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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	6.113	7.535	7.004	0.000	7.004	6.867	6.995	7.142	7.301	Continuing	Continuing
672888: <i>Distributed Mission Operations Center (DMOC)</i>	-	6.113	7.535	7.004	0.000	7.004	6.867	6.995	7.142	7.301	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Distributed Mission Operations Center (DMOC) provides comprehensive Live, Virtual, and Constructive (LVC) simulation capabilities which prepare warfighters to conduct Joint All-Domain Command & Control (JADC2) operations in air, land, sea, space, and cyber domains for theater-level, full spectrum combat training for Air Force, joint service, and coalition partners. The DMOC training capabilities reach over 40 geographically separated Live, Virtual, and Constructive (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) and other Distributed Mission Operations (DMO) 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 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 emerging technology and 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), which 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 Gateway (CDOG, 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 complies with the application 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; support of Air Force Network Integration Center (AFNIC) software certification.

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3. Distributed Training Sites & Systems Integration: DMOC integrates over 40 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 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.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	6.341	7.535	0.000	0.000	0.000
Current President's Budget	6.113	7.535	7.004	0.000	7.004
Total Adjustments	-0.228	0.000	7.004	0.000	7.004
• 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	0.000	0.000			
• Other Adjustments	-0.228	0.000	7.004	0.000	7.004

**Change Summary Explanation**

The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY2023 cannot be made in a relevant manner.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> Distributed Mission Operations (DMO) Capability / Battlespace Systems Development	4.147	5.081	4.723	0.000	4.723
<b>Description:</b> Simulation software/hardware development in support of users conducting RDT&E, mission rehearsal, and concepts of operation development.					
<b>FY 2022 Plans:</b> - Continue DMO tool enhancements.					

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>- Continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, develop/install future versions of DMOC customized NGTS, and focus on increasing NAWCAD partnership/requirements development to better meet AF DMO needs.</p> <p>- Transition battlespace virtualization into operations and explore other virtualized methods to enhance training.</p> <p>- Continue to research and test promising emerging Modeling &amp; Simulation (M&amp;S) technologies for possible integration into DMO training.</p> <p>- Continue to explore and transition to cloud-based software development.</p> <p><b>FY 2023 Base Plans:</b></p> <p>- Will continue DMO tool enhancements.</p> <p>- Will continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, develop/install future versions of DMOC customized NGTS, and focus on increasing NAWCAD partnership/requirements development to better meet AF DMO needs.</p> <p>- Will transition battlespace virtualization into operations and explore other virtualized methods to enhance training.</p> <p>- Will continue to research and test promising emerging Modeling &amp; Simulation (M&amp;S) technologies for possible integration into DMO training.</p> <p>- Will continue to explore and transition to cloud-based software development.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Costs adjusted downward due to slight reduction (\$0.270M) in FY23 budget.</p>					
<p><b>Title:</b> Assessment and Authorization (A&amp;A)/Software (A&amp;AS) Certification</p> <p><b>Description:</b> Support requirements definition, integration test support, scenario development, analysis, systems engineering support, and Certification and Accreditation (C&amp;A) and Networthiness of core systems. Implement requirements of Cybersecurity, Risk Management Framework, and Continuous Monitoring.</p> <p><b>FY 2022 Plans:</b></p> <p>- Continue testing for the following Assessment and Authorization activities:</p> <p>-- Maintain ATO from HAF/A3 for Battlespace.</p> <p>-- Maintain ATO for Jumper Room with accompanying SSP modifications for event-driven needs.</p> <p>- Continue to assess DMOC software for the AFNIC E/APL process viability and test accordingly</p>	0.466	0.581	0.540	0.000	0.540

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> <li>- Continue A&amp;A support for virtualization effort.</li> <li>- Continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation.</li> <li>- Continue development of Cross Domain Solutions into LVC training.</li> </ul> <p><b>FY 2023 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue testing for the following Assessment and Authorization activities:                             <ul style="list-style-type: none"> <li>-- Will maintain ATO from HAF/A3 for Battlespace.</li> <li>-- Will maintain ATO for Jumper Room with accompanying SSP modifications for event-driven needs.</li> </ul> </li> <li>- Will continue to assess DMOC software for the AFNIC E/APL process viability and test accordingly</li> <li>- Will continue A&amp;A support for virtualization effort.</li> <li>- Will continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation.</li> <li>- Will continue development of Cross Domain Solutions into LVC training.</li> </ul> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Costs adjusted downward due to slight reduction (\$0.270M) in FY23 budget.</p>					
<p><b>Title:</b> Distributed Training Sites and Systems Integration</p> <p><b>Description:</b> Establish distributed training site system integration and interoperability between DMOC, operational units, and modeling &amp; simulation facilities.</p> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue the development of LVC concepts in support of VF/CVF integration efforts.</li> <li>- Continue to support emerging higher headquarters/CCDR requirements.</li> <li>- Continue Virtual-into-Live integration and testing with NTTR/VTTC/RF.</li> <li>- Expand Jumper Room support to CJCS events.</li> <li>- Expand distributed operations to increase the number of small-scale, joint/coalition events.</li> <li>- Utilize the Nellis Mission Operations Network (NMON) to enable VTTC incorporation into Joint/Coalition exercises.</li> </ul> <p><b>FY 2023 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue the development of LVC concepts in support of VF/CVF integration efforts.</li> <li>- Will continue to support emerging higher headquarters/CCDR requirements.</li> </ul>	1.500	1.873	1.741	0.000	1.741

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> <li>- Will continue Virtual-into-Live integration and testing with NTTR/VTTC/RF.</li> <li>- Will expand Jumper Room support to CJCS events.</li> <li>- Will expand distributed operations to increase the number of small-scale, joint/coalition events.</li> <li>- Will utilize the Nellis Mission Operations Network (NMON) to enable VTTC incorporation into Joint/Coalition exercises.</li> </ul> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Costs adjusted downward due to slight reduction (\$0.270M) in FY23 budget.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	6.113	7.535	7.004	0.000	7.004

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**  
N/A

**E. Acquisition Strategy**  
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) 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. IDE is a firm-fixed-price contract.

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**Appropriation/Budget Activity**  
3600: *Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development*

**R-1 Program Element (Number/Name)**  
PE 0207605F / *Wargaming and Simulation Centers*

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 delivered products. Develops requirements for site/system integration of sites/systems into VF, CVF, and other DMO events. C2TSC is a firm-fixed-price contract.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / Wargaming and Simulation Centers	<b>Project (Number/Name)</b> 672888 / Distributed Mission Operations Center (DMOC)
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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/FFP	General Dynamics IT : Kirtland AFB, NM	-	3.358	Nov 2020	3.779	Nov 2021	3.500	Nov 2022	-		3.500	Continuing	Continuing	17.662
NAWCAD NGTS Development	MIPR	NAWCAD : Patuxent River, MD	-	0.992	Nov 2020	1.050	Nov 2021	1.445	Nov 2022	-		1.445	Continuing	Continuing	-
Artificial Intelligence Integration Into VF (Concept and Development)	C/CPFF	TBD : TBD	-	0.200	Nov 2021	0.750	Aug 2022	0.350	Aug 2023	-		0.350	Continuing	Continuing	-
Global Positioning System (GPS) Jamming Integration Into VF (Concept and Development)	C/CPFF	TBD : TBD	-	0.255	Nov 2021	0.750	Aug 2022	0.500	Aug 2023	-		0.500	Continuing	Continuing	-
<b>Subtotal</b>			-	4.805		6.329		5.795		-		5.795	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	River Tech, LLC : Kirtland AFB, NM	-	1.108	Jan 2021	0.966	Jan 2022	0.959	Jan 2023	-		0.959	Continuing	Continuing	4.759
<b>Subtotal</b>			-	1.108		0.966		0.959		-		0.959	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2023 Air Force</b>		<b>Date:</b> April 2022
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FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
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

<b>DMO</b>	
DMO Capability / Battlespace Systems Development	
<b>Virtual Flag (VF)</b>	
Virtual Flag / Coalition Virtual Flag exercises	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>DMO</b>				
DMO Capability / Battlespace Systems Development	1	2021	4	2027
<b>Virtual Flag (VF)</b>				
Virtual Flag / Coalition Virtual Flag exercises	1	2021	4	2027