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	30.216		39.709		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 039 / *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*

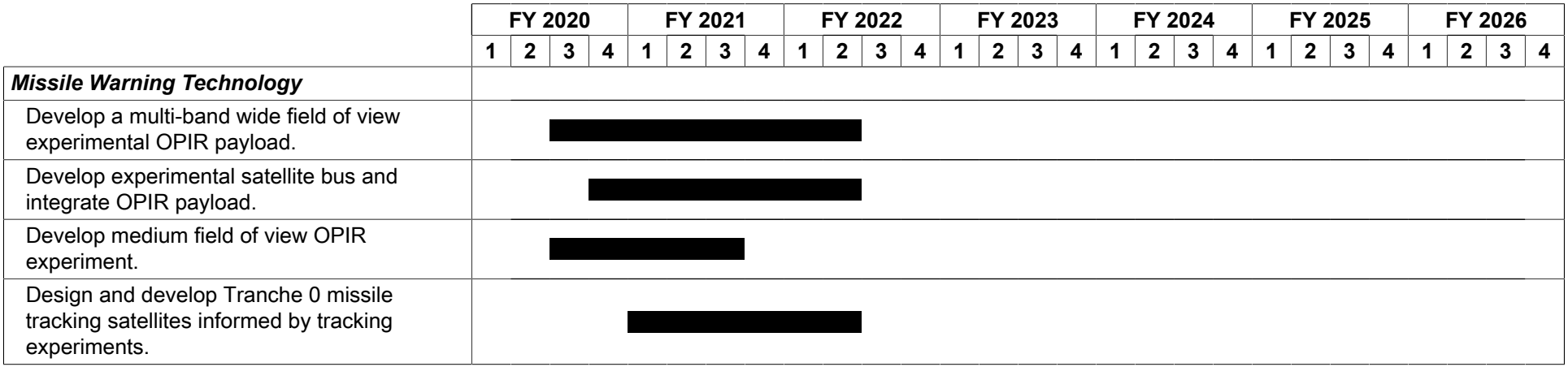

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 039 / *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Missile Warning Technology				
Develop a multi-band wide field of view experimental OPIR payload.	3	2020	2	2022
Develop experimental satellite bus and integrate OPIR payload.	4	2020	2	2022
Develop medium field of view OPIR experiment.	3	2020	3	2021
Design and develop Tranche 0 missile tracking satellites informed by tracking experiments.	1	2021	2	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 191 / *Space-Based Interceptors*	

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
191: *Space-Based Interceptors*	0.000	15.000	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations to provide the eight capabilities outlined in the Department of Defense (DoD) Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort focused on developing the battle management software, infrastructure, and test capabilities to ensure maximum utility of pLEO hardware. This effort supported on-board space data processing, data ingest and fusion of legacy, current, and future space-based capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Space-Based Interceptor Assessment	15.000	0.000	0.000
Description: Developed software to support Battle Management Command, Control, and Communications that optimizes use of fielded space, ground, and user hardware, minimizes required communication bandwidths, and supports tactical users. ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** While funding for this Project code ended in FY 2020, the work initiated in this Project code continues in FY 2021 under Project codes 039 and 196. This work initiated the development of the Transport Layer, and initial OPIR background measurement payload development for missile targeting data dissemination.			
Accomplishments/Planned Programs Subtotals	15.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities included large defense contractors.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 191 / *Space-Based Interceptors*

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
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	11.200	Aug 2020	0.000		0.000		0.000		0.000	-	-	-
Transport Tranche 0	C/FFP	York : Denver, CO	0.000	0.217	Aug 2020	0.000		0.000		0.000		0.000	-	-	-
Prototype Infrared Payload (PIRPL)	SS/FFP	Northrop Grumman : Huntsville, AL	0.000	3.583	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	15.000		0.000		0.000		0.000		0.000	-	-	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	15.000		0.000		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 191 / *Space-Based Interceptors*

	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
Space-Based Interceptor																												
Develop medium field of view OPIR experiment enabling advanced missile detection and tracking.			[redacted]																									
Develop initial data transport capabilities enabling the dissemination of missile targeting data.				[redacted]																								

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 191 / *Space-Based Interceptors*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space-Based Interceptor				
Develop medium field of view OPIR experiment enabling advanced missile detection and tracking.	3	2020	3	2021
Develop initial data transport capabilities enabling the dissemination of missile targeting data.	4	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 193 / *Space-Based Discrimination*	

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
193: *Space-Based Discrimination*	0.000	5.000	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and its sub-constellations to provide the eight capabilities outlined in the Department of Defense (DoD) Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Space-Based Discrimination Assessment	5.000	0.000	0.000
Description: Design and demonstrate initial data transport capabilities in a pLEO architecture to enable future dissemination of advanced missile warning and tracking data to tactical users. ***FY 2021 Plans:*** N/A ***FY 2022 Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** While funding for this Project code ended in FY 2020, the work initiated in this Project code continues in FY 2021 under Project code 196. This work initiated the development of the Transport Layer for data dissemination.			
Accomplishments/Planned Programs Subtotals	5.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities included large defense contractors.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 193 / *Space-Based Discrimination*

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
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	5.000	Aug 2020	0.000		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	5.000		0.000		0.000		0.000		0.000	-	-	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	5.000		0.000		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 193 / *Space-Based Discrimination*

	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
Space-Based Discrimination																												
Develop initial data transport capabilities enabling the dissemination of missile targeting data.					[redacted]																							

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 193 / *Space-Based Discrimination*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space-Based Discrimination				
Develop initial data transport capabilities enabling the dissemination of missile targeting data.	4	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / *Space Technology Development and Prototyping*	Project (Number/Name) 196 / *Space Technology Development*	

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
196: *Space Technology Development*	0.000	0.000	115.354	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 is transferred to the new Transport, Sensing, and Integration and Battle Management Project codes.

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. The SDA is developing capabilities to address a wide range of Department space needs as stated in the National Defense Strategy and Department of Defense (DoD) Space Vision, including low-latency tactical communication, beyond-line-of-sight targeting, and advanced missile tracking. SDA will orchestrate the rapid development and fielding of the National Defense Space Architecture (NDSA), a resilient military sensing and data transport capability via a proliferated space architecture in low-earth orbit.

This program element funds the space technology development and prototyping activity to deliver a resilient military sensing and data transport capability via a proliferated space architecture to U.S. joint warfighting forces in two-year tranches, beginning as early as FY 2022. These capabilities including a low-latency mesh network data transport layer; advanced missile tracking layer; global surveillance and surface moving target custody layer; low-latency sensor tasking, command and control, and data dissemination layer; alternate position, navigation, and timing layer; enhanced space situational awareness and deterrence layer; and common ground segment and launch services layer.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Space Technology Development	0.000	115.354	0.000
Description: Space technology development and prototyping of a resilient military sensing and data transport capability via a proliferated space architecture in Low Earth Orbit (LEO). ***FY 2021 Plans:*** - Design and begin development of Transport Layer Tranche 0 capability. - Design and begin development of wide field-of-view infrared payload with sensitivity sufficient to detect advance missile threats. - Design and begin development of ground support infrastructure and integration with space constellation to support Tranche 0 mission operations. - Design, develop, and test hardware-in-the-loop facility to support architecture interoperability testing and validation. ***FY 2022 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 196 / *Space Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding in FY 2022 is transferred to the new Transport, Sensing, and Integration and Battle Management Project codes.			
Accomplishments/Planned Programs Subtotals	0.000	115.354	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space and Missile Systems Center (SMC), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 196 / *Space Technology Development*

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
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	0.000		43.390		0.000		0.000		0.000	-	-	-
Transport Tranche 0	C/FFP	York Space Systems, LLC : Denver, CO	0.000	0.000		19.986		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		9.900		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	L3Harris : Palm Bay, FL	0.000	0.000		19.440		0.000		0.000		0.000	-	-	-
Mission Systems Engineering and Integration (MSE&I)	C/CPFF	Perspecta Engineering Inc : Chantilly, VA	0.000	0.000		11.357		0.000		0.000		0.000	-	-	-
Launch Tranche 0	C/CPFF	SpaceX : Hawthorne, CA	0.000	0.000		4.500		0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/FFP	TBD : TBD	0.000	0.000		6.781		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	0.000		115.354		0.000		0.000		0.000	-	-	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	0.000		115.354		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 196 / *Space Technology Development*

	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
Space Technology Development																												
Develop Tranche 0 data transport capabilities.					[redacted]																							
Develop hardware in the loop test facility supporting Tranche 0 capability development.					[redacted]																							
Develop and integrate Tranche 0 ground support infrastructure.					[redacted]																							

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Space Development Agency		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 196 / *Space Technology Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Technology Development				
Develop Tranche 0 data transport capabilities.	1	2021	4	2022
Develop hardware in the loop test facility supporting Tranche 0 capability development.	1	2021	4	2022
Develop and integrate Tranche 0 ground support infrastructure.	1	2021	4	2022