

Miniaturised energy self-sufficient Components with reliable wireless communication for Automation technology **"MIKOA"**

Focus project

"Autonomous networked sensor systems (mst-AVS)"

of the Federal Ministry for Education and Research

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Supported by:



Objectives

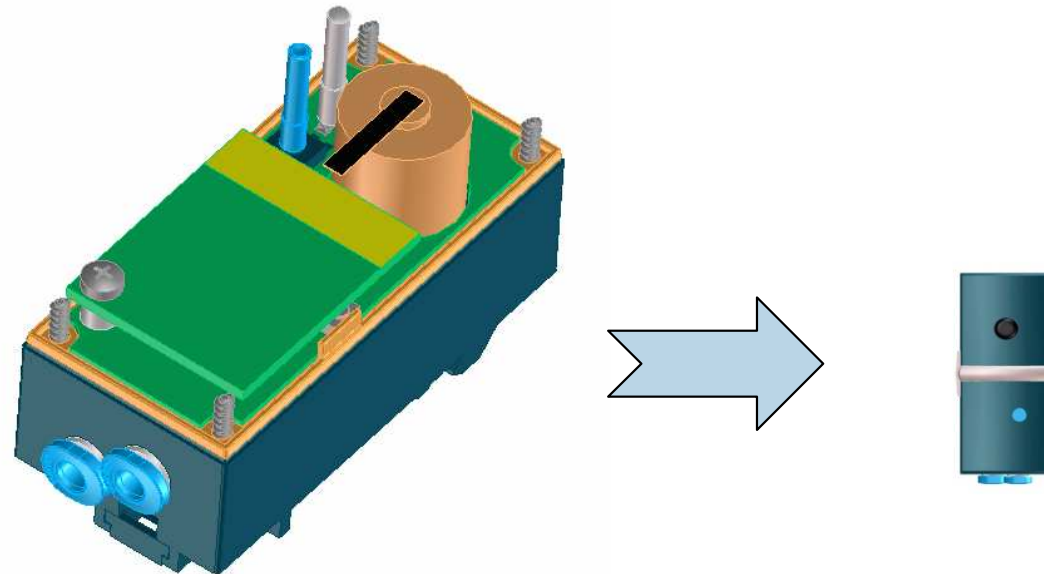
Consortium

Structure of the work

Results up to now

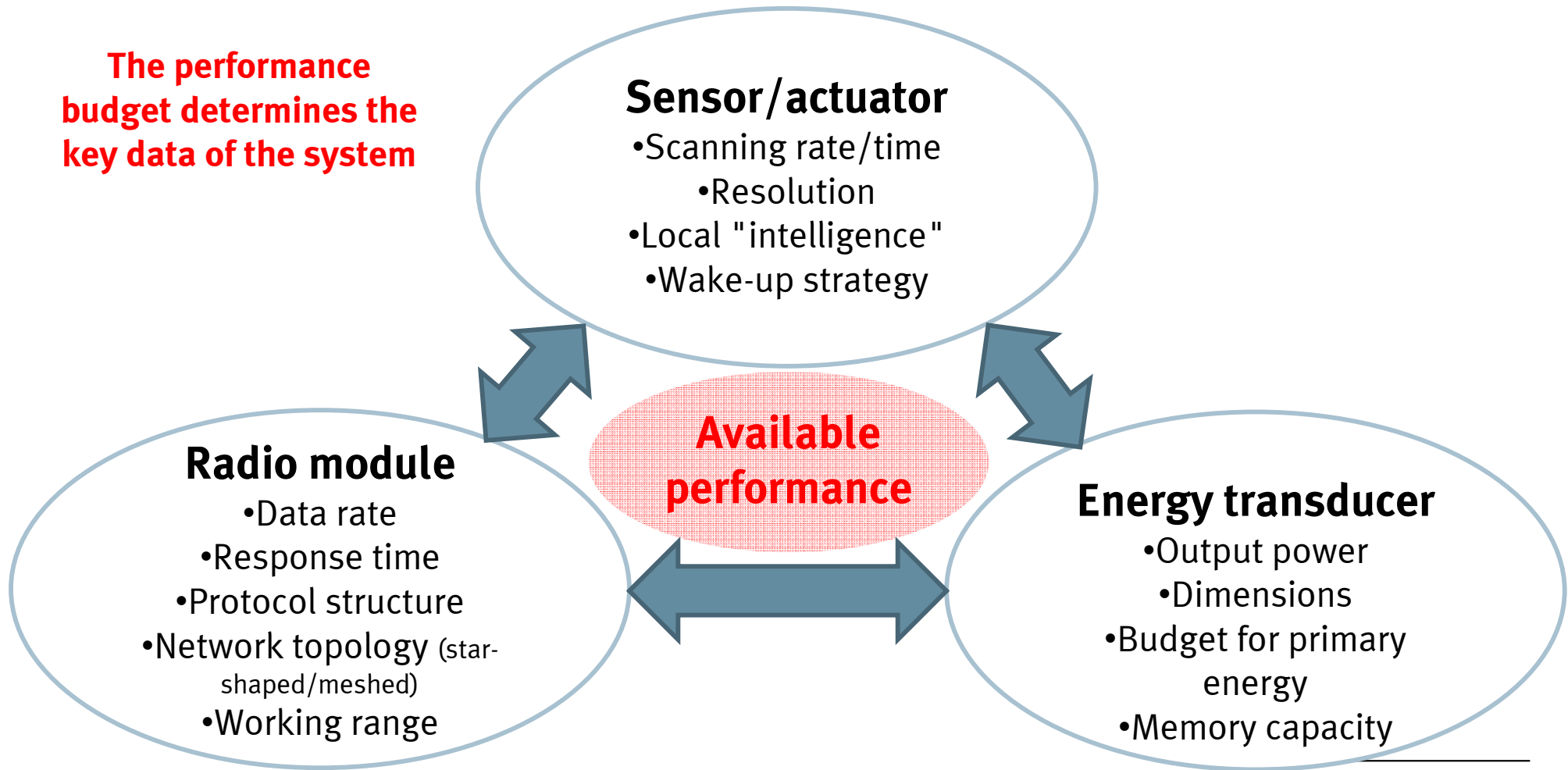
Initial situation

- Available standard components are usually too large to be integrated into industrial sub-assemblies
- Wireless communication does not yet fulfil the requirements of automation technology in some performance characteristics



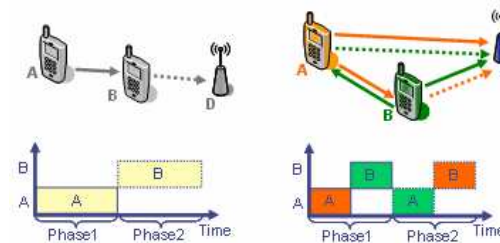
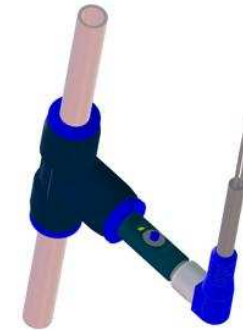
Technical core problem

The performance budget determines the key data of the system



Objectives

- Miniaturised sensors**
 with signal detection, evaluation and wireless communication
- Wireless communication**
 with very high availability and defined real-time behaviour
 Fading, movement, multipath reception, coexistence
- Optimised energy transducer**
 Existing technologies continue to be miniaturised



Objectives

Consortium

Structure of the work

Results up to now

Project partners

- **EnOcean** GmbH, Oberhaching
- **Festo** AG & Co KG, Esslingen
- **SIEMENS** AG, Munich
- **Zollner** AG, Zandt
- **Helmut Schmidt University**, Hamburg
University of the German Federal Armed Forces
- **University of Paderborn**
- **HSG-IMIT**, Villingen-Schwenningen
- **Ifak**, Magdeburg






Corporate Technology



Computer Networks Group
Universität Paderborn



Project partners

Included under sub-contracts

- **IK Elektronik**, Hammerbrücke
- **InTraCom**, Stuttgart



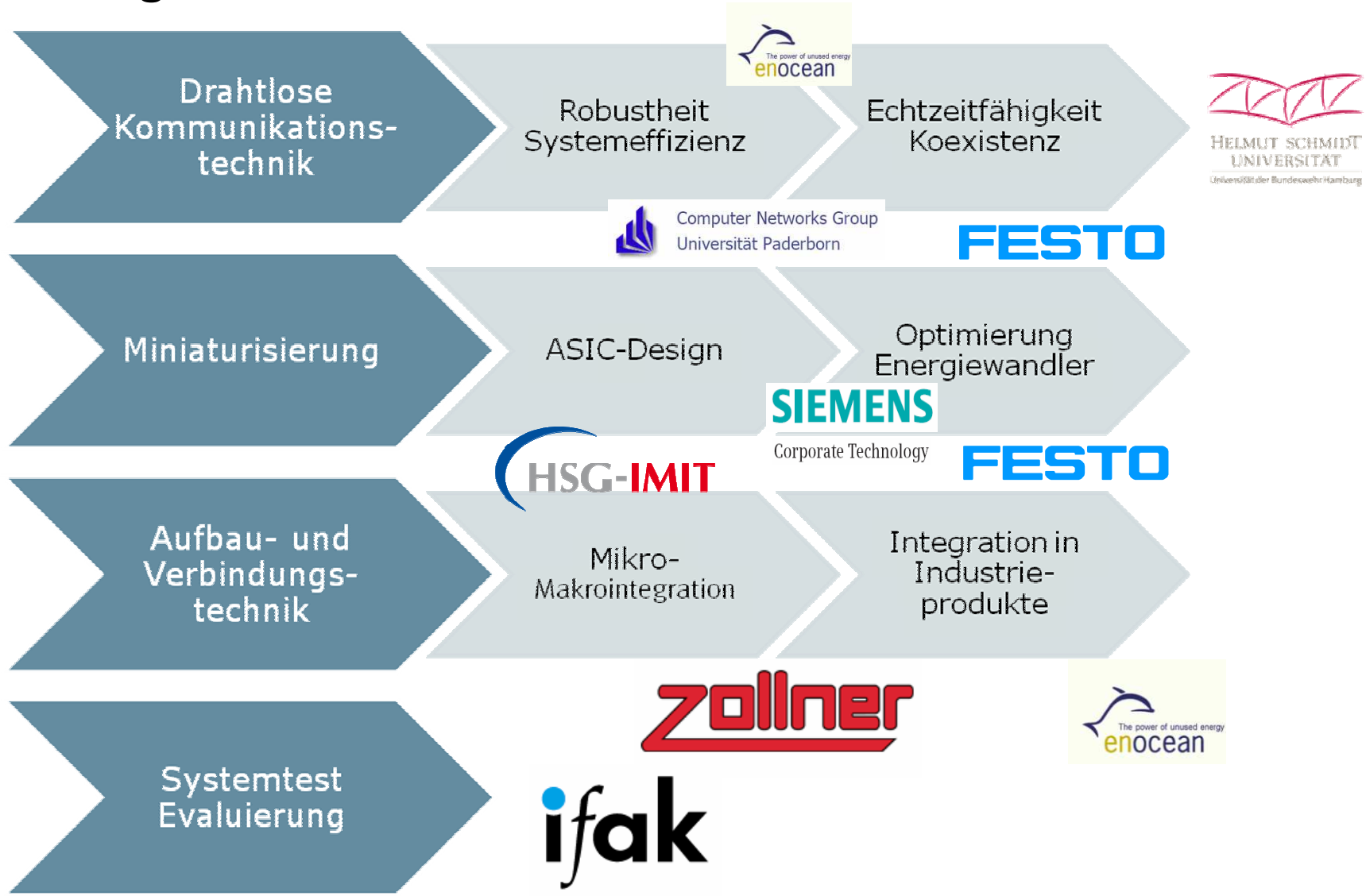
InTraCom Group

Associated via letter of intent

- **Texas Instruments**, Freising/Oslo
- **ABB Stotz Kontakt**, Heidelberg



Thematic goals



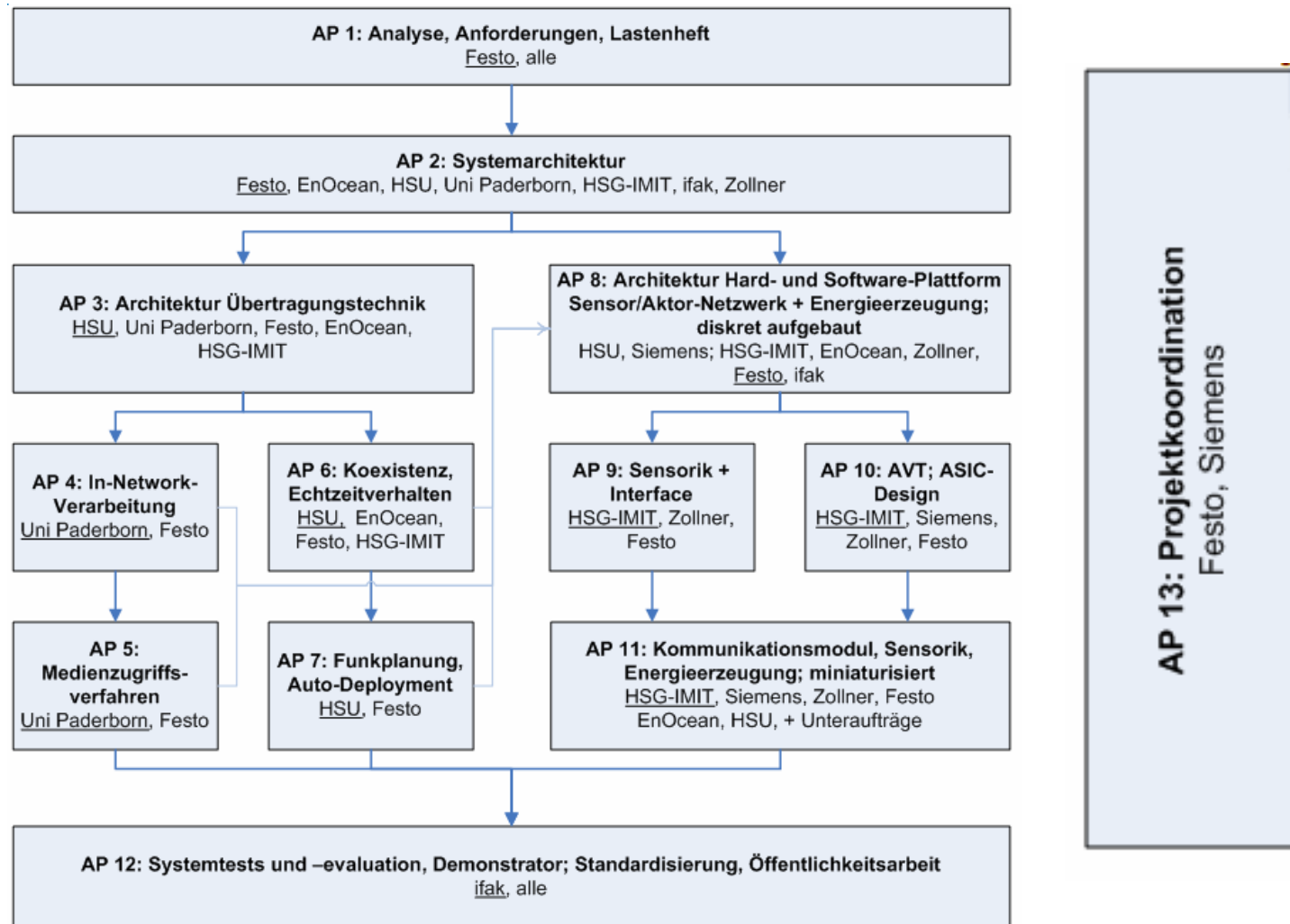
Objectives

Consortium

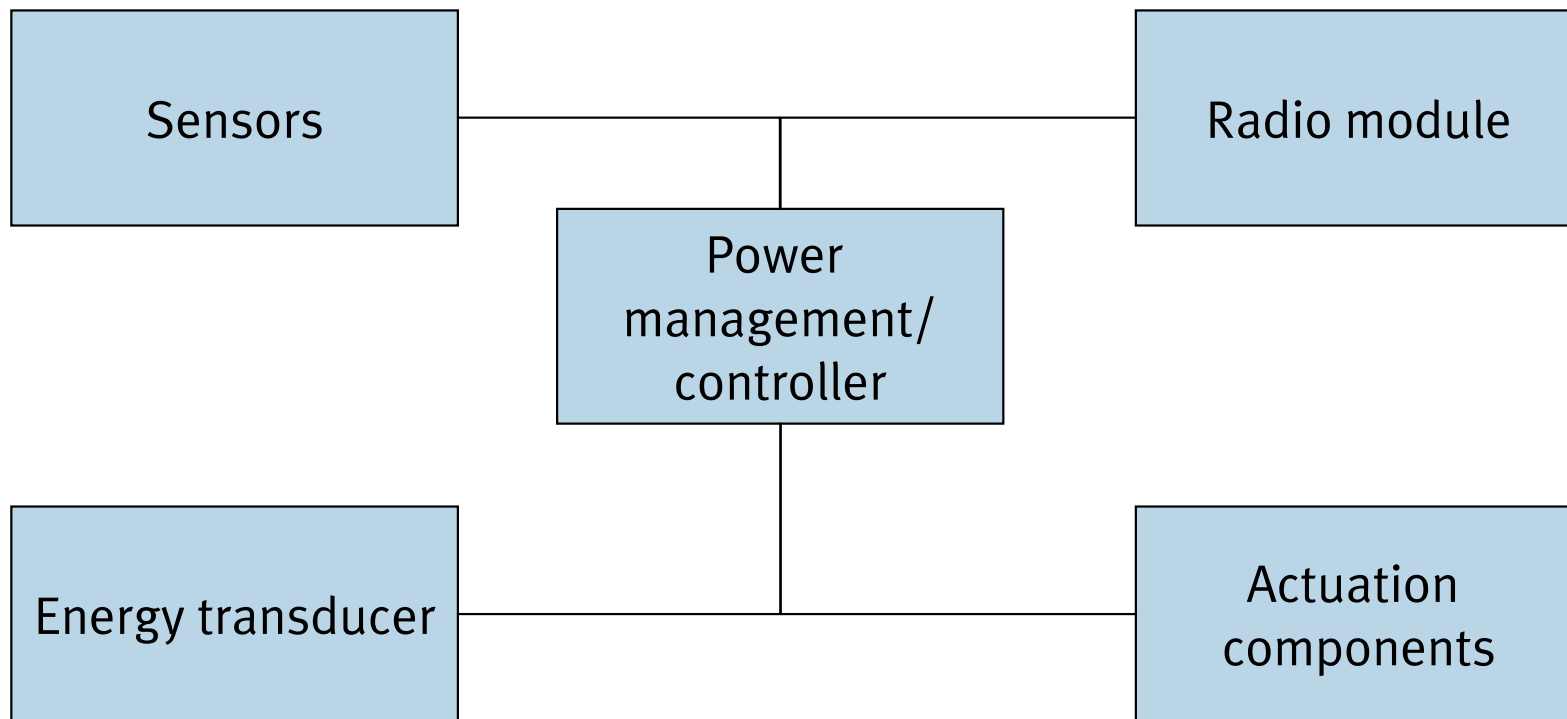
Structure of the work

Results up to now

Structure of the planned work

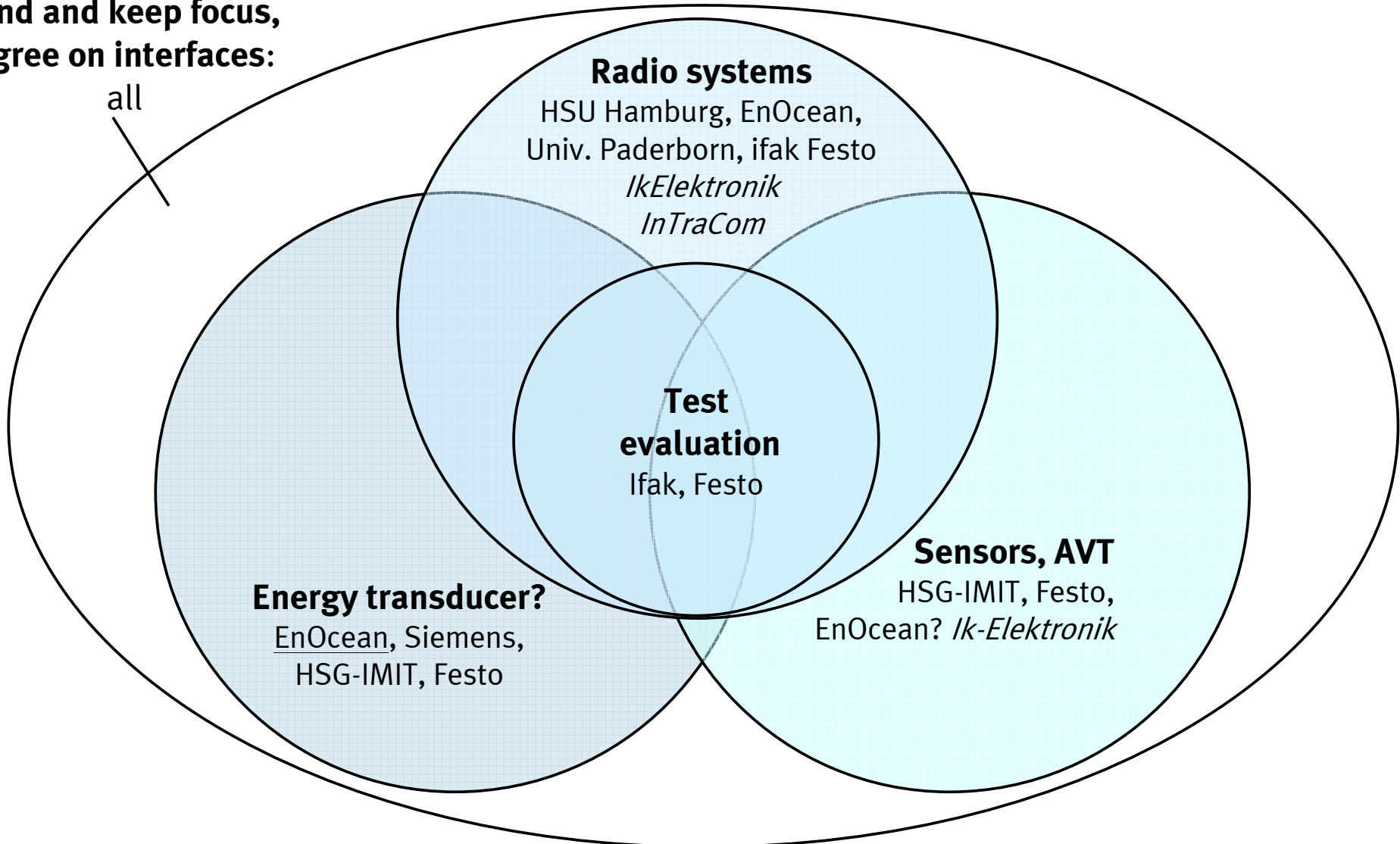


Functional basic structure



Structure of the working groups

Find and keep focus,
agree on interfaces:



Objectives

Consortium

Structure of the work

Results up to now, Next steps

Use Case „Plant Monitoring“

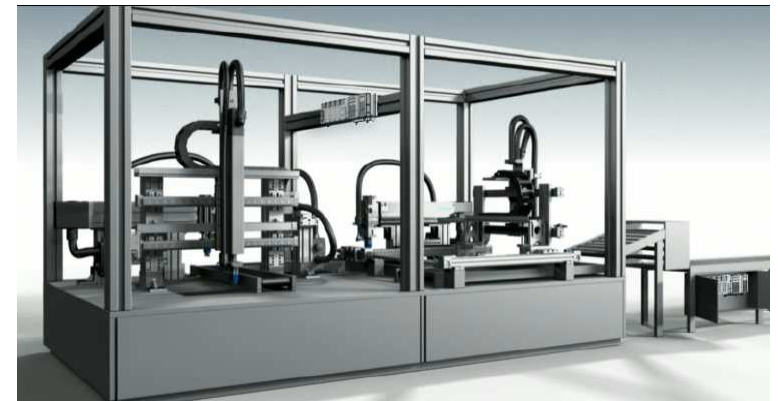
Measured variable:

- **System States**
 - Flow
 - Pressure

- **Air quality**
 - Humidity
 - Particles
 - Temperature

Customer benefits:

- Better, faster documentation (e.g. Environmental compliance)
- Reduced Downtime
-> plant availability improves
- Reduced maintenance costs
- Better resource efficiency
- Improved quality



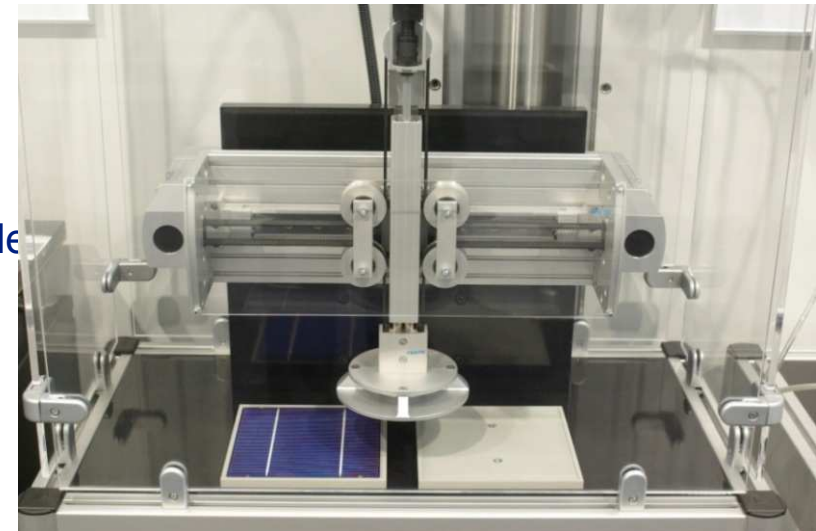
Use Case „Fast Handling Unit“

Measured variable:

- **System States**
 - Flow
 - Pressure
- **Monitored quantities**
 - Final position
 - Position
 - Reference position

Customer Benefits:

- Solutions for moving units and special environment
- Reduced wear
Replacement of slip rings and cable carriers
- Enhanced flexibility
- Reduced installation costs
- online Diagnosis
- Reduced Downtime
-> plant availability improves
- Reduced maintenance costs
- Improved flexibility for adaptive production

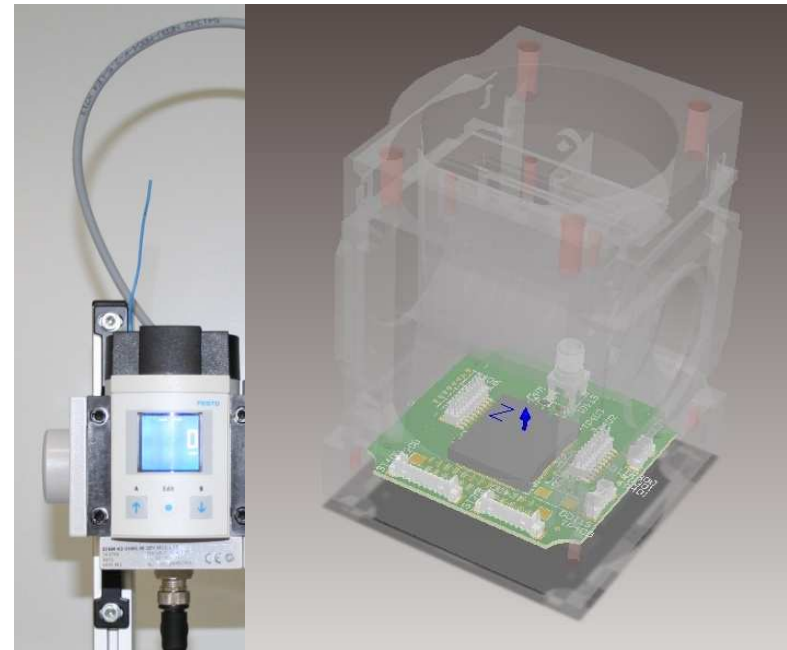


Next steps

- Proof of concepts
- Technology development towards miniaturisation
- Systems engineering for functional and coexistence tests

Proof of concept

- Functional tests with components in conventional technologies
- Immediate benefit in applications with reduced demands for smaller dimensions



Next steps: Miniaturisation

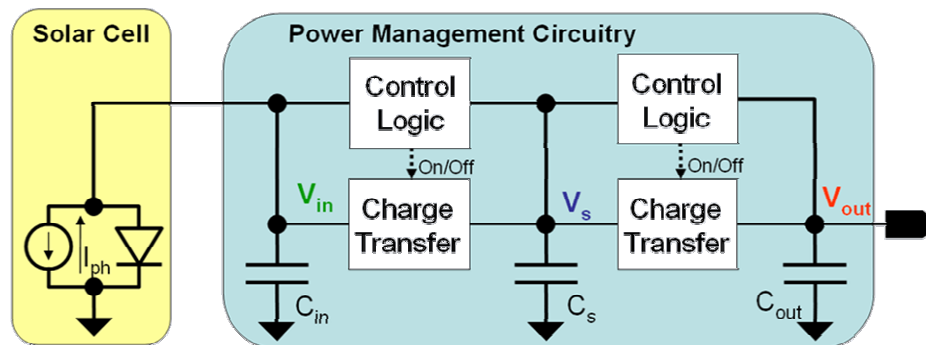
- ● Evaluation of various packaging technologies
 - Implementation of various concepts and validation towards technical feasibility and economical aspects
-
- **Examples :**
 - Flex-Rigid solutions
 - Embedded components technologies
 - 3D-MID
 - Housing technologies



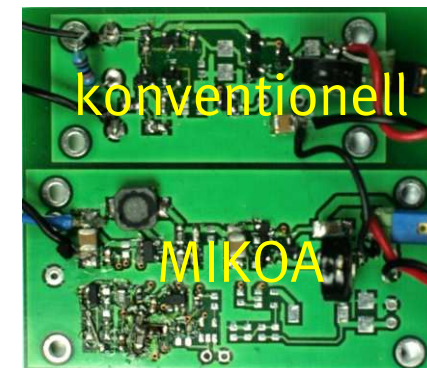
ASIC-Design for miniaturised solar module

- Specification
- Concept for ASIC-Design
- PCB for proof of concept available
- First measurements demonstrate feasibility
- ASIC Design in progress

New MIKOA Concept:



PCB-Implementation:



Development of typical coexistence scenarios

Wireless communication standards, Field strength, coverage

