Lockheed Martin To Use Augmented Cognition To Develop A New Human-Computer Interactive Interface

The Defense Advanced Research Projects Agency (DARPA) awarded Lockheed Martin$650,000 to support Phase IV of a program designed to help maintain the performance levels of military personnel working in stressful environments.

Called Improving Warfighter Information Intake Under Stress, the program monitors operators' cognitive activity, identifies conditions that may lead to sub-optimal performance, and adaptively implements intelligent strategies to help avoid performance declines. Applying recent advances in cognitive neuroscience to develop revolutionary human-computer interfaces, the technology uses a human operator's cortical electrical activity, blood oxygenation, heart rate, skin conductance and pupil dilation to monitor cognitive activity in real time. These physiological markers typically depart from norms during high workload, distraction or drowsiness.

During Phase IV, Lockheed Martin Advanced Technology Laboratories (ATL) will integrate its Performance Augmentation through Cognitive Enhancements (PACE) architecture and physiological data from its cognitive-state gauges into a user-interface prototype of a future command-and-control application.

"Gauges receive physiological data from devices like electroencephalographs and electrocardiographs to provide a continuum of cognitive workload levels, from low to nominal to extremely high," said Dr. Patrice Tremoulet, principal investigator. "Through PACE, the system will use those responses to determine the operator's cognitive state. When it approaches overload, the system - among other actions - may slow the rate of information or change its presentation format to return the operator to a more comfortable and effective state."

ATL and teammates Lockheed Martin Integrated Systems and Solutions and Advanced Brain Monitoring, Inc., Carlsbad, CA, are looking to use neuroscience-based technologies to assist controllers of multiple unmanned aerial vehicles (UAVs) and missiles launched from surface ships and submarines. The ATL-led team expects to demonstrate a prototype later this year that will let operators simultaneously launch and track 25 percent more missiles or UAVs than current systems without any increase in errors.

Headquartered in Bethesda, Md., Lockheed Martin employs about 135,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration, and sustainment of advanced technology systems, products, and services.

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