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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force</i> / BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	75.405	87.608	0.000	0.000	0.000	-	-	-	-	-	-
632181: <i>Spacecraft Payloads</i>	-	23.176	0.000	0.000	0.000	0.000	-	-	-	-	-	-
633834: <i>Integrated Space Technology Demonstrations</i>	-	18.856	57.268	0.000	0.000	0.000	-	-	-	-	-	-
634400: <i>Space Systems Protection</i>	-	7.708	0.000	0.000	0.000	0.000	-	-	-	-	-	-
635021: <i>Space Systems Survivability</i>	-	1.581	6.500	0.000	0.000	0.000	-	-	-	-	-	-
63682J: <i>Spacecraft Vehicles</i>	-	24.084	23.840	0.000	0.000	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This program develops, integrates, and demonstrates space technologies in the areas of spacecraft payloads, spacecraft protection, spacecraft vehicles, and space systems survivability. The integrated space technologies are demonstrated by component or system level tests on the ground or in flight. 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 FY 2022, PE 0603401F, Advanced Spacecraft Technology, Project 633834, Integrated Space Technology Demonstrations efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, Project 633834, Integrated Space Technology Demonstrations, from Appropriation 3600, Budget Activity (BA) 03 due to the creation of a new Appropriation for Space Force.

In FY 2022, the space communications technologies efforts of PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, Project 63682J, Spacecraft Vehicles, from Appropriation 3600, Budget Activity (BA) 03 due to the creation of a new Appropriation for Space Force.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science & technology capabilities. The use of program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 0602298F, and 1206601SF.

This program is in Budget Activity 3, Advanced Technology Development because this budget activity includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

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Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force / BA 3: Advanced Technology Development (ATD)	R-1 Program Element (Number/Name) PE 0603401F / Advanced Spacecraft Technology
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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	80.525	0.000	0.000	0.000	0.000
Current President's Budget	75.405	87.608	0.000	0.000	0.000
Total Adjustments	-5.120	87.608	0.000	0.000	0.000
• Congressional General Reductions	0.000	-0.160			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	30.500			
• Congressional Directed Transfers	0.000	57.268			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.652	0.000			
• Other Adjustments	-2.468	0.000	0.000	0.000	0.000

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

Project: 632181: Spacecraft Payloads

Congressional Add: *Congressional Add: Program increase - radiation hardened memory*

Congressional Add Subtotals for Project: 632181

Project: 633834: Integrated Space Technology Demonstrations

Congressional Add: *Congressional Add: Program increase - modular satellite power systems*

Congressional Add: *Congressional Add: Program increase - upper stage engine technology*

Congressional Add Subtotals for Project: 633834

Project: 635021: Space Systems Survivability

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

Congressional Add Subtotals for Project: 635021

Congressional Add Totals for all Projects

	FY 2020	FY 2021
Congressional Add	10.000	0.000
Congressional Add Subtotals for Project: 632181	10.000	0.000
Congressional Add	0.000	4.000
Congressional Add	0.000	20.000
Congressional Add Subtotals for Project: 633834	0.000	24.000
Congressional Add	0.000	6.500
Congressional Add Subtotals for Project: 635021	0.000	6.500
Congressional Add Totals for all Projects	10.000	30.500

Change Summary Explanation

Decrease in FY 2022 due to efforts of PE 0603401F, Advanced Spacecraft Technology, being transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, from Appropriation 3600, Budget Activity (BA) 03 due to the creation of a new Appropriation for Space Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 632181 / <i>Spacecraft Payloads</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
632181: <i>Spacecraft Payloads</i>	-	23.176	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project funds the development, demonstration, and evaluation of radiation-hardened space electronic hardware, satellite control hardware, and software for advanced satellite surveillance operations. Future improved space-qualifiable electronics and software for data and signal processing will be more interchangeable, interoperable, and standardized. In the near-term, this project's work concentrates on converting (for example, radiation-hardening) commercial data and signal processor technologies for use in Air Force space systems. For mid-term applications, this project merges advanced, radiation-hardened space processor, memory, and interconnect technologies with commercially-derived, open system architectures to develop and demonstrate robust, on-board processing capabilities for 21st century Department of Defense satellites. In the long-term, this project area focuses on developing low-cost, easily modifiable software and hardware architectures for fully autonomous constellations of intelligent satellites capable of performing all mission related functions without operator intervention.

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

	FY 2020	FY 2021	FY 2022
<p>Title: Advanced Space Electronics</p> <p>Description: Develop microelectronic devices, including radiation-hardened data processors and high-density hardened memories, advanced packaging technologies, and micro-electro-mechanical system components and applications.</p> <p>FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>	3.197	0.000	0.000
<p>Title: Advanced Space Modeling and Simulation Tools</p> <p>Description: Develop modeling, simulation, and analysis tools for space-based surveillance systems, space capability protection technologies, access/mobility technologies, and flight experiments.</p> <p>FY 2021 Plans:</p>	0.749	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021		
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 632181 / <i>Spacecraft Payloads</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>				
<p>Title: Advanced Space Sensors</p> <p>Description: Develop space infrared technology and hardened focal plane detector arrays to enable acquisition, tracking, and discrimination of hot targets, as well as "cold body" objects.</p> <p>FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>		2.070	0.000	0.000
<p>Title: Positioning, Navigation, and Timing Space Payload Technologies</p> <p>Description: Develop, validate, and transition technologies that: enable new, or enhance existing, United States positioning, navigation, and timing satellite capabilities by increasing resiliency and availability of accuracy; and/or increase the affordability of providing current capabilities. Develop, validate, and transition technologies to meet identified Air Force Space Command/Space and Missile Systems Center positioning, navigation, and timing space payload technology needs.</p> <p>FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>		7.160	0.000	0.000

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Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 632181 / <i>Spacecraft Payloads</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Not applicable				
Accomplishments/Planned Programs Subtotals		13.176	0.000	0.000
		FY 2020	FY 2021	
Congressional Add: Congressional Add: Program increase - radiation hardened memory		10.000	0.000	
FY 2020 Accomplishments: Conduct Congressionally directed effort				
FY 2021 Plans: N/A.				
Congressional Adds Subtotals		10.000	0.000	
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Not applicable				

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 3					R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>				Project (Number/Name) 633834 / <i>Integrated Space Technology Demonstrations</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
633834: <i>Integrated Space Technology Demonstrations</i>	-	18.856	57.268	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project is a series of advanced technology demonstrations designed to address mission needs by applying emerging technologies from the Air Force Research Laboratory, other United States government laboratories, and industry. These technologies are integrated into system-level demonstrations that are used to test, evaluate, and validate the technologies in a relevant environment.

In FY 2021, PE 0603401F, Advanced Spacecraft Technology, Project 633834, Integrate Space Technology Demonstrations, Navigation Technology Satellite-3 (NTS-3) Vanguard efforts were transferred to PE 0603032F, Future AF Integrated Technology Demos, Project 630320, Air Force Vandards, in order to realign technology areas that better support the National Defense Strategy, Air Force Future Operating Concept and Air Force Science and Technology Strategy, April 2019. This is an administrative realignment and not a new start. This work will continue to be executed by the Air Force Research Laboratory Space Vehicles Technology Directorate located in Kirtland Air Force Base, New Mexico.

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

	FY 2020	FY 2021	FY 2022
Title: Integrated Satellite Demonstrations	18.856	33.268	0.000
Description: Develop satellite technologies for integrated, robust, and flexible satellite demonstrations building on previous work and leveraging investments by other organizations.			
FY 2021 Plans: In FY 2021, Navigation Technology Satellite-3 Vanguard activities will be performed under the Navigation Technology Satellite-3 effort in PE 0603032F, Future AF Integrated Technology Demos, Project 630320, Air Force Vandards. Continue on-orbit demonstrations of multiple formation flying satellites for near autonomous formation control leveraging opportunities to fly demonstrations and prototypes, where successes can identify quick transition to next generation technology needs. Continue coordination of a manifest timeline for critical space projects prioritizing Air Force Space Command technical, security, and operational development requirements. Continue to utilize the Long Duration Propulsive Evolved Expendable Launch Vehicle Secondary Payload Adaptor launch schedule and other prospects to quickly fly demonstrations and prototypes. Continue payloads maturation tasks from concept proposal to leveraging commercial Low Earth orbit constellations.			
FY 2022 Plans: In FY 2022, PE 0603401F, Advanced Spacecraft Technology, Project 633834, Integrated Space Technology Demonstrations efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space			

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Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 633834 / <i>Integrated Space Technology Demonstrations</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Advanced Technology Development/Demo, Project 633834, Integrated Space Technology Demonstrations, from Appropriation 3600, Budget Activity (BA) 03 due to the creation of a new Appropriation for Space Force.				
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 decreased compared to FY 2021 by \$33.268 million. Funding decreased due to the transfer and realignment of the work in the Integrated Satellite Demonstrations effort in PE 0603401F, Advanced Spacecraft Technology, Project 633834, Integrated Space Technology Demonstrations, to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, Project 633834, Integrated Space Technology Demonstrations due to the creation of a new Appropriation for Space Force.				
Accomplishments/Planned Programs Subtotals		18.856	33.268	0.000
		FY 2020	FY 2021	
Congressional Add: Congressional Add: Program increase - modular satellite power systems		0.000	4.000	
FY 2020 Accomplishments: Not applicable				
FY 2021 Plans: Conduct Congressionally directed effort.				
Congressional Add: Congressional Add: Program increase - upper stage engine technology		0.000	20.000	
FY 2020 Accomplishments: Not applicable				
FY 2021 Plans: Conduct Congressionally directed effort. Per Congressional Committee direction, this effort will be executed in PE 0603216F, Aerospace Propulsion and Power Technology, Project 634922, Space & Missile Rocket Propulsion.				
Congressional Adds Subtotals		0.000	24.000	
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Not applicable				

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Appropriation/Budget Activity 3600 / 3					R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>				Project (Number/Name) 634400 / <i>Space Systems Protection</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
634400: <i>Space Systems Protection</i>	-	7.708	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops and demonstrates tools, instruments, and mitigation techniques required to assure operation of United States space assets in hostile warfighting environments. The project performs assessments of critical components and subsystems, and evaluates susceptibility and vulnerability to radio frequency and laser threats. This project also develops technologies that mitigate identified vulnerabilities. These technologies support balanced satellite protection strategies for detecting and avoiding threats in a hostile space environment.

In FY 2021 and future years, the efforts and activities under Project 634400, Space Systems Protection, have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.

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

	FY 2020	FY 2021	FY 2022
<p>Title: Space Situational Awareness Capability Development</p> <p>Description: Develop tools and technologies that advance space-based proximity awareness capabilities and enable protection and countermeasure courses of action. Efforts will assess a variety of phenomenologies and concepts in response to multiple threat classes and scenarios.</p> <p>FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>	1.409	0.000	0.000
<p>Title: Space Indicators and Warning Research</p> <p>Description: Develop passive satellite countermeasures and mitigation techniques for current and future threats to satellites.</p> <p>FY 2021 Plans:</p>	2.182	0.000	0.000

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Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 634400 / <i>Space Systems Protection</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities. FY 2022 Plans: Not applicable FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable			
Title: Spacecraft Threat Detection Description: Develop active satellite local space awareness technologies and exploitation tools for satellite systems. FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities. FY 2022 Plans: Not applicable FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable	4.117	0.000	0.000
Accomplishments/Planned Programs Subtotals	7.708	0.000	0.000

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

Remarks

D. Acquisition Strategy
Not applicable

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 3					R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>				Project (Number/Name) 635021 / <i>Space Systems Survivability</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
635021: <i>Space Systems Survivability</i>	-	1.581	6.500	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops and demonstrates technologies to improve space system survivability and reliability of current and future Department of Defense space systems that must continue operation despite natural space hazards. It develops and demonstrates cost-effective solutions to mitigate hazardous space environmental interactions including electrical charge buildup and electronics failures due to both single radiation events and long-term radiation doses.

In FY 2021 and future years, the efforts and activities under Project 635021, Space Systems Survivability, have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.

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

	FY 2020	FY 2021	FY 2022
Title: Spacecraft Survivability/Reliability	1.581	0.000	0.000
Description: Develop technologies to provide improved space radiation and ionospheric hazard specification and forecasting.			
FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.			
FY 2022 Plans: Not applicable			
FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable			
Accomplishments/Planned Programs Subtotals	1.581	0.000	0.000
	FY 2020	FY 2021	
Congressional Add: Congressional Add: Program increase - ground-based interferometry	0.000	6.500	

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force	Date: May 2021
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Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 635021 / <i>Space Systems Survivability</i>
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	FY 2020	FY 2021
FY 2020 Accomplishments: Not applicable		
FY 2021 Plans: Conduct Congressionally directed effort. This effort will be executed in PE 0603401F, Advanced Spacecraft Technology, Project 633834, Integrated Space Technology Demonstrations.		
Congressional Adds Subtotals	0.000	6.500

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

N/A

Remarks

D. Acquisition Strategy

Not applicable

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 63682J / <i>Spacecraft Vehicles</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
63682J: <i>Spacecraft Vehicles</i>	-	24.084	23.840	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project develops and demonstrates compact, low-cost, spacecraft power generation, storage, distribution, and thermal management technologies, including cryogenic cooling technologies. This project also develops composites for spacecraft structures and technologies for spacecraft control and mechanisms.

In FY 2022, the space communications technology development efforts of PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles, were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, Project 63682J, Spacecraft Vehicles, from Appropriation 3600, Budget Activity (BA) 03 due to the creation of a new Appropriation for Space Force.

In FY 2022, strategic deterrence ground technology development efforts of PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles, were transferred to PE 0603211F, Aerospace Technology Dev/Demo, Project 634094, Next Gen Platform Dev/Demo, to better align DAF technology development.

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

	FY 2020	FY 2021	FY 2022
<p>Title: Space Power Technologies</p> <p>Description: Develop power generation space technologies such as multi-junction solar cells, thin-film solar cells, lightweight solar cell arrays, and radiation resistant solar cell modules and arrays.</p> <p>FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>	1.065	0.000	0.000
<p>Title: Spacecraft Structures Technologies</p> <p>Description: Develop, integrate, and demonstrate composite spacecraft structures and thermal technologies for deployable structures, antennas, electronics cooling, and structural sensing.</p> <p>FY 2021 Plans:</p>	1.415	0.000	0.000

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Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 63682J / <i>Spacecraft Vehicles</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>				
<p>Title: On-Orbit Satellite Controls</p> <p>Description: Develop technologies for spacecraft controls and mechanisms for on-orbit applications.</p> <p>FY 2021 Plans: In FY 2021, all activities in this effort have been postponed/curtailed due to higher Air Force, Space Force, and Department of Defense priorities.</p> <p>FY 2022 Plans: Not applicable</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable</p>		0.416	0.000	0.000
<p>Title: Space Communication Technologies</p> <p>Description: Develop technologies for next-generation space communications terminals and equipment, along with methods/techniques to enable future space system operational command and control concepts.</p> <p>FY 2021 Plans: Continue support of planned five-year W/V-band propagation experiment. Support ground terminal operations, maintenance, and re-deployments. Collect and analyze data to statistically characterize atmospheric propagation effects and correlate to meteorological parameters. Continue research and development to address future military satellite communications capability and technology needs. Continue development of space-qualified V-band high power amplifier technology. Initiate development of W/V-band satellite transponder for on-orbit experiment and demonstration coupled with crosslinks. Continue systems engineering and technology risk-reduction for W/V-band ground terminals.</p> <p>FY 2022 Plans: In FY 2022, the space communications technology development efforts of PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles, were transferred to Appropriation 3620, Research, Development, Test & Evaluation,</p>		9.744	9.317	0.000

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Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603401F / <i>Advanced Spacecraft Technology</i>	Project (Number/Name) 63682J / <i>Spacecraft Vehicles</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, Project 63682J, Spacecraft Vehicles, from Appropriation 3600, Budget Activity (BA) 03 due to the creation of a new Appropriation for Space Force. FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 decreased compared to FY 2021 by \$9.317 million. Funding decreased due to transfer of space communications technology development efforts in PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles, to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206616SF, Space Advanced Technology Development/Demo, Project 63682J, Spacecraft Vehicles, due to the creation of a new Appropriation for Space Force.				
Title: Inertial Sensor Navigation Technologies Description: Develop next-generation solid state, radiation-hardened strategic advance inertial system components for hostile environments. FY 2021 Plans: Continued development of sensor and strategic grade components required for next generation systems. FY 2022 Plans: In FY 2022, strategic deterrence ground technology development efforts of PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles, were transferred to PE 0603211F, Aerospace Technology Dev/Demo, Project 634094, Next Gen Platform Dev/Demo, to better align DAF technology development. FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 decreased compared to FY 2021 by \$14.523 million. Funding decreased due to transfer of strategic deterrence ground technology development efforts in PE 0603401F, Advanced Spacecraft Technology, Project 63682J, Spacecraft Vehicles, to PE 0603211F, Aerospace Technology Dev/Demo, Project 634094, Next Gen Platform Dev/Demo, to better align DAF technology development.		11.444	14.523	0.000
Accomplishments/Planned Programs Subtotals		24.084	23.840	0.000
C. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
D. Acquisition Strategy Not applicable				