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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 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</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	-	54.676	69.656	71.229	0.000	71.229	-	-	-	-	-	-
642810: <i>Cyber Workforce Development</i>	-	8.200	0.000	0.000	0.000	0.000	-	-	-	-	-	-
642812: <i>Acquisition/System Security Engineering</i>	-	17.001	31.452	26.775	0.000	26.775	-	-	-	-	-	-
642816: <i>Agile/Adaptable Standards</i>	-	7.250	0.000	0.000	0.000	0.000	-	-	-	-	-	-
642834: <i>Mitigations</i>	-	15.387	31.307	36.993	0.000	36.993	-	-	-	-	-	-
642836: <i>Mission Risk Analysis</i>	-	6.838	6.897	7.461	0.000	7.461	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This program funds activities at the Cyber Resiliency Office for Weapon Systems (CROWS), which provides cyber capabilities and acquisition support to weapon system programs across the Department of the Air Force (DAF). CROWS increases the cyber resiliency of DAF weapon systems to maintain mission effective capability under adverse conditions. Its goals are to bake cyber resiliency into new weapon systems and mitigate critical vulnerabilities in fielded weapon systems. CROWS aligns the DAF with strategic guidance, such as the National Defense Strategy (NDS). The NDS highlights the re-emergence of great power competition as the central challenge to U.S. prosperity and security. This strategic guidance identified the space and cyberspace domains that require the Department of Defense to prioritize investments in cyber defense, resilience, and the continued integration of cyber capabilities into the full spectrum of military operations.

This program addresses cyber resiliency and security gaps in three primary activities to meet these goals. The first activity is to develop systems security engineering tools, techniques and procedures, and associated training and education to build cyber expertise within the acquisition workforce. This includes developing a common secure environment to enable effective sharing of cyber intelligence and vulnerability information across multiple acquisition programs. It also includes identifying emerging technologies for further development and prototyping to posture DAF weapon systems to counter emerging threats. The second activity is to conduct threat informed weapon systems' solution analysis, identify and prioritize vulnerabilities and identify, develop and present courses of action to develop materiel and non-materiel mitigation trade space. The third activity is to design mitigation strategies and prototype mitigation solutions to critical vulnerabilities, with emphasis on those vulnerabilities that affect multiple weapon systems.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CROWS weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>
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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	56.325	69.783	79.688	0.000	79.688
Current President's Budget	54.676	69.656	71.229	0.000	71.229
Total Adjustments	-1.649	-0.127	-8.459	0.000	-8.459
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.649	0.000			
• Other Adjustments	0.000	-0.127	-8.459	0.000	-8.459

Change Summary Explanation

Decrease in FY 2020 of \$1.649 is due to SBIR transfer.

Decrease in FY 2021 of \$0.127 is due to higher DAF priorities.

Decrease in FY 2022 of \$8.459 is due to Department of Defense inflationary adjustments of \$1.159M and \$7.3M to Program Element 0605056F Open Architecture Management to appropriately align requirements associated with open architecture/open standards activities.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>				Project (Number/Name) 642810 / <i>Cyber Workforce Development</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
642810: <i>Cyber Workforce Development</i>	-	8.200	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cyber Workforce Development project develops and transitions cyber resiliency training, manning strategies, and deploys teams providing cyber acquisition experts to Program Executive Offices (PEO) to address acquisition workforce gaps in cyber resiliency/security manpower, experience, and knowledge. This project hones workforce expertise and skills required to counter weapon system-unique cyber threats, which exceeds the knowledge needed to secure Internet Protocol (IP) based systems against traditional network-based cyber threats. Such expertise is critical for acquisition professionals to ensure cyber resiliency/security design tenets are integrated into the weapon system's life cycle.

In FY 2021, the entirety of work under Project 642810, Cyber Workforce Development, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with cyber resiliency of weapon systems activities.

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

	FY 2020	FY 2021	FY 2022
Title: Increase Acquisition Workforce Cyber Expertise	8.200	0.000	0.000
Description: Increases knowledge and advanced skills of acquisition workforce.			
FY 2021 Plans: In FY 2021, the work under this effort was transferred to the Prototype, Evaluate, and Transition System Security Engineering effort under Project 642812, Acquisition/System Security Engineering.			
FY 2022 Plans: Not applicable			
Accomplishments/Planned Programs Subtotals	8.200	0.000	0.000

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

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate. The government agency responsible for managing the program is the

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642810 / <i>Cyber Workforce Development</i>
Air Force Life Cycle Management Center, Cyber Resiliency Office for Weapons Systems, Wright-Patterson Air Force Base, Ohio and Hanscom Air Force Base, Massachusetts.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642810 / <i>Cyber Workforce Development</i>
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Education and Training (AFRL, AFIT)	Various	Various : Various	-	0.730	Feb 2020	-		-		-		-	-	-	-
Subtotal			-	0.730		-		-		-		-	-	-	N/A

Remarks
In FY 2021, the entirety of work under Project 642810, Cyber Workforce Development, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MITRE	Various	MITRE : Bedford, MA	-	6.688	Nov 2019	-		-		-		-	-	-	-
Subtotal			-	6.688		-		-		-		-	-	-	N/A

Remarks
In FY 2021, the entirety of work under Project 642810, Cyber Workforce Development, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS, Travel, Government Purchase Card	Various	Various : Various	-	0.782	Nov 2019	-		-		-		-	-	-	-
Subtotal			-	0.782		-		-		-		-	-	-	N/A

Remarks
In FY 2021, the entirety of work under Project 642810, Cyber Workforce Development, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642810 / <i>Cyber Workforce Development</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<i>Cyber Workforce Development</i>																												
Deploy Cyber Focus Teams																												
Develop basic weapon system cyber awareness training																												
Develop weapon system cyber training																												
Hire/retain cyber security professionals																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642810 / <i>Cyber Workforce Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Cyber Workforce Development</i>				
Deploy Cyber Focus Teams	1	2020	4	2020
Develop basic weapon system cyber awareness training	1	2020	4	2020
Develop weapon system cyber training	1	2020	4	2020
Hire/retain cyber security professionals	1	2020	4	2020

Note

In FY 2021, the entirety of work under Project 642810, Cyber Workforce Development, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>				Project (Number/Name) 642812 / <i>Acquisition/System Security Engineering</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
642812: <i>Acquisition/System Security Engineering</i>	-	17.001	31.452	26.775	0.000	26.775	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Acquisition/System Security Engineering (SSE) activity develops Department of the Air Force (DAF) and Department of Defense system security engineering and acquisition security processes, policies, and contracting language, and refines intelligence collection and processes to provide actionable information on cyber threats to the weapons system community. This activity bolsters Air Force cyber resiliency/security by developing common secure environments for Program Offices to share information on classified weapon system cyber intelligence, threats, and vulnerabilities. It also encompasses developing cyber resiliency training, manning strategies, and Cyber Focus Teams, which provide cyber acquisition expertise to Program Executive Offices (PEO) to address acquisition workforce gaps in cyber resiliency/security manpower, experience, and knowledge. This project hones workforce expertise and skills required to counter weapon system-unique cyber threats, which exceeds the knowledge needed to secure Internet Protocol (IP) based systems against traditional network-based cyber threats. Such expertise is critical for acquisition professionals to ensure cyber resiliency/security design tenets are integrated into the weapon system's life cycle. The project also enables rapid response to emerging peer threats by focusing on early technology readiness level (TRL) efforts via non-traditional industry partners to develop and field cyber resiliency technologies to operational users. Finally, this project includes identification, evaluation, and prioritization of emerging cyber techniques, products, and technologies for further development and prototyping to posture DAF weapon systems to counter emerging threats. This activity supports Air Force Program Offices, the Protecting Critical Technologies Task Force, Defense Industrial Base data protection efforts, Air Force Supply Chain Risk Management, and other weapon system cyber security/resiliency activities as required.

Prior to FY 2021, reporting of Cyber Workforce Development activities were reported under Project 642810, Cyber Workforce Development, and the reporting of Agile/Adaptable Standards activities were reported under Project 642816, Agile/Adaptable Standards.

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

	FY 2020	FY 2021	FY 2022
Title: Prototype, Evaluate, and Transition System Security Engineering	17.001	31.452	26.775
Description: Prototypes, evaluates, and transitions cyber security and resiliency activities into policy, processes, products, and people.			
FY 2021 Plans: Continue to evolve the Acquisition/SSE requirements, processes, policies, and contracting language to influence cyber resiliency in all phases of the acquisition process. Refine intelligence collection and processes to provide actionable information on cyber threats to the weapons system community. Continue developing common security environments to enable program offices to collaborate/share information on classified weapon system cyber intelligence threats and vulnerabilities. Continue to deliver cyber			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>expertise to PEOs through the Cyber Focus Team (CFT) manpower, identify acquisition cyber resiliency training gaps and develop training to support the acquisition workforce. Continue identification, evaluation, and prioritization of emerging cyber techniques, products, and technologies for further development and prototyping to posture Air Force weapon systems to counter emerging threats.</p> <p><i>FY 2022 Plans:</i> Continue to evolve the Acquisition/SSE requirements, processes, policies, and contracting language to influence cyber resiliency in all phases of the acquisition process. Refine intelligence collection and processes to provide actionable information on cyber threats to the weapons system community. Continue developing common security environments to enable program offices to collaborate/share information on classified weapon system cyber intelligence threats and vulnerabilities as well as the necessary verification and validation infrastructure (technology, hardware/software modelling and lab resources) to understand, reconcile, and program against emerging cyber resiliency attack vectors. Increase delivery of cyber expertise to PEOs through Cyber Focus Team (CFT) manpower, continue to identify acquisition cyber resiliency training gaps and analyze required knowledge and skill sets and develop increasingly more technical and hands on training to support the acquisition workforce. Continue identification, evaluation, and prioritization of emerging cyber techniques, products, and technologies for further development and prototyping to posture Air Force weapon systems to counter emerging threats.</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> FY 2022 decreased compared to FY 2021 by \$4.677 million. Decrease is due to Department of Defense inflationary adjustments and transfer of the open architecture/open standards requirements to Program Element 65056F Open Architecture Management.</p>			
Accomplishments/Planned Programs Subtotals	17.001	31.452	26.775

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

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate. The government agency responsible for managing the program is the Air Force Life Cycle Management Center, Cyber Resiliency Office for Weapons Systems, Wright-Patterson Air Force Base, Ohio and Hanscom Air Force Base, Massachusetts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642812 / <i>Acquisition/System Security Engineering</i>
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Common Cyber Security Environment	Various	Various : Various	-	9.550	Nov 2019	6.000	Nov 2020	6.250	Nov 2021	-		6.250	-	-	-
Intel collection skills to identify cyber threats to weapon systems	Various	Various : Various	-	6.995	Dec 2019	5.500	Dec 2020	5.750	Dec 2021	-		5.750	-	-	-
Education and Training (AFRL, AFIT)	Various	Various : Various	-	-		1.050	Jan 2021	1.050	Jan 2022	-		1.050	-	-	-
Cyber Resiliency Technologies Development	Various	Various : Various	-	-		11.352	Nov 2020	5.719	Nov 2021	-		5.719	-	-	-
Subtotal			-	16.545		23.902		18.769		-		18.769	-	-	N/A

Remarks
Prior to FY 2021, reporting of Cyber Workforce Development activities were reported under Project 642810, Cyber Workforce Development, and the reporting of Agile/Adaptable Standards activities were reported under Project 642816, Agile/Adaptable Standards.

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Security Engineering requirements, policy and guidance documents (DTIC)	Various	Various : Various	-	0.456	Jan 2020	0.456	Jan 2021	0.456	Jan 2022	-		0.456	-	-	-
MITRE	Various	Various : Bedford, MA	-	-		4.410	Nov 2020	4.800	Nov 2021	-		4.800	-	-	-
CMU/SEI	Various	Carnegie Mellon Univ. : Pittsburgh, PA	-	-		1.000	Dec 2020	1.000	Dec 2021	-		1.000	-	-	-
Subtotal			-	0.456		5.866		6.256		-		6.256	-	-	N/A

Remarks
Prior to FY 2021, reporting of Cyber Workforce Development activities were reported under Project 642810, Cyber Workforce Development, and the reporting of Agile/Adaptable Standards activities were reported under Project 642816, Agile/Adaptable Standards.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642812 / <i>Acquisition/System Security Engineering</i>
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS, Travel, Government Purchase Card	Various	Various : Various	-	-		1.684	Dec 2020	1.750	Dec 2021	-		1.750	-	-	-
Subtotal			-	-		1.684		1.750		-		1.750	-	-	N/A

Remarks
Prior to FY 2021, reporting of Cyber Workforce Development activities were reported under Project 642810, Cyber Workforce Development, and the reporting of Agile/Adaptable Standards activities were reported under Project 642816, Agile/Adaptable Standards.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	17.001	31.452	26.775	-	26.775	-	-	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642812 / <i>Acquisition/System Security Engineering</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Acquisition/System Security Engineering				
Prototype and deliver common cyber security environments	1	2020	4	2026
Prototype and deliver enhanced system security engineering processes and products	1	2020	4	2026
Prototype and deliver cyber security design and contractual requirements	1	2020	4	2026
Prototype and deliver acquisition cyber intel analysis products and techniques	1	2020	4	2026
Develop weapon system cyber training	1	2021	4	2026
Deploy cyber focus teams	1	2021	4	2026
Prototype advanced cyber resiliency technology	1	2021	4	2026
Prototype and update open standards	1	2021	4	2021

Note

Previous to FY 2021, Cyber Workforce Development activities are reported under Project 642810, Cyber Workforce Development, and Agile/Adaptable Standards activities are reported under Project 642816, Agile/Adaptable Standards.

Beginning in FY 2022, the open architecture/open standards mission will transfer to program element 0605056F to better align scope and resources associated with these activities.

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Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642816 / <i>Agile/Adaptable Standards</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
642816: <i>Agile/Adaptable Standards</i>	-	7.250	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Agile/Adaptable Standards project identifies, evaluates and prioritizes emerging cyber techniques, products, and technologies for further development and prototyping to posture Department of the Air Force (DAF) weapon systems to counter emerging threats.

In FY 2021, the entirety of work under Project 642816, Agile/Adaptable Standards, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

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

	FY 2020	FY 2021	FY 2022
Title: Agile and Adaptable Standards	7.250	0.000	0.000
Description: Develop, prototype, evaluate, and transition agile and adaptable system standards for integration into DAF weapon systems.			
FY 2021 Plans: In FY 2021, the work under this effort was transferred to the Prototype, Evaluate, and Transition System Security Engineering effort under Project 642812, Acquisition/System Security Engineering.			
FY 2022 Plans: Not applicable			
Accomplishments/Planned Programs Subtotals	7.250	0.000	0.000

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

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate. The government agency responsible for managing the program is the Air Force Life Cycle Management Center, Cyber Resiliency Office for Weapons Systems, Wright-Patterson Air Force Base, Ohio and Hanscom Air Force Base, Massachusetts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642816 / <i>Agile/Adaptable Standards</i>
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Cyber Resiliency Technology - Open system architecture	Various	Various : Various	-	6.000	Feb 2020	-		-		-		-	-	-	-
Cyber Resiliency Technology - (Firesky, Pitchday, Cloud One)	Various	Various : Various	-	1.250	Jan 2020	-		-		-		-	-	-	-
Subtotal			-	7.250		-		-		-		-	-	-	N/A

Remarks
In FY 2021, the entirety of work under Project 642816, Agile/Adaptable Standards, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	7.250	0.000	-	-	-	-	-	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642816 / <i>Agile/Adaptable Standards</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Agile/Adaptable Standards	
Transition resilient embedded GPS/INS (REGI) technology and design to PNT Program Office	██████████
Prototype and update open standards	██████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Agile/Adaptable Standards</i>				
Transition resilient embedded GPS/INS (REGI) technology and design to PNT Program Office	1	2020	3	2020
Prototype and update open standards	1	2020	4	2020

Note

In FY 2021, the entirety of work under Project 642816, Agile/Adaptable Standards, was transferred to Project 642812, Acquisition/System Security Engineering, to better align scope and resources associated with Cyber Resiliency of Weapon Systems activities.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>				Project (Number/Name) 642834 / <i>Mitigations</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
642834: <i>Mitigations</i>	-	15.387	31.307	36.993	0.000	36.993	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Mitigations activity prototypes mitigations to high risk cyber vulnerabilities and recommends a transition path for fielded weapon systems, subsystems, and support systems. CROWS program will perform the engineering analysis and partner with program offices for the affected weapon systems to develop a mitigation strategy. CROWS will lead the non-recurring engineering effort to prototype a mitigation that can be fielded on multiple weapon systems and transition the mitigation to programs for implementation and sustainment. CROWS will develop a mitigation handbook that catalogs proven materiel mitigations for use across Department of the Air Force weapon systems program offices to maximize return on investment in the prototyping activity.

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

	FY 2020	FY 2021	FY 2022
Title: Cyber Mitigation Prototyping	15.387	31.307	36.993
Description: Evaluate weapon systems cyber risk assessments to identify, validate, and prioritize mitigations required for cyber vulnerabilities/susceptibilities. Partner with system owners and acquisition Program Offices to develop prototype mitigations.			
FY 2021 Plans: Continue prototyping mitigations for cyber vulnerabilities on fielded weapon systems, subsystems, and support systems in realistic, high fidelity environments. Collaborate with system owners and acquisition program offices to prototype mitigation projects and implement technology transfer of prototyped solutions within the associated acquisition program office. Develop centralized data repository for mitigations addressing weapon system cyber vulnerabilities.			
FY 2022 Plans: Continue focus on prototyping mitigations for cyber vulnerabilities on fielded weapon systems, subsystems, and support systems in realistic, high fidelity environments and identifying threat-informed risks/vulnerabilities. Collaborate with system owners and acquisition program offices to prototype mitigation projects and implement technology transfer of prototyped solutions within the associated acquisition program office. Develop centralized data repository for mitigations addressing weapon system cyber risks and vulnerabilities. Support mitigation integration requirements by translating/mapping threats to enterprise mitigation techniques using mature methodologies for weapon system common reference architectures. Build and implement a strategy to manage OSD's & NSA's requests on DAF weapon systems' cyber vulnerability and mitigation activities.			
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 increased compared to FY 2021 by 5.686 million. Increase due to additional developments for F-35, Space Force, and Nuclear Weapon Center cyber mitigations and platform integration in response to the previously completed NDAA s. 1647 Critical Weapon System vulnerability assessments (virtual, physical, and cyber infrastructure). This project supports Joint Requirements			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021		
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642834 / <i>Mitigations</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Oversight Council Memorandums (JROCM) 039-16 and 094-20 for NDAA 1647 and NDAA 1640 weapon system assessments and mitigations.				
Accomplishments/Planned Programs Subtotals		15.387	31.307	36.993
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures. The government agency responsible for managing the program is the Air Force Life Cycle Management Center, Cyber Resiliency Office for Weapons Systems, Wright-Patterson Air Force Base, Ohio and Hanscom Air Force Base, Massachusetts.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
3600 / 4				PE 0604414F / Cyber Resiliency of Weapon Systems-ACS					642834 / Mitigations						
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Material Solutions for Major Weapon Systems	Various	Various : Various	-	5.797	Dec 2019	9.558	Dec 2020	13.053	Jan 2022	-		13.053	-	-	-
Material Solutions for Subsystems	Various	Various : Various	-	2.249	Dec 2019	6.279	Dec 2020	7.963	Dec 2021	-		7.963	-	-	-
Non-Materiel Solutions	Various	Various : Various	-	1.239	Dec 2019	3.768	Dec 2020	3.957	Dec 2021	-		3.957	-	-	-
Mitigation Distribution Tool	Various	Various : Various	-	0.659	Dec 2019	2.512	Dec 2020	2.730	Dec 2021	-		2.730	-	-	-
Subtotal			-	9.944		22.117		27.703		-		27.703	-	-	N/A
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MITRE	Various	Various : Bedford, MA	-	-		3.000	Jan 2021	3.000	Jan 2022	-		3.000	-	-	-
Defense Technical Information Center (DTIC)	Various	Various : Various	-	0.240	Jan 2020	0.240	Jan 2021	0.240	Jan 2022	-		0.240	-	-	-
Gartner	Various	Various : Various	-	0.485	Dec 2019	0.600	Nov 2020	0.600	Nov 2021	-		0.600	-	-	-
Subtotal			-	0.725		3.840		3.840		-		3.840	-	-	N/A
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS, Travel, Government Purchase Card	Various	Various : Various	-	4.718	Oct 2019	5.350	Dec 2020	5.450	Dec 2021	-		5.450	-	-	-
Subtotal			-	4.718		5.350		5.450		-		5.450	-	-	N/A
Project Cost Totals			-	15.387		31.307		36.993		-		36.993	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force							Date: May 2021			
Appropriation/Budget Activity 3600 / 4			R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>			Project (Number/Name) 642834 / <i>Mitigations</i>				
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642834 / <i>Mitigations</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Mitigations																												
Prototype cyber mitigations on known cyber vulnerabilities																												
Identify transition plan for tested mitigations to known cyber vulnerabilities																												
Mitigation Data Repository																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642834 / <i>Mitigations</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Mitigations				
Prototype cyber mitigations on known cyber vulnerabilities	1	2020	4	2026
Identify transition plan for tested mitigations to known cyber vulnerabilities	1	2020	4	2026
Mitigation Data Repository	1	2020	4	2026

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

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642836 / <i>Mission Risk Analysis</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
642836: <i>Mission Risk Analysis</i>	-	6.838	6.897	7.461	0.000	7.461	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Discover and analyze cyber susceptibilities/vulnerabilities to Department of the Air Force (DAF) weapon systems and characterize their impacts based on mission risk. Promote the enhancement of cyber discovery methodologies and capabilities within DAF. Focus is on assessing the gaps and seams that exist between defined weapon system boundaries and within areas that are not assigned to specific weapon system program offices. This activity builds upon existing efforts that identify and mitigate cyber vulnerabilities, and does not duplicate similar ongoing efforts or conduct redundant assessments on systems that have already been evaluated. As the Acquisition/System Security Engineering activity under Project 642812 develops Cyber Focus Teams, additional, more robust assessment data sets will be generated for CROWS to continue identifying and validating vulnerabilities. This activity disseminates cyber risk information to inform acquisition decisions, provides feedback to focus future assessments and also feeds into the Mitigations activity under Project 642834.

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

	FY 2020	FY 2021	FY 2022
Title: Cyber Mission Risk Analysis	6.838	6.897	7.461
Description: Discovers, analyzes and coordinates sharing of information in support of cyber risk discovery activities for DAF weapon systems.			
FY 2021 Plans: Continue to coordinate cyber vulnerability assessments and develop a capability to provide focused assessments where required. Continue developing solutions to find, assess and share cyber vulnerabilities through an enterprise-level data analysis capability.			
FY 2022 Plans: Continue to coordinate cyber vulnerability assessments and develop a capability to provide focused assessments where required. Continue developing solutions to find, assess, and share cyber vulnerabilities through an enterprise-level data analysis capability. Establish service level cyber resiliency Red/Blue Team to augment DoD cyber vulnerability assessment by providing subject matter expertise for ongoing discovery tasks.			
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 increased compared to FY 2021 by 0.564 million. Increase to account for Department of Defense inflationary adjustments and additional emphasis on continued Cyber Mission risk analysis and discovery on weapon systems and across mission areas. Also includes increased breadth of application in assessment teams to continue 2016 NDAA s. 1647 assessment regularity as well as support service level involvement in the 2018 NDAA s. 1640 Strategic Cybersecurity Program.			
Accomplishments/Planned Programs Subtotals	6.838	6.897	7.461

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642836 / <i>Mission Risk Analysis</i>

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

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate. The government agency responsible for managing the program is the Air Force Life Cycle Management Center, Cyber Resiliency Office for Weapons Systems, Wright-Patterson Air Force Base, Ohio and Hanscom Air Force Base, Massachusetts.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642836 / <i>Mission Risk Analysis</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Mission Risk Analysis	
Develop, institutionalize and utilize a Data Aggregation & Analytics Tool (DAAT).	
Execute risk analysis and discovery on weapons systems and across mission areas. Leverage and augment existing and emerging assessment environments and tools.	
Engineer solution candidates for reducing cyber risk with DAF weapon systems.	

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / <i>Cyber Resiliency of Weapon Systems-ACS</i>	Project (Number/Name) 642836 / <i>Mission Risk Analysis</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Mission Risk Analysis</i>				
Develop, institutionalize and utilize a Data Aggregation & Analytics Tool (DAAT).	1	2020	4	2026
Execute risk analysis and discovery on weapons systems and across mission areas. Leverage and augment existing and emerging assessment environments and tools.	1	2020	4	2026
Engineer solution candidates for reducing cyber risk with DAF weapon systems.	1	2020	4	2026