Exhibit R-2, **RDT&E Budget Item Justification:** FY 2018 Army										**Date:** May 2017	

Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*						**R-1 Program Element (Number/Name)** PE 0305251A *I Cyberspace Operations Forces and Force Support*					

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	40.510	56.492	-	56.492	52.817	52.102	53.578	54.697	Continuing	Continuing
FA8: *Cyberspace Operations Forces and Force Support*	-	0.000	40.510	56.492	-	56.492	52.817	52.102	53.578	54.697	Continuing	Continuing

A. Mission Description and Budget Item Justification

In support of the 2016 National Defense Authorization Act, Section 1645, the Persistent Cyber Training Environment (PCTE) will provide the Department of Defense (DoD) cyber forces with a standardized training capability with access to existing Cyber Training Ranges and available training resources and content. The current environment does not have the capacity to maintain a persistent environment and is primarily used for major exercises (i.e. Cyber Flag). The Service Cyber Components have established their own training environments but do not have standardized capabilities or content. PCTE system approaches are aligned to the outputs of the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD AT&L) and Chairman of the Joint Chiefs of Staff (CJCS) J6 led, "Cyber Range Evaluation of Alternatives (EOA) Findings and Issue Paper Deliberations," dated 17 November 2015. The Program Executive Office for Simulation, Training, and Instrumentation (PEO STRI) was designated as the DoD Acquisition Lead for the PCTE.

B. Program Change Summary ($ in Millions)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	40.510	56.509	-	56.509
Current President's Budget	0.000	40.510	56.492	-	56.492
Total Adjustments	0.000	0.000	-0.017	-	-0.017
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	-0.017	-	-0.017

Change Summary Explanation

FY18 funding change is a price adjustment.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army											Date: May 2017	
Appropriation/Budget Activity 2040 I 4					**R-1 Program Element (Number/Name)** PE 0305251A I *Cyberspace Operations Forces and Force Support*				**Project (Number/Name)** FA8 I *Cyberspace Operations Forces and Force Support*			
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
FA8: *Cyberspace Operations Forces and Force Support*	-	0.000	40.510	56.492	-	56.492	52.817	52.102	53.578	54.697	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Persistent Training Environment (PTE) will provide the Department of Defense (DoD) cyber force with a capability that uses a combination of loosely affiliated or independent virtual environments with varied capabilities that are not scalable or extensible. The current environment constrains training capabilities and capacity, but lack a joint or standard approach consistent with a broader vision of PTE. PTE system approaches are aligned to the outputs of the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD AT&L) and Chairman of the Joint Chiefs of Staff (CJCS) J6 led, "Cyber Range Evaluation of Alternatives (EOA) Findings and Issue Paper Deliberations," dated 17 November 2015. The US Army acknowledges it is the lead candidate service to perform as the Executive Agent (EA) for Cyber Training Ranges and DoD Acquisition Lead for the PTE. Program is directed by the 2016 National Defense Authorization Act, Section 1645.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Event Management for Persistent Cyber Training Environment (PCTE) *Description:* Develop event scheduling, allocation, and management function for PCTE, to include event design, planning and execution, supported by standardized training assessment tools and capabilities. *FY 2017 Plans:* PCTE event management to include the OPFOR environment, system capacity, modeling, simulation, assessments and management. The OPFOR environment provides the capability to support live and automated OPFOR events which are realistically tailored to the training audience. System Capacity includes the capability to support individual and collective training, certification and recertification activities within definitive timelines. Modeling and simulation provides training event data collection for event replay and archiving to include operation of the cyber range, instrumentation and tools. The assessments and management capability will provide oversight and feedback support to include analytics, metrics, and Master Scenario Event List (MSEL) execution. *FY 2018 Plans:* Continue development and management of Event Management for PCTE, to include the physical and logical infrastructure of the training platform and core training environment that allows for automated training events at the individual and team level. It will also include instances at the unclassified, secret, and top secret classification levels. Event management is the integration of multiple applications that support a training event. The capabilities include a master control, centralized order portal, event design, event control, automated opposition force, technical support, assessments and feedback, content library and tool management repository, and a virtual classroom. FY17 included the procurement and evaluation of event management	-	10.510	18.600

Exhibit R-2A, **RDT&E Project Justification:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 4	**R-1 Program Element (Number/Name)** PE 0305251A *I Cyberspace Operations Forces and Force Support*	**Project (Number/Name)** FA8 *I Cyberspace Operations Forces and Force Support*

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018**
application prototypes. In FY18, those event management applications will be integrated into a PCTE platform and provided to the Service Cyber components.			
Title: Environment operations and management for Persistent Cyber Training Environment (PCTE)	-	10.000	14.130
Description: Develop PCTE with realistic vignettes/scenarios as part of a system (syllabus) of individual and collective training that includes certification and real-world mission rehearsals. *FY 2017 Plans:* Develop the PCTE environment with realistic vignettes/scenarios as part of a system (syllabus) of individual and collective training that includes certification and real-world mission rehearsals. This includes interoperability (capability to generate a training network that is able to emulate an operational network), system capacity (capability to reconstitute the environment from a given save point. Incorporates pre-determined standardized environment constructs and scenarios), and modeling and simulations (capability to replicate current/future requirements and threats.) *FY 2018 Plans:* Provides for the creation of a robust cloud network connecting participating cyber training ranges and the ability for the PCTE to utilize resources and content at the participating cyber ranges. This eliminates the need to replicate those environments for every PCTE instantiation. The environment includes the emulation of blue, red, green, and gray networks as well as the ability to replicate Industrial Control Systems (ICS) and Supervisory Control and Data Acquisition (SCADA) environments. These environments provide the "maneuver" space and training grounds for Cyber Mission Forces (CMF). FY18 will provide the virtual connections with the PCTE in order for the CMF trainee to choose the maneuver environment while establishing the training event. This will also include the ability to "clean" after the completion of training so that the next student has a neutral environment. This will also include the ability to use current threat information and intelligence to ensure that the environments remain current and relevant providing a realistic training environment.			
Title: Physical and Virtual Connectivity for the Persistent Cyber Training Environment (PCTE)	-	10.000	19.780
Description: On-Demand reliable, secure physical and virtual global access from wherever participants are geographically located. A core cyber exercise network and event management platform with access to the full suite of DoD, Service, Interagency, Multinational, and States' distributed systems. *FY 2017 Plans:* Provides for the connectivity of on-demand and reliable secure physical and virtual global access from wherever participants are geographically located. A core cyber exercise network and event management platform with access to the full suite of DoD, Service, Interagency, Multinational, and States' distributed systems. Connectivity includes system accessibility (capability to provide user interface as well as facilitate user provided assets such as crew training facility, system under test, and other user			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 I 4	R-1 Program Element (Number/Name) PE 0305251A I Cyberspace Operations Forces and Force Support	Project (Number/Name) FA8 I Cyberspace Operations Forces and Force Support

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
assets), system capacity (capability to support network capacity for multiple engagements from multiple sites and connections to include intra-range entities, between ranges, cross-domain solutions, and other resources), interoperability (capability to ensure interoperability standards for integration of environments and service assets at geographically separated locations) and cyber security measures (capability to ensure continuous enforcement of security policies to prevent successful intrusions, protect data at rest, and eradicate the threat to and cause of any incident.) *FY 2018 Plans:* Provides for the connectivity at multiple security levels and the compute and storage requirements to support the processing of the PCTE and required data. FY18 will provide robust connectivity to the cyber ranges defined in the PCTE Initial Capability Document, in support of Section 1645 of the 2016 NDAA. The new sites will support the establishment of the cloud environment and provide the access to the resources and content from the participating cyber training ranges and the Service Cyber components.			
Title: Training Sites *Description:* Capability to enable and provide the Cyber Mission Forces (CMF) to connect to the PCTE from Base, Post, Camp, Station, or Deployed Locations for distributed cyber training, certification, and major training events. *FY 2017 Plans:* Provides capability to the training sites to enable and provide the CMF to connect to the PCTE from Base, Post, Camp, Station, or Deployed Locations for distributed cyber training, certification, and major training events. Capabilities include system capacity and system accuracy (capability to connect training sites to PCTE (Unclassified through Top Secret and SAP) and to develop foundational documentation or continuous rework of documentation to include team Tactics, Techniques and Procedures (TTPs) and Validation.)	-	10.000	-
Title: Government Program Managment for Persistent Cyber Training Environment (PCTE) *FY 2018 Plans:* Will provide program management, engineering and technical oversight, contract support and travel for the PCTE program.	-	-	2.300
Title: Persistent Cyber Training Environment (PCTE) Test and Evaluation *FY 2018 Plans:* Persistent Cyber Training Environment is the integration of multiple applications and environments as well as connectivity to the existing Cyber Ranges. These funds will provide for required significant testing. This funding will be used for integration testing, field evaluations, and operational testing.	-	-	1.682
Accomplishments/Planned Programs Subtotals	-	40.510	56.492

Exhibit R-2A, **RDT&E Project Justification:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 4	**R-1 Program Element (Number/Name)** PE 0305251A *I Cyberspace Operations Forces and Force Support*	**Project (Number/Name)** FA8 *I Cyberspace Operations Forces and Force Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OMA 121251000: *Cyberspace Operations Forces and Force Support*	-	-	6.300	-	6.300	11.300	11.300	11.600	11.600	0	52.100
• OPA B65011000: *Persistent Cyber Training Environment*	-	-	4.000	-	4.000	3.000	3.000	3.000	-	0	13.000

Remarks

D. Acquisition Strategy

The Persistent Cyber Training Environment (PCTE) program will employ an incremental acquisition strategy. The strategy leverages the use of existing cyber contract vehicles in FY17 and FY18 to meet urgent requirements. Efforts in FY18 focus on augmenting connectivity (access), integrating existing Service capabilities into a common repository, and developing tools to enhance training of Cyber Mission Forces (CMF). A full and open competitive contract will be awarded in FY19 for development efforts based on performance specifications to include scope to support training and sustainment.

E. Performance Metrics

N/A

Exhibit R-3, **RDT&E Project Cost Analysis:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 4	**R-1 Program Element (Number/Name)** PE 0305251A *I Cyberspace Operations Forces and Force Support*	**Project (Number/Name)** FA8 *I Cyberspace Operations Forces and Force Support*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Program Management	TBD	Various : Various	0.000	-		-		2.300	Oct 2017	-		2.300	Continuing	Continuing	Continuing
		Subtotal	0.000	-		-		2.300		-		2.300	-	-	-

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Operations Forces and Force Support	C/TBD	Various : Various	0.000	-		40.510		52.509		-		52.509	Continuing	Continuing	Continuing
		Subtotal	0.000	-		40.510		52.509		-		52.509	-	-	-

Remarks
 FY17 funds are being realigned to PEO STRI. FY18 funds will be placed as an option on the FY17 contract.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PCTE Test and Evaluation	TBD	To Be Determined : To Be Determined	0.000	-		-		1.683		-		1.683	Continuing	Continuing	Continuing
		Subtotal	0.000	-		-		1.683		-		1.683	-	-	-

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-	40.510	56.492	-	56.492	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0305251A / Cyberspace Operations Forces and Force Support	**Project (Number/Name)** FA8 / Cyberspace Operations Forces and Force Support

Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Event Management													Event Management															
Environment													Environment															
Connectivity													Connectivity															
Training Sites													Training Sites															

Exhibit R-4A, **RDT&E Schedule Details:** FY 2018 Army		**Date:** May 2017
Appropriation/Budget Activity 2040 *I* 4	**R-1 Program Element (Number/Name)** PE 0305251A *I Cyberspace Operations Forces and Force Support*	**Project (Number/Name)** FA8 *I Cyberspace Operations Forces and Force Support*

Schedule Details

Events	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
Event Management	1	2017	4	2022
Environment	1	2017	4	2022
Connectivity	1	2017	4	2022
Training Sites	1	2017	4	2022