



## Prototype Helmet Device Uses EEG to Detect TBI Early



A portable system to detect traumatic brain injury (TBI) has been developed in Norway. The helmet-based system can run EEG tests at the scene of an accident or in an ambulance, and has been patented by Smartbrain.

Haldor Sjøheim at Smartbrain explained that the EmerEEG system allows fast EEGs to be run. "The diagnostics and outcomes for many patient groups in the field of emergency medicine will be improved, especially in cases of head trauma and strokes", he says. "Currently, we can't be sure of a patient's status before some time has passed – when he or she has arrived at the hospital. This can result in delayed injury and prolonged periods of convalescence", he says.

Smartbrain's device is fast to assemble and records activity automatically. An elastic membrane inside the helmet ensures that the same pressure is applied to all parts of the scalp. If a negative pressure is then applied within the helmet, the membrane will inflate to enable the helmet to be placed on the patient's head. A conducting gel is then released to establish electrical contact and signal recording can begin after about a minute. The results are compared with a database of signals typically emitted by people known to have head injuries. Based on this comparison, the system assigns a "score" indicating the likelihood of the patient having suffered a head injury. Since the system is completely automatic it will be possible for ambulance personnel to use the system unassisted. The EEG will be transferred via a telenetwork to a hospital so that EEG specialists can assess the patient and, if necessary, take decisions about treatment. The initial prototype helmet (pictured) weighs 4.5 kilos, but the researchers are confident they can make it lighter.

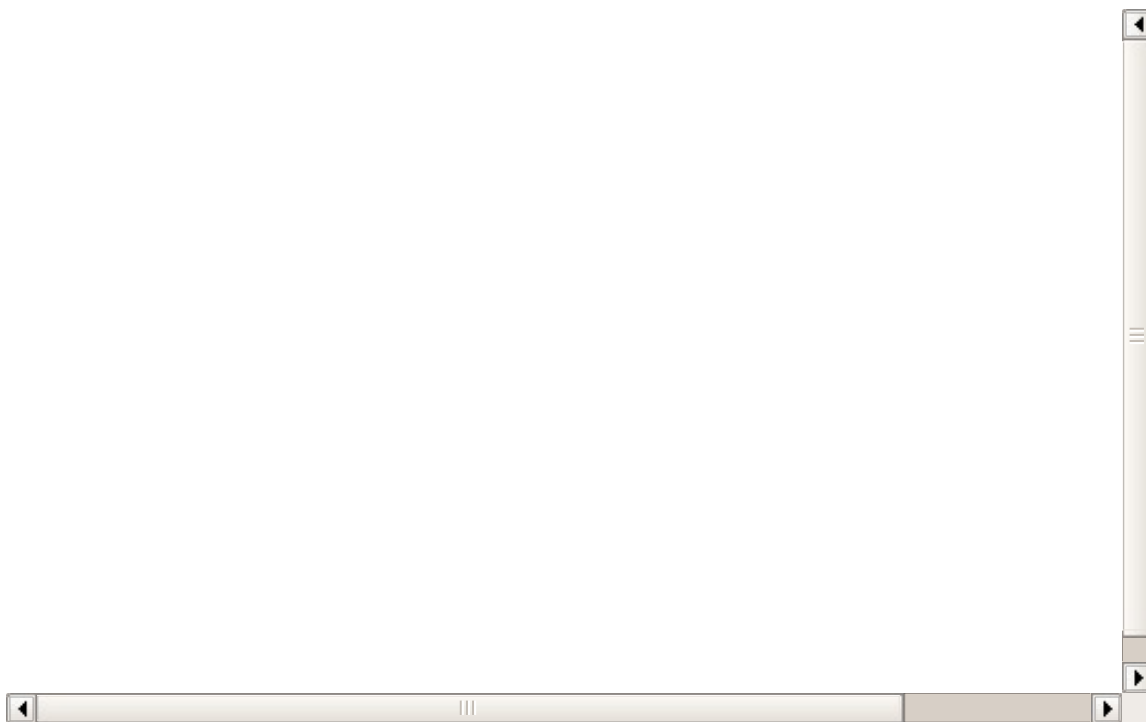
See Also: [Ruling Out CT for Minor Head Trauma](#)

"The EmerEEG system we have developed is all-inclusive", says [Frode Strisland](#), Senior Scientist at SINTEF. "Simply getting 19 electrodes automatically to establish contact with a wide variety of head shapes is a challenge in itself", he says. "For use in ambulances and at accident scenes the helmet has to be robust and able to withstand rough treatment. It must also function under all kinds of weather conditions. The EEG signals we record are measured in microvolts. They must be interpreted accurately if the patient and health personnel are to be confident that the right conclusions are arrived at", says Strisland.

### Next Steps

A consortium has now been granted the rights to the project results which it intends to exploit as part of further work. The project's German partner Meytec is looking to include the EmerEEG technology as the standard EEG system in its ambulance concept.

### Watch Smartbrain's video



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