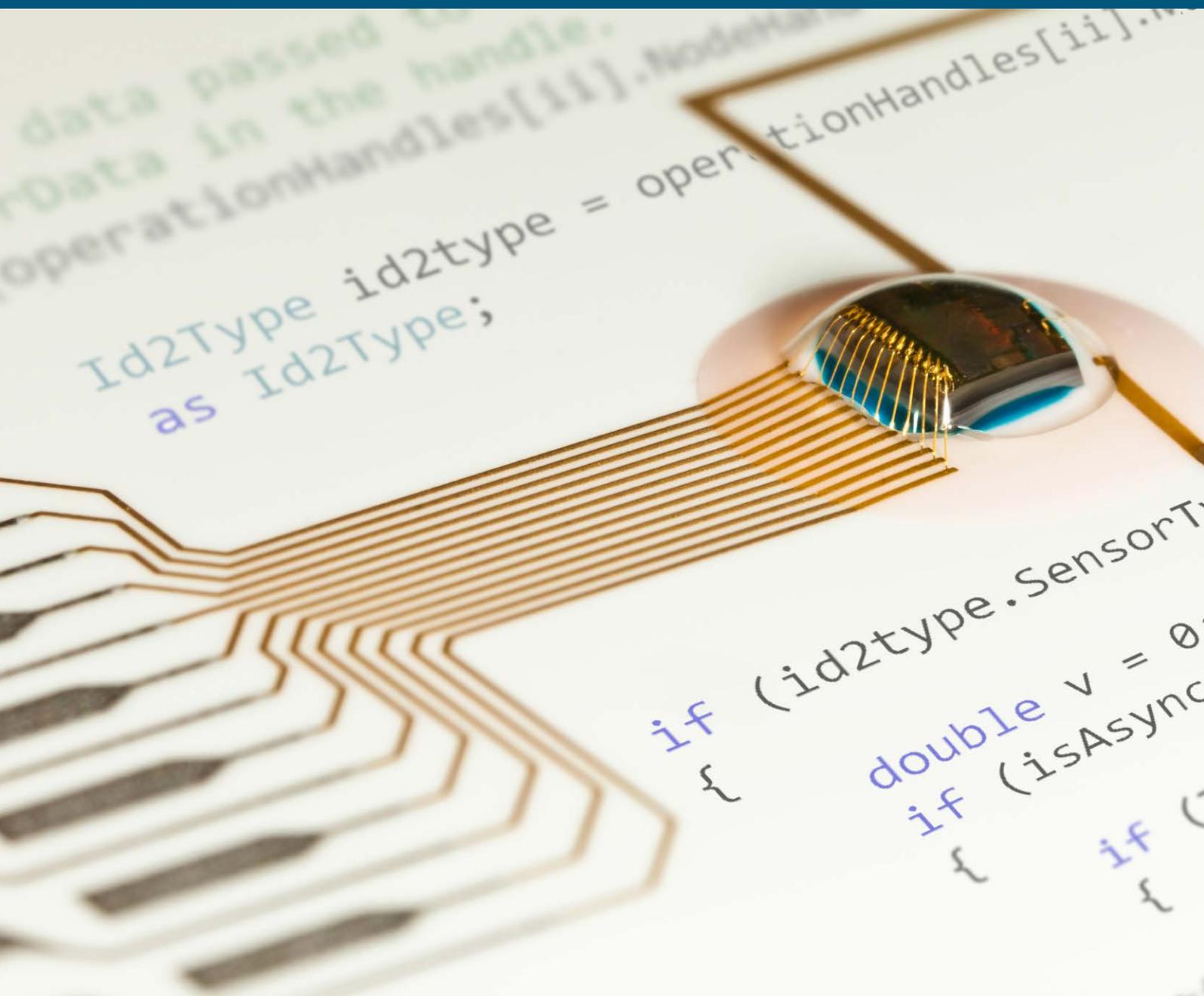




Into the Cloud with Wireless RFID Sensors





RFID TECHNOLOGY

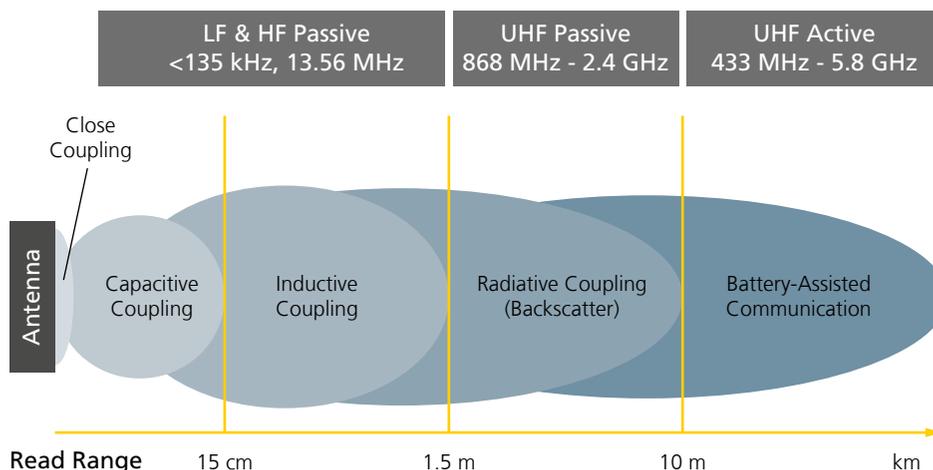
Radio Frequency Identification (RFID) allows consumers and businesses to contactlessly identify, authenticate, locate and engage things by attaching an RFID tag. RFID tags communicate using electromagnetic waves and can be supported both by batteries (active) and sourcing energy from the reader without batteries (passive) to reach a better reading distance. RFID operates in various frequency ranges with different reading distances.

In our daily life, RFID can recognize and locate everyday items including keys, clothes, medications and more. In comparison to other identification methods such as barcodes, RFID provides even more benefits.

- No line-of-sight requirements
- No external power requirements (if passive)
- Strong security features
- Bulk reading is possible

WIRELESS RFID SENSORS

RFID tags can be equipped with sensors that can measure condition data, creating even smarter objects. Temperature, humidity, strain, acceleration and other types of measurements can be wirelessly and passively captured. RFID sensors could provide the solution in cases involving rotating or moving objects, or inaccessible areas where cable connections are not possible. In these situations, the same energy gaining principle is used, with sensor operating power being delivered by commercially available RFID readers. Existing RFID infrastructures can therefore be easily supplemented with RFID sensors to add value to existing processes and products.



RFID SENSOR LAB

Discuss potential of wireless RFID sensors at the Fraunhofer IPMS RFID Sensor Lab in Dresden

Performance of RFID sensors is demonstrated

- » Read distances
- » Bulk reading
- » Speed

Sensor Types

- » Strain
- » Temperature
- » Pressure
- » Humidity
- » Acceleration
- » Light
- » And others

INDUSTRIAL IOT TEST BED

Discuss your own IoT use case in an Industry 4.0 manufacturing landscape at HTW Dresden

- » Model manufacturing line fully equipped with RFID
- » RFID sensors within manufacturing & logistics processes

WIRELESS SENSOR SYSTEMS DEVELOPMENT JOURNEY

KEY FACTORS

What are the requirements?

- Process Mapping
- Physical Environment

Which solution fits best?

- Carrier Frequency
- Sensor Power Source
- RFID IC Selection
- Sensor Interface
- Additional Circuits
- Software

Consulting

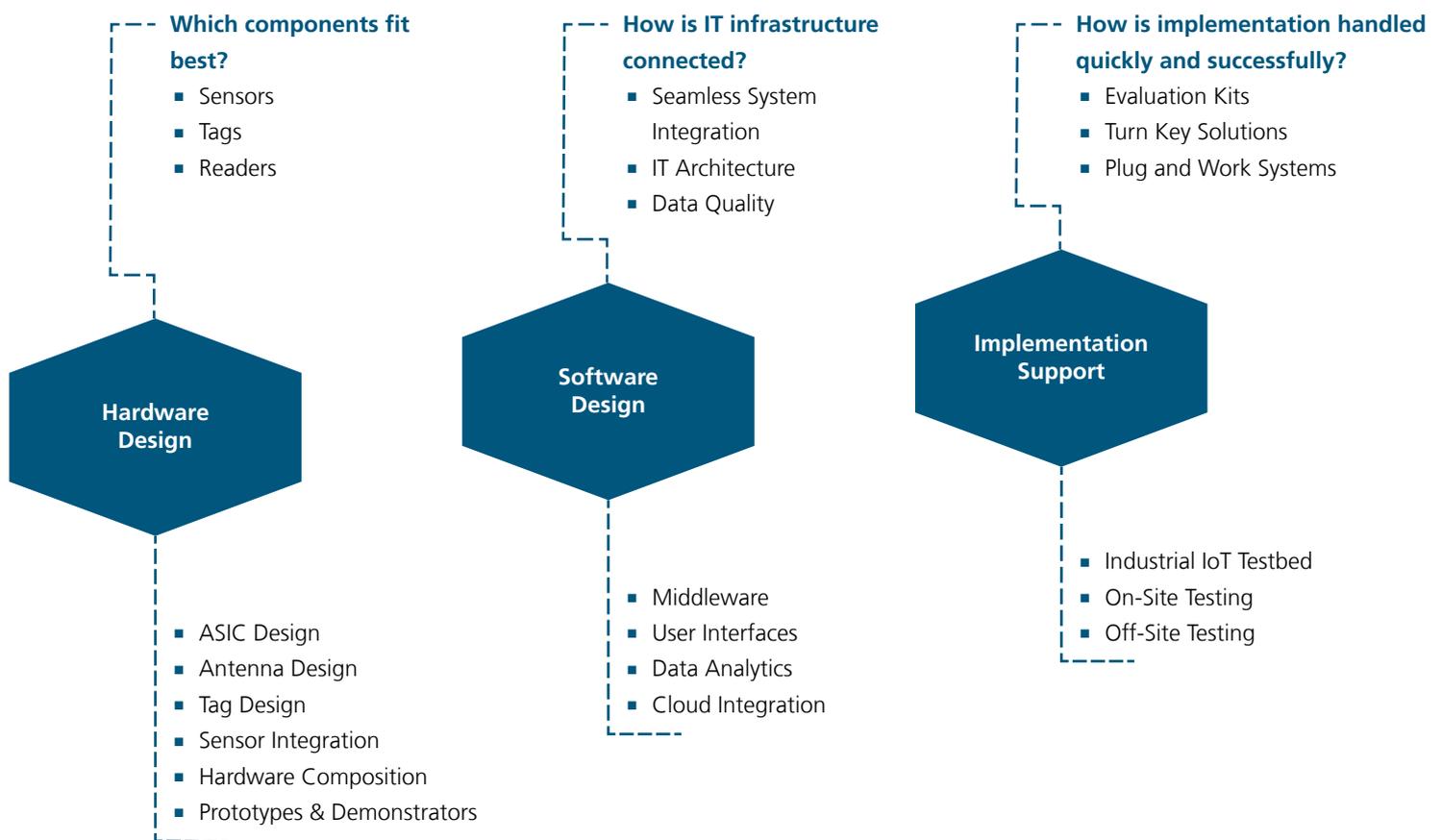
Concept

SERVICES

- Technology Consulting
- Process Consulting

- Feasibility Study
- Proof of Concept
- Simulation

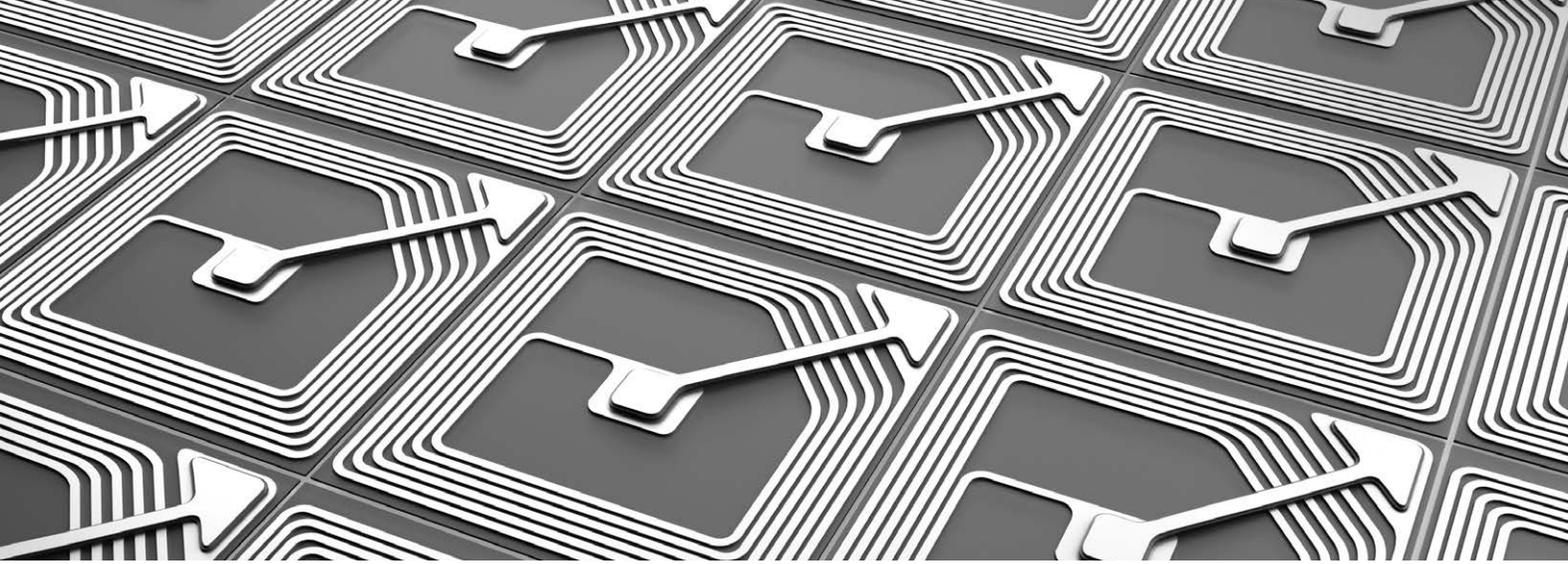




SIMPLIFIED RFID SYSTEM INTEGRATION WITH OPC UA

RFID component integration is often associated with considerable installation time and costs. Readers as well as identification and sensor transponders differ according to manufacturer, frequency band, protocol, interface and sensor, hindering their easy combination. The Fraunhofer IPMS RFID OPC UA AutoID server (ROAD server) middleware follows the OPC UA AutoID Companion Specification for RFID components to significantly ease system integration.

- Simple integration of AutoID devices in OPC UA environments
- Unified interface for any RFID reader, hardware, identification or sensor transponder
- Supports LF, HF, NFC and UHF



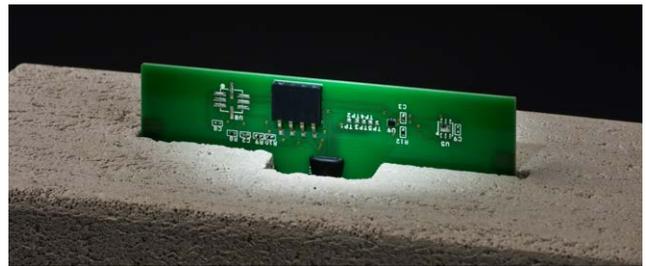
Process Monitoring

Integrated RFID sensor for measuring strain and temperature on rotating shafts during operation. Because no cables and batteries for monitoring are necessary, it is possible to implement the sensor on moving and rotating objects.



Smart Building

RFID transponder with temperature or humidity sensors for maintenance-free condition monitoring in building structures. Integrated transponders can be used to identify components and store additional information, and can be read as passive sensors for many years.



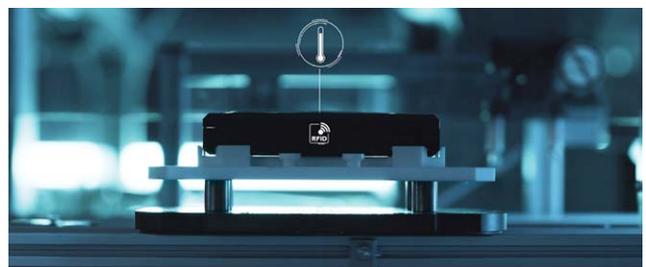
Condition Monitoring

RFID sensor equipped to measure conditions for predictive maintenance concepts in hard-to-maintain areas such as switchgears. Wireless recording can be carried out in areas that must otherwise be measured in a turned-off state.



Smart Manufacturing

Manufacturing controlled by RFID-equipped workpiece supplemented with wireless sensors to enhance the production processes. The workpiece carries both identification and production data, thus controlling the production process. Sensor data allows for the direct regulation of individual process steps.



Track, Trace & Sense

Track & trace logistics processes can be complemented with RFID sensors or RFID data loggers to measure and record temperature, vibration and humidity. Status data can be wirelessly tracked and stored throughout the entire process.



SHORT PROFILE

Based in Dresden, Fraunhofer IPMS is your research and service partner in the fields of optical sensors and actuators, integrated circuits, micro-systems (MEMS/MOEMS) and nanoelectronics. As one of the currently 72 independent institutes and research units making up the Fraunhofer-Gesellschaft, the leading European organization for near-industrial research, our more than 300 scientists work together with both private industrial and service companies as well as the public sector in projects to directly benefit business and society. To meet the high standards of our customers, Fraunhofer IPMS is certified by DEKRA in accordance with DIN EN 9001:2008 for the research, development and manufacturing of microsystems, respective semiconductor and microsystems processes as well as integrated actuators/sensors.

We support companies in realizing their innovative ideas in the field of wireless data acquisition using RFID based sensor solutions and provide services such as technology and process consulting, conceptual as well as hardware and software design, and system and cloud integration. We have extensive experience in application oriented research and development, especially in the areas of analog and digital circuit design, antenna design, and sensor and module integration as well as system and software integration in modern industrial architectures. Fraunhofer IPMS is therefore able to support you with complete and comprehensive assistance from your initial idea to prototype production and pilot series.

We are member of various associations

AMA – a leading network for sensor and measuring technologies

RAIN RFID Alliance – a global organization promoting UHF RFID

The Industrial Internet Consortium – the world's leading organization for accelerating the Industrial Internet of Things (IIoT)

AIM – a worldwide industry association for the automatic identification industry

OPC Foundation – a global industry consortium that creates OPC standards



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