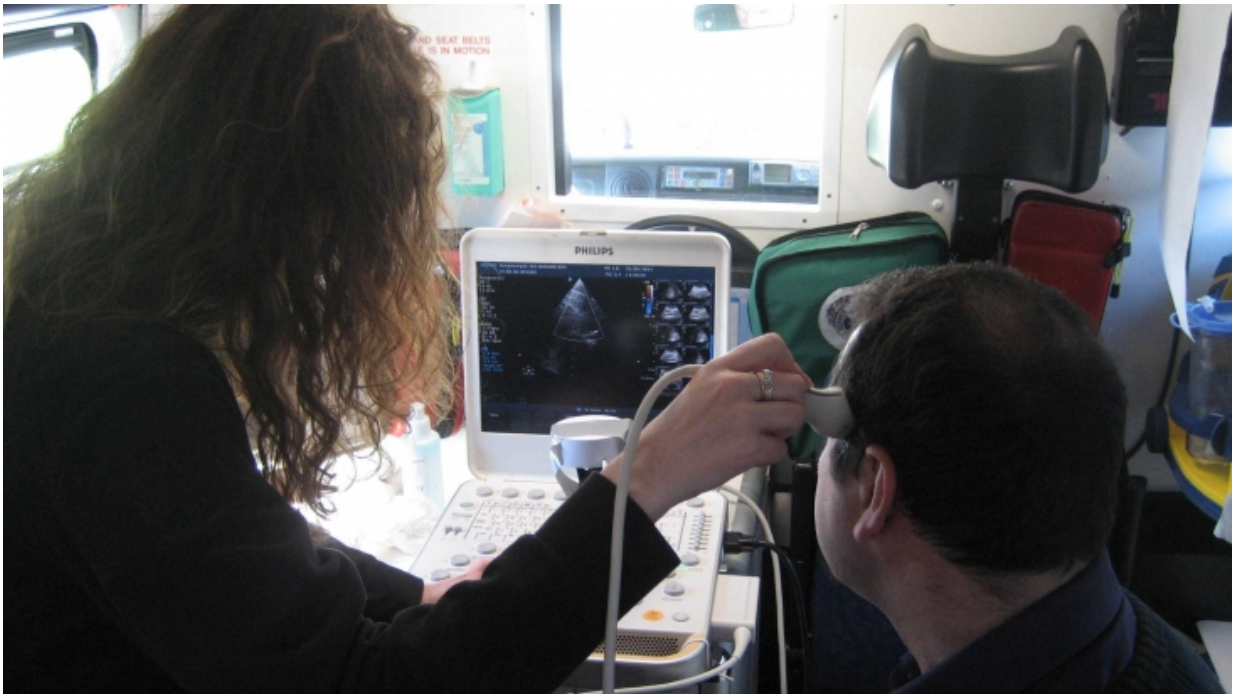


# New head scanning ultrasound technology could save soldier lives

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New software could enable portable ultrasound scanners to be used in battlefield situations. Credit: University of Aberdeen

Soldiers' lives could be saved or improved by new technology which enables medics to scan for bleeding in the brain using ultrasound.

Software being developed by the University of Aberdeen and funded by the Defence Science and Technology Laboratory's (Dstl) Centre for

Defence Enterprise, part of the Ministry of Defence, creates a 3D model of the brain on location which can then be sent to an expert for swift diagnosis.

The technology is still at an early stage of development but has already been trialled on real hospital patients to test its viability.

The software could also be helpful in civilian life, helping paramedics record head ultrasound to diagnose brain haemorrhage as a result of stroke or other causes. This could be particularly useful for patients living remotely, with a long distance to travel to hospital.

## The problem

'Closed' brain injuries, i.e. internal bleeding or other damage caused to the head by explosions or knocks, can cause death or have severe long-term implications. If identified early enough, emergency steps can be taken to prevent long-term damage, including drilling holes in the skull to relieve pressure, or taking medication.

Even minor head injuries that do not receive early treatment can result in complex long-term complications including depression, memory problems, attention deficit and other [mental health issues](#).

## How it works

The [ultrasound image](#) of the brain is acquired using existing hardware as found in any hospital. The information is captured using a movement sensor attached to an [ultrasound probe](#) which is used to scan the brain from certain points on the skull where the bone is thinnest. The probe captures up to 40 images per second and the resulting 3D image can be built up from around 2,000 individual photos.

The software is designed to guide a medic with only basic training in ultrasound to produce as detailed a scan of the brain as possible.

The software shows the user where it has already scanned, and where has yet to be scanned.

Once completed, the file containing the brain scan can be sent to an expert for analysis and appropriate advice is fed back to the medical staff on the ground.

Because of the nature of battlefield scenarios, soldiers with 'invisible' injuries could be overlooked, so having a relatively simple means of scanning the head for any problematic signs would be extremely helpful.

Dstl's Capability Advisor for Medical Sciences Neal Smith said: "UK Armed Forces operate in many remote locations and where personnel are injured we need to ensure that all conditions can be rapidly and correctly diagnosed to provide the best possible treatment and care. Devices which are lightweight, easy to deploy and easy to use, such as the portable ultrasound scanning support system being developed by the University of Aberdeen, have the potential to enhance our capabilities on operations and enhance patient care."

Dr Leila Eadie, a researcher at the Centre for Rural Health at the University of Aberdeen said: "There is a clear need for this technology, as outlined by Dstl. Traumatic brain injury is a big problem for the military, especially because it can be difficult to spot in the field and if left untreated, it can have long-term effects.

"Ultrasound is not normally used for imaging the [brain](#), but we hope to prove through further investigations that it is a viable method of making an early diagnosis of head injury whilst in the field. Battlefield medics will not have CT or MRI scanners which are bulky and expensive, but

they are likely to have ultrasound equipment already, so it is a case of extending the use of the kit they already have."

Provided by University of Aberdeen

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