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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: Research, Development, Test & Evaluation, Space Force I BA 2: Applied Research	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / Space Technology
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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	-	355.174	206.196	244.964	0.000	244.964	251.303	267.412	272.650	278.213	Continuing	Continuing
620200: Enterprise Transformational Appld Research	-	0.000	0.000	9.193	0.000	9.193	7.014	7.015	7.015	7.014	Continuing	Continuing
621010: Space Survivability & Surveillance	-	56.399	41.591	42.502	0.000	42.502	38.900	41.603	42.743	43.640	Continuing	Continuing
624846: Spacecraft Payload Technologies	-	61.582	71.286	43.953	0.000	43.953	45.773	47.625	49.094	50.123	Continuing	Continuing
624847: Rocket Propulsion Technology	-	15.511	14.483	28.214	0.000	28.214	29.099	30.071	30.994	31.643	Continuing	Continuing
624866: Lasers & Imaging Technology	-	31.318	19.985	30.298	0.000	30.298	31.629	33.114	32.097	32.768	Continuing	Continuing
625018: Spacecraft Protection Technology	-	33.727	32.345	42.834	0.000	42.834	49.936	56.553	57.929	59.141	Continuing	Continuing
628809: Spacecraft Vehicle Technologies	-	156.637	26.506	47.970	0.000	47.970	48.952	51.431	52.778	53.884	Continuing	Continuing

**Note**  
 This program, BA 2, PE 1206601SF, project , Explore, is a new start.  
 This program, BA 2, PE 1206601SF, project , Seedlings for Disruptive Capabilities, is a new start.

Program Element 1206601SF/Space Technology, Project 620200/Enterprise Transformational Appld Research, is a new start under the 3620 appropriation. The (1) Explore and (2) Seedlings for Disruptive Capabilities Thrusts are FY25 transfers of Space domain efforts from 3600 USAF Program Element 0602020F/Future AF Capabilities Applied Research, Project 620200/Enterprise Transformational Appld Research.

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

This program focuses on seven major areas. First, the Space Survivability and Surveillance area develops technologies to understand space weather and the geophysics environment for mitigation and exploitation of these effects to Department of Air Force systems. Second, the spacecraft payload technologies area improves satellite payload operations by developing advanced materials/components, networking, analysis tools, and subsystem capabilities. Third, the rocket propulsion technology area develops rocket propulsion and associated technologies for space access, space maneuver, and strategic systems. Fourth, the lasers & imaging technology area conducts research supporting ground-based optical space situational awareness and ground-to-space laser-enabled communication. Fifth, the

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2025 Air Force	<b>Date:</b> March 2024
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<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force I BA 2: Applied Research</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>
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spacecraft protection area develops technologies for protecting United States space assets in potential hostile settings. The sixth major area, spacecraft vehicles, focuses on spacecraft platform and control technologies, operator effectiveness, and human-machine interactions. The last area, enterprise transformational applied research develops multidisciplinary applied research efforts to accelerate the technology pipeline of transformational capabilities. Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

In order to manage, execute, and deliver science and technology capabilities, this program element may include: Necessary civilian pay expenses; expenses to support the operation and maintenance of facilities; as well as expenses related to travel, supplies, IT hardware, software and support, administrative contractor services, etc.

This program is in Budget Activity 2, Applied Research because this budget activity includes studies, investigations, and non-system specific technology efforts directed toward general military needs with a view toward developing and evaluating the feasibility and practicality of proposed solutions and determining their parameters.

<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	360.286	206.196	157.742	0.000	157.742
Current President's Budget	355.174	206.196	244.964	0.000	244.964
Total Adjustments	-5.112	0.000	87.222	0.000	87.222
• 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	10.000	0.000			
• SBIR/STTR Transfer	-5.028	0.000			
• Other Adjustments	-10.084	0.000	87.222	0.000	87.222

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

**Project:** 624847: *Rocket Propulsion Technology*

Congressional Add: *Propulsion Technology*

Congressional Add Subtotals for Project: 624847

**Project:** 625018: *Spacecraft Protection Technology*

Congressional Add: *Congressional Add: Program increase - ground-based interferometry*

Congressional Add: *Congressional Add: Program Increase - digital engineering and modeling for space domain awareness*

Congressional Add: *Congressional Add: Program Increase - lunar surface space domain awareness*

Congressional Add: *Congressional Add: Program Increase - SOSA-based spacecraft protection technology*

	<b>FY 2023</b>	<b>FY 2024</b>
	4.930	-
	4.930	-
	1.972	-
	9.367	-
	3.944	-
	9.860	-

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2025 Air Force	<b>Date:</b> March 2024
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<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force I BA 2: Applied Research</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>
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<b><u>Congressional Add Details (\$ in Millions, and Includes General Reductions)</u></b>	<b>FY 2023</b>	<b>FY 2024</b>
Congressional Add Subtotals for Project: 625018	25.143	-
<b>Project: 628809: <i>Spacecraft Vehicle Technologies</i></b>		
Congressional Add: <i>Congressional Add: Program increase - thin-film photovoltaic energy</i>	2.958	-
Congressional Add: <i>Congressional Add: Program increase - hybrid space architecture</i>	4.930	-
Congressional Add: <i>Congressional Add: Program increase - university consortia for space technology</i>	19.721	-
Congressional Add: <i>Congressional Add: Program increase - aerospace films for increased operational range of reconnaissance</i>	5.916	-
Congressional Add: <i>Congressional Add: Program increase - 3D graphene lithium-sulfur batteries</i>	4.930	-
Congressional Add: <i>Congressional Add: Program increase - L-Band active phased array demonstration</i>	2.958	-
Congressional Add: <i>Congressional Add: Program increase - next generation multiband space array antenna</i>	9.860	-
Congressional Add: <i>Congressional Add: Program increase - advanced analog microelectronics</i>	2.958	-
Congressional Add: <i>Congressional Add: Program increase - spectrum superiority lab</i>	4.930	-
Congressional Add: <i>Congressional Add: Program increase - advanced space power systems</i>	9.269	-
Congressional Add: <i>Congressional Add: Program increase - cybersecurity for a hybrid space architecture</i>	14.791	-
Congressional Add: <i>Congressional Add: Program increase - flexible solar panels</i>	4.930	-
Congressional Add: <i>Congressional Add: Program increase - high efficiency lightweight RF amplifiers for LEO constellation</i>	4.930	-
Congressional Add: <i>Congressional Add: Program increase - moving target engagement solutions</i>	5.916	-
Congressional Add: <i>Congressional Add: Program increase - operational upper stage augmentation kit</i>	9.860	-
Congressional Add Subtotals for Project: 628809	108.857	-
Congressional Add Totals for all Projects	138.930	-

**Change Summary Explanation**

FY 2025 increased compared to FY 2024 by \$38.8M due to the additional funding for Starfire Optical Range base operations support, correction of a known database error realigning funding from BA06 1206601SF, and USAF to USSF transfers for Enterprise Transformational Applied Research. This was coupled with a decrease in funding for completion of the resilient satellite navigation and reductions for re-prioritization to meet the nation's future security needs.

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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 2:  
*Applied Research*

**R-1 Program Element (Number/Name)**  
PE 1206601SF / *Space Technology*

The increase in FY2025 from PB 2024 to PB 2025 of \$87.2M reflects additional funding for Starfire Optical Range base operations support (\$7.3M), USAF to USSF transfers for Enterprise Transformational Applied Research (\$9.2M), a correction of a known database error realigning funding from BA06 1206601SF (\$81.9M) and reductions for re-prioritization to meet the nation's future security needs(\$-11.2M).

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

<b>Appropriation/Budget Activity</b> 3620F / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 620200 / <i>Enterprise Transformational Appld Research</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
620200: <i>Enterprise Transformational Appld Research</i>	-	0.000	0.000	9.193	0.000	9.193	7.014	7.015	7.015	7.014	Continuing	Continuing

**Note**  
 This program, BA 2, PE 1206601SF, project , Explore, is a new start.  
 This program, BA 2, PE 1206601SF, project , Seedlings for Disruptive Capabilities, is a new start.

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

This project element develops multidisciplinary applied research efforts to accelerate the technology pipeline of transformational capabilities by reducing risk and maturing technologies so they can transition in support of larger advanced technology development capability investments. These activities are selected to enable solutions to the Department of the Air Force (DAF)s highest priorities. The Explore effort engages traditional & non-traditional industry, government laboratories, and academia through 12-24 month feasibility studies and demonstrations. The Seedlings for Disruptive Capabilities Program (SDCP) facilitates Air Force Research Laboratory (AFRL) cross-disciplinary applied research to provide leap-ahead, high risk technology development. Applied research efforts span a broad spectrum of activities, and established processes allow agility and flexibility to meet higher demand signals.

AFRL will plan and manage these funds at the enterprise level to achieve a high level of collaboration executed across all the applicable Technology Directorates and will apply the research toward disruptive capabilities. Building off the technology competencies and ecosystems of the Technology Directorates brings together the needed expertise and components to develop the transformational capabilities.

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

<b>Title:</b> Explore	FY 2023	FY 2024		FY 2025
<b>Description:</b> Explore engages traditional & non-traditional industry, government labs and academia through competitive opportunity calls to incubate transformational Science and Technology (S&T). Its strategy-informed construct works to uncover game-changing and leap-ahead technologies that address DAF future force priorities. Explore's three-step process identifies, invests in, and matures these technologies through 12-24 month feasibility studies and proof-of-concept activities. The technology areas are identified through concept decomposition, technical horizon scanning, and broad competitive calls to the nation's best and brightest innovators in industry, academia, government, non-profits, and other non-traditional partners. Promising technologies are accelerated through aggressive, short-duration, applied research and development efforts. These efforts assess operational viability and demonstrate feasibility of transformational warfighter capabilities, including their associated business and use cases. To do this, a variety of approaches are used including modeling and simulation, military utility experimentation, exercise participation, technical analysis, technology/concept maturation, risk reduction activities, and subject matter expertise	-	0.000		3.500

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 620200 / <i>Enterprise Transformational Appld Research</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>input. Explore informs future areas of research and aids in identifying emerging technologies which could enable larger advanced technology development capability investments.</p> <p><b>FY 2024 Plans:</b> Previously this work was accomplished under USAF Program Element 0602020F/ Future AF Capabilities Applied Research, Project 620200/Enterprise Transformational Appld Research and was transferred as part of the realignment to the Space Force Unique Science and Technology.</p> <p><b>FY 2025 Plans:</b> Initiate efforts which support immediate space priorities of the DAF within building blue combat effects capabilities, countering adversary capabilities, supporting contested logistics, and command, control, and communications battle management</p> <p>Continue development of space technologies investment framework and identification of key space capability needs for the future force.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by 3.500M. Increase is a result of a transfer from USAF Program Element 0602020F/ Future AF Capabilities Applied Research, Project 620200/Enterprise Transformational Appld Research into this USSF Program Element 1206601SF/Space Technology, Project 620200/ Enterprise Transformational Appld Research.</p>				
<p><b>Title:</b> Seedlings for Disruptive Capabilities</p> <p><b>Description:</b> Integrates cross-enterprise multi-directorate space transformational applied research efforts to accelerate the pipeline of technology-enabled capability candidates pursuing the Department of the Air Force Operational Imperatives. Seedlings for Disruptive Capabilities solicit applied research to provide leap-ahead, high risk technology development. Significantly advances scientific progress of innovative concepts underpinning transformational operational capabilities to future forces, enhance organic AFRL research capabilities in an enterprise-level, cross-Directorate environment &amp; fortify external research partnerships to leverage key emerging technology developments in academia, industry, and/or government laboratories. The Air Force Research Laboratory will plan and manage these research activities at the enterprise level with decentralized execution to achieve the intent of the strategy.</p> <p><b>FY 2024 Plans:</b> Previously this work was accomplished under USAF Program Element 0602020F/ Future AF Capabilities Applied Research, Project 620200/Enterprise Transformational Appld Research and was transferred as part of the realignment to the Space Force Unique Science and Technology.</p> <p><b>FY 2025 Plans:</b></p>		-	0.000	5.693

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Continue building infrastructure for trusted satellite autonomy that can enable quick reaction, planning and decision making in contested operations.  <b><i>FY 2024 to FY 2025 Increase/Decrease Statement:</i></b> FY 2025 increased compared to FY 2024 by 5.693M. Increase is a result of a transfer from USAF Program Element 0602020F/ Future AF Capabilities Applied Research, Project 620200/Enterprise Transformational Appld Research into this USSF Program Element 1206601SF/Space Technology, Project 620200/ Enterprise Transformational Appld Research.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	9.193

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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

<b>Appropriation/Budget Activity</b> 3620F / 2					<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>				<b>Project (Number/Name)</b> 621010 / <i>Space Survivability &amp; Surveillance</i>			
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
621010: <i>Space Survivability &amp; Surveillance</i>	-	56.399	41.591	42.502	0.000	42.502	38.900	41.603	42.743	43.640	Continuing	Continuing

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

This project develops technologies to understand and control the space environment for warfighter's future capabilities. The focus is on characterizing and forecasting the battlespace environment for more realistic space system design, modeling, and simulation, as well as the battlespace environment's effect on space systems' performance. This includes technologies to specify and forecast the space environment for planning operations, ensure uninterrupted system performance, optimize space-based surveillance operations, and provide capability to mitigate or exploit the space environment for both offensive and defensive operations.

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

	FY 2023	FY 2024	FY 2025
<p><b>Title:</b> Space Environment Research</p> <p><b>Description:</b> Develop techniques, forecasting tools, sensors, and technologies for specifying, monitoring, predicting, and controlling space environmental conditions hazardous to Department of Defense (DoD) operational space and radar systems.</p> <p><b>FY 2024 Plans:</b> Continue support for North American Aerospace Defense Command (NORAD) Homeland Defense Modernization and Department of the Air Force (DAF) Arctic strategy. Develop and investigate representative and median regional space environment specifications intended for operational system simulation experiments. Extend and improve software radio techniques to monitoring and specifying space environment impacts. Utilize Artificial Intelligence (AI)/Machine Learning (ML) techniques. Improve efficiency of plasma generation systems. Support space experiments and demonstrations. Develop and enhance space environment modelling capabilities to better enable accurate specification and forecasting of the state of the space environment and the resulting impacts to Department of Defense and national systems. Extend advanced research into beyond-geosynchronous space environment impacts to national systems. Continue applied research of space environment interactions and effects for space situational awareness. Evaluate basic research in solar and space environment physics for transition to applied research efforts. Initiate exploratory work on space protection and exploitation technologies.</p> <p><b>FY 2025 Plans:</b> Continue to expand and refine space environment modeling capabilities to facilitate precise specification and forecasting of the space environment's conditions and its implications on Department of Defense and national systems. Increase our ability to drive down granularity of space environment specification through increased space based environmental monitoring capabilities. Continue to increase support for the North American Aerospace Defense Command (NORAD) Homeland Defense Modernization and the techniques to enhance data analysis, decision-making processes, and improve our ability to understand faster, decide faster, and act faster in the Electromagnetic Operating Environment. Continue to develop plasma generation</p>	19.443	15.591	23.725

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>systems for improved operational impacts. Provide comprehensive support for space experiments and demonstrations. Continue comprehensive research and analysis of the space environment to establish accurate regional environment specifications for effective operational system simulation experiments. Increase research efforts to investigate the impacts of the space environment beyond geosynchronous orbits on national systems. Continue to explore and study space environment interactions and effects to improve space domain awareness and technologies in operational environments including space and terrestrial sensor development. Continue to evaluate foundational research in solar and space environment physics to determine its suitability for application in practical research initiatives and exploratory work on developing technologies for space protection and exploitation. Complete space based environmental monitoring sensor development.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by \$8.134M due to increasing research in beyond geosynchronous orbits, support to NORAD, and the DAF arctic strategy. Funding was realigned into this thrust from BA06 1206601SF to correct known database error to accurately reflect actual costs of research performed and planned in this thrust.</p>			
<p><b>Title:</b> Surveillance Technologies</p> <p><b>Description:</b> Develop advanced target detection techniques, spectral signature libraries, and decision aids for space-based sensors and surveillance systems.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust will be realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and consolidated under one thrust titled Missile Warning and Tactical Sensing to better align projects under focused mission areas and in line with the USSF Space Systems Command (SSC) PEOs.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>	8.973	0.000	0.000
<p><b>Title:</b> Alternative Navigation Technologies</p> <p><b>Description:</b> Develop new technologies based on cold atom physics and photonics that provide autonomous jam-proof precision inertial navigation to augment Global Positioning System (GPS) in case of GPS-denial. Develop atomic clocks and methods to disseminate time based on new technologies to replace legacy GPS atomic clocks and networks.</p> <p><b>FY 2024 Plans:</b></p>	12.978	0.000	0.000

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>In FY 2024 this thrust will be realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies and consolidated under one thrust titled Space Communication/Positioning, Navigation, &amp; Timing (PNT) Technologies to better align projects in line with the USSF SSC PEO's mission areas.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>				
<p><b>Title:</b> Strategic Radiation Hardened Electronics</p> <p><b>Description:</b> Design, develop, produce and qualify strategic radiation hardened (SRH) non-volatile memory (NVM) that does not exist today and is suitable to support DoD strategic missile, missile defense, and space system needs and to address a more diverse &amp; advanced nuclear threat.</p> <p><b>FY 2024 Plans:</b> Finalize concept design for SRH NVM to address the electrical and radiation performance requirements identified in FY 2023. Continue plan for fabrication, test and evaluation of test articles to mitigate emerging radiation effects in electronics. Initiate the technical development of the sub-scale test chip and continue efforts to develop a space qualification strategy. Continue efforts to ensure durability of a domestic source of readout integrated circuits (ROIC) and focal plane array (FPA) technologies. Continue efforts to enable maturation of large format high-dynamic range FPAs. Initiate feasibility assessment to port radiation hardened ROIC technology from current State-of-the-Art to a more advanced processing node.</p> <p><b>FY 2025 Plans:</b> Continue development of SRH NVM to address the electrical and radiation performance requirements gap identified in Strategic Radiation Hardened Electronics Council's (SRHEC) Program Needs Report #4. Complete Design Review (DR) for up to two vendors, initiate down select to 1 vendor that will proceed to further mature the technology. During down select phase, begin initial fabrication of sub-scale test articles and evaluation of test chips to reduce program risk and ensure the full-scale prototype is on track to meet radiation and performance requirements, then produce a space qualification strategy. Continue efforts to ensure durability of a domestic source of readout integrated circuits (ROIC) and focal plane array (FPA) technologies. Continue efforts to enable maturation of large format, high- dynamic range FPAs. Continue feasibility assessment to port radiation hardened ROIC technology from current State-of-the-Art to a more advanced processing node.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 decreased compared to FY 2024 by \$7.223M due to downselect to one vendor for SRH NVM.</p>		15.005	26.000	18.777
<b>Accomplishments/Planned Programs Subtotals</b>		56.399	41.591	42.502

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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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 / 2					<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>				<b>Project (Number/Name)</b> 624846 / <i>Spacecraft Payload Technologies</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>
624846: <i>Spacecraft Payload Technologies</i>	-	61.582	71.286	43.953	0.000	43.953	45.773	47.625	49.094	50.123	Continuing	Continuing

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

This project develops advanced technologies that enhance spacecraft payload operations by improving materials/component, networking, analysis tools, and subsystem capabilities. The project focuses on development of advanced space data generation and exploitation technologies, including infrared sensors; and development of high-fidelity space simulation models that support space-based surveillance and space asset protection research and development for the warfighter.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p><b>Title:</b> Space-Based Detector Technologies</p> <p><b>Description:</b> Develop advanced infrared device technologies that enable hardened space detector arrays with improved detection to perform acquisition, tracking, and discrimination of space objects and missile warning.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust is consolidated under one thrust titled Missile Warning and Tactical Sensing to better align with the USSF Space Systems Command (SSC) PEO's mission areas.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>	4.032	0.000	0.000
<p><b>Title:</b> Missile Warning and Tactical Sensing</p> <p><b>Description:</b> Develop advanced infrared device technologies that enable hardened space detector arrays with improved detection to perform acquisition, tracking, and discrimination of space objects and missile warning. Develop advanced target detection techniques, spectral signature libraries, and decision aids for space-based sensors and surveillance systems.</p> <p><b>FY 2024 Plans:</b> Complete performance characterization of High Dynamic Range (HDR) resilient 10um pitch Focal Plane Array (FPA) series. Results will be rolled into full large format FPA build. Continue developing a more thorough understanding of noise sources in smaller Complementary Metal Oxide Semiconductor (CMOS) mixed signal nodes which are vital to success of HDR FPA program. Continue involvement in Event Based Sensor (EBS) development and assist in defining DoD and IC path forward. Evaluate the performance of test chips as they become available, as part of the AFRL collaboration with the Defense Advanced Research</p>	0.000	8.076	15.553

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624846 / <i>Spacecraft Payload Technologies</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>Projects Agency (DARPA). Continue the development of next generation infrared detector materials that have the potential of offering higher performance.</p> <p>Continue development of novel sensing concepts for space-based surveillance and detection of challenging, evolving strategic and tactical targets in contested environments. Initiate development and design of space-based sensors for resilient target custody by proliferated space architectures. Continue development of data analytics for edge processing, cloud solutions, and human-machine learning to shorten sensor-to-shooter timelines. Initiate development of trusted artificial intelligence and machine learning models for autonomous classification and moving target indication of ground vehicles, air platforms, and maritime vessels for battlefield operations. Initiate study of sensing systems optimized for space-based autonomous tasking and moving target indication from multiple target surveillance and tracking layers of a hybrid space architecture. Continue study and development of autonomous sensing strategies and technologies for multi-domain target acquisition and tracking by networked satellite constellations.</p> <p><b>FY 2025 Plans:</b> Initiate testing of noise properties of smaller mixed signal nodes. Initiate identification of transition opportunities for Event Based Sensors (EBS) based on results from FY 2024 testing. Continue development of next generation infrared detector materials that have the potential of offering higher performance. Continue build of focal plane arrays using novel detector material and obtain statistically significant performance characterization data product.</p> <p>Continue development of novel sensing concepts for space-based moving target engagement at scale in time sensitive, highly contested environments. Initiate design and laboratory testing of concepts for space-based sensing payloads. Continue development and design of space-based sensors for resilient target custody by target tracking space architectures. Continue development of data analytics and data mobility solutions for edge processing, information networking, and human-machine learning in support of tactical sensing and targeting. Continue development of trusted artificial intelligence and machine learning models for autonomous classification and identification of moving targets in support of multi-domain battlefield operations. Continue study of sensing system networking optimized for space-based autonomous tasking and moving target indication from multi-tiered hybrid space architectures.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by \$7.477M due to design and laboratory testing of concepts for space-based sensing payloads. Funding was realigned into this thrust from BA06 1206601SF to correct known database error to accurately reflect actual costs of research performed and planned in this thrust.</p>				
<b>Title:</b> Space Electronics Research		5.683	0.000	0.000
<b>Description:</b> Develop technologies for space-based payload components such as radiation-hardened electronic devices, microelectro-mechanical system devices, and advanced electronics packaging.				

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624846 / <i>Spacecraft Payload Technologies</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p><b>FY 2024 Plans:</b> In FY 2024 this thrust is realigned to PE 1206601SF/Space Technology, Project 628809/Spacecraft Vehicle Technologies and consolidated under one thrust, titled Spacecraft Component Technologies to better align efforts with the USSF SSC PEO's mission areas.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>				
<p><b>Title:</b> Modeling and Simulation Tools for Space Applications</p> <p><b>Description:</b> Provide modeling, simulation, and analysis for technology evolution in space-based terrestrial surveillance systems, precision navigation and timing, space situational awareness, satellite communications, space environment monitoring, and space control payloads.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align efforts with the USSF SSC PEO's mission areas.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>		3.752	0.000	0.000
<p><b>Title:</b> Alternative Positioning, Navigation, and Timing Technology</p> <p><b>Description:</b> Identify and develop technologies that enable new, or enhance existing, United States positioning, navigation, and timing (PNT) satellite capabilities by increasing resiliency and availability of accuracy, and/or increasing the affordability of providing current capabilities. Develop technologies to meet identified Air Force Space Command/Space and Missile Systems Center positioning, navigation, and timing space payload technology needs.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust is consolidated under one thrust titled Space Communication/PNT Technologies to better align efforts with the USSF Space Systems Command (SSC) PEO's mission areas.</p> <p><b>FY 2025 Plans:</b></p>		7.315	0.000	0.000

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624846 / <i>Spacecraft Payload Technologies</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
N/A				
<b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A				
<p><b>Title:</b> Space Communication/ Positioning, Navigation &amp; Timing Technologies</p> <p><b>Description:</b> Identify and develop technologies that enable new, or enhance existing, United States communication, positioning, navigation, and timing satellite capabilities. Technology solutions should improve performance, increase robustness and/or resilience, and/or increase the affordability of providing current capabilities. Develop technologies to meet identified US Space Command/Space Systems Command communication, positioning, navigation, and timing space payload technology needs. Develop new technologies based on cold atom physics and photonics that provide autonomous jam-proof precision inertial navigation to augment Global Positioning System (GPS) in case of Global Positioning System-denial. Develop atomic clocks and methods to disseminate time based on new technologies to replace legacy Global Positioning System atomic clocks and networks.</p> <p><b>FY 2024 Plans:</b> Continue scientific research and technology development for space communications exploring W/V-band spectrum options. Continue to support field demonstrations and on-orbit experiments to examine the interaction of communication, position, navigation and timing signals between the multi-layer, multi-function architectures in contested environments and exercise potential Concept of Operations (CONOPs). Continue development of the enabling technologies to increase Timing precision, enable transition to proliferated low earth orbit constellation, and provide increased options for the user. Continue to support Quantum Rim of the Pacific (RIMPAC) exercise and other opportunities to accelerate the fielding of Quantum-based technologies. Continue laboratory development of Quantum-based technologies and component miniaturization efforts.</p> <p><b>FY 2025 Plans:</b> Initiate development of low probability of intersect and low probably of detection (LPI/LPD), high bandwidth, multi-domain communications for contested and denied environments to include GPS-free Positioning, Navigation, &amp; Timing (PNT) dissemination. Develop lasercom interoperability laboratory capabilities (both indoor and outdoor). Explore research and development of Artificial Intelligence/Machine Learning (AI/ML) enhancements to PNT architecture to reduce the time required to react to a PNT-based threat. Continue to support field demonstrations and on-orbit experiments to examine the interaction of communication, position, navigation, and timing signals between the multi-layer, multi-function architectures in contested environments and exercise potential Concept of Operations.</p> <p>Continue to develop enabling technologies and demonstration units to enhance the transition path for advanced clocks and time dissemination. Continue to explore and utilize opportunities to accelerate the fielding of quantum-based technologies and testing in relevant environments. Continue collaboration with international partners in the development of Quantum-based technologies</p>		0.000	13.210	28.400

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624846 / <i>Spacecraft Payload Technologies</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2023	FY 2024	FY 2025
<p>to leverage allied funding and capabilities and ensure US leadership in these areas. Continue lab development of quantum-based technologies and component miniaturization efforts. Complete Quantum Rim of the Pacific (RIMPAC) exercise support.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b>                      FY 2025 increased compared to FY 2024 by \$15.190M due to initiating development of multi-domain communications for contested and denied environments and Artificial Intelligence/Machine Learning (AI/ML) enhancements to PNT architecture. Funding was realigned into this thrust from BA06 1206601SF to correct known database error to accurately reflect actual costs of research performed and planned in this thrust.</p>			
<p><b>Title:</b> Resilient Satellite Navigation</p> <p><b>Description:</b> *Formerly Resilient Positioning, Navigation, and Timing Solutions</p> <p>Advance and evaluate technologies contributing diversity to satellite positioning, navigation and timing (PNT) information delivery, creating models of performance, scalability and resiliency needed to anchor USSF's Space Warfighting Analysis Center (SWAC) Force Design analytics. Pursue signals and user equipment concepts targeting low size, weight and power (SWAP) users. Promote and characterize commercial PNT capabilities potentially suitable for DoD use. Conduct laboratory and on-orbit experimentation to capture representative integrated system performance and feed back key parameters to SWAC analyses and forward into future requirements definition.</p> <p><b>FY 2024 Plans:</b>                      Complete development of reprogrammable user equipment silicon. Continue signals and hardware/software-in-the-loop (HIL/SIL) development toward on-orbit demonstration of reprogrammable PNT signal broadcast to low-SWAP user equipment to assess resiliency, performance and scalability. Conduct modeling and simulation of planned field experiments utilizing testbed assets to predict end-to-end PNT performance in contested electromagnetic environment. Feed initial findings back to inform SWAC PNT Force Design model.</p> <p><b>FY 2025 Plans:</b>                      N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b>                      FY 2025 decreased compared to FY 2024 by \$50.000M due to completion of the specific planned resilient satellite navigation S&amp;T efforts to feed future SWAC force design. This effort was planned and funded for 2 years FY 2023-FY 2024.</p>	40.800	50.000	0.000
<b>Accomplishments/Planned Programs Subtotals</b>	61.582	71.286	43.953

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

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

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
3620F / 2	PE 1206601SF / <i>Space Technology</i>	624846 / <i>Spacecraft Payload Technologies</i>

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

**Remarks**

**D. Acquisition Strategy**

N/A

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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 / 2					<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>				<b>Project (Number/Name)</b> 624847 / <i>Rocket Propulsion Technology</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>
624847: <i>Rocket Propulsion Technology</i>	-	15.511	14.483	28.214	0.000	28.214	29.099	30.071	30.994	31.643	Continuing	Continuing

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

This project develops and demonstrates rocket propulsion technologies for space access and space maneuver. Analytical and experimental areas of emphasis are propellants, propellant management, combustion, rocket material applications, and innovative space access and in space propulsion concepts. Technologies of interest will improve reliability, performance, survivability, affordability, and environmental compatibility of these systems. Develop technologies to reduce the weight and cost of components using new materials and improved designs and manufacturing techniques. All efforts in this project contribute to the sustainment and growth of the space and rocket propulsion industry, providing space access and in space propulsion technology for the entire Department of Defense (DoD). Technologies under this project enable capabilities of interest to DoD, National Aeronautics and Space Administration (NASA) and growing Space community. Tasks include: proof of concept tests of critical components; advanced component development; and ground-based tests. This project develops next generation of physics-based modeling, simulation, and analysis (MS&A) tools for rapid and agile space access and in-space propulsion design, analysis, and production, as well as the digital engineering concepts to manage the entire process of design, test, and validation of space access and in-space systems. All thrusts are reviewed by a DoD level steering committee yearly for relevance to DoD missions, and the associated support costs.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Rocket Combustion Technologies	4.474	6.123	12.146
<b>Description:</b> Develop and demonstrate advanced combustion technology for significantly improved performance, while preserving chamber lifetime and reliability. This effort includes design testing of materials and systems and supports investigation into environments/ processes to improve efficiency, effectiveness, suitability, and interoperability of space access technologies. Leveraging commercial investments to develop this technology.			
<b>FY 2024 Plans:</b> Continue the employment of new fuel and material operating limitations, manufacturing processes, and launch goals in cycle analysis to identify trade space for future engines. Continue to develop and evaluate advanced material solutions for high temperature components in rocket propulsion. Continue development and payoff determination of rotating detonation rocket engine technologies. Initiate technologies and material studies supporting rapid launch capabilities emphasizing digital design capabilities.			
<b>FY 2025 Plans:</b> Continue the employment of new fuel and material operating limitations, manufacturing processes, and launch goals in cycle analysis to identify trade space for future engines. Continue to develop, demonstrate, and evaluate advanced material solutions for high temperature components in rocket propulsion. Continue development and payoff determination of rotating detonation			

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624847 / <i>Rocket Propulsion Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>rocket engine technologies. Continue technologies and material studies supporting rapid launch capabilities emphasizing digital design capabilities.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY2025 increased compared to FY2024 by \$6.023M. \$0.358M of the increase is due to acceleration of digital design capabilities work and the remainder \$5.665M is due to transfer from BA06 PE 1206601SF to correct known database error from stand up of the Space Force in FY22 to accurately reflect actual costs of research performed and planned in this thrust.</p>				
<p><b>Title:</b> Applied Space Access Technologies</p> <p><b>Description:</b> Develop technologies for improved performance, while increasing life and reliability needs for engine uses in expendable and reusable launch vehicles. This effort also develops propulsion technologies that improve readiness, mobility, and responsive capabilities of space access methods and systems.</p> <p><b>FY 2024 Plans:</b> Continue sub-scale risk mitigation and technology maturation activities to incorporate into next generation engine concepts. Continue modular component integration and interaction research activities supporting next generation engine concepts and operational capabilities. Initiate technologies and processes supporting modeling and analysis for rapid launch capabilities.</p> <p><b>FY 2025 Plans:</b> Continue sub-scale risk mitigation and technology maturation activities to incorporate into next generation engine concepts. Continue modular component integration and interaction research activities supporting next generation engine concepts and operational capabilities. Continue technologies and processes supporting modeling and analysis for rapid launch capabilities.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY2025 increased compared to FY2024 by 2.724M. -0.320M decreased due to higher national security priorities and the 3.044M is due to transfer from Program Element 1206601SF/Space Technology, Project 628809/Spacecraft Vehicle Technologies to correct known database error from stand up of the Space Force in FY22 to accurately reflect actual costs of research performed and planned in this thrust.</p>		2.403	3.290	6.013
<p><b>Title:</b> On-Orbit Propulsion Technologies</p> <p><b>Description:</b> Develop electric, chemical, and advanced propulsion technologies for station-keeping, repositioning, and orbit transfer for satellites and satellite constellations. This effort develops technologies for flexible, responsive in-space maneuver in all orbit regimes. Develop technologies critical to expanding Space Force's capacity to maneuver, and project power throughout space.</p> <p><b>FY 2024 Plans:</b></p>		3.704	5.070	10.055

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624847 / <i>Rocket Propulsion Technology</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2023	FY 2024	FY 2025
<p>Continue advanced chemical propellants development focusing on flight-weight systems to assist in transition to industry partners. Continue to support the maturation of advanced diagnostics for both chemical and electric propulsion thruster plumes with potential for integrated state-of-health application. Continue to expand the validation and verification programs (both experimental and flight) to quantify accuracy of modeling and simulation tools developed to support thruster-spacecraft integration. Continue transition and support of thruster/plume modeling framework to spacecraft industry to propulsion community. Continue expanding exploration of advanced integrated electric propulsion and chemical thruster concepts and assess new spacecraft propulsion requirements.</p> <p><b>FY 2025 Plans:</b> Continue advanced chemical propellants development focusing on flight-weight systems to assist in transition to industry partners. Continue to support the maturation of advanced diagnostics for both chemical and electric propulsion thruster plumes with potential for integrated state-of-health application. Continue to expand the validation and verification programs (both experimental and flight) to quantify accuracy of modeling and simulation tools developed to support thruster-spacecraft integration. Continue transition and support of thruster/plume modeling framework to spacecraft industry to propulsion community. Continue expanding exploration of advanced integrated electric propulsion and chemical thruster concepts and assess new spacecraft propulsion requirements.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY2025 increased compared to FY2024 by 3.044M. 0.295M of the increase is due to cost of raw materials and fuels and the remainder 2.749M is due to transfer from Program Element 1206601SF/Space Technology, Project 628809/Spacecraft Vehicle Technologies to correct known database error from stand up of the Space Force in FY22 to accurately reflect actual costs of research performed and planned in this thrust.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	10.581	14.483	28.214

	FY 2023	FY 2024
<b>Congressional Add:</b> Propulsion Technology	4.930	-
<b>FY 2023 Accomplishments:</b> Conduct Congressionally directed efforts.		
<b>Congressional Adds Subtotals</b>	4.930	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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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 / 2					<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>				<b>Project (Number/Name)</b> 624866 / <i>Lasers &amp; Imaging Technology</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>
624866: <i>Lasers &amp; Imaging Technology</i>	-	31.318	19.985	30.298	0.000	30.298	31.629	33.114	32.097	32.768	Continuing	Continuing

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

This project conducts research advancing ground-based optical space domain awareness, techniques to counter laser threats to space craft, and laser applications towards ground-to-space communication.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Electro-Optic Space Domain Awareness and Satellite Security	31.318	19.985	30.298
<p><b>Description:</b> Develop advanced, long-range, electro-optical technologies that enable ground-based optical Space Domain Awareness (SDA) and quantum-based optical communications. Develop and use technologies to quantitatively assess the vulnerability of blue satellite systems and components to lasers and other-directed energy sources. Operate the Starfire Optical Range (SOR) to conduct research meeting internal and customer requirements.</p> <p><b>FY 2024 Plans:</b> Continue research and development (R&amp;D) of laser-enabled real-time space domain awareness (SDA) focused on imaging of satellites when in Earth's shadow. When demonstrated, transition this capability to Space Operations Command (SPoC)/DEL2/Det2. Continue to mature component technologies for 24/7 optical and infrared imaging of near-earth and geosynchronous objects enabling characterization of tactical timelines, especially technology enabling detection of small-sats in very close proximity to large high-value space assets. Continue investigation through measurement, modeling, and simulation of the susceptibility of satellite components to laser and other-directed energy threats to inform practical designs for protective equipment and for employing protection methods on tactically rapid timelines. When demonstrated, transition to Space Systems Command (SSC) the simulation tools necessary to enable laser-satellite deconfliction. Continue to mature daylight detection of satellites enabling custody and imaging through daytime hours when satellites cannot normally be detected by ground-based optical systems. Continue development of laser-enabled options for ranging to geosynchronous satellites from apertures smaller than 3 meters and development of laser-enabled options for characterizing near-geosynchronous satellites. Continue development of long-range secure optical network technology leveraging quantum science, especially for free space laser communication channels during daylight. Continue to apply machine-learning to automatically identify geosynchronous orbit objects more accurately and rapidly than current "hard-wired" algorithms. Conduct research into maintaining custody of space craft in three-body-gravitational pseudo-orbits, such as in cis-lunar space and Earth-Sun equilibrium zones. Continue to maintain the Starfire Optical Range (SOR) facilities and experimental equipment in a mission-ready state for both R&amp;D and for use by Space Operations Command (SPoC)/DEL2/Det2.</p> <p><b>FY 2025 Plans:</b></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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 624866 / <i>Lasers &amp; Imaging Technology</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>Complete research and development (R&amp;D) of laser-enabled real-time space domain awareness (SDA) focused on imaging of satellites when in Earth's shadow. Transition this capability to Space Operations Command (SPoC)/DEL2/Det2. Continue to mature component technologies for 24/7 optical and infrared imaging of near-earth and geosynchronous objects enabling characterization of tactical timelines, especially technology enabling detection of small satellites in very close proximity to large high-value space assets. Continue investigation through measurement, modeling, and simulation of the susceptibility of satellite components to laser and other-directed energy threats to inform practical designs for protective equipment and for employing protection methods on tactically relevant timelines. When demonstrated, transition to Space Systems Command (SSC) the simulation tools necessary to enable laser-satellite deconfliction. Continue to mature daylight detection of satellites enabling custody and imaging through daytime hours when satellites cannot normally be detected by ground-based optical systems. Continue development of laser-enabled options for ranging to geosynchronous satellites from apertures smaller than 3 meters and development of laser-enabled options for characterizing near-geosynchronous satellites. Continue development of long-range secure optical network technology leveraging quantum science, especially for free space laser communication channels during daylight. Complete efforts to train artificial intelligence to identify space objects in non-imaging observations, such as spectra and speckle. Continue development of artificial intelligence to estimate the position and orientation of uncooperative space objects. Continue research into maintaining custody of space craft in three-body-gravitational pseudo-orbits from ground-based measurements, such as in cis-lunar space and Earth-Sun equilibrium zones. Continue to maintain the Starfire Optical Range (SOR) facilities and experimental equipment in a mission-ready state for both R&amp;D and for use by Space Operations Command (SPoC)/DEL2/Det2.</p> <p><b><i>FY 2024 to FY 2025 Increase/Decrease Statement:</i></b> Increase from FY 2024 to FY 2025 of \$10.313 million to fund necessary base operations support and civilian pay realignment from Air Force to Space Force.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	31.318	19.985	30.298

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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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 / 2					<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>				<b>Project (Number/Name)</b> 625018 / <i>Spacecraft Protection Technology</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>
625018: <i>Spacecraft Protection Technology</i>	-	33.727	32.345	42.834	0.000	42.834	49.936	56.553	57.929	59.141	Continuing	Continuing

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

This project develops the technologies to perform faster, well-informed decision making for space operations, enhanced mission assurance of critical space services, and integrate space with joint operational picture for protecting United States space assets, in potentially hostile environments, to assure continued space system operation. The project provides transitionable technology and knowledge to enable speed-of-light protection, many-on-many engagement and defense, and new orbit regimes despite growing threat impunity. This project also encompasses efforts to expand the University Consortium for Space Research to address research needs unique to the USSF.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Space Control	8.584	20.345	26.414
<b>Description:</b> Provide timely, well-informed decisions enabled by space situational awareness in the cislunar environment, analytic tools powered by modern techniques and practices, trusted autonomy in both ground and on-orbit systems, and an underlying resilience to cyber and electronic warfare threats.			
<b>FY 2024 Plans:</b> Continue to develop techniques to detect, identify, track, characterize, and catalog satellites using multi-phenomenology techniques with particular focus on space situational awareness in the cislunar environment; provide technical expertise towards flight experiments that will demonstrate utility of cislunar situational awareness for establishing and transferring custody, tracking, and deterring threats from deep space. Continue studies to inform potential upgrades to operational tools used in space situational awareness. Continue development of on-orbit threat warning sensing and assessment with emphasis on spectrum awareness and inherent, on-board satellite sensors. Continue research on cyber vulnerability and cyber hardening methods of space assets with laboratory testbeds; developing standards and techniques. Continue collaboration and demonstration of cyber hardening techniques aboard on-orbit experiments through established transitional pipeline of flight experiments; growing pipeline for future demonstrations. Continue to develop on-board autonomous satellite technologies, emphasizing operational resilience for tactical action, awareness across operator, ground and space interfaces, enabling tactical awareness for distributed system elements, defining success criteria for many-to-many engagements; plan for next generation flight experiments. Continue experimentation and exercises with DoD ground architectures, operations centers, commercial and international partners.			
<b>FY 2025 Plans:</b> Continue to develop techniques to detect, identify, track, characterize, and catalog satellites using multi-phenomenology techniques with particular focus on space situational awareness in the cislunar environment; provide technical expertise towards flight experiments that will demonstrate utility of cislunar situational awareness for establishing and transferring custody, tracking,			

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 625018 / <i>Spacecraft Protection Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>and deterring threats from deep space. Continue studies to inform potential upgrades to operational tools used in space situational awareness. Continue development of on-orbit threat warning sensing and assessment with emphasis on spectrum awareness and inherent, on-board satellite sensors. Continue research on cyber vulnerability and cyber hardening methods of space assets with laboratory testbeds, developing standards and techniques. Continue collaboration and demonstration of cyber hardening techniques aboard on-orbit experiments through established transitional pipeline of flight experiments, growing pipeline for future demonstrations. Continue to develop on-board autonomous satellite technologies, emphasizing operational resilience for tactical action, awareness across operator, ground and space interfaces, enabling tactical awareness for distributed system elements, defining success criteria for many-to-many engagements, plan for next generation flight experiments. Continue experimentation and exercises with DoD ground architectures, operations centers, commercial and international partners. Initiate studies, assessments, and engineering trades to support spectrum resilience via radio frequency sensing to support multi-satellite, multi-domain spectrum dominance. Complete integration and testing of multiple cyber resilience, reactive protection, and autonomous sensing capabilities into on-orbit demonstrations and initiate on-orbit experimentation with those capabilities.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by \$6.069M due to expanding technical research in the areas of spectrum resilience, multi-domain spectrum dominance and autonomous sensing to initiate on-orbit experimentation.</p>				
<p><b>Title:</b> University Consortium for Space Research</p> <p><b>Description:</b> Expand the University Consortium for Space Research to address research needs unique to the USSF. Create Technology Institutes at universities focused on developing and delivering technology for critical USSF missions. Support development of the future space workforce. Build capacity for space research within higher education institutions. Accelerates the transition of fundamental research and early-stage technology development into integrated systems capable of aiding the national security space enterprise. The objective is to create key technology breakthroughs for USSF through Space Strategic Technology Institutes (SSTIs). The goal for each SSTI is to transition fundamental research and early-stage tech development into transformational research and technology development and demonstration capabilities within the space domain. Supports research, development, and demonstration; and educates and trains students for the future national security space workforce. Annual calls for specific technology areas will result in one or multiple contract awards.</p> <p><b>FY 2024 Plans:</b> Expand the number of Technology Institutes, provide programming that builds capacity for space research in higher education including a focus on minority serving institutions.</p> <p><b>FY 2025 Plans:</b> Continue to expand the number of Technology Institutes to be comprised of network of universities, non-profits and industry partnerships with a high emphasis to include workforce development and research areas, prioritized under USSF challenges.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b></p>		0.000	12.000	16.420

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 625018 / <i>Spacecraft Protection Technology</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2023	FY 2024	FY 2025
FY 2025 increased compared to FY 2024 by \$4.420M due to the continued expansion of the University Consortium for Space, to include increasing the number of Technology Institutes through multiple awards for future SSTI calls comprising of at least three new research institutions, collaborating with other universities and industry to address space research, development and demonstration needs.			
<b>Accomplishments/Planned Programs Subtotals</b>	8.584	32.345	42.834

	FY 2023	FY 2024
<b>Congressional Add:</b> Congressional Add: Program increase - ground-based interferometry <i>FY 2023 Accomplishments:</i> Conduct Congressionally directed effort.	1.972	-
<b>Congressional Add:</b> Congressional Add: Program Increase - digital engineering and modeling for space domain awareness <i>FY 2023 Accomplishments:</i> Conduct Congressionally directed effort.	9.367	-
<b>Congressional Add:</b> Congressional Add: Program Increase - lunar surface space domain awareness <i>FY 2023 Accomplishments:</i> Conduct Congressionally directed effort.	3.944	-
<b>Congressional Add:</b> Congressional Add: Program Increase - SOSA-based spacecraft protection technology <i>FY 2023 Accomplishments:</i> Conduct Congressionally directed effort.	9.860	-
<b>Congressional Adds Subtotals</b>	25.143	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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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 / 2					<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>				<b>Project (Number/Name)</b> 628809 / <i>Spacecraft Vehicle Technologies</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>
628809: <i>Spacecraft Vehicle Technologies</i>	-	156.637	26.506	47.970	0.000	47.970	48.952	51.431	52.778	53.884	Continuing	Continuing

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

This project is a pervasive portfolio pursuing a broad range of emerging technologies targeted for application and insertion in the future national space architecture. The project focuses on spacecraft components including, structures, power, thermal management, electronics, and robotics/logistics modules. Leap-ahead capability is provided utilizing in-house expertise and laboratories, and by leveraging the creativity and innovation of the Nation's industry, universities, and national laboratories to conduct applied research. The project maintains core competencies in astrodynamics, controls, electronics, materials, power, structures, and thermal, and provides foundational technologies supporting all space mission areas.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p><b>Title:</b> Space Power/Thermal Research</p> <p><b>Description:</b> Develop technologies for advanced space platform subsystems such as compact, high efficiency solar power cells and arrays, and innovative power generation concepts.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust will be consolidated under one thrust titled Spacecraft Component Technologies to better align efforts with the USSF SSC PEO's mission areas.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>	9.963	0.000	0.000
<p><b>Title:</b> Space Structures and Controls Research</p> <p><b>Description:</b> Develop revolutionary and enabling technologies, including lighter weight, lower cost, high performance structures for space platforms; guidance, navigation, and controls hardware and software for next generation of space superiority systems.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust with associated funding is consolidated under one thrust titled Spacecraft Component Technologies to better align efforts with the USSF SSC PEO's mission areas.</p> <p><b>FY 2025 Plans:</b></p>	14.424	0.000	0.000

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 628809 / <i>Spacecraft Vehicle Technologies</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
N/A				
<b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A				
<p><b>Title:</b> Spacecraft Component Technologies</p> <p><b>Description:</b> Develop technology and research initiatives executed through continuous cycles of development, maturation, and assessment of component technologies. Develop revolutionary and enabling technologies including: lighter weight, lower cost, high-performance structures and thermal systems for space platforms; compact, high-efficiency solar power cells and arrays, and innovative power-generation concepts; radiation-hardened electronic devices; microelectro-mechanical system devices; advanced electronics packaging; guidance, navigation, and controls hardware and software; refueling and logistics module upgrade; on-orbit assembly; and high degree of freedom robotics. Due to the pervasive nature of the project, many of the developed components support DoD missions in the terrestrial domain in addition to their primary space mission.</p> <p><b>FY 2024 Plans:</b> Continue development of high power arrays and storage capability for small satellites including solar array structures scalable to all missions with specific power greater than 100 Watts per kilogram. Transition compact telescoping array to industry and initiate new efforts pushing toward landmark 40% efficiency solar cells. Transition initial development of directed energy protection capabilities for proliferated low Earth orbit constellations and next generation USSF satellite buses. Complete exploration of alternative power generation sources, such as nuclear to characterize the limitations and challenges underpinning operating space systems in non-traditional orbital regimes. Initiate technology development required for alternative power generation sources and next-generation USSF satellite buses. Transition research to enable high-pulsed power systems including generation, storage, and heat rejection technologies for small satellites. Continue research efforts in high-performance, resilient small satellite technologies and development efforts in deployable structures, metrology, power and thermal management for tactical intelligence, surveillance, and reconnaissance missions in contested environments.</p> <p><b>FY 2025 Plans:</b> Continue to develop high-power resilient satellite technology, including deployable solar arrays scalable to all missions. Transition modular self-stiffening array to industry. Continue efforts for landmark 40% efficiency solar cells and develop alternative power generation and storage sources. Complete tech maturation of robotic test capabilities for high-fidelity ground testing of microgravity deployment and 3-dimensional attitude control systems testing. Continue transitioning research enabling space logistics concepts including autonomous rendezvous, proximity operations, and docking; guidance and navigation algorithms for novel orbits; scalable autonomy and multi-agent behavior; and high degrees of freedom robotics for spacecraft operations including on-orbit refueling, spacecraft upgrade, assembly, and manufacturing. Continue development for functional materials, metrology, power and thermal management for space-based sensing missions in contested environments.</p>		0.000	26.506	47.970

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 628809 / <i>Spacecraft Vehicle Technologies</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>Continue leadership role in OUSD(R&amp;E) Trusted and Assured Microelectronics program executing the research, development and transition of radiation hardened electronic components to support National Security Space and Strategic systems. Continue adapting bench-marking capabilities on new electronics using the latest spacecraft algorithms and transitioning bench-marking capabilities and results to the acquisition community to enable data-informed payload architecture design decisions. Continue development of strategic radiation hardened microprocessor. Continue research and development on reliable application of high-performance commercial-based processing in future space systems to enable revolutionary on-orbit edge processing, autonomy, data fusion, and machine learning. Continue research into heterogeneous on-orbit processing capabilities in support of future on-orbit servicing objectives. Initiate effort on Hyper-Converged edge computing for space systems.</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by \$21.464M due to initiating effort on Hyper-Converged edge computing for space systems and applying resources to research on reliable application of high-performance commercial-based processing in future space systems. Funding was realigned into this thrust from BA06 1206601SF to correct known database error to accurately reflect actual costs of research performed and planned in this thrust.</p>				
<p><b>Title:</b> Space Experiments</p> <p><b>Description:</b> Develop flight experiments to improve the capabilities of existing operational space systems and to enable new transformational space capabilities.</p> <p><b>FY 2024 Plans:</b> In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations and consolidated into the Integrated Satellite Demonstrations thrust to better align efforts with the USSF Space Systems Command (SSC) PEO's mission areas.</p> <p><b>FY 2025 Plans:</b> N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A</p>		8.925	0.000	0.000
<p><b>Title:</b> Space Communication Technologies</p> <p><b>Description:</b> Develop technologies for next-generation space communications terminals and equipment and methods/techniques to enable future space system operational command and control concepts.</p> <p><b>FY 2024 Plans:</b></p>		14.468	0.000	0.000

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 628809 / <i>Spacecraft Vehicle Technologies</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2023	FY 2024	FY 2025
In FY 2024 this thrust is realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and consolidated under one thrust titled Space Communication/Positioning, Navigation, & Timing Technologies to better align efforts with the USSF SSC PEO's mission areas.  <b>FY 2025 Plans:</b> N/A  <b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	47.780	26.506	47.970

	FY 2023	FY 2024
<b>Congressional Add:</b> Congressional Add: Program increase - thin-film photovoltaic energy <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	2.958	-
<b>Congressional Add:</b> Congressional Add: Program increase - hybrid space architecture <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	4.930	-
<b>Congressional Add:</b> Congressional Add: Program increase - university consortia for space technology <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	19.721	-
<b>Congressional Add:</b> Congressional Add: Program increase - aerospace films for increased operational range of reconnaissance <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	5.916	-
<b>Congressional Add:</b> Congressional Add: Program increase - 3D graphene lithium-sulfur batteries <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	4.930	-
<b>Congressional Add:</b> Congressional Add: Program increase - L-Band active phased array demonstration <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	2.958	-
<b>Congressional Add:</b> Congressional Add: Program increase - next generation multiband space array antenna <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	9.860	-
<b>Congressional Add:</b> Congressional Add: Program increase - advanced analog microelectronics <b>FY 2023 Accomplishments:</b> Conduct Congressionally directed effort.	2.958	-
<b>Congressional Add:</b> Congressional Add: Program increase - spectrum superiority lab	4.930	-

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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 / 2	<b>R-1 Program Element (Number/Name)</b> PE 1206601SF / <i>Space Technology</i>	<b>Project (Number/Name)</b> 628809 / <i>Spacecraft Vehicle Technologies</i>
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	FY 2023	FY 2024
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b><i>Congressional Add:</i></b> Congressional Add: Program increase - advanced space power systems	9.269	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b><i>Congressional Add:</i></b> Congressional Add: Program increase - cybersecurity for a hybrid space architecture	14.791	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b><i>Congressional Add:</i></b> Congressional Add: Program increase - flexible solar panels	4.930	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b><i>Congressional Add:</i></b> Congressional Add: Program increase - high efficiency lightweight RF amplifiers for LEO constellation	4.930	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b><i>Congressional Add:</i></b> Congressional Add: Program increase - moving target engagement solutions	5.916	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b><i>Congressional Add:</i></b> Congressional Add: Program increase - operational upper stage augmentation kit	9.860	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally directed effort.		
<b>Congressional Adds Subtotals</b>	108.857	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A