Forschungsfabrik Mikroelektronik Deutschland

Indoor-Lokalisierungstechnologien: Überblick und Anwendungsbeispiele aus dem Umfeld von Industrie 4.0

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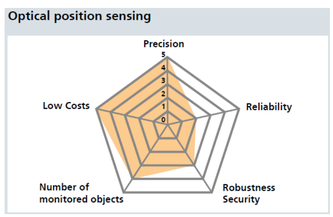
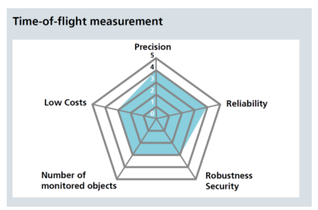
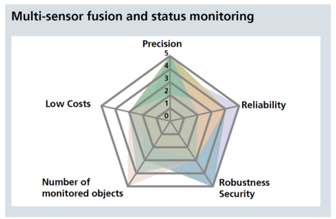
Comparison of different real-time Indoor-localization technologies

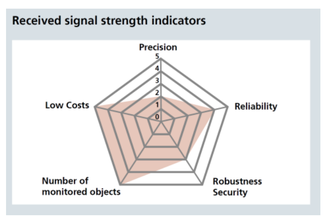
Technical Requirements

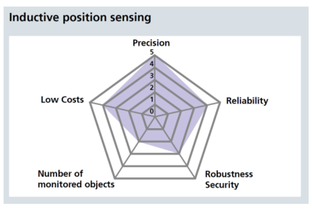
- **Precision**, dynamic update rate
- **Reliability**
- **Robustness and Security**
- **Number of monitored objects**, range
- **Low Costs**
- Form factor/weight of transmitter/receiver

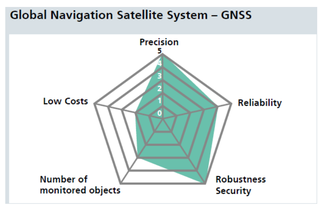






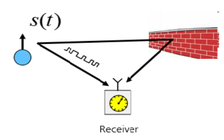


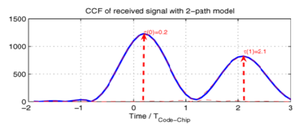




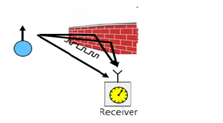
Technological Challenges with Multiple Paths

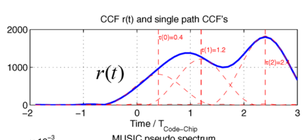
Superposition of signals from multiple paths



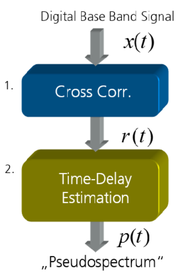


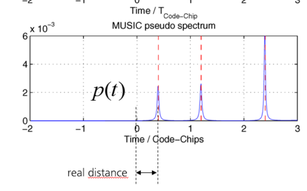
More pronounced effect for narrow band signals, thus Ultra Wide Band prefered





For high resolution use cross-correlation method to generate pseudo-spectrum





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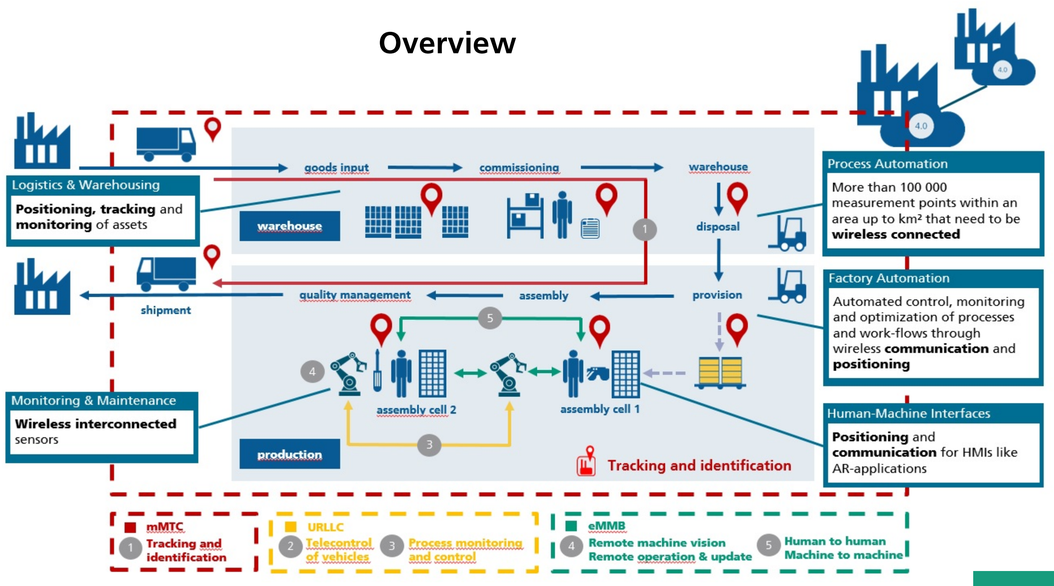
Use Case Scenario Industrie 4.0

Overview



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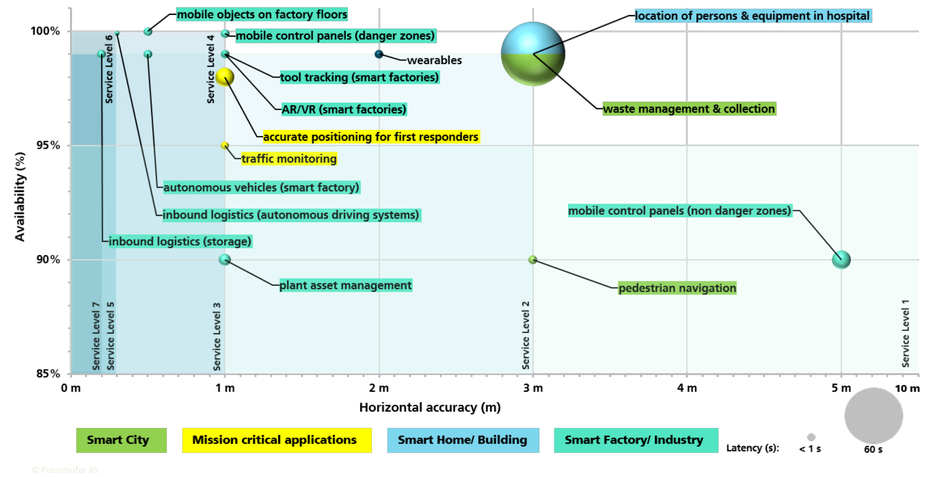
Requirements on accuracy and availability



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Added Value

- Reduced search times
- Cost reduction
- Error prevention
- Improved transparency and efficiency of industrial processes
- Controlling material flow and processes

Real-Time Indoor-Localization Systems

TOF

- RedFIR® based on ultrawideband radio
- WiSmIt (Wireless Smart Items) 2.4 GHz, range 30m

Signal Strength

- awiloc® algorithm using existing networks

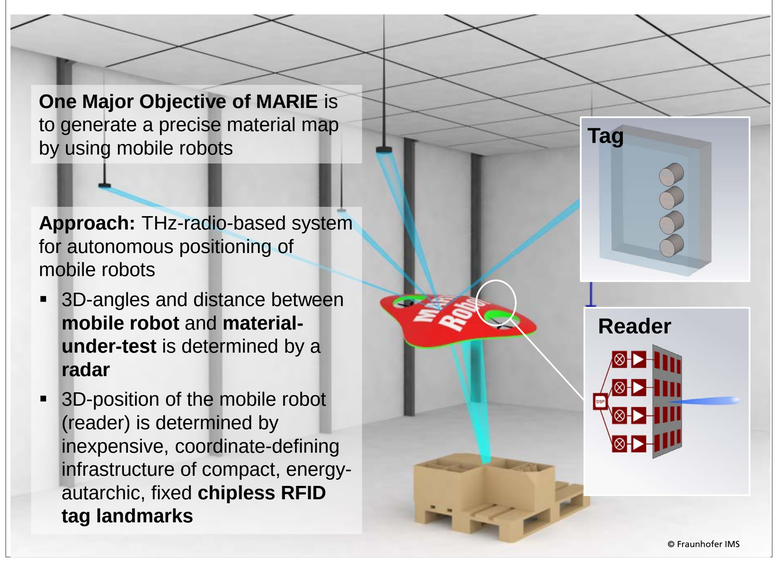
Inductive Positioning for smart shelving, picking, tool tracking etc.

- Using tools in the right spot and with the correct orientation
- Combination of real-time position data and status classification
- Resistant to interference

GNSS

- 5G Testbed for Indoor-Use
- S-net® algorithm using existing networks

THz-based Localization System Project MARIE



Test- and Application Center L.I.N.K.

- Locating, Identification & Navigation
- Communication Systems and Services

Characteristics:

- 1400 m² indoor hall & lab space
- 10.000 m² outdoor area & track
- Loading gates, staging area, truck transit
- Production & storage equipment

MikroSystemTechnik KONGRESS 2019

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