Point of Care Teleconsultation Prototype Evaluated at CERDEC Ground Activity 2017

The call goes out: "Medic!" When you're a front line medic, attached with a dismounted patrol in an austere environment, and you hear that call, your heart begins to race. You ask yourself, "What kind of injury am I dealing with? Will I have the proper amount of gear?" Then you begin to rehearse your procedures in your head. You come up to the casualty and you begin your assessment. You come to the conclusion that the casualty needs surgical intervention now! Evacuation is hours out. What can you do to keep the casualty alive or relieve the pressure to save a limb or organ?

TATRC's Operational Telemedicine Lab is looking at capabilities that can provide assistance through teleconsultation. TATRC is researching and developing prototype teleconsultation applications and predictive algorithms to enable a medic to talk with a medical provider in the rear to provide guidance in these difficult situations and for prolonged field care. TATRC conducts prototype field evaluations on basic research capabilities to stream video, voice, and telemetry data over the tactical radio network, back to a Brigade Medical Company with reach-back capability to the surgeon. TATRC, along with PM Nett Warrior, the CERDEC Ground Activity (CGA), the US Air Force Research Lab (USAFRL), and industry partners are developing prototype software applications that can be installed on Nett Warrior End User Devices (EUDs) in order to monitor the casualty's vital signs with wireless medical sensors. Additionally, it can send video from the EUD back to the surgeon and enable the surgeon to conduct a virtualized, remote telepresence, imposing his hands into the video feed to guide the medic on a procedure, and researching machine learning predictive algorithm capabilities to provide the medic with a 20-30 minute warning on the potential of the casualty crashing.

TATRC evaluated new basic research technology concepts for the dismounted, mounted, and en route medical care

Op-T-med staff demonstrating secure transmission of near real-time vital signs data and imagery from Point of Care.

telemedicine at CGA, Joint Base McGuire-Dix-Lakehurst, NJ. While at CGA, during the three-week evaluation, TATRC tested basic research capabilities to transmit medical data on a tactical radio network and had medical personnel evaluate these capabilities in simulated casualty scenarios, with the goal of providing situational awareness and electronic documenta-

tion of medical care. Some of the technologies tested and evaluated included: the USAFRL's Battlefield Assisted Trauma Distributed Observation Kit, a software application on an EUD that monitors the vital signs of up to 6 casualties wirelessly, and documents care on a DD 1380 encounter; the Naval Surface Warfare Center Dahlgren Division's Battlefield eTC3 card Data Transfer to EHR, a DD 1380 encounter compression to transmit over the horizon on

One of the many simulated casualty scenarios evaluated using a variety of systems at CGA 2017.

Iridium networks; the Mobile Virtual Interactive Presence Capability to stream imagery from the dismounted medics EUD to the Physician at a medical treatment facility where the physician can introduce sports casting to guide a medic on difficult procedures; and Chat for Intelligence Surveillance Reconnaissance; to provide medics a capability to text message each other to provide situational awareness. For en route care, TATRC evaluated Remote Diagnostic Technology's new Corsium Suite, which is a web-based portal that displays multiple Tempus Pro data on the tactical network, and transmits the Tempus Pro data from evacuation vehicles to a server on the Brigade Tactical Network.

TATRC also had medics evaluate these technologies in addition to other concepts. One such concept was a tactical micro-cloud that provides situational awareness and updates to the DD 1380 encounters to all medics on the tactical network. Another concept evaluated was the Automated Processing of the Physiological Registry for Assessment of Injury Severity system, which is a computational platform for real-time analysis of vital signs, for identification of substantial bleeding in trauma patients specifically, hemorrhagic injuries. Finally, medics evaluated the Comprehensive, Robust, Adaptive Multi-Modality Image Compression Technique, which is data compression of imagery from ultrasound and other x-ray devices and transmit the encounters to be uploaded into the casualty's electronic health record. TATRC selects experienced medics and corpsmen to provide a subject matter expert opinion on these new research prototypes during the concept demonstration. The

medics are taken out into a realistic field environment, and run through a variety of different casualty scenarios armed with the devices to treat and document care. The goal of the overall evaluation is to obtain invaluable insight on the feasibility of the prototypes, provide guidance on the direction for further development and improve basic tactics, techniques and procedures.

CGA provided an actual and virtual 75th Ranger Regimental network architecture to provide the tactical radio and satellite connectivity from the forward location to a simulated Ranger Regimental Headquarters Tactical Operational Center. The architecture provided an outstanding capability to test and evaluate up and coming research capabilities that will be connected on the military operational network. The network introduced satellite communication latency, bandwidth constraints such as additional operational user congestions.

Mr. Carl Manemeit, Deputy Lab Manager for TATRC's Operational Telemedicine Lab stated, "This annual evaluation exercise provides our vendors with early insight on tactical network limitations and bandwidth constraints that aid in the further development and advancement of their prototype system in an operational environment, which is priceless for Principle Investigators. Understanding the operational environment, allows for a better end product that can be delivered to the advanced developer and product developer." ⑅