

## ConCardiac

Piezofilm sensor technology for non-invasive monitoring of pulse transit time



### Objective

- Development of an innovative sensor technology for non-invasive and continuous monitoring of pulse transit time with high patient comfort

### Challenge

- Sensitivity requirements
- low energy consumption
- signal processing and artefact treatment

### Solution

- Patented piezofilm sensor technology
- Mobile recording unit with color display
- Wireless bluetooth connectivity

### Procedure

- Continuous beat-to-beat monitoring of pulse transit time
- Acquisition of a peripheral pulse signal on the finger

### The system

ConCardiac is the name of a new and innovative technology of SectorCon GmbH for non-invasive and continuous monitoring of cardiovascular parameters with high patient comfort. The system's centerpiece is a novel piezo-film sensor which works without exerting pressure on the patient's vessels and is worn on the finger. Another substantial system component is the ConCardiac evaluation procedure which makes it possible to assess pulse transit time beat-to-beat for single heart contractions.

### Sensor technology

The ConCardiac system uses a patented piezo-film sensor which is worn comfortably on the patient's finger. The sensitive area consists of several Polyvinylidene fluoride (PVDF) films, is very thin, offers high mechanical flexibility and allows to detect pressure fluctuations on a small sensor area. Because of the sensor's low energy consumption and low weight, it is particularly suited for mobile applications.

The principle of operation of the PVDF piezo-film is the direct piezoelectric effect. If a mechanical force is applied to the material it results in smallest electrical charges which are proportional to the deformation of the film. Subsequently, it is possible to conduct the charges by a metal coating and make them measurable.

### Recording unit

The compact and mobile recording unit is powered by two AA batteries and allows for recordings of up to 24 hours. The data can be stored on a removable microSD card. Furthermore, the recording unit comes with a color display and an easy to use on-screen menu. Wireless communication is possible due to the integrated Bluetooth interface.

### About pulse transit time

Pulse transit time is the time that the pulse wave needs for the propagation from the aorta to the peripheral vessels.

For the measurement of pulse transit time it is required to track two cardiovascular signals simultaneously. For this purpose, the ConCardiac registers the pulse pressure signal on the patient's finger as well as the ECG. While the ECG is used to identify the starting time of the pulse wave propagation, the finger signal is used to detect the end time of the pulse wave. By calculating the time difference the pulse transit time can consequently be determined with every heartbeat.



The ConCardiac finger sensor

Gefördert durch:



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für Wirtschaft  
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aufgrund eines Beschlusses  
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*Non-invasive  
beat-to-beat  
monitoring of pulse  
transit time with high  
patient comfort*

*Patented  
piezofilm sensor*

*Mobile recording unit  
with color display  
for recordings of  
up to 24 hours*

### Applications

The ConCardiac technology offer a wide range of potential application areas. The patented piezo-film sensor make the system particularly suited for applications that demand for continuous monitoring with low patient stress. These applications include in particular the clinical monitoring of pulse transit time, ambulatory monitoring, sleep medicine as well as telemedicine.



The ConCardiac recording unit

### Further development

The further development of the system is undertaken in cooperation with the clinical university Charité Berlin. The prospective goal is to determine further cardiovascular parameters for hemodynamic monitoring in the future.

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For further information about our activities and business areas, please visit our website at [www.sector.de](http://www.sector.de)

### About SectorCon

SectorCon GmbH was founded in Berlin in 1992. Since then we stand for solid German Mittelstand, high professional competence as well as sustainable and responsible entrepreneurship. Our customers are the main focus of all of our activities. It is our aspiration to provide them with innovative, high quality products and services for business, science and administrative applications. Furthermore, it is of prime importance to us, that all of our work is shaped by both high technical expertise and high social skills as well as integrity and reliability.

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