
SAL
SILICON AUSTRIA LABS
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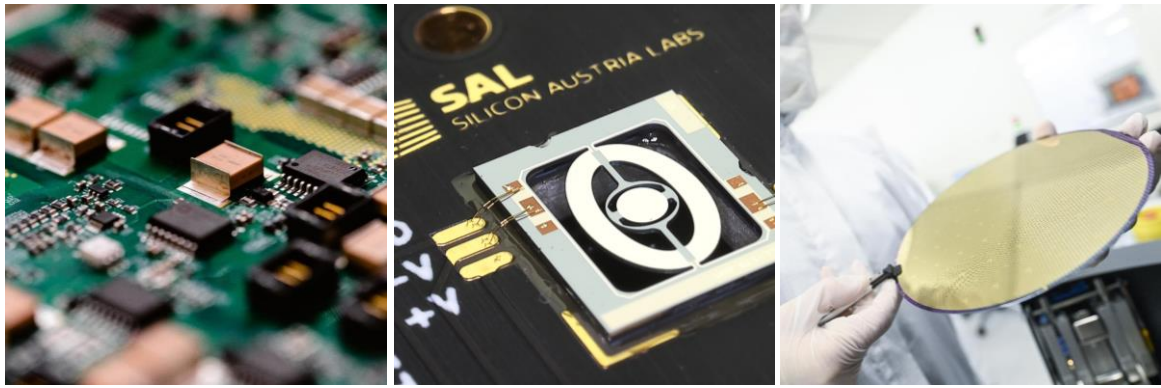
The Austrian Research Center for Electronics and Software Based Systems (ESBS)
Bundesministerium
Klimaschutz, Umwelt,
Energie, Mobilität,
Innovation und Technologie
FFG
Das Land
Steiermark
SFG
LAND KÄRNTEN
ober
österreich
Member of
UAR
INNOVATION
NETWORK

SILICON AUSTRIA LABS

What do we do?

Silicon Austria Labs (SAL), established in 2018, is a European **R&D center** with a focus on the development of efficient and trustworthy technologies in the field of **Electronics and Software Based Systems.**

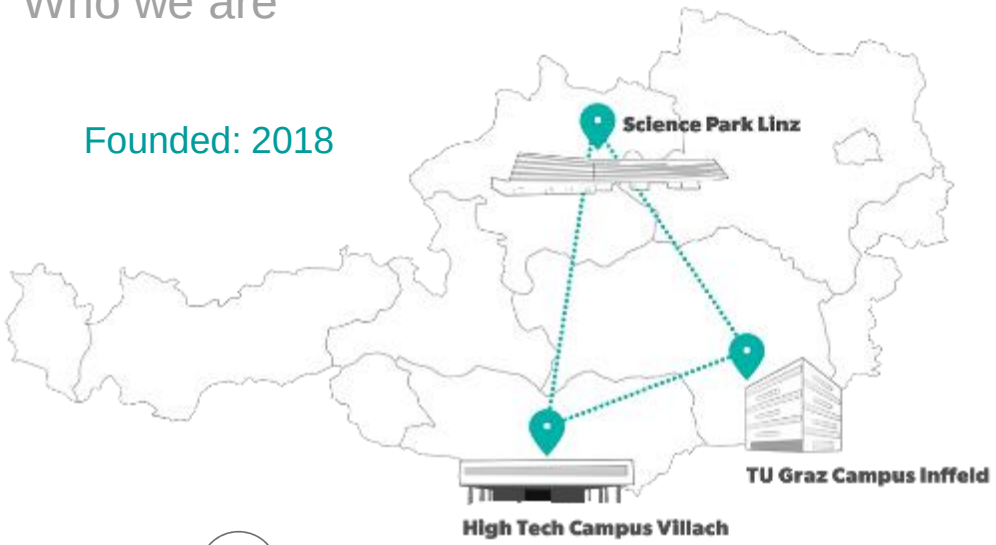
- Industry-oriented research
- R&D services
- Well-equipped research infrastructures
- Customized opportunities for cooperation



KEY FACTS*

Who we are

Founded: 2018



3

LOCATIONS

- Graz (HQ)
- Villach
- Linz

> 90

PARTNER NETWORK

- From Industry & Research

> 300

EXPERTS

- Experienced team
- 40 nations
- Multidisciplinary

128

PUBLICATIONS

5

SHAREHOLDER

- 50,1 % Republic of Austria (BMK)
- 24,95 % FEEI
- 10 % Styria (SFG)
- 10 % State of Carinthia
- 4,95 % Upper Austria (UAR)

32 Mio. €

PROJECT VOLUME

- Total volume for research projects

OUR EXPERTISE

SAL Divisions

SENSOR SYSTEMS

POWER ELECTRONICS

INTELLIGENT WIRELESS SYSTEMS

MICRO-SYSTEMS

EMBEDDED SYSTEMS

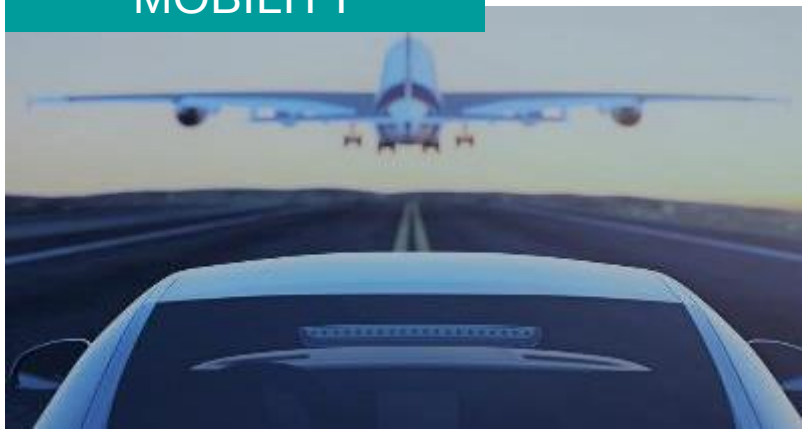
INDUSTRIES

SAL as a partner for all industries

ENGINEERING

ENERGY

MOBILITY



ELECTRONICS

MEDICAL

CHEMICAL & PHARMA

OUR BUSINESS MODELS

How to work together

SAL Cooperative Research

Purpose:
- Easy, accessible co-financing for R&D projects with SAL
- Long term R&D cooperations (>1year)

Organisational Framework:
- Project Evaluation by SAL
- SAL General Contract Terms
- SAL Project Agreement
- IP-rules are in line with the European State Aid Law

Advantages:
- 50% co-financing by SAL
- Bi/multilateral cooperation possible
- No application process necessary

Contract Research

Purpose:
- Technology Concepts
- Test & Measurements
- Feasibility Studies
- Proof of Concept Studies
- (Rapid) Prototyping

Organisational Framework:
- Quote – Order Process

Advantages:
- Fast project start
- No further contractual framework necessary
- Fixed price
- Clearly defined deliverables

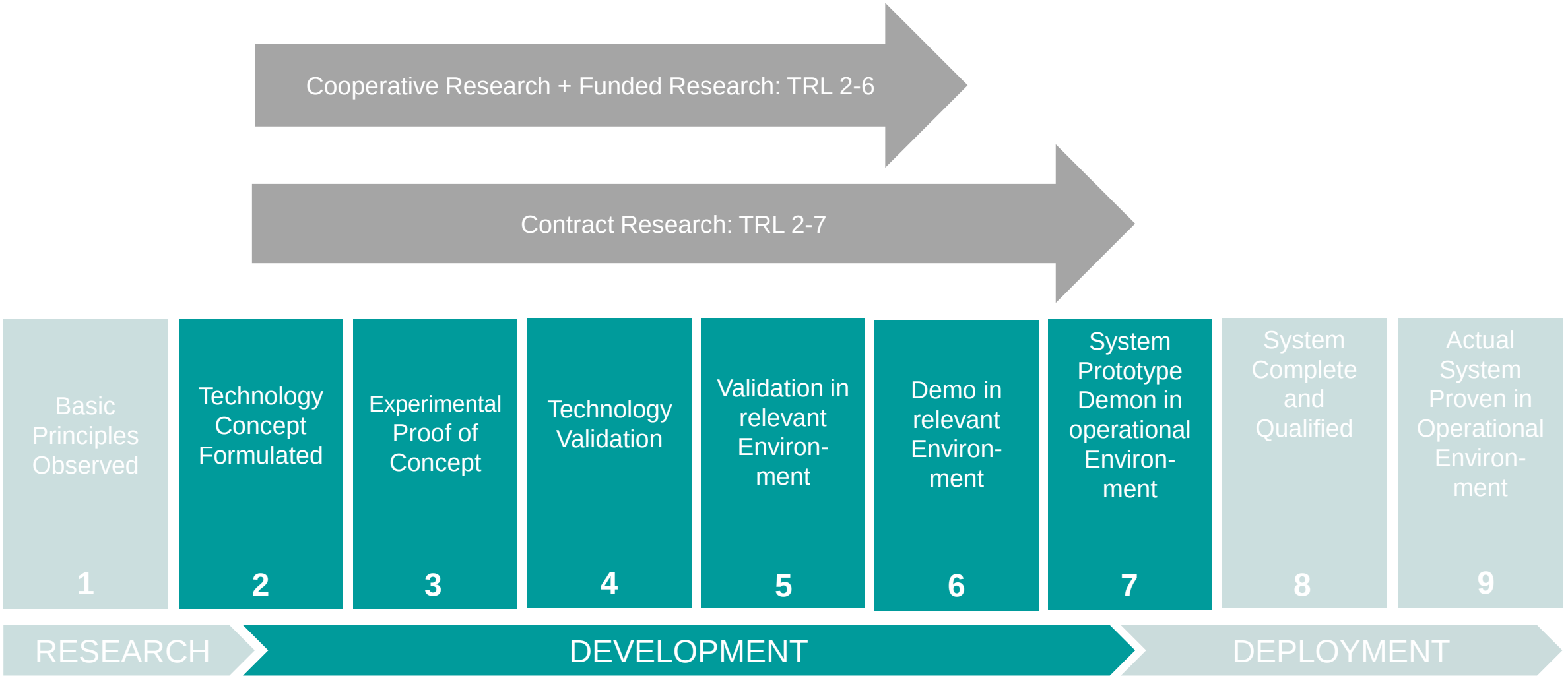
R&D Services

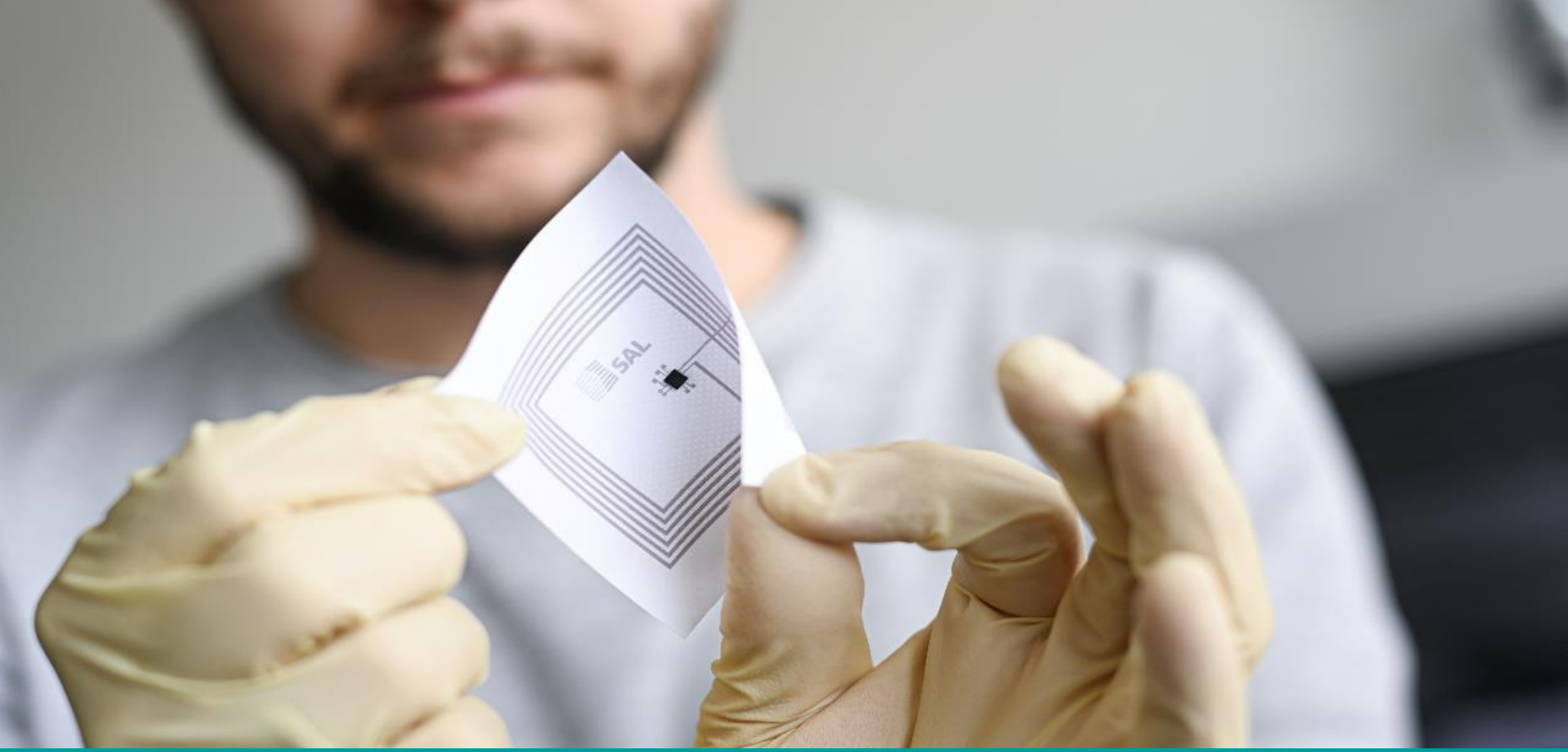
Design and **simulation**, **characterizations**, **measurements** and **testing** up to **manufacturing** in the field of micro- and nanotechnology.

Funded Research

TECHNOLOGY READINESS LEVEL

Research projects TRL 2-7





SENSOR SYSTEMS

DIVISION

SENSOR SYSTEMS

The Sensor Systems research division develops sensors and systems that can be used in almost all areas of commerce and industry. In addition to developing novel sensor solutions, SAL also integrates market-available sensor technologies into a wide variety of applications. Furthermore, the division's teams work in various labs to design, test and characterize components or systems.

RESEARCH TOPICS

Photonic Systems develops highly integrated, compact and robust measurement & light projection devices, as well as high power laser systems. Supported by simulation tools, the team is able to realize functional demonstrators meeting industrial needs.

Electronic Sensors focuses on the development of the entire sensor readout, data processing and data presentation system and testing of sensors and readout circuits.

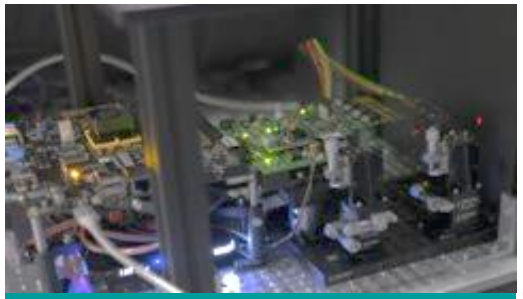
Advanced Sensors & Electronics Technologies focuses on all aspects of the printed electronics innovation process from concept, design up to integration and testing.

R&D Services Electronics covers the whole development process of digital and analog electronics, hardware-related software development as well as mechanical construction and prototype assembly.

INFRASTRUCTURE

PRINTED & FLEXIBLE ELECTRONICS

CHARACTERIZATION LAB



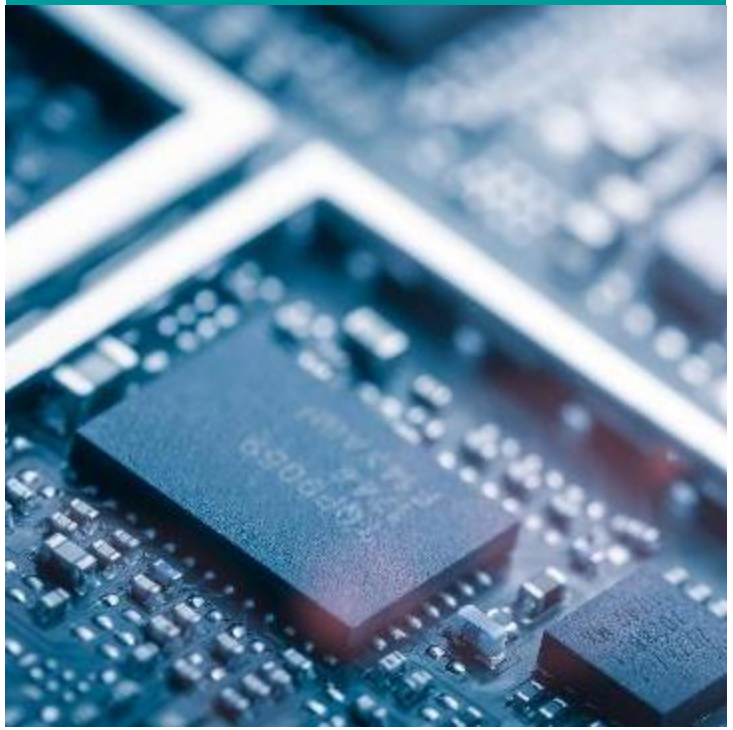
PHOTONICS/ LASER LAB

VALIDATION LAB

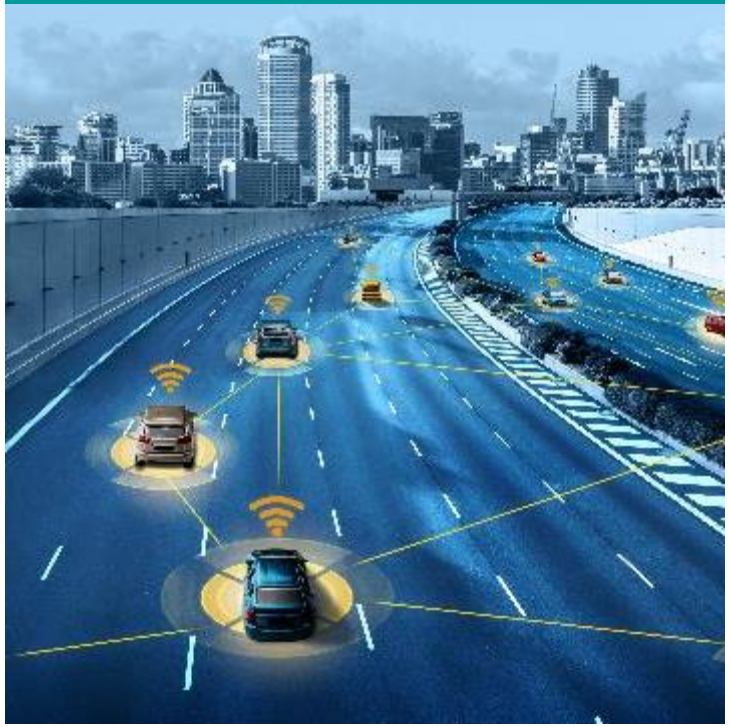
SENSOR SYSTEMS

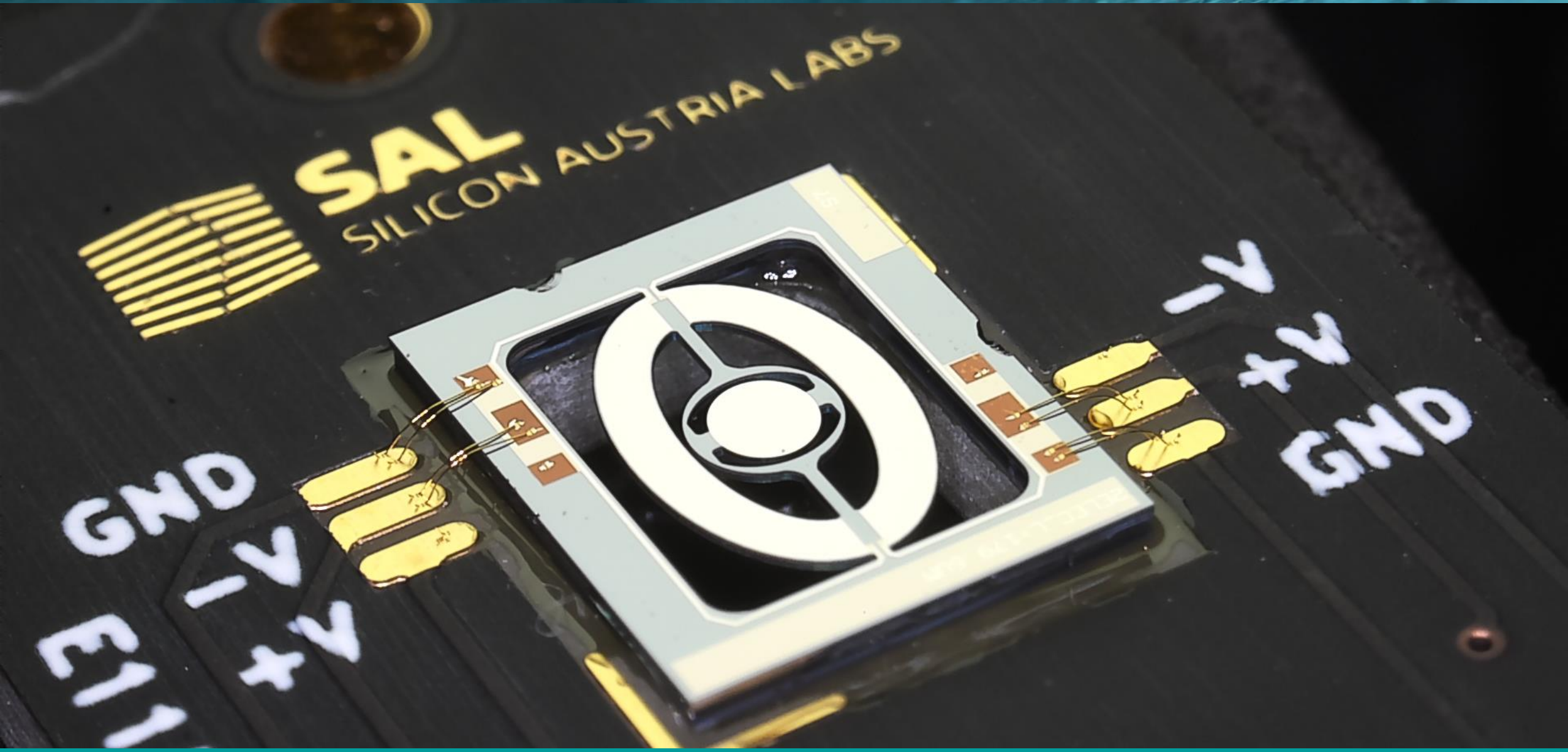
DEVELOPMENT OF A SOFT ROBOTIC GRIPPER, EQUIPPED WITH FLEXIBLE SENSORS

DEVELOPMENT OF NOVEL HARDWARE CONCEPTS FOR ULTRA-SONIC TRANSDUCERS, SIGNAL GENERATORS & SIGNAL PROCESSING



DEVELOPMENT OF QUANTUM GYROSCOPES FOR THE NEXT GEN OF AUTONOMOUS VEHICLES





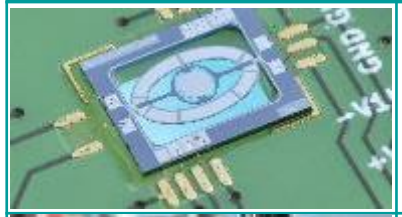
MICROSYSTEMS

DIVISION

MICROSYSTEMS

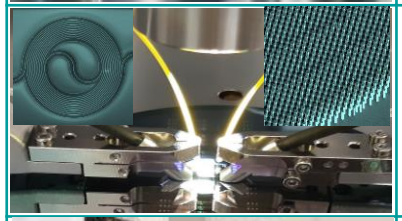
The Microsystems Research Division is dedicated to pioneering advancements beyond current technological standards in novel micro-electro-mechanical systems (MEMS), MOEMS, integrated photonics, and integrated magnetics by synergizing advanced materials and fabrication technologies. Through close collaboration with industrial and scientific partners, SAL endeavors to innovative at every stage, from initial design and proof-of-concept to the development of product prototypes.

RESEARCH TOPICS



Piezoelectric Microsystem Technologies pioneers innovative MEMS solutions for miniaturized sensors, transducers, and acoustic wave resonators, establishing full stack development platforms for novel piezo MEMS systems.

Magnetic Microsystem Technologies focuses on the development and integration of magnets, sensors and spintronic devices into microsystems and their applications for magnetic position and orientation sensing.

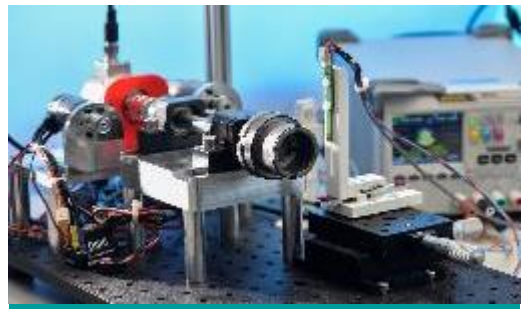


Integrated Photonics Technologies specializes in advancing meta-optics and integrated photonic solutions tailored for compact, multifunctional sensors applicable across automotive, consumer electronics, communication sectors.

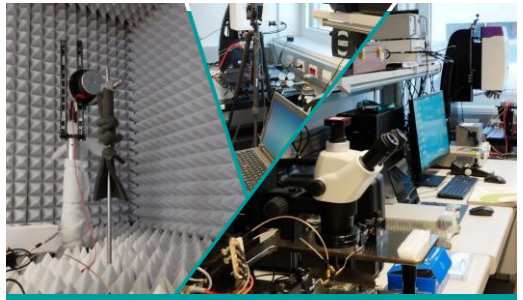
Thin-film Technologies specializes in solutions catering to the development, fabrication, and characterization of cutting-edge thin film technologies applied across piezo-electrics, photonics, magnetics, and electronics applications.

INFRASTRUCTURE

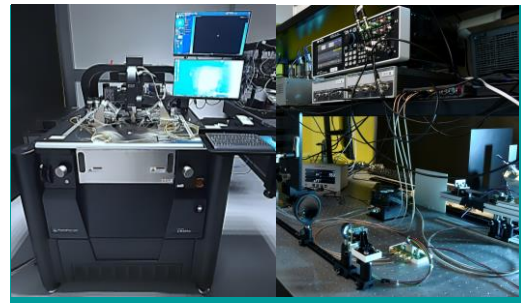
THIN FILM CLUSTER



MAGNETICS LAB



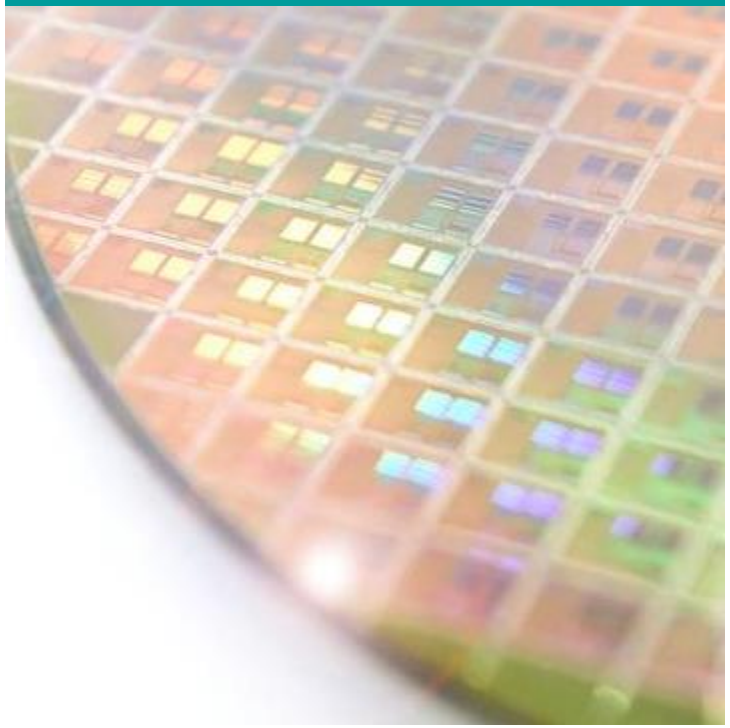
ACOUSTICS LAB



PHOTONICS LAB

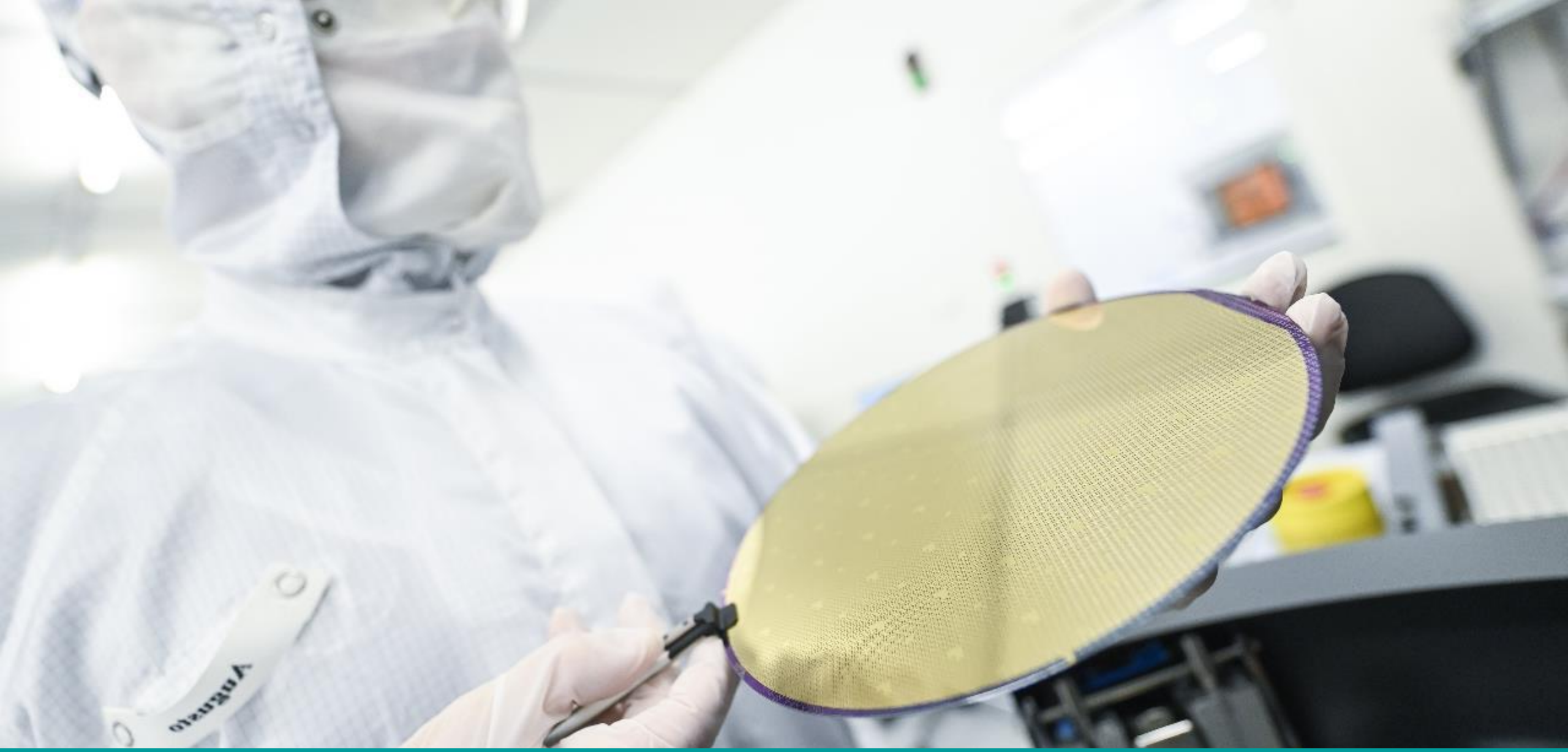
MICROSYSTEMS

DEVELOPMENT OF A MEMS DESIGN TOOLBOX FOR ADVANCED WAFER LEVEL MEMS INTEGRATION



DEVELOPMENT OF PMUT ULTRASOUND TRANSDUCERS AND ARRAYS FOR GAS FLOWMETERS

DEVELOPMENT OF MICROPHONE TECHNOLOGIES TO IMPROVE THE ENVIRONMENTAL PERFORMANCE OF AIRCRAFTS



SAL MICRO-NANO-FABRICATION CENTER

DIVISION

SAL MICROFAB

Focus:

- ISO 4 / 1000 m² cleanroom
- Serving the full value chain of ESBS
- Research – Prototyping – Small Series

Cleaning

Lithography

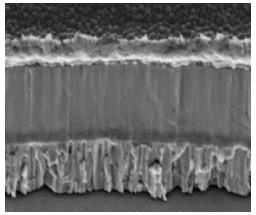
Deposition

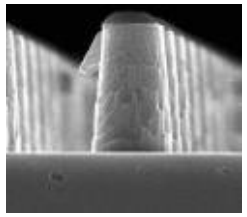
Etching

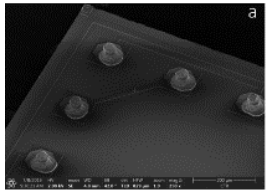
Metrology

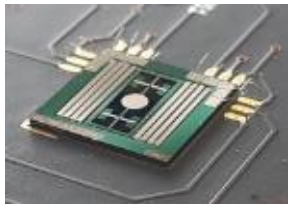
Chip

Packaging







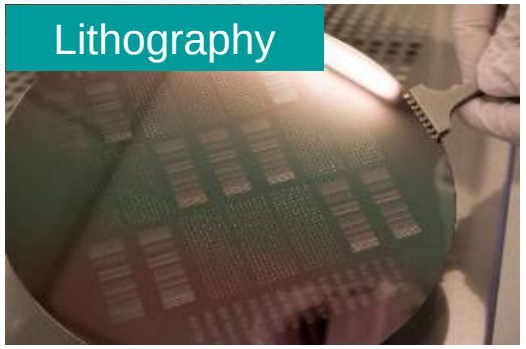


CLEANROOM I

Focus:

- ISO 5 / 300 m^2
- 4-to-8-inch capability
- µFabrication
- Characterization
- MEMS Sensors know-how
- Open access

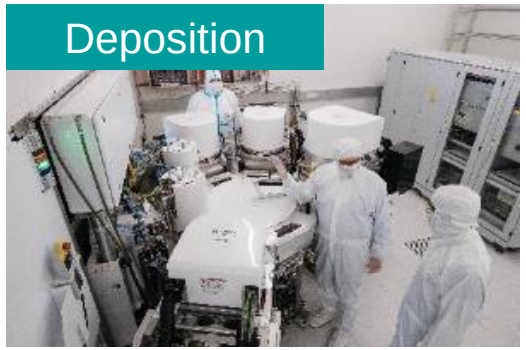
Lithography



Dry Etching

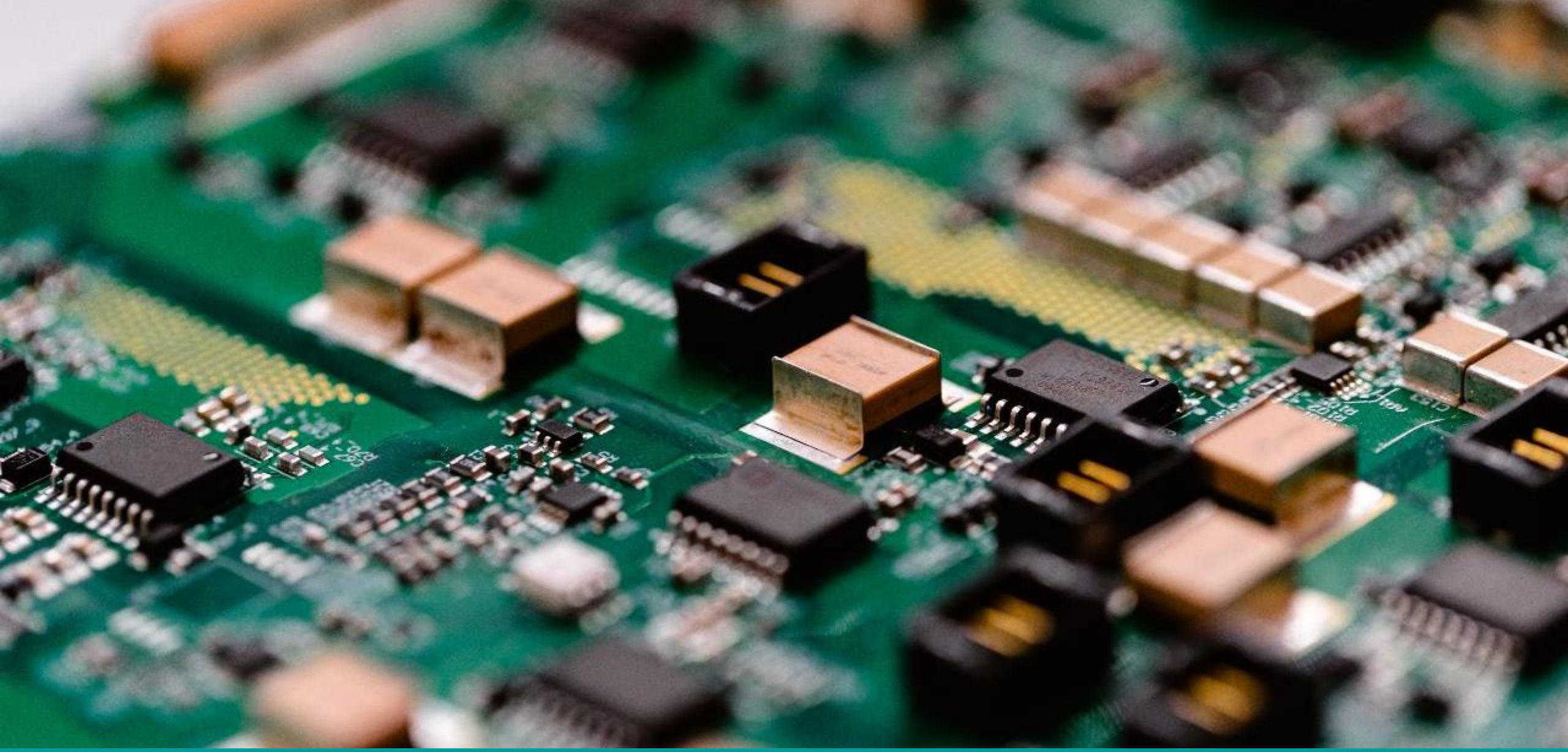
Wet etching

Deposition



Aligning | Bonding

Characterization



POWER ELECTRONICS

DIVISION

POWER ELECTRONICS

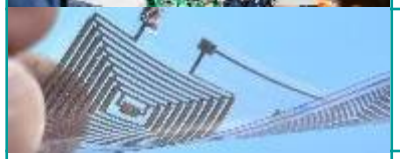
In the Power Electronics research division, more efficient and powerful solutions are developed for all types of electric energy converters in all power classes, from the system and control design, through to switching structures and to integration methods and construction elements in new technologies. This is primarily done with modeling, simulation and virtual prototyping, but also includes the construction and validation of prototypes.

RESEARCH TOPICS

Architectures & Topologies focuses on different aspects of power converter system design, including advanced theoretical analysis, simulation and design methodologies, and practical design issues.

Instrumentation & Testing focuses on test systems for e-mobility components and systems such as batteries, electric motors, complete drives or fuel cells.

Packaging & Multiphysics focuses on the integration of PE modules and systems and on optimized and compact integrated power converter systems with integrated enhanced functionalities.



Heterogeneous Integration refers to the integration of separately manufactured components into a higher-level assembly.

Coexistence & Electromagnetic Compatibility (CEMC) focuses on the simulation of the CEMC behavior and model based design to explore multiphysics.

INFRASTRUCTURE

CEMC LAB

PE LAB I

PE LAB II

HIT LAB

POWER ELECTRONICS

DEVELOPMENT OF A BIDIRECTIONAL ONBOARD CHARGER

DEVELOPMENT OF MODELS AND METHODS FOR SIMULATING THE EMI OF POWER ELECTRONIC SYSTEMS

DEVELOPMENT OF A CONTROL SYSTEM FOR A SIMULATOR FOR SOLAR SYSTEMS WITH HIGH POWER DENSITY

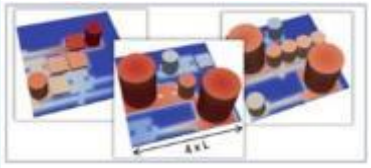
EMBEDDED SYSTEMS

DIVISION

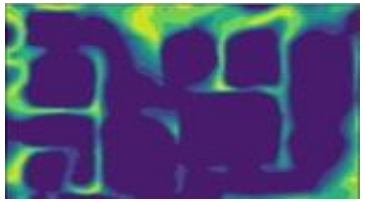
EMBEDDED SYSTEMS

The Embedded Systems research division focus on dependable software and adaptive computation covering conventional designs up to privacy-preserving distributed AI-solutions. The focus lies on the research of their reliability, real-time capability and energy efficiency.

RESEARCH TOPICS

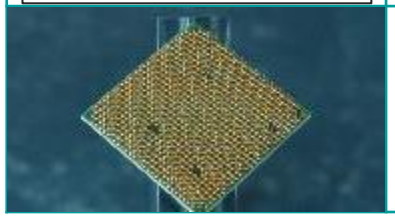


Virtual Sensing & Sensor Fusion focuses on the replacement of "hard-to-measure" system parameters with model estimation, based on existing "easy-to-measure" parameters.



Distributed & Federated Learning for privacy-preserving focuses on the performance of on-site model refinements, using local data. This can be followed by an aggregation of the parameters of on-site models for a global update.

Explainable-AI & Verification for AI in safety-critical settings or systems with very high dependability requirements. We are also looking into sustainability and efficiency topics.



Hardware Accelerators for Custom and Adaptive Computing are the key to maximally efficient and secure systems. Our research supports the RISC-V ecosystem with custom accelerators (e.g., crypto).

INFRASTRUCTURE

HPC SERVERS

DEPENDABLE CPS (DCPS) LAB

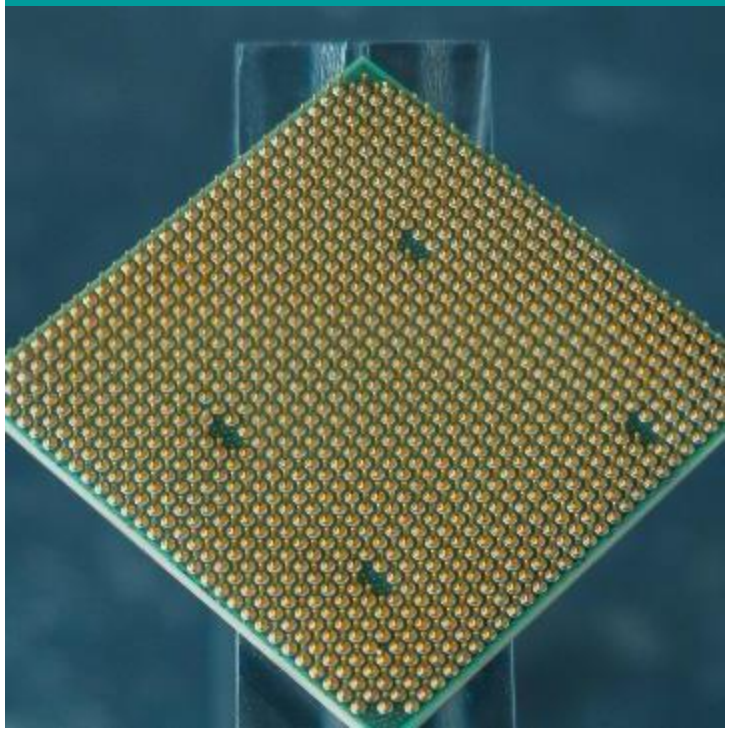
NVIDA JETSON AGX NANO

GENESYS FPGA-BOARD

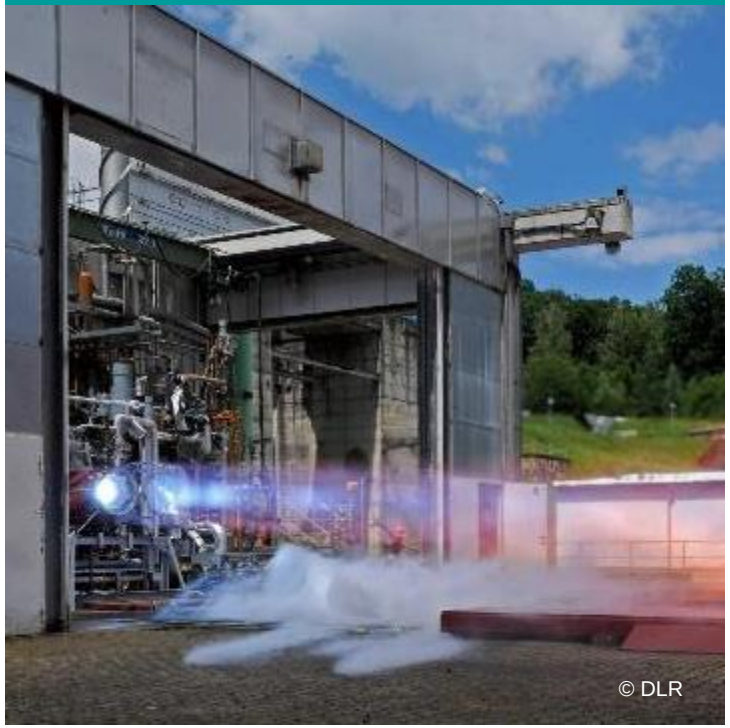
EMBEDDED SYSTEMS

DEVELOPMENT OF TECHNIQUES TO INCREASE THE LIFETIME OF KEY ESBS

DEVELOPMENT & INDUSTRIALIZATION OF THE EUROPEAN RISC-V ECOSYSTEM



EXPLORATION OF INTELLIGENT SENSING CONCEPTS & VIRTUAL SENSING FOR ROCKET ENGINES & TEST BENCHES



INTELLIGENT WIRELESS SYSTEMS

DIVISION

INTELLIGENT WIRELESS SYSTEMS

The Intelligent Wireless Systems research division aims to develop innovations in relation to wireless communication and radar technologies in the radio-frequency spectrum from MHz through to the very high GHz range.

RESEARCH TOPICS

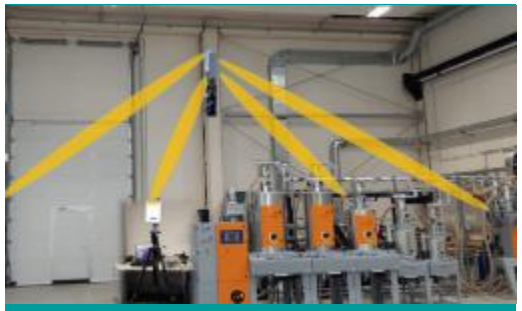
Millimeter Wave Technologies focuses on developing key systems technologies from MHz to sub-THz frequency range in emerging 5G/6G and radar/imaging/sensor applications.

Frontend Integrated Circuits and Systems focuses on the exploration of AD and DA converters, RF- and Mixed Signal-IP as well as frontend integrated circuits in communication and sensor systems.

Embedded AI focuses on new system approaches (HW&SW), intelligent multisensory data processing & Machine Learning. Furthermore, we focus on distributed reasoning, decision-making, automation and control to establish design principles for collectives of ultra-reliable and ultra-scalable autonomous systems.

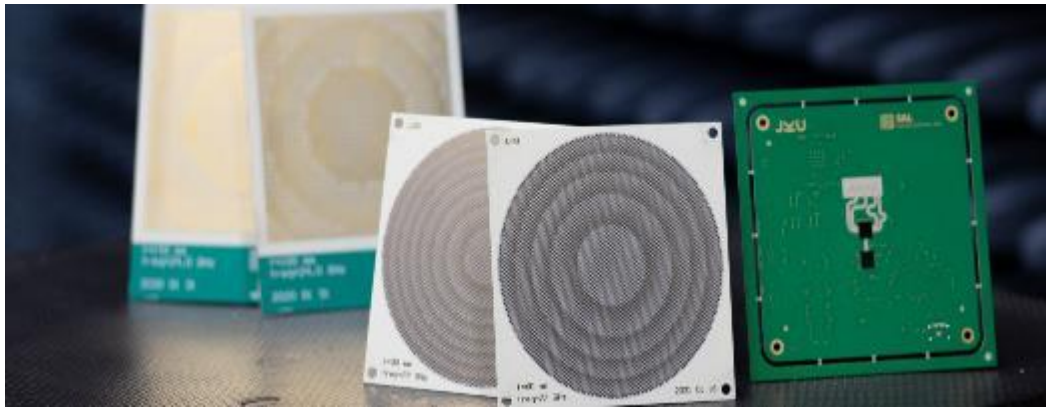
Wireless Communications focuses on solutions for the development of reliable and trustworthy wireless communication to allow industry 4.0 and cyber physical systems heading to more flexibility.

INFRASTRUCTURE



5G TESTBED

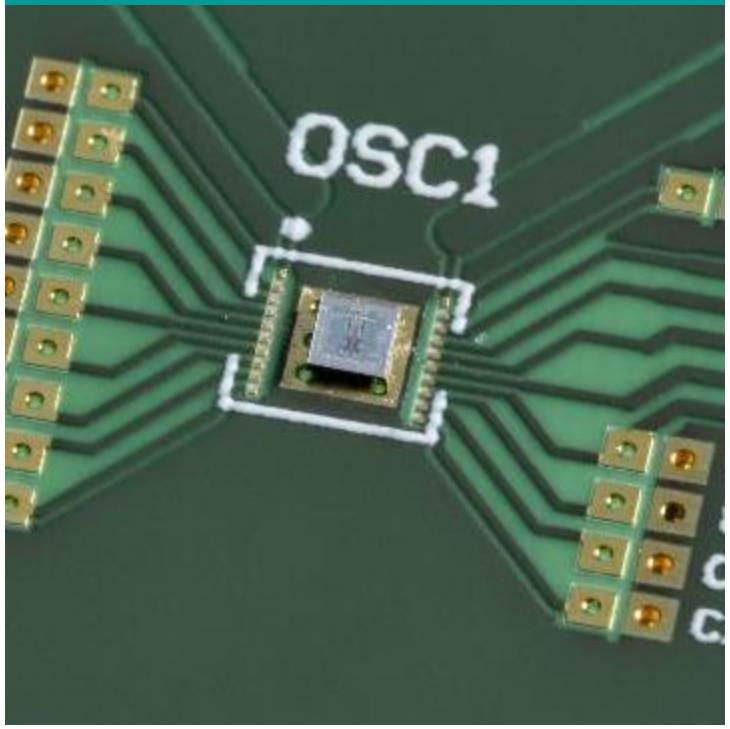
MMWAVE-LAB



INTELLIGENT WIRELESS SYSTEMS

DEVELOPMENT OF NOVEL ACTIVE METAMATERIAL SURFACES TO ASSESS THE RADIATION CHARACTERISTICS OF MMWAVE FREQUENCY DEVICES

DESIGN OF A FREQUENCY SYNTHESIZER OPERATING BEYOND 100GHZ TO SUPPORT 6G EMERGING APPLICATIONS AND USE CASES



DEVELOPMENT OF A PROOF-OF-CONCEPT TO EXPLORE FEASABILITIES ON AN ONBOARD-AI ENABLED EARTH OBSERVATION MISSION

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