Intelligent electronic system enables faster and more reliable stroke diagnoses

- Development partnership between SoNovum AG and exceet electronics
- Mobile diagnosis device saves lives and reduces the cost of subsequent treatment and care
- approval procedure and product launch is planned in 2015

Rotkreuz, Ebbs, February 10, 2015 - An accurate diagnosis is crucial to a stroke victim's chances of survival and recovery. A new technology developed by SoNovum AG and supported by exceet electronics GesmbH will make it possible to distinguish between ischemia (vascular blockage) and a brain hemorrhage quickly and reliably in the future. SoNovum is seeking to obtain approval for their system before the end of 2015 and is supported by exceet.

At the moment, it's not possible to make a rapid differentiated diagnosis of a stroke at the site of the emergency or in an ambulance. Such diagnoses are made with the help of clinical imaging procedures, most commonly CAT scans and magnetic resonance imaging (MRI). These examination techniques take time, are expensive and, most importantly, require patients to be present where the machines are. A mobile solution would enable EMTs to decide on the correct immediate treatment more quickly. This could reduce the damage suffered by stroke survivors, which would also significantly lower the cost of subsequent treatment and care.

Background

Despite extensive research and development work over the last few decades, medical experts still face major challenges when it comes to quickly and reliably diagnosing a stroke. A very accurate stroke diagnosis requires time-consuming neurological and internal-medicine examinations. That's because before treatment can begin, it must be determined whether the stroke was caused by ischemia or a brain hemorrhage. Doctors generally conduct a CAT scan of the brain to identify the cause. The ability to distinguish between ischemia and a hemorrhage is absolutely crucial to a stroke patient's chances of recovery. What's more, an ischemic stroke must treated within a 4–5 hour time window after vascular obstruction has occurred if the treatment is to be successful. Scientists have been trying to extend this time window and reduce the difficulty of making an accurate diagnosis.

The solution

Using a tried-and-tested industrial ultrasound technology as a basis, SoNovum has developed a mathematical solution approach that is now being transferred into an electronic environment with the help of exceet electronics. Ultrasound has been used in industry for quite some time as

a non-imaging technique for classifying substances. One of the most common applications involves the monitoring of processes, particularly in the biochemical, petrochemical, and pharmaceutical industries. Use of acoustic interferometers is very widespread here. The development team for the new system made use of this procedure and the measurement data it produces to develop a new technology that now enables transcranial ultrasound examinations to be used as a medical application for the first time. A multi-frequency ultrasound signal is used here. This signal changes in a very characteristic way in line with physiological parameters such as heart rate, blood pressure, and oxygen saturation. The measurement data is analyzed with the help of highly precise mathematical methods. Doctors are provided with a clear result that they can interpret even without any specialized training, which is not the case with ultrasound imaging systems. It is thus possible to determine very quickly if a patient's condition is becoming unstable. The technology also allows anesthetists to monitor a patient's brain in real-time during an operation. This means an anesthetist can react much more quickly if any dangerous changes occur, which enhances patient safety.

"Transmission ultrasound enables precise conclusions to be drawn about the condition of brain tissue and changes that occur to it," says Mr. Wrobel from SoNovum. "With its new technology, the development team is seeking to fill the current gap in the early-stage diagnosis of strokes and establish a useful complement to imaging procedures such as CAT scans and MRIs. The mobile diagnosis device from SoNovum enables a doctor to quickly and reliably differentiate between the two forms of stroke before the patient even arrives at the hospital and then begin the proper treatment immediately after the patient is brought in."

exceet electronics is focusing on the electronic components needed for the system and preparations for large-scale production of the new mobile device, which could be used both in ambulances and in clinics and hospitals. The mobile solution will make it possible for EMTs on the scene to quickly decide on the right treatment. This could reduce the damage suffered by stroke survivors, which would also significantly lower the cost of subsequent treatment and care. Even if used in a hospital, the mobile stroke diagnosis device could still be moved anytime — for example, to an intensive care unit. It's also possible to integrate the device into local data networks.

In addition, the developers are looking to use the newly developed technology for a type of neurological monitoring — something like an EKG of the brain. Such a continual patient monitoring system would make it possible to detect "silent strokes," which have no outward symptoms and which can now occur unnoticed by physicians in intensive care units, for example.

Some 200,000 people suffer a stroke each year in Germany. Strokes are the third most frequent cause of death in the country after cancer and cardiovascular diseases. Roughly 64 percent of the 40 percent of patients who survive a stroke for one year end up permanently disabled. Each stroke currently costs the German health care system approximately €43,000. Costs for stroke

treatment and stroke-patient care will increase over the next few years as a result of demographic developments and the associated growing number of older people at risk of a stroke. (Source: Stiftung Deutsche Schlaganfall-Hilfe — German Stroke Assistance Foundation).

exceet electronics at "embedded world 2015"

Learn more about the new solution for stroke diagnoses and see many other innovations at the exceet booth at „embedded world conference & exhibition 2015". Hall 5 Booth 308.

About SoNovum
SoNovum is a medical technology firm located in Leipzig, Germany. The company is currently developing and testing a new technology for more rapid and differentiated stroke diagnoses.

About exceet Group
exceet Group is an international technology group specialized in intelligent electronics and card-based security technology.

About exceet electronics
exceet electronics is a full-service developer and manufacturer of complex electronic modules, components, and systems in the field of industrial and medical technology.

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