

*By the very nature of their high intensity and physically demanding work, soldiers on the battlefield are prone to all kinds of injuries. Some of the most common include musculoskeletal injuries, environmental injury and hearing damage. Now, as **Grant Turnbull** reports, the government is funding projects that could see soldiers utilise wearable tech to flag potential injuries before they occur.*

The most recent data released by the MoD – April 2017 to March 2018 – revealed there were 2,451 medical discharges (MD) from all three services, equating to seven regular armed forces personnel being discharged each day.

The army has the highest number of MDs totalling 1,769 for 2017/18.

For all the services, the two most common reasons for being discharged are musculoskeletal disorders and injuries (MSKI), and mental and behavioural disorders.

When comparing the two, the percentage of personnel discharged with MSKI is usually significantly higher. The most recent data shows that approximately 50% of MDs (pushing up to 60% for the army) can be attributed to MSKI.

Discharging personnel who could have been utilised during operations ultimately affects force readiness, which is why there is a continuing drive to reduce these numbers. Personnel that are medically downgraded, and not discharged, also affects force readiness and soldier deployability. The British Army is currently working to a target of 90% deployability for its total personnel.

According to a 2018 Freedom of Information request, more than 17,000 soldiers in the British Army were medically downgraded as of January 1 2018 (out of a total force of close to 77,500), with 7,000 not able to deploy on operations.

The MoD is funding rapid innovations that could improve deployability and the overall health of personnel through the use of wearable and also “nearable” technologies.

The defence and security accelerator (DASA) kickstarted a £1 million competition in December 2018 to explore what technologies could be used to prevent injuries including MSKI, noise induced hearing loss (NIHL) and environmental injuries from hot or cold conditions.

“The aspiration is to employ practical sensors and supporting data analysis that will provide indicators and warnings prior to injury, to allow for early intervention and prevention of injuries,” noted DASA. “Technology proposed must function in all climates and environments, and in extreme conditions, with challenges such as dust, sand, wet and extreme temperatures.”

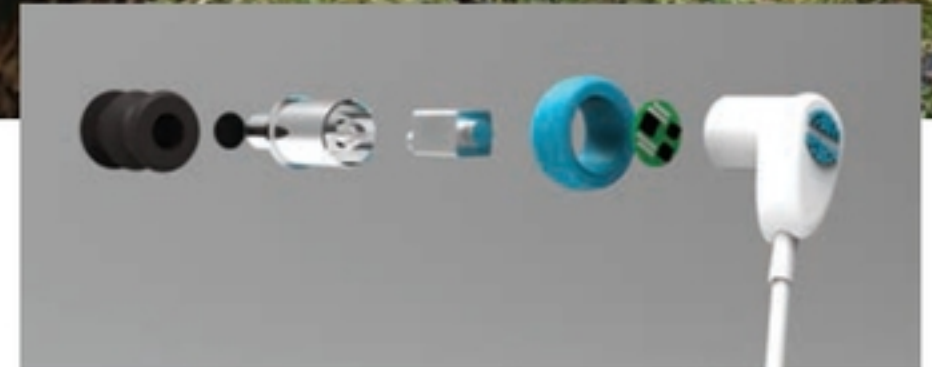
DASA expects to carry out trials in a

## HEALTH TECH IN SIGHT FOR SOLDIERS



**Tough times:** The rigours of the job means soldiers are prone to a number of injuries, from musculoskeletal issues to hearing loss. PICTURE: MoD.

**Plugged in:** Plextek has developed technology that allows soldiers to self-test their hearing. PICTURE: PLEXTEK.



realistic military environment by August or September, with projects submitted expected to achieve a technology readiness level 6 at the end of this phase. The competition will comprise two challenges, including the actual sensor technology to collect data, and the data analysis, management and ability to predict and warn of potential injury.

DASA could eventually tap into several pioneering technologies from academia, consultancies and industry that address this problem.

Technology consultancy, Plextek, for instance, has developed an innovative hearing analysis tool that effectively creates a ‘fingerprint’ of a person’s hearing ability – potentially detecting early hearing loss or tinnitus. The technology measures what is known as auditory evoked potentials (AEP), which are signals generated within the brain by acoustic stimuli.

“If you hear a noise in your ear then it generates a particular brainwave, and those brainwaves are quite characteristic of

certain features about your hearing,” explained Dr Nigel Whittle, head of medical & healthcare at Plextek. “That gives a fingerprint of your hearing and you can measure that over a period of time, such as a deployment, and then you can monitor the changes in those brainwaves, which are indicative of changes in your hearing.

“Those changes are quite predictive as well. So, in other words, they give advanced warning of what might happen to your hearing.”

The technology is designed to be integrated within existing headphones and headsets, which allows troops to do self-testing in the field. The data can then be forwarded to the unit’s medical officer for analysis.

Plextek has also developed the armour integrity monitoring system (AIMS), a low weight sensor that can provide immediate status of ceramic body armour plates. AIMS has also been modified to monitor the condition of in-service helmets.