



US DEPARTMENT OF DEFENSE

## BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

# Neurobehavioral and Psychological Health Outcomes Integrated Eye Tracking and Neural Monitoring for Enhanced Assessment of Mild Traumatic Brain Injury (mTBI)

Approximately one in six deployed US Service Members has sustained a mTBI. Identifying and characterizing these injuries is critical to achieving positive operational and treatment outcomes. Neurocognitive measures must be practical for use in a broad range of contexts, from operational settings where injuries occur, to TBI clinics where wounded Service Members work on regaining operational proficiency. Unfortunately, research suggests that commonly used measures are often insensitive to injury-related changes in cognitive function. Researchers from the Uniformed Services University of the Health Sciences (USUHS), National Intrepid Center of Excellence (NICoE), the Neurocognitive Assessment Branch of the US Army, and Naval Medical Center San Diego (NMCSO) have been working together to develop and validate a single system for evaluation of mTBI, integrating both electroencephalogram (EEG)-based measures of neurocognitive effort, and eye tracker-based measures of saccadic reaction time. Accomplishments for FY16 include complete development and testing of combined EEG with eye tracking and neurocognitive tests and virtual reality simulation in a small pilot study of 30 healthy human subjects. Preliminary analyses indicate that these cognitive efficacy tasks were successful in discriminating between workload conditions. Hence, the next phase of the primary study has started using tools developed and tested in the pilot study to assess the cognitive functions among these groups: controls (16 enrolled), mTBI (13 enrolled) and moderate-severe TBI (14 enrolled).

Successful validation of a combined EEG and eye tracking system would offer a novel, non-invasive and efficient method of assessing compromised cognitive function stemming from mTBI populations. A practical and effective neurodiagnostic assessment tool for assessing mTBI populations with compromised cognitive function would enable better healthcare and improved health outcomes for injured Service Members.

