Abstract
This pilot study examines how a three-dimensional (3D) perspective display influences learning of military tactics as opposed to the same content viewed on a flat surface. The Augmented REality Sandtable (ARES), an interactive research test bed that projects imagery onto an actual sand table, will be used to display the tactical content. This study will also leverage the Generalized Intelligent Framework for Tutoring (GIFT; Sottilare, Brawner, Goldberg, & Holden, 2012) for the management of a lesson to assess learning based on training scenarios validated by subject matter experts (SME). Participants with map reading experience will view a tactical decision exercise via Virtual Battlespace 3 (VBS3), and will be prompted for their input as to the appropriate actions to perform. Assessment measures include a validated pre / post survey, electrodermal activity, the NASA Task Load Index (NASA-TLX) to assess subjective workload, the Self-Assessment Manikin Test to assess participant affect, mental rotation, and physiological data collected by the Multimodal Behavior Analytics (MIBA) tool via a Microsoft Kinect®. It is expected that the perspective display will have a greater impact on lower performing students than on higher performing students (expertise reversal effect; Kalyuga, 2007). Mental rotation ability is also expected to have differential effects on performance improvement based on condition; where individuals with lower ability will perform better with the perspective display than similar individuals using the flat display. This pilot study will serve to focus the research for a larger scale study in 2016.

What is GIFT?
GIFT is an open-source prototype tutoring architecture developed at the Simulation and Training Technology Center. With GIFT integrated into the ARES research test bed, courses on a variety of topics can be created that will include intelligent tutoring. For more information on GIFT, see www.gifttutoring.org.

Military Tactical Training Using Decision Exercises
Military tactics are part of the basic curriculum at military training institutions. This analytical and decision making learning occurs through tactical decision exercises (TDEs). TDEs are currently being facilitated in the classroom environment using virtual environments (VEs) such as Virtual Battlespace (VBS). ARES has the unique capability to add a 3D perspective display from an overhead view using a tangible user interface like sculpted sand. Further research is needed to be able to quantify the results that this technology will have in a classroom or operational environment.

References: