Department of Defense
Fiscal Year (FY) 2023 Budget Estimates

April 2022

Space Development Agency

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Table of Volumes

Volume 5 Table of Contents

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Department of Defense
FY 2023 President's Budget
Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

13 Apr 2022

Appropriation	FY 2021 (Base + OCO)	FY 2022 Less Supplementals Enactment	FY 2022 Division B Division C P.L.117-43 Enactment*	FY 2022 Division B P.L.117-70 Enactment**	FY 2022 Division A P.L. 117-86 Enactment***	FY 2022 Division N P.L. 117-103 Enactment****
Research, Development, Test & Eval, DW	267,116	1,376,817				
Total Research, Development, Test & Evaluation	267,116	1,376,817				

R-123PBP: FY 2023 President's Budget (Total Base Published Version), as of April 13, 2022 at 08:16:16
*Includes enacted funding pursuant to the Extending Government Funding and Delivering Emergency Assistance Act (Public Law 117-43).
**Includes enacted funding pursuant to the Further Extending Government Funding Act (Public Law 117-70).
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Department of Defense
FY 2023 President's Budget
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Total Obligational Authority
(Dollars in Thousands)

13 Apr 2022

Appropriation	FY 2022 Total Supplemental Enactment	FY 2022 Total Enactment	FY 2023 Request
Research, Development, Test & Eval, DW		1,376,817	
Total Research, Development, Test & Evaluation		1,376,817	

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Department of Defense
FY 2023 President's Budget
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13 Apr 2022

Summary Recap of Budget Activities	FY 2021 (Base + OCO)	FY 2022 Less Supplementals Enactment	FY 2022 Division B Division C P.L.117-43 Enactment*	FY 2022 Division B P.L.117-70 Enactment**	FY 2022 Division A P.L. 117-86 Enactment***	FY 2022 Division N P.L. 117-103 Enactment****
Advanced Technology Development	69,914	172,638				
Advanced Component Development & Prototypes	187,953	1,204,179				
Management Support	9,249					
Total Research, Development, Test & Evaluation	267,116	1,376,817				

Summary Recap of FYDP Programs

Research and Development	9,249					
Space	257,867	1,376,817				
Total Research, Development, Test & Evaluation	267,116	1,376,817				

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Advanced Technology Development		172,638	
Advanced Component Development & Prototypes		1,204,179	
Management Support			
Total Research, Development, Test & Evaluation		1,376,817	

Summary Recap of FYDP Programs			
Research and Development			
Space		1,376,817	
Total Research, Development, Test & Evaluation		1,376,817	

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Space Development Agency		1,376,817	
Total Research, Development, Test & Evaluation		1,376,817	

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Defense-Wide
FY 2023 President's Budget
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(Dollars in Thousands)

13 Apr 2022

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Less Supplementals Enactment	FY 2022 Division B Division C P.L.117-43 Enactment*	FY 2022 Division B P.L.117-70 Enactment**	FY 2022 Division A P.L. 117-86 Enactment***	FY 2022 Division N P.L. 117-103 Enactment****	Sec
73	1206310SDA	Space Science and Technology Research and Development	03	69,914	172,638					U
		Advanced Technology Development		69,914	172,638					
121	1206410SDA	Space Technology Development and Prototyping	04	187,953	1,204,179					U
		Advanced Component Development & Prototypes		187,953	1,204,179					
164	0605502SDA	Small Business Innovative Research	06	9,249						U
		Management Support		9,249						
Total Research, Development, Test & Eval, DW				267,116	1,376,817					

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FY 2023 President's Budget
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13 Apr 2022

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2022 Total Supplemental Enactment	FY 2022 Total Enactment	FY 2023 Request	Sec
73	1206310SDA	Space Science and Technology Research and Development	03		172,638		U
		Advanced Technology Development			172,638		
121	1206410SDA	Space Technology Development and Prototyping	04		1,204,179		U
		Advanced Component Development & Prototypes			1,204,179		
164	0605502SDA	Small Business Innovative Research	06				U
		Management Support					
Total Research, Development, Test & Eval, DW					1,376,817		

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Space Development Agency
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73	1206310SDA	Space Science and Technology Research and Development	03	69,914	172,638					U
	Advanced Technology Development			69,914	172,638					
121	1206410SDA	Space Technology Development and Prototyping	04	187,953	1,204,179					U
	Advanced Component Development & Prototypes			187,953	1,204,179					
164	0605502SDA	Small Business Innovative Research	06	9,249						U
	Management Support			9,249						
Total Space Development Agency				267,116	1,376,817					

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Space Development Agency
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13 Apr 2022

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2022 Total Supplemental Enactment	FY 2022 Total Enactment	FY 2023 Request	Sec
73	1206310SDA	Space Science and Technology Research and Development	03		172,638		U
	Advanced Technology Development				172,638		
121	1206410SDA	Space Technology Development and Prototyping	04		1,204,179		U
	Advanced Component Development & Prototypes				1,204,179		
164	0605502SDA	Small Business Innovative Research	06				U
	Management Support						
Total Space Development Agency					1,376,817		

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Program Element Table of Contents (by Budget Activity then Line Item Number)

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

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Program Element Table of Contents (Alphabetically by Program Element Title)

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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SDA / *Space Science and Technology Research and Development*

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	0.000	69.914	172.638	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
012: *Space Development Agency R&E*	0.000	69.914	172.638	0.000	0.000	0.000	0.000	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, 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. This program and funding continue in FY 2023 forward under Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206310SF.

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 and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of the Department of Defense (DoD) space needs as stated in the National Defense Strategy and the DoD Space Vision, including low-latency tactical communication, beyond-line-of-sight targeting, and advanced missile tracking. Specifically, SDA will demonstrate and field persistent, resilient capabilities needed to be responsive to emerging multi-domain threats against the U.S. national interest. SDA is responsible for the overall programmatic development and execution of a National Defense Space Architecture (NDSA). In coordination with other DoD Space stakeholders, SDA will drive the development of space capabilities to achieve the DoD Space Vision and reduce overlap and inefficiency. SDA will expand the DoD's space warfighting capability and foster growth in the U.S. space industrial base, by developing enhanced government-commercial relationships and international collaborations with key allies and partners.

While SDA is not responsible for building and fielding all capabilities within the NDSA, the Agency is responsible for orchestrating and architecting the NDSA and ensuring capability delivery to the warfighter following a spiral development approach. SDA is building and fielding the Transport Layer, a proliferated constellation of satellites to provide low-latency, high-volume data to the warfighter. This transport layer will provide the space-based data transport backbone for Joint All-Domain Command and Control (JADC2).

The establishment of a proliferated data transport layer is essential to developing a new and responsive space architecture. SDA will leverage the Transport Layer to integrate and deliver multiple warfighting capabilities, such as advanced missile warning and tracking, 24/7/365 custody of time critical targets, and alternative position, navigation and timing (PNT) in navigation warfare (NAVWAR) resilient environments.

This program element funds efforts to develop and demonstrate a prototype proliferated communications and data transport layer and other capability layers in support of the National Defense Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SDA *I Space Science and Technology Research and Development*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	72.422	172.638	0.000	0.000	0.000
Current President's Budget	69.914	172.638	0.000	0.000	0.000
Total Adjustments	-2.508	0.000	0.000	0.000	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.508	-			

Change Summary Explanation

FY 2021 funding in the amount of $2.508 million was transferred to SBIR/STTR PE 0605502SDA.

Funding continues in FY 2023 and out under Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206310SF.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 1206310SDA / *Space Science and Technology Research and Development*	Project (Number/Name) 012 / *Space Development Agency R&E*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
012: *Space Development Agency R&E*	0.000	69.914	172.638	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding for FY 2023 and future years has been transferred to a new Program Element (PE), 1206310SF, under the U.S. Space Force (USSF), Research, Development, Test and Evaluation, appropriation.

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 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, 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 research and development activity to deliver capabilities to U.S. joint warfighting forces in two-year tranches, beginning in FY 2022, including performing trade studies, technical analyses, or modeling and simulation; identifying and maturing enabling technologies; defining and conducting risk reduction demonstrations, prototyping hardware or software systems; and exploring novel concepts for future warfighting capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Space Development Agency R&E	69.914	172.638	-
Description: Research and development activities to support development, demonstration, and fielding of a resilient military sensing and data transport capability via a proliferated space architecture in Low Earth Orbit (LEO). ***FY 2022 Plans:*** Tranche 0 - Demonstrate alternate position, navigation, and timing orbit and clock software. - Perform ground-based processing of missile tracking scene data collected in FY 2021. - Develop and conduct ground-based demonstration of multi-intelligence data fusion algorithms on flight-like systems and in flight-like environments. - Develop algorithms for integrated battle management, command, control, and communications (BMC3) applications. Tranche 1			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 1206310SDA / *Space Science and Technology Research and Development*	**Project (Number/Name)** 012 / *Space Development Agency R&E*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
- Begin Transport space vehicle system design. - Continue design and analysis efforts for TACSATCOM payloads planned for demonstration in Tranche 1 and proliferation beginning with NDSA Tranche 2. - Complete space vehicle-specific interface control documents for Partner Payload Program participants. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The program continues in the USSF PE 1206310SF.			
Accomplishments/Planned Programs Subtotals	69.914	172.638	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTE BA 03: *1206310SF, Space Science & Technology R&D*	0.000	0.000	460.820	0.000	460.820	690.386	527.806	540.040	550.556	Continuing	Continuing

Remarks

N/A

D. Acquisition Strategy

Partners for these activities include DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, University Affiliated Research Centers, Missile Defense Agency (MDA), and Space Systems Command (SSC). SDA is also a transition partner for technology developers seeking to conduct on-orbit experimentation and prototyping.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency											Date: April 2022	
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 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	187.953	1,204.179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
001: *Transport*	0.000	0.000	260.481	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
002: *Sensing*	0.000	0.000	837.112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
003: *Integration and Battle Management*	0.000	0.000	106.586	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
033: *Transport Layer Architecture and Standards*	0.000	26.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
034: *Space Situational Awareness and Launch*	0.000	23.601	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
039: *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	0.000	31.369	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
196: *Space Technology Development*	0.000	106.928	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-

Note

This program and funding continue in FY 2023 and out under Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206410SF. 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:

- 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 navigation warfare (NAVWAR) resilient 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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	194.694	636.179	0.000	0.000	0.000
Current President's Budget	187.953	1,204.179	0.000	0.000	0.000
Total Adjustments	-6.741	568.000	0.000	0.000	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	580.000			
• Congressional Directed Transfers	-	-12.000			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-6.741	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)

	FY 2021	FY 2022
Project: 001: *Transport*		

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
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*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Congressional Add: *Laser Communication Router Demonstration System*	-	12.000
Congressional Add Subtotals for Project: 001	-	12.000
Project: 002: *Sensing*		
Congressional Add: *Missile Tracking Demonstration (Tracking Layer)*	-	550.000
Congressional Add Subtotals for Project: 002	-	550.000
Project: 003: *Integration and Battle Management*		
Congressional Add: *Space Networking Centers*	-	18.000
Congressional Add Subtotals for Project: 003	-	18.000
Congressional Add Totals for all Projects	-	580.000

Change Summary Explanation

FY 2021 funding in the amount of $6.741 million was transferred to SBIR/STTR PE 0605502SDA.

FY 2022 Congressional marks resulted in a net gain of $568.000 million. Project 001 (Transport) was increased by $12.000 million to develop a laser communication router demonstration system and decreased by $12.000 million for the Congressional Directed Transfer to SDA's Procurement PE (1203953SDA - Line Item NSSL01) for Tranche 1 launch. Project 001 also includes a transfer of $20.000 million from SDA Tranche 1 satellite cost savings to be used for SDA Tranche 1 launch Integration. Project 002 (Sensing) was increased by $550.000 million to develop a Missile Tracking demonstration (Tracking Layer) in support of USINDOPACOM's needs. Project 003 (Integration and Battle Management) was increased by $18.000 million for the Space Networking Centers in Redstone Arsenal, AL and Grand Forks, ND.

Starting in FY 2023, the program and funding for PE 1206410SDA has been transferred to Appropriation 3620, RDT&E, Space Force, PE 1206410SF.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
001: *Transport*	0.000	0.000	260.481	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2022, funding was realigned from Project 033 (Transport Layer Architecture and Standards) and Project 196 (Space Technology Development) into this 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 Program Element (PE) 1206410SF under the U.S. Space Force (USSF).

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 is orchestrating 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 bi-annual tranches, beginning in FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Transport	0.000	248.481	-
Description: Rapidly develop, deploy 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 2022 Plans: Tranche 0: - Finalize design and development of Transport warfighter immersion constellation. - Develop, integrate and test 20 Transport Tranche 0 space vehicles. - Complete Tranche 0 interoperability verification testing at Government hardware-in-the-loop (HWIL) test facility. - Ready flight missions for initial tranche operations. - Finalize plans for Tranche 0 capstone demonstrations. - Complete first launch of Tranche 0 satellites.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
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 2021	FY 2022	FY 2023
- Complete all operations preparations at Naval Research Laboratory Blossom Point Tracking Facility in advance of satellite launch, early operations and full orbital check out. Tranche 1: - Conduct source selection and contract initialization for Transport Tranche 1 satellites. - Conduct source selection and contract initialization for Operations and Integration (constellation, network and mission ground systems) for Transport Tranche 1 capability. - Conduct source selection and contract initialization for Tranche 1 Demonstration and Experimentation System (T1DES). - Mature design of Transport Tranche 1 satellites. - Design Battle Management, Command, Control and Communications (BMC3) Interoperability and Security Layer for Transport Tranche 1 capability. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding in FY 2023 and future years has been transferred to a new PE under the USSF, 1206410SF.			
Accomplishments/Planned Programs Subtotals	0.000	248.481	-

	FY 2021	FY 2022
Congressional Add: Laser Communication Router Demonstration System	-	12.000
FY 2022 Plans: Conduct additional development and testing for space to air capabilities required in three areas: noncoherent laser communication development and testing from space vehicle to airborne platform; modem development and design for small Size, Weight, and Power (SWaP) associated with limited real estate associated with airborne vehicles; and the command and control associated with commanding a SV to communicate with a specific airborne platform in a very defined geographic region. Conduct contract initialization of vendors to support these three areas.		
Congressional Adds Subtotals	-	12.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTE 04: *1206410SF, Space Technology Development and Prototyping, Project: Transport*	0.000	0.000	816.442	0.000	816.442	1,448.089	1,317.715	1,484.437	1,517.891	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 001 / *Transport*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), 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. Tranche 1 has been approved to Middle Tier of Acquisition, enabling rapid prototyping.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Space Development Agency		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	0.000		101.903	Oct 2021	0.000		0.000		0.000	-	-	-
Transport Tranche 0	C/FFP	York Space Systems : Denver, CO	0.000	0.000		51.924	Jan 2022	0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/FFP	Lockheed Martin : Littleton, CO	0.000	0.000		36.958	Feb 2022	0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/FFP	York Space Systems : Denver, CO	0.000	0.000		22.023	Feb 2022	0.000		0.000		0.000	-	-	-
Tranche 1 Crypto Risk Reduction	SS/TBD	Missile Defense Agency (MDA) : Ft. Belvoir, VA	0.000	0.000		1.689	Mar 2022	0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/CPFF	TBD : TBD	0.000	0.000		33.984	Sep 2022	0.000		0.000		0.000	-	-	-
Laser Communication Router Demonstration System	C/TBD	TBD : TBD	0.000	0.000		12.000	Sep 2022	0.000		0.000		0.000	-	-	-
		Subtotal	0.000	0.000		260.481		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		260.481		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 001 / *Transport*

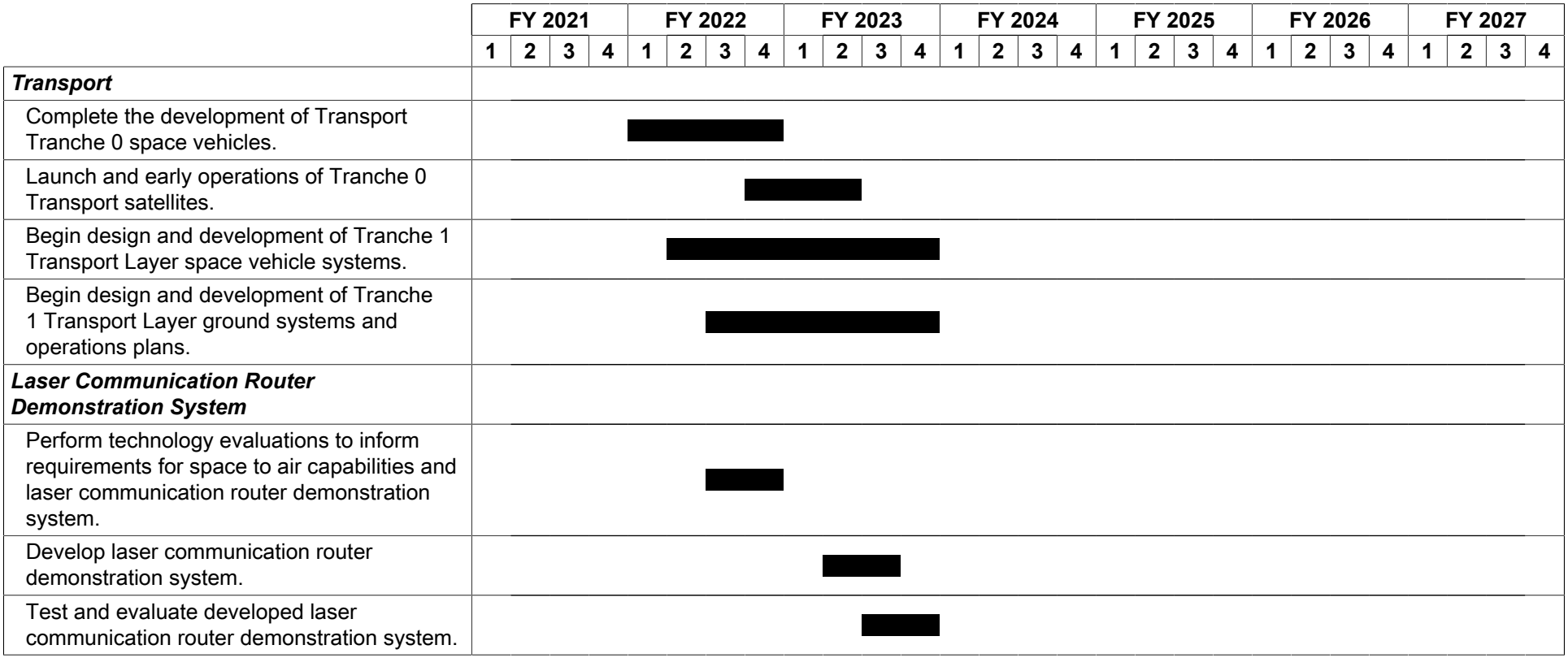


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 001 / *Transport*

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.	4	2022	2	2023
Begin design and development of Tranche 1 Transport Layer space vehicle systems.	2	2022	4	2023
Begin design and development of Tranche 1 Transport Layer ground systems and operations plans.	3	2022	4	2023
Laser Communication Router Demonstration System				
Perform technology evaluations to inform requirements for space to air capabilities and laser communication router demonstration system.	3	2022	4	2022
Develop laser communication router demonstration system.	2	2023	3	2023
Test and evaluate developed laser communication router demonstration system.	3	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
002: *Sensing*	0.000	0.000	837.112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
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 project code (Project 002) in FY 2022 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 enhanced space domain awareness and deterrence capabilities to U.S. joint warfighting forces in bi-annual tranches, beginning in FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Sensing	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/missile tracking capabilities to enable enhanced space domain awareness. 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 2022 Plans: Tranche 0: - Develop Tracking Tranche 0 comprised of Wide Field of View (WFOV) Infrared (IR) satellites. - Integrate Tracking space vehicles with one another and with Transport space vehicles to enable low-latency transport of advanced missile tracking data. - Conduct first launch of Tracking Tranche 0 satellites. - Demonstrate the performance of the IR 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
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 2021	FY 2022	FY 2023
- 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. Tranche 1: - Begin identifying potential payload mission partners. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding in FY 2023 and future years has been transferred to a new PE under the USSF, 1206410SF.			
Accomplishments/Planned Programs Subtotals	0.000	287.112	-

	FY 2021	FY 2022
Congressional Add: Missile Tracking Demonstration (Tracking Layer)	-	550.000
FY 2022 Plans: Conduct source selection and contract initialization for Tranche 1 (T1) Tracking Other Transaction Authority agreements to multiple vendors. Develop Tranche 1 Tracking satellites with WFOV and possibly Medium Field of View (MFOV) IR. Develop T1 Tracking payload data management and Ground Stations. Integrate Real-time Transfer Service (RTS) into T1 Tracking Layer Ground Stations.		
Congressional Adds Subtotals	-	550.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTE 04: *1206410SF, Space Technology Development and Prototyping, Project: Sensing*	0.000	0.000	81.308	0.000	81.308	106.224	36.299	0.000	0.000	Continuing	Continuing
• RDTE 05: *1206446SF, Resilient Missile Warning Missile Tracking-Low Earth Orbit (LEO)*	0.000	0.000	499.840	0.000	499.840	723.621	802.313	827.201	863.350	Continuing	Continuing
• RDTE 05: *1206448SF, Missile Warning/Missile Tracking - Ground - LEO*	0.000	0.000	225.800	0.000	225.800	231.700	254.037	260.271	249.276	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 002 / *Sensing*

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), 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 2023 Space Development Agency		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracking PIRPL	C/FFP	Northrop Grumman : Redondo Beach, CA	0.000	0.000		0.336	Oct 2021	0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	L3Harris : Palm Bay, FL	0.000	0.000		128.782	Nov 2021	0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		99.947	Oct 2021	0.000		0.000		0.000	-	-	-
Launch Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		30.679	Nov 2021	0.000		0.000		0.000	-	-	-
Transport Tranche 1	C/TBD	TBD : TBD	0.000	0.000		27.368	Sep 2022	0.000		0.000		0.000	-	-	-
Tracking Tranche 1	C/FFP	TBD : TBD	0.000	0.000		550.000	Sep 2022	0.000		0.000		0.000	-	-	-
		Subtotal	0.000	0.000		837.112		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		837.112		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 002 / *Sensing*

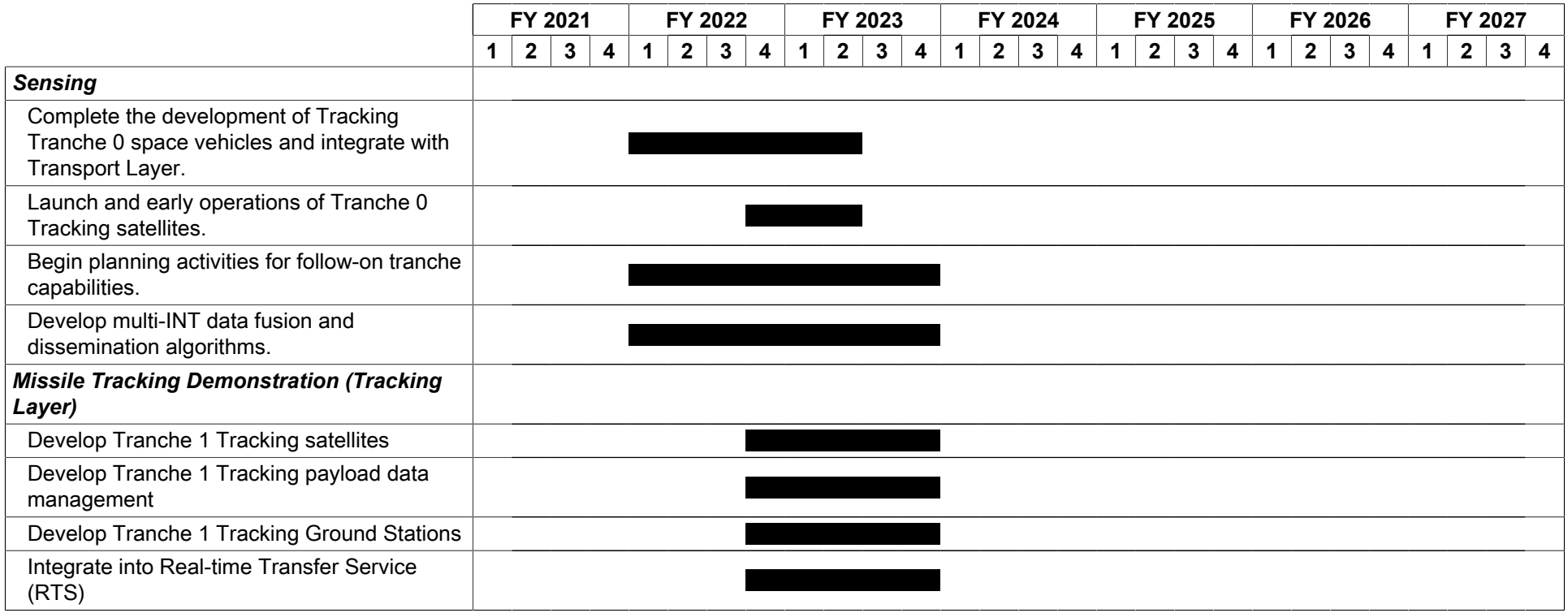


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 002 / *Sensing*

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	2	2023
Launch and early operations of Tranche 0 Tracking satellites.	4	2022	2	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
Missile Tracking Demonstration (Tracking Layer)				
Develop Tranche 1 Tracking satellites	4	2022	4	2023
Develop Tranche 1 Tracking payload data management	4	2022	4	2023
Develop Tranche 1 Tracking Ground Stations	4	2022	4	2023
Integrate into Real-time Transfer Service (RTS)	4	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
003: *Integration and Battle Management*	0.000	0.000	106.586	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
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 project code (Project 003) in FY 2022 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 bi-annual tranches, beginning in FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Integration and Battle Management	0.000	88.586	-
Description: Deliver capabilities to U.S. joint warfighting forces in two-year enhanced capability tranches, beginning in 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 2022 Plans:*** Tranche 0: - 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. - 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
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 2021	FY 2022	FY 2023
- Launch Tranche 0 satellites. Tranche 1: - Develop plans for follow-on tranche capabilities. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding in FY 2023 and future years has been transferred to a new PE under the USSF, 1206410SF.			
Accomplishments/Planned Programs Subtotals	0.000	88.586	-

	FY 2021	FY 2022
Congressional Add: Space Networking Centers	-	18.000
FY 2022 Plans: Finalize plans for SDA Space Networking Centers and Ground Entry Point with host installations. Modify/reassemble facility space for SDA's networking and operations centers. Assess existing utilities (HVAC, power, water, etc..) for SDA operations and upgrade as required. Upgrade host installation operational/administrative terrestrial networking services. Conduct development and integration/functionality testing for mission readiness. Prepare SDA's Space Networking Centers (North and South) for Tranche 1 network operations. Establish SDA ground capability and prepare for Tranche 1 network operations.		
Congressional Adds Subtotals	-	18.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTE 04: *1206410SF, Space Technology Development and Prototyping, Project: Integration and Battle Management*	0.000	0.000	89.072	0.000	89.072	126.094	152.605	43.879	36.978	Continuing	Continuing

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), 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 2023 Space Development Agency		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Launch Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	0.000		88.586	Nov 2021	0.000		0.000		0.000	-	-	-
Space Networking Centers	C/TBD	TBD : TBD	0.000	0.000		18.000	Jun 2022	0.000		0.000		0.000	-	-	-
		Subtotal	0.000	0.000		106.586		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		106.586		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
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*

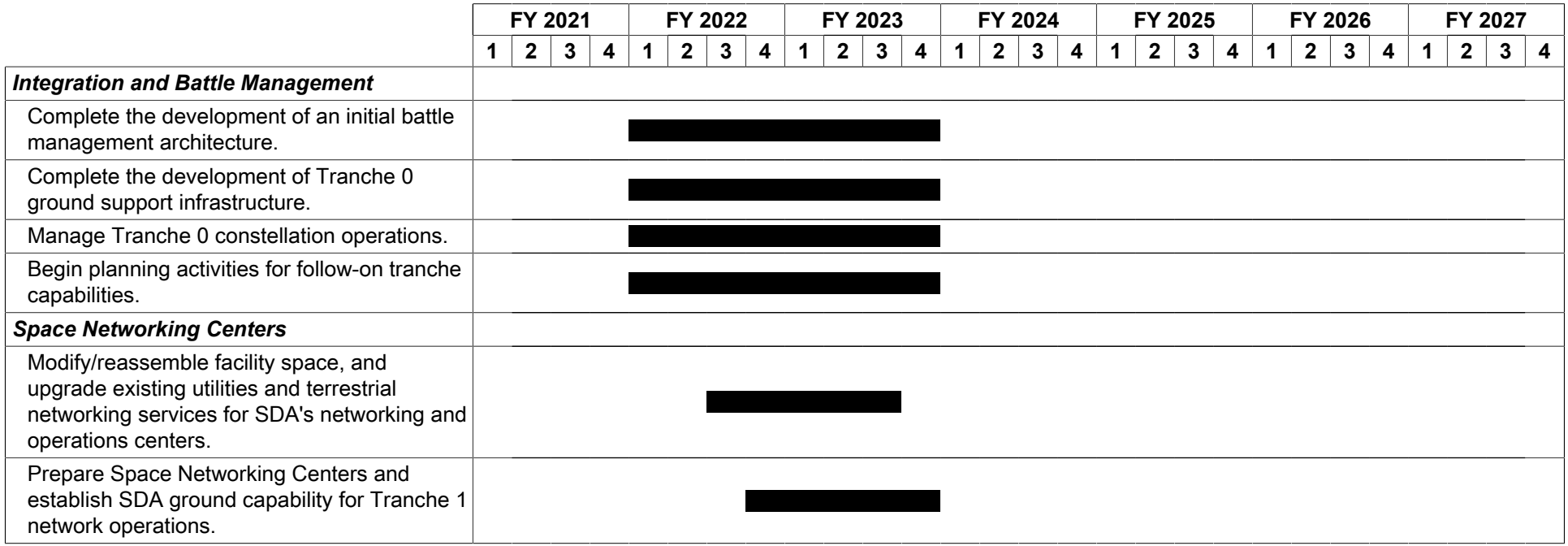


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 003 / *Integration and Battle Management*

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
Space Networking Centers				
Modify/reassemble facility space, and upgrade existing utilities and terrestrial networking services for SDA's networking and operations centers.	3	2022	3	2023
Prepare Space Networking Centers and establish SDA ground capability for Tranche 1 network operations.	4	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
033: *Transport Layer Architecture and Standards*	0.000	26.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 was transferred to the Transport Project 001.

A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort developed and demonstrated 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 2021	FY 2022	FY 2023
Title: Transport Layer Architecture and Standards	26.055	-	-
Description: Developed and demonstrated prototypes that enabled a resilient and unified military data transport layer and sensor capabilities, enabling a pLEO architecture. This effort defined and delivered the architectures and standards necessary to rapidly prototype and field new satellite capabilities in Low Earth Orbit (LEO). For Tranche 0: performed technology development and in-flight demonstrations to test and demonstrate optical intersatellite link technologies; and designed a space-to-air optical connectivity experiment taking advantage of existing MQ-9 pod in advance of on-orbit optical link deployment.			
Accomplishments/Planned Programs Subtotals	26.055	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Space Development Agency			Date: April 2022
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*	

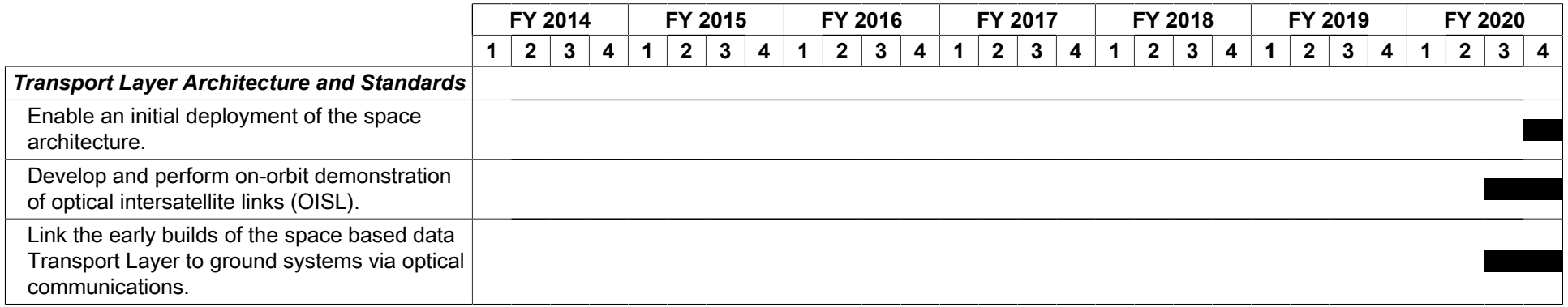
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	25.943	Feb 2021	0.000		0.000		0.000		0.000	-	-	-
Crypto Equipment	MIPR	National Security Agency : MD	0.000	0.006	Jun 2021	0.000		0.000		0.000		0.000	-	-	-
Optical Intersatellite Links (OISL)	SS/FFP	General Atomics : San Diego, CA	0.000	0.026	Aug 2021	0.000		0.000		0.000		0.000	-	-	-
Propulsion System Vetting	MIPR	Air Force Research Laboratory : CA	0.000	0.080	Sep 2021	0.000		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	26.055		0.000		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	26.055		0.000		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
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*



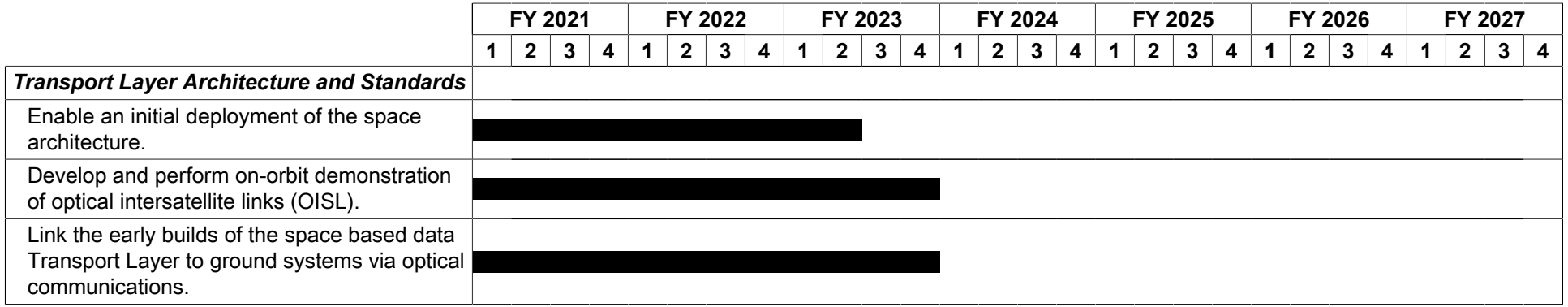


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 033 / *Transport Layer Architecture and Standards*

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	2	2023
Develop and perform on-orbit demonstration of optical intersatellite links (OISL).	3	2020	4	2023
Link the early builds of the space based data Transport Layer to ground systems via optical communications.	3	2020	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
034: *Space Situational Awareness and Launch*	0.000	23.601	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 was transferred to the Integration and Battle Management Project 003.

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 2021	FY 2022	FY 2023
Title: Space Situational Awareness and Launch	23.601	-	-
Description: Developed transport layer to provide critical data transfer capabilities, such as dissemination of space situational awareness data. In addition, this effort identified and contracted for launch of small-to-medium size payloads, to demonstrate responsive constitution and replenishment. For Tranche 0: identified launch opportunities for Space Transport Layer demonstration; designed and developed initial pLEO data transport capabilities; improved architecture resilience by developing advanced beyond-line-of-sight communications systems; and developed deep space surveillance plans.			
Accomplishments/Planned Programs Subtotals	23.601	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities included commercial space providers, small businesses and Federally Funded Research and Development Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Space Development Agency			Date: April 2022
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*	

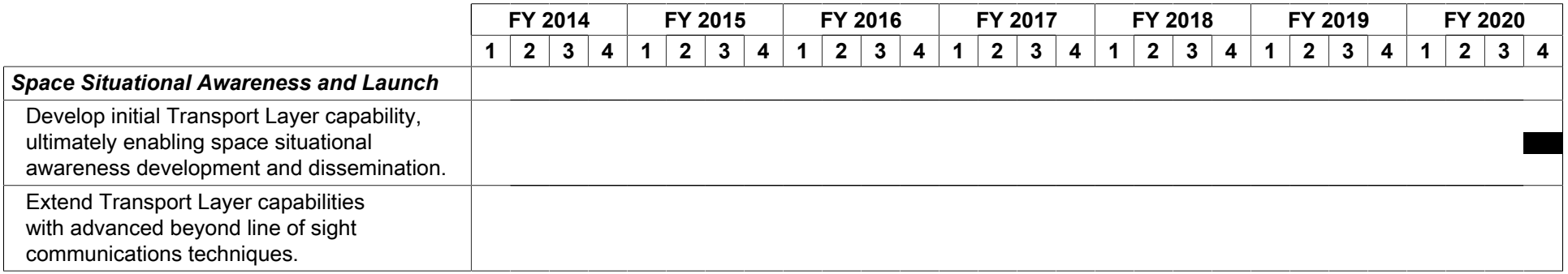
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integration / Support Tranche 0	MIPR	NRL : Washington, DC	0.000	2.554	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Launch Tranche 0 (Support)	C/FFP	SpaceX : Hawthorne, CA	0.000	19.259	Dec 2020	0.000		0.000		0.000		0.000	-	-	-
Laser Interconnect and Communications System (LINCS) Rideshare Integration	C/FFP	Perspecta Engineering : Chantilly, VA	0.000	1.788	Feb 2021	0.000		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	23.601		0.000		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	23.601		0.000		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
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*



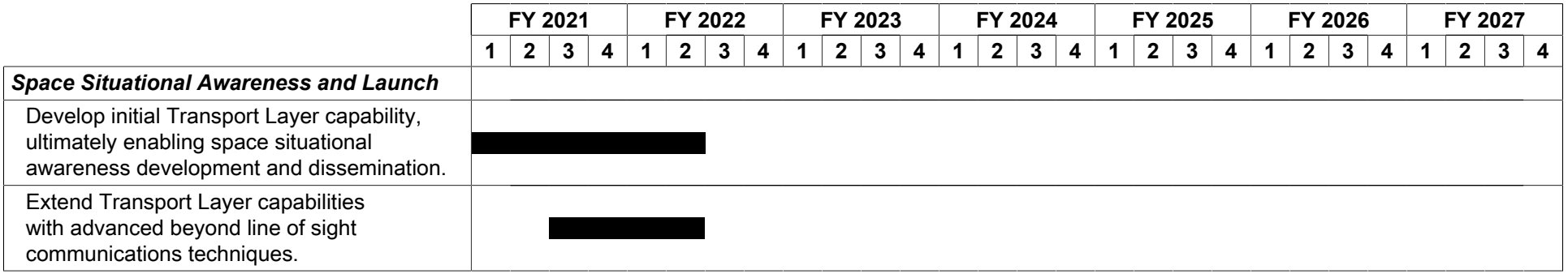


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 034 / *Space Situational Awareness and Launch*

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 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
039: *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	0.000	31.369	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 was transferred to the Sensing Project 002.

A. Mission Description and Budget Item Justification

The proliferated Low Earth Orbit (pLEO) Payload and Ground Integration project enabled 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 2021	FY 2022	FY 2023
Title: pLEO Missile Warning Ground Integration	31.369	-	-
Description: Developed and demonstrated payload prototypes compatible with a pLEO architecture. This effort focused 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 addressed key risk elements present in moving missile tracking to LEO from higher orbits. Ground infrastructure linkage to existing capabilities were designed to support payload integration and data processing. For Tranche 0: developed multi-band WFOV infrared (IR) payload to evaluate IR detection and tracking methods from Low Earth Orbit (LEO); integrated payload with ISS resupply vehicle, launched payload, and conducted background measurements in LEO while berthed to station; and developed MFOV IR experiment to reduce technical risk of hybrid WFOV/MFOV missile tracking architecture.			
Accomplishments/Planned Programs Subtotals	31.369	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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 2023 Space Development Agency			Date: April 2022
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*	

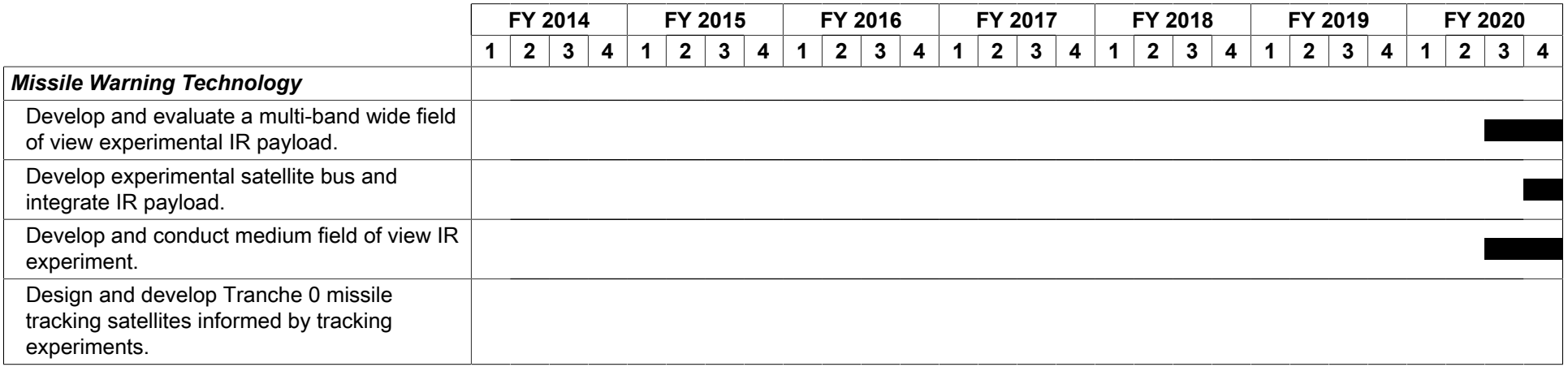
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracking Tranche 0	C/FFP	L3Harris : Melbourne, FL	0.000	10.502	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	19.504	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Prototype Infrared Payload (PIRPL)	SS/CPFF	Northrop Grumman : Huntsville, AL	0.000	1.161	Jun 2021	0.000		0.000		0.000		0.000	-	-	-
Commercial Tranche 0 Optical Intersatellite Links (OISL) Demo	C/FFP	Capella : San Francisco, CA	0.000	0.003	Jun 2021	0.000		0.000		0.000		0.000	-	-	-
Crypto Equipment	C/FFP	Viasat : Carlsbad, CA	0.000	0.199	Sep 2021	0.000		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	31.369		0.000		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	31.369		0.000		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
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*



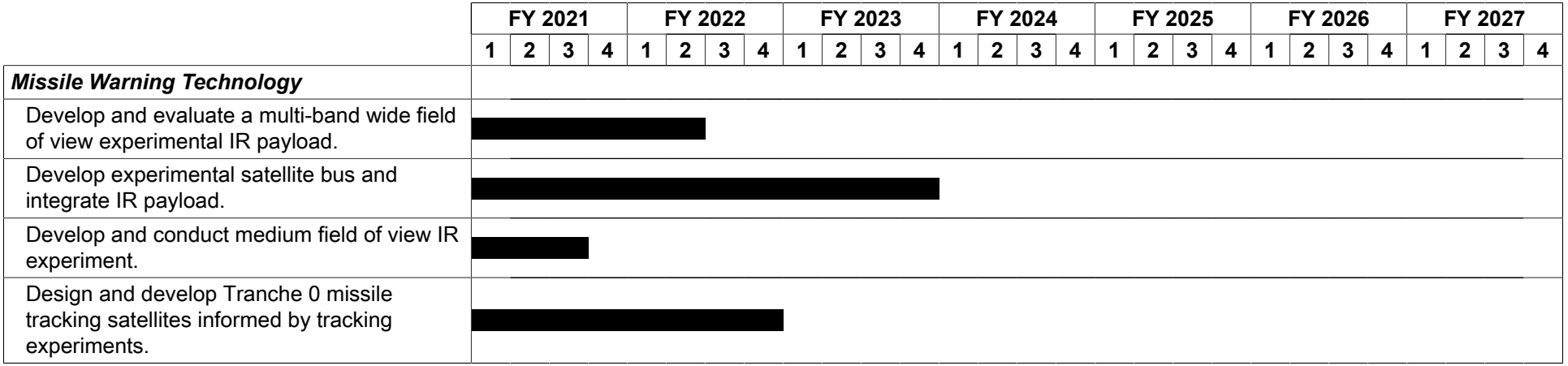


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 039 / *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Missile Warning Technology				
Develop and evaluate a multi-band wide field of view experimental IR payload.	3	2020	2	2022
Develop experimental satellite bus and integrate IR payload.	4	2020	4	2023
Develop and conduct medium field of view IR experiment.	3	2020	3	2021
Design and develop Tranche 0 missile tracking satellites informed by tracking experiments.	1	2021	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
196: *Space Technology Development*	0.000	106.928	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in FY 2022 was transferred to the 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 funded 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 included 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 2021	FY 2022	FY 2023
Title: Space Technology Development	106.928	-	-
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). For Tranche 0: designed and began development of Transport Layer Tranche 0 capability; designed and began development of wide field-of-view infrared payload with sensitivity sufficient to detect advance missile threats; designed and began development of ground support infrastructure and integration with space constellation to support Tranche 0 mission operations; and designed, developed, and tested hardware-in-the-loop facility to support architecture interoperability testing and validation.			
Accomplishments/Planned Programs Subtotals	106.928	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
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*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Partners for these activities included Missile Defense Agency (MDA), Space Systems Command (SSC), 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 2023 Space Development Agency		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Transport Tranche 0	C/FFP	Lockheed Martin : Littleton, CO	0.000	43.390	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Transport Tranche 0	C/FFP	York Space Systems, LLC : Denver, CO	0.000	18.012	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	9.900	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Tracking Tranche 0	C/FFP	L3Harris : Palm Bay, FL	0.000	19.440	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Mission Systems Engineering and Integration (MSE&I)	C/CPFF	Perspecta Engineering Inc : Chantilly, VA	0.000	11.357	Oct 2020	0.000		0.000		0.000		0.000	-	-	-
Launch Tranche 0	C/FFP	SpaceX : Hawthorne, CA	0.000	4.500	Dec 2020	0.000		0.000		0.000		0.000	-	-	-
Crypto Purchase	MIPR	General Services Administration : Washington, DC	0.000	0.329	Sep 2021	0.000		0.000		0.000		0.000	-	-	-
		Subtotal	0.000	106.928		0.000		0.000		0.000		0.000	-	-	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	106.928		0.000		0.000		0.000		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Space Development Agency		Date: April 2022
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 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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.																												
Develop hardware in the loop test facility supporting Tranche 0 capability development.																												
Develop and integrate Tranche 0 ground support infrastructure.																												

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Space Development Agency		Date: April 2022
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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	0.000	9.249	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
SBIR-: *Small Business Innovation Research*	0.000	8.109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
STTR-: *Small Business Technology Transfer*	0.000	1.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

New Requirement (Y/N): Yes

This is a new PE created to manage and execute the Space Development Agency (SDA)'s Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding.

A. Mission Description and Budget Item Justification

The goals of the Small Business Innovation Research (SBIR) program are to stimulate technological innovation, increase private sector commercialization of federal research and development (R&D), increase small business participation in federally funded R&D, and foster participation by minority and disadvantaged firms in technological innovation. Leveraging the innovation of small business concerns is an important contributor to the development of the cutting edge technologies that will generate decisive and sustained U.S. military advantages by increasing the readiness, modernization and lethality of the Joint Force. This program supports high priority projects within the DoD Components, their missions, and the Warfighter. The goals of the Small Business Technology Transfer (STTR) program are to stimulate a partnership of ideas between small business concerns (SBCs) and research institutions through DoD funded research or research and development (R/R&D). By providing awards to SBCs or cooperative R/R&D efforts with research institutions, the DoD supports innovation and economic growth to generate decisive and sustained U.S. military advantages. This program supports high priority projects within the DoD Components, their missions, and the Warfighter.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502SDA *I Small Business Innovation Research (SBIR)*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	9.249	0.000	0.000	-	0.000
Total Adjustments	9.249	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	9.249	-			

Change Summary Explanation

PE 0605502SDA was created in FY 2021 to house SDA's Congressionally-mandated SBIR/STTR funding to be consistent with other SBIR/STTR PE's across the Department. Funds were transferred from PEs 1206310SDA and 1206410SDA. SBIR/STTR funds were previously executed out of PE 1206310SDA in FY 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502SDA / *Small Business Innovation Research (SBIR)*	Project (Number/Name) SBIR- / *Small Business Innovation Research*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
SBIR-: *Small Business Innovation Research*	0.000	8.109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021, effective on October 1, 2022, 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. This program and funding continue in FY 2023 and out under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.

A. Mission Description and Budget Item Justification

The goals of the Small Business Innovation Research (SBIR) program are to stimulate technological innovation, increase private sector commercialization of federal research and development (R&D), increase small business participation in federally funded R&D, and foster participation by minority and disadvantaged firms in technological innovation. Leveraging the innovation of small business concerns is an important contributor to the development of the cutting edge technologies that will generate decisive and sustained U.S. military advantages by increasing the readiness, modernization and lethality of the Joint Force. This program supports high priority projects within the DoD Components, their missions, and the Warfighter.

Numerous, capable small businesses are driving down the cost of accessing and utilizing space, which is accelerating the commoditization of space hardware and software. The SDA highly leverages the SBIR program to invest in the research, development, and demonstration of innovative technologies from these small businesses that support the modernization of our national defense space capabilities. These SBIR opportunities have the potential to enhance future tranches and inform the spiral development projects that demonstrate enhanced warfighter capability via proliferated a low Earth orbit architecture. This program has sought investments in the following space-based technology areas : laser communications; novel antenna steering methods; data networking; automated encryption; on-orbit data fusion algorithms; reduced size, weight, and power multi-modal sensors; higher accuracy, low latency information processing; and space-related modeling and simulation testbeds.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Business Innovation Research	8.109	0.000	-
Description: This project funds small business research and development activities providing analysis products and enabling technologies and capabilities for the National Defense Space Architecture (NDSA). In FY 2021, SDA issued the following Topic solicitations: Free-Space Optical Communication (FSOC) Technology for Optical Intersatellite Links (OISLs); L-Band Multiband/Interleaved Electronically Scanned Array (ESA) Antenna; Advanced Space Mesh			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*	**Project (Number/Name)** SBIR- / *Small Business Innovation Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Networking; Mesh Network NSA Certifiable Cryptographic Solution; Target Recognition and Acquisition in Complex Environments (TRACE); Compact Passive Polarimetric Microwave Radiometer and Sounder (CP2MRS); and, Commercial Synthetic Aperture Radar and Scatterometry (COSAS). In FY 2021, SDA funded the following efforts: - FSOC for OISLs ($4.995 million): Compact Multi-Link OISL Terminal, V'Ger-T1 10 Gbps OISL Terminal, MOCA One-to-Many OISL - Mesh Network NSA Certifiable Cryptographic Solution ($1.700 million): High Integrity, Performant, Efficient Realization of a Spaceborne Cryptographic Engine - Prototype On-Orbit Experimental Testbed (POET) ($1.391 million) The remaining $0.023 million will be allocated to an additional project associated to FSOC for OISLs. ***FY 2022 Plans:*** The following efforts will be funded with FY 2022 funds: - FSOC for OISLs (estimated funding, $1.727 million): Addressing development of a FSOC solution that demonstrates a next-generation low size, weight, power, and cost (SWAP-C) OISL terminal or enabling technology that will provide advancement in one or more of the following interest areas: 1. Reduction of the SWAP-C per bit 2. Design for manufacturing considerations to support high rate production and assembly, integration, and test processes 3. Demonstration of a path to 100 Gbps for space-to-space FSOC 4. Development of low-cost, mobile or fixed optical ground terminals (OGTs) 5. Demonstration of enhanced space-to-ground and space-to-air FSOC links 6. Development of compact FSOC systems capable of supporting coherent and non-coherent optical links. 7. Demonstration of one-to-many optical terminal links 8. Demonstration of enhanced position, navigation, and timing technology - L-Ba.5nd Multiband/Interleaved ESA Antenna (estimated funding, $0.500 million): Addressing an L-band ESA antenna for use on the Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) class space vehicles (SV) - Advanced Space Mesh Networking (estimated funding, $1.750 million): Addressing preliminary system design for a router/ switch implementation and networking technology capable of forwarding packets/frames in excess of 50Gbps and targeted at current / next-generation space-qualified hardware - TRACE (estimated funding, $1.250 million): Addressing advancement of the capability and utility of algorithms for low-latency recognition and acquisition of tactically relevant targets from overhead persistent infrared (OPIR) systems			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*	**Project (Number/Name)** SBIR- / *Small Business Innovation Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
- CP2MRS (estimated funding, $0.250 million): Addressing development of a preliminary system design for a next-generation compact passive polarimetric microwave radiometer and sounder capable of performing multiple SBEM functions from low earth orbit (LEO) The remaining $20.323 million will be allocated to additional projects that have yet to be selected in Integrated Architecture Technology and other space related topics. Where possible and of value, SDA will partner with other SBIR/STTR funding agencies such as DARPA, AFRL, NRL, ARL, etc. to take advantage of ongoing and/or emerging efforts with broad applicability to accelerate completion and delivery of capability to the warfighter via partnership funding. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This program and funding continue in FY 2023 forward under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.			
Accomplishments/Planned Programs Subtotals	8.109	0.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities include small businesses.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502SDA / *Small Business Innovation Research (SBIR)*	Project (Number/Name) STTR- / *Small Business Technology Transfer*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
STTR-: *Small Business Technology Transfer*	0.000	1.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021, effective on October 1, 2022, 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. This program and funding continue in FY 2023 and out under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.

A. Mission Description and Budget Item Justification

The goals of the Small Business Technology Transfer (STTR) program are to stimulate a partnership of ideas between small business concerns (SBCs) and research institutions through DoD funded research or research and development (R/R&D). By providing awards to SBCs or cooperative R/R&D efforts with research institutions, DoD supports innovation and economic growth to generate decisive and sustained U.S. military advantages. This program supports high priority projects within the DoD Components, their missions, and the Warfighter.

SDA leverages STTR funds to support the collaborative development of defense space technologies by small businesses partnering with U.S. research institutions. By supporting such partnerships between emerging technology development companies and leading research organizations, SDA will help to foster the growth of a stronger, more integrated space industrial base while addressing our nation's greatest technical challenges in space. These STTR opportunities have the potential to enhance future tranches and inform the overall architecture of spiral development projects to demonstrate warfighter capability via proliferated low Earth orbit.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Business Technology Transfer	1.140	0.000	-
Description: This project supports collaborative research and development activities by small businesses and research institutions providing enabling technologies and capabilities for the National Defense Space Architecture (NDSA). In FY 2021, SDA issued the following Topic solicitations: Advanced Space Mesh Networking, Mesh Network NSA Certifiable Cryptographic Solution; Target Recognition and Acquisition in Complex Environments (TRACE); Compact Passive Polarimetric Microwave Radiometer and Sounder (CP2MRS); and, Commercial Synthetic Aperture Radar and Scatterometry (COSAS). In FY 2021, SDA funded the following efforts: - Mesh Network NSA Certifiable Cryptographic Solution ($0.322 million): Secure Communications Architecture Low Earth, Mesh Network NSA Certifiable Cryptographic Solution - TRACE ($0.250 million): Target Recognition and Acquisition in Complex Environments			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*	**Project (Number/Name)** STTR- / *Small Business Technology Transfer*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
The remaining $0.568 million will be allocated to additional projects that have yet to be selected from the topics listed above and other space related topics. ***FY 2022 Plans:*** In FY 2022, SDA plans to fund projects in the areas of advanced space mesh networking, mesh network NSA certifiable cryptographic solutions, target recognition and acquisition in complex environments, compact passive polarimetric microwave radiometer and sounder, commercial synthetic aperture radar and scatterometry, and other space related topics. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This program and funding continue in FY 2023 forward under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.			
Accomplishments/Planned Programs Subtotals	1.140	0.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities include small businesses teamed with a non-profit research institution.

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