

# Competencies at Fraunhofer HHI

## Security at Fraunhofer HHI

To protect intellectual and material property, information and communication technologies play a key role. Security and safety in the workplace, urban infrastructure, and transportation (e.g., by land, air, and water), can be protected through functional security or the identification of attacks/hazards. Fraunhofer HHI offers solutions that benefit from its range of technological competencies, packaged within its security business unit.



### Secure Communication

- Physical Layer Security (PLS)
- Low-cost secret-key distribution with free-space laser beams
- Quantum Key Distribution (QKD)
- Visible Light Communication/Li-Fi



### Sensor Technology

- Toxic gas spectroscopy with terahertz radiation
- Non-destructive testing with same radiation
- Micro-Drones Defense System
- Battery safety tests
- Secure workplace – Digital gesture recognition
- Detection of explosives in water and air
- 3D Modelling for Pipe Inspection
- Aerial Surveillance, Object Detection
- Flood Disaster Risk Management



### Attack Detection

- Optical seal for tamper protection – optical reflection gratings in ultra-thin glass slides
- Secure person authentication, presentation attack and face morphing detection
- Machine Learning for Industry 4.0
- Monocular Deformable Structure-from-Motion

### Applications

- Non-destructive material testing using terahertz
- Detection of explosives, viruses, and hazardous substances through evanescence field sensors in real time
- Cost-effective solutions for indoor navigation through Visible Light Communication
- Tap-proof communication for field camps using wireless data connections in the 60 GHz band
- Innovative solutions for forensic evidence at crime scenes or for the ID document of the future through depth maps and 3D visualization
- Customized video codecs for robust, ultra-low latency video transmission
- Disaster management supported by smart data algorithms
- Safe and reliable maintenance in the wastewater industry with 3D camera technology

**Prof. Dr. rer. nat. Martin Schell**  
Executive Director

phone +49 30 31002 703  
office +49 30 31002 202  
email martin.schell@hhi.fraunhofer.de

Fraunhofer Institute for Telecommunications,  
Heinrich Hertz Institute, HHI  
Einsteinufer 37  
10587 Berlin  
Germany

[www.hhi.fraunhofer.de](http://www.hhi.fraunhofer.de)