



TASK ORDER NUMBER: 001-MOD4 – W81XWH1590001-0006

MTEC RESEARCH PROJECT NUMBER: MTEC-17-07-JETS-03

EGS NUMBER: MT17007.03

TITLE: Prototype of Joint Evacuation and Transport Simulation (JETS) System

PRINCIPAL INVESTIGATOR: Catherine Strayhorn, CEO, IVIR Inc.

PERFORMING ORGANIZATION: Information Visualization and Innovative Research (IVIR Inc.)

CONTRACTING ORGANIZATION: Medical Technology Enterprise Consortium (MTEC)

REPORT DATE: 25 January 2022

TYPE OF REPORT: Annual Report

PREPARED FOR: U.S. Army Medical Research and Development Command  
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: "Approved for Public Release; Distribution Unlimited"

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.



<b>REPORT DOCUMENTATION PAGE</b>		<i>Form Approved</i> <i>OMB No. 0704-0188</i>
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. <b>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</b>		
<b>1. REPORT DATE</b> 25 January 2022	<b>2. REPORT TYPE</b> Annual Report	<b>3. DATES COVERED</b> 01 Jan 2021–31 Dec 2021
<b>4. TITLE AND SUBTITLE</b>  Prototype of Joint Evacuation and Transport Simulation (JETS) System Phase-III		<b>5a. CONTRACT NUMBER</b> W81XWH-15-9-0001
		<b>5b. GRANT NUMBER</b> N/A
		<b>5c. PROGRAM ELEMENT NUMBER</b> N/A
<b>6. AUTHOR(S)</b>  Strayhorn, Catherine, BS-PI; Lewandowski, William, MS-Educational Engineer; Kuenzig Dee, MS-Program Manager; Honold, Erin, BS-Systems Engineer; Lewandowski, William II, MS-Architecture Engineer, Samuel Strayhorn, BS-Assistant Program Manager  E-Mail: cstrayhorn@ivirinc.com		<b>5d. PROJECT NUMBER</b> [MT17007.03]
		<b>5e. TASK NUMBER</b> [Enter Unique Task Order #]
		<b>5f. WORK UNIT NUMBER</b> N/A
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b>  Information Visualization and Innovative Research (IVIR Inc.) 1990 Main Street, Suite 750 Sarasota, Fl. 34236		<b>8. PERFORMING ORGANIZATION REPORT</b>  [Enter RPA#]
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b>  U.S. Army Medical Research and Development Command Fort Detrick, Maryland 21702-5012		<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b> USAMRMC
		<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b> N/A
<b>12. DISTRIBUTION / AVAILABILITY STATEMENT</b>  Approved for Public Release; Distribution Unlimited		
<b>13. SUPPLEMENTARY NOTES</b> Prepared in cooperation with sub-awardees HC Simulation, Pitch Technologies, Education Management Solutions (EMS), Content Writers Workshop, Calytrix, 3D Systems, ECS, and program Subject Matter Experts (SMEs)		
<b>14. ABSTRACT</b>  Proper medical training is critical to ensure that Service component members are prepared for wartime deployment, with a particular emphasis to support the en route care of patients from initial point of injury through several echelons to Continental U.S. (CONUS)-based military hospitals. Currently, medical training is generally conducted within each Service component "independently" (i.e., Army, Navy, Air Force, etc.) and our NATO/Coalition allies, with only occasional combined training. In addition, there is a wide repertoire of tools, devices, and approaches used to provide deployable training to Service member, ranging from devices (e.g., manikins) to computerized simulations to formal didactic training through internet-based, video, or classroom style instruction. This study and design effort systematically gathered and transformed requirements for JETS into an architecture description that provides a basis for understanding the current state of the potential component parts, the work required to achieve the Medical Simulation Enterprise (MSE) vision, and the staging of further development to successfully bring the full family of systems online.		

<b>15. SUBJECT TERMS</b>					
Medical simulation, casualty care, high level architecture, federation object model, capability development document, training					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b>	<b>18. NUMBER</b>	<b>19a. NAME OF RESPONSIBLE PERSON</b>
<b>a. REPORT</b>	<b>b. ABSTRACT</b>	<b>c. THIS PAGE</b>			<b>19b. TELEPHONE NUMBER</b> <i>(include area code)</i>
Unclassified	Unclassified	Unclassified	Unclassified	31	

Standard Form 298 (Rev. 8-98)

## TABLE OF CONTENTS

Annual Technical Report

1. Project Status	
a. Accomplishments .....	6 - 7
b. Reportable Outcomes .....	7 - 8
c. Progress Detail .....	8 - 22
2. Future Plans .....	22
3. Problems / Issues .....	22-23
a. Current Problems / Issues .....	23
b. Anticipated Problems / Issues .....	23
4. Financial Health .....	23
5. Personnel Effort .....	23-24
6. Protocol and Activity Status .....	24 - 26
a. Human Use Regulatory Protocols .....	
b. Use of Human Cadavers for RDT&E, Education or Training .....	
c. Animal Use Regulatory Protocols .....	

Annual Business Report

1. Current Staff .....	28
2. Current Expenditures .....	28
3. Status of Milestones .....	28 - 31
4. Deviation from Project Plan .....	31



**Annual Technical Status Report for**

MTEC-17-07-JETS-03 Prototype of Joint Evacuation and Transport Simulation (JETS) System

Research Project No. 2018-649-001

EGS# MT17007.03

Reporting Period: Effective Date – 01 January 2021 – 31 December 2021

**MTEC Research Project Awardee**

Catherine Strayhorn, CEO, Contractual Representative, PI

IVIR Inc.

1990 Main Street, Suite 750

Sarasota, Fl. 34236

941-961-0627

cstrayhorn@ivirinc.com

William Lewandowski, Technical Representative

IVIR Inc.

1990 Main Street, Suite 750

Sarasota, Fl. 34236

blewandowski@ivirinc.com

Submitted: JETS Annual Report Submitted on 25 January 2022



## 1. Project Status

### a. Accomplishments

This may include completion of milestones, objectives, and/or tasks, regulatory approval received, publication of papers, presentations at conferences, filing of intellectual property, etc. for this year. Write salient bullet points to highlight the requested information.

The following objectives and tasks were accomplished during the reporting period of 01-January-2021 through 31-March 2021:

- Updated the Project Plan Monthly
- Held Phase III Weekly Sprint Meetings, and Monthly Status Meetings with the Government
- Completed and submitted all required Monthly Report Milestones
- Completed and submitted Annual Report 3, 23 January 2021
- Held Technical Review Meeting with JPC-1, 3 February 2021
- Submitted Contract Modification 6 per Technical Meeting outcome 8 March 2021

The following objectives and tasks were accomplished during the reporting period of 01-April-2021 through 30-June-2021:

- Updated the Project Plan Monthly
- Continued Weekly Sprint Meetings and Monthly Status Meetings with the Government
- Completed and submitted all required Monthly Report Milestones
- Completed and Submitted Quarterly Report 10 on 23 April 2021
- Updated all project documents and Milestone Payment Schedule to reflect Contract Modification 6
- Held internal design review meetings on 22 and 29 April to discuss updated design approach for demonstration based on government feedback
- Provided demonstration design briefing to JPC-1 on 21 May 2021
- Provided same briefing to the Government audience on the JETS design demonstration on 24 May 2021
- Finalized design concept for the JETS demonstration system
- Released MMS FOM v0.3.dev05
- Received approval from JPC-1, the sponsor and the SOTR, to change the meaning of “JETS” to “Joint Emergency Trauma Simulation”

The following objectives and tasks were accomplished during the reporting period of 01-July-2021 through 30 September 2021:

- Updated the Project Plan Monthly
- Continued Weekly Sprint Meetings and Monthly Status Meetings with the Government
- Completed and submitted all required Monthly Report Milestones
- Completed and submitted the Quarterly Report 11 on 23 July 2021
- Updated the Project Deliverable Dates and Milestone Payment Schedule to reflect Contract Modification 7



- Held internal design meetings to discuss updated design approach for demonstration based on government feedback
- Drafted and received approval for marketing plan approach from government
- Received approval for animation script and Storyboard from the Government
- Completed Instructional Design Lesson Plan for the JETS program
- Completed the Leishmaniasis Augmented Reality model

The following objectives and tasks were accomplished during the reporting period of 01-October-2021 through 31-December 2021:

- Continued updating the Project Plan Monthly
- Continued Weekly Sprint Meetings and Monthly Status Meetings with the Government
- Completed and submitted all required Monthly Report Milestones
- Completed and submitted Quarterly Report 12 on 25 October 2021
- Continued updating the Sub-Contractor Agreements based on Period of Performance due to COVID-19 Protocols
- Submitted Abstract and was selected for MODSIM 2022 to be held May 9 - 11
- Submitted documentation and launched the web article marketing plan for publishing
- Presented JETS concept to the Synthetic Training Environment (STE) Medical Working Group
- Coordinated the logistics for the JETS demonstration at MacDill AFB and Fort Sam Houston
- Submitted Contract Modification 8, a No Cost Extension (NCE) through the 31 March 2022
- Submitted the updated PFCT CDRL's with the JETS specified changes

## b. Reportable Outcomes

This may include development of a product, prototype, new methodology, or any other similar items that have resulted from this research. Write salient bullet points to highlight the requested information. Please also include a cumulative chronological list of written publications in technical journals, papers, or other presentations at meetings, conferences, seminars, etc.; New discoveries, inventions, or patent disclosures, and specific applications.

The following outcomes were realized during the reporting period of 01-January-2021 through 31-March-2021:

- Submitted the JETS information draft abstract to I/ITSEC for the 2021 December I/ITSEC conference
  - Received acceptance of the I/ITSEC abstract to submit a full paper for peer review

The following outcomes were realized during the reporting period of 01-April-2021 through 30-June-2021:

- Conducted a briefing with the Director of Simulation, Medical Center of Excellence regarding the JETS Architecture
  - The intent is to determine how JETS is beneficial to the end-users and gain support for the demonstration
- Collaborated with I/ITSEC assigned birddog to draft a full paper for consideration and presentation at the I/ITSEC conference in 2021 December
  - Paper, and release were submitted on 21 June by upload to the I/ITSEC website



The following outcomes were realized during the reporting period of 01-July-2021 through 30-September-2021:

- Completed the JETS Animation video for use during the demonstration and JETS Website

The following outcomes were realized during the reporting period of 01-October-2021 through 31-December-2021:

- Continued marketing plan through Healthy Simulation
  - Launched JETS web article and banner ads through Healthy Simulation
- Submitted the AMSUS Draft Slide Presentation for AMSUS 2022
- Submitted Abstract and was selected for paper for MODSIM 2022, May 9 - 11

### c. Progress Detail

Describe each Statement of Work (SOW) task or logical segment of work on which effort was expended during this quarterly reporting period only. Description shall include pertinent data and graphs in sufficient detail to explain any significant results achieved or problems encountered. A succinct description of the methodology used shall be provided.

For an award that includes the recruitment of human subjects for clinical research or a clinical trial: (i) report progress on subject recruitment, screening, enrollment, completion, and numbers of each compared to original planned target(s), e.g., number of subjects enrolled versus total number proposed; (ii) report amendments submitted to the IRB and USAMRDC HRPO for review; and (iii) any adverse events.

**Milestone Detail:** The following outlines the efforts undertaken during the period for the reporting period of 01 January-2021 through 31-March-2021

- **047:** Architecture Validation – **Closed**
- **048:** FOM Extended Demonstration – **In Progress**
  - Continued collaboration and communication with the proposed locations for the JETS Phase III Demo. Initiated contact with the Pennsylvania Army and Air National Guard as a risk mitigator in lieu of projected sites not able to participate due to current protocols regarding COVID-19
  - Continued drafting the demonstration design document
    - Added sequence and use case diagrams for each of the handoff events
      - Initial diagrams focus on the human interactions during the handoff and how the handoff events align with actions in OneSAF
    - Added use case diagrams describing the startup events at each site during the demonstration
      - The federation will have an object that describe the status of the federation (waiting on start, started, paused, stopped)
      - Systems that join the federation later in the demo, such as the systems at the en route care and Role 3 training event sites, will be able to join the federation and immediately know the operational state of the federation
    - Continued adding deployment diagrams to account for all supplementary equipment needed for the demonstration
  - Continued regular design meetings with development subcontractors as required



- Provided support to ECS to enable TC3Sim to join the federation
- Worked with HCSimulation to verify that treatments were properly mapped to the corresponding injuries, test and fix the mapping of the FOM objects to HumMod treatments
- Verified that SimulationIQ systems were updated to the current version of the FOM (v0.3.dev.04)
- Began investigating upgrading the software used to generate code and libraries for the systems to integrate with the federation
- Began work on the next version of the FOM: v0.3.dev05
  - The release includes an upgrade to the software used to generate code
  - Release was put on hold pending the result of the 11 February meeting for the PFC component of the deliverable
  - Continued documenting necessary equipment for the demonstration system and network setup. This aligned with the deployment diagrams in the system design documentation
- Continued to update and utilize a Git repository for configuration management of the Medical Modeling and Simulation (MMS) Federation Object Model (FOM) and the code needed for each federate
- Continued updating the MMS FOM
  - Updated a set of medical evacuation interactions to the FOM to support integration with OneSAF or other tactical simulation systems
    - The interactions include an evacuation request, response, and update between OneSAF and the MMS Control software
    - The evacuation enumeration set includes items such as evac requested, request acknowledged, vehicle en route, and arrival notices
    - The vehicle type enumeration set includes ground and air ambulance requests, allowing OneSAF to determine the specific vehicle to dispatch based on availability
  - Support to capture a DD1380 as binary data was added. This will allow the federation to capture a handwritten DD1380 as either a picture or pdf file
  - A Simulation Status object was added, allowing all federates to know the current operational status of the federation (waiting for start, running, paused, etc). This allows systems that join late to immediately know the operational state
  - Patient specific control interactions were added that apply only to the patient modeling system, allowing operators to start or pause a patient independently from other systems on the federation
  - Continued updates to the treatment and medication enumeration lists based on prolonged field care patient treatments
- Held meeting with JPC-1 on 3 February 2021 to discuss the future direction of JETS and adjustments in the planned demonstration
  - IVIR prepared and submitted an outline based upon meeting discussion, which was approved by JPC-1
  - Work on design documentation has been put on hold as the result of this meeting
  - IVIR held an internal design review meeting on 04 March 2021 to define the new system requirements
  - The full scope of design changes will be documented in the demonstration design documents

- Some key aspects of the new design:
      - Multiple smaller demonstrations instead of one large demonstration
      - Focus on modularity and human factors system design
      - Developing a new lesson plan wizard to allow custom creation of lesson plans and checklists
      - Redefined the role of the tactical simulation system with the potential for integration to the synthetic training environment (STE)
    - Some existing core design focuses will remain with limited changes:
      - Focus on patient handoffs and transfers
      - Enabling global and summarized views of the federation during training events
      - Utilizing multiple training
  - Began migrating to the Portico runtime interface (RTI), an open source RTI that will replace the Pitch RTI
    - Held kickoff meeting with Calytrix on 11 March 2021
  - Began work on acquiring the REBOA part task trainer system
    - Held kickoff meeting with 3D Systems on 18 March 2021
  - Began updating capability and requirement documentation to track all system requirements for the new demonstration design
  - Began designing new workflow processes involving the learning management system, learner record store, and the new lesson plan wizard
  - Began upgrading to Developer Studio 6.0, to provide better support for different code compilers and libraries
    - This software is used to generate code for each of the systems to join the federation
- **049: Program Management – In Progress**
  - Continued coordination and scheduling of Weekly and Monthly Project Update Calls
  - Continued modifying and updating the Project schedule based upon Government guidance
  - Submitted the 18, 19, and 20 Monthly Reports
  - Submitted Annual Report 3 (Q4 2021) due 25 January 2021
  - Continued to monitor Sub-Contractor Agreements/Statements of Work (SOW)
  - Submitted contract modification request to MTEC/JPC-1 for additional funding, and changes to the SOW. Monitored progress of Contract modification 6 request through approval channels
- **074: Monthly Sprint Report Phase III – Month 18 – Complete**
  - Submitted Phase III Month 19 report due on 07 January 2021
  - The following files were submitted with MS 74
    - File Name: *JETS Phase III MS Project Chart v1.2 as submitted 07 January 2021*
- **075: Annual Report 3 - Complete**
  - Submitted Annual Report 3 on 23 January 2021
- **076: Monthly Sprint Report Phase III – Month 19 – Complete**
  - Submitted Phase III Month 19 report on 05 February 2021
  - The following files were submitted with MS 76
    - File Name: *JETS Phase III MS Project Chart v1.2 as submitted 05 February 2021*
- **077: Monthly Sprint Report Phase III – Month 20 – Complete**

- Submitted Phase III Month 20 report on 05 March 2021
- The following files were submitted with MS 77
  - File Name: *JETS Phase III MS Project Chart v1.2 as submitted 05March2021*
- **083: MSE Propagation and Advocacy - In Progress**
  - Continued searching venues to develop advocacy for JETS
    - Initiated contact with the conference committee for the Operational Medicine Symposium to be held on 28-29 September 2021 in San Antonio, TX
    - Contacted the Defense Strategies Institute and provided information regarding JETS, and obtained the information to participate in the 2021 Operation Medical Symposium
  - Continued contacting stakeholders:
    - Initiated contact with the Surgeon's Sergeant Major for the US Army Force Command to coordinate and present JETS for the surgeon's staff
    - Initiated contact with Captain Daryl Daniels, Surgeon, US Naval Fleet Forces Command to present the JETS Demo to the surgeon's staff
    - Provided a brief at the 927th Aeromedical Staging Squadron, US Air Force at the MacDill Air Force Base regarding the JETS Phase III Demo. The leadership displayed interest in participation of the JETS Phase III Demo
    - Conducted a conference call with the Medical Site at Fort Indiantown Gap, PA
    - Contacted the Joint Trauma Systems staff at Fort Sam Houston, TX. The JTS leadership has tentatively given IVIR the opportunity to provide an online briefing
    - Conversed with the Directorate of Simulation at the Medical Center of Excellence and discussed the utility of the JETS Architecture to facilitate Delayed Evacuation Casualty Management (DECM) Course
    - Continued updating and reviewing the stakeholder spreadsheet based on the outcome of the design changes
  - Conferences:
    - Invited by AMSUS to consider presenting the JETS/PFC presentation via webinar
    - Continued communicating with AMSUS staff to gather information on JETS presentation in webinar format to expand information to potential stakeholders
  - Drafted and submitted a JETS Phase III abstract to ITSEC for consideration for presentation at the conference to be held in December 2021
    - IVIR received notification of acceptance of the abstract and to submit a full paper for peer reviewed
  - Prepared and submitted JETS information of a draft abstract for submission to MHSRS, submitted 31 March 2021
  - Website:
    - Continued working with Content Workshop on the creation of the JETS website
    - Continued updating and editing the copywrite for the draft website pages
    - Continued editing based on IVIR and government feedback
    - Generated and updated the wireframe layout based on internal feedback
      - Created site map Version 2 which after presentation to the government, received Government approval to move forward
  - Updated a new copy for Version 2 website and received and implemented the feedback
  - Presented the draft layout for the JETS website to government for feedback, JPC-1 approved moving forward

- Initiated the final installment for website and graphic design development
- Continued updating the copy and graphics
  - IVIR continues to conduct internal reviews and make the necessary changes based upon new and updated Government guidance

**Milestone Detail:** The following outlines the efforts undertaken during the period for the reporting period of 01 April-2021 through 30-June-2021

- **048: FOM Extended Demonstration – In Progress**
  - Held internal design review meetings on 22 April and 29 April to discuss new design approach to the demonstration. The previous approach of smaller demonstrations at conferences was shifted back to a full joint demonstration to be held at Ft. Sam Houston. A summary of key points follows:
    - A large synchronous demonstration across several roles of care
    - An asynchronous demonstration
    - Several small technical feature demonstrations alongside the primary synchronous demonstration
    - Focus will remain on modularity and human factors system design to facilitate ease of use
    - Focus will remain on patient handoffs and transfers
    - Developing a new lesson plan wizard to facilitate creation of custom lesson plans and checklists
    - Redefined the role of the tactical simulation system with the potential for integration to the synthetic training environment (STE) in the future
    - Will enable a global and summarized view of the federation during training events
    - Utilizing multiple training modalities including patient simulators and virtual patients
  - Provided a demonstration design briefing to JPC1 on 21 May 2021
  - With JPC-1's approval, provided the same briefing to the Government audience on the JETS weekly call on 24 May 2021. An update on the site coordination status was also provided.
  - Finalized design concept for the JETS demonstration system
    - The demonstration is divided into six segments organized into three groups
    - Each segment is shown separately and do not directly interact with any other segment
    - Each group represents a particular day or time frame
      - Group 1 is located at Ft. Sam Houston and will be shown in a single day
      - Group 2 is also located at Ft. Sam Houston and will be shown 1-2 days after Group 1
      - Group 3 will be delivered with the project's final report
    - Group 1: Asynchronous Demo
      - Demo Segment 1: a live asynchronous demonstration showing a single patient at a Navy site in an offline local network; will show data being captured locally and later imported to the main JETS federation
      - Demo Segment 2: a live remote instruction support demonstration showing the ability for an instructor to remote into a JETS micro system to provide training from a remote location
    - Group 2: Synchronous Demo

- Demo Segment 3: a live synchronous demonstration showing three patients moving through different roles of care; a joint event showing patient handoffs between sites
  - Demo Segment 4: a live preview of the ability for JETS to support faster than real time operation with a physiology engine
  - Demo Segment 5: a video showing how JETS can integrate with a tactical simulation system, OneSAF, by integrating casualty generation and vehicle movement capabilities between the systems
  - Group 3: Video Delivery
    - Demo Segment 6: a video showing the lesson plan support system and how it can enable training in JETS
- Released MMS FOM v0.3.dev05
  - Includes the upgrade to Developer Studio 6.0 for better compatibility with existing systems
  - The new FOM version includes:
    - Patient movement interactions to control CASEVAC and MEDEVAC requests
    - A federation status object that allows systems who join the federation late to know the current runtime status of the federation
    - A binary representation of the DD1380 to allow for the form to be transmitted as an image or pdf over the federation
    - Patient-specific control interactions to allow operators to pause a physiology engine without pausing all other systems on the federation
- Completed the release of the Portico RTI to all active subcontractors
  - Continued migrating to the Portico runtime interface (RTI), an open source RTI that will replace the Pitch RTI
  - Began expanding Portico to support 32-bit C++ libraries
- Began a new development branch for MMS FOM v0.3.dev06
  - Continued designing multi-site and multi-patient support for systems that track one patient across multiple sites, and track multiple patients within one site
- Completed training on the REBOA simulation systems on 18 May 2021
- Conducted site visit to Ft. Sam Houston 3-4, 7 June and met with the POCS from DMMSO, J-7, and DOS to discuss planning and providing insights for the JETS Phase III demonstration
  - Viewed possible locations/facilities for the Demonstration, and tested signal strength for network
  - Demonstration sites were reserved, and dates were set for 01 November for the Asynchronous Demonstration, and 04 November for the Synchronous Demonstration
- The formal Phase III Demonstration Support Request was filed with POC's at Ft. Sam Houston on 29 June 2021, including request for personnel, equipment, and facilities
- Conducted a site visit to MacDill AFB in reference to the Dry Run and conducted a briefing with the POCs who will be involved. Date for the dry run was scheduled for 6-7 October 2021
- Conducted an internal design review meeting on 30 June 2021
  - Approved current system designs
  - Approved the use of TrACER for performance assessment checklists
- Completed designs for the following systems:
  - TC3Sim serious game
  - OneSAF tactical simulation system
  - REBOA surgical simulator
  - SimulationIQ AAR system

- HumMod physiology engine
  - Continued working on designs for the command center layout, network configuration, multi-site and multi-patient support, and the AnyLogic logistics system
  - Began working on interface and functionality updates for the MMS Control software
    - This software is used for federation-wide system control
    - Began developing dashboards for centralized information and control of multiple systems
  - Continued setup and testing of cloud-based Portico RTI
  - Continued to update and utilize a Git repository for configuration management of the Medical Modeling and Simulation (MMS) Federation Object Model (FOM) and the code needed for each federate
  - Restarted TC3Sim integration efforts with new FOM version and Developer Studio 6.0 support
    - Identified new patient injuries and associated treatments that will be published to the federation
  - Completed initial integration of TC3Sim to the federation
  - Began creating detailed design specifications for OneSAF and how it will be used in Demo Segment 5
- **049: Program Management – In Progress**
  - Continued coordinating program meetings as required
  - Submitted Month 21, 22, and 23 Reports
  - Submitted Quarterly Report 10 on 23 April 2021
  - Monitor Sub-Contractor Agreements and Statements of Work as required
    - Reviewed and initiated all Sub-Contractor Agreements and Statements of Work (SOW) and amendments to align with Contract Modification 6 requirements and Period of Performance (PoP) as required
  - Continued modifying and updating the Project Plan/Schedule based upon Government guidance and/or required
  - Executed contract modification 6 on 22 June 2021
  - All documentation and reporting for Contract Mod 6 was updated to reflect the changes for the JETS Phase III program
  - Received approval from JPC-1, the sponsor and the SOTR to change the meaning of “JETS” to “Joint Emergency Trauma Simulation”
- **051: Project Plan Phase III – In Progress**
  - Continued updating the Project Plan, made modifications based on Contract Mod 6
- **078: Monthly Sprint Report Phase III – Month 21 – Complete**
  - Submitted Phase III Month 21 report on 07 April 2021
  - The following files were submitted with MS 78
    - File Name: [JETS Phase III MS Project Chart v1.2 as submitted 07April2021](#)
- **079: Quarterly Report 10 – Complete**
  - Submitted Quarterly Report 10 due on 23 April 2021
- **080: Monthly Sprint Report Phase III – Month 22 – Complete**
  - Submitted Phase III Month 22 report on 07 May 2021
  - The following files were submitted with MS 80
    - File Name: [JETS Phase III MS Project Chart v2.0 as submitted 07May2021](#)

- **081: Monthly Sprint Report Phase III – Month 23 – Complete**
  - Submitted Phase III Month 23 report on 07 June 2021
  - The following files were submitted with MS 81
    - File Name: *JETS Phase III MS Project Chart v2.0 as submitted 07June2021*
- **083: MSE Propagation and Advocacy – Completed June 2021**
  - Contacted the Joint Trauma System leadership regarding the utility of the JETS Architecture for Combat Casualty Care Training Systems.
  - Attended AMSUS via webinar on Combat Casualty Care to comprehend the current tactics for training and impact of the data relevant to the JETS Demo for the stakeholders
  - Collaborated with I/ITSEC assigned birdog (mentor) to draft a full paper for consideration by the I/ITSEC staff to present at the December conference
    - IVIR continues to draft and revise a full paper for consideration for submission due on June 21st
  - Prepared and conducted a briefing for the Directorate of Simulation, Medical Center of Excellence to provide information regarding the JETS Architecture. The intent is to determine how the collaborate is beneficial to the end-users and gain support for the demonstrations
  - Contacted the Directorate of Simulation to arrange visits to each of the following Medical Simulation Training Centers: Fort Carson, CO; Fort Riley, KS; Fort Hood, TX. Visited Fort Carson and Fort Riley this month. Observed their processes and provided information to the staff leadership about JETS and how it can be integrated into their training
  - Conducted calls with DMMSO and Directorate of Simulation to discuss the needs of stakeholders and end-users of JETS. The goal is to ensure the demo is designed to current simulation standards/requirements
  - Reviewed the Marketing Plan based upon new guidance
  - Contract Modification 6 moved all remaining MS 83 deliverables and funds to MS 84
- **084: Final Deliverables – In Progress**
  - I/ITSEC paper was uploaded for consideration.
  - Prepared a presentation for the Medical Center of Excellence Synthetic Training Environment (STE) working group, briefing scheduled for 1 July 2021
  - Held initial concept discussion for the Marketing Plan, after which drafting of the Plan commenced
  - Authored an Informational Paper of the evolved JETS (Joint Emergency Trauma Simulation) concept, modified the JETS Logo to reflect the new meaning, and provided the Paper to the government for use in spreading the JETS message.

**Milestone Detail:** The following outlines the efforts undertaken during the period for the reporting period of 01 July-2021 through 30-September-2021

- **048: FOM Extended Demonstration – In Progress**
  - Continued Held internal feature lock design review meeting 30 July 2021
  - Began designing an animation to be shown at the Demonstration, and on the JETS Website that will assist viewers in understanding what JETS does and how it can be beneficial. The animation design and storyboards were approved, allowing the animation itself to begin being created.
  - Updated designs for the TrACER assessment system, and the MMS Control software system



- Continued updating the design document to include more detailed design guidance for each system
  - Updated designs for the HumMod system to include clarifications on patient models and changing the simulation time scale
  - Updated deployment diagrams to include all required devices
  - Added detailed networking diagrams to show various network connections among systems
- Completed integration between OneSAF and JETS for MEDEVAC requests and patient movement
- Continued updating the TrACER interface to support new JETS features and JETS integration
  - Continued updating the checklist for improved functionality, including additional timers, integration with JETS, and the ability to adjust scores post-event
  - Completed checklist interface updates to include new timers, step detail information, and the ability to edit checklist scores at a later date
  - Completed designing new remediation report
  - Completed first draft of checklist content for use in the demo
  - Completed integration of the checklist start button with the after action review system start command
- Continued working on interface and functionality updates for the MMS Control software, used for federation-wide system control
  - Continued developing dashboards for centralized information and control of multiple systems
    - Integrated backend support for the federation dashboard and for the patient dashboard
  - Developed a new page for OneSAF control
  - Developed a new page for patient handoff support
  - Researched methods to support taking and sending a picture using the tablet within the browser interface
  - Continued back-end integration updates to support new features
    - Added both REST and WebSocket support layers for live data updates between the webpage and server backend for MMS Control
    - Completed designs of a global, admin level dashboard
  - Completed first version of the patient dashboard
    - Allows for consolidated control of a single patient on the federation
    - Provides visualizations of vital signs, last performed treatments, and patient sound control when using a SimScope
    - Provides manual vital signs control when a physiology engine is not available
  - Completed first version of the federation dashboard
    - Shows all federates on the federation
    - Allows for global federation control (start, stop)
    - Operates local bridge connections between MMS control and local devices like a patient monitor
  - Completed developing a new page for patient handoff support
    - Page allows for two instructors to send ready checks to each other
    - Supports taking a picture of a hand-written DD1380, sending the picture over the federation, and printing the picture at the receiving location
- Completed integration tests for:

- TC3Sim, REBOA, HumMod, Simulation IQ AAR, OneSAF
  - All systems can join the federation and begin sending/receiving messages through the federation
- Completed functional tests for:
  - TC3Sim to publish all identified treatments and events
  - REBOA to subscribe to vital signs, publish events, and publish treatments
  - All other systems are able to join the federation and can send/receive messages through the federation
    - Additional systems will undergo full functional testing as they are available
- Completed setup of AWS Amazon cloud server to host the Portico router, TrACER, and central LRS
- Conducted initial network testing
- Conducted network testing at Ft. Sam Houston on 20 August 2021 and 07-09 September
  - The purpose of the test was to verify cellular network access using commercial hotspots
  - After testing, determined that the Willis Hall and MIF-4 locations did not have strong network connections and alternate solutions would be needed
  - Continued researching alternate solutions, including adding antennas to the hotspots and adding a 4G/LTE network repeater to the next test scheduled in September
  - Tested a cellular signal booster for network access in Willis Hall
  - Follow up tests in September were successful
- Conducted network test at MacDill on 02 September
  - Verified cellular network access in the building reserved for the dry run events
- Completed development of a new augmented reality application to support leishmaniasis disease model
- Conducted full-scale integration tests of all available systems
  - Individually tested systems to verify specific functionality
  - Attempted to test a full scale, end to end scenario test
- Continued to update and utilize a Git repository for configuration management of the Medical Modeling and Simulation (MMS) Federation Object Model (FOM) and the code needed for each federate
- Continued developing and updating the MMS FOM v0.3.dev06 and released the update for all systems
  - Added new enumerations to support all treatments published by the JETS systems
  - Added a set of instructional control interactions (start, stop, etc) to enable synchronizing the video timestamps with the checklist timestamps
  - Updated support for setting a simulation time scale to allow the physiology engine to run faster than real time
  - Added more publish and subscribe support for existing data, including publishing injury objects
- Provided support for systems updating to the dev06 version of the FOM
- **049: Program Management – In Progress**
  - Continued coordinating program meetings as required
  - Continue modifying and updating the project plan as required
  - Submitted Month 24, 25, and 26 Reports
  - Began writing Month 27 Report
  - Submitted Quarterly Report 11 and Quad chart on 25 July 2021
  - Began writing Quarterly Report 12 and Quad Chart

- Reviewed and initiated all Sub-Contractor Agreements and Statements of Work (SOW) and amendments to align with Contract Modification 6 requirements and Period of Performance (PoP) as required
  - Continue coordination for the Dry Run at MacDill AFB and Ft. Sam Houston demonstration for logistics and travel requirements
  - Submitted and received request for contract Modification 7, which cleaned up administrative items to allow the closing of MS83
- **051: Project Plan Phase III – In Progress**
    - Continued modifications to Project Plan based on progress
- **81.1: Monthly Sprint Report Phase III – Month 24 – Complete**
    - Submitted Phase III Month 24 report on 07 July 2021
    - The following files were submitted with MS 81.1
      - File Name: *JETS Phase III MS Project Chart v2.0 as submitted 07July2021*
- **81.2: Quarterly Report 11 – Complete**
    - Submitted Phase III Quarterly Report & Quad Chart on 25 July 2021
- **81.3: Monthly Sprint Report Phase III – Month 25 – Complete**
    - Submitted Phase III Month 25 report due on 07 August 2021
    - The following files were submitted with MS 81.3
      - File Name: *JETS Phase III MS Project Chart v2.0a as submitted 07August2021*
- **81.4: Monthly Sprint Report Phase III – Month 26 – Complete**
    - Submitted Phase III Month 26 report on 07 September 2021
    - The following files were submitted with MS 81.4
      - File Name: *JETS Phase III MS Project Chart v2.0a as submitted 07September2021*
- **084: Final Deliverables – In Progress**
    - Continued discussions to determine which stakeholders are to attend the Dry Run at Mac Dill AFB and the actual demonstration at Fort Sam Houston
    - Conducted a follow- up network test at Fort Sam Houston in preparation for the JETS demonstration
    - Conducted preliminary network testing at MacDill AFMAST site in preparation for the Dry Run
    - Initiated visit at the Clearwater Airport to discuss the Dry Run demonstration with the USAR Air Ambulance Unit
    - Prepared for videographer for Dry Run at MacDill AFB
    - Contacted the DOS and MCOE via email regarding tasking at Fort Sam Houston
    - Submitted an abstract topic for the AMSUS Annual Meeting due on 04 October
    - Closed manuscript for ITSEC due to IVIR not being selected
    - Continued meetings with Content Workshop regarding the Storyboards for the animation creation
    - Reviewed and approved Content Workshop storyboard & script for the JETS Animation based on IVIR and Gov't feedback
    - Creation of the JETS animation began
    - Continued marketing plan with Healthy Simulation, submitted web article to JPC-6 for approval

**Milestone Detail:** The following outlines the efforts undertaken during the period for the reporting period of 01 October -2021 through 30-December -2021

**Milestone Detail:**

- **048: FOM Extended Demonstration - In Progress**
  - Held meeting with Gov't on 15 October to make a go/no go decision on conducting the demonstration at Ft. Sam Houston as scheduled in early November.
    - Based on the results of the integration testing and the challenges created by using cellular hotspots networks, the decision was made to postpone the demonstration until February 2022
    - The Dry Run at MacDill AFB has been rescheduled for 12-14 January 2022
  - Conducted full scale integration testing
    - The setup included all available systems and the Portico run-time infrastructure (RTI) with the Portico WAN router. The WAN router allows systems across different networks to still join the same federation, without requiring a VPN connection
    - Completed the development of adjustments to the Portico RTI and the WAN router to better handle the cellular hotspot network connection
      - Added longer time-out support to the RTI (so that systems will wait up to 10 seconds for a response, from the default 1 second)
      - Added better error handling to the RTI and WAN router, so that a single failed system connection would not affect existing connections to the RTI
    - After testing the Portico updated, while network performance improved, the network still experienced latency and connectivity issues
      - A new solution involving proxy portals will be developed and tested to address the remaining network issues
    - The testing identified issues in network connectivity due to using cellular hotspot connections. The network connections have unpredictable latency spikes and connection brown-outs that impact federation connectivity
  - Began development of a proxy portal solution for the federation network
    - The solution is meant to limit individual network connections between each system on the federation, so that one portal at each site is responsible for all network communication between the systems on the federation
    - The portals are designed to temporarily store data on their own local federation so that in the case of a full disconnect, that data is not lost and is instead published to the federation on reconnect
  - Continued updating TrACER interface to support new JETS features and JETS integration
    - Began and completed the development of a new report to store the pictures of DD1380 forms taken for patient handoffs
      - The DD1380 pictures are sent over the federation and stored in TrACER for later review
  - Began and continued the design of the Instructional Design Expert System (IDES) which will guide an instructor through the process of creating a lesson plan and skill assessment checklist
    - Identified the tech stack that will be used to build the IDES, leveraging open-source solutions Angular (front end web) and PostgreSQL (database)
  - Began and completed the development of the infectious disease model in AnyLogic
    - The model is based on a Forward Resuscitative and Surgical Detachment facility
  - Began and completed installing the new version of OneSAF with JETS support/integration to allow for local testing
    - OneSAF is able to publish injuries for each casualty

- OneSAF is able to respond to MEDEVAC requests for specific patients and vehicle types (ground or air)
    - OneSAF provides MEDEVAC status updates while the vehicle is en route and provides an update when the vehicle arrives at its pickup and drop off destinations
  - Continued working on interface and functionality updates for the MMS Control software
    - This software is used for federation-wide system control
    - Updated and completed developing the page for patient handoff support
      - Page allows for two instructors to send ready checks to each other
      - Supports taking a picture of a hand-written DD1380, sending the picture over the federation, and printing the picture at the receiving location
      - Update includes better support for printing the image
      - Update includes better error-proofing to prevent the receiving user from accidentally pressing the send option for the DD1380 image
    - Continued and completed the development of the new page to support OneSAF integration
      - Page will show injuries from casualties created in OneSAF
      - Page will allow users to request MEDEVACs for patients while showing the responses from OneSAF
    - Began work on a top- level audience dashboard that will show the location and vital signs of each patient on the federation
    - Continued back-end integration updates to support new features
      - Added both REST and WebSocket support layers for live data updates between the webpage and server backend for MMS Control
      - Improved support for updating information on page refresh
      - Added additional calls for real time patient status updates across all MMS Control pages
  - Continued to update and utilize a Git repository for configuration management of the Medical Modeling and Simulation (MMS) Federation Object Model (FOM) and the code needed for each federate
- **049: Program Management – In Progress**
  - Modified and continued updating the project plan as required
  - Submitted Month 27, 28, and 29 Sprint Planning Report
  - Began drafting of Month 30 Sprint Planning Report
  - Submitted Quarterly Report 12 and Quad Chart
  - Monitor Sub-Contractor Agreements, Statements of Work as required
  - Began and continued the initial draft for the Final Report
  - Coordinated & scheduled program meetings as required
  - Continue coordinating the logistics and scheduling for the Dry Run at MacDill AFB and actual demonstration at Fort Sam Houston
    - The Dry Run Demonstration at MacDill AFB is scheduled on 12 – 14 January 2022
    - The JETS Demonstration at Ft. Sam Houston is currently scheduled on 23 – 25 of February 2022
  - Submitted and awaiting Contract Modification 8 based on the JETS Demonstration postponement with No Cost Extension (NCE) through 31 March 2022
- **051: Project Plan for Phase III – In Progress**
  - Continued modifying the Project Plan based on progress and the Contract Modification
- **81.5: Monthly Sprint Report Phase III – Month 27 - Complete**
  - Submitted Phase III Month 27 report due on 07 October 2021



- The following files were submitted with MS 81.5
  - File Name: *JETS Phase III MS Project Chart v2.0a as submitted 07October2021*
- **81.6: Quarterly Report 12 - Complete**
  - Submitted Quarterly Report 12 and Quad Chart due on 25 October 2021
- **81.7: Monthly Sprint Report Phase III – Month 28 - Complete**
  - Submitted Month 28 Report due 07 November 2021
  - The following files were submitted with MS 81.7
    - File Name: *JETS Phase III MS Project Chart v2.0a as submitted 07November2021*
- **81.8: Monthly Sprint Report Phase III – Month 29 - Complete**
  - Submitted Month 29 Report due 07 December 2021
  - The following files were submitted with MS 81.8
    - File Name: *JETS Phase III MS Project Chart v2.0a as submitted 07December2021*
- **082: Final Report Summary Phase III Draft – In Progress**
  - Began and continued writing Final Summary Report due 31 December 2021, changed to 31 March 2022 with Modification 8
- **083: Stakeholder Analysis – Completed June 2021**
- **084: Final Deliverables – In Progress**
  - Finalized and submitted the AMSUS and MODSIM (2022) abstracts
  - Created documentation for Dr. Frye to send to the stakeholders for the demonstration
  - Conducted conference calls with the DOS and J-7 group for coordination of the final demonstration (The call was prior to postponement of the demonstration)
    - The planning for the JETS demonstration dates are in progress
  - Contacted the DOS and MCOE to initiate new tasking requests at Fort Sam Houston
  - Informed the Government representatives/stakeholders at Fort Sam Houston the JETS demonstration has been postponed
  - Assisted the government with the selection of stakeholders for the final demonstration
  - Conducted open lines of communication with the Medical Group at MacDill AFB to prepare for the dry run at MacDill AFB
    - Conducted a site visit at MacDill AFB on 17 December for preparation and network connectivity validation
  - Contacted the Medical Group at MacDill AFB to inform that the Dry Run scheduled in October has been postponed
    - Arrangements for the Dry Run dates have been rescheduled for January 12 – 14, 2022
  - Finalized and submitted the AMSUS Draft Slide Presentation
  - Initiated and began work on the MODSIM Manuscript for the MODSIN 2022 Conference
  - Coordinated with Content Workshop of the development and design of the Animation
    - Completed and finalized the animation which was shared with Government representatives and approved to use as submitted
  - Began working on the slide presentation for the 2022 AMSUS Annual Meeting
  - Continued and submitted the PFCT CDRL updates as required
  - Continued working on the Annual Report for submission due on 25 January 2022
  - Launched JETS web article through Healthy Simulation and began development of banner ads
  - Continued with the development and design of the JETS website

## 2. Future Plans

Present a brief statement of plans or milestones planned for the next year. If any of the plans deviate from the original approved SOW (e.g., new or modified tasks, objectives, experiments, etc), they will require review by the Sponsor Officer Technical Representative (SOTR) and final approval by USAMRAA Contracting through an award modification prior to initiating any changes. A change request must be submitted to MTEC.

**Milestone Detail:** The following outlines the efforts to be undertaken during the period for the reporting period of 01-January-2022 through 31-March-2022

- **048:** FOM Extended Demonstration
  - Conduct dry run demonstration at MacDill AFB on 12 – 14 January
  - Complete MMS Control dashboards and new pages to support new demo features
  - Complete integration of TrACER with xAPI
  - Complete development of the IDES system
  - Conduct Demonstration at Fort Sam Houston 23-25 February 2022
- **049:** Program Management
  - Continue modifying and updating the project plan as required
  - Execute Contract Modification 8
  - Submit Months 30 and 31 Sprint Planning Reports
  - Submit Annual Report 4 due on 25 January 2022
  - Coordinate schedule program meetings as required
- **051:** Project Plan Phase III
  - Continue modifications to Project Plan based on progress
- **81.9:** Monthly Sprint Report Phase III
  - Submit Monthly Sprint Report 30 due on 07 January 2022
- **81.10:** Annual Report 4
  - Submit Annual Report 4 due on 25 January 2022
- **81.11:** Monthly Sprint Report Phase III
  - Submit Month 31 Report due on 07 February 2022
- **082:** Final Report DRAFT
  - Draft and submit the Final Report DRAFT due 07 March 2022
- **084:** Final Deliverables
  - Execute the dry run demonstration at MacDill AFB with the assistance of the stakeholders scheduled for 12 -14 January 2022
  - Work with Videographer to create the Video presentation
  - Collaborate with the stakeholders at Fort Sam Houston to ensure all requirements and protocols are compliant to Government standards
  - Finalize the manuscript and upload the narration for the AMSUS Hybrid Presentation
  - Finalize the manuscript for the MODSIM 2022 Conference Presentation
  - Finalize the JETS Phase III website
  - Deliver Final report and documentation as required
  - Arrange for all final deliverables with SOTR

## 3. Problems / Issues

Any change that is substantially different from the original approved SOW (e.g., new or modified tasks, objectives, experiments, etc.) will require review by the Sponsor Officer Technical Representative and final



approval by USAMRAA Contracting through an award modification prior to initiating any changes. A change request must be submitted to MTEC.

**a. Current Problems / Issues**

Provide a description of current problems or issues that may impede performance or progress of this project along with proposed corrective action. This may include administrative, technical, and/or logistical issues.

For an award that includes the recruitment of human subjects for clinical research or a clinical trial, discuss any problems or barriers encountered, if applicable, and what has been done to mitigate those issues. Discussion may highlight enrollment problems, retention problems, and actions taken to increase enrollment and/or improve retention.

- There are no current problems or issues.

**b. Anticipated Problems / Issues**

Provide a description of anticipated problems or issues that have a potential to impede performance or progress. Also provide course of actions planned to mitigate problems or to take should the problem materialize.

- There are no current problems or issues.

**4. Financial Health**

Comment on the financial health of the study. Was the study financially on track during this year and cumulatively for completion as proposed within the period of performance? If not, describe the cause(s), whether this will have a short-term or long-term impact, the likelihood this can be overcome, and provide remediation strategy. Provide amount expended this quarter and cumulatively. State if there was any major equipment procured, sub-award implemented, and/or travel conducted.

- The program is on schedule with Modification 8 execution
- The program is within the period of performance, and within budget during this annual reporting period with agreement for a no cost extension through March 2022 (No Cost Extension Contract Modification 8).
- Total expended this year: \$1,487,560.05
- Total cumulative amount expended: \$4,456,522.02
- Amount spent on Subcontractors during this year: \$465,360.67
- Amount spent on Consultants during this year: \$143,675.40
- Amount spent on equipment during this year: \$2,935.06
- Amount spent on materials during this year: \$10,111.91
- Amount spent on travel this year: \$13,446.38
- Amount spent on Other Direct Costs (ODC) during this year: \$19,770.74
- Subcontractor tasks per Statement of Work (SOW) Assignments are all proceeding

**5. Personnel Effort**



Provide names of current staff along with their roles and percent effort of each on this project. Add additional rows if necessary to list the complete team. If there is more than one project on this award, breakdown according to each project (one table per project).

Personnel	Role	Percent Effort
Ms. Dee Kuenzig	Program Manager	63.0%
Ms. Catherine Strayhorn	Principal Investigator	42.5%
Mr. William Lewandowski, Jr	Sr. Systems Engineer	10.8%
Ms. Erin Honold	Biomedical/Systems Engineer	71.0%
Mr. David Litteral	Deputy PI/ SME Military Medicine	61.5%
Mr. Ray Shuford	Sr. Researcher	14.3%
Ms. Mary O' Hara	Contract Administration	4.8%
Mr. Sam Strayhorn	Administration	43.0%

## 6. Protocol and Activity Status

For awards involving the use of human subjects, use of human cadavers, and/or use of animal subjects, prepare a summary in accordance with the following subsections. For all other awards, including those involving the use of human anatomical substances (such as tissue or cells or identifiable private information), mark as directed below.

### a. Human Use Regulatory Protocols

- No human subjects research will be performed to complete the Statement of Work (SOW)

**TOTAL PROTOCOLS:** State the total number of human use protocols required to complete this project (e.g., 5 human subject research protocols will be required to complete the Statement of Work.”). If not applicable, write “No human subjects research will be performed to complete the Statement of Work.”

**PROTOCOLS:** List all human use protocols to be performed to complete the project, an include approved target number for clinical significance, followed by type of submission and type of approval with associated dates, and performance status for each.

**Protocol [HRPO Assigned Number]:**

**Title:**

**Target required for clinical significance:**

**Target approved for clinical significance:**

**Submitted to and Approved by:**

Provide bullet point list of protocol development, submission, amendments, and approvals (include IRB in addition to HRPO).

**STATUS:** Provide bullet point list of performance and/or progress status relating to the above protocol and discuss recruitment number, enrollment number, drop outs, disqualified, etc. Discuss any administrative, technical, or logistical issues that may impact performance or progress of the



study (e.g. slow enrollment, large dropouts, or adverse events) for the above HPRO approved protocol.

#### b. Use of Human Cadavers for RDT&E, Education or Training

- No RDT&E, education or training activities involving human cadavers will be performed to complete the Statement of Work (SOW)

“Cadaver” is defined as a deceased person or portion thereof, and is synonymous with the terms “human cadaver” and “post-mortem human subject” or “PMHS.” The term includes organs, tissue, eyes, bones, arteries or other specimens obtained from an individual upon or after death. The term “cadaver” does not include portions of an individual person, such as organs, tissue or blood, that were removed while the individual was alive (for example, if a living person donated tissue for use in future research protocols, that tissue is not considered a “cadaver” under this policy, regardless of whether the donor is living or deceased at the time of tissue use).

**TOTAL ACTIVITIES:** State the total number of RDT&E, education or training activities that will involve cadavers. If not applicable, write “No RDT&E, education or training activities involving human cadavers will be performed to complete the Statement of Work (SOW).”

**ACTIVITIES:** Provide the following information in a bulleted list for all RDT&E, education or training activities involving human cadavers conducted or supported during the quarter:

- Title of the RDT&E, education or training activity
- SOW task/aim associated with the activity
- Date the activity was conducted
- Identification of the organization’s responsible individual (e.g., PI or individual primarily responsible for the activity’s conduct)
- Brief description of the use(s) of cadavers in the activity and the total number of cadavers used during the reporting period
- Brief description of the Department of Army organization’s involvement in the activity
- Status of document submission and approvals
- Problems encountered in the procurement, inventory, use, storage, transfer, transportation and disposition of cadavers used for RDT&E, education or training. Examples of problems include but are not limited to: loss of confidentiality of cadaveric donors, breach of security, significant deviation from the approved protocol, failure to comply with state laws and/or institutional policies and public relations issues.

#### c. Animal Use Regulatory Protocols

- No animal use research will be performed to complete the Statement of Work (SOW)

**TOTAL PROTOCOLS:** State the total number of animal use protocols required to complete this project (e.g., 2 animal use research protocols will be required to complete the Statement of Work.). If not applicable, write “No animal use research will be performed to complete the Statement of Work.”



**PROTOCOLS:** List all animal use protocols to be performed to complete the project, include approved target number for statistical significance, followed by type of submission and type of approval with associated dates, and performance status for each.

**Protocol [ACURO Assigned Number]:**

**Title:**

**Target required for statistical significance:**

**Target approved for statistical significance:**

**Submitted to and Approved by:**

Provide bullet point list of protocol development, submission, amendments, and approvals (include IACUC in addition to ACURO).

**STATUS:** Provide bullet point list of performance and/or progress status relating to the above protocol and discuss any administrative, technical, or logistical issues that may impact performance or progress of the study (e.g. animal use protocol need revision to minimize animal suffering, animal protocol modification to include additional staff) for the above ACURO approved protocol.

**Annual Business Status Report for**

Prototype of Joint Evacuation and Transport Simulation (JETS) System

Research Project No. 2018-649-001

EGS#MT17007.03

Reporting Period: Effective Date – 01 January 2021 – 31 December 2021

MTEC Research Project Awardee

Catherine Strayhorn, CEO, IVIR Inc. (Principal Investigator)

1990 Main Street, Suite 750

Sarasota, Fl. 34236

941-961-0627

cstrayhorn@ivirinc.com

Research Project Technical POC

William Lewandowski

1990 Main Street, Suite 750

Sarasota, Fl. 34236

304-283-3487

blewandowski@ivirinc.com

Submitted: 25 January 2022



## 1. CURRENT STAFF

Personnel	% of Effort on project
Program Manager – Ms. Dee Kuenzig	63.0%
Principal Investigator – Ms. Catherine Strayhorn	42.5%
Sr. Systems Engineer – Mr. William Lewandowski Jr.	10.8%
Deputy PI/SME Military Medicine – Mr. Dave Litteral	61.5%
Biomedical/Systems Engineer – Ms. Erin Honold	71.0%
Sr. Researcher – Mr. Ray Shuford	14.3%
Contract Administration – Ms. Mary O’Hara	4.8%
Administration – Mr. Sam Strayhorn	43.0%

## 2. CURRENT EXPENDITURES

**DIRECTIONS: FILL OUT TABLE A OR B DEPENDING ON CONTRACT TYPE. TABLE A IS FOR COST REIMBURSABLE CONTRACTS AND TABLE B IS FOR FIX PRICED CONTRACTS.**

### A. Cost Reimbursable Contracts: Complete only if your contract is Cost Reimbursable or Cost Plus Fixed Fee.

Expenditures should be reflective of cost incurred to date, not exceeding awarded project ceiling. Expenditures should coincide with the latest invoice for the reporting period. For cost reimbursable contracts please use the table below.

Contract Expenditures	Current Annual Expenditures	Cumulative To Date Expenditures
Labor (Salary, OH, and Fringe)	\$ 428,580.39	\$ 1,600,174.69
Supplies/Materials	\$ 10,111.91	\$ 115,836.13
Travel	\$ 13,446.38	\$ 66,758.21
Equipment	\$ 2,935.06	\$ 4,261.84
Subcontractors and Consultants	\$ 609,036.08	\$ 1,292,584.21
Other Direct Costs	\$ 19,770.74	\$ 60,983.45
Indirect Costs	\$ 268,446.78	\$ 916,480.37
Fee	\$ 135,232.72	\$ 399,443.12
<b>Total</b>	<b>\$ 1,487,560.05</b>	<b>\$ 4,456,522.02</b>

## 3. STATUS OF MILESTONES – FILL OUT FOR ALL CONTRACT TYPES (all project milestones are to be included)

All project milestones from the Milestone Payment Schedule, in the project award, should be accounted for below. **Items in Red reflect changes to the MPS approved in Contract Modification 8, approved 31 December 2021, and fully executed 04 January 2022.**



MTEC Milestone Number	Milestone Description	Due Date	% Completed this Reporting Period	Cumulative % Complete
Phase I				
1	Contract Award	23Jan2018	0%	100%
2	Sprint Planning Meeting Phase 1 – Month 1	22Feb2018	0%	100%
3	Generate Project Plan	22Feb2018	0%	100%
4	Sprint Planning Meeting Phase 1 – Month 2	22Mar2018	0%	100%
5	Sprint Planning Meeting Phase 1 _ Month 3	07May2018	0%	100%
6	Conduct Front End Domain Analysis	29Jun2018	0%	100%
7	First Quarterly Report	25Apr2018	0%	100%
8	Sprint Planning Meeting Phase 1 – Month 4	07Jun2018	0%	100%
9	Site Visits to: Ft. Rucker, WPAFB, TRANSCOM	29Jun2018	0%	100%
10	Sprint Planning Meeting Phase 1 – Month 5	06Jul2018	0%	100%
11	Develop JETS Architecture Data Plan	31Jul2018	0%	100%
12	Develop JETS Capability Models	31Jul2018	0%	100%
13	Develop JETS Operational Systems Models	31Jul2018	0%	100%
14	Technical Feasibility Studies	31Jul2018	0%	100%
15	Provide Recommended Edits to the JETS CDD	31Jul2018	0%	100%
16	Sprint Planning Meeting Phase 1 – Month 6	07Aug2018	0%	100%
17	Quarterly Report 2	25Jul2018	0%	100%
18	Final Deliverables Phase 1	21Aug2018	0%	100%
Phase II				
19	Project Plan	07Sept2018	0%	100%
20	Sprint Monthly Planning Report – Phase II, Month 1	07Spet2018	0%	100%
21	Sprint Monthly Planning Report – Phase II, Month 2	05Oct2018	0%	100%
22	Conduct Front End Domain Analysis POINTS	29Apr2019	0%	100%
24	Quarterly Report 3	25Oct2018	0%	100%
23	Sprint Monthly Planning Report – Phase II, Month 3	07Nov2018	0%	100%
25	Sprint Monthly Planning Report – Phase II, Month 4	07Dec2018	0%	100%
27	Sprint Monthly Planning Report – Phase II, Month 5	07Jan2019	0%	100%
26	Develop POINTS Architecture Data Plan and Requirements Definition	29Apr2019	0%	100%
29	Quarterly Report 4	25Jan2019	0%	100%
30	Annual Report	25Jan2019	0%	100%
28	Sprint Monthly Planning Report – Phase II, Month 6	07Feb2019	0%	100%

31	Sprint Monthly Planning Report – Phase II, Month 7	07Mar2019	0%	100%
32	Sprint Monthly Planning Report – Phase II, Month 8	05Apr2019	0%	100%
37	Quarterly Report 5	25Apr2019	0%	100%
36	Sprint Monthly Planning Report – Phase II, Month 9	07May2019	0%	100%
33	Develop POINTS Capability Models	30May2019	0%	100%
34	Conduct Technical Feasibility Studies for POINTS	30MAY2019	0%	100%
38	Sprint Monthly Planning Report – Phase II, Month 10	07Jun2019	0%	100%
35	Develop POINTS Operational Systems Models	27Jun2019	0%	100%
39	Conduct Site Visits and Critical Design Review PONTs	29Apr2019	0%	100%
40	Provide suggested Edits to POINTS Draft CDD	27Jun2019	0%	100%
41	Sprint Monthly Planning Report – Phase II, Month 11	08Jul2019	0%	100%
42	Final Deliverables Phase II	22Jul2019	0%	100%
43	Final Reports	22Jul2019	0%	100%
44	Iteratively Refine and Refractor JETS Architecture	30May2019	0%	100%
45	Demonstrate Preliminary MMS FOM	27Jun2019	0%	100%
Phase III				
46	Phase III Contract Award Executed	01Jul2019	100%	100%
47	Architecture Validation - Closed	30Sept2020	0%	100%
48	Phase III FOM Extended Demonstration	31Mar2022	58.9 %	90.3 %
49	Program Management, Meetings and Reporting	31Mar2022	20.9 %	95.7 %
50	Monthly Sprint Report Phase III-Month 1	07Aug2019	0 %	100%
51	Project Plan	07Aug2019	0 %	100%
52	Quality Plan	07Aug2019	0 %	100%
53	Monthly Sprint Report Phase III-Month 2	07Sept2019	0 %	100%
54	Monthly Sprint Report Phase III-Month 3	07Oct2019	0 %	100%
55	Quarterly Report 6	25Oct2019	0 %	100%
56	Monthly Sprint Report Phase III-Month 4	07Nov2019	0 %	100%
57	Monthly Sprint Report Phase III-Month 5	07Dec2019	0 %	100%
58	Monthly Sprint Report Phase III-Month 6	07Jan2020	0%	100%
59	Annual Report 2	25Jan2020	0%	100%
60	Monthly Sprint Report Phase III-Month 7	07Feb2020	0%	100%
61	Monthly Sprint Report Phase III-Month 8	07Mar2020	0 %	100%
62	Monthly Sprint Report Phase III-Month 9	07Apr2020	0 %	100%
63	Quarterly Report 7	25Apr2020	0 %	100%
64	Monthly Sprint Report Phase III-Month 10	07May2020	0%	100%
65	Monthly Sprint Report Phase III-Month 11	07Jun2020	0%	100%
66	Monthly Sprint Report Phase III-Month 12	07Jul2020	0%	100%
67	Quarterly Report 8	25Jul2020	0%	100%

68	Monthly Sprint Report Phase III-Month 13	07Aug2020	0%	100%
69	Monthly Sprint Report Phase III-Month 14	07Sept2020	0%	100%
70	Monthly Sprint Report Phase III-Month 15	07Oct2020	0%	100%
71	Quarterly Report 9	25Oct2020	0%	100%
72	Monthly Sprint Report Phase III-Month 16	07Nov2020	0%	100%
73	Monthly Sprint Report Phase III-Month 17	07Dec2020	0%	100%
74	Monthly Sprint Report Phase III-Month 18	07Jan2021	15 %	100%
75	Annual Report 3	25Jan2021	35%	100%
76	Monthly Sprint Report Phase III-Month 19	07Feb2021	100 %	100%
77	Monthly Sprint Report Phase III-Month 20	07Mar2021	100%	100%
78	Monthly Sprint Report Phase III-Month 21	07Apr2021	100%	100%
79	Quarterly Report 10	25Apr2021	100%	100%
80	Monthly Sprint Report Phase III-Month 22	07May2021	100%	100%
81	Monthly Sprint Report Phase III-Month 23	07Jun2021	100%	100%
81.1	Monthly Sprint Report Phase III – Month 24	07Jul2021	100%	100%
81.2	Quarterly Report 11	25Jul2021	100%	100%
81.3	Monthly Sprint Report Phase III – Month 25	07Aug2021	100%	100%
81.4	Monthly Sprint Report Phase III – Month 26	07Sept2021	100%	100%
81.5	Monthly Sprint Report Phase III – Month 27	07Oct2021	100%	100%
81.6	Quarterly Report 12	25Oct2021	100%	100%
81.7	Monthly Sprint Report Phase III – Month 28	07Nov2021	100%	100%
81.8	Monthly Sprint Report Phase III – Month 29	07Dec2021	100%	100%
81.9	Monthly Sprint Report Phase III – Month 30	07Jan2022	85%	85%
81.10	Annual Report 4	25Jan2022	35%	35%
81.11	Monthly Sprint Report Phase III – Month 31	07Feb2022	0%	0%
82	Final Report Summary Phase III (Draft)	07Mar2022	0 %	0 %
83	MSE Propagation and Advocacy	13Jun2021	26.6 %	100 %
84	Final Deliverables Phase III	31Mar2022	71.3 %	71.3 %

#### 4. DEVIATION FROM PROJECT PLAN

Any major deviations from the agreed to project plan shall be explained with a discussion of proposed actions to address the deviations.

- All changes to the Project Plans were addressed and incorporated via Contract Modifications.
- No major deviations to report.

**Please name this annual report file as EGS#\_Annual Report\_Y# (For example MT160001.01\_Annual Report\_Y2)**

**Please submit as a PDF file.**

**Please make sure to fill in the page number on page 3 Table of Contents.**

**Don't forget to submit an updated Quad Chart as well. Please name the Quad chart file as EGS#\_Quad Chart\_Y#.**

