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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0208088F / <i>AF Defensive Cyberspace Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	36.953	38.609	15.165	0.000	15.165	18.726	17.601	15.098	15.375	Continuing	Continuing
677820: <i>Computer Security RDTE: Firestarter</i>	-	21.308	25.264	6.524	0.000	6.524	8.655	7.942	6.902	7.028	Continuing	Continuing
677821: <i>Cyberspace Vulnerability Assessment</i>	-	14.080	11.745	7.015	0.000	7.015	8.412	7.970	6.477	6.597	Continuing	Continuing
677822: <i>Cyber Defense Analysis</i>	-	0.268	0.274	0.279	0.000	0.279	0.285	0.290	0.295	0.300	Continuing	Continuing
677823: <i>AFCERT</i>	-	1.297	1.326	1.347	0.000	1.347	1.374	1.399	1.424	1.450	Continuing	Continuing

A. Mission Description and Budget Item Justification

AF Defensive Cyberspace Operations (AF DCO) provides defensive cyber capabilities that protect the AFNET and DoD network enclaves, to include their associated computer systems, software applications and sensitive operational information against unauthorized intrusion, corruption, and/or destruction. The emphasis of the program is directed toward defensive cyberspace capabilities, computer and network systems security, damage assessment and recovery, cyber threat recognition, attribution, and mitigation, and active response methodologies in response to evolving threats and changes to cyber environment. These areas of emphasis are realized through research and development, test and acquisition in the areas of proactive defense, defensive counter cyberspace, cyberspace intelligence, surveillance and reconnaissance, command and control situational awareness, persistent network operations, as well as decision support, recovery, and digital forensics.

Firestarter utilizes cyber and Information Assurance (IA) technology investments by US Cyber Command, the Defense Advanced Research Projects Agency (DARPA), the National Security Agency (NSA), Director of National Intelligence (DNI), Intelligence Advanced Research Projects Activity (IARPA), the Department of Homeland Security (DHS), and various government research laboratories, to jump-start its development of solutions to existing Air Force cyber and IA requirements. This program supports AF Cyberspace strategic direction in support of Cyber Defense which provides capabilities to 16th AF, as AF component to US Cyber Command (USCYBERCOM), Defense Information Systems Agency (DISA), National Security Agency (NSA), and other services to ensure Global Information Grid (GIG) cyber and IA requirements are being met. Activities performed include those designed to identify, analyze, test, rapidly acquire, and integrate emerging IA and cyber technology and defensive cyberspace weapons systems and capabilities into all regions of the GIG - terrestrial, airborne, and space systems. In addition, this effort will support implementation of DoD Enterprise-wide IA & Computer Network Defense (CND) Solutions Steering Group (ESSG) solutions. Current Air Force systems, such as the AFNET NIPRNet Gateways, SIPRNet Modernization program, and Host Based Security System leverage this technology to meet their information assurance and defensive cyberspace needs/requirements.

Cyberspace Vulnerability Assessment/ Hunter Team (CVA/H) weapon system develops new capabilities to provide Air Force Cyber Command (AFCYBER) and Combatant Commanders additional mobile precision in addition to currently fielded protection capabilities to identify, pursue, and mitigate cyberspace threats. The CVA/H weapon system performs defensive sorties world-wide via remote or on-site access. CVA/H executes vulnerability, compliance, defense and non-technical assessments, best practice reviews, penetration testing and Hunter missions of AF and DoD networks and systems. Hunter operations characterize and then eliminate threats for the purpose of mission assurance. The Hunter mission focuses on the capability to find, fix, track, target, engage, and assess (F2T2EA) the advanced

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<p>persistent threat (APT). This effort funds the development efforts to enhance command and control situational awareness and to expand the capability of the current weapon system to meet the scope and scale of USCYBERCOM directed Cyber Protection Teams and AF Mission Defense Teams.</p> <p>Cyberspace Defense Analysis (CDA) is an assessment of non-secure telecommunications to determine type and amount of sensitive and/or classified information that may have been disclosed to our adversaries and encompasses the following mission subsets: Telephony Communications, Radio Frequency (RF) Communications, Email Communications, Internet based Capabilities (IbC), and Cyber Operations Risk Assessment (CORA). CDA is the cyberspace weapon system that is used to conduct assessments during peace time and contingency operations. CDA shows its true capability in the force protection realm and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations. FY21 funding is essential in developing new capabilities to combat the rapidly evolving cyber threat.</p> <p>The AF Cyberspace Defense (ACD) weapon system is designed to prevent, detect, and respond to adversarial penetration into AF unclassified and classified networks. ACD supports Air Force and Combatant Commanders by conducting synchronized Defensive Cyber Operations (DCO) and providing 24/7/365 monitoring and defense of USAF and US Central Command Secure/Non-secure Internet Protocol Router Network (SIPRNET/NIPRNET) systems against hostile attack. Daily intrusions to the AF network are analyzed in a forensics manner to identify a multitude of counter defensive and defensive tools and techniques that are required to truly strengthen cyber security. The Air Force Research Laboratory (AFRL), Air Force CyberWorx and other Federal R&D entities often have cutting edge solutions, that, with Research and Development funding, can be taken to the technology readiness level (TRL) needed for rapid deployment as new capability to counter critical cyber weapon system vulnerabilities. AFCERT Funding for this effort will focus on development of capability, capacity, and potential modifications to increase the utility of the ACD weapon system to the warfighter as well as testing requirements for new capabilities.</p> <p>Activities include studies and analysis to support both current program planning and execution and future program planning.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver Air Force Defensive Cyberspace Operations weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.</p> <p>The FY 2021 funding request was reduced by \$1.654 million to account for the availability of prior year execution balances.</p> <p>This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.</p>		

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	38.387	16.609	16.819	0.000	16.819
Current President's Budget	36.953	38.609	15.165	0.000	15.165
Total Adjustments	-1.434	22.000	-1.654	0.000	-1.654
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	22.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.434	0.000			
• Other Adjustments	0.000	0.000	-1.654	0.000	-1.654

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

Project: 677820: *Computer Security RDTE: Firestarter*

Congressional Add: *Internet of Things Research*

Congressional Add: *Transportation Research*

Congressional Add: *Critical Infrastructure Cyber Security*

Congressional Add: *Cyber Resilient Space Architecture*

Congressional Add Subtotals for Project: 677820

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	7.500	-
	7.500	-
	-	10.000
	-	12.000
Congressional Add Subtotals for Project: 677820	15.000	22.000
Congressional Add Totals for all Projects	15.000	22.000

Change Summary Explanation

The FY 2021 funding request was reduced by \$1.654 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677820 / Computer Security RDTE: Firestarter			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
677820: Computer Security RDTE: Firestarter	-	21.308	25.264	6.524	0.000	6.524	8.655	7.942	6.902	7.028	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Firestarter program provides newly improved capabilities and technical transition opportunities for Cyber Defense and Information Assurance (IA) technologies and tools needed to defend Air Force Command, Control, Communications, Computer, and Intelligence (C4I) systems from cyber attacks, while ensuring recovery in the event of an attack. The emphasis of the program is directed toward defensive cyberspace capabilities; computer and network systems security; damage assessment and recovery; cyber threat recognition, attribution, and mitigation; and active response methodologies in response to evolving threats and changes to cyber environment. These areas of emphasis are realized through research and development, test and acquisition in the areas of proactive defense, defensive counter cyberspace, cyberspace intelligence, surveillance and reconnaissance & situational awareness, persistent network operations, as well as decision support, recovery, and digital forensics. Current Air Force systems, such as the AFNET NIPRNet Gateways, SIPRNet Modernization program, and Host Based Security System leverage this technology to meet their information assurance and defensive cyberspace needs/requirements.

Firestarter utilizes cyber and IA technology investments by US Cyber Command, the Defense Advanced Research Projects Agency (DARPA), the National Security Agency (NSA), Director of National Intelligence (DNI), Intelligence Advanced Research Projects Activity (IARPA), and the Department of Homeland Security (DHS), and various government research laboratories, to jump-start its development of solutions to existing Air Force cyber and IA requirements. This program supports AF Cyberspace strategic direction in support of Cyber Defense which provides capabilities to 16th AF, as AF component to US Cyber Command (USCYBERCOM), Defense Information Systems Agency (DISA), National Security Agency (NSA), and other services to ensure Global Information Grid (GIG) cyber and IA requirements are being met. Activities performed include those designed to identify, analyze, test, rapidly acquire, and integrate emerging IA and cyber technology and defensive cyberspace weapons systems and capabilities into all regions of the GIG - terrestrial, airborne, and space systems. In addition, this effort will support implementation of DoD Enterprise-wide Information Assurance (IA) & Computer Network Defense (CND) Solutions Steering Group (ESSG) solutions.

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Cyber Forensic Tools & Methodologies	1.500	0.812	1.400	-	1.400
Description: Cyber forensic tools & methodologies. Includes initial metrics for reliable info assurance; secure coalition cyber data management, collaboration and visualization; analysis of cyber security bots					

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>FY 2020 Plans: - Continue the development, enhancement, and transition of incident response data gathering and attack attribution technologies</p> <p>FY 2021 Base Plans: - Will continue the development, enhancement, and transition of incident response data gathering and attack attribution technologies</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased to meet need for cyber forensic tools to counter emerging threats.</p>					
<p>Title: Cyber Threat Recognition</p> <p>Description: Enhancing cyber platform technology to identify zero-day threats in real time.</p> <p>FY 2020 Plans: - Continue to normalize and automate methods and procedures to identify zero day cyber threats prior to system compromise</p> <p>FY 2021 Base Plans: - Will continue to normalize and automate methods and procedures to identify zero day cyber threats prior to system compromise</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased for additional cyber threat recognition requirements.</p>	1.411	0.626	1.599	-	1.599
<p>Title: Cyber Threat Attribution & Mitigation</p> <p>Description: Includes risk mitigation techniques for wireless networks and systems; active response, dynamic policy enforcement and computer/net attack attribution efforts.</p> <p>FY 2020 Plans: - Continue to mature, enhance, and integrate developmental concepts to attribute cyber patterns, techniques, behaviors, and signatures to specific threat actors and identify mitigation strategies for each</p> <p>FY 2021 Base Plans:</p>	0.750	0.700	0.815	-	0.815

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will continue to mature, enhance, and integrate developmental concepts to attribute cyber patterns, techniques, behaviors, and signatures to specific threat actors and identify mitigation strategies for each FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to increased need for attribution & mitigation of foreign and criminal actors in Air Force networks and systems.					
Title: Transition of Cyber and Information Assurance Technologies Description: Transition cyber defense technologies that support AF Defensive Cyber Operations architecture. Includes space systems cyber solutions; terrestrial net defense technology development; airborne IP network cyber and IA tools; IA/cyber modeling & simulation; secure interoperable distributed agent computing, and others that relate to defending the AF networks. FY 2020 Plans: - Continue enhancing and transitioning customer funded cyber and IA technology to operational USAF components in accordance with rapid requirements documentation FY 2021 Base Plans: - Will continue enhancing and transitioning customer funded cyber and IA technology to operational USAF components in accordance with rapid requirements documentation FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to higher pace of transition of IA technologies for the defense of AF networks against emerging cyber threats.	2.647	1.126	2.710	-	2.710
Accomplishments/Planned Programs Subtotals	6.308	3.264	6.524	-	6.524

	FY 2019	FY 2020
Congressional Add: Internet of Things Research FY 2019 Accomplishments: - Craft and execute integrated Internet of Things research and development plan - Perform research, develop test configurations, conduct assessments, and complete technical reports on multiple classes of Internet of Things devices	7.500	-
Congressional Add: Transportation Research	7.500	-

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	FY 2019	FY 2020
FY 2019 Accomplishments: - Craft and execute integrated transportation research and development plan - Perform research, develop basic test configurations, conduct assessments, and complete technical reports on a variety of Air Force transportation methods		
Congressional Add: Critical Infrastructure Cyber Security FY 2020 Plans: - Craft and execute Critical Infrastructure Cyber Security research and development plan - Perform research; develop test plans, exercises, and security configurations; conduct assessments; and complete technical reports on a variety of Air Force critical infrastructure and interfaces	-	10.000
Congressional Add: Cyber Resilient Space Architecture FY 2020 Plans: - Craft and execute cyber resilient space architecture research and development plan - Perform research; develop security profiles, integrate developmental concepts and enhance security configurations; conduct assessments; and complete technical reports on a variety of space system architectures - Transition cyber technologies for use in space enterprise	-	12.000
Congressional Adds Subtotals	15.000	22.000

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

N/A

Remarks

D. Acquisition Strategy

Firestarter conducts late stage Science and Technology (S&T) for tech demo and tech transition to warfighter employment. All contracts within this project are awarded using full and open competition and utilize evolutionary capability and incremental development. Where appropriate, collaborative efforts are conducted with services and agencies within the USAF to result in more robust and cost effective solutions. Contracting activities are primarily done through other agencies when deemed more advantageous. All aspects of the Firestarter project are managed by the Air Force Research Laboratory.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677820 / Computer Security RDTE: Firestarter
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Firestarter Development	C/CPFF	Various : Various	-	17.221	Jan 2019	23.710	Jan 2020	3.427	Jan 2021	-		3.427	Continuing	Continuing	-
Firestarter Integration	C/CPFF	Various : Various	-	2.271	Jan 2019	0.638	Jan 2020	1.499	Jan 2021	-		1.499	Continuing	Continuing	-
Subtotal			-	19.492		24.348		4.926		-		4.926	Continuing	Continuing	N/A

Remarks
Multiple contractors and multiple universities reflect on-going efforts with over a dozen contractors and universities. Each has a different contract date depending on when that particular contract was awarded.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Firestarter Testing	C/CPFF	Various : Various	-	1.369	Jan 2019	0.691	Jan 2020	1.373	Jan 2021	-		1.373	Continuing	Continuing	-
Subtotal			-	1.369		0.691		1.373		-		1.373	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Firestarter PMA	C/CPFF	Various : Various	-	0.447	Jan 2019	0.225	Jan 2020	0.225	Jan 2021	-		0.225	Continuing	Continuing	-
Subtotal			-	0.447		0.225		0.225		-		0.225	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	21.308	25.264	6.524	-	6.524	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Firestarter	
Cyber Forensic Tools & Methodologies	
Cyber Threat Recognition	
Cyber Threat Attribution & Mitigation	
Transition of Cyber/IA Technologies	
Internet of Things Research	
Transportation Research	
Critical Infrastructure Cyber Security	
Cyber Resilient Space Architecture	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677820 / Computer Security RDTE: Firestarter

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Firestarter				
Cyber Forensic Tools & Methodologies	1	2019	4	2025
Cyber Threat Recognition	1	2019	4	2025
Cyber Threat Attribution & Mitigation	1	2019	4	2025
Transition of Cyber/IA Technologies	1	2019	4	2025
Internet of Things Research	1	2019	2	2020
Transportation Research	1	2019	2	2020
Critical Infrastructure Cyber Security	2	2020	3	2021
Cyber Resilient Space Architecture	2	2020	3	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677821 / Cyberspace Vulnerability Assessment			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
677821: <i>Cyberspace Vulnerability Assessment</i>	-	14.080	11.745	7.015	0.000	7.015	8.412	7.970	6.477	6.597	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This requirement supports the Cyberspace Vulnerability Assessment / Hunter Team (CVA/H) weapon system development of new capabilities to provide Air Force Cyber Command (AFCYBER) and Combatant Commanders additional mobile precision in addition to currently fielded protection capabilities to identify, pursue, and mitigate cyberspace threats. The CVA/H weapon system performs defensive sorties world-wide via remote or on-site access. CVA/H executes vulnerability, compliance, defense and non-technical assessments, best practice reviews, penetration testing and Hunter missions on AF and DoD networks & systems. Hunter operations characterize and then eliminate threats for the purpose of mission assurance. The Hunter mission focuses on the capability to find, fix, track, target, engage, and assess (F2T2EA) the advanced persistent threat (APT). This effort funds development efforts to enhance command and control situational awareness and to expand the capability of the current weapon system to meet scope and scale of the USCYBERCOM directed Cyber Protection Teams and AF Mission Defense Teams.

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Cyber Threat Mitigation	0.800	0.800	0.400	0.000	0.400
Description: Cyber Threat Mitigation includes vulnerability, compliance, defense and non-technical assessments, best practice reviews, penetration testing and supports Cyberspace Vulnerability Assessment/ Hunter (CVA/H) missions in support of Air Force Cyber Command and Combatant Commanders.					
FY 2020 Plans: - Continue development and integration of technologies to conduct vulnerability assessments, network intrusion analysis and systems vulnerability analysis					
FY 2021 Base Plans: -Will continue development and integration of technologies to conduct vulnerability assessments, network intrusion analysis and systems vulnerability analysis					
FY 2021 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677821 / Cyberspace Vulnerability Assessment			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to mission prioritization for vulnerability assessments					
Title: Defensive Next Generation Development	12.280	9.945	5.615	-	5.615
Description: Development and integration of solutions supporting defensive cyber modernization and AF Cyber Needs Forms in the area of DCO capabilities and technologies to meet capability gaps required by Cyber Protection Teams and Mission Defense Teams.					
FY 2020 Plans: - Continue development and integration to support modernization of DCO capabilities and technologies to support Cyber Protection Teams and Mission Defense Teams					
FY 2021 Base Plans: - Will continue development and integration to support modernization of DCO capabilities and technologies to support Cyber Protection Teams and Mission Defense Teams					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to the availability of prior year execution balances					
Title: Test & Evaluation	1.000	1.000	1.000	0.000	1.000
Description: Test and Evaluation					
Description: Test and Evaluation provides both developmental testing of new capabilities and the test environments for validating the capabilities.					
FY 2020 Plans: - Continue developmental testing for DCO capability products and technologies prior to fielding					
FY 2021 Base Plans: -Will continue development testing for DCO capability products and technologies prior to fielding					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
Accomplishments/Planned Programs Subtotals	14.080	11.745	7.015	0.000	7.015

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 831010: <i>Comsec Equipment</i>	28.803	12.654	-	-	-	-	-	-	-	-	Continuing
• OPAF 03 834320: <i>C3 Countermeasures</i>	-	-	32.436	-	32.436	43.513	40.974	41.140	5.366	Continuing	Continuing

Remarks
Beginning in FY21 associated OPAF realigned from COMSEC Equipment WSC to C3 Countermeasures WSC for clarity in reporting.

D. Acquisition Strategy
The Cyberspace Vulnerability Assessment Hunter (CVA/H) program office will utilize Concept, Development, Risk Management, or Production and Deployment Plans as part of a phased approach to acquisition planning. All plans will contain sufficient information for the Milestone Decision Authority (MDA) to determine readiness to enter into the applicable phase of the acquisition process. CVA/H Program office will utilize both new and existing contractual vehicles, in addition to existing Government-Wide Acquisition Contract (GWAC) vehicles such as Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules, Network-Centric Solutions (NETCENTs).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Cyber Threat Mitigation - Threat Intelligence	C/CPFF	Various : Various	-	0.800	Jan 2019	0.800	Jan 2020	0.400	Jan 2021	-		0.400	Continuing	Continuing	-
Defensive Next Gen - Data & Analysis	C/CPFF	Various : Various	-	1.950	Mar 2019	0.850	Mar 2020	0.716	Mar 2021	-		0.716	Continuing	Continuing	-
Defensive Next Gen - Sensor Optimization	C/FFP	Various : Various	-	1.650	Mar 2019	2.779	May 2020	1.105	May 2021	-		1.105	Continuing	Continuing	-
Defensive Next Gen - Training Simulator	C/FFP	Various : Various	-	5.724	Apr 2019	2.675	Apr 2020	0.552	Apr 2021	-		0.552	Continuing	Continuing	-
Defensive Next Gen - Data Collection and Correlation	C/FFP	Various : Various	-	1.092	Mar 2019	1.031	Mar 2020	0.666	Mar 2021	-		0.666	Continuing	Continuing	-
Defensive Next Gen - Intrusion Prevention Capabilities	C/FFP	Various : Various	-	0.690	Aug 2019	0.690	Aug 2020	0.656	Aug 2021	-		0.656	Continuing	Continuing	-
Subtotal			-	11.906		8.825		4.095		-		4.095	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Test Support	MIPR	46 Test Squadron : Eglin, FL	-	1.000	Oct 2018	1.000	Oct 2019	1.000	Oct 2020	-		1.000	Continuing	Continuing	-
Subtotal			-	1.000		1.000		1.000		-		1.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
PMA - Engineering & Technical Assistance Support Services (ETASS & FFRDC)	Various	AFLCMC/PZ : Bedford, MA	-	1.174	Jan 2019	1.920	Jan 2020	1.920	Jan 2021	-		1.920	Continuing	Continuing	-
Subtotal			-	1.174		1.920		1.920		-		1.920	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020				
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677821 / Cyberspace Vulnerability Assessment				
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals	-	14.080	11.745	7.015	-	7.015	Continuing	Continuing	N/A		

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677821 / Cyberspace Vulnerability Assessment

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Cyber Vulnerability Assessment																												
Test and Evaluation																												
Cyber Threat Mitigation																												
Defensive Next Generation Development (Data & Analysis)																												
Defensive Next Generation (Data Collection and Correlation)																												
Defensive Next Generation Sensor Optimization																												
Defensive Next Generation (Training Simulator)																												
Defensive Next Generation (Cloudshield Capabilities)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677821 / Cyberspace Vulnerability Assessment

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Cyber Vulnerability Assessment				
Test and Evaluation	1	2019	4	2025
Cyber Threat Mitigation	1	2019	4	2025
Defensive Next Generation Development (Data & Analysis)	1	2019	4	2025
Defensive Next Generation (Data Collection and Correlation)	1	2019	4	2025
Defensive Next Generation Sensor Optimization	1	2019	4	2025
Defensive Next Generation (Training Simulator)	1	2019	4	2025
Defensive Next Generation (Cloudshield Capabilities)	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677822 / Cyber Defense Analysis			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
677822: Cyber Defense Analysis	-	0.268	0.274	0.279	0.000	0.279	0.285	0.290	0.295	0.300	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Cyberspace Defense Analysis (CDA): The CDA Weapon System conducts Defensive Cyberspace Operations (DCO) and network defense by monitoring, collecting, analyzing, and reporting sensitive information transiting or residing on the AFNet. Without proper funding the CDA Operators will not be able to determine potential impacts and operational adjustments resulting from information disclosures or identify compromised information from network intrusions. There will be a decreased assurance of network defense and an increase in the amount of lost PII, OPSEC, and other sensitive information. The CDA mission subsets include: Telephony Communications, Radio Frequency (RF) Communications, Email Communications, Internet based Capabilities (IbC), and Cyber Operations Risk Assessment (CORA). CDA is the cyberspace weapon system that is used to conduct assessments during peace time and contingency operations. CDA shows its true capability in the force protection realm and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations. FY21 funding is essential in developing new capabilities to combat the rapidly evolving cyber threats.

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Cyber Defense Analysis	0.268	0.274	0.279	-	0.279
Description: Engineering support to conduct Cyberspace Defense Analysis (CDA) assessment of non-secure telecommunications during peace time and contingency operations.					
FY 2020 Plans: - Continue to support CDA technical maturation and development of technologies to prevent disclosure of sensitive and or classified information to adversaries that attempt to penetrate the network					
FY 2021 Base Plans: Continued support development of data loss prevention technologies and support insider threat detection capabilities. Support technology areas that prevent adversary's attempt to get into our networks.					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to inflation adjustment					
Accomplishments/Planned Programs Subtotals	0.268	0.274	0.279	-	0.279

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677822 / Cyber Defense Analysis

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

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	Total Cost
			Base	OCO	Total					Complete	
• OPAF 03 Line Item 831010: COMSEC Equipment	1.259	1.698	-	-	-	-	-	-	-	Continuing	Continuing
• OPAF 03 834320: C3 Countermeasures	-	-	1.699	-	1.699	10.488	10.672	10.864	3.070	Continuing	Continuing

Remarks

Beginning in FY21 associated OPAF realigned from COMSEC Equipment WSC 831010 to C3 Countermeasures WSC 834320 for clarity in reporting.

D. Acquisition Strategy

The Cyberspace Defense Analysis (CDA) Weapon System development of new capabilities to provide additional information protection capabilities to monitor, collect, analysis, and report cyberspace threats and compromised data. These capabilities encompass the support to OPSEC protection as well. The CDA program will utilize various contractual vehicles when necessary such as Government-Wide Acquisition Contract (GWAC), Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules, Network-Centric Solutions (NETCENTS) and competitive contract (if required). The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet requirements related to Defensive Cyberspace Operations.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677822 / Cyber Defense Analysis
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
CDA PMA - Engineering & Technical Assistance Support Services (ETASS & FFRDC)	Various	AFLCMC/PZ : Hanscom, MA	-	0.268	Jan 2019	0.274	Jan 2020	0.279	Jan 2021	-		0.279	Continuing	Continuing	-
Subtotal			-	0.268		0.274		0.279		-		0.279	Continuing	Continuing	N/A

Remarks
Provides program office subject matter expertise, engineering continuity, technical maturation and expertise, and access to an extensive professional network for future capabilities.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.268	0.274	0.279	-	0.279	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677822 / Cyber Defense Analysis

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Cyber Defense Analysis																												
Cyber Defense Analysis (FFRDC)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677822 / Cyber Defense Analysis

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Cyber Defense Analysis				
Cyber Defense Analysis (FFRDC)	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677823 / AFCERT			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
677823: AFCERT	-	1.297	1.326	1.347	0.000	1.347	1.374	1.399	1.424	1.450	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The AF Cyberspace Defense (ACD) weapon system and is designed to prevent, detect, and respond to adversarial penetration into AF unclassified and classified networks. ACD supports Air Force and Combatant Commanders by conducting synchronized Defensive Cyber Operations (DCO) and providing 24/7/365 monitoring and defense of USAF and US Central Command Secure/Non-secure Internet Protocol Router Network (SIPRNET/NIPRNET) systems against hostile attack. Daily intrusions to the AF network are analyzed in a forensics manner to identify a multitude of counter defensive and defensive tools and techniques that are required to truly strengthen cyber security. The Air Force Research Laboratory (AFRL), Air Force CyberWorx, and other Federal R&D entities often have cutting edge solutions, that, with Research and Development funding, take them to the technology readiness level (TRL) needed for rapid deployment as new capabilities to counter critical cyber weapon system vulnerabilities. AFCERT funding for this effort will focus on development of capability, capacity, and potential modifications to increase the utility of the ACD weapon system to the warfighter as well as testing requirements for new capabilities.

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Cyberspace Defense Development	1.297	1.326	1.347	-	1.347
Description: AF Cyberspace Defense (ACD) weapon system to prevent, detect, and respond to adversarial penetration in AF networks					
FY 2020 Plans: - Continue to develop and test technologies for the AF Cyberspace Defensive (ACD) weapon system to prevent, detect, and respond to adversarial penetration in AF networks					
FY 2021 Base Plans: - Will continue to develop and test technologies for the AF Cyberspace Defensive (ACD) weapon system to prevent, detect, and respond adversarial penetration in AF networks					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to inflation adjustment					
Accomplishments/Planned Programs Subtotals	1.297	1.326	1.347	-	1.347

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677823 / AFCERT

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 835080: AFNET	30.044	16.883	-	-	-	-	-	-	-	Continuing	Continuing
• OPAF 03 834320: C3 Countermeasures	-	-	23.860	-	23.860	35.852	36.476	37.134	1.851	Continuing	Continuing

Remarks

Beginning in FY21 associated OPAF realigned from AFNET WSC 835080 to C3 Countermeasures WSC 834320 for clarity in reporting. In FY21, Computer Security Assistance Program (CSAP) to merge into ACD baseline. Beginning in FY22, OPAF funding associated with CSAP included within ACD funding line.

D. Acquisition Strategy

The AF Cyberspace Defense (ACD) weapon system office will utilize existing contractual vehicles such as Massachusetts Institute of Technology Research and Engineering (MITRE), General Services Administration (GSA) Federal Supply Schedules, Air Force Research Laboratory (AFRL), Advisory and Assistance Services (A&AS) as well as various Test and Evaluation Enterprises. The ACD weapon system office also intends to utilize the commercial contracting community to lead the Development, Test and Integration of future Cyberspace Defense capabilities. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to the ACD mission.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677823 / AFCERT

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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>Integrated Cyber Aggregation Tool</i>																												
Cyberspace Defense Development																												
Test and Evaluation																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations	Project (Number/Name) 677823 / AFCERT

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Integrated Cyber Aggregation Tool</i>				
Cyberspace Defense Development	1	2019	4	2025
Test and Evaluation	1	2019	4	2025