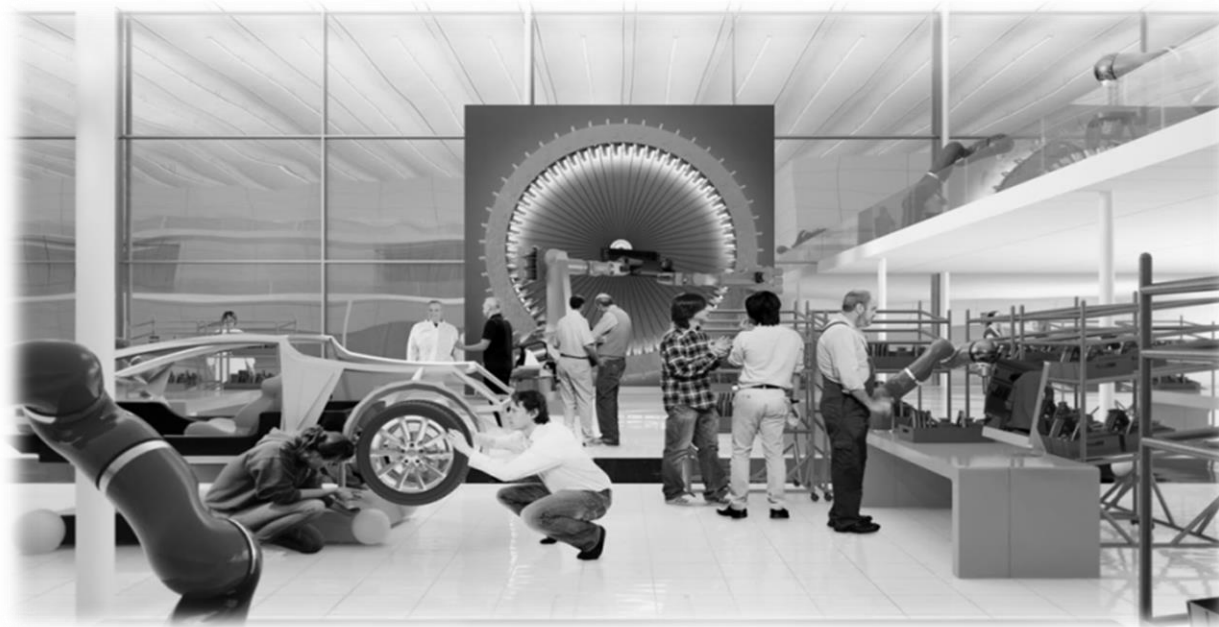


ARENA2036



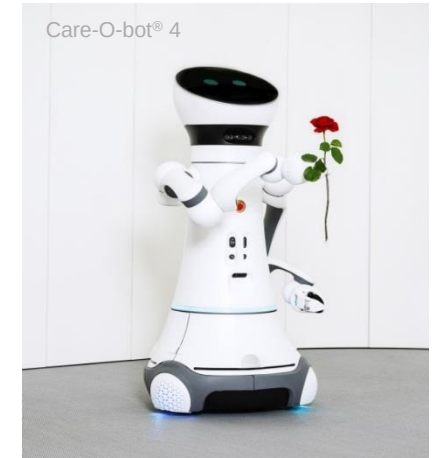
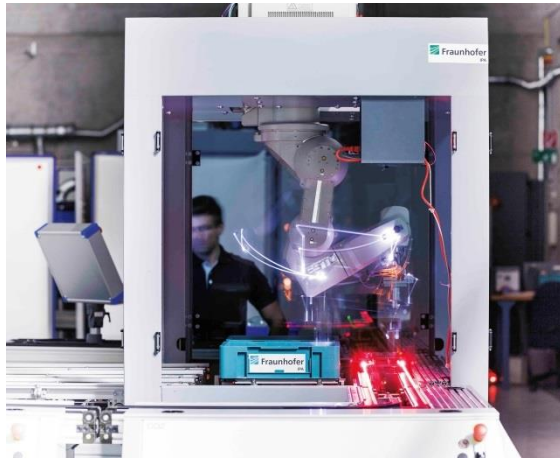
A NEW WORLD OF JOINT RESEARCH AND INNOVATION

Dr. Mirko Bordignon – Fraunhofer IPA

RRI IIoT International Symposium, Nov 30, 2017 - Tokyo

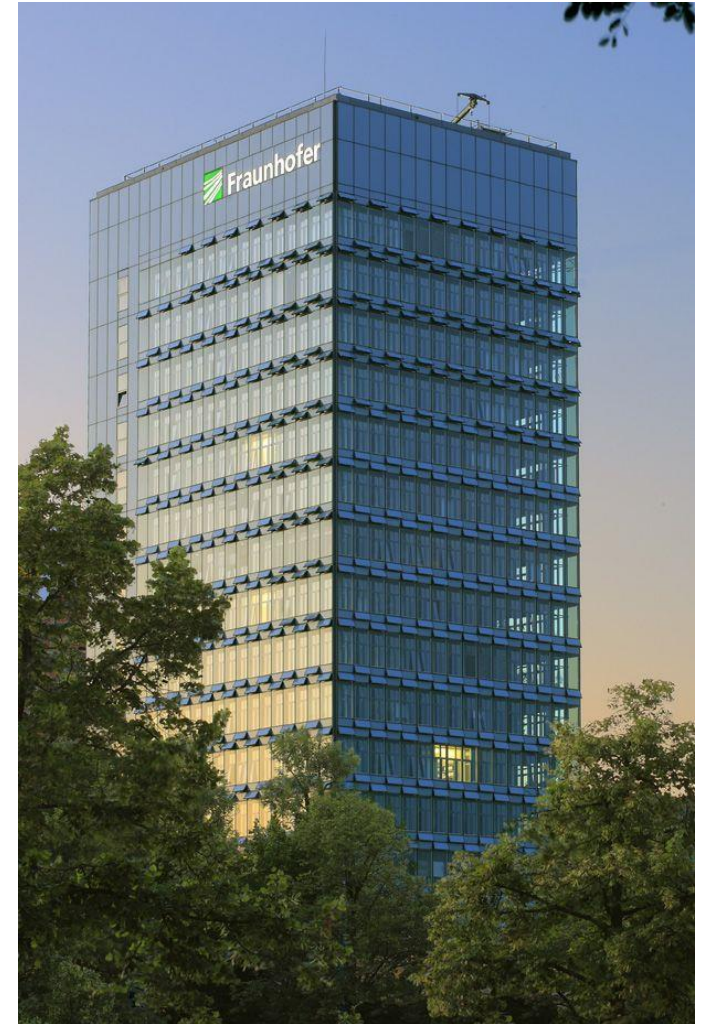
FRAUNHOFER INSTITUTE FOR MANUFACTURING ENGINEERING AND AUTOMATION IPA

in cooperation with the institutes EEP, IFF and ISW of the University of Stuttgart



Future is our product
Sustainable. Personalized. Smart.

- More than 80 research institutions, including 67 Fraunhofer institutes
- More than 24,000 employees, the majority educated in natural sciences or engineering
- An annual research volume of € 2.4 billion,
of which € 1.6 billion is generated through contract research.
 - More than 70 % of this research revenue derives from contracts with industry and from public founded research projects.
- International collaboration through representative offices in Europe, America, Asia and the Middle East



Technology consultant and innovation driver since 1959

- Operational budget of 70.8 million euros
- 25.8 million euros in industrial revenues
- More than 1,000 employees



New technical center "Gebäude D" in Stuttgart

Note: key figures for 2016; IPA Stuttgart including locations in Rostock, Mannheim, Bayreuth and Vienna



Application Center
Industrie 4.0



Motion laboratory



BioPoLis



Biomanufacturing
laboratory



Factory planning cockpit



Electroplating laboratory



Intervention room



Coating technology
center



Production laboratory



Cleanrooms & cleanliness
rooms



Robotics experimentation
area

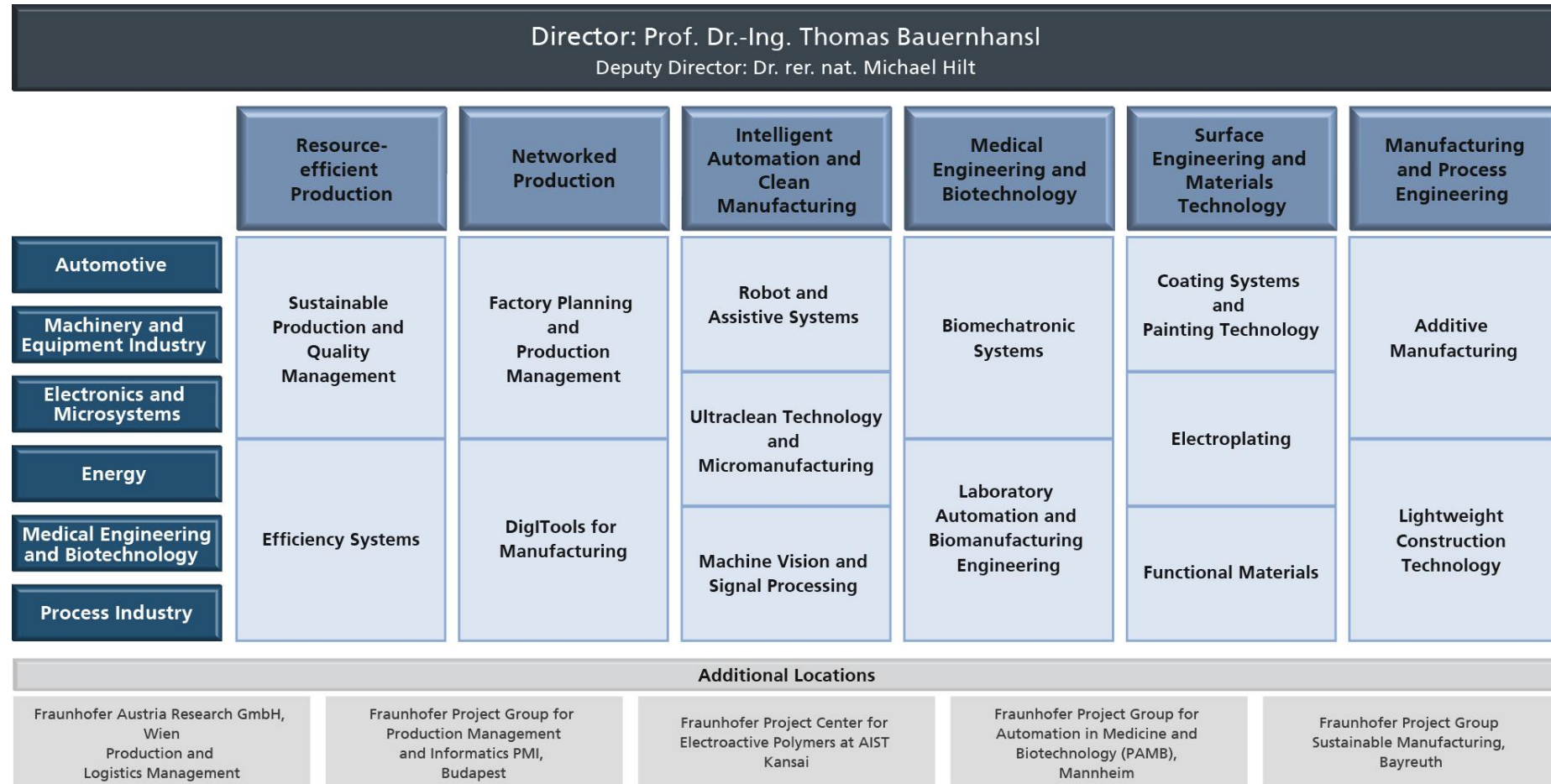


Synthesis & reactor park

Fraunhofer IPA

with an interdisciplinary organization

ARENA2036



Version as of: 09.2017

Cooperating at the highest level

ARENA2036

“Industry on Campus” with centers and labs



Automotive:
“ARENA2036”



Ergonomics:
“Future Work Lab”



Machines:
“Metal processing
of the future”



Laboratory:
“nICLAS”

Note: selected current lighthouse projects

ARENA2036

Active Research Environment for the Next Generation of Automobiles in 2036

ARENA2036 is the **internationally leading research campus**, where **excellent partners** in scientific and industrial research focus on **production and lightweight engineering in the context of Industry 4.0**.

- Development of disruptive projects & innovations *a whole new thinking of mobility and its creation*
- Research along the entire value chain *from product to production, from design to recycling*
- Interdisciplinary cluster of excellent partners *automotive, mechanical & aircraft engineering, IT, plastics, production, social sciences ...*
- “Industry on Campus” *Establishing a new collaboration platform*
- Campus concept with shared, project and science spaces *employees from scientific institutions & enterprises work together for at least 3 days a week*

Implementation of the research campus concept in ARENA2036:

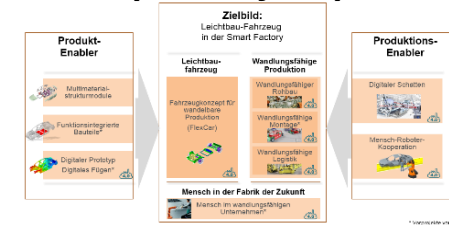
ARENA2036 building



Leading technology enterprises and research institutes as partners



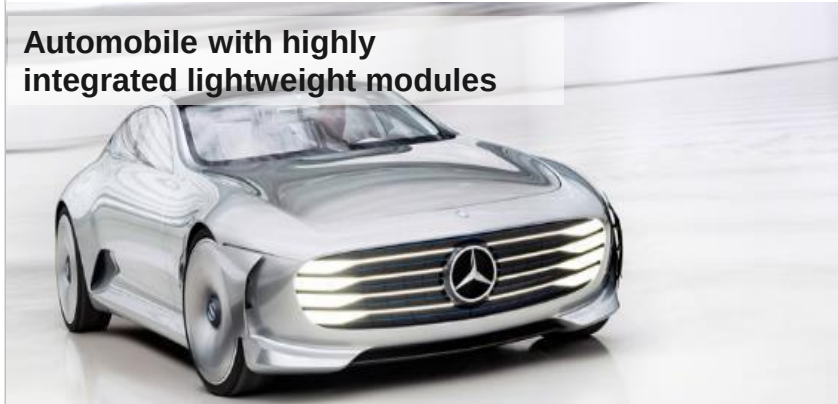
Multi-material lightweight design and value chain systems (Industry 4.0)



The demand for sustainability and individuality radically changes the products and the production environment of tomorrow. ARENA2036 focuses on two research fields:

Mobility2036:

Automobile with highly integrated lightweight modules



- Multi-Material lightweight design by way of functional integration
- New materials and joining technologies
- Continuous digitalization of all parts and processes
- New concepts for autonomous and crashless cars

Production2036:

Versatile production without production line



- Versatile production
- Industry 4.0 research and implementation
- Humans in the factory of the future
- Micro-factories

Industry 4.0 from development to production

Automobile research meets the demand of the mobility of the future – but not only. Besides mobility itself, its whole creation is about to be changed.



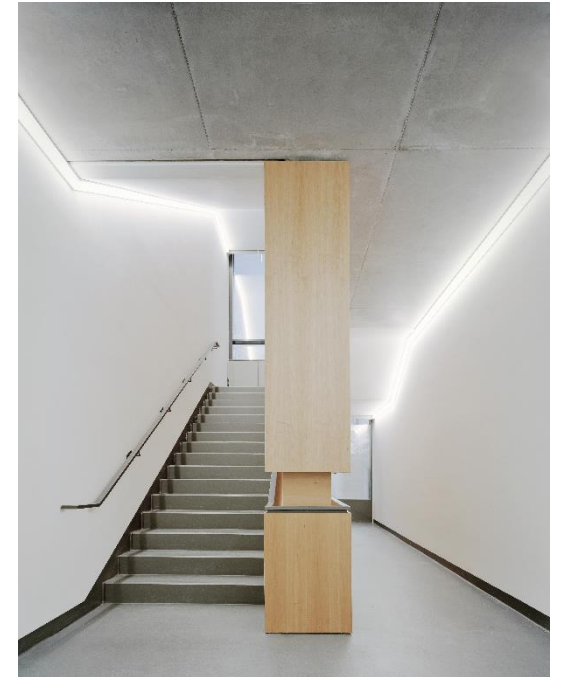
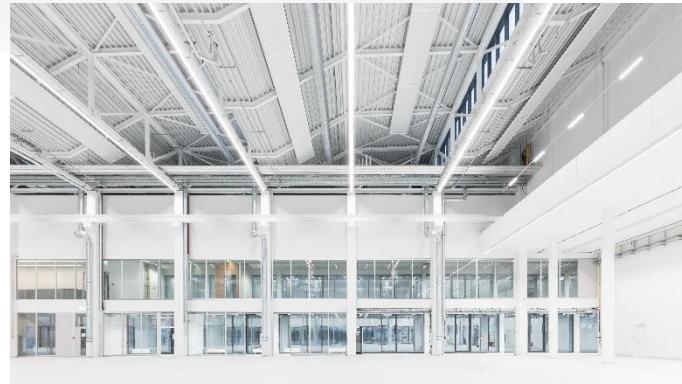
ARENA2036 Building

- Research space of about **10.000 m²**
- Up to **160 fulltime** employees
- 1 year construction time
- Funded with more than € 30 Mio. of state- and EU-Funding (EFRE)
- Build on the campus of the University of Stuttgart
- Cutting edge building technology

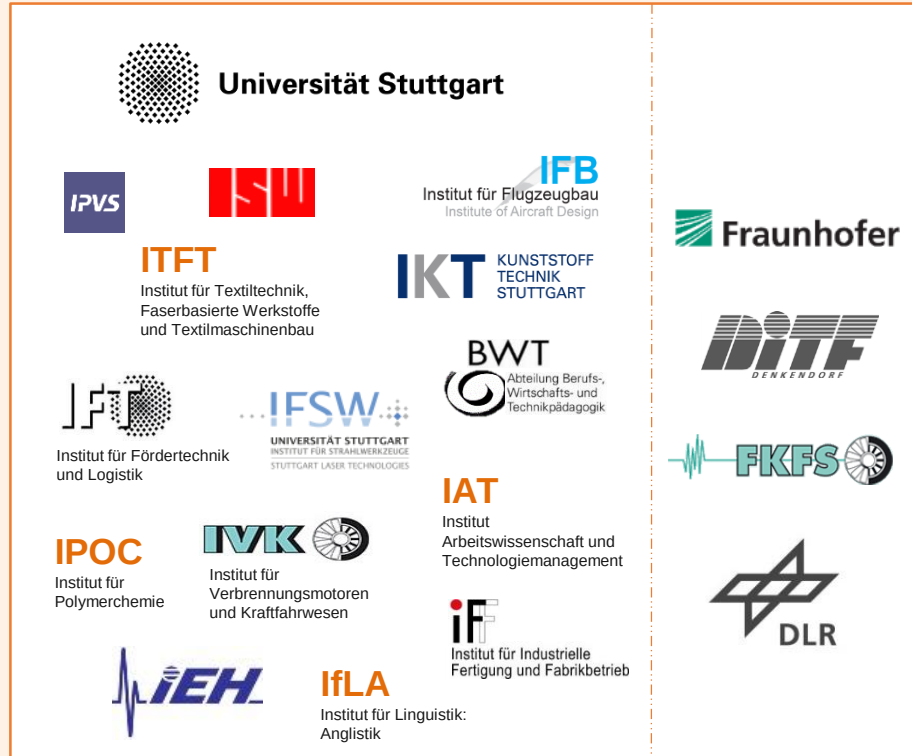


Concepts of cooperation

- Industry and research institutes develop products and production together
- Flexible environment for a hardware-based knowledge work of the future
- Short distances and fast loops for agile development processes
- Interdisciplinary transfer of knowledge for the employees of the future
- Modern, attractive and model-like working environment for the Factory 4.0
- Versatile and adaptable infrastructure



University of Stuttgart and Research Institutes



Industry Partners



In preparation



Sponsors/ Associated Members



LAPP KABEL



TOX PRESSOTECHNIK

2013 PHASE 1

Initiation and Implementation

ARENA2036 building planning and construction



Moving
and
working
in the
new
building

Creating and launching of initial projects

LeiFu

Forsch
Fab

Stimulation of the new basis
projects „agile innovation budget“

DigitPro

Khoch3

Initiation of the new basis projects
for phase 2

Innovation pool and transfer

STARTUP AUTOBAHN
Hackathons
Innovation Pitches
Doctoral study courses
Worker qualification



2018 PHASE 2

Stabilization and Expansion



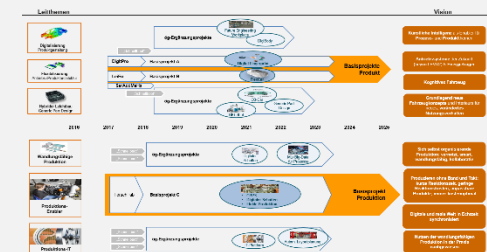
- Working models
- Plant and production engineering



- Working capacity
- Project development

Goal for phase 2:

Start new **projects** with additional
partners on further **topics** regarding
Industry 4.0 in the new **building**.



Mobility2036		Production2036	
Intelligent lightweight construction with functional integration (LeiFu)	Digital production: new materials and processes (DigitPro)	Production of the future (ForschFab)	Creativity, cooperation, transfer of skills (Khoch3)
Materials and Design	Simulation and Digital Prototype	Production and Research Factory	New types of Cooperation

Weight reduction

through functional integration and new materials

New manufacturing methods of lightweight components

Cost reduction

Decrease of logistics and installation costs by reducing the number of parts

Reduction of the simulation time and weight
50% faster simulations and 10% lighter designs through better component optimization

Cost savings

through Computer Aided Manufacturing (CAM): faster development process, fewer scrap parts, prototypes, and development loops

Adaptability of production

Setup of new revolutionary production concepts of the future

Hybrid production concept

Adaptation of lightweight and manufacturing processes on production related requirements

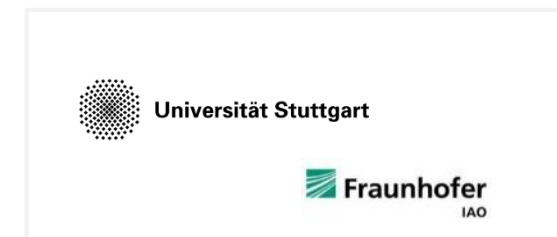
Innovative robots as a agile basic components

Creativity-focused work environment

innovative, interdisciplinary and interinstitutional

cooperation model

innovative approach for the **transfer of skills**



The projects in the value chain are interlinked to increase the learning speed and to reduce research time.

This research area offers an excellent basis for new ideas and projects.

- To reach a quick change in IT and automotive agility and speed is needed
- To be successful, an agile combination of competence profiles is necessary
- In ARENA2036 three innovative project approaches exist



STARTUPAUTOBAHN
powered by **PLUGANDPLAY**

concept

- Startup-Accelerator with a worldwide focus
- New partners: Porsche, HPE, BASF, ZF, Murata
- Co-Working in ARENA2036 for young businesses
- Pilot-projects with mature Startups

Relevance

- Existing topics: Big Data, sensors, KI, Blockchain, VR/AR
- International network
- Implementation of pilot-projects and use cases



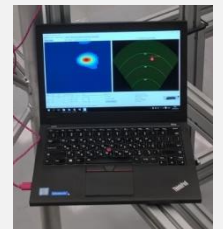
Example Ltd (does a pilot with ARENA2036 partner A)

- **Technology:** own SW+HW-Platform for smart data acquisition, -analysis und -application
- **Application: Big Data** (quick recognition and forecasts of patterns)



Example Ltd (does a pilot with ARENA2036 partner B)

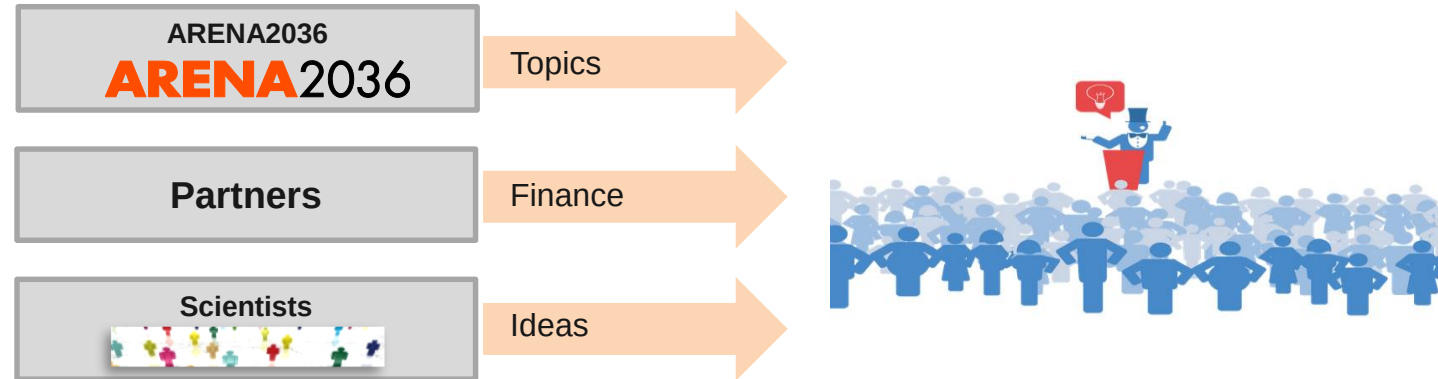
- **Technology:** 3D radar sensors and evaluation for the identification of fabric structure
- **Application:** human beings can be recognized in production facilities (MRK)





Project pitches

- Open platform for researchers
- Promote and bring in new disruptive ideas for the automotive industry
- Start of new projects which fit to ARENA2036 topics
- Presentation of topics in front of the research directors



Hackathons and integration of Developer Communities

- Developer Communities provides a high speed innovation generation
- This advantage is also established in the production sector using production hardware



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The research campus ARENA2036 networks strategic, sustainable and innovative.

Researching together – creating the change!