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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3620F: <i>Research, Development, Test & Evaluation, Space Force I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 1206116SF / <i>Space Test and Training Range Development</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	20.281	0.000	20.281	20.709	21.079	21.458	21.851	Continuing	Continuing
666156: <i>Space Test and Training Range Development</i>	-	0.000	0.000	20.281	0.000	20.281	20.709	21.079	21.458	21.851	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206116F, Space Test and Training Range Development efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206116SF, Space Test and Training Range Development from Appropriation 3600, Budget Activity 06 due to the creation of a new Appropriation for Space Force.

Supports the development of Space Test and Training Range (STTR) capabilities critical for developmental and operational test, training, exercises and tactics development for Space Control systems and Joint National Space Architecture. Includes development, demonstration and delivery of test assets, special test equipment, capabilities and systems required to test, validate, and verify performance of integrated space control systems. Provides a safe, secure, controllable and repeatable environment for the testing of space control mission systems and training operators in both realistic and relevant environments. Additionally, using an agile incremental development approach for range capabilities, this program develops test range assets for both the fixed node Space Range Operations Center (SROC) at Schriever Air Force Base and a deployable Signal Monitoring Unit capability to support complex Joint and AF exercises. The virtual range as part of the Family of Systems (FoS), called Advanced Threat Simulation Environment (ATSE) virtual range, is being developed to accomplish the STTR mission. ATSE integrates to a Distributed Mission Architecture, tying into cyber, air, and space ranges for increased realism and complexity required to prepare space operators for real-world threats. This technology will allow for the first-ever use of a realistic signal environment to increase the realism and efficiency of space control squadron training. Additionally, the STTR Next Space Orbital Engagement (OE) range risk reduction projects will analyze, prototype, and demonstrate potential range systems that are used to support the testing and training of new advanced development space systems, advanced training for space operator orbital engagement maneuvers and future exercises. These risk reduction activities will include on-orbit capabilities, ground components, communication between nodes, and other required infrastructure.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

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

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This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	20.281	0.000	20.281
Total Adjustments	0.000	0.000	20.281	0.000	20.281
• 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	20.281	0.000	20.281

Change Summary Explanation

FY 2021: +\$20.281M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Range Control	0.000	0.000	20.281
Description: Continue development of virtual range integration with cyber and air ranges hosting network emulators and other environments allowing tactics, techniques, and procedures (TTP) development, realistic operational testing, and enable more realistic exercises integrating joint air, space and cyber effects. Continue risk reduction/mitigation efforts for Space Orbital Engagement Range Risk Reduction Projects which will analyze, prototype and demonstrate potential range systems that will be used to support the live and virtual testing of new advanced development space systems, space operator orbital engagement maneuvers (OEM) advanced training, and future SPACE FLAG exercises using live and virtual systems. Continue overhaul of fixed range capabilities, replacement of obsolete equipment, outdated servers, and performing software upgrades focusing on updating signal monitoring hardware with visualization tools and new monitoring capabilities and cybersecurity automation. Rapidly respond and implement system resiliency and situational awareness necessary to operate in the contested space domain. Acquire additional system capability to enable and enhance training against new and emerging adversarial assets, to integrate mission scenarios into one graphic user interface, to integrate training into joint operations across multi-domain training events, to reduce size, weight, and power, and to replace			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>software defined radio cards. Integrate joint DoD solutions for counterspace and space superiority effects. RDT&E funding is required to support this transformation and enable Space Superiority end-to-end integration activities such as, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering, demonstrations, testing, command and control integration, mission partner integration, and space test/combat range events.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Plans: Continue development of virtual range integration with cyber and air ranges hosting network emulators and other environments allowing tactics, techniques, and procedures (TTP) development, realistic operational testing, and enable more realistic exercises combining air, space and cyber effects. Continue Interim Contractor support (ICS) of virtual range. Continue risk reduction/mitigation efforts for Space Orbital Engagement Range Risk Reduction Projects which will analyze, prototype and demonstrate potential range systems that will be used to support the live and virtual testing of new advanced development space systems, space operator orbital engagement maneuvers (OEM) advanced training, and future SPACE FLAG exercises using live and virtual systems. Continue overhaul of fixed range capabilities, replacement of obsolete equipment, outdated servers, and performing software upgrades focusing on updating signal monitoring hardware with visualization tools and new monitoring capabilities and migrating to Linux for automation of cybersecurity. Rapidly respond and implement system resiliency and situational awareness necessary to operate in the contested space domain. Acquire additional system capability for new and emerging adversarial assets and replace obsolete equipment to reduce sustainment costs. Integrate joint DoD solutions for counterspace and space superiority effects. RDT&E funding is required to support this transformation and enable Space Superiority end-to-end integration activities such as, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering, demonstrations, testing, command and control integration, mission partner integration, and space test/combat range events.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	0.000	0.000	20.281

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible.