

OPTICAL BRAIN MONITORING USING FUNCTIONAL NEAR INFRARED (FNIR) SPECTROSCOPY TO MEASURE COGNITIVE WORKLOAD WHILE UNDER G.

Summary

An accurate measure of mental workload in human operators is a critical element of monitoring and adaptive aiding systems that are designed to improve the efficiency and safety of human-machine systems during critical tasks. Functional near infrared (fNIR) spectroscopy is a field-deployable non-invasive optical brain monitoring technology that provides a measure of cerebral hemodynamics within the prefrontal cortex in response to sensory, motor, or cognitive activation. This study seeks to determine the efficacy of using fNIR spectroscopy to measure cognitive workload while under G by testing a group of naive subjects at several standardized mental workload, memory and cognition tasks at various G levels in the ATFS-400.

Objectives

- To determine differences in cognitive performance and mental workload at various G levels
- To validate the fNIR optical brain monitoring system under G loading
- To develop protocols and metrics for future testing of aviators during UPRT, SD and Tactical flight training at NASTAR
- To develop potential cognitive screening mechanisms for pilot selection

Customer/Partner

Drexel University Cognitive Neuro-engineering and Quantitative Experimental Research (CONQUER) program partnered with ETC

Status

Under review by the NASTAR Institutional Review Board.

Future Publications

NeuroImage
Journal of Biomedical Optics