

Wearable Technology Supports Infantry Performance

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From rifles that can track targets to providing battlefield monitoring via augmented reality, the UK military is seriously engaging wearable technology to help improve its capabilities. In the UK Roke Manor Research has, working with the UK's Defence Science and Technology Laboratory (Dstl), displayed a wearable kit designed to help troops navigate even when they can't access GPS, as well as to automatically detect threats and share information.

The Dismounted Close Combat Sensor (DCCS) uses inertial and visual navigation sensors, combined with advanced algorithms to provide soldiers with 3D navigation data when a GPS signal is not available, which can happen in urban environments.

The developers behind the adoption of wearable technology applications are varied, but one key application is using this technology to monitor a soldier's physical condition. According to newelectronics.co.uk, by employing sensors it's possible to optimise the well-being of the soldier or, should they be wounded in action or injured in training, sense injuries and relay medical data back to medical support services.

Figures show that every year preventable fatalities are being recorded. The protection of service personnel, whether during training or on active duty, is now seen as a priority by the military. In July 2013, during a military exercise, several service personnel died as a result of exertional heat illness, due in part to the demanding physical nature of the exercise they were undergoing.

Three reservists died from the effects of hyperthermia caused by heat, a report on the incident found that those organising and overseeing the exercise were not monitoring those taking part and failed to understand the implications of exertion and heat illness. In response to this and to better understand thermoregulatory and cardiovascular responses to heat and other physiological challenges during training, the Ministry of Defence, via Dstl, approached Bodytrak, a London based company which had developed a light-weight, precision monitoring in-ear device.

The portable device is able to provide data in real time monitoring various body biometrics and activity. "In developing the device, our initial aim was to create a body monitoring in-ear device, embedded with machine learning algorithms and multiple high-grade sensor components," explains the company's founder, Leon Marsh. "Our focus was on functionality and accuracy. We wanted to

provide a degree of monitoring that could be applied to remote workers in extreme environments, for example, or to athletes who were looking to improve their performance. Each individual, a soldier or elite athlete, has different physical limitations, so it's vital that we can support them and help avoid untoward events".

According to Marsh, "Our device is a personal solution that can be supported with a smartphone application but can also be part of a much larger IoT (Internet of Things) platform which means that data can be fed into a centralised platform to display biometric data in real-time to provide remote monitoring. We're trialling Bodytrak not only to support the welfare of soldiers but also for use with the emergency services, elite sports, medical patient monitoring and for other types of professionals working in extreme environments," Marsh explains.

According to Alec Creighton, the company's Marketing Director, "Bodytrak is intended to record data for later interrogation or backhaul and could play an important part in the assessment and prioritising of casualties".

From a military perspective data, collected in real-time, can be seen locally by the soldier, or by a squadron commander, who can then be alerted should specific health parameters exceed safety ranges. The use of wearable technology is not just about collecting data but also involves combining data with machine learning to provide meaningful information that is actionable.

"While we're able to monitor heart rates over time, for example, we'll now be able to personalise an individual's response to physical exertion and their exposure to extreme conditions," explains Creighton. "We can create tailored road maps to identify specific points when an individual may be susceptible to heat stress of heart strain and able to alert operators to the possibility of fatigue."