Augmented Immersive Team Training

AT A GLANCE

WHAT IS IT?

Augmented Immersive Team Training, or AITT, is an augmented reality training system that integrates with the U.S. Marine Corps' ground combat team training instrumentation system, Instrumented Tactical Engagement Simulation System (ITESS II) to display virtual indirect fire effects, aircraft, vehicles, and/or role players onto actual terrain.

HOW DOES IT WORK?

Advanced software algorithms and multiple sensors accurately determine the trainee's viewpoint. A head-worn display and an enhanced instructor station drives the training content, providing virtual indirect fire, munitions effects, aircraft, and targets inserted into the real world view.

WHAT WILL IT ACCOMPLISH?

AITT, integrated with ITESS II and OneTESS, will enable small unit leaders, forward observers, and mortarmen to more realistically participate in force-on-force training. It will allow for realistic training at a fraction of the cost of live training. If successful, it will enable more elements of a Marine infantry battalion to train together, resulting in significant cost savings for the military. It will improve instructor and trainee efficiency and effectiveness.

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The purpose of Augmented Immersive Team Training (AITT) is to enhance force-on-force (FOF) training of call-for-fire and close-air support. Currently, Marines cannot see simulated battlefield effects, such as munitions explosions, during FOF exercises. This limits the training capability for Marines, and is a Marine Corps requirement gap. AITT address this gap with augmented reality, and will transition the science and technology to the FOF program of record and the Squad Immersive Training Environment (SITE) program – a "toolkit" of live, virtual, and constructive (LVC) technologies to enhance squad operational readiness and squad leader tactical decision-making skills.

Augmented reality (AR), a technology that combines virtual information with a real-world view, is the enabling capability for AITT. The yellow first-down line in a televised football game is a simple example of AR: The line is not really on the field, it is computationally inserted into the live scene.

For AITT, realistic virtual elements (e.g., weapons effects to include mortar, artillery, fixed and rotary wing aircraft), and targets (e.g., enemy personnel, tanks, or buildings) are combined with the real world scene. The resulting images are displayed in a commercial off-the-shelf (COTS) head-worn display and in simulated tactical equipment, such as binoculars. To support training development and assessment, an easy-to-use enhanced instructor station (EIS) will allow the instructor to select and control the scenarios.

AITT began in FY11, and major demonstrations each year will lead to a final demonstration and transition in FY15. Demonstrations took place at Marine Corps Base Camp Pendleton in February 2013, Marine Corps Base Quantico in August 2013 and Orlando, Florida in February 2014. The focus of the work to date has been the development of a video see-through AR system, integration of the AR system with existing Marine Corps equipment/devices, initial prototypes of a tablet-based EIS, and development of the training framework. Future work will focus on the integration of an optical see-through AR capability (e.g., eyeglasses perspective), and enhancing the realism of the computer-generated elements and EIS capabilities. The program will also conduct an assessment of the capability's effectiveness to support squad training tasks.

Research Challenges and Opportunities:

- Can augmented virtual targets, munitions effects, and simulated aircraft provide adequate fidelity to support training?
- Can the AITT system replace some live training resources required to conduct small unit training tasks?
- Can commercial head-worn displays provide sufficient performance for effective training (e.g., field of view, resolution, weight, mobility, and brightness)?