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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

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| 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 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | FY 2022 | FY 2023 | FY 2024 | FY 2025 | Cost To Complete | Total Cost |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | - | 5.916 | 4.316 | 6.353 | 0.000 | 6.353 | 7.648 | 7.378 | 6.721 | 6.844 | Continuing | Continuing |
| 672888: <i>Distributed Mission Operations Center (DMOC)</i> | - | 5.916 | 4.316 | 6.353 | 0.000 | 6.353 | 7.648 | 7.378 | 6.721 | 6.844 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

The Distributed Mission Operations Center (DMOC) provides comprehensive Live, Synthetic, and Blended (LSB) simulation capabilities which prepare warfighters to conduct dominant 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 31 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) 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 The Distributed Mission Operations Center (DMOC) provides comprehensive Live, Synthetic, and Blended (LSB) simulation capabilities which prepare warfighters to conduct dominant 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 31 geographically separated Live, Virtual and Constructive 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 Virtual Flag (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

UNCLASSIFIED

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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 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 Air Force Network Integration Center (AFNIC) software certification.

3. Distributed Training Sites & Systems Integration: DMOC integrates up to 31 geographically separated LVC training locations and 50+ systems into LSB 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 LSB DMO events each year based on higher headquarters and Combatant Commander's (CCDRs) emerging requirements.

The FY 2020 funding request was reduced by \$1.940 million to account for the availability of prior year execution balances.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Distributed Mission Operations Center capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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.

UNCLASSIFIED

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| B. Program Change Summary (\$ in Millions) | FY 2019 | FY 2020 | FY 2021 Base | FY 2021 OCO | FY 2021 Total | |
| Previous President's Budget | 6.141 | 4.316 | 6.365 | 0.000 | 6.365 | |
| Current President's Budget | 5.916 | 4.316 | 6.353 | 0.000 | 6.353 | |
| Total Adjustments | -0.225 | 0.000 | -0.012 | 0.000 | -0.012 | |
| • 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 | -0.225 | 0.000 | -0.012 | 0.000 | -0.012 | |
| C. Accomplishments/Planned Programs (\$ in Millions) | | | | FY 2019 | FY 2020 | FY 2021 |
| Title: Distributed Mission Operations (DMO) Capability / Battlespace Systems Development | | | | 4.364 | 2.931 | 4.744 |
| Description: Simulation software/hardware development in support of users conducting RDT&E, mission rehearsal, and concepts of operation development. | | | | | | |
| FY 2020 Plans: | | | | | | |
| - Continue DMO tool enhancements | | | | | | |
| - Continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, Develop/Install future versions of DMOC customized NGTS | | | | | | |
| - Continue to Explore, improve, and execute the plan for battlespace virtualization and DMO tools | | | | | | |
| - Prepare readiness posture for emerging technologies and cybersecurity measures. | | | | | | |
| FY 2021 Plans: | | | | | | |
| - Will continue DMO tool enhancements | | | | | | |
| - Will continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, Develop/Install future versions of DMOC customized NGTS | | | | | | |
| - Will continue to explore, improve, and execute the plan for battlespace virtualization and DMO tools | | | | | | |
| - Will prepare readiness posture for emerging technologies and cybersecurity measures. | | | | | | |
| FY 2020 to FY 2021 Increase/Decrease Statement: | | | | | | |
| FY 2020 decrease is a result of a \$1.940 million program reduction to account for the availability of prior year execution balances. Full funding is being restored to the program in FY 2021, which is why the FY 2021 is higher than FY 2020. | | | | | | |
| Title: Assessment and Authorization (A&A)/Software Certification | | | | 0.514 | 0.328 | 0.533 |

UNCLASSIFIED

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|---|--|---|----------------|----------------|
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| C. Accomplishments/Planned Programs (\$ in Millions) | | FY 2019 | FY 2020 | FY 2021 |
| <p>Description: Support requirements definition, integration test support, scenario development, analysis, systems engineering support, and Certification and Accreditation (C&A) and Networthiness of core systems. Implement requirements of Cybersecurity, Risk Management Framework, and Continuous Monitoring.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue testing for the following Assessment and Authorization activities: -- Maintain ATO from HAF/A3 for Battlespace -- Maintain ATO for Jumper Room with accompanying SSP modifications for even-driven needs - Continue to assess DMOC software for AFNIC E/APL process viability and test accordingly - Provide A&A support for virtualization effort - Continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation. - -Begin development of utilizing Cross Domain Solutions into LSB Training <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Will continue testing for the following Assessment and Authorization activities: -- Maintain ATO from HAF/A3 for Battlespace -- 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 - Will provide A&A support for virtualization effort - Will continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation. -Will continue development of utilizing Cross Domain Solutions into LSB training <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p> <p>FY 2020 decrease is a result of a \$1.940 million program reduction to account for the availability of prior year execution balances. Full funding is being restored to the program in FY 2021, which is why the FY 2021 is higher than FY 2020.</p> | | | | |
| <p>Title: Distributed Training Sites and Systems Integration</p> <p>Description: Establish distributed training site system integration and interoperability between DMOC, operational units, and modeling & simulation facilities.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue the development of LVC concepts in support of VF/CVF/RF integration efforts - Continue to support emerging higher headquarters/CCDR requirements - Continue Virtual-into-Live integration and testing with NTTR/VTTC/RF - Expand Jumper Room support to CJCS events | | 1.038 | 1.057 | 1.076 |

UNCLASSIFIED

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|---|--|---|----------------|----------------|
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| C. Accomplishments/Planned Programs (\$ in Millions) | | FY 2019 | FY 2020 | FY 2021 |
| <ul style="list-style-type: none"> - Expand current practice of distributed training - Establish NMON connection for use in joint training exercises <p>FY 2021 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 emerging higher headquarters/CCDR requirements - Will continue Virtual-into-Live integration and testing with NTTR/VTTC/RF - Will expand Jumper Room support to CJCS events - Will expand current practice of distributed training - Will utilize NMON connection for use in joint training exercises <p>FY 2020 to FY 2021 Increase/Decrease Statement: Normal inflationary cost.</p> | | | | |
| Accomplishments/Planned Programs Subtotals | | 5.916 | 4.316 | 6.353 |
| D. Other Program Funding Summary (\$ in Millions) | | | | |
| N/A | | | | |
| Remarks | | | | |
| N/A | | | | |
| E. Acquisition Strategy | | | | |
| <p>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.</p> <p>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.</p> <p>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.</p> | | | | |

UNCLASSIFIED

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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> | | |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force | | | | | | | | | | | | Date: February 2020 | | | |
|--|------------------------|--|-------------|--|------------|---------|------------|---|------------|-------------|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity | | | | R-1 Program Element (Number/Name) | | | | Project (Number/Name) | | | | | | | |
| 3600 / 7 | | | | PE 0207605F / Wargaming and Simulation Centers | | | | 672888 / Distributed Mission Operations Center (DMOC) | | | | | | | |
| Product Development (\$ in Millions) | | | | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 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 |
| Product Development | C/CPAF | Not specified. : TBD | - | - | | - | | - | | - | | - | Continuing | Continuing | - |
| 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 | - | 4.342 | Jan 2019 | 3.198 | Jan 2020 | 4.287 | Nov 2020 | - | | 4.287 | Continuing | Continuing | 17.662 |
| NAWCAD NGTS Development | MIPR | NAWCAD : Patuxent River, MD | - | 0.411 | Nov 2018 | 0.375 | Nov 2019 | 0.425 | Nov 2020 | - | | 0.425 | Continuing | Continuing | - |
| Subtotal | | | - | 4.753 | | 3.573 | | 4.712 | | - | | 4.712 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 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 |
| Support | C/CPAF | Not specified. : TBD | - | - | | - | | - | | - | | - | Continuing | Continuing | - |
| Technical requirements development, integration/ acceptance testing, and engineering support | C/FFP | River Tech, LLC : Kirtland AFB, NM | - | 0.955 | Mar 2019 | 0.548 | Jan 2020 | 1.343 | Jan 2021 | - | | 1.343 | Continuing | Continuing | 4.759 |
| Subtotal | | | - | 0.955 | | 0.548 | | 1.343 | | - | | 1.343 | Continuing | Continuing | N/A |
| Management Services (\$ in Millions) | | | | FY 2019 | | FY 2020 | | FY 2021 Base | | FY 2021 OCO | | FY 2021 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 |
| Management Services | C/CPAF | Not specified. : TBD | - | - | | - | | - | | - | | - | Continuing | Continuing | - |

UNCLASSIFIED

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| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force | | Date: February 2020 |
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| | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | | FY 2025 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

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| Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force | | Date: February 2020 |
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Schedule Details

| Events by Sub Project | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| DMO | | | | |
| DMO Capability / Battlespace Systems Development | 1 | 2019 | 4 | 2025 |
| Virtual Flag (VF) | | | | |
| Virtual Flag / Coalition Virtual Flag exercises | 1 | 2019 | 4 | 2025 |