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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army										Date: March 2019		
Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)					R-1 Program Element (Number/Name) PE 0305251A / Cyberspace Operations Forces and Force Support							
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	-	56.071	52.817	52.102	-	52.102	53.578	54.697	55.463	56.018	0.000	380.746
FA8: Cyberspace Operations Forces and Force Support	-	56.071	52.817	52.102	-	52.102	53.578	54.697	55.463	56.018	0.000	380.746

A. Mission Description and Budget Item Justification

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 (CTR) 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. Program is directed by the 2016 National Defense Authorization Act, Section 1645.

FY 2020 will focus on the requirements of the PCTE fielded capabilities, the build out of Technical Operations Management, and the extension of the PCTE to the National Guard and Reserve Cyber Mission Force teams.

B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	56.492	65.817	65.102	-	65.102
Current President's Budget	56.071	52.817	52.102	-	52.102
Total Adjustments	-0.421	-13.000	-13.000	-	-13.000
• Congressional General Reductions	-0.009	-			
• Congressional Directed Reductions	-	-13.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.412	-			
• Adjustments to Budget Years	-	-	-13.000	-	-13.000

Change Summary Explanation

FY 2018 Congressional Rescission of \$5.676M.

FY 2020 decrease reflects Cyber Operational Risk Assessment-Programs (CORA-P) funding realignment to program element 0606942A project FL2.

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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
FA8: Cyberspace Operations Forces and Force Support	-	56.071	52.817	52.102	-	52.102	53.578	54.697	55.463	56.018	0.000	380.746
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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 (CTR) 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. Program is directed by the 2016 National Defense Authorization Act, Section 1645.

FY2020 will focus on the requirements of the PCTE fielded capabilities, the build out of Technical Operations Management, and the extension of the PCTE to the National Guard and Reserve CMF teams.

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

	FY 2018	FY 2019	FY 2020
Title: Event Management for Persistent Cyber Training Environment (PCTE)	18.600	23.400	25.600
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 2019 Plans: Event management capabilities will continue to build on previous year's efforts by introducing new capability and continuing to refine those already integrated based on Cyber Mission Forces' (CMF) evaluations. The Program Management Office will continue development, integration, and evaluation of prototype applications that will satisfy the PCTE requirement gaps and meet the IOC definition. This includes training package development, event scheduling and event execution. Through this, Cyber Mission Forces will be provided the ability to plan, design, execute and assess training.			
FY 2020 Plans: The expansion of the fielded PCTE capabilities will include the ability to have an automated opposition force that is reactive to the trainee and the capability of using near real-time intelligence to update training scenarios, Tactics, Techniques, and Procedures (TTPs). Will also provide the material solution to support the Technical Operations Management (TOM) capability.			
FY 2019 to FY 2020 Increase/Decrease Statement:			

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2018	FY 2019	FY 2020
The increase for Event Management is due to the implementation of the material solution for the Technical Operations Management capability.					
Title: Environment Operations and Management for Persistent Cyber Training Environment (PCTE) 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 2019 Plans: Continue building emulated environments and the hybrid cloud environment with the participating cyber ranges to support team/group, and force level training events. The emulated environments 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). Fund 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 sanitize the environment at the completion of training so that the next student has a neutral environment. This will include the ability to use current threat information and intelligence to ensure that the environments remain current and relevant providing a realistic training environment. FY 2020 Plans: Will continue to build and host persistent virtual environments that DoD Cyber Mission Forces use as their training maneuver terrain. These high fidelity virtual environments allow realistic and relevant training on demand that are representative of actual network or system environments. FY 2020 also continues to add more blue environments, red environments, Industrial Control System (ICS), and Supervisory Control and Data Acquisitions (SCADA) virtualizations to support multiple simultaneous training events. Additional environments will be created based on priority per the validated Initial Capability Document (ICD) that include telepresence, battlefield systems (blue and red), and commercial mobile.			14.130	13.400	13.400
Title: Physical and Virtual Connectivity for the Persistent Cyber Training Environment (PCTE) 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 State distributed systems. FY 2019 Plans: Continue to build and refine on the initial connectivity established in prior years to include establishing a robust hybrid cloud environment and expanding to access multiple training facilities within one geographic location. Current connections to the CMF			13.683	10.500	10.600

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
sites will be optimized to reduce latency and efficiency on the existing persistent backbone transport bandwidth. This will include providing network nodes at training sites and cyber ranges directly supporting PCTE.				
FY 2020 Plans: Connectivity will continue to extend the PCTE capabilities to more regional or base training facilities. This also includes extending the PCTE services to the National Guard and Reserve Cyber Mission Forces (CMF) teams, expansion to Government or commercial cloud capabilities, and expansion onto DoD enterprise transport capabilities to improve the reach of selected PCTE services.				
FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 increase is due to the requirements to extend PCTE capabilities to all available training facilities within the base.				
Title: Government Program Management for Persistent Cyber Training Environment (PCTE) Description: 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 Description: Persistent Cyber Training Environment (PCTE) integration, development, and operational testing that will include validation and verifications (V&V), limited user assessments (LUA), and testing in association with cyber training exercises.		1.682	5.517	2.502
FY 2019 Plans: Continue to complete multi-levels of evaluation and testing on individual products, integrated capabilities, and capability drops. This includes integration testing, field evaluations, and operational testing. Execute formal validation and verifications events prior to release of capability drops assuring capabilities perform as expected.				
FY 2020 Plans: Testing will continue in FY 2020 through integration testing, validation and verifications, limited user assessments, and exercises serving as PCTE operational testing. Testing is essential in FY 2020 to ensure that any fielded capability drop does not break the existng PCTE platform and training capabilities. Testing will also focus more on the ability to conduct multiple training events and the team/group and force levels.				
FY 2019 to FY 2020 Increase/Decrease Statement: The reduction in funding is due to anticipated learning curve efficiencies.				
Title: FY 2018 Congressional Rescission Description: FY 2018 Congressional Rescission		5.676	-	-
Accomplishments/Planned Programs Subtotals		56.071	52.817	52.102

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

<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u> <u>Base</u>	<u>FY 2020</u> <u>OCO</u>	<u>FY 2020</u> <u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• B65010: <i>Persistent Cyber Training Environment</i>	4.000	3.000	3.000	-	3.000	3.000	3.000	3.000	3.030	0.000	22.030

Remarks

B65010-OPA2

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 and Other Transaction Authority (OTA) vehicles to provide specified capabilities that will be integrated into a cohesive training platform. PCTE will provide iterative capability in prototypes provided to the Cyber Mission Forces (CMF) in drops that either improve or add features. These capability drops will be based on requirements contained and further developed as part of the PCTE Information System Capability Development Document (IS CDD).

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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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
Government Program Management	TBD	Various : Various	-	2.300		-		-		-		-	Continuing	Continuing	Continuing
Subtotal			-	2.300		-		-		-		-	Continuing	Continuing	N/A
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
PCTE Development and Integration	Option/CPFF	Various : Various	29.336	52.088	May 2018	47.300	Feb 2019	49.602	Feb 2020	-		49.602	Continuing	Continuing	Continuing
Subtotal			29.336	52.088		47.300		49.602		-		49.602	Continuing	Continuing	N/A
Remarks PCTE will utilize existing contracts in order to provide the best capabilities available within the market until the base contract is awarded in FY2020.															
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
PCTE Government Test and Evaluation	Various	Various : Various	-	1.683	Mar 2018	5.517	Mar 2019	2.500	Mar 2020	-		2.500	Continuing	Continuing	Continuing
Subtotal			-	1.683		5.517		2.500		-		2.500	Continuing	Continuing	N/A
Remarks Validation and Verification tests will be conducted with every capability drop utilizing Cyber Mission Force operators and representatives from the Operational Test Authority. PCTE will host limited excursions during cyber exercises in order to provide an operational evaluation ultimately building up to hosting a major force level exercise event.															
			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			29.336	56.071		52.817		52.102		-		52.102	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019												
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Event Name	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
Event Management																												
	Event Management																											
Environment																												
	Environment																											
Connectivity																												
	Connectivity																											
Training Sites																												
	Training Sites																											
Test and Evaluation																												
	Test and Evaluation																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Event Management	1	2017	4	2024
Environment	1	2017	4	2024
Connectivity	1	2017	4	2024
Training Sites	1	2017	4	2024
Test and Evaluation	2	2018	4	2024