**AWARD NUMBER:** W81XWH-17-2-0023

**TITLE:** Telemedicine to Improve Human Performance During Prolonged Field Care

**PRINCIPAL INVESTIGATOR:** LTC Jeremy Pamplin, MD

**CONTRACTING ORGANIZATION:** The Geneva Foundation
**Tacoma, WA 98387**

**REPORT DATE:** August 2019

**TYPE OF REPORT:** Annual

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

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# REPORT DOCUMENTATION PAGE

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| August 2019 | Annual | 1 Aug 2018 - 31 Jul 2019 |

**4. TITLE AND SUBTITLE**
Telemedicine to Improve Human Performance During Prolonged Field Care

**5a. CONTRACT NUMBER**

**5b. GRANT NUMBER**
W81XWH-17-2-0023

**5c. PROGRAM ELEMENT NUMBER**

**6. AUTHOR(S)**
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**5d. PROJECT NUMBER**

**5e. TASK NUMBER**

**5f. WORK UNIT NUMBER**

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**

The Geneva Foundation
917 Pacific Ave, Ste. 600
Tacoma, WA 98402

**8. PERFORMING ORGANIZATION REPORT NUMBER**

**9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)**

U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

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USAMRMC

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**13. SUPPLEMENTARY NOTES**

**14. ABSTRACT**

U.S. military units are increasingly organized into smaller elements and operating in remote areas leading to longer evacuation times. This necessitates increased medical care by inexperienced clinical providers beyond doctrinal timelines, a concept coined "prolonged field care" (PFC). Early entry medical operations planning anticipate similar challenges during future engagements. Our research project proposes to use an off-the-shelf device that is capable of two-way audio/video streaming that can be used for expert medical consultation. We will develop PFC scenarios that are realistic along with a training program for novice physicians and medics to test. We will then evaluate the clinicians on what decisions were made, the timing of those decisions, their mental workload, confidence in their performance, and evaluation of the impact of their daily clinical practice on PFC performance. In this research study, we will determine if virtual critical care consultation (VC3) is beneficial in a PFC. Our research aligns with focus area 3 in which we will provide scientific knowledge on optimizing management of critically ill patients during PFC, the impact of virtual critical care consultation and how to provide it during PFC, and how to optimize tele-medical support technology.

**15. SUBJECT TERMS**
Trauma, simulation training, telemedicine, prehospital emergency care

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | USAMRMC |
| Unclassified | Unclassified | Unclassified | Unclassified | 17 | 19b. TELEPHONE NUMBER *(include area code)* |

TABLE OF CONTENTS

1. **INTRODUCTION:** *Narrative that briefly (one paragraph) describes the subject, purpose and scope of the research.*

The purpose of this study is to measure military caregiver performance related to critical care management in prolonged field care (PFC). We have created a PFC testing platform, developed and validated simulation scenarios, and are actively recruiting subjects to measure their performance during PFC simulation scenarios both with and without support from a telementor. The telementor groups use synchronous and asynchronous communication technologies and is divided into partial and comprehensive telemedicine support to better approximate current military telemedicine capabilities supporting operational environments. Partial support uses phone and e-mail; comprehensive support uses phone, e-mail, and videoteleconferencing (VTC) during procedural telementoring (i.e. placement of tube thoracostomy).

2. **KEYWORDS:** *Provide a brief list of keywords (limit to 20 words).*

Telemedicine; Critical Care; Simulation; Technology; Virtual Health; Prolonged Field Care (PFC); Telecritical Care; Tactical Combat Casualty Care (TCCC); Telementoring

3. **ACCOMPLISHMENTS:** *The PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction.*

**What were the major goals of the project?**
*List the major goals of the project as stated in the approved SOW. If the application listed milestones/target dates for important activities or phases of the project, identify these dates and show actual completion dates or the percentage of completion.*

1) Major Task 1: Identify a commercial off the shelf product that is sustainable and deployable. (**Complete**)
2) Major Task 2: Install telemedicine workstations at collaborating sites. (**Complete**)
3) Major Task 3: Identify ideal, critical care clinical scenarios for testing. (**Complete**)
4) Major task 4: Write PFC scenarios (**Complete**)
5) Major Task 5: Pilot test and validate scenarios with subject matter experts. (**Complete**)
6) Major Task 6: Recruit and conduct just in time training. (**In-Progress**)
7) Major Task 7: Test subject performance in PFC scenarios at MAMC & ISR. (**In-Progress**)
8) Major Task 8: Statistical Analysis, publications, and final report. (**In-Progress**)

**What was accomplished under these goals?**
*For this reporting period describe: 1) major activities; 2) specific objectives; 3) significant results or key outcomes, including major findings, developments, or conclusions (both positive and negative); and/or 4) other achievements. Include a discussion of stated goals not met. Description shall include pertinent data and graphs in sufficient detail to explain any significant results achieved. A succinct description of the methodology used shall be provided. As the project progresses to completion, the emphasis in reporting in this section should shift from reporting activities to reporting accomplishments.*

1) Major Task 1: Identify a commercial off the shelf product that is sustainable and deployable. (**Completed Previously, see year 1 annual report**)

2) Major Task 2: Install telemedicine workstations at collaborating sites (**Completed Previously, see year 1 annual report**)

3) Major Task 3: Identify ideal, critical care clinical scenarios for testing (**Completed Previously, see year 1 annual report**)

4) Major Task 4: Write PFC scenarios (**Completed Previously, see year 1 annual report**)

5) Major Task 5: Pilot test and validate scenarios with subject matter experts. (**Completed Previously, see year 1 annual report**)

6) Major Task 6: Recruit and conduct just in time training. (In Progress)
    - Fundamentals of Critical Care Support (FCCS) courses were conducted at both MAMC and BAMC sites in June 2018.
    - Following the FCCS course, the ISR recruited and consented 14 individuals to participate in the study. MAMC recruited and consented 2 individuals.
    - FCCS was an unsuccessful recruiting platform. Both sites are working to mitigate this problem by changing inclusion criteria for the protocols. These protocol amendments are currently pending with the MRMC IRB. For more details on the reasons behind this change, please see the Q1Y2 report.
    - At the MAMC site, efforts have been organized to recruit from Delayed Evacuation Casualty Management Course (DECM) and other Medical Sustainment Training Center (MSTC) courses in order to mimic similar "just-in-time" training as was intended from the FCCS course. These recruiting efforts allow for a large and steady number of potential subjects to be recruited from theses recurring courses. Additionally, connections have been made at the USAISR to recruit subjects in a similar manner which may start to occur after the core site protocol amendment and SSA's amendments are approved. The core site amendment was approved 25 Mar 2019. A letter of support from the 7ID at MAMC has been received. This will allow 7ID medics participating in the DECM course to be recruited for this study. A similar letter from the 1SFG at MAMC is currently pending final signature.

7) Major Task 7: Test subject performance in PFC scenarios at MAMC and ISR. (**In Progress, 35% complete**)
    - In total, the MAMC site has recruited and consented 18 subjects, 15 of which have participated in a simulation; 14 of these completed their full scenario and 1 dropped out mid-way through the simulation due to an emergency. The ISR has had 4 subjects complete a simulation scenario.
    - 10 of the completed scenarios have been fully coded and adjudicated. Using this information, MAMC and the USAISR were able to refine the CRFs to more effectively capture the data pertinent to the simulation and primary outcomes of the study while simultaneously defining standards for running simulations and coding.

- Continued changes were implemented to role player scripts to better adapt to diversity in subject behavior and performance and to ensure consistency with future simulations.
  **Milestone E: Is 35% complete. The research team at MAMC is actively recruiting and scheduling subjects.**

8) Major Task 8: Statistical Analysis, publications, and final report. (**In-Progress**)
   - CRFs were created and refined for compiling data collection elements, including scenario information and end-points for inter-rater reliability.
   - Scenario statistical analysis will be ongoing and performed periodically between subject testing according to protocol.
   - Hexoskin data has been collected for all simulations and will be uploaded for visualization of data.
   - A digitized database has been created for coded data. Survey data from all subjects has been uploaded as well as coding data from 14 simulations. The research team is actively working to identify a long-term storage solution for videos which will be easily shared between sites.
   - Publications:
     ◊ Abstract presented at 2018 Military Health Systems Research Symposium Conference. Veazey et. al., "Developing a Validated Simulation Platform for Testing Telemedicine's Impact on Clinician Performance During Prolonged Field Care".
     ◊ Abstract presented at 2019 SOMSA. Veazey et. al, "How Telemedicine Impacts Clinical Decision and Performance in Prolonged Field Care Scenarios: A Preliminary Review".
     ◊ SimVentors showcase presented at the 2019 International Meeting on Simulation in Healthcare. Cohen et. al, "Low-cost simulator modification to support repetitive practice and performance improvement of lower extremity escharotomy".

**What opportunities for training and professional development has the project provided?**
*If the project was not intended to provide training and professional development opportunities or there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe opportunities for training and professional development provided to anyone who worked on the project or anyone who was involved in the activities supported by the project. "Training" activities are those in which individuals with advanced professional skills and experience assist others in attaining greater proficiency. Training activities may include, for example, courses or one-on-one work with a mentor. "Professional development" activities result in increased knowledge or skill in one's area of expertise and may include workshops, conferences, seminars, study groups, and individual study. Include participation in conferences, workshops, and seminars not listed under major activities.*

Under this award, we have had the opportunity to send research team members and collaborators to various conferences related to our field of study. Conferences have provided advanced knowledge

of topics such as prolonged field care, innovative medical technologies, mobile health solutions, and telemedicine.

Conference travel supported by this grant during the reporting period:

| Date | Conference | Attendees |
|---|---|---|
| 20-23 Aug 2018 | 2018 Military Health System Research Symposium (MHSRS)<br>Kissimmee, FL | Principle Investigator<br>Research Nurse |
| 26-30 Jan 2019 | International Meeting on Simulation in Healthcare (IMSH)<br>San Antonio, TX | Research Nurse* |
| 19-22 Aug 2019 | 2019 Military Health System Research Symposium (MHSRS)<br>Kissimmee, FL | Principle Investigator<br>Project Manager<br>System Integrator<br>Research Coordinator |

*Denotes presentation

Additionally**,** scenario development and pilot testing has offered advanced medical training to 16 medics and physician trainees. Feedback from these individuals has been that the scenarios and telementoring have helped them grow as medical providers and better prepare them for future patient care. When research is completed with these scenarios, they could provide outstanding opportunities for training caregivers.

**How were the results disseminated to communities of interest?**
*If there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe how the results were disseminated to communities of interest. Include any outreach activities that were undertaken to reach members of communities who are not usually aware of these project activities, for the purpose of enhancing public understanding and increasing interest in learning and careers in science, technology, and the humanities.*

In addition to previous local efforts, MAMC has continued outreach efforts with *medic group(s)* and experienced a great deal of positive feedback and support from leadership. This has created a strong recruitment platform at MAMC.

Previous efforts have included briefings to MAMC's Senior Medical Council, Delayed Evacuation Casualty Management Course (DECM), 1st Special Forces Group, and the Enlisted Board of Directors. At the USAISR, past local efforts have included presentations to UT San Antonio graduate students and at the USAISR Summer internship poster day. Additional dissemination activities will occur as study results become available.

**What do you plan to do during the next reporting period to accomplish the goals?**
*If this is the final report, state "Nothing to Report."*

*Describe briefly what you plan to do during the next reporting period to accomplish the goals and objectives.*

| Associated Task | |
|---|---|
| Major Task 6 | • Amendments have been approved broadening the subject pool for recruitment allowing for more widespread efforts at both sites. Recruitment will continue over the next quarter. |
| Major Task 7 | • Recruiting, screening, scheduling, and running simulations will continue in the next quarter. The MAMC site has been able to set availability for 1-2 scenarios per week over most weeks. |
| Major Task 8 | • Continue method development for integration of Hexoskin data with statistical analysis. The research team will continue to upload coded data and survey data from simulations as available. This increase in data collection will also allow the team to evaluate whether the current digital database solution will be a good long term solution. |

**4. IMPACT:** D*escribe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the project relative to:*

**What was the impact on the development of the principal discipline(s) of the project?**
*If there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe how findings, results, techniques that were developed or extended, or other products from the project made an impact or are likely to make an impact on the base of knowledge, theory, and research in the principal disciplinary field(s) of the project. Summarize using language that an intelligent lay audience can understand (Scientific American style).*

Nothing to report.

**What was the impact on other disciplines?**
*If there is nothing significant to report during this reporting period, state "Nothing to Report." Describe how the findings, results, or techniques that were developed or improved, or other products from the project made an impact or are likely to make an impact on other disciplines.*

Thus far, this project has developed several tools that are likely to support military operational medical training and technology development and testing:

- Methodology for developing, validating and sharing through documentation high fidelity *military relevant* prolonged field care simulation scenarios
- Methodology for time compressing prolonged field care scenarios so that subjects or trainees could, when appropriate/desired, complete the scenarios in less time. This includes a *new software application* that manages simulation vs. real time.
- Methodology for standardizing groups so that it is possible to compare differences between caregiver performance with and without use of different technologies. Performance in key decisions and tasks is a surrogate marker for patient outcome.
- Low cost task trainers for tube thoracostomy, escharotomy, and tracheostomy.
- Pilot database of annotated audio, video, and "casualty" physiology that could be used for machine learning purposes.

*If there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe ways in which the project made an impact, or is likely to make an impact, on commercial technology or public use, including:*

- *transfer of results to entities in government or industry;*
- *instances where the research has led to the initiation of a start-up company; or*
- *adoption of new practices.*

It is possible that the Dragon Skin and low-cost task trainers could be "transitioned" to industry. These tools would be beneficial for the simulation community and could be developed more fully to production and minimum cost.

**What was the impact on society beyond science and technology?**

*If there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe how results from the project made an impact, or are likely to make an impact, beyond the bounds of science, engineering, and the academic world on areas such as:*

- *improving public knowledge, attitudes, skills, and abilities;*
- *changing behavior, practices, decision making, policies (including regulatory policies), or social actions; or*
- *improving social, economic, civic, or environmental conditions.*

Nothing to report.

5. **CHANGES/PROBLEMS:** *The PD/PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction. If not previously reported in writing, provide the following additional information or state, "Nothing to Report," if applicable:*

**Changes in approach and reasons for change**

*Describe any changes in approach during the reporting period and reasons for these changes. Remember that significant changes in objectives and scope require prior approval of the agency.*

The distribution of workload between study sites has been adjusted to accommodate personnel and resource availability. The MAMC site has become the primary site for recruitment and data collection. This has allowed the USAISR to focus on data analysis and statistical considerations.

**Actual or anticipated problems or delays and actions or plans to resolve them**

*Describe problems or delays encountered during the reporting period and actions or plans to resolve them.*

ACTUAL:

Overall, the biggest challenge has been scheduling delays. This has caused subject recruitment and subject testing to start approximately 3 months delayed. This delay will force subject testing to continue through 2019 which will delay mid-point analysis and subsequent update to the year 2 portion of our protocol (refining telemedicine technology to test). Staffing changes occurring after the initial protocol approval along with subsequent prolonged amendment approval timelines have resulted in additional delays to subject scheduling. At this time, we do not anticipate the need for NCE. Cost and performance are on-target.

The lack of a central database for information transfer has delayed the project. Connectivity and bandwidth issues for remote technologies have caused significant issues in data transfer. Coding and finalization of CRFs have since been completed and significant efforts have been made with coding completed subject simulations. To alleviate the video data transfer requirement, coding is assigned to local members for the time being. There have also been site visits to ensure inter-rater reliability between sites. A percentage of video/subject data will be coded by the alternate site to ensure data quality and consistency, although a seamless way of video transfer has yet to be identified.

ANTICIPATED:
Telementors face a large time commitment during simulations. Given the availability of medical professionals, this may be a resource constraint. To mitigate this concern, we plan to schedule telementors in advance so that they can leave that day available for role playing.

All telementors are different as they all have varying life experiences and may react to unexpected simulation events differently. For the first phase of this project, we have also made the decision to use a restricted list of telementors. By using a core group of on-site mentors, we will increase the simulation standardization and eliminate as much variability as possible. This should translate to less confounding factors for data analysis.

The research team is anticipating the loss of the site PI at ISR in the coming months which will hinder the ISR's ability to perform simulations. The MAMC site is currently planning to run an increased schedule of simulations to accrue the same number of anticipated subjects. Additionally, the research team is pursuing possible ISR PI replacements to minimize this risk.

**Changes that had a significant impact on expenditures**
*Describe changes during the reporting period that may have had a significant impact on expenditures, for example, delays in hiring staff or favorable developments that enable meeting objectives at less cost than anticipated.*

Initial delays contributed to a slightly slower spending projection than originally anticipated.

**Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents**

*Describe significant deviations, unexpected outcomes, or changes in approved protocols for the use or care of human subjects, vertebrate animals, biohazards, and/or select agents during the reporting period. If required, were these changes approved by the applicable institution committee (or equivalent) and reported to the agency? Also specify the applicable Institutional Review Board/Institutional Animal Care and Use Committee approval dates.*

**Significant changes in use or care of human subjects**

| |
|---|
| None. |

**Significant changes in use or care of vertebrate animals**

| |
|---|
| N/A |

**Significant changes in use of biohazards and/or select agents**

| |
|---|
| N/A |

6. **PRODUCTS:** *List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state "Nothing to Report."*

**Publications, conference papers, and presentations**

*Report only the major publication(s) resulting from the work under this award.*

**Journal publications.** *List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

| |
|---|
| Nothing to Report |

**Books or other non-periodical, one-time publications.** *Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like. Identify for each*

*one-time publication: author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (e.g., book, thesis or dissertation); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

Nothing to Report

**Other publications, conference papers and presentations**. *Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication as noted above. List presentations made during the last year (international, national, local societies, military meetings, etc.). Use an asterisk (*) if presentation produced a manuscript.*

1. Abstract presented at the 2019 SOMSA. Veazey et. al, "How Telemedicine Impacts Clinical Decision and Performance in Prolonged Field Care Scenarios: A Preliminary Review".
2. SimVentors showcase presented at the 2019 International Meeting on Simulation in Healthcare. Cohen et. al, "Low-cost simulator modification to support repetitive practice and performance improvement of lower extremity escharotomy".

- **Website(s) or other Internet site(s)**

*List the URL for any Internet site(s) that disseminates the results of the research activities. A short description of each site should be provided. It is not necessary to include the publications already specified above in this section.*

Nothing to report.

- **Technologies or techniques**

*Identify technologies or techniques that resulted from the research activities. Describe the technologies or techniques were shared.*

Please see the Y1Q4 Annual report.

- **Inventions, patent applications, and/or licenses**
  *Identify inventions, patent applications with date, and/or licenses that have resulted from the research. Submission of this information as part of an interim research performance progress report is not a substitute for any other invention reporting required under the terms and conditions of an award.*

| |
|---|
| Nothing to report. |

- **Other Products**
  *Identify any other reportable outcomes that were developed under this project. Reportable outcomes are defined as a research result that is or relates to a product, scientific advance, or research tool that makes a meaningful contribution toward the understanding, prevention, diagnosis, prognosis, treatment and /or rehabilitation of a disease, injury or condition, or to improve the quality of life. Examples include:*
  - *data or databases;*
  - *physical collections;*
  - *audio or video products;*
  - *software;*
  - *models;*
  - *educational aids or curricula;*
  - *instruments or equipment;*
  - *research material (e.g., Germplasm; cell lines, DNA probes, animal models);*
  - *clinical interventions;*
  - *new business creation; and*
  - *other.*

| |
|---|
| Please see the Y1Q4 Annual Report. |

## 7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

**What individuals have worked on the project?**
*Provide the following information for: (1) PDs/PIs; and (2) each person who has worked at least one person month per year on the project during the reporting period, regardless of the source of compensation (a person month equals approximately 160 hours of effort). If information is unchanged from a previous submission, provide the name only and indicate "no change".*

*Example:*
*Name:* *Mary Smith*
*Project Role:* *Graduate Student*
*Researcher Identifier (e.g. ORCID ID):* *1234567*
*Nearest person month worked:* *5*

| | |
|---|---|
| *Contribution to Project:* | *Ms. Smith has performed work in the area of combined error-control and constrained coding.* |
| *Funding Support:* | *The Ford Foundation (Complete only if the funding support is provided from other than this award.)* |

| | |
|---|---|
| **NAME** | LTC Jeremy Pamplin |
| **PROJECT ROLE** | Principal Investigator |
| **NEAREST PERSON MONTH WORKED** | 1 months effort |
| **CONTRIBUTION TO PROJECT** | Leads project, scenario development, budget management, experimental design, lead meetings, meet with subject matter experts. |

| | |
|---|---|
| **NAME** | Sena Veazey |
| **PROJECT ROLE** | CO-Principal Investigator |
| **NEAREST PERSON MONTH WORKED** | 2 months effort |
| **CONTRIBUTION TO PROJECT** | Project management, experimental design of simulations, administer tasks to other investigators, assist in CRADA approvals, lead meetings, write protocols, simulation role development, meet with stakeholders for recruitment and simulation experiments. |

| | |
|---|---|
| **NAME** | David Luellen |
| **PROJECT ROLE** | Associate Investigator, Biomedical Software Engineer |
| **NEAREST PERSON MONTH WORKED** | 1 months effort |
| **CONTRIBUTION TO PROJECT** | Write security plan and work with USAISR IMD, identifying device and software integration solutions, simulation role development, assist in CRADA approvals, attends all meetings. |

| | |
|---|---|
| **NAME** | LTC Christopher Colombo |
| **PROJECT ROLE** | Co-Investigator |
| **NEAREST PERSON MONTH WORKED** | 1 months effort |
| **CONTRIBUTION TO PROJECT** | Leads project, scenario development, budget management, experimental design, lead meetings, meet with subject matter experts. |

| | |
|---|---|
| **NAME** | Katy Cohen |
| **PROJECT ROLE** | Research Nurse |
| **NEAREST PERSON MONTH WORKED** | 12 months effort |
| **CONTRIBUTION TO PROJECT** | Assist with project management, write, edit and contribute to simulation scenarios, assist with protocol creation, simulation role development, |

| | |
|---|---|
| | assist with recruiting and consenting of subjects. |

| | |
|---|---|
| **NAME** | Mark Espinoza |
| **PROJECT ROLE** | Research Assistant |
| **NEAREST PERSON MONTH WORKED** | 10 months effort |
| **CONTRIBUTION TO PROJECT** | Simulation role development, assist with recruiting and consenting of subjects, assist with resource procurement, role player in scenario. |

| | |
|---|---|
| **NAME** | Maria Seriomelvin |
| **PROJECT ROLE** | Associate Investigator, Research Coordinator |
| **NEAREST PERSON MONTH WORKED** | 1 months effort |
| **CONTRIBUTION TO PROJECT** | Assist with project management, edit and contribute to simulation scenarios, assist with protocol creation, simulation role development, assist with recruiting and consenting of subjects. |

| | |
|---|---|
| **NAME** | Kevin Ross |
| **PROJECT ROLE** | Program Manager |
| **NEAREST PERSON MONTH WORKED** | 6 months effort |
| **CONTRIBUTION TO PROJECT** | Project management at MAMC, administer task to other team members, facilitate meetings, engage with stakeholders for recruitment and simulation experiments. |

| | |
|---|---|
| **NAME** | Joanne Kunze |
| **PROJECT ROLE** | Research Assistant |
| **NEAREST PERSON MONTH WORKED** | 11 months effort |
| **CONTRIBUTION TO PROJECT** | Contribute to simulation scenarios, assist with protocol creation, simulation role development, assist with recruiting and consenting of subjects, role player in scenario. |

| | |
|---|---|
| **NAME** | Drew Thomas |
| **PROJECT ROLE** | Clinical Research Coordinator |
| **NEAREST PERSON MONTH WORKED** | 3 months effort |
| **CONTRIBUTION TO PROJECT** | Simulation role development, assist with recruiting and consenting of subjects, assist with resource procurement, role player in scenario. |

**Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?**
*If there is nothing significant to report during this reporting period, state "Nothing to Report."*

*If the active support has changed for the PD/PI(s) or senior/key personnel, then describe what the change has been. Changes may occur, for example, if a previously active grant has closed and/or if a previously pending grant is now active. Annotate this information so it is clear what has changed from the previous submission. Submission of other support information is not necessary for pending changes or for changes in the level of effort for active support reported previously. The awarding agency may require prior written approval if a change in active other support significantly impacts the effort on the project that is the subject of the project report.*

| |
|---|
| Nothing to Report |

**What other organizations were involved as partners?**
*If there is nothing significant to report during this reporting period, state "Nothing to Report."*

*Describe partner organizations – academic institutions, other nonprofits, industrial or commercial firms, state or local governments, schools or school systems, or other organizations (foreign or domestic) – that were involved with the project. Partner organizations may have provided financial or in-kind support, supplied facilities or equipment, collaborated in the research, exchanged personnel, or otherwise contributed.*

*Provide the following information for each partnership:*
*Organization Name:*
*Location of Organization: (if foreign location list country)*
*Partner's contribution to the project (identify one or more)*

- *Financial support;*
- *In-kind support (e.g., partner makes software, computers, equipment, etc., available to project staff);*
- *Facilities (e.g., project staff use the partner's facilities for project activities);*
- *Collaboration (e.g., partner's staff work with project staff on the project);*
- *Personnel exchanges (e.g., project staff and/or partner's staff use each other's facilities, work at each other's site); and*
- *Other.*

| | |
|---|---|
| **Organization Name** | Aptima |
| **Location of Organization** | Woburn, MA |
| **Contribution to the project** | Collaboration; Aptima's staff worked with the research team to train, install, and deploy the ACLAMATE software platform. The research team is currently working with Aptima staff to finesse the software for ease of use. |

## 8. SPECIAL REPORTING REQUIREMENTS

**COLLABORATIVE AWARDS:** *For collaborative awards, independent reports are required from BOTH the Initiating Principal Investigator (PI) and the Collaborating/Partnering PI. A duplicative report is acceptable; however, tasks shall be clearly marked with the responsible PI and research site. A report shall be submitted to* ***https://ers.amedd.army.mil*** *for each unique award.*

**QUAD CHARTS:** *If applicable, the Quad Chart (available on https://www.usamraa.army.mil) should be updated and submitted with attachments.*

9. **APPENDICES:** *Attach all appendices that contain information that supplements, clarifies or supports the text. Examples include original copies of journal articles, reprints of manuscripts and abstracts, a curriculum vitae, patent applications, study questionnaires, and surveys, etc.*

# Development of a Simulation Model to Test Technologies that Improve Human Performance During Prolonged Field Care

# W81XWH-17-2-0023

**PI:** LTC Jeremy Pamplin, MD **Org:** The Geneva Foundation **Award Amount:** $1,109,809

## Study/Product Aim(s)

- Aim 1: Identify a technology platform that supports real-time telemedicine in during PFC.
- Aim 2: Develop simulation training scenarios that test critical decision making during PFC.
- Aim 3: Test subject performance in PFC scenarios after standardized training with and without use of telementoring

### Approach

The purpose of this study is to measure clinician performance related to critical care management in prolonged field care (PFC). We will create a PFC testing platform, develop and validate simulation scenarios, recruit clinicians to complete "just-in-time" training, and then measure their performance during PFC simulation scenarios with/without telementoring. We hypothesize that patient care provided to critically ill or injured patients during PFC by clinicians following standardized training will be inferior to patient care provided following standardized training and supported by real-time telementoring.


Figure 1: Example of telemedicine consultation using device to inform military clinician.

Accomplishment: NA

## Timeline and Cost

| Activities CY | 18 | 19 | 20 |
|---|---|---|---|
| Establish telemedicine platform | | | |
| Develop simulation training scenarios | | | |
| Pilot test and validate scenarios | | | |
| Test subject performance in PFC scenarios | | | |
| Data analysis and manuscript writing. | | | |
| **Estimated Budget ($K)** | **$646K** | **$348K** | **$115K** |

**Updated:** 13 Sept 2019

**Goals/Milestones**

**CY 18 Goal** – Establish technology platform, Pilot test simulations

☑ Identify commercial off the shelf product to use as telemedicine device.

☑ Install telemedicine workstations/hubs at collaborating sites (SAMMC and MAMC)

☑Develop simulation training scenarios

☑Identify and write PFC scenarios (95% complete)

**CY 19-20 Goal** – Test subject performance in simulated PFC scenarios.

☑Pilot test and validate scenarios using subject matter experts

▣ Complete just in time training & recruit subjects

▣ Test subject performance of critically injured patients using validated testing platform with or without telemedicine consult

**CY 20 Goals** – Data analysis and manuscript writing

❑ Statistical analysis

▣ Publication (abstracts and manuscripts)

**Comments/Challenges/Issues/Concerns**

None.

**Budget Expenditure to Date**

Projected Expenditure: $878K

Actual Expenditure: $801K