# Physiological Status Monitoring System

*An AFFOA Project | Department of Defense Manufacturing Innovation Institutes*



**Technology:** Physiological Status Monitoring System for High-Altitude Low-Opening (HALO) Jumpers

**Project Participants:** Sponsored by United States Army Research Institute of Environmental Medicine (USARIEM) and in partnership with end-users from the US Air Force Special Operations Command, AFFOA in collaboration with MIT Lincoln Laboratory.

**Institutes' Role:** AFFOA's team of electrical engineers and textile technologists worked together with partners at MIT Lincoln Laboratory to simultaneously design and build a textile-based solution, along with the hardware, software and app to solve a specific DoD need. AFFOA and the Defense Fabric Discovery Center at MIT Lincoln Laboratory's unique mix of in-house capabilities, technical knowledge, and industry network made this system possible.

**Technology Description:** Existing technologies to address this need are insufficient due to inaccuracies and user friction associated with conventional wrist-worn PSM wearables. The fabric headband sensor system contains embedded microelectronic components that measure with increased accuracy of key physiological status markers including temperature, heart rate, and blood-oxygen levels. Data is transmitted wirelessly from the fabric in each headband to a sing smart-device (phone, computer, tablet), with an edge-computing architecture enabling the mission commander or medic rapid access to the readiness status of multiple jumpers in real-time.

**Impact:** This system has undergone initial end-user testing in a simulated high-altitude environment and has successfully demonstrated the ability to identify moments of induced hypoxia. Feedback from these tests is informing improvements to fit that will be included in future development efforts. In the future, this technology will enable real-time tracking of multiple Warfighter's physiological status simultaneously and enable proactive and reactive countermeasures for safety and strategic redeployment.