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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	59.605	72.138	51.824	0.000	51.824	59.213	60.916	59.429	60.831	Continuing	Continuing
635321: <i>C4I Battlespace Dev and Demo</i>	-	41.909	49.166	32.301	0.000	32.301	38.429	40.215	35.643	36.516	Continuing	Continuing
635329: <i>Cyber Battlespace Dev &amp; Demo</i>	-	17.696	22.972	19.523	0.000	19.523	20.784	20.701	23.786	24.315	Continuing	Continuing

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

This program develops and demonstrates Air Force enterprise-centric information technologies for the warfighter. The C4I Battlespace Dev and Demo project provides technology enabling the Air Force (a) to monitor, assess, plan, and execute missions rapidly across the full spectrum of operations at all levels of war and during all phases of conflict; (b) to field advanced, secure, net-enabled architectures and communications/network technologies in support of persistent, global, and survivable kinetic and non-kinetic military operations; (c) to process and exploit data and information from a variety of sources and domains to create a common operating picture of the battlespace; and (d) to provide the decision maker and staff with seamless access to tailored information within a mobile, dynamic, and scalable, globally distributed Air Operations Center, as well as among other producers, consumers, and managers of information relevant to other particular Communities of Interest (COI). The Cyber Battlespace Dev & Demo project develops the ability to deliver cyber-attack capabilities (access, stealth, persistence, intelligence, and weapons delivery), cyber defense capabilities (attack detection, attack attribution, and response automation) and cyber support capabilities (situation awareness and war gaming). This project will also develop (a) a science and engineering capability demonstrating new models of computation; (b) novel approaches for high performance, interactive, net-centric, distributed and embedded computing systems; and (c) the technological tools enabling affordable, large-scale, and complex software-intensive systems.

The National Defense Strategy and Air Force Future Operating Concept established science and technology challenges to enable operational agility (the ability to rapidly generate and shift among multiple solutions for a given challenge) as a way to adapt swiftly to any situation or enemy action. Operational agility will require flexibility (manifested as multi-domain operations), speed (manifested as superior decision speed), coordination (manifested as dynamic command and control), balance (manifested as presenting a balanced capability mix), and strength (manifested as performance-optimized teams). In order to enable operational agility, this program will begin to shape future research and development (R&D) to focus on technologies in support of operational agility through multi-domain command and control (MDC2) capabilities.

This program has been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science and technology capabilities. The use of program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0601102F, 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 1206601SF, and 0602298F.

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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>
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The Department of the Air Force technologies in this program are both enabling and enduring as we invest in maturing emerging technologies that address established mission gaps, and transformational technologies that address integrated enterprise capabilities intended to reshape the future force across air, space, and cyber warfighting domains. Development of transformational operational capabilities through advanced technology solutions focuses on five strategic capabilities: Global Persistent Awareness; Resilient Information Sharing; Rapid, Effective Decision-Making; Complexity, Unpredictability, and Mass; and Speed and Reach of Disruption and Lethality.

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.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	63.106	56.772	0.000	0.000	0.000
Current President's Budget	59.605	72.138	51.824	0.000	51.824
Total Adjustments	-3.501	15.366	51.824	0.000	51.824
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	-2.824			
• Congressional Adds	0.000	18.190			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.572	0.000			
• Other Adjustments	-1.929	0.000	51.824	0.000	51.824

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

**Project: 635321: C4I Battlespace Dev and Demo**

Congressional Add: *Program Increase- Assured Communication and Networks*

Congressional Add: *Program Increase- Command and Control Capability Development*

Congressional Add: *Program Increase - Assured Communication and Networks*

Congressional Add: *Project Increase - Command and Control Capability Development and Deployment*

Congressional Add Subtotals for Project: 635321

**Project: 635329: Cyber Battlespace Dev & Demo**

Congressional Add: *Program Increase- assured communication and networks*

Congressional Add: *Program Increase- command and control capability development*

	<b>FY 2021</b>	<b>FY 2022</b>
	9.751	0.000
	4.875	0.000
	0.000	10.000
	0.000	5.000
	14.626	15.000
	0.000	0.000
	0.000	0.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

	FY 2021	FY 2022
Congressional Add: <i>Project Increase - Development of Cybersecurity Methodologies</i>	0.000	2.990
Congressional Add: <i>Project Increase - Skydome Trusted Smart-X Experimentation Environment</i>	0.000	0.200
Congressional Add Subtotals for Project: 635329	0.000	3.190
Congressional Add Totals for all Projects	14.626	18.190

**Change Summary Explanation**

Decrease in FY 2021 reflects reprogramming to support Research and Development Projects, 10 U.S.C. Section 2363, an amendment to PL 110-417, 10 U.S.C. Section 2358 and 10 U.S.C. 2805(d)(1)(B).

The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3600 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>				<b>Project (Number/Name)</b> 635321 / <i>C4I Battlespace Dev and Demo</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
635321: <i>C4I Battlespace Dev and Demo</i>	-	41.909	49.166	32.301	0.000	32.301	38.429	40.215	35.643	36.516	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The National Defense Strategy and Air Force Future Operating Concept established science and technology challenges to enable operational agility (the ability to rapidly generate and shift among multiple solutions for a given challenge) as a way to adapt swiftly to any situation or enemy action. In order to enable multi-domain operations, this project will begin to shape future research and development to focus on technologies in support of multi-domain command and control.

In order to achieve operational agility, the Air Force must be able (a) to monitor, assess, plan, and execute missions rapidly across the full spectrum of operations at all levels of war and during all phases of conflict; (b) to field advanced, secure, net-enabled architectures and communications/network technologies in support of persistent, global, and survivable kinetic and non-kinetic military operations; (c) to process and exploit data and information from a variety of sources and domains to create a common operating picture of the battlespace; and (d) to provide the decision maker and staff with seamless access to tailored information within a mobile, dynamic, and scalable, globally distributed Air Operations Center, as well as among other producers, consumers, and managers of information relevant to other particular Communities of Interest (COI).

This project includes the initiation and development of programs addressing DAF capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.”

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

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> Transformational Technology Development	0.000	8.042	8.583
<b>Description:</b> Continually funded effort. This funding allocation will initiate new and continue existing Transformational Technology Development efforts. The Transformational Technology Development program will select new projects, in alignment with mission focused areas which include, but are not limited to: Intelligent Planning and Wargaming, Battlespace Awareness, Integrated Base Defense, and Hypersonic Multi-Mission Aircraft. Investments focus on technology development efforts including, but are not limited to technologies to enhance survivability, operability and performance of personnel, sensors, and structures in a threat environment through advances in enterprise-centric information technologies, offensive and defensive cyber operations capabilities, advanced command and control capabilities, and collection, management, analysis, and exploitation of complex data. This investment is overseen by senior representatives from Air and Space Forces who participate in the submission, initial review, and down-selection of Transformational Technology Development proposed efforts. Final selections will be reviewed by the Air			

**UNCLASSIFIED**

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>Force Deputy Assistant Secretary for Science, Technology, and Engineering before a final recommendation for Congressional approval is made.</p> <p><b>FY 2022 Plans:</b> Fund the follow-on efforts for projects started in FY 2021. Select Transformational Technology Development efforts that support the National Defense Strategy and Department of the Air Force priorities.</p> <p><b>FY 2023 Plans:</b> Continue investments leveraging Artificial Intelligence and gaming technologies to accelerate Department of the Air Force capability to create theatre-scale operational plans within hours. Initiate projects selected from the annual WARTECH process that investigate Department of the Air Force prioritized topics. Continue to perform modeling, simulation, and analyses to establish the future force effect of candidate Transformational Component investments and continue the next cycle of WARTECH process.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 Funding increased compared to FY 2022 by \$0.541 million. Funding increased to scale investment toward the Department of the Air Force target outlined in the Air Force 2030 Science and Technology (S&amp;T) Strategy.</p>				
<p><b>Title:</b> Multi-Domain Command and Control</p> <p><b>Description:</b> Perform research and development (R&amp;D) that will advance existing, or discover new, command and control capabilities to support multi-domain operations (MDO) for air, space, cyberspace, land, sea, and undersea.</p> <p><b>FY 2022 Plans:</b> Continue demonstration of communication, information management, and replication capabilities for intra base distribution of one C2 operational echelon function. Continue to execute experiments, based on operational scenarios, which incorporate process management execution into the extensible Space command and control framework, and which integrate disparate data and applications, providing a pedigree for proposed tasking options to decision makers. Continue to develop software capabilities that employ cyber, directed energy, and electronic warfare weaponry. Continue to provide on-the-fly valuable quantitative evaluations of cyber assets to cyber operators, enabling them to present viable cyber options to commanders in multi-domain settings. Continue development of tools, technology, and framework for execution management of operational center process workflows and applications.</p> <p><b>FY 2023 Plans:</b> Continue demonstration of communication, information management, and replication capabilities for intra base distribution of one C2 operational echelon function. Continue to execute experiments, based on operational scenarios, which incorporate process management execution into the extensible Space command and control framework, and which integrate disparate data and</p>		6.537	6.975	10.214

**UNCLASSIFIED**

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>applications, providing a pedigree for proposed tasking options to decision makers. Continue development of tools, technology, and framework for execution management of operational center process workflows and applications.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 increased compared to FY 2022 by \$3.239 million due to implementation of AF S&amp;T 2030 addressing Rapid, Effective Decision Making and Complexity, Unpredictability, and Mass.</p>				
<p><b>Title:</b> Nuclear C3 Modernization</p> <p><b>Description:</b> Develop and demonstrate the advancement of existing nuclear capable forces to ensure command, control, and connectivity for the President without constraints.</p> <p><b>FY 2022 Plans:</b> Starting in FY 2022, this work will be performed in PE 0603788F, Battlespace Knowledge, Development, and Demonstration, Project 635321, C4I Battlespace Dev and Demo, Assured Communications &amp; Networks effort.</p> <p><b>FY 2023 Plans:</b> Starting in FY 2022, this work will be performed in PE 0603788F, Battlespace Knowledge, Development, and Demonstration, Project 635321, C4I Battlespace Dev and Demo, Assured Communications &amp; Networks effort.</p>		2.945	0.000	0.000
<p><b>Title:</b> Artificial Intelligence/Autonomy/Machine Learning</p> <p><b>Description:</b> Develop and demonstrate to harness the speed and scale of computers and machines to address problems of complexity.</p> <p><b>FY 2022 Plans:</b> Decrease development of robust artificial intelligence/machine learning (AI/ML) for targeted transition capabilities. Decrease development to operationalize and implement state of the art learning models. Continue to integrate within the AI/ML framework to develop, evaluate, and deploy custom solutions meeting operational requirements &amp; needs. Decrease development of secure diode for cross-domain embedded solution. Implementation and testing of neuromorphic-based algorithms for processing and exploitation of multiple data feeds.</p> <p><b>FY 2023 Plans:</b> Decrease development of robust artificial intelligence/machine learning (AI/ML) for targeted transition capabilities. Decrease development to operationalize and implement state of the art learning models. Continue to integrate within the StreamlinedML framework. Decrease development of secure diode for cross-domain embedded solution. Implementation and testing of neuromorphic-based algorithms for processing and exploitation of multiple data feeds.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b></p>		2.234	3.274	1.729

**UNCLASSIFIED**

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
FY 2023 decreased compared to FY 2022 by \$1.545 million due to higher Department priorities.				
<p><b>Title:</b> Data to Decisions</p> <p><b>Description:</b> Develop and demonstrate the collection, management, analysis, and exploitation of complex data for availability to Air Force and other stakeholders.</p> <p><b>FY 2022 Plans:</b> Continue development and demonstration of intelligence analysis capabilities from multiple intelligence sources for both near-real time and post mission. Continue research and development in data analytics and strategic indications and warnings. Continue to perform service-based capability development. Conduct a demonstration of additional government fusion techniques applied to combined commercial/commodity hardware and existing military hardware within a trusted wrapper. Conduct an integrated demonstration of data flow into intelligence production environment. Continue to advance the prototype to deliver multi-INT exploitation on-board and in real-time.</p> <p><b>FY 2023 Plans:</b> Continue development and demonstration of intelligence analysis capabilities from multiple intelligence sources for both near-real time and post mission. Continue research and development in data analytics and strategic indications and warnings for the air and space domains. Continue to perform service-based capability development. Decrease investments to advance the prototype to deliver multi-INT exploitation on-board and in real-time.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 decreased compared to FY 2022 by \$2.597 million due to higher Department priorities.</p>		4.180	3.809	1.212
<p><b>Title:</b> Game Changing Computing Power</p> <p><b>Description:</b> Develop and demonstrate computer architectures with greater capacity and sophistication to enable game-changing computing power to the warfighter anywhere, anytime.</p> <p><b>FY 2022 Plans:</b> Demonstrating secure, on-board, simultaneous processing of multi-INT data to correlate and identify surface targets.</p> <p><b>FY 2023 Plans:</b> Continue to demonstrate secure, on-board, simultaneous processing of multi-INT data to correlate and identify surface targets. Integrate and test to utilize pod for additional data sources.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b></p>		3.086	3.099	2.235

**UNCLASSIFIED**

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
FY 2023 decreased compared to FY 2022 by \$0.864 million due to higher Department priorities.			
<p><b>Title:</b> Assured Communications &amp; Networks</p> <p><b>Description:</b> Develop and demonstrate secure and reliable communications to ensure the delivery of timely, reliable, and actionable information to warfighters and systems.</p> <p><b>FY 2022 Plans:</b> Continue development and demonstration for rapid waveform development of multi-mission software defined radio frequency capability. Continue wideband high frequency waveform development and testing. Continue ionospheric research, propagation modeling and simulation. Continue beacon data collection on both the V and W frequency bands along with waveform development and simulation. Develop robust mesh networking capability with both Line-of-Sight and Beyond Line-of-Sight communication links. Continue to add SATCOM links to multi-spectral capability. Continue to demonstrate a protected, single security domain commercial off-the-shelf (COTS) device hosting user and asset tracking, machine learning architecture provisioning and innovative aerial port (AMC) solutions for mobile situational awareness (SA) and decision making. Continue to enhance communication link availability prediction for better Command, Control, and Communications (C3) planning and simulation.</p> <p><b>FY 2023 Plans:</b> Continue development and demonstration for rapid waveform development of multi-mission software defined radio frequency capability. Advance development of wideband high frequency waveform development and testing. Continue to enhance communication link availability prediction for better Command, Control, and Communications (C3) planning and simulation. Continue to demonstrate a protected, single security domain commercial off-the-shelf (COTS) device hosting user and asset tracking, machine learning architecture provisioning and innovative aerial port (AMC) solutions for mobile situational awareness (SA) and decision making.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 decreased compared to FY 2022 by \$0.639 million. Justification for the decrease is described in the plans above.</p>	8.301	8.967	8.328
<b>Accomplishments/Planned Programs Subtotals</b>	27.283	34.166	32.301

	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Congressional Add:</b> Program Increase- Assured Communication and Networks</p> <p><b>FY 2021 Accomplishments:</b> Conduct congressionally directed effort.</p> <p><b>FY 2022 Plans:</b> Not applicable.</p>	9.751	0.000
<p><b>Congressional Add:</b> Program Increase- Command and Control Capability Development</p>	4.875	0.000

**UNCLASSIFIED**

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	FY 2021	FY 2022
<b>FY 2021 Accomplishments:</b> Conduct congressionally directed effort.		
<b>FY 2022 Plans:</b> Not applicable.		
<b>Congressional Add:</b> Program Increase - Assured Communication and Networks	0.000	10.000
<b>FY 2021 Accomplishments:</b> Not applicable.		
<b>FY 2022 Plans:</b> Conduct congressionally directed effort.		
<b>Congressional Add:</b> Project Increase - Command and Control Capability Development and Deployment	0.000	5.000
<b>FY 2021 Accomplishments:</b> Not applicable.		
<b>FY 2022 Plans:</b> Conduct congressionally directed effort.		
<b>Congressional Adds Subtotals</b>	14.626	15.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable

**UNCLASSIFIED**

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<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
635329: <i>Cyber Battlespace Dev &amp; Demo</i>	-	17.696	22.972	19.523	0.000	19.523	20.784	20.701	23.786	24.315	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Air Force requires the ability to deliver sovereign options in cyberspace through the development and integration of cyber-attack, cyber defense, and cyber support technologies for a strategic capability of cyber dominance. This project develops the ability to deliver cyber-attack capabilities (access, stealth, persistence, intelligence, and weapons delivery), cyber defense capabilities (attack detection, attack attribution, and response automation) and cyber support capabilities (situation awareness and war gaming). This project will also develop 1) a science and engineering capability demonstrating new models of computation, 2) novel approaches for high performance, interactive, net-centric, distributed and embedded computing systems, and 3) the technological tools enabling affordable, large-scale, and complex software-intensive systems.

The National Defense Strategy and Air Force Future Operating Concept established science and technology challenges to enable operational agility (the ability to rapidly generate and shift among multiple solutions for a given challenge) as a way to adapt swiftly to any situation or enemy action. In order to enable multi-domain operations, this project will begin to shape future research and development to focus on cyber technologies in support of multi-domain command and control.

This project includes the initiation and development of programs addressing DAF capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.

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

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> Transformational Technology Development	0.000	3.251	4.322
<b>Description:</b> Continually funded effort. This funding allocation will initiate new and continue existing Transformational Technology Development efforts. The Transformational Technology Development program will select new projects, in alignment with mission focused areas which include, but are not limited to: Intelligent Planning and Wargaming, Battlespace Awareness, Integrated Base Defense, and Hypersonic Multi-Mission Aircraft. Investments focus on technology development efforts including, but are not limited to technologies to enhance survivability, operability and performance of personnel, sensors, and structures in a threat environment through advances in enterprise-centric information technologies, offensive and defensive cyber operations capabilities, advanced command and control capabilities, and collection, management, analysis, and exploitation of complex data. This investment is overseen by senior representatives from Air and Space Forces who participate in the submission, initial review, and down-selection of Transformational Technology Development proposed efforts. Final selections will be reviewed by the Air			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>Force Deputy Assistant Secretary for Science, Technology, and Engineering before a final recommendation for Congressional approval is made.</p> <p><b>FY 2022 Plans:</b> Fund the follow-on efforts for projects started in FY 2021. Select Transformational Technology Development efforts that support the National Defense Strategy and Department of the Air Force priorities.</p> <p><b>FY 2023 Plans:</b> Continue to develop and enable multi-domain sense-making at the tactical edge. Initiate projects selected from the annual WARTECH process that investigate Department of the Air Force prioritized topics. Continue to perform modeling, simulation, and analyses to establish the future force effect of candidate Transformational Component investments and continue the next cycle of WARTECH process</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 Funding increased compared to FY 2022 by \$1.071 million. Funding increased to scale investment toward the Department of the Air Force target outlined in the Air Force 2030 Science and Technology (S&amp;T) Strategy.</p>				
<p><b>Title:</b> Cyber Defense Technologies</p> <p><b>Description:</b> Develop and demonstrate defensive cyber operations capabilities in a series of experimental technology demonstrations.</p> <p><b>FY 2022 Plans:</b> Continue development of software capabilities and concept of operations for active guidance and automated processes addressing cyber defense. Continue to demonstrate automated cyber survivability using integrated cyber technologies within the operational system laboratory in the context of risk management framework requirements. Continue development of an advanced secure processor hardware capability. Develop processor-agnostic sub-system for golden-image storage, verification, and re-flashing. Continue development and integration of polyglot file identification filters to mitigate data exfiltration risks. Continue to sustain development of a modularized filter store to maximize filter re-usability and increase the agility of cross-domain solutions to support new file types. Continue development and demonstration of Air, Space, Cyber tasking order interoperability and ingestion by IKE Cyber system. Demonstrate additional government fusion techniques applied to combined commercial/commodity hardware and existing military hardware within a trusted wrapper. Demonstrate data flow into the intelligence production environment.</p> <p><b>FY 2023 Plans:</b> Decrease development of software capabilities and concept of operations for active guidance and automated processes addressing cyber defense. Decrease demonstration of automated cyber survivability using integrated cyber technologies within</p>		0.000	7.416	4.647

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3600 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>	<b>Project (Number/Name)</b> 635329 / <i>Cyber Battlespace Dev &amp; Demo</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
the operational system laboratory in the context of risk management framework requirements. Continue development of an advanced secure processor hardware capability. Continue development, demonstration, and integration of the IKE Cyber system.  <b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 decreased compared to FY 2022 by \$2.769 million due to higher Department priorities.				
<b>Title:</b> Cyber Offense Technologies  <b>Description:</b> Develop and demonstrate offensive cyber operations capabilities in a series of experimental technology demonstrations.  <b>FY 2022 Plans:</b> Continue the development of a counter small unmanned aerial system open architecture specification to enable interoperability between disparate protection systems. Develop a base-threat awareness toolkit. Develop a framework for quickly adapting new features to allow for increased efficiency in updating cyber offense capabilities. Continue development of processor-agnostic sub-system for golden-image storage, verification, and re-flashing. Continue to integrate and transition multiple Air Force Research Laboratory and Air Force Lifecycle Management Center counter small unmanned aerial system capabilities. Continue the development of a capability to enable the warfighter access into congested environments as directed by warfighter requirements. Continue development of cellular testbed with 5G and Internet of Things representative technologies. Demonstrate an initial SIGINT hardware prototype.  <b>FY 2023 Plans:</b> Advance research towards development of non-kinetic cyber effects against high-impact, critical targets within areas of responsibility (AORs) or of interest to enable stand-off power projection options that enable cyber-only and coordinated cyber-kinetic target prosecution. Increase development in signal identification capabilities in adverse environments addressing advanced communications signals and networks. Decrease investments for the development of a counter small unmanned aerial system open architecture specification to enable interoperability between disparate protection systems. Develop a base-threat awareness toolkit. Decrease development of processor-agnostic sub-system for golden-image storage, verification, and re-flashing. Decrease to integrate and transition multiple Air Force Research Laboratory and Air Force Lifecycle Management Center counter small unmanned aerial system capabilities. Decrease investments for the development of a capability to enable the warfighter access into congested environments as directed by warfighter requirements. Decrease investments for the development of cellular testbed with 5G and Internet of Things representative technologies. Demonstrate an initial SIGINT hardware prototype.  <b>FY 2022 to FY 2023 Increase/Decrease Statement:</b>		0.000	9.115	10.554

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3600 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>	<b>Project (Number/Name)</b> 635329 / <i>Cyber Battlespace Dev &amp; Demo</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
FY 2023 increased compared to FY 2022 by \$1.438 million due to implementation of AF S&T 2030 for Speed and Reach of Disruption & Lethality for cyber offensive and information warfare offensive to change the future fight.				
<p><b>Title:</b> Resiliency</p> <p><b>Description:</b> Integrate and demonstrate a resilient and self-generating information enterprise that dynamically recognizes, characterizes, and understands novel cyber attacks, and then reconfigures and self-optimizes itself to resist new attacks.</p> <p><b>FY 2022 Plans:</b> Starting in FY 2022, this work will be performed within this PE, under Project 635329, Cyber Battlespace Dev &amp; Demo, in the Cyber Defense Technologies effort.</p> <p><b>FY 2023 Plans:</b> Not applicable</p>		7.485	0.000	0.000
<p><b>Title:</b> Game Changing Computing Power</p> <p><b>Description:</b> Develop and demonstrate computer architectures with greater capacity and sophistication to enable game-changing computing power to the warfighter anywhere, anytime.</p> <p><b>FY 2022 Plans:</b> Not Applicable</p> <p><b>FY 2023 Plans:</b> Not applicable</p>		0.000	0.000	0.000
<p><b>Title:</b> Autonomous, Multi-level Access and Transfer</p> <p><b>Description:</b> Develop autonomous, secure information access and sharing capabilities required by the Air Force net-centric information enterprise.</p> <p><b>FY 2022 Plans:</b> Starting in FY 2022, this work will be performed within this PE, under Project 635329, Cyber Battlespace Dev &amp; Demo, in the Cyber Defense Technologies effort.</p> <p><b>FY 2023 Plans:</b> Not applicable</p>		1.042	0.000	0.000
<p><b>Title:</b> Cyber Power Projection</p>		9.169	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3600 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>	<b>Project (Number/Name)</b> 635329 / <i>Cyber Battlespace Dev &amp; Demo</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p><b>Description:</b> Develop and demonstrate offensive cyber capabilities in contested environments through a series of experiments and exercises.</p> <p><b>FY 2022 Plans:</b> Starting in FY 2022, this work will be performed within this PE, under Project 635329, Cyber Battlespace Dev &amp; Demo, in the Cyber Offense Technologies effort.</p> <p><b>FY 2023 Plans:</b> Not applicable</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	17.696	19.782	19.523

	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Congressional Add:</b> Program Increase- assured communication and networks</p> <p><b>FY 2021 Accomplishments:</b> Conduct congressionally directed efforts. To be executed from Project 635321, C4I Battlespace Dev and Demo.</p> <p><b>FY 2022 Plans:</b> Not applicable.</p>	0.000	0.000
<p><b>Congressional Add:</b> Program Increase- command and control capability development</p> <p><b>FY 2021 Accomplishments:</b> Conduct congressionally directed efforts. To be executed from Project 635321, C4I Battlespace Dev and Demo.</p> <p><b>FY 2022 Plans:</b> Not applicable.</p>	0.000	0.000
<p><b>Congressional Add:</b> Project Increase - Development of Cybersecurity Methodologies</p> <p><b>FY 2021 Accomplishments:</b> Not applicable.</p> <p><b>FY 2022 Plans:</b> Conduct congressionally directed effort.</p>	0.000	2.990
<p><b>Congressional Add:</b> Project Increase - Skydome Trusted Smart-X Experimentation Environment</p> <p><b>FY 2021 Accomplishments:</b> Not applicable.</p> <p><b>FY 2022 Plans:</b> Conduct congressionally directed effort.</p>	0.000	0.200
<b>Congressional Adds Subtotals</b>	0.000	3.190

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603788F / <i>Battlespace Knowledge Development and Demonstration</i>	Project (Number/Name) 635329 / <i>Cyber Battlespace Dev &amp; Demo</i>

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable