

## Healthcare industry BW

# movisens GmbH – innovative systems for measuring psychophysiological parameters

**How would you feel about walking around with a laboratory on your body? People who suffer from stress or vascular diseases often need to undergo daily examinations over a long period of time. In an effort to reduce the number of visits to GPs or clinics whilst enabling doctors to closely monitor their patients' ECG, breathing or physical activity, Karlsruhe-based movisens GmbH offers mobile systems for measuring physiological parameters. The company's clients include research institutions, hospitals, employers and the police and fire brigade. Modern smartphone technology will also be used in the future to allow doctors and researchers to keep up to date – from a distance.**

How does the ECG, heart rate or breathing of a patient suffering from stress continue to evolve after he or she has left hospital? How do the physiological parameters of athletes change in relation to different physical activities such as walking, running or jumping? What is the relationship between objective physiological parameters and subjective variables such as well-being, stress perception or fatigue of employees? In order to effectively answer such questions, patients or volunteers are monitored 24/7 over a period of several weeks. Constant monitoring is made possible by mobile systems such as those marketed by Karlsruhe-based movisens GmbH. The young company offers systems to record physiological parameters, physical activity and subjective data that can, if necessary, be directly sent to the experts who analyse the data. "A patient or volunteer needs to be able to carry such a device on his or her body," said Dr. Jörg Ottenbacher, who, along with Dr. Ulrich Großmann, is one of the company's two CEOs. "The challenge is to produce systems with high signal quality."

## Innovative data acquisition

Ottenbacher and Großmann brought knowledge they had accumulated at the Karlsruhe Institute of Technology (KIT) into the company they created. The two CEOs both did their doctoral thesis at the Institute for Information Processing Technologies and were part of the "hiper.campus" research group that is aimed at increasing the cognitive performance of KIT students, scientists and employees. The hiper.campus researchers study the relationship between personal fitness and mental performance. At the end of 2009, Ottenbacher and Großmann were granted funding through the EXIST research transfer programme of the German Ministry of Economics and Technology (BMWi) and used it to establish movisens GmbH, which now has four employees. The matchbox-sized activity measurement devices can be combined with the ECG chest belt to provide information about heart rate, heart rate variability, breathing, energy consumption and physical activity. The recorded data



The company's "Stressguard" system consists of a belt worn around the chest that monitors physiological parameters such as ECG and heart rate.

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can be stored for up to one week and transferred to a computer by way of a USB key. Specifically developed software analyses the data and provides further analyses in the form of contextualised reports.

In addition to the measurement systems, movisens GmbH has developed a context-aware data collection software for smartphones that enables objective and subjective data to be captured. Using mobile devices, including PDAs and mobile phones, users can complete surveys to provide information on whether they feel well, stressed or are suffering from anxiety. In addition, the MyExperience electronic Diary (e-Diary) will in future also enable users to send images, video and audio data directly to doctors or scientists to keep them up-to-date. "Another innovation is the possibility to couple a smartphone to the sensors that measure physiological parameters," said Ottenbacher explaining that "this enables doctors to access information about a person's well-being in the event of a sudden, unexpected increase in their heart rate, for example. The collection of objective and subjective data in a contextualised self-report opens up completely new possibilities for data collection."

Financing company development once funding comes to an end



The "My Experience" system opens up completely new possibilities for data collection.  
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The movisens products are mainly used by research institutions such as the hiper.campus research group at the KIT. Cooperation with KIT researchers – which is facilitated by the fact that movisens is headquartered on the KIT campus – has its benefits for movisens and KIT alike. Due to their close geographic vicinity, the KIT researchers have access to state-of-the-art technology and the movisens specialists are constantly provided with new ideas to extend their product portfolio. The movisens systems can be used in a broad range of research disciplines including the sports sciences, psychology, food science, medicine, pharmaceutical research as well as in exotic disciplines such as physioeconomics, which focuses on the analysis of the decision behaviour of stock exchange traders, for example, by collecting physiological parameters (e.g., ECG) and recording psychological behaviour (e.g., perception of stress).

In addition to research clients, movisens also services clients from more application-oriented areas, including for example occupational health practitioners who would like to investigate the physical and psychological effects coaching measures have on employees. In the ongoing initial EXIST funding phase, movisens GmbH has been able to turn its know-how into an attractive range of products. "In the second EXIST funding phase, we need to focus on reaching market maturity and being able to finance our developments without external funding," said Ottenbacher going on to add "current sales development is excellent and I am sure that we will be able to achieve this."

**Further information:**

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**Article**

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