Department of Defense
Fiscal Year (FY) 2021 Budget Estimates

February 2020

Space Development Agency

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Research, Development, Test & Eval, DW		95,000			95,000
Total Research, Development, Test & Evaluation		95,000			95,000

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Research, Development, Test & Eval, DW	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Advanced Technology Development		20,000			20,000
Advanced Component Development & Prototypes		75,000			75,000
Total Research, Development, Test & Evaluation		95,000			95,000
Summary Recap of FYDP Programs					
Space		95,000			95,000
Total Research, Development, Test & Evaluation		95,000			95,000

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Advanced Technology Development	72,422				72,422
Advanced Component Development & Prototypes	215,994				215,994
Total Research, Development, Test & Evaluation	288,416				288,416
Summary Recap of FYDP Programs					
Space	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

Defense-Wide
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Advanced Technology Development		20,000			20,000
Advanced Component Development & Prototypes		75,000			75,000
Total Research, Development, Test & Evaluation		95,000			95,000
Summary Recap of FYDP Programs					
Space		95,000			95,000
Total Research, Development, Test & Evaluation		95,000			95,000

Defense-Wide
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
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(Dollars in Thousands)

21 Jan 2020

Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Advanced Technology Development	72,422				72,422
Advanced Component Development & Prototypes	215,994				215,994
Total Research, Development, Test & Evaluation	288,416				288,416
Summary Recap of FYDP Programs					
Space	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

Defense-Wide
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Space Development Agency		95,000			95,000
Total Research, Development, Test & Evaluation		95,000			95,000

Defense-Wide
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Space Development Agency	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

Defense-Wide
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

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

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	Sec
71	1206310SDA	Space Science and Technology Research and Development	03		20,000			20,000	U
		Advanced Technology Development			20,000			20,000	
121	1206410SDA	Space Technology Development and Prototyping	04		75,000			75,000	U
		Advanced Component Development & Prototypes			75,000			75,000	
Total Research, Development, Test & Eval, DW					95,000			95,000	

Defense-Wide
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

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

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
71	1206310SDA	Space Science and Technology Research and Development	03	72,422				72,422	U
		Advanced Technology Development		72,422				72,422	
121	1206410SDA	Space Technology Development and Prototyping	04	215,994				215,994	U
		Advanced Component Development & Prototypes		215,994				215,994	
Total Research, Development, Test & Eval, DW				288,416				288,416	

Space Development Agency
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

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

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	Sec
71	1206310SDA	Space Science and Technology Research and Development	03		20,000			20,000	U
		Advanced Technology Development			20,000			20,000	
121	1206410SDA	Space Technology Development and Prototyping	04		75,000			75,000	U
		Advanced Component Development & Prototypes			75,000			75,000	
Total Space Development Agency					95,000			95,000	

Space Development Agency
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

21 Jan 2020

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

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
71	1206310SDA	Space Science and Technology Research and Development	03	72,422				72,422	U
		Advanced Technology Development		72,422				72,422	
121	1206410SDA	Space Technology Development and Prototyping	04	215,994				215,994	U
		Advanced Component Development & Prototypes		215,994				215,994	
Total Space Development Agency				288,416				288,416	

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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency	Date: February 2020
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*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	20.000	72.422	-	72.422	187.638	452.790	677.290	517.290	Continuing	Continuing
032: *Proliferated Low Earth Orbit (pLEO) Sensor Technology*	0.000	0.000	20.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
12: *Space Development Agency R&E*	0.000	0.000	0.000	72.422	0.000	72.422	187.638	452.790	677.290	517.290	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and fielding next generation space capabilities enabled by proliferation and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department space needs, including low-latency tactical communication, beyond line of sight targeting, and advanced missile tracking. Specifically, the SDA will demonstrate and field persistent, resilient capabilities needed to be responsive to emerging multi-domain threats against the U.S. national interest. The SDA will be responsible for overall programmatic policy development and execution for next-generation military space capabilities, except those funded in the Military Intelligence Program (MIP). In coordination with other DoD Space stakeholders, the SDA will drive the development of space capabilities to achieve the DoD space vision and reduce overlap and inefficiency. The SDA will expand the Department's space warfighting capability and foster growth in the U.S. space industrial base, the SDA will incorporate enhanced government-commercial relationships and international collaboration with key allies and partners.

While SDA is not responsible for building and fielding all layers of the National Defense Space Architecture, it is responsible for ensuring capability deliveries. In this construct, SDA is responsible for 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 be compatible with the architecture defined by Fully Networked Command, Control, and Communications Network.

The establishment of a proliferated data transport layer is essential to developing a new and responsive space architecture. The SDA will develop additional sub-constellations on this transport layer to provide additional capabilities, such as advanced missile warning, custody and alternative position, navigation and timing (PNT).

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 2021 Space Development Agency	Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	20.000	0.000	-	0.000
Current President's Budget	0.000	20.000	72.422	-	72.422
Total Adjustments	0.000	0.000	72.422	-	72.422
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other	0.000	0.000	72.422	-	72.422

Change Summary Explanation

The increase in FY 2021 is to support technology demonstrations.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 1206310SDA / *Space Science and Technology Research and Development*	Project (Number/Name) 032 / *Proliferated Low Earth Orbit (pLEO) Sensor Technology*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
032: *Proliferated Low Earth Orbit (pLEO) Sensor Technology*	0.000	0.000	20.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

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 other capability layers to provide the eight capabilities outlined in the DoD Space Vision. The SDA will rapidly develop and field the next generation space architecture that will enable the US to deploy space capabilities that out-pace adversarial threats. This architecture is underpinned by a data transport layer, which will reside on a proliferated small satellite constellation in Low Earth Orbit (LEO). The Transport Layer will support the transfer of data between the space segment of the next generation space architecture, to include payloads co-hosted with the Transport Layer or other non-collocated space elements, and the ground, to include ground support infrastructure and very large numbers of users/subscribers. The Transport Layer will provide the "connective tissue" for the next generation space architecture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Proliferated Low Earth Orbit (pLEO) Sensor Technology	-	20.000	0.000	0.000	0.000
Description: Develop and demonstrate a resilient and unified military data transport layer, enabled by a proliferated Low Earth Orbit (pLEO) architecture. This effort will demonstrate capability to provide very low latency (low or high bandwidth) data between any two points on the globe to enable mission-agnostic battle management, command, control, and communications (BMC3). This effort will leverage technologies developed under the DARPA Blackjack program and, wherever feasible, leverage commercial industry approaches to provide broadband internet access from space to form the foundation of the transport layer architecture.					
FY 2020 Plans: - Conduct trade studies and feasibility assessments of different sensor modalities to perform national security space missions. - Conduct Preliminary Design Review (PDR) of selected sensor payload(s).					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 1206310SDA / *Space Science and Technology Research and Development*	**Project (Number/Name)** 032 / *Proliferated Low Earth Orbit (pLEO) Sensor Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
There was no planned funding in FY 2021.					
Accomplishments/Planned Programs Subtotals	-	20.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency, DARPA, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 1206310SDA / *Space Science and Technology Research and Development*	Project (Number/Name) 12 / *Space Development Agency R&E*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
12: *Space Development Agency R&E*	0.000	0.000	0.000	72.422	0.000	72.422	187.638	452.790	677.290	517.290	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and fielding next generation space capabilities enabled by proliferation and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department space needs, 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 US joint warfighting forces in two-year tranches, beginning as early as FY22, 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 concept for future warfighting capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space Technology Development Agency R&D	0.000	0.000	72.422	0.000	72.422
Description: Research and development activities to support development and fielding of a resilient military sensing and data transport capability via a proliferated space architecture in LEO ***FY 2020 Plans:*** N/A ***FY 2021 Base Plans:*** - Design, develop, and demonstrate space-to-space optical crosslink data exchange in LEO - Design and begin development of wide field-of-view payload for advanced missile tracking experiment - Conduct requirements review for multi-INT data fusion algorithms ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase in FY 2021 is to support technology demonstrations.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	72.422	0.000	72.422

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 1206310SDA / *Space Science and Technology Research and Development*	**Project (Number/Name)** 12 / *Space Development Agency R&E*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

Partners for these activities may 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, SMC, and DARPA.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	0.000	75.000	215.994	0.000	215.994	681.898	834.891	1,465.559	1,465.342	Continuing	Continuing
033: *Transport Layer Architecture and Standards*	0.000	0.000	15.000	14.891	-	14.891	14.962	14.959	15.037	15.343	Continuing	Continuing
034: *Space Situational Awareness and Launch*	0.000	0.000	10.000	24.740	-	24.740	49.771	49.751	49.985	51.003	Continuing	Continuing
039: *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	0.000	0.000	30.000	39.709	-	39.709	39.899	49.864	75.185	76.716	Continuing	Continuing
191: *Space-Based Interceptors*	0.000	0.000	15.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
193: *Space-Based Discrimination*	0.000	0.000	5.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
196: *Space Technology Development*	-	0.000	0.000	136.654	-	136.654	577.266	720.317	1,325.352	1,322.280	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is established to develop 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, the SDA will help inform the Department's decision to develop and implement a proliferated architecture enabled by lower-cost, mass-produced spacecraft and routine space access, shift the Department to a development organization focused on experimentation, prototyping, and accelerated fielding, and change the Department to a concentrated, decoupled structure to generate speed. The SDA will manage, direct, and execute the development of the space capabilities 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).

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

- Persistent global surveillance for advanced missile targeting,

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency	Date: February 2020
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*

- 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,
- Development of a deterrent capability
- 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-enable 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. The SDA will develop an initial wedge 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	85.000	80.000	0.000	80.000
Current President's Budget	0.000	75.000	215.994	0.000	215.994
Total Adjustments	0.000	-10.000	135.994	0.000	135.994
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-10.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Space Technology Development	0.000	0.000	136.654	0.000	136.654
• Economic Adjustment	0.000	0.000	-0.078	-	-0.078
• Fiscal Guidance Program Adjustment	-	-	-0.582	-	-0.582

Change Summary Explanation

Funding was added to SDA program line to develop system designs, perform on-orbit risk reduction demonstrations, and deliver National Defense Strategy Architecture capability. This activity will result in on-orbit implementation of the NDSA.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
033: *Transport Layer Architecture and Standards*	0.000	0.000	15.000	14.891	-	14.891	14.962	14.959	15.037	15.343	Continuing	Continuing
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 DoD Space Vision. The SDA will rapidly develop and field the next generation space architecture that will enable the US to deploy space capabilities that out-pace adversarial threats. This architecture is underpinned by a common satellite buses, common interfaces between payloads to the bus, and common data interfaces and standards. The 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Transport Layer Architecture and Standards	0.000	15.000	14.891	0.000	14.891
Description: Develop and demonstrate prototypes that enable a resilient and unified military data transport layer and sensor capabilities, enabling a proliferated Low Earth Orbit (pLEO) architecture. This effort will define and deliver the architectures and standards necessary to rapidly prototype and field new satellite capabilities at LEO. ***FY 2020 Plans:*** - Develop interface and messaging standards for data transport layer architecture and bus interfaces. ***FY 2021 Base Plans:*** - Perform technology demonstration to test and demonstrate interface and messaging technologies. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Slight reduction in funding due to “unsubstantiated growth”.					
Accomplishments/Planned Programs Subtotals	0.000	15.000	14.891	0.000	14.891

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
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)

Remarks

N/A

D. Acquisition Strategy

Partners for these activities may include the Missile Defense Agency, 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 2021 Space Development Agency		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	C/TBD	TBD : TBD	0.000	0.000		15.000		14.891		0.000		14.891	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		15.000		14.891		0.000		14.891	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	Various	TBD : TBD	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		15.000		14.891		0.000		14.891	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency		Date: February 2020
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*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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 Layer Architecture and Standards																												
Develop interface and messaging standards for data transport layer architecture.									[redacted]																			

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020
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				
Develop interface and messaging standards for data transport layer architecture.	2	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
034: *Space Situational Awareness and Launch*	0.000	0.000	10.000	24.740	-	24.740	49.771	49.751	49.985	51.003	Continuing	Continuing
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 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space Situational Awareness and Launch	0.000	10.000	24.740	0.000	24.740
Description: Working with commercial providers, develop and demonstrate enhanced space situational awareness (SSA) and small-to-medium launch service access. This effort will leverage existing Government and commercial tools and approaches to extend capabilities for a pLEO environment. In addition, this effort will identify and contract for launch of small-to-medium size payloads, to demonstrate responsive constitution and replenishment. ***FY 2020 Plans:*** - Conduct trade studies of existing SSA capabilities and approaches for pLEO applications. - Conduct trade studies of small-to-medium payload launch service providers and ability to responsively support pLEO constitution and replenishment. ***FY 2021 Base Plans:*** - Identify launch opportunities for Space Transport Layer demonstration ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Initial assessment is expected to feed into our planning technology demonstrations.					
Accomplishments/Planned Programs Subtotals	0.000	10.000	24.740	0.000	24.740

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
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 may include Space and Missile Systems Center, 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 2021 Space Development Agency		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	C/TBD	TBD : TBD	0.000	0.000		10.000		24.740		0.000		24.740	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		10.000		24.740		0.000		24.740	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	Various	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		10.000		24.740		0.000		24.740	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency		Date: February 2020
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*

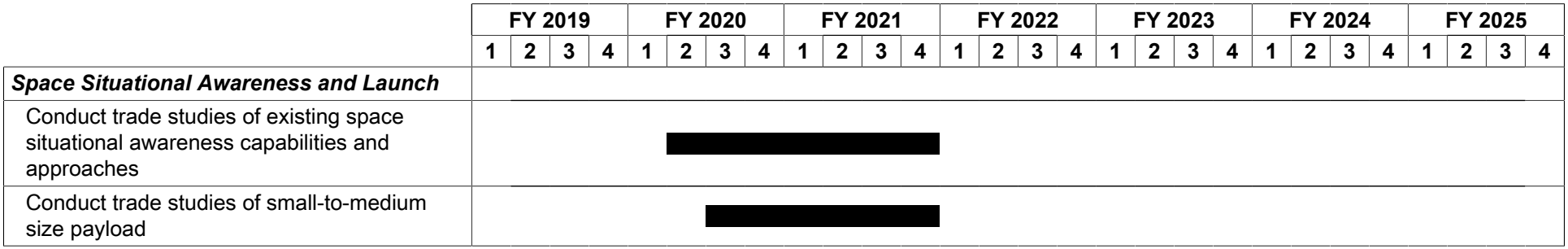

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 034 / *Space Situational Awareness and Launch*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Situational Awareness and Launch				
Conduct trade studies of existing space situational awareness capabilities and approaches	2	2020	4	2021
Conduct trade studies of small-to-medium size payload	3	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
039: *Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration*	0.000	0.000	30.000	39.709	-	39.709	39.899	49.864	75.185	76.716	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: pLEO Missile Warning Ground Integration	0.000	30.000	39.709	0.000	39.709
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. 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 2020 Plans:*** - Develop advanced missile warning sensor and develop ground architecture to support ***FY 2021 Base Plans:*** - Integrate, test, and launch advanced missile warning phenomenology experiment ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase in FY 2021 is to support technology demonstrations.					
Accomplishments/Planned Programs Subtotals	0.000	30.000	39.709	0.000	39.709

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
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)

Remarks

N/A

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency, 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 2021 Space Development Agency			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	C/TBD	TBD : TBD	0.000	0.000		30.000		39.709		0.000		39.709	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		30.000		39.709		0.000		39.709	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	C/Various	TBD : TBD	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		30.000		39.709		0.000		39.709	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency		Date: February 2020
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*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Missile Warning Technology																												
Examine current MW ground segment and conduct trade studies of alternative						[redacted]																						
Conduct Preliminary Design Review of MW ground infrastructure						[redacted]																						

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020
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				
Examine current MW ground segment and conduct trade studies of alternative	2	2020	4	2021
Conduct Preliminary Design Review of MW ground infrastructure	2	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
191: *Space-Based Interceptors*	0.000	0.000	15.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
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 DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort is focused on developing the battle management software, infrastructure, and test capabilities to ensure maximum utility of pLEO hardware. This effort supports on-board space data processing, data ingest and fusion of legacy, current, and future space-based capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space-Based Interceptor Assessment	-	15.000	0.000	0.000	0.000
Description: The SDA will develop 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 2020 Plans:*** The initial capabilities of the hardware architecture will be designed and specified to support a space-based operating system. Development of a ground based Hardware In The Loop laboratory for validation and verification will commence. ***FY 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** This effort is not funded in FY 2021.					
Accomplishments/Planned Programs Subtotals	-	15.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
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*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Partners for these activities may include DoD research centers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Space Development Agency		Date: February 2020
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*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space-Based Interceptor Assessment	TBD	TBD : TBD	-	-		15.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	-	-		15.000		0.000		0.000		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		15.000		0.000		0.000		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency		Date: February 2020
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 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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																												
Space-Based Interceptor Assessment																												

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020
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				
Space-Based Interceptor Assessment	3	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
193: *Space-Based Discrimination*	0.000	0.000	5.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
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 DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort is focused on developing a government reference architecture for a space-based discrimination layer for missile defense.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space-Based Discrimination Assessment	-	5.000	0.000	0.000	0.000
Description: The SDA, under the leadership of the Under Secretary of Defense for Research and Engineering and in coordination with the Missile Defense Agency, Joint Staff, Air Force, and Director, Cost Assessment and Program Evaluation, will execute a Space-Based Discrimination assessment. ***FY 2020 Plans:*** The Space-Based Discrimination assessment entails developing a government reference architecture for a space-based discrimination layer for missile defense. These efforts include developing an independent cost estimate and assessment of technical risks, potential countermeasures, and development timelines. ***FY 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** This effort is not funded in FY 2021.					
Accomplishments/Planned Programs Subtotals	-	5.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
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*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Partners for these activities may include DoD research centers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Space Development Agency			Date: February 2020
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*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space-Based Discrimination Assessment	TBD	TBD : TBD	-	-		5.000		0.000		0.000		0.000	Continuing	Continuing	0.000
		Subtotal	-	-		5.000		0.000		0.000		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		5.000		0.000		0.000		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency		Date: February 2020
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*

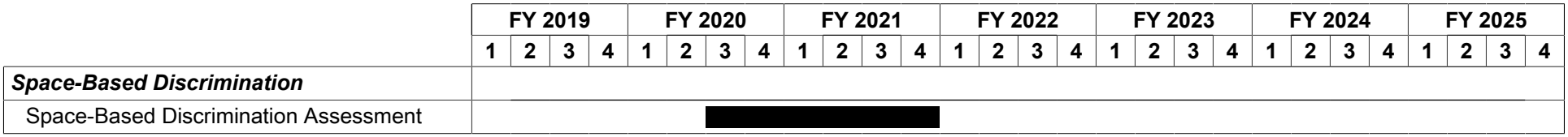

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 193 / *Space-Based Discrimination*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space-Based Discrimination				
Space-Based Discrimination Assessment	3	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
196: *Space Technology Development*	-	0.000	0.000	136.654	-	136.654	577.266	720.317	1,325.352	1,322.280	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and fielding next generation space capabilities enabled by proliferation and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department space needs, 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 US joint warfighting forces in two-year tranches, beginning as early as FY22. 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space Technology Development	0.000	0.000	136.654	0.000	136.654
Description: Space technology development and prototyping of a resilient military sensing and data transport capability via a proliferated space architecture in LEO.					
FY 2020 Plans: N/A					
FY 2021 Base 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 software to perform multi-INT data fusion for targeting support - Design, develop, and test hardware-in-the-loop facility to support architecture interoperability testing and validation					
FY 2021 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase in FY 2021 is to support technology development.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	136.654	0.000	136.654

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Space Development Agency		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Technology Development	C/TBD	TBD : TBD	-	-		-		136.654		0.000		136.654	Continuing	Continuing	N/A
		Subtotal	-	-		-		136.654		0.000		136.654	Continuing	Continuing	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		136.654		0.000		136.654	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency		Date: February 2020
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*

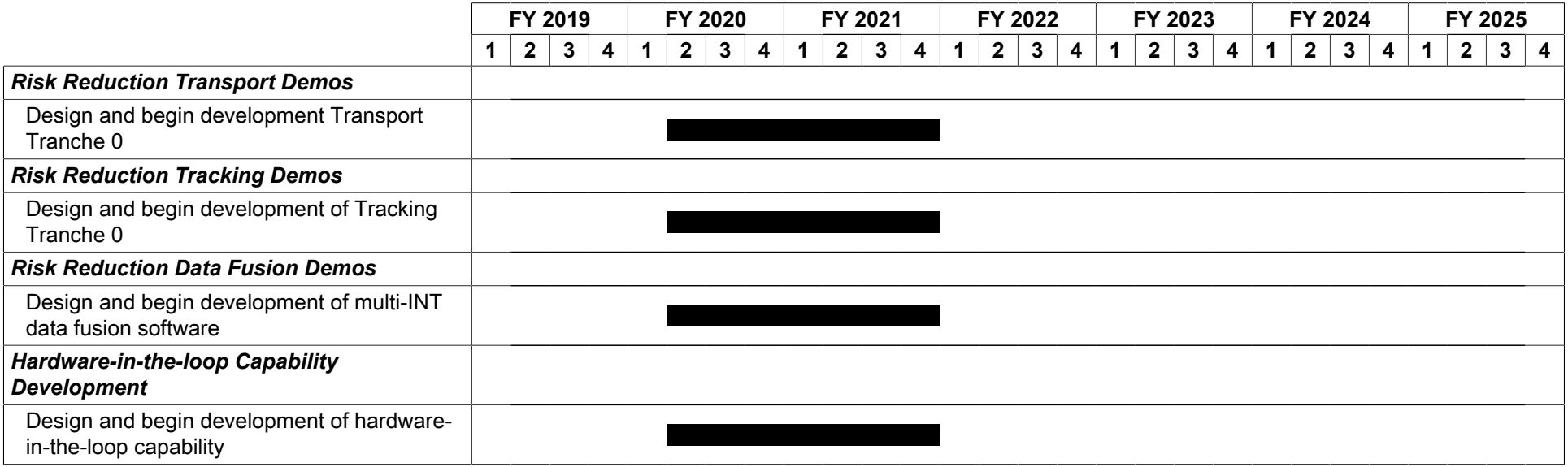

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206410SDA / *Space Technology Development and Prototyping*	**Project (Number/Name)** 196 / *Space Technology Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Risk Reduction Transport Demos				
Design and begin development Transport Tranche 0	2	2020	4	2021
Risk Reduction Tracking Demos				
Design and begin development of Tracking Tranche 0	2	2020	4	2021
Risk Reduction Data Fusion Demos				
Design and begin development of multi-INT data fusion software	2	2020	4	2021
Hardware-in-the-loop Capability Development				
Design and begin development of hardware-in-the-loop capability	2	2020	4	2021