



U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – SOLDIER CENTER

Adding Stressors to Tactical Combat Casualty Care and Care Under Fire Virtual Reality Performance Assessments Using Haptics and Integrated Immersive Technologies

William Y Pike, PhD

Conner Parsey

SFC Paul Ray Smith Simulation and Training Technology Center (STTC)

Joanne Barnieu

Engineering & Computer Simulations, Inc.



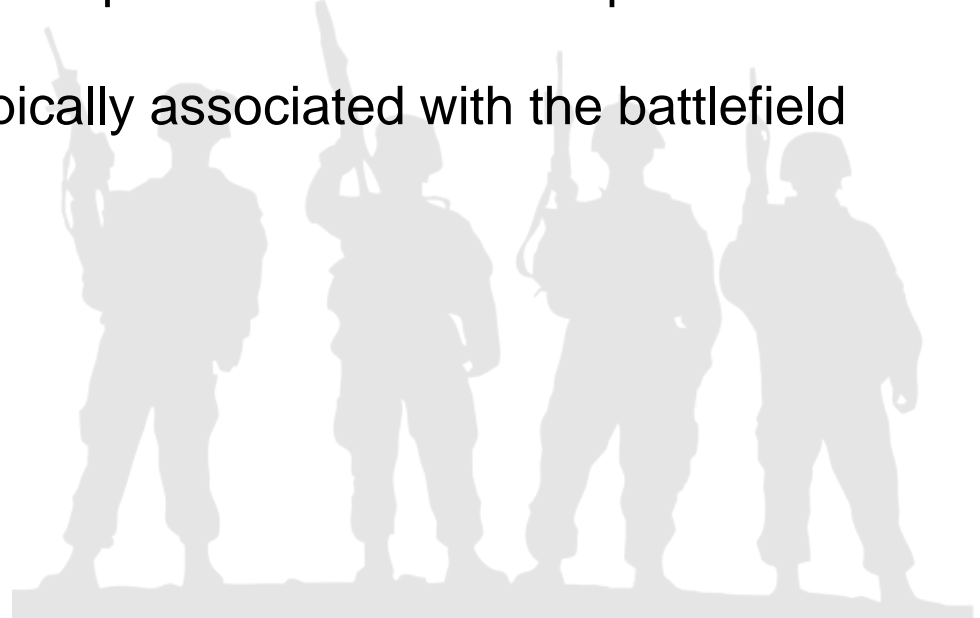
PROBLEM STATEMENT



- Virtual Reality (VR) has advantages over live training & assessments such as:
 - Access to more and varied scenarios with increasing complexity
 - More realistic stressors (bloodshed, explosions, etc.)
 - More cost-effective
- Yet, VR alone has its limitations in how it can effectively measure warfighter performance in a real-life battlefield scenario, notably:
 - Lack of tactile input from weapon recoil or a tourniquet as it is being applied
 - Lack of olfactory input typically associated with the battlefield



Tactical Combat Casualty Care (TC3) VR Environment



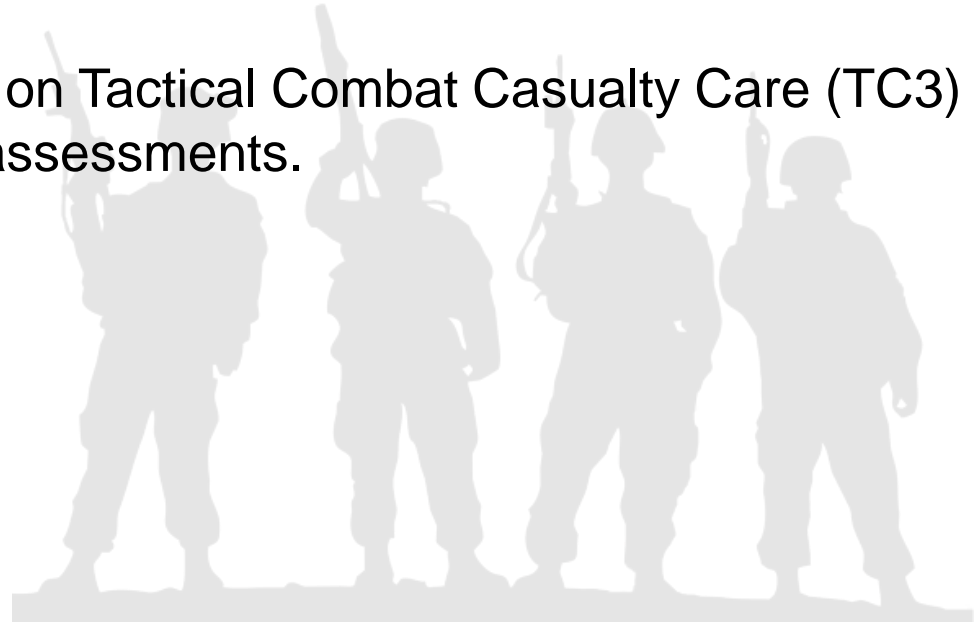


HYPOTHESIS

- The US Army is interested in exploring immersive and innovative technologies that can be added to VR scenarios to increase realism such as:
 - Haptic gloves
 - Haptic-based weapons
 - Olfactory devices
- By adding stressors to the scenario through use of immersive technologies, the assessment could be a more effective measurement of warfighter readiness.
- The focus for the research is on Tactical Combat Casualty Care (TC3) and Care Under Fire (CUF) assessments.



Haptic gloves with haptic weapon

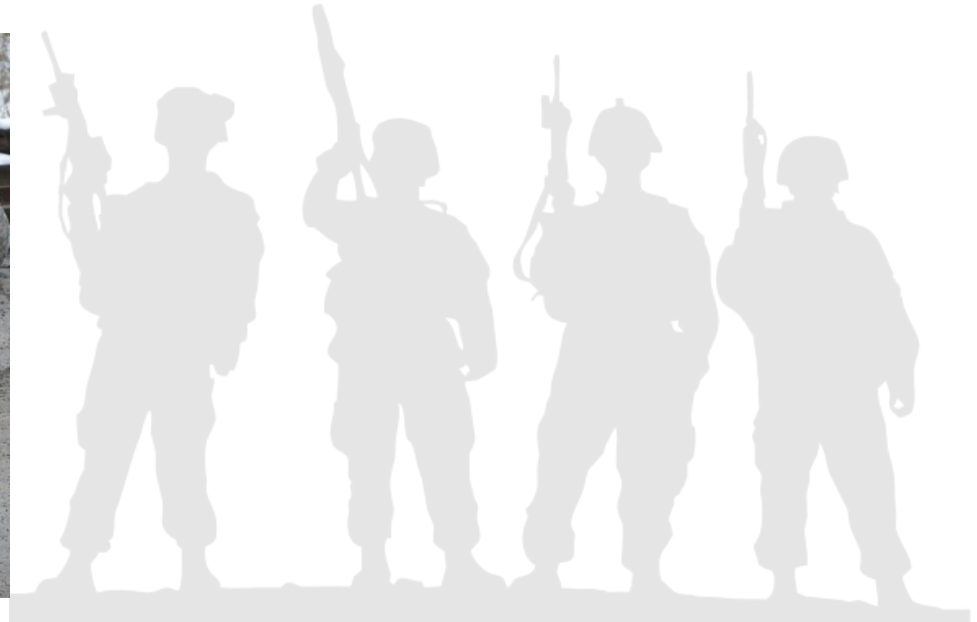




METHODS



- Front-end analysis
 - Reviewed current CUF assessment rubrics
 - Observed a combat medic course with field assessments
 - Interviewed combat medic course instructors
 - Investigated different haptic gloves & haptic-based weapons
 - Investigated olfactory devices and researched optimal scents

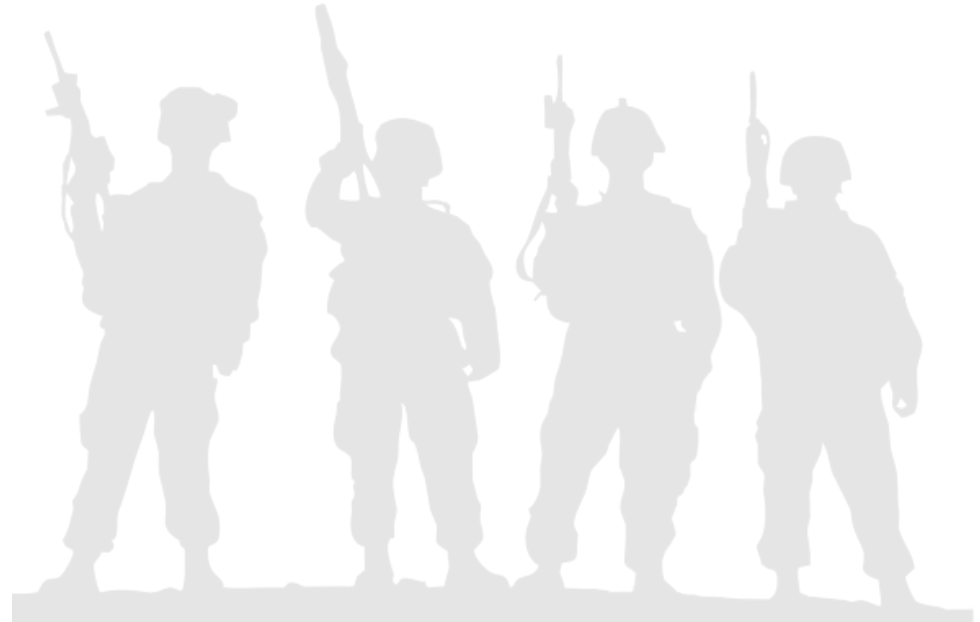




METHODS



- Designed and developed a CUF VR assessment prototype with haptics and olfactory device integration (including a haptic-based weapon)
 - Includes a scoring mechanism to rate performance on individual CUF tasks on a scale of 1-4.

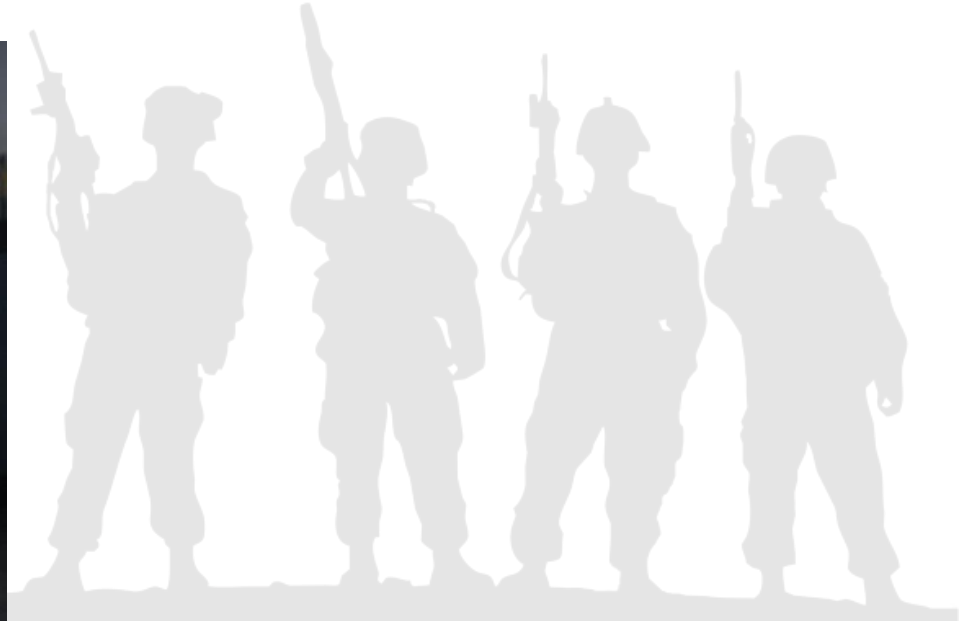




METHODS



- Designed a usability study to collect data from either Combat Lifesavers (CLS) or combat medics as they go through the assessment with added technologies. Data collection instruments will address:
 - Impact of realism on performance
 - General reaction on how certain technologies increased realism
 - Usability, Functionality, and Human Factors / Ergonomic benefits or challenges
 - Prior training or experience with technologies





NEXT STEPS

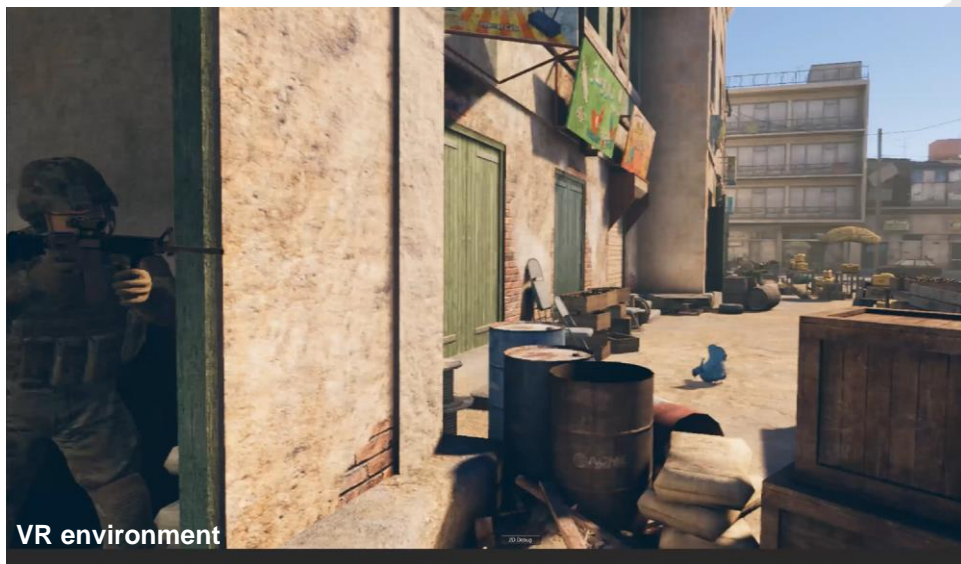
- Despite the ongoing pandemic challenges, in 2021, the team plans to:
 - Execute the usability study during a CLS or combat medic course with the Army Guard and Reserve component.
 - Include a data collection concerning instructor impact. Instructors will be interviewed concerning:
 - Increased workload
 - Concerns or challenges with setting up or breaking down equipment or equipment troubleshooting during assessments.
 - Perceived challenges with implementing these assessments long-term.
 - Learning curve concerning the use of these technologies (during set up, break-down, or while assessment is in progress).
 - General reaction and perceived effectiveness for assessment (and training).
 - Compile, synthesize, analyze, and report out on study findings.



QUESTIONS



Haptic weapon



VR environment



Haptic glove