

On the transparent Army After Next battlefield, information dominance will be a critical component of success. Part of this intelligence will include automated physical and psychological status of soldiers geographically dispersed or physically separated in complex urban terrain. Warfighter Physiological Status Monitoring (WPSM), in combination with the Warrior Medic program, provides prognostic and diagnostic capabilities for mounted and dismounted soldiers, including a methodology to assess components of individual medical readiness, furnish real time command and medical intelligence on warfighter initial readiness, sustainability and recovered capability, and to detect casualty events and ensure seamless transition to far forward casualty care.

STO Milestones

FY99 *Prototype wearable WPSM* for use at the DBBL that has wireless sensor network (activity, pulse, core and skin temperature, geolocation, metabolic cost of marching) that collects and stores information in open, standardized format

FY00 Prototype wearable WPSM system *interfaced with Land Warrior Dead Reckoning Module* to collect mission-specific physiological data during field training exercises

FY01 Utilize *WPSM database*, and data acquisition and management capability, to support the development and testing of model strategies to predict individual warfighter status

FY02 *Knowledge management system* to reduce information from WPSM and predictive performance and health risk models to only that which is essential to commanders

FY03 Develop highly reliable, automated bioelectronic and embedded environmental and imminent physiological threat *sensors* via enabling technologies, including real-time EEG analysis and other indicators of mental performance

"Tool Kit" to Understand Warfighter Physiology

CURRENT

SENSORS/MEASUREMENTS

- 1 Headband EEG and Oximetry*
- 2 Acoustic*
(Voice Stress and Content Analysis)
- 3 Dead Reckoning Module
(3-Axis Accelerometer, GPS, Magnetometer, Altimeter)
- 4 EKG, EMG, and Thoracic Impedance Cardiography
- 5 Body Core and Skin Temperature
- 6 Near-Infrared (or Other) Technology*
Tissue pH, Glucose, and Lactate
- 7 Wrist-Worn Actigraph
- 8 Boot-to-Boot Impedance*
- 9 Foot Contact (Weight/Location)
- 10 Wireless Inter-Module Communication



PHYSIOLOGICAL CONSEQUENCES OF CONCERN

- Hypothermia
- Hyperthermia
- Hypoxia
- Metabolic Fatigue
- Vigilance Lapses
- Dehydration
- Psychological Stress
- Inadequate Restorative Sleep
- Desynchronization of Circadian Functions
- Jolt, Blast, and Repeated Impact Exposure

Predict Significant Performance Degradation and Impending Casualty

FUTURE

Specifications for Minimal Sensor Set to Predict Warfighter Physiology

* Concept

