Integrated Sensing: Intelligent wireless measurement technology – smaller than a 1€ coin

Martin-Christopher Noll, i4M technologies GmbH Innovation Forum for Smart Sensing Systems, Aachen, 17.11.2022



Intelligent wireless measurement technology - smaller than a 1€ coin



- Mission: Gain meaningful data in challenging applications
- Specialized in wireless sensor systems for machines, vehicles and infrastructure
- Combining knowledge of mechanical systems, data analysis and advanced measurement technology
- Founded 2016 as spin-off from two institutes of RWTH Aachen University
- Team of 9 electrical & mechanical engineers
- Serving a wide variety of industries, from roller coasters to wind turbines





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- Case Study: Realization of a "sensing grinding spindle"
- Objective: Optimization of grinding process by compensation of spindle displacements
- Data needed: Forces / strains, turning angle, vibrations
- Challenges:
 - Tiny space,
 - Encapsulated position,
 - Process-compatible, fast energy transmission,
 - Elevated temperatures > 80 °C,
 - EMI by additional spark erosion process
- Okay, so let's build a robust strain-gage telemetry with additional MEMS sensors and fast rechargeable battery on a space smaller than a 1€ Coin!





intelligence for mechanical systems

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• Let's sum it up:

Component	Size	Area
Telemetry-Board	28.0 x 7.5 mm	210 mm²
Power-Management-Board	16.4 x 7.5 mm	123 mm²
Charging-Contacts	18.0 x 5.0 mm	90 mm ²
Sum		423 mm ²
Li-Ion Battery	20.0 x 4.7 mm	94 mm²





- Diameter: 23.25 mm Area: **424.6 mm²**
- Check
- Thank you for your attention, questions are welcome!

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