ECS Delivers Haptics-Based VR Training for Burn Care Treatment

Engineering & Computer Simulations (ECS) [Booth 1235] has delivered “Advanced Haptics Development to Support Medical Simulated Training Environments” as part of a Phase II Small Business Innovation Research (SBIR) project for the Defense Health Agency. This project includes the design and development of haptics-based virtual reality (VR) training systems to support combat medicine within the U.S. Army’s Synthetic Training Environment (STE) and allows for potential expansion to the broader medical community.

Led by Shane Taber, ECS Vice President of Operations, Orlando, this research project has been designed as an extension of Tactical Combat Casualty Care Simulation (TC3Sim) and has been implemented using the baseline of multimodal, haptic-based VR research scenarios developed from TC3Sim. The SBIR project features a multiplayer teleteaching capability for the synchronous training of students while an instructor can be observing and providing increasing levels of intervention to guide students on the procedure. The system also supports a single player experience for new users or those requiring refresher training.

“We are proud to provide this innovative medical training to our Soldiers within the Army’s STE systems,” said Waymon Armstrong, ECS CEO and President. “The integration with haptic devices offers a sense of touch and natural interactions within the immersive environment, which strengthens the quality of the training and the users’ retention. When applied in almost any medical scenario, this enhanced training can provide all healthcare professionals - in the government or industry sectors - with the tools they need to potentially save more lives.”

During the first year of the study, the ECS team worked with medical professionals at Mayo Clinic in Jacksonville, Florida, to perform a literature review and to design the scenario for instructors and students to address escharotomy, a critical burn-care treatment. ECS developed the scenario as a prototype system to demonstrate how learners can effectively collaborate using multiple modalities within the medical environment with support from haptics devices to learn potentially lifesaving techniques. ECS partnered with HaptX to integrate their DK2 haptic glove system into the VR-based training scenario for escharotomy. Upon completing development, ECS successfully conducted a usability study at Mayo Clinic Jacksonville for future research and development and to capture feedback on the technology and training approach based on a prototype training scenario.

Within the scenario, users are presented with a simulated burn patient, with which they can directly interact to perform the escharotomy. Running in a VR scenario including interaction with the patient’s leg, marker, scalpel, iodine and cleaning pads, the trainee completes the procedure individually or with a live instructor’s assistance. Next, the player may independently review their overall performance or while collaborating with an instructor regarding feedback and areas for improvement.

During the second year of the SBIR study, the ECS team will continue its research expanding the scenarios to the point of injury in the battlefield for Combat Life Saver and Care Under Fire training. This SBIR will culminate with a training effectiveness evaluation to determine the learning value and engagement for learners as compared to other methods of training.

“We’re excited to contribute to this body of research related to human performance and training effectiveness for both the military and medical communities,” said Taber. “By collaborating with HaptX and Mayo Clinic, this type of innovative work advances high-fidelity VR training by combining the state-of-the-art hardware and software solutions.”

5G Network Demonstration Links I/ITSEC Displays

Kratos Defense & Security Solutions, Inc. [Booth 1322] is joining in a multi-domain, immersive training demonstration linking multiple vendor booths over 5G into a collective immersive whole. Real-world implications include the possibility of networking multiple components, each at its point of need, being networked together through 5G for joint training.

The I/ITSEC Exhibit Hall scenario involves a helicopter gunship directed by a ground-based forward observer pursuing a truck-mounted gunner adversary. Two immersive Holodecks in the Kratos booth – one for an UH-60 helicopter Aerial Gunner and one for a Forward Observer/Joint Terminal Attack Controller (JTAC) station – are connected to two partner booths; RTI [Booth 1307], where the UH-60 pilot flies the aircraft simulation in the Kratos booth, and Rave Computer [Booth 3018], in which an adversary truck-mounted gunner joins the collective training environment.

Kratos representatives say that the networking demonstration utilizes a Common Communications Architecture (CCA) that includes a Data Distribution Service (DDS) to integrate 5G Communications with its immersive training systems.

The capability for real-time distributed immersive training will be demonstrated across three booths at I/ITSEC, including partners RAVE Computer and Real-Time Innovations (RTI) [Booth 1307].

Company representatives describe CCA as a scalable, platform agnostic, data-centric architecture using open standards and a DDS to enable delivery of low latency, ultra-reliable, secure communications across multiple networks, including 5G, satellite communications (SatCom) as well as public and private networks.