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**Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force** **Date:** March 2024

<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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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	979.364	2,081.307	1,701.685	0.000	1,701.685	1,799.720	1,824.708	1,900.937	1,938.374	Continuing	Continuing
643729: <i>Integration and Battle Management</i>	-	89.730	126.661	153.732	0.000	153.732	44.245	37.329	38.670	39.434	Continuing	Continuing
643731: <i>Transport</i>	-	811.242	1,847.944	1,439.241	0.000	1,439.241	1,695.357	1,783.370	1,859.261	1,895.934	Continuing	Continuing
643732: <i>Sensing</i>	-	78.392	106.702	108.712	0.000	108.712	60.118	4.009	3.006	3.006	Continuing	Continuing

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

SDA is responsible for developing and demonstrating the next generation proliferated warfighter 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,
- Warfighter-centric capability development enabling joint all-domain operations,
- Industrial base expansion; streamlined development and acquisition processes, and
- Increased acquisition cooperation across the space enterprise.

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 hypersonic and advanced missile threats,
- Alternate position, navigation, and timing (APNT) for a navigation warfare (NAVWAR) resilient environment,
- Responsive, resilient, common ground-based space support infrastructure (e.g., optical and RF ground stations and commercially-oriented satellite operations centers),
- Cross-domain, networked, node-independent battle management command, control, and communications (BMC3), and
- Highly-scaled, low-latency, persistent, resilient proliferated Low Earth Orbit (LEO) space data transport.

The establishment of a proliferated data Transport Layer in LEO is essential to developing a new, responsive space architecture, and will be SDA's primary initial focus within the Proliferated Warfighter Space Architecture (PWSA). SDA will develop an initial set of adjunct and sub-constellations in conjunction with this Transport Layer to provide additional capabilities, such as advanced missile warning and tactical satellite communications.

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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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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 program element may include necessary civilian pay expenses and contractor support required to facilitate delivery of the Transport capability.

The total cost of the Tranche 1 (T1) Transport Layer Middle Tier of Acquisition effort is \$2,977.300 million, including RDT&E and procurement of prototype units. The T1 Transport Layer RP program is fully funded across the Future Years Defense Program.

The total cost of the Tranche 2 (T2) Transport Layer Middle Tier of Acquisition effort is \$5,250.700 million, including RDT&E and procurement of prototype units. The T2 Transport Layer RP program is fully funded across the Future Years Defense Program.

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 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>
Previous President's Budget	1,015.822	2,081.307	1,626.682	0.000	1,626.682
Current President's Budget	979.364	2,081.307	1,701.685	0.000	1,701.685
Total Adjustments	-36.458	0.000	75.003	0.000	75.003
• 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	-36.458	0.000			
• Other Adjustments	0.000	0.000	75.003	0.000	75.003

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

**Project:** 643731: *Transport*

Congressional Add: *Laser Communication Downlink Systems*

Congressional Add: *Space Architecture Experimental Testbed*

Congressional Add Subtotals for Project: 643731

Congressional Add Totals for all Projects

	<b>FY 2023</b>	<b>FY 2024</b>
	24.085	-
	3.853	-
Congressional Add Subtotals for Project: 643731	27.938	-
Congressional Add Totals for all Projects	27.938	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force Date: March 2024

**Appropriation/Budget Activity**  
3620F: *Research, Development, Test & Evaluation, Space Force / BA 4: Advanced Component Development & Prototypes (ACD&P)*

**R-1 Program Element (Number/Name)**  
PE 1206410SF / *Space Technology Development and Prototyping*

**Change Summary Explanation**

FY 2023 decreases between the Previous President's Budget and Current President's Budget by \$36.458 million due to reallocations for SBIR/STTR projects.

FY 2025 increases between the Previous President's Budget and Current President's Budget due to the addition of a classified project, adjustments for inflation, and adjustments for other United States Space Force priorities.

FY 2025 decreases from FY 2024 due to Tranche 1 completing satellite development and production.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force										<b>Date:</b> March 2024		
<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 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>FY 2029</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
643729: <i>Integration and Battle Management</i>	-	89.730	126.661	153.732	0.000	153.732	44.245	37.329	38.670	39.434	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**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 Proliferated Warfighter Space Architecture (PWSA), 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, which began in FY 2022.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Integration and Battle Management	89.730	126.661	153.732
<p><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.</p> <p><b>FY 2024 Plans:</b></p> <p>Tranche 0</p> <ul style="list-style-type: none"> <li>- Continue on-orbit command and control operations from ground operations center.</li> <li>- Continue to coordinate post-Capstone demonstrations and experimentation with warfighters and partner organizations.</li> <li>- Demonstrate on-orbit data fusion to inform command and control operations.</li> </ul> <p>Tranche 1</p> <ul style="list-style-type: none"> <li>- Define Concept of Operations (CONOPS) and complete pre-launch validation and verification for Tranche 1 Ground based mission segment and define the Government Owned, Contractor Operated (GOCO) architecture.</li> <li>- Finalize Operations Center modifications at Redstone Arsenal and Grand Forks for Tranche 1 satellite operations.</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024
<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 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Develop ground mission management, network management, enterprise system management capabilities to support PWSA operations.</li> <li>- Complete integrated ground software testing with space vehicle command, control, and telemetry software.</li> <li>- Integrate space vehicle command and control workstations into both operations centers.</li> <li>- Finalize Ground Segment Ground Entry Point (GEP) Strategy, including locations and quantity of terminals, Operations Center Vision, and Basing Actions and preparation for integrated ground readiness tests.</li> <li>- Complete site modifications in preparation for GEP terminal installation and Defense Information Systems Agency (DISA) network connectivity.</li> <li>- Complete development, integration, and test of ground antennas and communications equipment and begin production and delivery of the hardware.</li> <li>- Conduct installation of ground terminal and network equipment for baseline continental U.S. (CONUS) GEP sites and begin preparations at OCONUS sites.</li> <li>- Coordinate software-in-the-loop (SIL) and hardware-in-the-loop (HIL) activities to ensure compatibility and interoperability of Space Vehicle Vendor Factories and FlatSats with Operations and Integration (O&amp;I) to support prelaunch testing and post launch anomaly resolution.</li> <li>- Establish a development, security, and operations (DevSecOps) pipeline to support integrated Operations, Maintenance, and Sustainment from the ground operations centers.</li> <li>- Configure and install workstations, server racks, IT support equipment, and administrative facilities into the Operations Centers</li> <li>- Develop test and training documentation for GOCO mission operations.</li> <li>- Conduct an integrated Ground Readiness Review for all PWSA baseline system segments to ensure readiness for launch and operations.</li> <li>- Continue development of the Application Factory that will serve as the foundation of the Battle Management Command, Control, and Communications (BMC3) Layer. Supported by bi-monthly Incremental Design Reviews to enable common data processing and fusion across all Transport Layer satellites.</li> <li>- Establish design standards to ensure forward compatibility and begin designing Applications for the BMC3 Layer Application Factory to process data on-board the space vehicle.</li> <li>- Begin designing additional BMC3 Layer Applications for supporting additional services and users.</li> </ul> <p>Tranche 2</p> <ul style="list-style-type: none"> <li>- Begin the Proliferated Warfighter Space Architecture (PWSA) Ground Segment (GS) systems engineering integration, development, operations, maintenance, and sustainment.</li> <li>- Continue development of the Test and Checkout Center (TCC) as a standalone Operations Center with terrestrial connectivity, additional GEPs, and all other necessary infrastructure to support the full range of Tranche 2 (T2) launch, initialization, and operational test activities.</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024
<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 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Begin transition from hybrid ground architecture to fully cloud-enabled capability to enable support and integration of future tranches.</li> <li>- Explore ground communication terminal efficiencies.</li> <li>- Explore expansion of BMC3 Application Factory to support T2 mission applications.</li> <li>- Complete design of interoperability testbeds to support T2 capabilities.</li> </ul> <p>Proliferated Warfighter Space Architecture (PWSA) Future Programs (PFP)</p> <ul style="list-style-type: none"> <li>- Construct ground segment network including a Demonstration Operations Center (DOC).</li> <li>- Initiate PFP Ground Segment Integration (PGI) effort to provide a common, enduring ground infrastructure and resources to minimize cost and complexity for PFP space vehicle demonstration and experimentation programs (beginning with FOO Fighter and T2DES).</li> </ul> <p><b>FY 2025 Plans:</b></p> <p>Tranche 0</p> <ul style="list-style-type: none"> <li>- Continue on-orbit command and control operations from ground operations center.</li> <li>- Continue to coordinate post-Capstone demonstrations and experimentation with warfighters and partner organizations.</li> </ul> <p>Tranche 1</p> <ul style="list-style-type: none"> <li>- Complete development and begin automation of ground mission management, network management, enterprise system management capabilities to support Proliferated Warfighter Space Architecture (PWSA) operations.</li> <li>- Complete integration of space vehicle command and control workstations into both operations centers.</li> <li>- Complete site modifications in preparation for Ground Entry Point (GEP) terminal installation and DISA network connectivity for full architecture of ground sites including optical GEPs.</li> <li>- Complete test and delivery of ground antennas and communications equipment.</li> <li>- Complete installation of ground terminal and network equipment for continental U.S. (CONUS) GEP sites and conduct installation at outside the continental U.S. (OCONUS) sites.</li> <li>- Maintain Operation Centers to support Tranche 1 activities.</li> <li>- Maintain DevSecOps pipeline to support integrated Operations, Maintenance, and Sustainment from the ground operations centers.</li> <li>- Train operators for PWSA Government Owned, Contractor Operated (GOCO) mission operations.</li> <li>- Conduct PWSA system level developmental testing and begin operational test planning and activities.</li> <li>- Establish system connectivity to PWSA users and tasking authorities to support test and early adopter operations.</li> <li>- Establish and maintain the Application Factory that will serve as the foundation of the Battle Management Command, Control, and Communications (BMC3) Layer.</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024		
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Operate and maintain the BMC3 Ecosystem including the ground and space components.</li> <li>- Continue design and development of BMC3 Applications to provide mission services, system automation, and data fusion capabilities in support of warfighter priorities.</li> </ul> <p>Tranche 2</p> <ul style="list-style-type: none"> <li>- Build out foundational modeling, simulation, and digital engineering tools to enable dynamic modeling for future architecture growth of the PWSA.</li> <li>- Continue to explore and implement ground communication terminal efficiencies.</li> <li>- Continue development of the PWSA Ground Segment.</li> <li>- Identify and implement extensions and/or additional capabilities required in SDA Operations Centers for ground command and control of Tranche 2 assets.</li> <li>- Continue development of the TCC and support early PWSA Ground Segment (GS) integration activities to ensure readiness for Tranche 2 (T2) launches.</li> <li>- Begin development of BMC3 Application Factory expansion.</li> <li>- Complete development of interoperability testbed to support T2 capabilities.</li> </ul> <p>Tranche 3</p> <ul style="list-style-type: none"> <li>- Identify extensions and/or additional capabilities required in SDA Operations Centers for ground command and control of Tranche 3 assets.</li> </ul> <p>PFP</p> <ul style="list-style-type: none"> <li>- Complete facility and network design for the DOC to support demonstrations.</li> <li>- Continue PFP Ground Segment Integration (PGI) effort to provide a common, enduring ground infrastructure and resources to minimize cost and complexity for PFP space vehicle demonstration and experimentation programs (beginning with FOO Fighter and T2DES).</li> </ul> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> The increase between the FY 2024 amount and the FY 2025 amount supports continued build out of ground capabilities for Tranche 2 and initial capabilities for Tranche 3.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		89.730	126.661	153.732
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				

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

**Remarks**

**D. Acquisition Strategy**

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), Space Operations Command (SpOC), Space Training and Readiness Command (STARCOM), Space Rapid Capabilities Office (SpRCO), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, non-traditional aerospace and defense contractors, 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 2025 Air Force		<b>Date:</b> March 2024
<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>

FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028				FY 2029			
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><i>Integration and Battle Management</i></b>	
Complete the development of an initial battle management architecture.	[Redacted]
Complete the development of Tranche 0 ground support infrastructure.	[Redacted]
Manage Tranche 0 constellation operations.	[Redacted]
Conduct Tranche 1 integration activities.	[Redacted]
Conduct Tranche 2 integration activities.	[Redacted]
Conduct Tranche 3 integration activities	[Redacted]
<b><i>Test and Checkout Center</i></b>	
Continue development of the Test and Checkout Center (TCC) within the Government Owned, Contractor Operated (GOCO) model.	[Redacted]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2025 Air Force		<b>Date:</b> March 2024
<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	2023	4	2024
Complete the development of Tranche 0 ground support infrastructure.	1	2023	4	2024
Manage Tranche 0 constellation operations.	1	2023	4	2026
Conduct Tranche 1 integration activities.	1	2023	4	2026
Conduct Tranche 2 integration activities.	3	2023	4	2026
Conduct Tranche 3 integration activities	3	2025	4	2026
<b><i>Test and Checkout Center</i></b>				
Continue development of the Test and Checkout Center (TCC) within the Government Owned, Contractor Operated (GOCO) model.	2	2023	4	2026

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**Exhibit R-2A, RDT&E Project Justification:** PB 2025 Air Force **Date:** March 2024

<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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
643731: <i>Transport</i>	-	811.242	1,847.944	1,439.241	0.000	1,439.241	1,695.357	1,783.370	1,859.261	1,895.934	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**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 Proliferated Warfighter Space Architecture (PWSA), 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, which began in FY 2022.

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

	FY 2023	FY 2024	FY 2025
<p><b>Title:</b> Transport</p> <p><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.</p> <p><b>FY 2024 Plans:</b></p> <p>Tranche 0</p> <ul style="list-style-type: none"> <li>- Continue to leverage Tranche 0 (T0) satellites as a testbed for investigating additional capabilities after Capstone demonstrations.</li> </ul> <p>Tranche 1</p> <ul style="list-style-type: none"> <li>- Complete interoperability and compatibility testing for Tranche 1 Transport Layer (T1TL) space vehicles space-to-ground radio frequency (RF) links, Link-16, Optical communications terminals, and network and encryption capabilities.</li> <li>- Execute Test Readiness Reviews for each Transport space vehicle vendor.</li> <li>- Perform integration testing of space vehicle command and control software with ground operations software.</li> <li>- Complete development of space vehicle command, control and telemetry hardware and software systems, test with O&amp;I ground system, and integrate workstations into the PWSA Operation Centers.</li> <li>- Complete space vehicle FlatSat development and begin operations testing through connections with O&amp;I the ground segment.</li> <li>- Determine readiness of hardware and software procedures to support the start of testing.</li> </ul>	763.841	1,809.964	1,428.111

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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>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Complete Transport SV component deliveries and vehicle assembly and integration.</li> <li>- Conduct Assembly, Integration &amp; Testing (AI&amp;T) of Transport space vehicles in preparation for Transport space vehicle launches.</li> <li>- Conduct production, build, and test phase for T1TL space vehicle.</li> <li>- Determine readiness to ship flight hardware, software, and support equipment to launch site and launch site readiness to receive and begin shipping space vehicles to launch site.</li> <li>- Evaluate the space flight worthiness of the space vehicle and launch vehicle flight hardware prior to integration, encapsulation, and upper stage mate and start launch vehicle integration activities.</li> <li>- Ensure readiness to conduct launch and early orbit phase operations and transition to nominal operations</li> <li>- Begin launching the T1TL space vehicles.</li> <li>- Continue hardware development and risk reduction for Battle Management Command, Control, and Communications (BMC3) modules for Transport Layer satellites.</li> </ul> <p>Tranche 2</p> <ul style="list-style-type: none"> <li>- Continue designing the Tranche 2 Transport Layer (T2TL) space vehicles based on requirements and lesson learned from T0 and T1 space vehicles, ground system, and interoperability requirements.</li> <li>- Continue establishing constellation design requirements for incorporating additional tactical data links into the Transport Layer, likely via the incorporation of Transport Layer vehicles hosting alternate data links.</li> <li>- Conduct the System Requirements Review for the T2TL Alpha and T2TL Beta space vehicles.</li> <li>- Complete Preliminary Design Review for the T2TL Alpha and T2TL Beta space vehicles and order long-lead items.</li> <li>- Complete award and kick-off for third T2TL Beta space vehicle vendor.</li> <li>- Award contracts to T2 Gamma space vehicle vendor(s) to support specific parts of the Transport mission.</li> </ul> <p>PWSA Future Programs (PFP)</p> <p>Tranche X Demonstration and Experimentation System (TxDES)</p> <ul style="list-style-type: none"> <li>- Complete T1 Demonstration and Experimentation (T1DES) delta System Requirements Review (delta-SRR)</li> <li>- Complete T1DES Preliminary Design Review (PDR).</li> <li>- Complete T1DES Critical Design Review (CDR).</li> <li>- Continue design and analysis effort for an additional tactical data link, waveform, and/or APNT signal planned for demonstration in T2 (i.e., T2 Demonstration and Experimentation System (T2DES)) and proliferation beginning with PWSA Tranche 3 (T3).</li> </ul> <p><b>FY 2025 Plans:</b></p> <p>Tranche 0</p> <ul style="list-style-type: none"> <li>- Continue to leverage Tranche 0 satellites as a testbed for investigating additional capabilities after Capstone demonstrations.</li> </ul>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024
<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>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>Tranche 1</p> <ul style="list-style-type: none"> <li>- Complete AI&amp;T of Transport space vehicles and payloads in preparation for Transport space vehicle launches.</li> <li>- Complete production, build, and test phase for Transport space vehicle.</li> <li>- Continue and complete shipping space vehicles to launch site and integration onto the multi-vehicle launch dispensers.</li> <li>- Continue and complete launch vehicle integration activities.</li> <li>- Continue and complete readiness for launch and early orbit phase operations and transition to nominal operations.</li> <li>- Complete the remaining launches for the T1 Transport Layer space vehicles.</li> <li>- Conduct on-orbit test and checkout, orbital positioning, and transition operations to the operations centers for each plane of space vehicles.</li> <li>- Conduct system level Developmental Testing.</li> <li>- Begin Operational Testing.</li> <li>- Transition to nominal operations and provide continuing space vehicle and enterprise management and sustainment.</li> </ul> <p>Tranche 2</p> <ul style="list-style-type: none"> <li>- Complete System Requirements Review for the T2TL Gamma space vehicles.</li> <li>- Complete Preliminary Design Review for the T2TL Gamma space vehicles.</li> <li>- Complete Critical Design Review for the T2TL Alpha, Beta, and Gamma space vehicles.</li> <li>- Begin assembly, integration, and testing of T2TL Alpha, Beta, and Gamma space vehicles.</li> <li>- Support early integration studies for T2TL launches.</li> </ul> <p>Tranche 3</p> <ul style="list-style-type: none"> <li>- Leverage lessons learned and accomplishments from previous Tranches to inform space vehicle, ground, and interoperability design requirements for Tranche 3 (T3) and start development of the next set of capabilities.</li> <li>- Determine minimum viable capability for T3 Transport, tactical satellite communications and future tactical data link constellation components.</li> <li>- Receive concurrence from the warfighting community on performance requirements for T3.</li> <li>- Initiate T3 acquisition and source selection processes leading to space vehicle vendor procurement instruments.</li> <li>- Award initial T3 space vehicle contracts.</li> </ul> <p>PFP</p> <p>Tranche x Demonstration and Experimentation System (TxDES):</p> <ul style="list-style-type: none"> <li>- Complete assembly, integration and test of T1 Demonstration and Experimentation System (T1DES) space vehicles and finalize demonstration plans.</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024		
<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>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>- Finalize development of additional tactical data link, waveform, and/or APNT signal planned for demonstration in T2 (i.e., T2DES) and proliferation beginning with PWSA T3.</p> <p>- Continue to integrate commercial and mission partners' satellite constellations into the PWSA as part of TxDES; Develop translator sats for integrating partner satellite constellations.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> The decrease between the FY 2024 amount and the FY 2025 amount reflects Tranche 1 completing satellite development and production.</p>				
<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 2024 Plans:</b> Due to the classified nature of this project, specific details are available at a higher classification level.</p> <p><b>FY 2025 Plans:</b> Due to the classified nature of this project, specific details are available at a higher classification level.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> Due to the classified nature of this project, specific details are available at a higher classification level.</p>		19.463	37.980	11.130
<b>Accomplishments/Planned Programs Subtotals</b>		783.304	1,847.944	1,439.241
		<b>FY 2023</b>	<b>FY 2024</b>	
<p><b>Congressional Add:</b> Laser Communication Downlink Systems</p> <p><b>FY 2023 Accomplishments:</b> SDA has used the appropriated funds to accelerate development of ground, maritime, and air optical communications terminals, advance the technical and manufacturing maturity of the optical communications vendor market, and provide capability at a low cost and shorter deployment timeline. Activities include awarded and pending contracts for demonstration systems (space, ground, sea, and airborne terminal hardware) that are ruggedized, hold the size, weight and power usable for mobile forces, and in compliance with standards set by SDA.</p>		24.085	-	
<p><b>Congressional Add:</b> Space Architecture Experimental Testbed</p> <p><b>FY 2023 Accomplishments:</b> Began Phase 1 of the Test and Checkout Center (TCC) to include design, demolition, and procurement of long lead items. The TCC is a standalone Space Networking Center with terrestrial connectivity, Ground Entry Points (GEP), and all other necessary infrastructure to support the full</p>		3.853	-	

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force	<b>Date:</b> March 2024
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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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	FY 2023	FY 2024
range of Tranche 2 system operations. The TCC would be used for Space Vehicle initialization, functional checkout, orbit raising and phasing, interoperability validation, and all other on-orbit system readiness preparations, allowing for a deliberate and orderly crossover to the SDA Space Networking Centers at Grand Forks Air Force Base, ND and Redstone Arsenal, AL.		
<b>Congressional Adds Subtotals</b>	27.938	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), Space Operations Command (SpOC), Space Training and Readiness Command (STARCOM), Space Rapid Capabilities Office (SpRCO), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, non-traditional aerospace and defense contractors, 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 2025 Air Force		<b>Date:</b> March 2024
<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 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028				FY 2029			
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.	
Continue activities for Tranche 1 development and delivery.	
Conduct activities for Tranche 2 capability development.	
Conduct activities for Tranche 3 capability development.	
<b>Laser Communication Downlink Systems</b>	
Development, Integration, Testing, and Capability Demonstration	
<b>Space Architecture Experimental Testbed</b>	
Explore the Test and Checkout Center (TCC) design and implementation options within the Government Owned, Contractor Operated (GOCO) model	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2025 Air Force		<b>Date:</b> March 2024
<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.	1	2023	4	2026
Continue activities for Tranche 1 development and delivery.	1	2023	4	2026
Conduct activities for Tranche 2 capability development.	1	2023	4	2026
Conduct activities for Tranche 3 capability development.	1	2025	4	2026
<b><i>Laser Communication Downlink Systems</i></b>				
Development, Integration, Testing, and Capability Demonstration	2	2023	4	2026
<b><i>Space Architecture Experimental Testbed</i></b>				
Explore the Test and Checkout Center (TCC) design and implementation options within the Government Owned, Contractor Operated (GOCO) model	3	2023	4	2024

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force										<b>Date:</b> March 2024		
<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>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>FY 2029</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
643732: <i>Sensing</i>	-	78.392	106.702	108.712	0.000	108.712	60.118	4.009	3.006	3.006	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Funds for the Tranche 1 Tracking Layer continue in RDT&E, Space Force, PE 1206446SF.

**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 Proliferated Warfighter Space Architecture (PWSA), 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, which began in FY 2022.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Sensing	22.652	4.002	24.247
<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 2024 Plans:</b></p> <p>Tranche 0:</p> <ul style="list-style-type: none"> <li>- Continue to leverage operating Tranche 0 satellites to investigate potential developmental capabilities.</li> <li>- Continue to characterize high-resolution background clutter in wide range of spectral bands.</li> <li>- Continue to collect data to inform medium field of view (MFOV) and wide field of view (WFOV) trades.</li> <li>- Continue to demonstrate WFOV performance and cost that enables proliferation.</li> </ul> <p>Tranche 1:</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024		
<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>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>- Continue to integrate commercial and mission partners' satellite constellations into the Proliferated Warfighter Space Architecture (PWSA).</p> <p><b>FY 2025 Plans:</b> Tranche 0:</p> <ul style="list-style-type: none"> <li>- Continue to leverage operating Tranche 0 satellites to investigate potential developmental capabilities.</li> <li>- Continue to characterize high-resolution background clutter in wide range of spectral bands.</li> <li>- Continue to demonstrate Wide Field of View (WFOV) performance and cost that enables proliferation.</li> </ul> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> The increase between the FY 2024 and the FY 2025 amount reflects final Tranche 0 Tracking Layer performer milestone payments.</p>				
<p><b>Title:</b> Sabre</p> <p><b>Description:</b> Sabre is a joint partnership executed/managed by Space Development Agency (SDA) and supported by the Office of the Secretary of Defense (OSD) Test Resource Management Center (TRMC) and United States Army Futures Command. This project will provide a three-space vehicle demonstration for space-based monitoring of telemetry data transmitted by vehicles under test (VUTs, missiles or interceptors) during flight testing. The Sabre Telemetry Relay payload module onboard the SDA NExT Low Earth Orbit (LEO) experimental testbed satellites will receive telemetry from VUTs during flight and relay it to range controllers on the ground.</p> <p>Sabre will demonstrate the ability to augment or replace DoD's decades-long approach of staging ships and airplanes along ground tracks of VUTs for the purpose of telemetry collection, tracking, and flight safety. In addition to reducing infrastructure cost, Sabre will also greatly enhance range test flexibility and improve test execution operational Security. The Sabre Telemetry Relay flight demonstration will leverage previously funded OSD TRMC and U.S. Army investments for payload design. This project will also consider other missions of opportunity to enhance Joint Warfighter capabilities in LEO.</p> <p><b>FY 2024 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete Program Milestone Reviews (PDR, CDR, MRR, TRR).</li> <li>- Complete Software Defined Radio (SDR) Build.</li> <li>- Complete Ground Control System Build.</li> <li>- Complete payload environmental testing.</li> </ul> <p><b>FY 2025 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete Test Readiness Review (TRR) and Pre-Ship Review (PRR)</li> <li>- Complete Flight Unit Delivery.</li> </ul>		21.252	64.000	3.114

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force		<b>Date:</b> March 2024		
<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>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
- Complete System Acceptance Review (SRR).				
<b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> The decrease from FY 2024 to FY 2025 is due to completion of program development and transition to demonstration.				
<b>Title:</b> Classified Projects		34.488	38.700	81.351
<b>Description:</b> Due to the classified nature of this project, specific details are available at a higher classification level.				
<b>FY 2024 Plans:</b> Due to the classified nature of this project, specific details are available at a higher classification level.				
<b>FY 2025 Plans:</b> Due to the classified nature of this project, specific details are available at a higher classification level.				
<b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> Due to the classified nature of this project, specific details are available at a higher classification level.				
<b>Accomplishments/Planned Programs Subtotals</b>		78.392	106.702	108.712
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), Space Operations Command (SpOC), Space Training and Readiness Command (STARCOM), Space Rapid Capabilities Office (SpRCO), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, non-traditional aerospace and defense contractors, 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 2025 Air Force		<b>Date:</b> March 2024
<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>

FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028				FY 2029			
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>Sensing</b>	
Complete the development of Tracking Tranche 0 space vehicles and integrate with Transport Layer.	[Redacted]
Launch and operations of Tranche 0 Tracking satellites.	[Redacted]
Conduct capstone demonstration to validate mission capabilities.	[Redacted]
<b>Sabre</b>	
Mission systems engineering and integration	[Redacted]
Payload development	[Redacted]
Procure and deliver space vehicle busses	[Redacted]
Bus and payload integration	[Redacted]
Launch Windows	[Redacted]
On-Orbit	[Redacted]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2025 Air Force		<b>Date:</b> March 2024
<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	2023	4	2025
Launch and operations of Tranche 0 Tracking satellites.	1	2023	1	2024
Conduct capstone demonstration to validate mission capabilities.	3	2023	4	2026
<b>Sabre</b>				
Mission systems engineering and integration	1	2023	1	2025
Payload development	1	2023	1	2024
Procure and deliver space vehicle busses	1	2023	4	2024
Bus and payload integration	4	2023	3	2024
Launch Windows	4	2025	1	2026
On-Orbit	4	2025	4	2026