

# Power Electronics and Sensing for Robotics

Danish-Bavarian Workshop on Robotics

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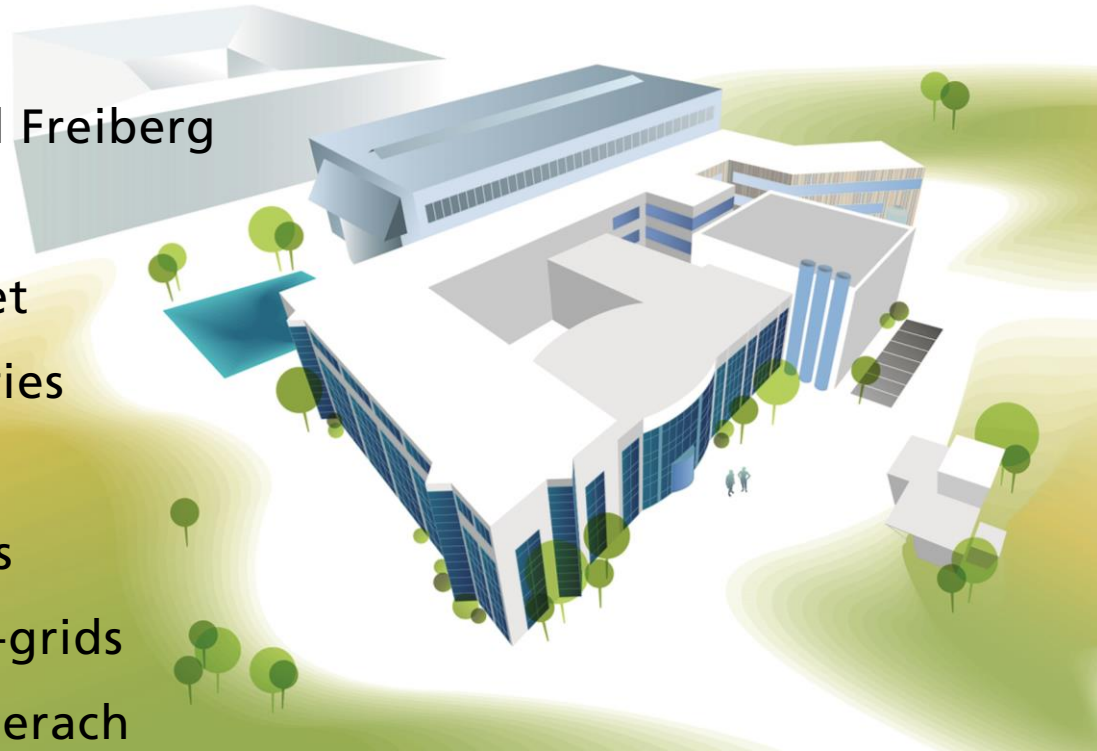
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# Fraunhofer Institute for integrated systems and device technologies (IISB)

Strong cooperation of Fraunhofer IISB and University Erlangen-Nuremberg (FAU)



- Headquarters IISB: Erlangen
- Branch labs in Nuremberg and Freiberg
- Ca. 300 employee
- Ca. 26 Mio. € operating budget
- 6.400 m<sup>2</sup> offices and laboratories
- 1.600 m<sup>2</sup> Cleanroom
- Test centre for electric vehicles
- Application laboratory for DC-grids
- Applied research and basic reserach



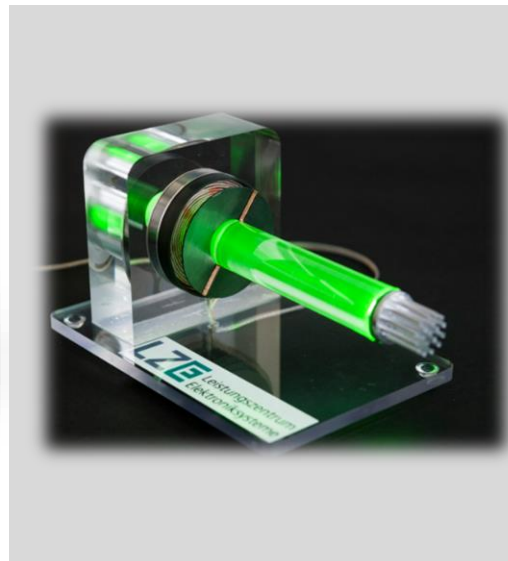


We are an enabler for intelligent ...

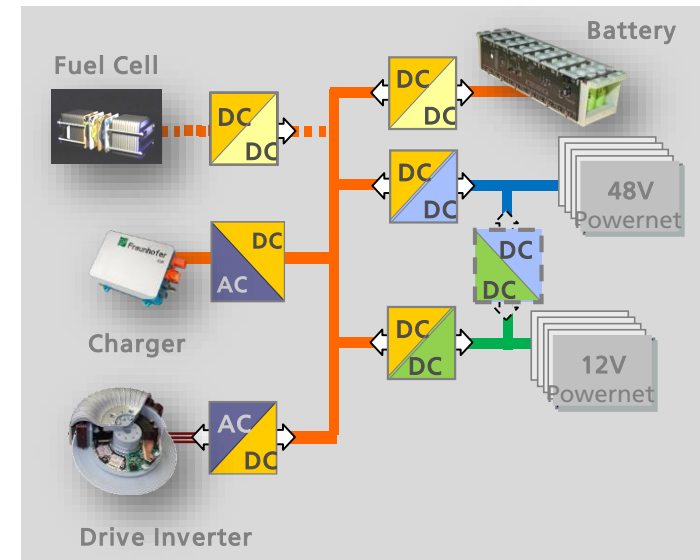
energy storage



energy transfer



and energy distribution



... in mobile or stationary autonomous systems.



## Exemplary robotic application in industry



\*1  
Cable: up to 40kg of weight

„Inductive ball bearing“

Increased ...

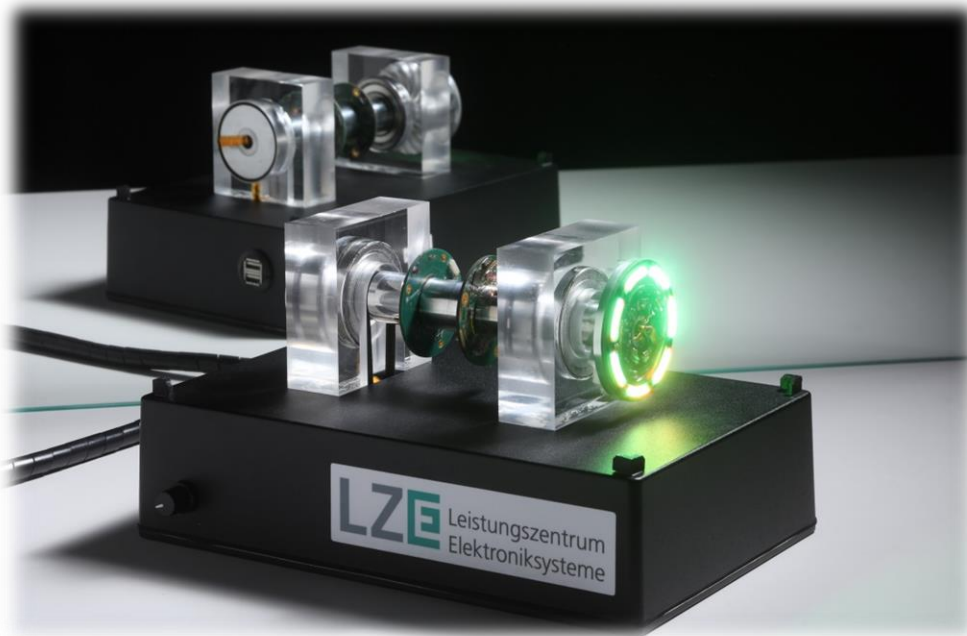
- ✓ range of motion
- ✓ robustness for energy and data transfer
- ✓ resistance against humidity, oil, dirt, ...



- ➔ Improved process times for production due to unrestricted movement and reduced inertia
- ➔ Reduction of required robots for each production line

\*1 <https://www.fanuc.eu>

## Technology demonstrator for inductive ball bearing

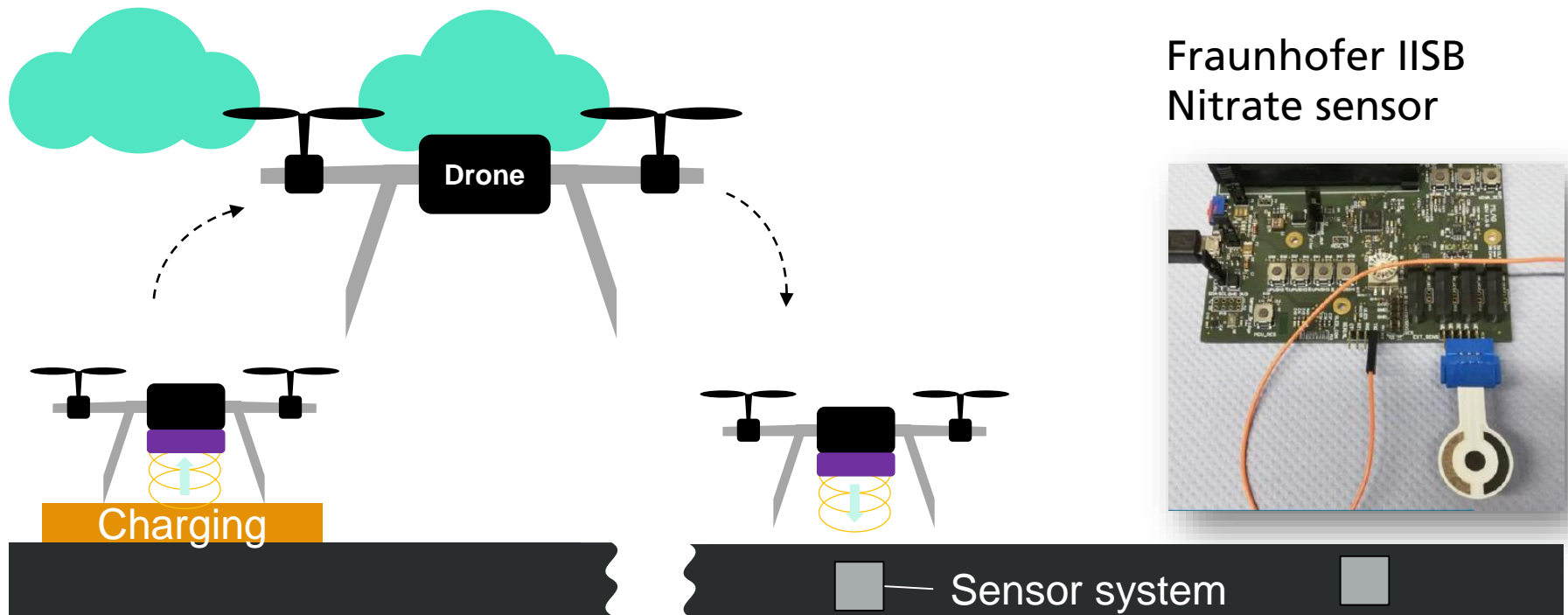


„Inductive ball bearing“

- 100 W transferred power
- Efficiency up to 90 %
- Bidirectional data transfer of 10 Mbit/s
- Increased robustness with wireless technologies

## Robotics for agri-food

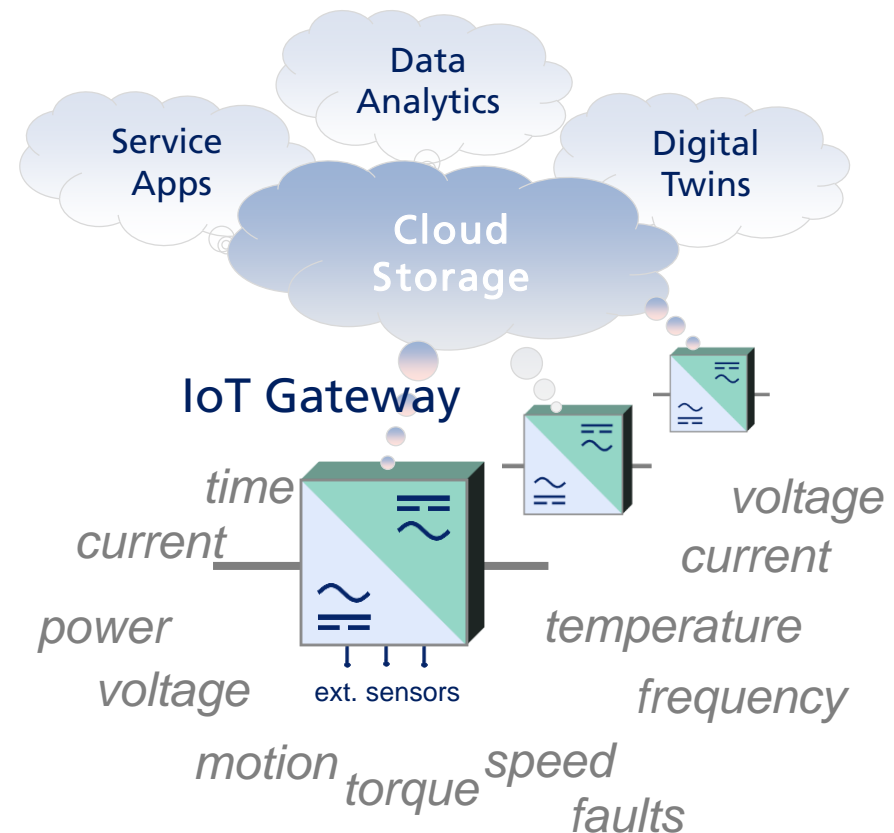
- Farming drone acts as power distributor and data collector for single sensors and sensor networks
- **Goal:** needs-based fertilization to reduce fertilizers, reduce costs and protect the environment



## Cognitive Power Electronics for Cognitive Mechatronic Systems

### Power electronics as “ubiquitously” sensor platform

- Continuous measurement of electrical parameters
- Secure data transfer
- Energy distribution and gateway for additional application specific sensors





## What project partners we are looking for?

- Robotic/mechatronic system developer and manufacturer
- Sensor and sensor system developer and manufacturer
- Companies specialized in
  - Data transfer
  - Data analytics
  - Highly automated production
  - Smart farming

# Thank you for your attention



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