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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	33.836	-	33.836	26.585	17.820	11.484	8.478	0.000	98.203
EV5: <i>Defensi</i>	-	0.000	0.000	33.836	-	33.836	26.585	17.820	11.484	8.478	0.000	98.203

Note
 This program element is a continuation of efforts funded in FY 2016 in PE 0303140, project 491.

A. Mission Description and Budget Item Justification

The Defensive Cyber Tool Development group of programs designs, builds, and tests the advanced Cyber tools and infrastructure that enables active defense of the network from Tactical Command Posts up through Post Camps and Station Home Station Mission Command. This capability will enable integration of the Cyber Mission Force with the Regional and Local Cyber Network Defense elements. These tools will provide cutting edge hardware and software, integrated with existing infrastructure and tools to facilitate Active Defensive Cyber operations. Cyber Tool Development will include Big Data Analytics solutions to enable the ability to correlate and analyze the massive amount of data coming across the network and provide timely situational awareness. It will also include development, integration, and testing of Defensive Cyber Tool and Infrastructure that will facilitate pushing Cyber sensor data to the Big Data analytics as well as support remote access to prevent or react to a Cyber incident. The Cyber Tool Development includes test and assessment of emerging Commercial Cyber tools for inclusion in the Defensive Cyber Operations Infrastructure. This tool development will include enhancements and testing of existing systems by enabling such capabilities as Public Key Infrastructure and enhancing mission assurance profiles of existing software that will heighten the Defensive Cyber posture.

This Program Element will support the Defensive Cyber Operations Infrastructure (DCO-I) program starting in FY17 to integrate and deliver key hardware and software that enables the Cyber Mission Forces to protect, search and discover, maneuver and engage, and mitigate and respond to enemy cyberspace operations. DCO-I will allow near real-time employment of defensive measures that will allow friendly cyber forces to maintain advantage. DCO-I will consist of a combination of hardware computing infrastructure along with advanced software fielded to units from Army Service Component Commands down to Brigade Combat Team level. DCO-I directly supports US Cyber Command Integrated Priority List #2 Produce Advanced Cyberspace Infrastructure and #5 defensive forces to execute passive and active defense operations at net-speed.

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>
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B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	33.836	-	33.836
Total Adjustments	0.000	0.000	33.836	-	33.836
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	33.836	-	33.836

Change Summary Explanation

Funds previously executed in PE 0303140, Project 491.

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Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>				Project (Number/Name) EV5 / <i>Defensi</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EV5: <i>Defensi</i>	-	0.000	0.000	33.836	-	33.836	26.585	17.820	11.484	8.478	0.000	98.203
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Defensive Cyberspace Operations (DCO) - Big Data Pilot (PEO EIS, Product Director Enterprise Services-CYBER)
 Defensive Cyberspace Operations - Infrastructure (DCO-I)Tactical - PEO C3T
 Defensive Cyberspace Operations –Infrastructure (DCO-I) Enterprise - PEO C3T
 Infrastructure Communications and Capabilities - Defense Cyber Operations (PEO EIS, Project Manager Installation Information Infrastructure - Communications and Capabilities (I3C2-DCO)
 Cyber Protection Team Support (DCO Platforms) (PEO EIS, PM I3C2-DCO)

A. Mission Description and Budget Item Justification

The Defensive Cyber Tool Development group of programs designs, builds, and tests the advanced Cyber tools and infrastructure that enables active defense of the network from Tactical Command Posts through Post Camps and Station and Home Station Mission Command. This capability will enable integration of the Cyber Mission Force with the Regional and Local Cyber Network Defense elements. These tools will provide cutting edge hardware and software, integrated with existing infrastructure and tools to facilitate Active Defensive Cyber operations. Cyber Tool Development will include Big Data Analytics solutions to enable the ability to correlate and analyze the massive amount of data coming across the network and provide timely situational awareness. It will also include development, integration, and testing of Defensive Cyber Tools and Infrastructure that will facilitate pushing Cyber sensor data to the Big Data analytics as well as support remote access to prevent or react to a Cyber incident. The Cyber Tool Development includes test and assessment of emerging Commercial Cyber tools for inclusion in the Defensive Cyber Operations Infrastructure. This tool development will include enhancements and testing of existing systems by enabling such capabilities as Public Key Infrastructure and enhancing mission assurance profiles of existing software that will heighten the Defensive Cyber posture.

This Program Element will support the DCO-I program starting in FY17 to integrate and deliver key hardware and software that enables the Cyber Mission Forces to protect, search and discover, maneuver and engage, and mitigate and respond to enemy cyberspace operations. DCO-I will allow near real-time employment of defensive measures that will allow friendly cyber forces to maintain advantage. DCO-I will consist of a combination of hardware computing infrastructure along with advanced software fielded to units from Army Service Component Commands down to Brigade Combat Team level. DCO-I directly supports US Cyber Command Integrated Priority List #2 Produce Advanced Cyberspace Infrastructure and #5 defensive forces to execute passive and active defense operations at net-speed.

The DCO program provides initial capabilities to Cyber Protection Teams. Team enable passive and active cyberspace defensive operations to preserve friendly cyberspace capabilities, and protect data, networks, net-centric capabilities, and other designated systems. DCO consists of four critical capabilities:

1. DCO-I Enterprise: the hardware and software baseline for remote cyber maneuver based on the Defense Advanced Research Projects Agency (DARPA) Plan X
2. Cyber Protection Team (CPT) Support (now called DCO Platforms): tools reside inside DCO-I
3. Web Vulnerability: Scanning software baseline to secure key cyber terrain and protect DoD websites

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4. Big Data Analytics: analytics that leverage Defense Information Security Agency (DISA) Acropolis analytics (PEO C3T)				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>Title: The Defensive Cyberspace Operations (DCO) - Tactical Infrastructure (PEO C3T)</p> <p>Description: DCO-I program integrates and delivers key hardware and software that enables the Cyber Mission Forces to protect, search and discover, maneuver and engage, and mitigate and respond to enemy cyberspace operations.</p> <p>FY 2017 Plans: FY17 initiates the Engineering Design and Development for Network Operations software in support of the Defensive Cyber Operations Infrastructure (DCO-I) Information Systems Initial Capabilities Document (IS ICD) which further integrates existing capability and extends that capability down to the Battalion Level. This funding initializes the program and funds the development effort for the first build cycle. FY17 also funds initial delivery of architecture products that help drive subsequent builds. DCO-I testing will include developmental events conducted on lab configurations and networks followed by an Operational Evaluation using Soldiers and live equipment.</p>		-	-	17.714
<p>Title: The Defensive Cyberspace Operations (DCO) - Big Data Pilot (PEO EIS, PD ES-CYBER)</p> <p>Description: FY17 initiates Big Data Pilot which provides an advanced analytics capability capable of ingesting structured, semi-structured, and unstructured data from multiple data sources (e.g., Joint Regional Security Stacks (JRSS), intrusion detection systems, intrusion prevention systems, network device log files, trouble tickets, firewalls, proxies, web and applications server log files, etc) and proves situational awareness of cyberspace battlefield. It provides the computer network defense provider with common analytic platform which informs and reduces risk associated with future material solutions and forms a blueprint for future Big Data Analytics. Big Data (analysis-of-all DoD Information Network sensor data) provides two optimized and accredited cluster deployed in support of JRSS and Defense Research and Engineering Network (DREN) with a tools suite accessible to Cyber Mission Forces via secure remote access.</p> <p>FY 2017 Plans: FY17 initiates Big Data Pilot cyber funding encompasses design and development that is focused on getting the core platform to threshold capability and certified. Equipment would be purchased for the first 22 instances located at 11 of the JRSS locations with installation in FY18 after type certification is completed.</p>		-	-	6.970
<p>Title: Defensive Cyberspace Operations –Infrastructure (DCO-I) Enterprise (PEO EIS, PM I3C2-DCO)</p> <p>Description: DCO-I Engineering Design, Development, and Software maintenance of standardized cloud infrastructure software to include deployment and build platforms for three primary environmental configurations (garrison, deployable and tactical). Additionally, providing advanced hypervisor, cloud deployment, security and integration and development.</p>		-	-	5.300

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p><i>FY 2017 Plans:</i> FY17 provides advanced security of infrastructure software for government managed purposes. Government unique cloud environment and management for infrastructure software facilitating collaboration and enhanced security to protect the abstraction layer of the infrastructure. Also begin Cyberspace Mission Command / Battle management Platform (Plan X) efforts. The foundational mission command platform for the conduct of cyberspace operations based on the transition of advanced technologies from the DARPA Foundational Cyberwarfare Program (Plan X). The platform includes battlespace awareness (SA), mission planning, course of action development, wargaming and execution capabilities. The platform will be developed in a continuous delivery methodology utilizing DevOps-like paradigms to ensure continued integration of new technological advances. Lastly, DevOps development for a centralized collaboration environment and repository including test and continuous delivery components. Facilitating license management, compilation and hosting of new platforms, centralized deployment/integration/hosting of products, synchronization of software tools developed by cyber forces; including tool development chain with integrated test capability and deployment by cyber mission effectiveness (existing DCO systems to be managed within - Log Collector & Q-tip).</p>				
<p><i>Title:</i> Cyber Protection Team Support (DCO Platforms) (PEO EIS, PM I3C2-DCO)</p> <p><i>Description:</i> FY17 initiates the DCO-I Engineering Design, Development, and Software maintenance of standardized cloud infrastructure software to include deployment and build platforms for three primary environmental configurations (garrison, deployable and tactical). Additionally, providing advanced hypervisor, cloud deployment, security and integration and development.</p> <p><i>FY 2017 Plans:</i> The capability that provide advanced security of infrastructure software for government managed purposes. Government unique cloud environment and management for infrastructure software facilitating collaboration and enhanced security to protect the abstraction layer of the infrastructure. Also begin Cyberspace Mission Command / Battle management Platform (Plan X) efforts. The foundational mission command platform for the conduct of cyberspace operations based on the transition of advanced technologies from the DARPA Foundational Cyberwarfare Program (Plan X). The platform includes battlespace awareness (SA), mission planning, course of action development, wargaming and execution capabilities. The platform will be developed in a continuous delivery methodology utilizing DevOps-like paradigms to ensure continued integration of new technological advances. Lastly, DevOps development for a centralized collaboration environment and repository including test and continuous delivery components. Facilitating license management, compilation and hosting of new platforms, centralized deployment/integration/hosting of products, synchronization of software tools developed by cyber forces; including tool development chain with integrated</p>		-	-	3.852

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
test capability and deployment by cyber mission effectiveness (existing DCO systems to be managed within - Log Collector & Q-tip).				
Accomplishments/Planned Programs Subtotals		-	-	33.836
C. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
D. Acquisition Strategy <p>The Defensive Cyber Tool Development line will support multiple Information System - Requirement Development Packages that result in multiple programs. The Army will conduct a Materiel Development Decisions in late FY16 based upon the Defensive Cyberspace Operations – Infrastructure (DCO-I), Big Data Analytics, and Cyber Protect Team Tools Requirements Development Packages to initiate these programs.</p> <p>The DCO-I Tactical program is expected to be an Acquisition Category III program using the Department of Defense Instruction 5000.02 Model 3: Incrementally Deployed Software Intensive approach. The DCO-I capability will primarily use commercial off the shelf (or slightly modified commercial off the shelf) hardware and software integrated with components of the Warfighter Information Network – Tactical and Mission Command programs. The functionality of DCO-I will integrate with the Command Post Computing Environment to support Commanders from Brigade up to Army Component Command level. Execution of the DCO-I program will be a combination of Government Labs (COMMUNICATIONS-ELECTRONICS RESEARCH, DEVELOPMENT AND ENGINEERING CENTER) and Contractor support.</p> <p>The Defensive Cyberspace Operations (DCO) program provides initial capabilities that enable passive and active cyberspace defense operations to preserve friendly cyberspace capabilities and protect data, networks, net-centric capabilities, and other designated systems. Big Data Pilot provides an advanced analytics capability capable of ingesting structured, semi-structured, and unstructured data from multiple data sources (e.g., Joint Regional Security Stacks (JRSS), intrusion detection systems, intrusion prevention systems, network device log files, trouble tickets, firewalls, proxies, web and applications server log files, etc) and provides situational awareness of cyberspace battlefield. It provides the computer network defense provider with common analytic platform which informs and reduces risk associated with future material solutions and forms a blueprint for future Big Data Analytics. Big Data (analysis-of-all DoD Information Network sensor data) provides two optimized and accredited cluster deployed in support of JRSS and Defense Research and Engineering Network (DREN) with a tools suite accessible to Cyber Mission Forces via secure remote access. The Army's DCO activities is a construct of active cyberspace defense which provides synchronized, real-time capability to discover, detect, analyze, and mitigate threats and vulnerability to DoD networks and systems.</p>				
E. Performance Metrics N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0605041A / Defensive CYBER Tool Development				EV5 / Defensi								
Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
Defensive Cyber Operations-Infrastructure (DCO-I) Tactical (PEO C3T)	C/TBD	Aberdeen Proving Ground : MD	0.000	-		-		1.732		-		1.732	0	1.732	0	
Big Data Pilot (PEO EIS, PD ES - CYBER)	TBD	PD ES : Ft Belvoir, VA	0.000	-		-		0.131		-		0.131	0	0.131	0	
Subtotal			0.000	-		-		1.863		-		1.863	0.000	1.863	0.000	
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
Big Data Pilot (PEO EIS, PD ES - CYBER)	C/TBD	Ft. Belvoir : VA	0.000	-		-		6.839		-		6.839	0	6.839	0	
Defensive Cyberspace Operations -Infrastructure (DCO-I) Enterprise (PEO EIS, PM I3C2-DCO)	C/TBD	ACC-RI : IL	0.000	-		-		5.300		-		5.300	0	5.300	0	
Defensive Cyber Operations-Infrastructure (DCO-I) Tactical (PEO C3T)	C/TBD	Aberdeen Proving Ground : MD	0.000	-		-		13.408		-		13.408	0	13.408	0	
Cyber Protection Team (PEO EIS, PEO I3C2)	C/TBD	ACC-RI : IL	0.000	-		-		3.852		-		3.852	0	3.852	0	
Subtotal			0.000	-		-		29.399		-		29.399	0.000	29.399	0.000	
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
Defensive Cyber Operations-Infrastructure	C/TBD	Aberdeen Proving Ground : MD	0.000	-		-		2.574		-		2.574	0	2.574	0	

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>	Project (Number/Name) EV5 / <i>Defensi</i>
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>	Project (Number/Name) EV5 / <i>Defensi</i>
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
(1) DCO - DMCA Milestone B	[Redacted]				DCO - DMCA Milestone B				▲ 1																			
(2) DCO - DMCA Acquisition Decision Memorandum					DCO - DMCA ADM				▲ 2																			
(3) DCO - DMCA Contract Award					DCO - DMCA Contract Award				▲ 3																			
(4) DCO - DMCA Build					DCO - DMCA Build				▲ 4																			
(5) DCO - DMCA Developmental Test					DCO - DMCA DT				▲ 5																			
DCO - DMCA - Initial Operational Test					DCO - DMCA - IOT				■																			
(6) DCO - DMCA - Full Deployment					DCO - DMCA - Full Deployment				▲ 6																			
(7) DCO - DMCA - Production Award	DCO - DMCA - Production Award				▲ 7																							
DCO-I Enterprise GDI Cloud Infrastructure	Procurement and fielding of stacks				■				■				■				■				■							
Plan X Transition From DARPA	transition from DARPA 4Q; AWA requirem				■				■				■															
DCO Platforms (garrison, deployable and tactical)	DEV Ops, Centralization of initial platforms				■				■				■				■				■							
DCO-I Enterprise MDD	MDD				■				■																			
DCO-I Enterprise (Plan X) Milestone C	Milestone C				■				■																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>	Project (Number/Name) EV5 / <i>Defensi</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
DCO IS ICD Approval	3	2016	3	2016
DCO-I Tactical Requirements Definition Package	4	2017	4	2017
DCO-I Tactical MDD	4	2017	4	2017
DCO-I Tactical Milestone C	1	2018	1	2018
DCO-I Tactical Acquisition Decision Memorandum	1	2018	1	2018
DCO-I Tactical Contract Award	1	2018	1	2018
DCO-I Tactical Build	1	2018	3	2019
DCO-I Tactical Developmental Test	3	2018	3	2018
DCO-I Tactical Initial Operational Test	3	2019	3	2019
DCO-I Tactical Full Rate Production	4	2020	4	2020
DCO-I Tactical Production Award	4	2020	4	2020
DCO - Data Mining and Cyber Analytics (DMCA)	1	2018	1	2018
DCO - DMCA Materiel Development Decision	2	2017	2	2017
DCO - DMCA Milestone B	2	2017	2	2017
DCO - DMCA Acquisition Decision Memorandum	2	2017	2	2017
DCO - DMCA Contract Award	3	2018	3	2018
DCO - DMCA Build	3	2018	3	2019
DCO - DMCA Developmental Test	2	2019	2	2019
DCO - DMCA - Initial Operational Test	3	2019	3	2019
DCO - DMCA - Full Deployment	4	2020	4	2020
DCO - DMCA - Production Award	4	2020	4	2020
DCO-I Enterprise GDI Cloud Infrastructure	1	2017	4	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605041A / <i>Defensive CYBER Tool Development</i>	Project (Number/Name) EV5 / <i>Defensi</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Plan X Transition From DARPA	2	2017	4	2017
DCO Platforms (garrison, deployable and tactical)	2	2017	4	2021
DCO-I Enterprise MDD	1	2017	1	2017
DCO-I Enterprise (Plan X) Milestone C	4	2017	4	2017