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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force **Date:** February 2018

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0207605F / <i>Wargaming and Simulation Centers</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	4.090	12.839	6.141	0.000	6.141	6.256	6.365	6.496	6.615	Continuing	Continuing
672888: <i>Distributed Mission Operations Center (DMOC)</i>	-	4.090	12.839	6.141	0.000	6.141	6.256	6.365	6.496	6.615	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
In FY19, PE 0207605F (Wargaming and Simulation Centers), Project 672888, Distributed Mission Operations Center (DMOC) realigns Air, Space, and Cyberspace Constructive Environment - Information Operations Suite (ACE-IOS), Project 674567, Modeling and Simulation Foundations funds to PE 0207601F (USAF Modeling and Simulation) in order to support execution of Air Force Space Command's information operations simulation efforts.

A. Mission Description and Budget Item Justification

Distributed Mission Operations Center (DMOC) - The DMOC provides comprehensive Live, Virtual, and Constructive (LVC) simulation capabilities which prepare warfighters to conduct dominant operations in air, space, and cyber domains for theater-level, full spectrum combat training for Air Force, joint service, and coalition partners. The DMOC training capabilities reach 31 geographically separated LVC locations across 17 time zones representing such assets as real-world weapon systems, operator-in-the-loop, and constructive or computer-driven simulations. It is responsible for development and integration of scenarios, models, and databases and the integration of participating sites into Virtual Flag (VF) training events via numerous network connections, DMOC-developed interoperability tools, and controlled interfaces in support of Air Force, joint, and coalition warfighter readiness. In addition, activities include Distributed Mission Operations (DMO) technology and capability studies/analyses which support both current and future program planning and execution by:

1. Distributed Mission Operations Capability/Battlespace Systems Development: The DMOC upgrades and enhances the capabilities of various systems, tools, and simulators to incorporate ever-changing technology and emerging training requirements into DMO events; such as, Virtual Flag (VF) and Coalition VF (CVF) to enhance the quality of warfighter training. Activities include Environment Generator development, DMO Tool Development, and Simulator Enhancement. DMOC is in partnership with the US Naval Air Warfare Center-Aircraft Division (NAWCAD) to enhance the capabilities of the Next Generation Threat System (NGTS). The NGTS is the primary environment generator for both Blue and Red Air in DMOC White Force. DMO Tool development includes: a. DMOC Replay Tool (DRT) facilitates a more complete mission review and debrief capability of the exercises as more sites and systems are added to events, b. enhancement & improvement of the Distributed Interactive Simulation (DIS) Filter and the Doctor-J (Dr. J) tools to enable tactical datalinks to be communicated and translated between disparate simulator and operationally fielded (i.e. live aircraft) communication formats, c. Development of Intelligence, Surveillance, and Reconnaissance (ISR)/Battle Damage Assessment (BDA) to improve damage state models used by intelligence analysts in exercises, and d. development of solutions for integrating Contested Degraded Operations (geographical and communications jamming) into DMO events; and simulator enhancement efforts to incorporate Mission Package standards upgrades into the Control and Reporting Center (CRC) Simulation Package (CSP) to allow a real-world system to be used as a simulator when needed in DMO events.

2. Assessment & Authorization (A&A)/Software Certification: The DMOC supports cybersecurity requirements definition, integration/test support, analysis, systems engineering support, A&A of core systems, and support software certification. The DMOC implements cybersecurity requirements and is working towards the application

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of the Risk Management Framework (RMF) and Continuous Monitoring. Efforts include Cross-Domain Information Sharing / Multi-national Information Sharing (CDIS/ MNIS) ruleset development, load sharing, and testing; integration and testing of various newly developed / updated systems such as the DMOC Replay Tool, Dr. J, DIS Filter, and the DMOC Battlespace; and support of AFNIC software certification.

3. Distributed Training Sites & Systems Integration: DMOC integrates up to 30 geographically separated LVC training locations and 50+ systems into LVC DMO training events such as VF and CVF by resolving interoperability issues between disparate systems and networks so that all exercise participants can interact in the DMO environment. New sites and systems are incorporated into LVC DMO events each year based on higher headquarters and Combatant Commander's (CCDRs) emerging requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the DMOC 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, and 0605898F.

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 anticipated production funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	4.245	12.839	13.054	0.000	13.054
Current President's Budget	4.090	12.839	6.141	0.000	6.141
Total Adjustments	-0.155	0.000	-6.913	0.000	-6.913
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.155	0.000			
• Other Adjustments	0.000	0.000	-6.913	0.000	-6.913

Change Summary Explanation

In FY19, PE 0207605F (Wargaming and Simulation Centers), Project 672888, Distributed Mission Operations Center (DMOC) is reduced \$6.913M to transfer funds to PE 0207601F (Air, Space, and Cyberspace Constructive Environment - Information Operations Suite, ACE-IOS), Project 674567, Modeling and Simulation Foundations.

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Title: Distributed Mission Operations (DMO) Capability / Battlespace Systems Development</p> <p>Description: Simulation software/hardware development in support of users conducting RDT&E, mission rehearsal, and concepts of operation development.</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Continue DMO tool enhancements - Complete testing of software and DMO tools for Win 10/Red Hat Enterprise Linux (RHEL) 6 conversion - Strengthen DMOC/NAWCAD Partnership: Enhance Next Generation Threat System (NGTS) source code to implement Air Force DMO requirements; develop and install NGTS 3.2.0 - Develop & execute proof of concept for a virtualization suite; with future goal of full virtualization of the battlespace <p>FY 2019 Base Plans:</p> <ul style="list-style-type: none"> - Continue DMO tool enhancements - Continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, Develop/Install NGTS 3.2.X - Continue to explore, improve, and execute the plan for battlespace virtualization - Provide support to Virtual Test and Training Center (VTTC) at Nellis AFB as needed to provide interoperability, integration, and testing of high end advanced training and tactics capabilities <p>FY 2019 OCO Plans: None</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Normal Contract Inflation</p>	3.025	4.548	4.589	0.000	4.589
<p>Title: Assessment and Authorization (A&A)/Software Certification</p> <p>Description: Support requirements definition, integration test support, scenario development, analysis, systems engineering support, and Certification and Accreditation (C&A) and Networkiness of core systems. Implement requirements of Cybersecurity, Risk Management Framework, and Continuous Monitoring.</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Support integration/testing for the following A&A activities: 	0.353	0.505	0.514	0.000	0.514

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C. Accomplishments/Planned Programs (\$ in Millions)					
<ul style="list-style-type: none"> -- Initial and Phase 1 RMF ATO from HAF/A3 for Battlespace -- Renewal of ATO for Jumper Room with accompanying Systems Security Plan (SSP) modifications for new facility requirements -- Implement architecture design changes to improve cybersecurity measures (fiber upgrade, virtualization, tech refresh) -- Conduct high-side and low-side operations for simultaneous event, utilizing both DMOC enclaves - Successfully test and certify DMOC software through AFNIC Enterprise/Approved Products List (E/APL) process with new Windows 10 standard - Support CVF and RED KITE with CDIS ruleset development, testing, and implementation 					
FY 2019 Base Plans:					
<ul style="list-style-type: none"> - Will continue testing for the following Assessment and Authorization activities: -- Will obtain Phase 2 and final ATO from HAF/A3 for Battlespace -- Will maintain ATO for Jumper Room with accompanying SSP modifications for even-driven needs - Will continue to assess DMOC software for AFNIC E/APL process viability and test accordingly- Continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation 					
FY 2019 OCO Plans:					
None					
FY 2018 to FY 2019 Increase/Decrease Statement:					
Normal Contract Inflation					
Title: Distributed Training Sites and Systems Integration					
0.712 1.018 1.038 0.000 1.038					
Description: Establish distributed training site system integration and interoperability between DMOC, operational units, and modeling & simulation facilities.					
FY 2018 Plans:					
<ul style="list-style-type: none"> - Continue development of LVC concepts in support of VF/CVF/RED FLAG (RF) integration efforts - Continue integration of 5th generation capabilities and infrastructure into DMOC Jumper Room -- VF 18-2, NORTHCOM homeland defense in depth of the CONUS with advanced systems integration (4th/5th generation fighters, AEGIS, and Patriot) - Support/leverage/collaborate DMOC efforts with Virtual Test and Traing Center (VTTC) at Nellis to enable a high end advanced testing and tactics (HEAT2) capability - Support emerging higher headquarters/Combatant Commander's (CCDR) requirements 					

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C. Accomplishments/Planned Programs (\$ in Millions)										
<p>- Continue Virtual-into-Live integration and testing with Nellis Test and Training Range (NTTR)/Virtual Test and Training Center (VTTC)/Red Flag (RF) to include virtual Rivet Joint, virtual JSTARS, Battle Space Command and Control Center (BC3), etc.</p> <p>FY 2019 Base Plans:</p> <ul style="list-style-type: none"> - Will continue the development of LVC concepts in support of VF/CVF/RF integration efforts - Will continue to support/leverage/collaborate DMOC efforts with Virtual Test and Training Center at Nellis to enable a high end advanced testing and tactics (HEAT2) capability - Continue to support emerging higher headquarters/CCDR requirements - Continue Virtual-into-Live integration and testing with NTTR/VTTC/RF <p>FY 2019 OCO Plans: None</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Normal Contract Inflation</p>						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Title: Air, Space and Cyberspace Collaborative Environment - Information Operations Suite (ACE-IOS)</p> <p>Description: Air, Space and Cyberspace Collaborative Environment - Information Operations Suite (ACE-IOS) provides the authoritative representation of Air Force information operations. ACE-IOS is comprised of models that support training and mission rehearsal for the Air Force, Joint Task Force commanders, and Combatant Commander's battle staffs during Joint and Service exercises and experimentations.</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Complete ACE-IOS version 5.0.19 open systems architecture design and underlying communication infrastructure, evolving from 5.0.18 - Complete development of license-free replacements for two commercial licensed applications - Complete control Graphical User Interfaces (GUIs) and run-time scripts for process monitoring and control of the system - Complete design of Supervisory Control and Data Acquisition (SCADA) and cascading battlefield effects - Replace National Wargaming System - Complete the capability for initial intelligence paint and fused intelligence reporting - Will maintain Certification and Accreditation to achieve certificate to field award <p>FY 2019 Base Plans:</p>						0.000	6.768	0.000	0.000	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to ACE-IOS efforts being transferred to PE 0207601F, USAF Modeling and Simulation.					
Accomplishments/Planned Programs Subtotals	4.090	12.839	6.141	0.000	6.141

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

N/A

Remarks

N/A

E. Acquisition Strategy

Distributed Mission Operations Center (DMOC):

The DMOC supports AF/Joint/Coalition DMO and the Joint National Training Capability (JNTC) through the development and integration of DMO training and test events, networks, scenarios, and databases. Due to evolving modeling & simulation technology, the DMOC is an on-going, evolutionary effort to keep pace with those changes by continuously developing/upgrading DMO environment generators, systems, and tools and ensuring integration/interoperability of new systems into DMO to provide the best warfighter training possible.

DMOC has the following two primary contracts that manage the acquisition, development, testing, and integration of DMO standards, training, modeling and simulation, cross-domain information sharing testbed, and exercises on AF/Joint/Coalition DMO networks. Additionally, Military Interdepartmental Purchase Requests (MIPRs) are sent to other external organizations (i.e. NAWCAD and DMOC-S) to fund development of DMO tools that support DMOC efforts.

Infrastructure, Development, and Engineering (IDE) Contract: Develops/upgrades various DMOC tools, systems, and simulators that are needed to conduct DMO training events. Develops, implements, and tests technical solutions for the integration of sites/systems into VF, CVF, and other DMO events. The current IDE contract is cost-plus-fixed-fee with multiple task orders awarded for individual projects over the course of the fiscal year, and the follow-on IDE contract, which is scheduled to be awarded in the 2nd quarter of FY17, will be firm-fixed-price.

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<p>Command and Control Technical Support Contract (C2TSC): Supports government by assisting with development of technical requirements for upgrades to various systems and tools that will be developed by the IDE contractor and then performs acceptance testing of the those products. Develops requirements for site/system integration of sites/systems into VF, CVF, and other DMO events. C2TSC is a firm-fixed-price contract.</p> <p>F. Performance Metrics</p> <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 2019 Air Force												Date: February 2018			
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0207605F / Wargaming and Simulation Centers				Project (Number/Name) 672888 / Distributed Mission Operations Center (DMOC)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Distributed Mission Operations (DMO) Capability / Battlespace Systems Development, Certification & Accreditation (C&A) and Networkiness, and Distributed Training Sites& Systems Integration	C/CPFF	Lockheed Martin : Kirtland AFB, NM	-	3.225	Jan 2017	0.165	Mar 2018	-		-		-	Continuing	Continuing	94.000
Follow-on Distributed Mission Operations (DMO) Capability / Battlespace Systems Development, Certification & Accreditation (C&A) and Networkiness, and Distributed Training Sites & Systems Integration	C/FFP	TBD : Kirtland AFB, NM	-	-		3.355	May 2018	3.656	May 2019	-		3.656	Continuing	Continuing	75.000
NAWCAD NGTS Development	C/CPFF	J.F. Taylor, Inc. : Patuxent River, MD	-	0.340	Mar 2017	0.450	Mar 2018	-		-		-	Continuing	Continuing	-
ACE-IOS	C/T&M	CACI, Inc : Lackland AFB, TX	-	-		6.193	Dec 2017	-		-		-	Continuing	Continuing	50.665
Subtotal			-	3.565		10.163		3.656		-		3.656	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Technical requirements development, integration/ acceptance testing, and engineering support	C/FFP	Alpha-Omega : Kirtland AFB, NM	-	0.148	Jul 2017	0.562	Dec 2017	-		-		-	Continuing	Continuing	30.000
Follow-on requirements development, integration/	C/FFP	TBD : Kirtland AFB, NM	-	-		1.043	Apr 2018	2.185	Apr 2019	-		2.185	Continuing	Continuing	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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

DMO																												
DMO Capability / Battlespace Systems Development																												
Virtual Flag (VF)																												
Virtual Flag / Coalition Virtual Flag exercises																												
ACE-IOS																												
ACE-IOS Version 5.0.19																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
DMO				
DMO Capability / Battlespace Systems Development	1	2017	4	2023
Virtual Flag (VF)				
Virtual Flag / Coalition Virtual Flag exercises	1	2017	4	2023
ACE-IOS				
ACE-IOS Version 5.0.19	1	2018	4	2018