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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>
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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	0.000	986.822	0.000	986.822	1,680.407	1,506.619	1,528.316	1,554.869	Continuing	Continuing
643729: <i>Integration and Battle Management</i>	-	0.000	0.000	89.072	0.000	89.072	126.094	152.605	43.879	36.978	Continuing	Continuing
643731: <i>Transport</i>	-	0.000	0.000	816.442	0.000	816.442	1,448.089	1,317.715	1,484.437	1,517.891	Continuing	Continuing
643732: <i>Sensing</i>	-	0.000	0.000	81.308	0.000	81.308	106.224	36.299	0.000	0.000	Continuing	Continuing

**Note**

In FY 2023, PE 1206410SDA, Space Technology Development and Prototyping efforts were transferred from Appropriation 0400, Research, Development, Test & Evaluation (RDT&E), Defense-Wide, Budget Activity (BA) 4 to Appropriation 3620, RDT&E, Space Force, PE 1206410SF, due to the transfer of the Space Development Agency to the U.S. Space Force (USSF) in accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021. This is an administrative realignment.

This program element includes funds for the Tranche 1 Transport Layer program, which is a Middle Tier of Acquisition effort. The total cost of the program is \$3,199.000 million, including RDT&E and procurement of prototype units. The Tranche 1 Transport Layer program is fully funded across the Future Years Defense Program.

**A. Mission Description and Budget Item Justification**

SDA is responsible for developing and demonstrating the next generation national defense 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 space vehicles and routine space access; and 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,
- Mission-focused technology maturation and systems engineering,
- Value-based lean engineering, manufacturing, and support,
- Industrial base expansion; streamlined development and acquisition processes, 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:

- Indications, warnings, targeting, and tracking for defense against advanced missile threats,
- Alternate position, navigation, and timing (PNT) for a navigation warfare (NAVWAR) resilient environment,

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<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>
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- 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 for advanced missile targeting.

The establishment of a proliferated 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 in conjunction with 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.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	986.822	0.000	986.822
Total Adjustments	0.000	0.000	986.822	0.000	986.822
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	986.822	0.000	986.822

**Change Summary Explanation**

The worked performed in this program element is a continuation of efforts that in FY 2022 are funded in Appropriation 0400, RDT&E, Defense-Wide, BA 4, PE 1206410SDA.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3620F / 4					<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>				<b>Project (Number/Name)</b> 643729 / <i>Integration and Battle Management</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
643729: <i>Integration and Battle Management</i>	-	0.000	0.000	89.072	0.000	89.072	126.094	152.605	43.879	36.978	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2023, PE 1206410SDA, Space Technology Development and Prototyping efforts were transferred from Appropriation 0400, Research, Development, Test & Evaluation (RDT&E), Defense-Wide, Budget Activity (BA) 4 to Appropriation 3620, RDT&E, Space Force, PE 1206410SF, due to the transfer of the Space Development Agency to the U.S. Space Force (USSF) in accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021. This is an administrative realignment.

**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)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> Integration and Battle Management	-	0.000	89.072	0.000	89.072
<b>Description:</b> 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.					
<b>FY 2022 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022				
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643729 / <i>Integration and Battle Management</i>				
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<p>For 2022 and prior, this work is performed under the Integration and Battle Management effort in Appropriation 0400, BA 4, PE 1206410SDA, Space Technology Development and Prototyping, Project 003, Integration and Battle Management.</p> <p><b>FY 2023 Base Plans:</b> Tranche 0:</p> <ul style="list-style-type: none"> <li>- Complete launch vehicle integration and services.</li> <li>- Complete design, integration, and installation of ground operations center.</li> <li>- Conduct on-orbit command and control operations from ground operations center.</li> <li>- Begin conducting Capstone demonstration.</li> </ul> <p>Tranche 1:</p> <ul style="list-style-type: none"> <li>- Define CONOPS for Tranche 1 for Ground based mission segment and define the government-owned contractor-operated (GOCO) architecture.</li> <li>- Finalize Operations Center modifications.</li> <li>- Develop Ground Segment Ground Entry Strategy, Operations Center Vision, and Basing Actions and prepare for readiness tests.</li> <li>- Leverage Tranche 0 radio frequency (RF) antenna options and identify potential to increase antenna capability.</li> <li>- Fund mission unique hardware and integration of the Tranche 1 space vehicles on the National Security Space Launch (NSSL) Launch vehicles.</li> <li>- Begin developing the Application Factory that will serve as the foundation of the Battle Management Command, Control, and Communications (BMC3) Layer.</li> <li>- Begin coordinating software-in-the-loop (SIL) and hardware-in-the-loop (HIL) activities to ensure compatibility and interoperability of Factory with Operations and Integration (O&amp;I).</li> </ul> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> In FY 2022, this effort was funded in RDT&amp;E BA 4, PE 1206410SDA. The increase between the FY 2022 amount in PE 1206410SDA, Project 003 and the FY 2023 amount in PE 1206410SF, Project 643729 supports</p>						

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643729 / <i>Integration and Battle Management</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
the concurrent execution of Tranche 0 efforts to support capstone demonstrations and an increase in Tranche 1 activities.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	89.072	0.000	89.072

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE 04 1206410SDA: <i>Space Technology Development and Prototyping/Project 003 Integration and Battle Management</i>	-	106.586	-	-	-	-	-	-	-	-	Continuing Continuing

**Remarks**  
The worked performed in this PE continues efforts that were previously funded in RDT&E BA 4, PE 1206410SDA, in FY 2022.

**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.





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643729 / <i>Integration and Battle Management</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Integration and Battle Management</i></b>				
Complete the development of an initial battle management architecture.	1	2022	1	2024
Complete the development of Tranche 0 ground support infrastructure.	1	2022	4	2023
Manage Tranche 0 constellation operations.	1	2022	4	2023
Tranche 1 integration activities.	1	2022	4	2024

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**Exhibit R-2A, RDT&E Project Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643731 / <i>Transport</i>
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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
643731: <i>Transport</i>	-	0.000	0.000	816.442	0.000	816.442	1,448.089	1,317.715	1,484.437	1,517.891	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2023, PE 1206410SDA, Space Technology Development and Prototyping efforts were transferred from Appropriation 0400, Research, Development, Test & Evaluation (RDT&E), Defense-Wide, Budget Activity (BA) 4 to Appropriation 3620, RDT&E, Space Force, PE 1206410SF, due to the transfer of the Space Development Agency to the U.S. Space Force (USSF) in accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021. This is an administrative realignment.

**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 Base	FY 2023 OCO	FY 2023 Total
<b>Title:</b> Transport	0.000	0.000	796.242	0.000	796.242
<b>Description:</b> 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.					
<b>FY 2022 Plans:</b> For 2022 and prior, this work is performed under the Transport effort in Appropriation 0400, BA 04, PE 1206410SDA, Space Technology Development and Prototyping, Project 001, Transport.					
<b>FY 2023 Base Plans:</b> Tranche 0: - Complete second launch of remaining Transport and Tracking satellites.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643731 / <i>Transport</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> <li>- Complete on-orbit flight operations and verify satellite-to-satellite and satellite-to-ground communications on Tranche 0 satellites.</li> <li>- Conduct Tranche 0 Capstone operational demonstration.</li> <li>- Leverage Tranche 0 satellites as a testbed for investigating additional capabilities after Capstone demonstration.</li> <li>- Integrate additional interoperable massless payload capabilities within Tranche 0 satellites.</li> <li>- Conduct Tranche 0 capstone operational demonstration.</li> </ul> <p>Tranche 1:</p> <ul style="list-style-type: none"> <li>- Finalize design through Critical Design Review (CDR) for the Transport Layer Tranche 1 space vehicles.</li> <li>- Investigate interoperable payloads for optical inter-satellite links for communications, radio-frequency (RF) communications, and Link-16.</li> <li>- Begin assembly, integration, and testing (AI&amp;T) of satellite buses.</li> <li>- Continue ground systems site development, integration, and installation in advance of operations and integration efforts at Tranche 1 Mission Operations Centers being planned for Grand Forks AFB, ND and Redstone Arsenal, AL.</li> <li>- Complete design through Critical Design Review (CDR) for the Operations and Integration Layer Tranche 1 ground operations centers.</li> <li>- Begin development of battle management command, control, and communications (BMC3) Layer Application Factory software to enable common data processing and fusion across all Transport Layer satellites.</li> </ul> <p>Tranche 2:</p> <ul style="list-style-type: none"> <li>- Leverage lessons learned and accomplishments from Tranches 0 and 1 to inform space vehicle, ground, and interoperability design requirements for Tranche 2 and start development of the next set of capabilities.</li> </ul> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> In FY 2022, this effort was funded in RDT&amp;E BA 4, PE 1206410SDA. The increase between the FY 2022 amount in PE 1206410SDA, Project 001 and the FY 2023 amount in PE 1206410SF, Project 643731 reflects</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643731 / <i>Transport</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
the concurrent execution of Tranche 0 to include capstone demonstrations, the significant increase in Tranche 1 activities, and Tranche 2 activities.					
<p><b>Title:</b> Classified Program</p> <p><b>Description:</b> Due to the classified nature of this project, specific details are available at a higher classification level.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Base Plans:</b> Due to the classified nature of this project, specific details are available at a higher classification level.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> This is a new effort in FY 2023.</p>	0.000	0.000	20.200	0.000	20.200
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	816.442	0.000	816.442

<b>C. Other Program Funding Summary (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	<b>Cost To Complete</b>	<b>Total Cost</b>
<p><b>Line Item</b></p> <ul style="list-style-type: none"> <li>• RDTE 04 1206410SDA: <i>Space Technology Development and Prototyping/ Project 001 Transport</i></li> </ul>	-	260.481	-	-	-	-	-	-	-	Continuing	Continuing

**Remarks**  
The worked performed in this PE continues efforts that were previously funded in RDT&E BA 4, PE 1206410SDA, in FY 2022.

**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.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643731 / <i>Transport</i>

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

<b>Transport</b>	
Launch and operations of Tranche 0 Transport satellites.	████████████████████
Conduct activities for Tranche 1 development and delivery.	██
Begin activities for Tranche 2 capabilities.	████████████████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643731 / <i>Transport</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Transport</i></b>				
Launch and operations of Tranche 0 Transport satellites.	4	2022	1	2024
Conduct activities for Tranche 1 development and delivery.	1	2022	4	2024
Begin activities for Tranche 2 capabilities.	1	2023	4	2024

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**Exhibit R-2A, RDT&E Project Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643732 / <i>Sensing</i>
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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
643732: <i>Sensing</i>	-	0.000	0.000	81.308	0.000	81.308	106.224	36.299	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2023, PE 1206410SDA, Space Technology Development and Prototyping efforts were transferred from Appropriation 0400, Research, Development, Test & Evaluation (RDT&E), Defense-Wide, Budget Activity (BA) 4 to Appropriation 3620, RDT&E, Space Force, PE 1206410SF, due to the transfer of the Space Development Agency to the U.S. Space Force (USSF) in accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021. This is an administrative realignment.

**A. Mission Description and Budget Item Justification**

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

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p><b>Title:</b> Sensing</p> <p><b>Description:</b> Develop and demonstrate payload prototypes compatible with a proliferated Low Earth Orbit (pLEO) architecture. This effort will focus on developing and demonstrating sensors for beyond-line-of-sight targeting, space-to-space data links, space-to-tactical data links, and advanced missile warning capabilities to enable enhanced space domain awareness. 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.</p> <p><b>FY 2022 Plans:</b> For FY 2022 and prior, this work is performed under the Sensing effort in Appropriation 0400, BA 4, PE 1206410SDA, Space Technology Development and Prototyping, Project 002, Sensing.</p> <p><b>FY 2023 Base Plans:</b></p>	0.000	0.000	23.456	0.000	23.456

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force				<b>Date:</b> April 2022	
<b>Appropriation/Budget Activity</b> 3620F / 4		<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>		<b>Project (Number/Name)</b> 643732 / <i>Sensing</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
<p>Tranche 0:</p> <ul style="list-style-type: none"> <li>- Conduct second launch of Tracking Tranche 0 satellites.</li> <li>- Leverage operating Tranche 0 satellites to investigate potential developmental capabilities.</li> <li>- Characterize high-resolution background clutter in wide range of spectral bands.</li> <li>- Collect data to inform medium field of view (MFOV) and wide field of view (WFOV) trades.</li> <li>- Demonstrate WFOV performance and cost that enables proliferation.</li> <li>- Launch additional WFOV satellite systems to demonstrate potential for operational use.</li> <li>- Conduct Tranche 0 capstone operational demonstration to validate key NDSA mission capabilities including 2D tracks generated on-board, passed to Ground and to Tranche 0 space vehicles for 3D fusion, and 3D tracks disseminated to user interface.</li> </ul> <p>Tranche 1:</p> <ul style="list-style-type: none"> <li>- Funds the integration of commercial and mission partners' satellite constellations into the NDSA to enable mission partner data to move directly into the hands of the warfighter via the SDA connected tactical data links. This investment creates synergy between mission partners' (commercial and government) investments in ISR satellite, and the SDA Transport Layer.</li> </ul> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> In FY 2022, this effort was funded in RDT&amp;E BA 4, PE 1206410SDA. The decrease between the FY 2022 amount in PE 1206410SDA, Project 002 and the FY 2023 amount in PE 1206410SF, Project 643732 reflects the shift from Tranche 0 to Tranche 1 activities. Funds for the Tranche 1 Tracking Layer continue in PE 1206446SF.</p>					
<b>Title:</b> Space Based Range					
<b>Description:</b> Space Based Range is a joint partnership executed/managed by Space Development Agency (SDA) and supported by OSD Test Resource Management Center (TMRC), and Army Futures Command. This project will provide a four space vehicle demonstration for continuous real-time monitoring of telemetry data transmitted by Test Vehicles (missiles or interceptors) during flight testing. Payloads onboard the Low Earth Orbit (LEO) satellites will collect the upward radiating emission from test vehicles (TV) during flight. Data on a collecting host satellite will be transmitted rapidly to other satellites by Optical Inter-Satellite Links. A ground station will forward the data to a Space Based Range Operations Center where the data will be decrypted, assembled from the independent receiver streams into a coherent data stream, re-encrypted, and distributed					
	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
	0.000	0.000	21.252	0.000	21.252

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force				<b>Date:</b> April 2022	
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>		<b>Project (Number/Name)</b> 643732 / <i>Sensing</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
to the end user. Space Based Range will demonstrate the ability to augment or replace DoD's decades-long approach of staging ships and airplanes along ground tracks of TV of the System Under Test (SUT) for the purpose of telemetry collection, tracking, and flight safety. This Space Based Range demonstration project will leverage previously funded OSD Test Resources Management Center (TRMC) investments for payload design. This project will also consider other missions of opportunity to enhance Joint Warfighter capabilities in LEO.					
<b>FY 2022 Plans:</b> N/A					
<b>FY 2023 Base Plans:</b> Conduct mission analysis and integration, initiate procurement of space vehicle busses, initiate procurement payloads, payload software development, design integration and interfaces of busses and payload and define space to ground interfaces.					
<b>FY 2023 OCO Plans:</b> N/A					
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> This is a new effort in FY 2023.					
<b>Title:</b> Classified Program					
<b>Description:</b> Due to the classified nature of this project, specific details are available at a higher classification level.					
<b>FY 2022 Plans:</b> N/A					
<b>FY 2023 Base Plans:</b> Due to the classified nature of this project, specific details are available at a higher classification level.					
<b>FY 2023 OCO Plans:</b> N/A					
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> This is a new effort in FY 2023.					
<b>Accomplishments/Planned Programs Subtotals</b>					
	0.000	0.000	36.600	0.000	36.600
	0.000	0.000	81.308	0.000	81.308

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643732 / <i>Sensing</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 04 1206410SDA: <i>Space Technology Development and Prototyping / Project 002 Sensing</i>	0.000	837.112	-	-	-	-	-	-	-	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.





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206410SF / <i>Space Technology Development and Prototyping</i>	<b>Project (Number/Name)</b> 643732 / <i>Sensing</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Sensing</b>				
Complete the development of Tracking Tranche 0 space vehicles and integrate with Transport Layer.	1	2022	2	2023
Launch and operations of Tranche 0 Tracking satellites.	4	2022	1	2024
Conduct capstone demonstration to validate mission capabilities.	3	2023	4	2024
Integrate commercial and mission partners satellite payloads and constellations.	1	2023	4	2024
<b>Space Based Range</b>				
Mission systems engineering and integration	1	2023	4	2024
Payload development	1	2023	4	2023
Procure and deliver space vehicle busses	1	2023	4	2023
Bus and payload integration	4	2023	2	2024