

Unlocking the Full Potential of Augmented Reality for Decision Making Under Battlefield Stress

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Abstract

Augmented reality on the battlefield has the potential to revolutionize tactical decision making, especially in support of a multi-domain operation (MDO). Previous work comparing more traditional tools such as sand tables and tablets to the newer mixed-reality options do not show clear superiority of the newer technology. However, consideration of the surrounding literature suggests that there may be inherent advantages, and design interventions, that ultimately improve the utility of augmented reality tools such that they are preferable to previous technologies. Specifically, in high-risk activities, such as those encountered in an active battlefield, the augmented reality interface, and the information available through that technology, may be designed so as to convey communication advantages. The proposed study compares design interventions for augmented reality using a HoloLens 2 to get information quickly for tactical decision-making across any MDO with similar representation on a tablet. Using the situation awareness framework and cognitive workload measures (based on NASA-TLX), we look at training on augmented reality technology to determine the best options. Furthermore, by studying the presentation of augmented reality images on the HoloLens 2, we would provide recommendations for how to quickly integrate the technology as a training tool and, eventually, a tool in the field. By determining the best ways to provide training on the new technology, the use of augmented reality can prevent costly and/or dangerous mistakes that would jeopardize the safety of the warfighter and increase the utility of the augmented system in scenarios where maintaining situation awareness is vital.

Keywords

Augmented Reality (AR), Multi-Domain Operation, (MDO), HoloLens, Situation Awareness (SA), Cognitive workload (NASA-TLX)

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Biography

Betsy Guzmán is a master's student in Industrial Engineering, Department of Industrial Engineering and Management Systems at the University of Central Florida (UCF). She works as a Research Associate with Sawyer Labs, supporting various projects as they relate to readability and human-computer interaction. Prior to joining the master's program at UCF, she worked at the U.S. Census Bureau as a demographic statistician where she became certified in contract and project management. Using those skills, she later worked as a small business consultant as well as a manager for various medical practices. Her interest in maximizing the potential of emerging technologies for the benefit of the greater good has led to work in human-computer engineering as it relates to augmented reality, virtual reality, readability, usability of technologies and the remote management of projects.