

**GHOST – feel it.**  
A Startup Project within the FMD Space

**About the Project**

More than 300,000 people in Europe suffer a nerve injury in the wrist area every year. Some suffer permanent damage to the nerves and have to live not only without feeling but also without a second functional hand. The company GHOST - feel it. GmbH has developed a non-invasive system that records information such as pressure, temperature and finger flexion from the hand with a loss of sensation and then releases it again on the back by means of intuitive vibration stimuli. In this way, the sense of touch is used as a communication channel from the sensor system to the human being.

In a FMD Space project together with Fraunhofer IZM and Fraunhofer HHI a functional demonstrator of this system was developed.

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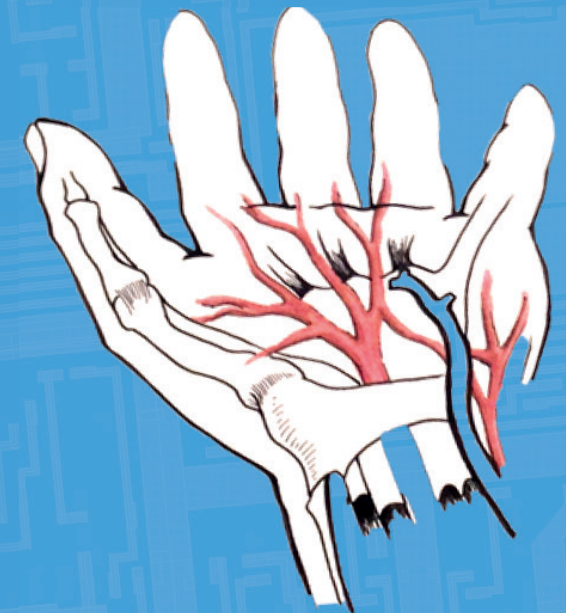
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The Resarch Fab Microelectronics Germany  
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PROJECT PARTNERS



**GHOST**  
feel it.

# Finger Tracking

Temperature Measurement

Multifunctional Sensor Platform

Touch Human-Machine-Interface

Smart Textile

Integrated Electronics

Modular Textile Base

Data Evaluation System

WiFi & BT Connection

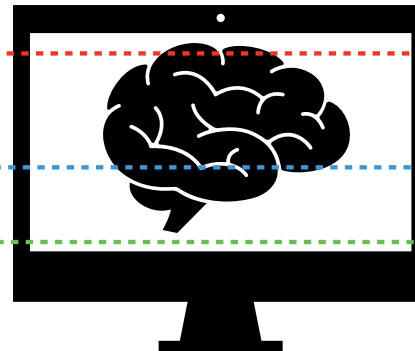
## Fiber Optic Data Glove

Fraunhofer HHI



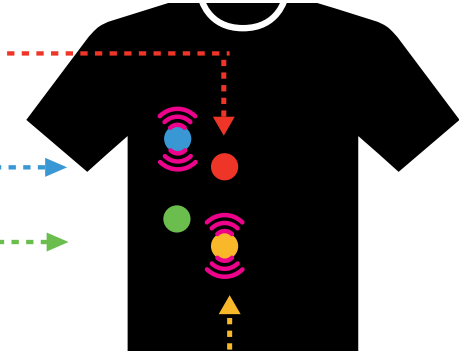
## Haptic User Interface

GHOST – feel it.



## Haptic Shirt

Fraunhofer IZM



- Based on fiber Bragg grating technology
- Developed for the essential data acquisition from a damaged hand
- Implemented on multiple measuring points (specifically eleven) with different sensor functions
- Ability of contact pressure determination, finger tracking and temperature measurement in just a single fiber

- Analysis of sensor input and translation into intuitive haptic patterns
- Haptic patterns are processed subconsciously and can evoke effects such as movements, emotions or learned information
- Software to equip products and services with haptic user interfaces and thus use the sense of touch as a human-machine interaction channel

- Modular E-textiles specific system design based on a textile bus in a narrow fabric with integrated insulated high performance conductors
- Integrated individually controlled vibration nodes
- Adhesive bonding technology was used to connect the vibration nodes and narrow fabric electrically and mechanically with the same process