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

Appropriation/Budget Activity 3620F: <i>Research, Development, Test & Evaluation, Space Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203182SF / <i>Spacelift Range System (SPACE)</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	-	11.219	11.175	55.906	0.000	55.906	57.270	58.660	60.251	61.692	Continuing	Continuing
674137: <i>Launch and Test Range System (LTRS) Modernization</i>	-	11.219	11.175	55.906	0.000	55.906	57.270	58.660	60.251	61.692	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Spacelift Range System (SLRS), also known as the Launch and Test Range System (LTRS), provides public safety and assured access to space. LTRS operates at the Eastern Range (ER) at Patrick SFB/Cape Canaveral SFS, FL and the Western Range (WR) at Vandenberg SFB, CA. LTRS provides tracking, telemetry, communications, flight safety, and other capabilities to support launch of national security space (NSS), civil and commercial space payloads, Intercontinental and Sea Launched ballistic missile and missile defense evaluations, and aeronautical and guided weapon tests. LTRS ensures ability to meet the national launch requirement, safely supports the launch cadence of ER/WR launch requirement holders and provides assured access to space for the nation. The ER and WR are designated as Department of Defense Major Range and Test Facility Bases (MRTFB).

LTRS is comprised of 12 subsystems that together provide this capability to the ranges. The Range Safety, Command Destruct, and Positive Control subsystems provide the capability to destroy an errant rocket, if necessary to protect public safety. These subsystems rely on the Telemetry, Radar, and Optics subsystems to provide tracking data. The Weather and Surveillance subsystems allow range operators and customers to determine if conditions are safe for launch. The Communications, Data Handling, and Timing & Sequencing subsystems ensure critical data is expeditiously routed from remote sensors (e.g., radars, optics) to range operators and customers. Finally, the Planning and Scheduling subsystem ensures all assets are available when needed for a launch or test operation. The shift from the LTRS program into the Spaceports of the Future (SOTF) will be accomplished over the coming years through capability transformation.

The Space Force requires RDT&E funds to conduct LTRS Digital Transformation studies, prototype experimentation, and developmental test activities to meet evolving technological requirements. These activities will constitute the shift from Range systems alone, to integrated Spaceports while remaining operational. The Commander's SOTF vision supports the increased launch tempo and volume, while meeting technological demands of the Spaceport customer base. The transformation will entail data capability pathfinding, integrating existing systems to emerging technologies through prototype activities, and development of unique-fit solutions. Specifically, funds will provide engineering analyses for insertion of promising technology, provide opportunity to test Cloud infrastructure and software development strategies to drive state-of-the-art applications into LTRS development, validate pathfinder concepts to meet an accelerating launch capacity and cadence, improve system cyber survivability and resilience, and continue to evaluate promising technology beyond current industry standards. Digital Transformation drives automation and system autonomy into LTRS operations for seamless launch and return operations and accelerates capability to Range users through adoption of modern systems, platforms and processes.

In order to meet these evolving technological requirements and Spaceport of the Future guidance, LTRS will rebalance funding from a predominantly Procurement focused appropriation to a balanced appropriation mix of Procurement and RDT&E funding through FY 2025 and beyond. This realignment of appropriations ensures

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requirements expend against the appropriation most suited for the type of development work required for mission fulfillment. No requirements planned for Procurement obligations will be sacrificed to achieve this shift in funding profile, but a large subset of these requirements to modernize Range Instrumentation and associated services will move to the software acquisition pathway effort as core capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver LTRS Critical Space Operations capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	11.608	11.175	10.797	0.000	10.797
Current President's Budget	11.219	11.175	55.906	0.000	55.906
Total Adjustments	-0.389	0.000	45.109	0.000	45.109
• 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	-0.389	0.000			
• Other Adjustments	0.000	0.000	45.109	0.000	45.109

Change Summary Explanation

FY 2025: Increase due to realignment of funds to begin fully executing Delta-V and align funding to match execution strategy for requirements enabling Spaceport of the Future.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2023	FY 2024	FY 2025
Title: Launch and Test Range (LTRS) Software Modernization, called Delta-V	-	-	30.112
Description: Continuation of a permanent modification to the Launch and Test Range System (LTRS) ACAT III-equivalent program baseline, the Delta-V program will execute the USSFs spaceport & test range software and IT infrastructure modernization portfolio. The program will service software and infrastructure requirements for both the Eastern Range (Cape Canaveral SFS, FL) and the Western Range (Vandenberg SFB, CA). "Delta-V", is a reference to a concept in spacecraft flight dynamics symbolizing a change (Delta, symbolized by a Greek letter in engineering and aerodynamics) in speed and direction (Velocity, symbolized by "V") from the current state. As its name suggests, Delta-V aims to continuously improve the quality and			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2023	FY 2024	FY 2025
<p>rate of software capability delivery to space launch and test range operations. The two primary thrusts of the program will be to (1) enable the modernization of existing range software & IT infrastructure and (2) to establish and operate a software factory to build/buy and operationally maintain and sustain spaceport and test range software systems.</p> <p>The program was funded initially in FY 2023 and FY 2024 within the LTRS Range Technology Integration Major Thrust area. Total funding in FY 2023 allocated to Delta-V is 1.774M and in FY 2024 planned funding to Delta-V is \$2.600M.</p> <p>Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, and activities that may leverage commercial and international opportunities.</p> <p>FY 2025 Plans: Delta-V will build developmental capabilities such as the Continuous Integration/Continuous Delivery (CI/CD) platform, SW development and test environments, Zero Trust pilot program, Spaceport agile software projects and prototypes and mature DevSecOps processes and leverage lessons learned virtualizing legacy LTRS hardware. Delta-V will utilize CI/CD platform and processes to provide engineering solutions, test, and deliver enhanced operational systems to meet National launch capacity and cadence requirements.</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: FY 2024 funding for Delta-V planning phase activities are in the LTRS Range Technology Integration Major Thrust area. The FY 2025 increase will enable execution phase activities of Delta-V in its own major thrust.</p>				
<p>Title: Enterprise Systems Engineering and Integration to Support Government-Controlled Baseline</p> <p>Description: SE&I manages the government-controlled system and subsystem level baseline requirements including analysis of future changes to the fielded baseline. SE&I provides "government as the integrator" engineering support to ensure multiple separate modernizations and the sustainment baseline are synchronized. SE&I will develop and recommend investment strategies to keep the Eastern and Western Ranges operating well beyond the FYDP.</p> <p>FY 2024 Plans: Continue to explore promising technology and concepts to add resiliency and agility to the LTRS fielded baseline to meet National launch capacity and cadence requirements envisioned by SOTF. Seek pathfinding and experimentation in Cloud infrastructure and software delivery pipeline concepts to prototype Range operations approaches, which will feed Digital Transformation of LTRS and accelerate capability to Range users through space access industry standard technology and sustain MRTFB capability. Implement system resiliency, survivability, and situational awareness necessary to operate in the contested space</p>		2.240	2.050	9.527

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2023	FY 2024	FY 2025
<p>domain and address ever-expanding cyber threats. Continuing activities including, but not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc.</p> <p>FY 2025 Plans: Continue to explore promising technology and concepts to add resiliency and agility to the LTRS fielded baseline to meet National launch capacity and cadence requirements envisioned by SOTF. Seek pathfinding and experimentation in Cloud infrastructure and software delivery pipeline concepts to prototype Range operations approaches, which will feed Digital Transformation of LTRS and accelerate capability to Range users through space access industry standard technology and sustain MRTFB capability. Implement system resiliency, survivability, and situational awareness necessary to operate in the contested space domain and address ever-expanding cyber threats. Continuing activities including, but not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc.</p> <p>FY 2024 to FY 2025 Increase/Decrease Statement: FY 2025 increased from FY 2024 due to additional support required to support digital transformation efforts and to evenly distribute the cost proportionally between the RDT&E and Procurement appropriations. Increased funding will fully enable execution of the Delta-V Software Acquisition Pathway program.</p>				
<p>Title: LTRS Range Technology Integration</p> <p>Description: Provides Advisory and Assistance Services (A&AS) support of the operational baseline (all twelve subsystems) to include configuration management of all range assets, requirements analyses, and special studies. Provides support for Systems Program Office operations, Systems Engineering and Technical Assistance (SETA), and Federally Funded Research and Development Centers (FFRDC). Strategically executes experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.</p> <p>FY 2024 Plans: Continue efforts to analyze, engineer, and prototype SOTF envisioned agility and resiliency through a Digital Transformation strategy via adoption of modern systems, infrastructure, platforms, and processes; includes research associated with Cloud infrastructure and software factory concepts. Development support services will facilitate prototypes and data-driven applications to accelerate capabilities to range users such as agile Range situational awareness and LTRS equipment automation to facilitate rapid range reconfiguration and continued expansion of capability to conduct simultaneous launch operations. Develop and prove Dev/Sec/Ops capability as a viable approach for deploying LTRS system applications and software in a continuous integration/continuous delivery methodology. Implement system resiliency and situational awareness necessary to operate in a contested space and cyber domain. Activities include, but are not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc.</p> <p>FY 2025 Plans:</p>		8.979	9.125	16.267

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2023	FY 2024	FY 2025
Adopt modern systems, infrastructure, platforms, and processes to transition to an increasingly Cloud-based infrastructure with Cloud-native data governance regimes to sustain future operational data needs. Continue efforts to analyze, engineer, and prototype SOTF envisioned agility and resiliency through a Digital Transformation strategy while upgrading rapid data delivery for decision-support in an increasingly contested operational environment. Transforming Range resiliency and launch customer responsiveness with data and predictive modeling for real-time decision support. Development teams and digital support services will facilitate prototypes and data-driven test applications to accelerate delivery of capabilities to range users. Efforts such as agile Range situational awareness and LTRS equipment automation to facilitate rapid range reconfiguration and continued expansion of capability to conduct simultaneous launch operations towards the SOTF objectives. Harness proven Dev/Sec/Ops approach for deploying LTRS system applications and transitioning legacy data transport for accelerated analysis and mission support. Implement system resiliency and situational awareness necessary to operate in a contested space and cyber domain, while improving operational efficacy through testing and prototyping throughout increased operational use. Activities include, but are not limited to, program office strategy advisement on advanced technology adoption, studies, technical analyses, experimentation, prototyping, etc.			
<i>FY 2024 to FY 2025 Increase/Decrease Statement:</i> FY 2025 increase due to the increased need for spaceport capacity, responsiveness and agility to meet the operational demand signal and prevent them from becoming a constraint to space launch and test through common platform integration, data transport modernization and sensor edge data integration. Increases in FY 2025 will enable additional development activities to provide enterprise support for the Delta-V Software Acquisition Pathway program.			
Accomplishments/Planned Programs Subtotals	11.219	11.175	55.906

D. Other Program Funding Summary (\$ in Millions)											
Line Item	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
• SPSF 01 1203182SF: <i>Spacelift Range System (Space)</i>	69.275	114.505	63.798	-	63.798	62.448	64.027	65.190	66.251	Continuing	Continuing

Remarks

E. Acquisition Strategy
 The Launch and Test Range System (LTRS) program acquisition strategy is Incremental System Modernization and Digital Transformation to ensure continued enablement of the accelerating National launch cadence executing on the Eastern Range (ER) and Western Range (WR). This strategy addresses the US Space Force (USSF) Spaceport of the Future (SOTF) guidance, formerly known as Range of the Future (ROTF), envisioned by Range instrumentation architecture—one of multiple SOTF lines of effort. The LTRS program is focused on developing a scalable system capable of responding to the demands of National Security Space objectives and DoD test and evaluation needs as well as assuring the Nation's ability to access space. Innovative development and employment of Cloud infrastructure, software

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Appropriation/Budget Activity
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R-1 Program Element (Number/Name)
PE 1203182SF / *Spacelift Range System (SPACE)*

factory and software development services, and cyber security strategies to facilitate data-driven Spaceport activities, digital processing, and data distribution capability is targeted as the enabling strategy for the SOTF Architectural line of effort. Promising prototypes and technology will be accelerated into the LTRS architecture via investments aimed at inserting on-demand increased operational capacity and state-of-the-practice data formatting and transport to launch operations. Contracted engineering and integration services innovate promising technology into the system technical baseline and manage the LTRS specifications and technical requirements on behalf of the government. Additionally, engineering services act as integrator for completed LTRS modernization projects. Federally Funded Research and Development Center (FFRDC) provides critical mission technical and cyber security analysis capability to ensure LTRS assets meet operational needs.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Air Force **Date:** March 2024

Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203182SF / <i>Spacelift Range System (SPACE)</i>	Project (Number/Name) 674137 / <i>Launch and Test Range System (LTRS) Modernization</i>
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Product Development (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Launch and Test Range System (LTRS) Software Modernization, called Delta-V	C/Variou	Various : Various	-	-		-		30.112	Jan 2025	-		30.112	Continuing	Continuing	-
Enterprise Systems Engineering and Integration	C/FPIF	ENSCO INC : Falls Church, VA	-	2.240	Oct 2022	2.050	Oct 2023	9.527	Oct 2024	-		9.527	Continuing	Continuing	-
LTRS Range Technology Integration	C/Variou	Various : Various	-	6.701	May 2023	6.812	May 2024	11.551	May 2025	-		11.551	Continuing	Continuing	-
SBIR/STTR	TBD	TBD : TBD	-	-		0.039	May 2024	2.009	May 2025	-		2.009	Continuing	Continuing	-
Subtotal			-	8.941		8.901		53.199		-		53.199	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FFRDC	RO	Aerospace : El Segundo, CA	-	0.659	Nov 2022	0.573	Nov 2023	0.591	Nov 2024	-		0.591	Continuing	Continuing	-
OTHER SUPPORT	PO	Various : El Segundo, CA	-	1.619	Nov 2022	1.701	Nov 2023	2.116	Nov 2024	-		2.116	Continuing	Continuing	-
Subtotal			-	2.278		2.274		2.707		-		2.707	Continuing	Continuing	N/A

	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals		-	11.219	11.175	55.906	-	-	55.906	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2025 Air Force		Date: March 2024
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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

LTRS	
LTRS Software Modernization, Delta-V	
Range Technology Integration	
Enterprise SE&I	

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Air Force		Date: March 2024
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LTRS				
LTRS Software Modernization, Delta-V	1	2025	4	2029
Range Technology Integration	1	2023	4	2029
Enterprise SE&I	1	2023	4	2029