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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604414F I Cyber Resiliency of Weapon Systems-ACS							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	32.253	62.618	0.000	62.618	60.667	74.535	82.947	84.458	Continuing	Continuing
642810: Cyber Workforce Development	-	0.000	10.461	17.462	0.000	17.462	19.413	19.779	20.938	21.320	Continuing	Continuing
642812: System Security Engineering	-	0.000	7.663	13.059	0.000	13.059	17.001	14.589	16.976	17.285	Continuing	Continuing
642816: Agile/Adaptable Standards	-	0.000	5.467	4.992	0.000	4.992	4.996	16.905	18.319	18.653	Continuing	Continuing
642834: Mission Assurance for Fielded Systems	-	0.000	3.245	20.925	0.000	20.925	12.419	16.353	19.129	19.478	Continuing	Continuing
642836: Mission Thread Analysis	-	0.000	5.417	6.180	0.000	6.180	6.838	6.909	7.585	7.722	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Cyber Resiliency of Weapon Systems (CRWS) for Agile Combat Support (ACS) provides funding to increase weapon systems cyber resiliency/security in all phases and activities of the acquisition life cycle by accomplishing two goals. First, CRWS integrates cyber resiliency design tenets into the systems engineering process and builds cyber resiliency into weapon systems. Second, CRWS assesses and enables modifications of fielded systems to protect them from cyber exploitation. To meet these goals, this effort addresses cyber resiliency and security gaps in five projects. The first project increases cyber security and resiliency skills, knowledge, and experience of acquisitions personnel. The second project prototypes, evaluates, and transitions cyber secure and resilient risk-informed processes, tools, products, and policies into all phases of the acquisition life cycle and sustainment. The third project develops standards for designing new weapon systems by defining a government reference architecture, providing the capability to rapidly update weapon systems cyber components in response to new cyber threats, and allowing future weapon system designers the opportunity to use open system architectures. The fourth project addresses the security and resiliency of fielded weapons systems by designing mitigations strategies and prototyping solutions for known vulnerabilities. The final project systematically reviews Air Force weapons systems' mission sets and addresses gaps in mission assurance (such as a weapon system's critical subsystem and support systems) due to evolving cyber threats.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CRWS capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program 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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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
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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 <i>Cyber Resiliency of Weapon Systems-ACS</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	40.000	32.253	51.089	0.000	51.089
Current President's Budget	0.000	32.253	62.618	0.000	62.618
Total Adjustments	-40.000	0.000	11.529	0.000	11.529
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-40.000	0.000	11.529	0.000	11.529

Change Summary Explanation

FY 2017 decrease because the FY 2017 Request for Additional Appropriations (RAA) for weapon system cyber resiliency was not appropriated.

FY 2019 increase due to acceleration of weapon systems cyber assessments and mitigation activities.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force										Date: February 2018		
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642810: <i>Cyber Workforce Development</i>	-	0.000	10.461	17.462	0.000	17.462	19.413	19.779	20.938	21.320	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification <p>The Cyber Workforce Development project prototypes, evaluates, and transitions techniques that address gaps in expertise, skills, capacity, and knowledge in cyber security and resiliency that are needed to assist acquisition professions in the performance of their acquisition life cycle and sustainment of weapon systems duties. Specifically, this project increases the knowledge and skills required to counter cyber threats to all cyber-systems within weapon systems by going beyond those skills required to only counter cyber threats to Internet Protocol network-based information systems.</p>												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2017	FY 2018	FY 2019	
Title: Increase Acquisition Workforce Cyber Expertise Description: Increases knowledge and advanced skills of acquisition workforce. FY 2018 Plans: Prototype techniques to increase cyber security/resiliency skills in the functional areas of the acquisition workforce. Prototype cyber expert cell concepts and locations. Develop and execute a recruitment and retaining strategy for skilled acquisition professionals. FY 2019 Plans: Validate/approve cyber expert cell (now called Cyber Resiliency Support Team) proof-of-concept based on value added to program offices. Initiate a second CRST at an acquisition base. Continue development and fielding of cyber training, establish an Air Force weapons system cyber training curriculum, and establish cross-service training, collaboration and standardization. Continue cyber security personnel recruiting/retaining strategy efforts. FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increased compared to FY 2018 by \$7.001 million. Justification for this increase is due to an Air Force emphasis on weapon system cyber resiliency across this program.									0.000	10.461	17.462	
Accomplishments/Planned Programs Subtotals									0.000	10.461	17.462	
C. Other Program Funding Summary (\$ in Millions) N/A												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
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>
C. Other Program Funding Summary (\$ in Millions) 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. E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
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>			

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
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
AF Acquisition Cyber CRST support	Various	AFMC : TBD	-	0.000		6.931	Feb 2018	15.462	Oct 2018	-		15.462		Continuing	Continuing	-
AF Acquisition Workforce	Various	AFMC : TBD	-	0.000		3.530	Feb 2018	2.000	Oct 2018	-		2.000		Continuing	Continuing	-
Subtotal			-	0.000		10.461		17.462		-		17.462		Continuing	Continuing	N/A

Remarks
 This project is a new start in FY 2018.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000	10.461	17.462	-	17.462	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force			Date: February 2018		
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 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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>																												
Cyber Resiliency Support Team (CRST) (Operating Location 1 - Wright Patterson Air Force Base)																												
Cyber Resiliency Support Team (CRST) (Operating Location 2,3,4 - TBD)																												
Initial Cyber Awareness Training development, fielding and instruction																												
Continue to mature cyber training to include new course development/fielding/instruction, establish Air Force cyber course curriculum, and initiate cross-service training sharing and standardization																												
Recruit/retain cyber security professionals																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
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>				
Cyber Resiliency Support Team (CRST) (Operating Location 1 - Wright Patterson Air Force Base)	2	2018	4	2023
Cyber Resiliency Support Team (CRST) (Operating Location 2,3,4 - TBD)	1	2019	4	2023
Initial Cyber Awareness Training development, fielding and instruction	2	2018	4	2023
Continue to mature cyber training to include new course development/fielding/ instruction, establish Air Force cyber course curriculum, and initiate cross-service training sharing and standardization	1	2019	4	2023
Recruit/retain cyber security professionals	2	2018	4	2023

Note

This project is a new start in FY 2018.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / Cyber Resiliency of Weapon Systems-ACS				Project (Number/Name) 642812 / System Security Engineering			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642812: System Security Engineering	-	0.000	7.663	13.059	0.000	13.059	17.001	14.589	16.976	17.285	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The System Security Engineering project prototypes, evaluates, and transitions cyber secure and resilient risk-informed processes, tools, products, and policies into all phases and activities of the acquisition life cycle and sustainment processes used to acquire and maintain weapon systems. This activity bolsters Air Force cyber resiliency and cyber security by developing a common security environment, system security engineering processes and policies, acceptance criteria used when acquiring weapon systems, contracting language, and intelligence collection skills and processes to provide intelligence on cyber threats to the weapons system user and acquisition community.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2017	FY 2018	FY 2019	
Title: Prototype, Evaluate, and Transition System Security Engineering									-	7.663	13.059	
Description: Prototypes, evaluates, and transitions cyber security and resiliency activities into policy, processes, products, and people.												
FY 2018 Plans: Prototype a common cyber security environment for sharing of cyber information related to weapon systems across the Air Force. Prototype improvements in intelligence collection skills and processes to identify cyber threats to weapon systems. Prototype products, tools, policy, and processes to integrate cyber security and resiliency in all phases and activities of the acquisition life cycle and sustainment of weapon systems.												
FY 2019 Plans: Continue prototyping a common cyber security environment for sharing of cyber information across Air Force weapon systems. Continue to refine and execute intelligence collection/analysis to identify cyber threats. Deliver product prototypes, tools, policy and processes to integrate cyber resiliency/security in all phases and activities of weapon system acquisition.												
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increased compared to FY 2018 by \$5.396 million. Justification for this increase is due to an Air Force emphasis on weapon system cyber resiliency across this program.												
Accomplishments/Planned Programs Subtotals									-	7.663	13.059	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
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>System Security Engineering</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.		
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
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>System Security Engineering</i>					

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
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
Common cyber security enviroment	Various	LCMC : TBD	-	-		2.600	Feb 2018	3.057	Oct 2018	-		3.057	Continuing	Continuing	-
Products, policy, and processes in the acqusition life cycle and sustainment process	Various	LCMC : TBD	-	-		3.963	Feb 2018	7.802	Oct 2018	-		7.802	Continuing	Continuing	-
Intel collection skills to identify cyber threats to weapon systems	Various	LCMC : TBD	-	-		1.100	Feb 2018	2.200	Oct 2018	-		2.200	Continuing	Continuing	-
Subtotal			-	-		7.663		13.059		-		13.059	Continuing	Continuing	N/A

Remarks
 This project is a new start in FY 2018.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-	7.663	13.059	-	13.059	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force			Date: February 2018		
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>System Security Engineering</i>	

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
System Security Engineering																												
1. Prototype and deliver common cyber security environment at selected locations #1-3																												
2. Design and deliver common cyber security environment at remaining locations																												
3. Prototype, evaluate, and transition cyber security design requirements																												
4. Prototype, evaluate, and transition cyber security contractual language requirements																												
5. Repeat steps 3 and 4 every 2 years to stay current with rapidly evolving threat advances																												
6. Improve quality and timeliness of intelligence collection process for collection of cyber threats to weapon systems																												
7. Provide intelligence collection supporting CRWS activities, program offices, and user community on a continuing basis																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
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>System Security Engineering</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>System Security Engineering</i>				
1. Prototype and deliver common cyber security environment at selected locations #1-3	2	2018	4	2018
2. Design and deliver common cyber security environment at remaining locations	2	2018	4	2023
3. Prototype, evaluate, and transition cyber security design requirements	2	2018	4	2022
4. Prototype, evaluate, and transition cyber security contractual language requirements	2	2018	4	2022
5. Repeat steps 3 and 4 every 2 years to stay current with rapidly evolving threat advances	4	2022	4	2023
6. Improve quality and timeliness of intelligence collection process for collection of cyber threats to weapon systems	2	2018	4	2022
7. Provide intelligence collection supporting CRWS activities, program offices, and user community on a continuing basis	2	2018	4	2023

Note

This project is a new start in FY 2018.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / Cyber Resiliency of Weapon Systems-ACS				Project (Number/Name) 642816 / Agile/Adaptable Standards			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642816: Agile/Adaptable Standards	-	0.000	5.467	4.992	0.000	4.992	4.996	16.905	18.319	18.653	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The Agile/Adaptable Standards project prototypes, evaluates, and transitions open mission standards for use in weapon systems to address gaps created by not having a government reference architecture (GRA) for avionics systems and position, navigation, and timing (PNT) systems. The policies, processes, and products will be prototyped, evaluated, and transitioned to allow for designers to build agile and adaptable cyber secure/resilient systems, subsystems, and support systems. In addition, concepts in improving workforce skills, knowledge, and expertise will be prototyped, evaluated, and transitioned to enable the efficient and effective institutionalization of resultant GRAs into all phases and activities of the acquisition life cycle and sustainment of weapon systems. Systems designed with GRA will facilitate responsive updates to new and evolving threats.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2017	FY 2018	FY 2019	
Title: Agile and Adaptable Standards									-	5.467	4.992	
Description: Develop, prototype, evaluate, and transition agile and adaptable system standards for integration into Air Force weapon systems.												
FY 2018 Plans:												
Prototype open system architecture components for use in advanced avionics systems and position, navigation, and timing (PNT) systems. Prototype techniques to increase cyber security/resiliency acquisition skills, knowledge, and expertise needed for the workforce to facilitate the institutionalizing of government reference architectures enabling adaptive and agile designs for weapons systems.												
FY 2019 Plans:												
Continue prototyping open system architecture components for use in advanced avionics systems and PNT systems. Prototype techniques and methodologies to increase cyber security features of GRAs and open standards. Prototype the use of alternative navigation techniques and software defined receivers.												
FY 2018 to FY 2019 Increase/Decrease Statement:												
FY 2019 decreased compared to FY 2018 by \$0.475 million. Justification for this decrease is provided in the FY 2019 plans above.												
Accomplishments/Planned Programs Subtotals									-	5.467	4.992	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
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>
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.		
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
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>					

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
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
Prototype open system architecture components	C/Various	AFLCMC : NV	-	0.000		5.467	Feb 2018	4.992	Oct 2018	-		4.992		Continuing	Continuing	-
Subtotal			-	0.000		5.467		4.992		-		4.992		Continuing	Continuing	N/A

Remarks This project is a new start in FY 2018.																
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			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.000		5.467		4.992		-		4.992	Continuing	Continuing	N/A

Remarks																
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force																Date: February 2018			
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 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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>Agile/Adaptable Standards</i>																												
Develop and update open systems architecture processes																												
Prototype open system architecture components																												
Prototype and update open standards																												
Conduct open systems architecture pathfinders																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
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>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Agile/Adaptable Standards</i>				
Develop and update open systems architecture processes	2	2018	1	2022
Prototype open system architecture components	2	2018	1	2019
Prototype and update open standards	2	2018	3	2022
Conduct open systems architecture pathfinders	2	2018	4	2023

Note

This project is a new start in FY 2018.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / Cyber Resiliency of Weapon Systems-ACS				Project (Number/Name) 642834 / Mission Assurance for Fielded Systems			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642834: Mission Assurance for Fielded Systems	-	0.000	3.245	20.925	0.000	20.925	12.419	16.353	19.129	19.478	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The Mission Assurance for Fielded Systems project identifies and verifies weapon system cyber susceptibilities/vulnerabilities and determines the risk to the user, platform, and enterprise by correlating cross-platform impacts and risk to the mission. This effort also identifies mitigations to high risk cyber vulnerabilities and recommends a transition path on the fielded weapon systems, subsystems, and support systems. Activities in this project include: 1) the investigation and identification of changes to Tactics, Techniques, and Procedures (TTPs) and 2) the investigation and prototyping of engineering solutions not effectively mitigated by TTPs to transfer to the program offices for development on their weapon systems, subsystems, and support systems. This project addresses the gap between the cyber security/resiliency that has been accomplished on traditional internet protocol (IP)-based Information Technology (IT) for the Department of Defense Information Network (DODIN) and lack of focused effort of cyber security/resiliency on non-DODIN IT plus non-IP based technologies typically found on fielded weapon systems, subsystems, and support systems.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2017	FY 2018	FY 2019	
Title: Cyber Susceptibility/Vulnerability Evaluations and Mitigation Prototyping									-	3.245	20.925	
Description: Evaluate weapon systems and previous cyber security assessments to identify, validate, and prioritize cyber vulnerabilities and susceptibilities. Partner with system owner and acquisition program office to develop common mitigation prototype solutions.												
FY 2018 Plans: Evaluate fielded weapon systems, subsystems, and support systems for cyber susceptibilities and vulnerabilities. Prototype mitigations for cyber vulnerabilities on fielded weapon systems, subsystems and support systems in realistic, high fidelity environments.												
FY 2019 Plans: Continue assessment of fielded weapon systems, subsystems, and support systems for cyber susceptibilities and vulnerabilities (including assessments of fielded weapon systems' hardware assurance, software assurance, and supply chain risk management postures). Continue prototyping mitigations for cyber vulnerabilities on fielded weapon systems, subsystems and support systems in realistic, high fidelity environments. Initiate identification of common cyber vulnerabilities on fielded weapons systems and partner with the system owner and acquisition program office to prototype common mitigation prototypes.												
FY 2018 to FY 2019 Increase/Decrease Statement:												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018	
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>Mission Assurance for Fielded Systems</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018
FY 2019 increase compared to FY 2018 by \$17.680 million. Justification due to an Air Force emphasis on weapon system cyber resiliency across this program.			
Accomplishments/Planned Programs Subtotals		-	20.925
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. E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.			

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
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>Mission Assurance for Fielded Systems</i>					

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
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
Evaluate weapon systems for cyber vulnerabilities	Various	AFLCMC : NV	-	0.000		1.509	Feb 2018	5.925	Oct 2018	-		5.925	Continuing	Continuing	-
Prototype cyber vulnerability mitigations	Various	AFLCMC : NV	-	0.000		1.736	Feb 2018	15.000	Oct 2018	-		15.000	Continuing	Continuing	-
Subtotal			-	0.000		3.245		20.925		-		20.925	Continuing	Continuing	N/A

Remarks
 This project is a new start in FY 2018.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		3.245		20.925		-		20.925	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force			Date: February 2018		
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>Mission Assurance for Fielded Systems</i>

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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>Mission Assurance for Fielded Systems</i>																												
Prototype cyber mitigations on known cyber vulnerabilities																												
Identify transition plan for tested mitigations to known cyber vulnerabilities																												
Perform cyber assessment of weapon systems, subsystems, and support systems																												
Verify and determine risk of cyber vulnerabilities found during weapon system assessments																												
Prototype cyber mitigations on high risk cyber vulnerabilities found during weapon system assessments																												
Identify transition plan for tested mitigations to cyber vulnerabilities found during weapons system assessments																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
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>Mission Assurance for Fielded Systems</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Mission Assurance for Fielded Systems</i>				
Prototype cyber mitigations on known cyber vulnerabilities	2	2018	2	2020
Identify transition plan for tested mitigations to known cyber vulnerabilities	1	2020	3	2020
Perform cyber assessment of weapon systems, subsystems, and support systems	2	2018	4	2023
Verify and determine risk of cyber vulnerabilities found during weapon system assessments	3	2018	4	2023
Prototype cyber mitigations on high risk cyber vulnerabilities found during weapon system assessments	2	2019	4	2023
Identify transition plan for tested mitigations to cyber vulnerabilities found during weapons system assessments	3	2021	4	2023

Note

Additional schedule details can be provided in the appropriate forum. This project is a new start in FY 2018.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604414F / Cyber Resiliency of Weapon Systems-ACS				Project (Number/Name) 642836 / Mission Thread Analysis			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642836: Mission Thread Analysis	-	0.000	5.417	6.180	0.000	6.180	6.838	6.909	7.585	7.722	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The Cyber Mission Thread Analysis (CMTA) project establishes an analytical approach for prioritizing where the Air Force should perform detailed cyber investigations based on potential mission impact. The results generated by the analytical approach will provide a system-of-systems mission context for prioritizing cyber vulnerability assessments and risk mitigation strategies and tactics, within programs and across the Air Force enterprise to improve mission assurance and effectiveness in a cyber-contested environment. Activities include investigating existing methodologies, prototyping an analytical process, prototyping software support tools, and building upon that to institutionalize CMTA in our acquisition processes. These activities will provide a common, repeatable, mission level cyber analytical methodology. Each CMTA will identify the functions performed, participating systems, and top level interactions among all relevant participants from the user's point of view. By understanding operational intent, mission dependencies, and the cyber risk landscape, operational and technology experts from various disciplines including acquisition, development, operational support, and sustainment can make objective statements about mission impact and task outcomes, as well as assess potential mitigations.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2017	FY 2018	FY 2019	
Title: Cyber Mission Thread Analysis									0.000	5.417	6.180	
Description: Prototypes, evaluates, and transitions methodologies, tools, and equipment in support of cyber threat for mission threads analyses.												
FY 2018 Plans: Prototype CMTA methodology, analytical/visualization tools, and data repository. Evaluate Air Refueling and Global Strike mission threads to: 1) validate the methodology and tools; and 2) support program offices' cyber evaluations. Identify next priority missions for analysis.												
FY 2019 Plans: Initiate CMTAs on missions prioritized in FY 2018 to support program offices and to improve tools and data sharing. Evaluate the effectiveness of the methodology, tools and repository, and update as required.												
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increased compared to FY 2018 by \$0.763 million. Justification for this increase is described in the FY 2019 plans above.												
Accomplishments/Planned Programs Subtotals									0.000	5.417	6.180	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
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 Thread 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.		
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
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 Thread Analysis</i>					

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
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
Prototype cyber threat and functional mission thread analysis methodologies, techniques, and tools	Various	AFLCMC : NV	-	0.000		2.417	Feb 2018	3.180	Oct 2018	-		3.180	Continuing	Continuing	-
Evaluate cyber threat for Air Refueling Mission Thread	Various	AFLCMC : NV	-	0.000		1.500	Feb 2018	1.500	Oct 2018	-		1.500	Continuing	Continuing	-
Evaluate cyber threats for Global Strike Mission Thread	Various	AFLCMC : NV	-	0.000		1.500	Feb 2018	1.500	Oct 2018	-		1.500	Continuing	Continuing	-
Subtotal			-	0.000		5.417		6.180		-		6.180	Continuing	Continuing	N/A

Remarks This project is a new start in FY 2018.															
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			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.000		5.417		6.180		-		6.180	Continuing	Continuing	N/A

Remarks This project is a new start in FY 2018.															
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force																Date: February 2018			
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 Thread Analysis</i>			

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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>Mission Thread Analysis</i>																												
Prototype cyber threat to mission thread analysis methodologies, techniques, tools and equipment																												
Prioritize and conduct cyber mission thread analyses																												
Institutionalize cyber mission thread analysis into policies and processes																												
Establish cyber tool set and update libraries																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
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 Thread Analysis</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Mission Thread Analysis</i>				
Prototype cyber threat to mission thread analysis methodologies, techniques, tools and equipment	2	2018	2	2020
Prioritize and conduct cyber mission thread analyses	2	2018	1	2021
Institutionalize cyber mission thread analysis into policies and processes	3	2020	3	2021
Establish cyber tool set and update libraries	2	2018	4	2023

Note

This project is a new start in FY 2018.