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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force										Date: February 2019		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0208088F I AF Defensive Cyberspace Operations							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	19.628	38.387	16.609	0.000	16.609	16.819	18.754	17.633	15.126	Continuing	Continuing
677820: Computer Security RDTE: Firestarter	-	6.005	21.308	3.264	0.000	3.264	6.536	8.668	7.957	6.915	Continuing	Continuing
677821: Cyberspace Vulnerability Assessment	-	12.140	15.514	11.745	0.000	11.745	8.655	8.425	7.985	6.490	Continuing	Continuing
677822: Cyber Defense Analysis	-	0.256	0.268	0.274	0.000	0.274	0.279	0.285	0.290	0.295	Continuing	Continuing
677823: AFCERT	-	1.227	1.297	1.326	0.000	1.326	1.349	1.376	1.401	1.426	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), 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 24th 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. The FY 2020 funding request was reduced by \$3.16 million to account for the availability of prior year execution balances.

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 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

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<p>weapon system to meet scope and scale of the USCYBERCOM directed Cyber Protection Teams and AF Mission Defense Teams. The FY 2020 funding request was reduced by \$3.773 million to account for the availability of prior year execution balances.</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), Web Risk Assessment (WRA), 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.</p> <p>AF Computer Emergency Response Team (AFCERT) supports 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) 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 elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.</p> <p>As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.</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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget		20.964	24.166	23.542	0.000	23.542
Current President's Budget		19.628	38.387	16.609	0.000	16.609
Total Adjustments		-1.336	14.221	-6.933	0.000	-6.933
• Congressional General Reductions		-0.608	-0.779			
• Congressional Directed Reductions		0.000	0.000			
• Congressional Rescissions		0.000	0.000			
• Congressional Adds		0.000	15.000			
• Congressional Directed Transfers		0.000	0.000			
• Reprogrammings		0.000	0.000			
• SBIR/STTR Transfer		-0.728	0.000			
• Other Adjustments		0.000	0.000	-6.933	0.000	-6.933
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 Subtotals for Project: 677820						
Congressional Add Totals for all Projects						
Change Summary Explanation						
The FY 2020 funding request was reduced by \$6.933 million to account for the availability of prior year execution balances.						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
677820: Computer Security RDTE: Firestarter	-	6.005	21.308	3.264	0.000	3.264	6.536	8.668	7.957	6.915	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 24th 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 elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

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

	FY 2018	FY 2019	FY 2020
Title: Cyber Forensic Tools & Methodologies	1.600	1.500	0.812
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 2018	FY 2019	FY 2020
FY 2019 Plans: - Continue the development, enhancement, and transition of incident response data gathering and attack attribution technologies FY 2020 Plans: - Will continue the development, enhancement, and transition of incident response data gathering and attack attribution technologies FY 2019 to FY 2020 Increase/Decrease Statement: - Funding decreased to account for the availability of prior year execution balances.					
Title: Cyber Threat Recognition Description: Enhancing cyber platform technology to identify zero-day threats in real time. FY 2019 Plans: - Continue to normalize and automate methods and procedures to identify zero day cyber threats prior to system compromise FY 2020 Plans: - Will continue to normalize and automate methods and procedures to identify zero day cyber threats prior to system compromise FY 2019 to FY 2020 Increase/Decrease Statement: - Funding decreased to account for the availability of prior year execution balances.			1.320	1.411	0.626
Title: Cyber Threat Attribution & Mitigation Description: Includes risk mitigation techniques for wireless networks and systems; active response, dynamic policy enforcement and computer/net attack attribution efforts. FY 2019 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 FY 2020 Plans: - 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 2019 to FY 2020 Increase/Decrease Statement: - N/A			0.835	0.750	0.700
Title: Transition of Cyber and Information Assurance Technologies			2.250	2.647	1.126

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019
<p>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.</p> <p>FY 2019 Plans: - Continue enhancing and transitioning customer funded cyber and IA technology to operational USAF components in accordance with rapid requirements documentation</p> <p>FY 2020 Plans: - Will continue enhancing and transitioning customer funded cyber and IA technology to operational USAF components in accordance with rapid requirements documentation</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: - Funding decreased to account for the availability of prior year execution balances.</p>			
Accomplishments/Planned Programs Subtotals		6.005	3.264
		FY 2018	FY 2019
<p>Congressional Add: Internet of Things Research</p> <p>FY 2019 Plans: - Craft and execute integrated Internet of Things research and development plan</p> <p>- Perform research, develop test configurations, conduct assessments, and complete technical reports on multiple classes of Internet of Things devices</p>		-	7.500
<p>Congressional Add: Transportation Research</p> <p>FY 2019 Plans: - Craft and execute integrated transportation research and development plan</p> <p>- Perform research, develop basic test configurations, conduct assessments, and complete technical reports on a variety of Air Force transportation methods</p>		-	7.500
Congressional Adds Subtotals		-	15.000
C. Other Program Funding Summary (\$ in Millions)			
N/A			
Remarks			

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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.		
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 2020 Air Force												Date: February 2019			
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			
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Firestarter Development	C/CPFF	Various : Various	-	3.375	Jan 2018	17.221	Jan 2019	1.710	Jan 2020	-		1.710	Continuing	Continuing	-
Firestarter Integration	C/CPFF	Various : Various	-	1.271	Jan 2018	2.271	Jan 2019	0.638	Jan 2020	-		0.638	Continuing	Continuing	-
Subtotal			-	4.646		19.492		2.348		-		2.348	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 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Firestarter Testing	C/CPFF	Various : Various	-	1.303	Jan 2018	1.369	Jan 2019	0.691	Jan 2020	-		0.691	Continuing	Continuing	-
Subtotal			-	1.303		1.369		0.691		-		0.691	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Firestarter PMA	C/CPFF	Various : Various	-	0.056	Jan 2018	0.447	Jan 2019	0.225	Jan 2020	-		0.225	Continuing	Continuing	-
Subtotal			-	0.056		0.447		0.225		-		0.225	Continuing	Continuing	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	6.005		21.308		3.264		-		3.264	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force																Date: February 2019			
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	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force			Date: February 2019
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
<i>Firestarter</i>				
Cyber Forensic Tools & Methodologies	1	2018	4	2024
Cyber Threat Recognition	1	2018	4	2024
Cyber Threat Attribution & Mitigation	1	2018	4	2024
Transition of Cyber/IA Technologies	1	2018	4	2024
Internet of Things Research	1	2019	2	2020
Transportation Research	1	2019	2	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
677821: Cyberspace Vulnerability Assessment	-	12.140	15.514	11.745	0.000	11.745	8.655	8.425	7.985	6.490	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 elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

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

	FY 2018	FY 2019	FY 2020
Title: Cyber Threat Mitigation	2.200	0.900	0.800
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 2019 Plans: - Continue development of technologies to conduct vulnerability assessments, network intrusion analysis and systems vulnerability analysis			
FY 2020 Plans: - Will continue development of technologies to conduct vulnerability assessments, network intrusion analysis and systems vulnerability analysis			
FY 2019 to FY 2020 Increase/Decrease Statement:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
N/A				
<p>Title: Defensive Next Generation Development</p> <p>Description: Development 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.</p> <p>FY 2019 Plans:</p> <p>- Continue development to support modernization of DCO capabilities and technologies to support Cyber Protection Teams and Mission Defense Teams</p> <p>FY 2020 Plans:</p> <p>- Will continue development to support modernization of DCO capabilities and technologies to support Cyber Protection Teams and Mission Defense Teams</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement:</p> <p>Funding decrease due to the availability of prior year execution balances.</p>		8.940	13.614	9.945
<p>Title: Test & Evaluation</p> <p>Description: Test and Evaluation</p> <p>Description: Test and Evaluation provides both developmental testing of new development capabilities and a network environment for testing.</p> <p>FY 2019 Plans:</p> <p>- Continued developmental testing for of DCO capability products and technologies prior to fielding</p> <p>FY 2020 Plans:</p> <p>- Will continue developmental testing for DCO capability products and technologies prior to fielding</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement:</p> <p>N/A</p>		1.000	1.000	1.000
Accomplishments/Planned Programs Subtotals		12.140	15.514	11.745

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C. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2020</u>	<u>FY 2020</u>	<u>FY 2020</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 831010: COMSEC Equipment	16.792	26.813	20.629	-	20.629	30.422	41.456	38.893	39.019	Continuing	Continuing
Remarks											
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).											
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 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677821 / Cyberspace Vulnerability Assessment					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 - Mission Oriented Mapping	C/CPFF	Various : Various	-	0.800	Jan 2018	0.900	Jan 2019	0.800	Jan 2020	-		0.800	Continuing	Continuing	-
Defensive Next Gen - Data & Analysis	C/CPFF	Various : Various	-	1.035	Mar 2018	1.950	Mar 2019	0.850	Mar 2020	-		0.850	Continuing	Continuing	-
Defensive Next Gen - Training Simulator	C/FFP	Various : Various	-	5.082	Apr 2018	7.058	Apr 2019	6.000	Apr 2020	-		6.000	Continuing	Continuing	-
Defensive Next Gen - Sensor Optimization	C/FFP	Various : Various	-	1.133	Mar 2018	1.650	Mar 2019	-		-		-	Continuing	Continuing	-
Defensive Next Gen - Data Collection and Correlation	C/FFP	Various : Various	-	1.226	Mar 2018	1.092	Mar 2019	1.231	Mar 2020	-		1.231	Continuing	Continuing	-
Defensive Next Gen - Cloudshield Capabilities	C/FFP	Various : Various	-	0.690	Aug 2018	0.690	Aug 2019	0.690	Aug 2020	-		0.690	Continuing	Continuing	-
Subtotal			-	9.966		13.340		9.571		-		9.571	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 2017	1.000	Oct 2018	1.000	Oct 2019	-		1.000	Continuing	Continuing	-
Subtotal			-	1.000		1.000		1.000		-		1.000	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 Asisstance Support Services (ETASS & FFRDC)	Various	AFLCMC/PZ : Bedford, MA	-	1.174	Jan 2018	1.174	Jan 2019	1.174	Jan 2020	-		1.174	Continuing	Continuing	-
Subtotal			-	1.174		1.174		1.174		-		1.174	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force										Date: February 2019			
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 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	12.140		15.514		11.745		-		11.745	Continuing	Continuing	N/A
Remarks													

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force			Date: February 2019		
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 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208088F / <i>AF Defensive Cyberspace Operations</i>	Project (Number/Name) 677821 / <i>Cyberspace Vulnerability Assessment</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Cyber Vulnerability Assessment</i>				
Test and Evaluation	2	2018	4	2024
Cyber Threat Mitigation	1	2018	4	2024
Defensive Next Generation Development (Data & Analysis)	2	2018	4	2024
Defensive Next Generation (Data Collection and Correlation)	2	2018	4	2024
Defensive Next Generation Sensor Optimization	2	2018	4	2024
Defensive Next Generation (Training Simulator)	3	2018	4	2024
Defensive Next Generation (Cloudshield Capabilities)	4	2018	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
677822: Cyber Defense Analysis	-	0.256	0.268	0.274	0.000	0.274	0.279	0.285	0.290	0.295	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
Cyberspace Defense Analysis (CDA) monitors and reports telecommunications that include 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, E-Mail Communications, Internet-based Capabilities, 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 information protection realm and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations through malicious, intentional, and/or inadvertent compromises of information.												
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 elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2018	FY 2019	FY 2020	
Title: Cyber Defense Analysis									0.256	0.268	0.274	
Description: Engineering support to conduct Cyberspace Defense Analysis (CDA) assessment of non-secure telecommunications during peace time and contingency operations.												
FY 2019 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 our networks												
FY 2020 Plans: - Will 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 2019 to FY 2020 Increase/Decrease Statement: N/A												
Accomplishments/Planned Programs Subtotals									0.256	0.268	0.274	

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019	
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)											
			<u>FY 2020</u>	<u>FY 2020</u>	<u>FY 2020</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 831010: COMSEC Equipment	13.125	1.259	1.698	-	1.698	1.702	10.498	10.685	10.878	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
<p>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.</p>											
E. Performance Metrics											
<p>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.</p>											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677822 / Cyber Defense Analysis					
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
CDA PMA - Engineering & Technical Assistance Support Services (ETASS & FFRDC)	Various	AFLCMC/PZ : Hanscom, MA	-	0.256	Jan 2018	0.268	Jan 2019	0.274	Jan 2020	-		0.274	Continuing	Continuing	-
Subtotal			-	0.256		0.268		0.274		-		0.274	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 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.256		0.268		0.274		-		0.274	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force			Date: February 2019		
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 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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 2020 Air Force		Date: February 2019
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	2018	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
677823: AFCERT	-	1.227	1.297	1.326	0.000	1.326	1.349	1.376	1.401	1.426	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
AF Computer Emergency Response Team (AFCERT) supports the AF Cyberspace Defense (ACD) weapons 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) 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 AF Cyber Defensive weapon system capability. 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.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2018	FY 2019	FY 2020	
Title: Cyberspace Defense Development									1.227	1.297	1.326	
Description: Air Force Computer Emergency Response Team (AFCERT) prevention, detection, and response to adversarial penetration into AF unclassified and classified networks.												
FY 2019 Plans: - Develop and test technologies for the AF Cyberspace Defensive (ACD) weapon system to prevent, detect, and respond adversarial penetration in AF networks												
FY 2020 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 2019 to FY 2020 Increase/Decrease Statement: N/A												
Accomplishments/Planned Programs Subtotals									1.227	1.297	1.326	

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force									Date: February 2019		
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)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPAF 03 Line Item 835080: AFNET	30.914	30.044	16.883	-	16.883	23.895	33.325	33.391	34.528	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
The AF Cyberspace Defense (ACD) weapons 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.											
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 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677823 / AFCERT					

Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
ACD Cyberspace Defense Development	Various	Various : Various	-	1.227	Aug 2018	1.297	Aug 2019	1.326	Aug 2020	-		1.326		Continuing	Continuing	-
Subtotal			-	1.227		1.297		1.326		-		1.326		Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total		Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.227		1.297		1.326		-		1.326		Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 7								R-1 Program Element (Number/Name) PE 0208088F / AF Defensive Cyberspace Operations				Project (Number/Name) 677823 / AFCERT			

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Integrated Cyber Aggregation Tool																												
Cyberspace Defense Development																												
Test and Evaluation																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
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	2	2018	4	2024
Test and Evaluation	3	2018	4	2024