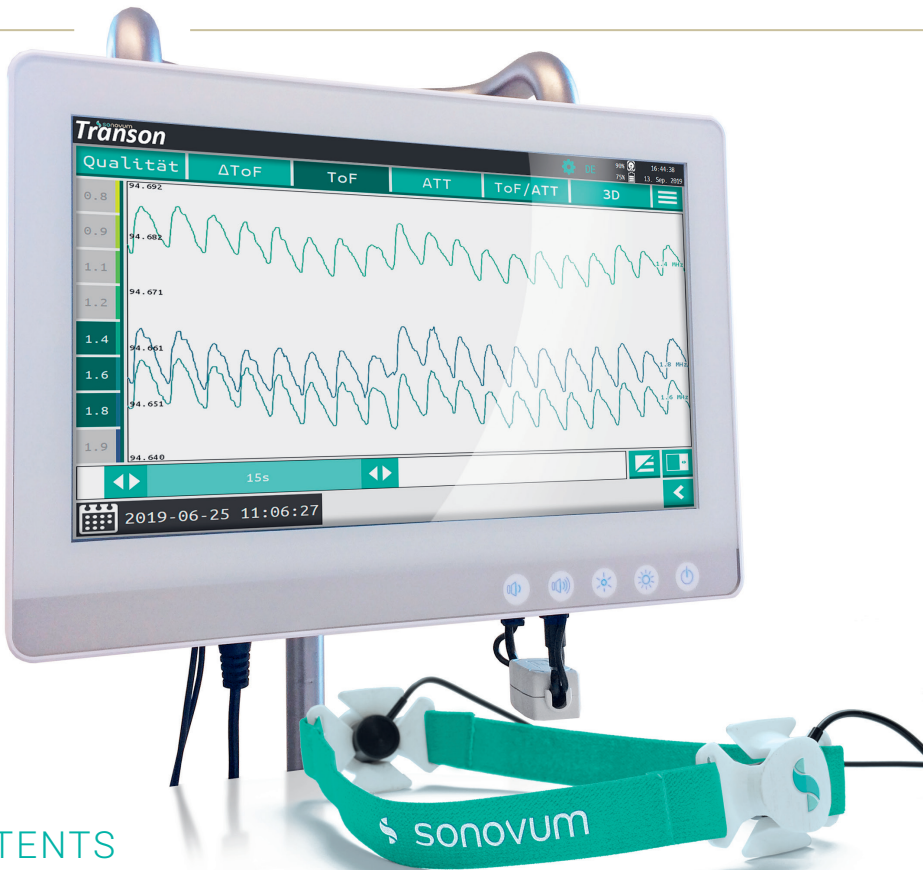


Quick, easy, cost-efficient

The new **UltraEasy 3<sub>ACG</sub>** non-invasively detects changes in the brain via ultrasound



**sonovum**



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## UltraEasy 3<sub>ACG</sub> – one device, many fields of application

A headband, two ultrasound probes, and a monitor – that's all UltraEasy 3<sub>ACG</sub> needs to capture the status of the brain, such as the brain pulse or any pathological changes, in just a few minutes. UltraEasy 3<sub>ACG</sub> creates, at eight ultrasound frequencies, an acoustic profile using acoustocerebrography (ACG), which is evaluated after the three-minute measurement. What is decisive here are the transit times of the ultrasound waves "time of flight" (ToF) and the attenuation of the signal (ATT). UltraEasy 3<sub>ACG</sub> is constantly evolving. After conducting and completing relevant clinical projects, it could be used for non-invasive intracranial pressure measurements, for the post-operative monitoring of patients undergoing cardio-vascular surgery, for stroke diagnosis and for the monitoring of multiple sclerosis patients.

UltraEasy 3<sub>ACG</sub> is a class IIa medical device with standard interfaces to transfer the data to common hospital systems in the future.

### Quick and easy handling

Compared to traditional diagnostic and monitoring methods, UltraEasy 3<sub>ACG</sub> offers many advantages.

#### Application is

- **easy:** put on the headband, insert the ultrasound probe, turn on the monitor
- **quick:** it takes only three minutes to measure the signals
- **cost-efficient:** large, costly equipment is not required
- **non-invasive:** the measurement is transcranial via ultrasound waves
- **gentle:** patients are not exposed to harmful radiation
- **possible at regular intervals:** measurements can be carried out repeatedly at short intervals



## Acoustocerebrography

Acoustocerebrography (ACG), a specific form of ultrasound technology, makes it possible to detect changes in the cellular and molecular brain structure using ultrasound waves. It is based on molecular acoustics. The measurement is transcranial and non-invasive. After the multifrequency ultrasound waves have passed through the skull, the signal electronics and processing systems, which were developed by us, are used to determine the transit time – to the pico-second – as well as the attenuation for each individual ultrasound frequency. Both parameters depend, among others, on the density and elasticity of the sound-transmitted tissue. The display shows the curves of time of flight (ToF) and attenuation (ATT) for each individual frequency which facilitates the work with our UltraEasy 3<sub>ACG</sub>.





## Fields of application of ACG

### **Vital parameters**

Changes of the brain can be measured based on the vital parameters of brain pulse and intracranial pressure. This is done via the acoustic recording of physiological processes in the brain tissue, which are captured with UltraEasy 3<sub>ACG</sub> on the basis of the brain pulse.

### **Acute parameters**

Measurements of physiological processes in the brain tissue as well as the pulsation of the skull calotte indicate cerebral changes, such as bleeding, ischemia or infection, enabling early diagnosis through ACG monitoring of the patient. The great advantage of ACG technology is that these measurements can be taken at the patient's bedside. Currently, these specific applications for monitoring and diagnosis are in product development and clinical testing.

### **Chronic cerebral processes**

As for the acute parameters, pathological changes can also be detected in chronic cerebral processes such as dementia, Alzheimer's disease, or multiple sclerosis, triggering specific diagnostics and therapy. UltraEasy 3<sub>ACG</sub> will provide new, easy-to-use options for the early detection of degenerative brain diseases. Also, we will develop specific diagnostic parameters for different chronic cerebral diseases.

## Application of the UltraEasy 3<sub>ACG</sub>



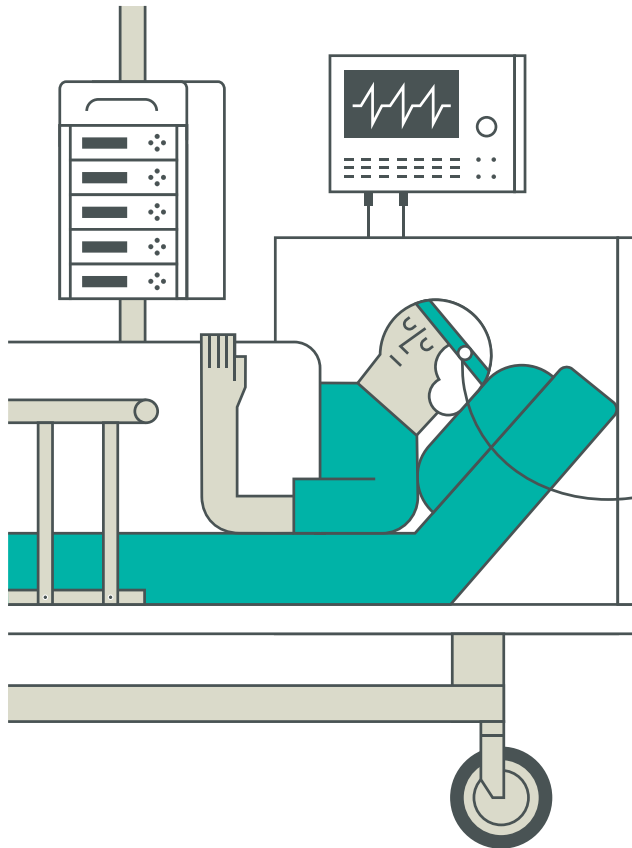
easy



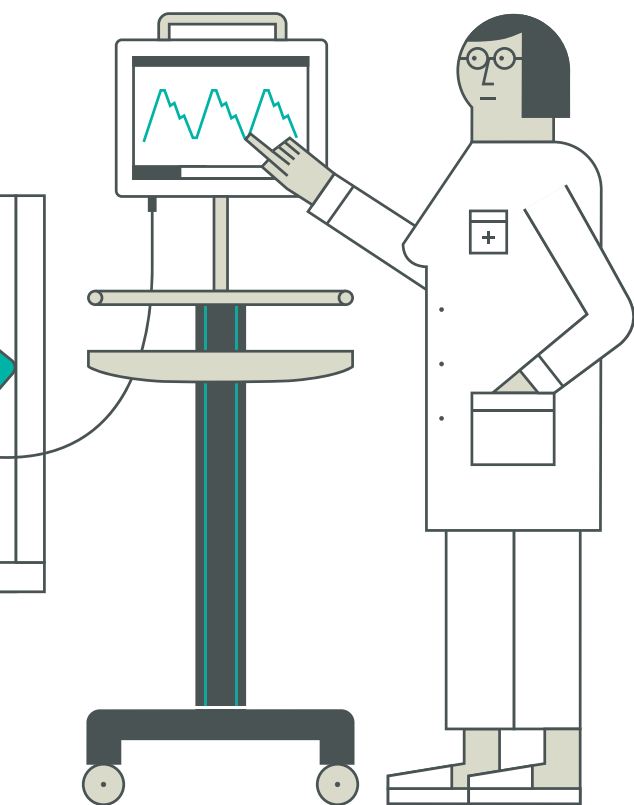
quick



cost-efficient







non-invasive



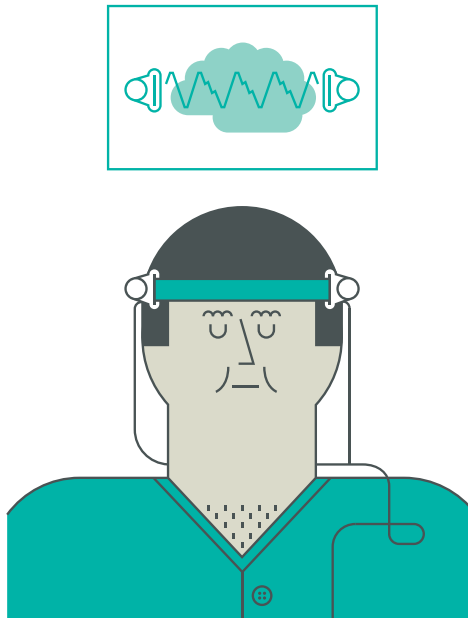
gentle



can be performed  
regularly

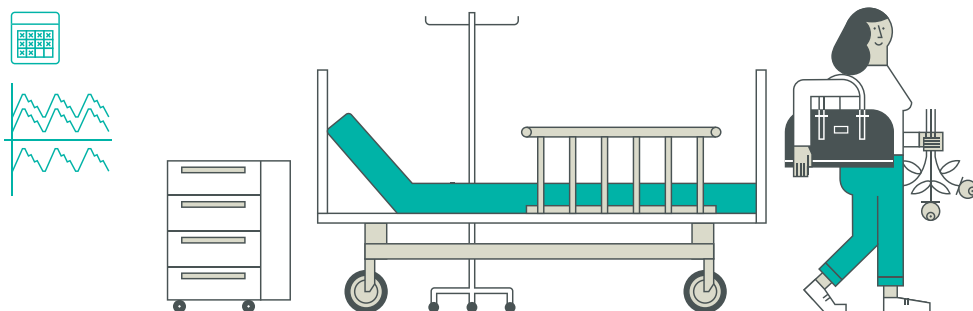
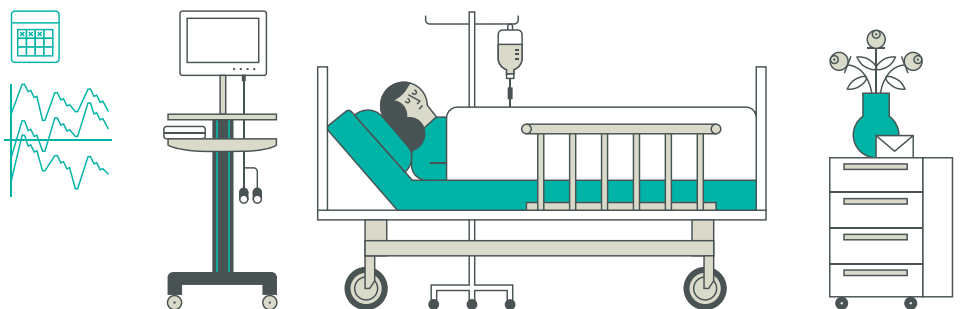
### Measurement at eight frequencies

The UltraEasy 3<sub>ACG</sub> is based on a multifrequency ultrasonic interferometer. The two ultrasound probes integrated in the headband send signals at eight frequencies from one side of the skull to the other. Depending on which pathological, physiological and anatomical conditions these signals meet, they reach their destination faster or slower, and are damped more or less strongly. Changes in the brain can be identified using the “time of flight” (ToF) and “attenuation” (ATT) parameters.



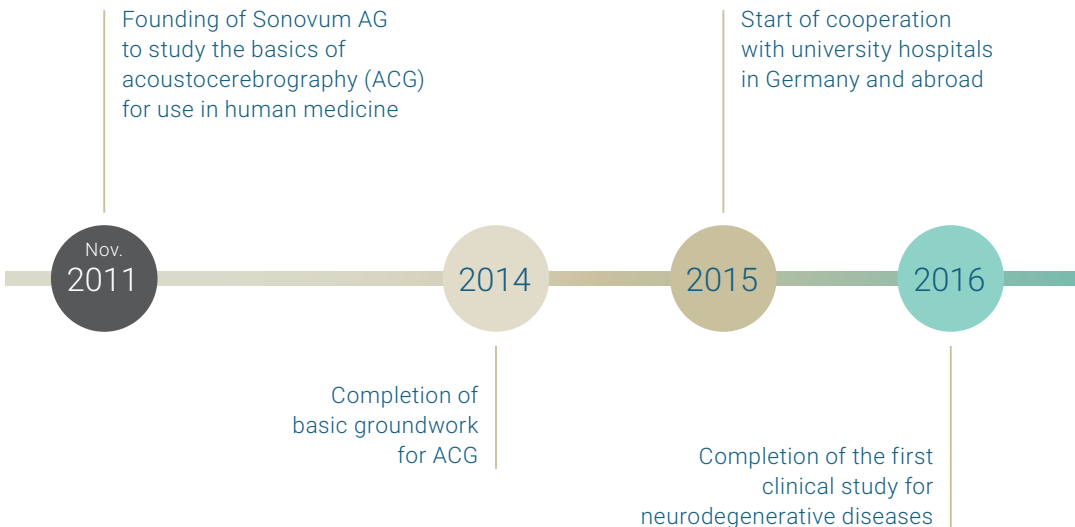
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When there are changes in the brain, the UltraEasy 3<sub>ACG</sub> indicates fluctuations of varying intensity in the curves. As the state of health improves, these irregularities decrease and the curves appear as even waves.



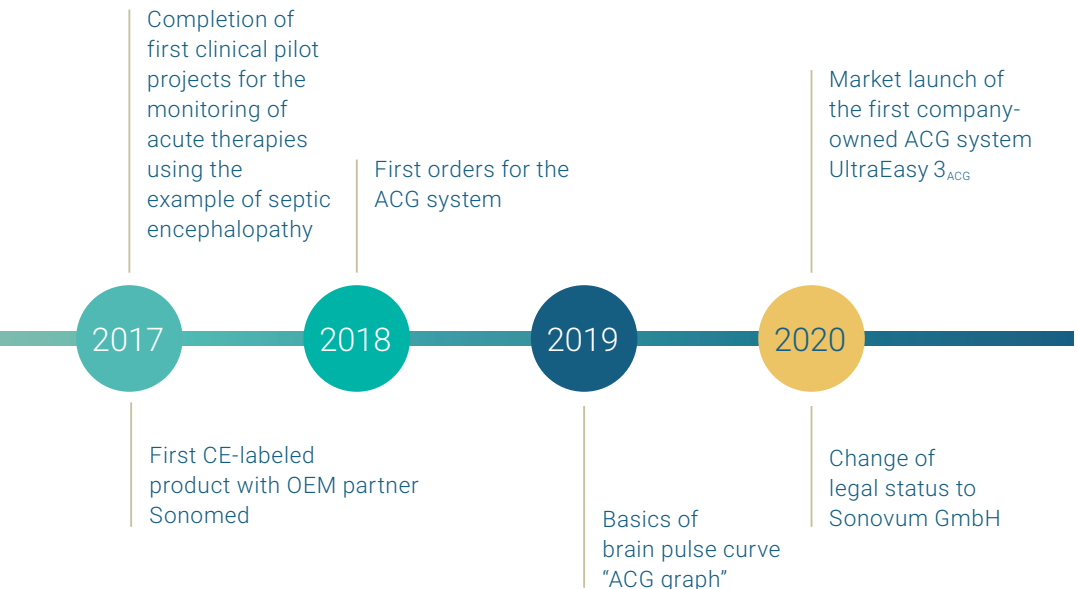
## Sonovum develops pioneering technologies

Sonovum combines the expertise of acoustocerebrography (ACG), mathematics, statistics, medical engineering, and medicine. Our employees contribute extensive experience in research, product development, and specialist expertise, for example from neurology and intensive care, in order to continuously develop the technology.



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In the coming years, the range of applications of ACG technology in the areas of diagnostics, monitoring, and therapy monitoring will be steadily expanded. In addition, the integration into clinical monitoring and evaluation systems will be promoted. The development of apps and telemedicine workflows is in the pipeline to add value to patients and users.



## What people say about ACG

They have already tried it: partners in science and practice have tested UltraEasy 3<sub>ACG</sub> and are convinced of the promising applications of ACG technology.



ACG offers completely new opportunities to better detect and thus better treat a broad spectrum of neurological acute diseases and neurodegenerative diseases.

Prof. Dr. Andreas Hetzel,  
Chief Physician of the Black Forest Clinic Neurology  
at Park-Klinikum Bad Krozingen



ACG may prove to be increasingly helpful in diagnosing and classifying patients with atrial fibrillation and hypertension in order to individualize their treatment and reduce their risk of stroke.

Prof. Dr. Robert Olszewski,  
Polish Academy of Sciences and Institute of Geriatrics, Warsaw



We see great potential here: with ACG, we want to identify septic encephalopathy as it arises and monitor its progress to help our patients as early and effectively as possible.

Prof. Dr. Martin Sauer,  
University Medical Center of Rostock,  
Clinic and Polyclinic for Anaesthesiology and Intensive Medical Care

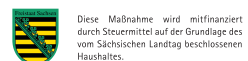


## Cooperations

Sonovum already works together with these partners in a trusting relationship.



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If you want to test UltraEasy 3<sub>ACG</sub>  
please feel free to contact us:

## CONTACT

### **Sonovum GmbH**

Perlickstraße 5

04103 Leipzig

Germany

Phone: +49 341 39299-510

Email: [info@sonovum.de](mailto:info@sonovum.de)

**[www.sonovum.de](http://www.sonovum.de)**

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