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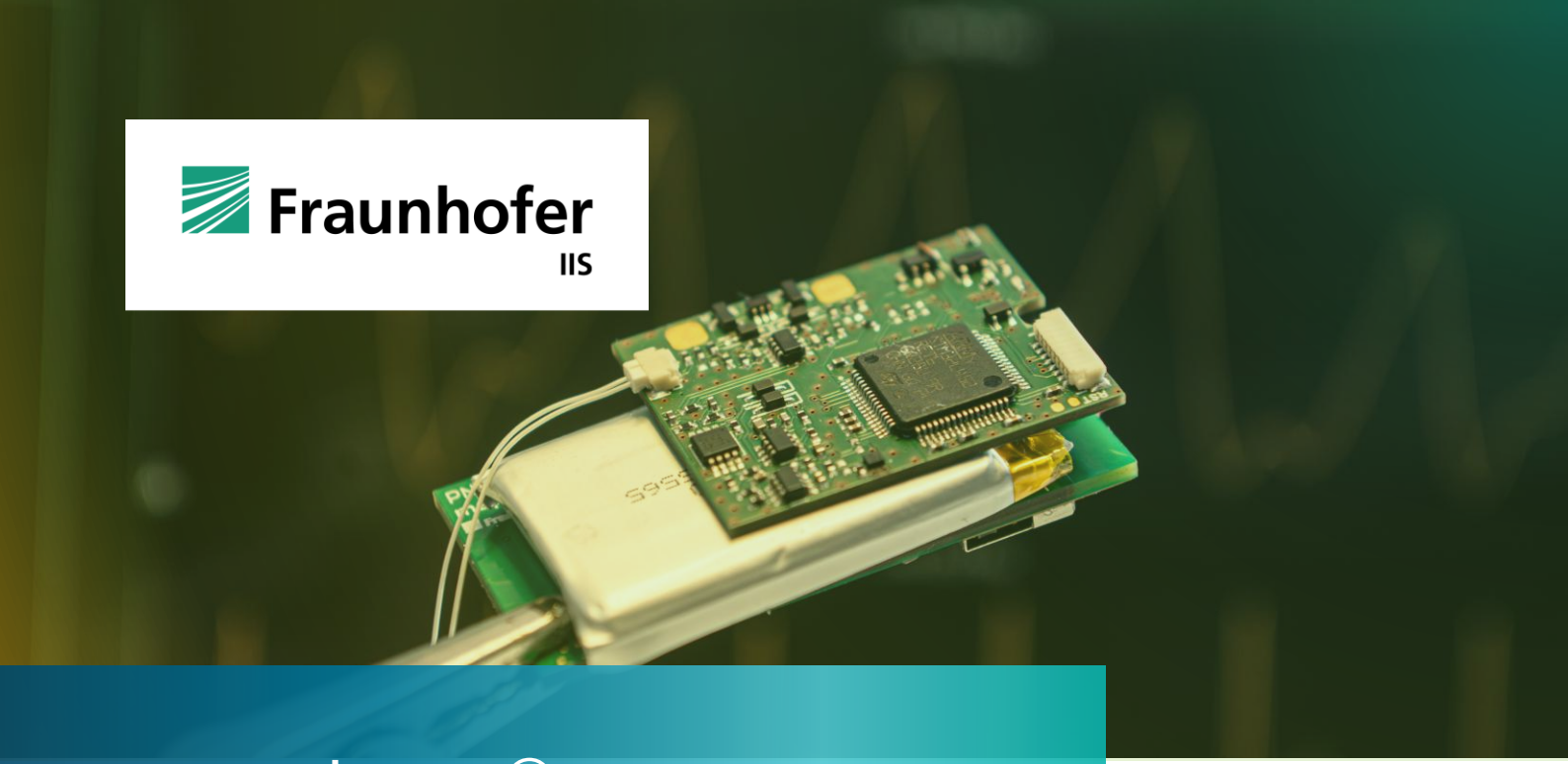

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# maphera®

## Modular Sensor Plattform for On-the-Go Biosignal Acquisition

The main challenge in biosignal acquisition, particularly in multimodal data collection, is achieving the synchronous capture of high-quality data while ensuring subject mobility. Our expertise in medical sensors has led us to develop maphera® – a mobile and extendable sensor platform that effectively addresses this challenge by collecting accurate multimodal data while maximizing freedom of movement. Designed for rapid prototyping, maphera® empowers our customers to accelerate their development cycles and evaluate their data more efficiently – from anywhere, with a setup tailored to their use case.

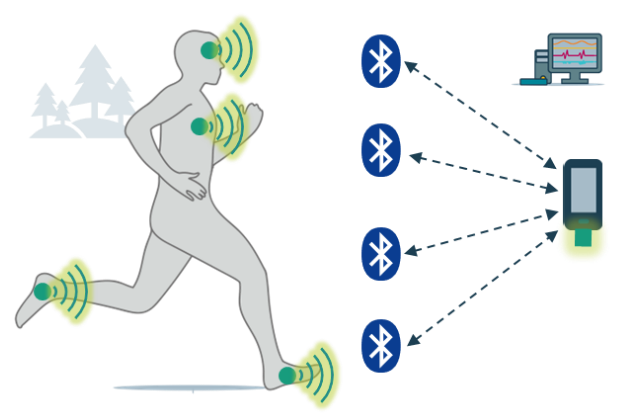
### Fast Facts

The modular sensor platform maphera® offers

- maximum freedom of movement,
- location independence,
- medical-grade physiological signal quality,
- seamless wireless data transmission via Bluetooth Low Energy (BLE),
- native sensor integration tailored for specific applications with up to seven nodes,
- data consistency through wireless synchronization,
- storage of full resolution raw data, and
- live streaming of vital data for real-time analysis.

### Benefits

- As a universal sensor platform, maphera® offers a flexible **plug-and-research** solution. The modular design of maphera® allows us to quickly tailor the platform for specific applications, supporting up to seven wirelessly connector sensors.
- Users can access our growing inventory of **ready-to-use wearables**, including sensors integrated into arm and headbands, shirts with an integrated ECG, and various other physiological sensors.
- Data from different modalities are synchronized during recordings with an **accuracy of 30 µs**.



*Unlike traditional methods of multimodal data collection, maphera® enables maximum freedom of movement while maintaining superior physiological signal quality and data consistency.© Fraunhofer IIS*

*maphera® nodes with wearables for IMU, ECG, and PPG. © Fraunhofer IIS / Paul Pulkert*

## Generic network & lightweight sensor interface

We have split the architecture of maphera® into two major components to separate application specifics form general tasks. The sensor frontend and the user interface (UI) are lightweight and easily adjustable, allowing for a perfect fit in the target environment. In between sits the generic network within which we abstract general functionalities such as power and data management and wireless communication. This architecture yields two core maphera® benefits:
First, we can quickly add new sensors into the system, as the generic network manages the required housekeeping tasks.
Second, with each newly integrated sensor, maphera® users gain access to a broader range of modalities.

## Sensor integration

The generic network exposes a universal and flexible sensor API. The API serves three main tasks: data exchange and configuration, power management, and sensor synchronization. A new sensor node can build on the generic network by simply implementing the compact API.
Users can access the available sensor nodes through their customizable wearable integrations. But what if a required sensor is not yet available? We can seamlessly integrate any sensor IC and custom analog circuits directly into the network.

## Data consistency & synchronization

Data quality and consistency are a key feature of maphera®. The generic network handles storing and streaming of data. Additionally, we have developed, implemented, and tested multiple different synchronization algorithms. We achieve 30 µs accuracy between all connected nodes.
To achieve this, we leverage simultaneous events from the BLE stack and convert them into a configurable and synchronized trigger signal using multiple hardware timers.

## Our offer

We build systems for capturing physiological data and biosignals, covering the entire development roundtrip:

- Requirement analysis and feasibility studies
- Development of functional prototypes
- Implementation of tailored user interfaces and GUIs
- Design and execution of custom studies
- Licensing options of the complete system

As an additional service, we provide multimodal data fusion and analysis.

## Applications

maphera® can be utilized in any environment where high-quality signal acquisition and mobility are essential, including

- clinical studies,
- professional sports,
- automotive health,
- safety and defense,
- industrial and workplace safety.

If you're curious about whether maphera® is a good fit for your use case, please do reach out.

## Contact

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