“Industrial Small Cells” Project Idea

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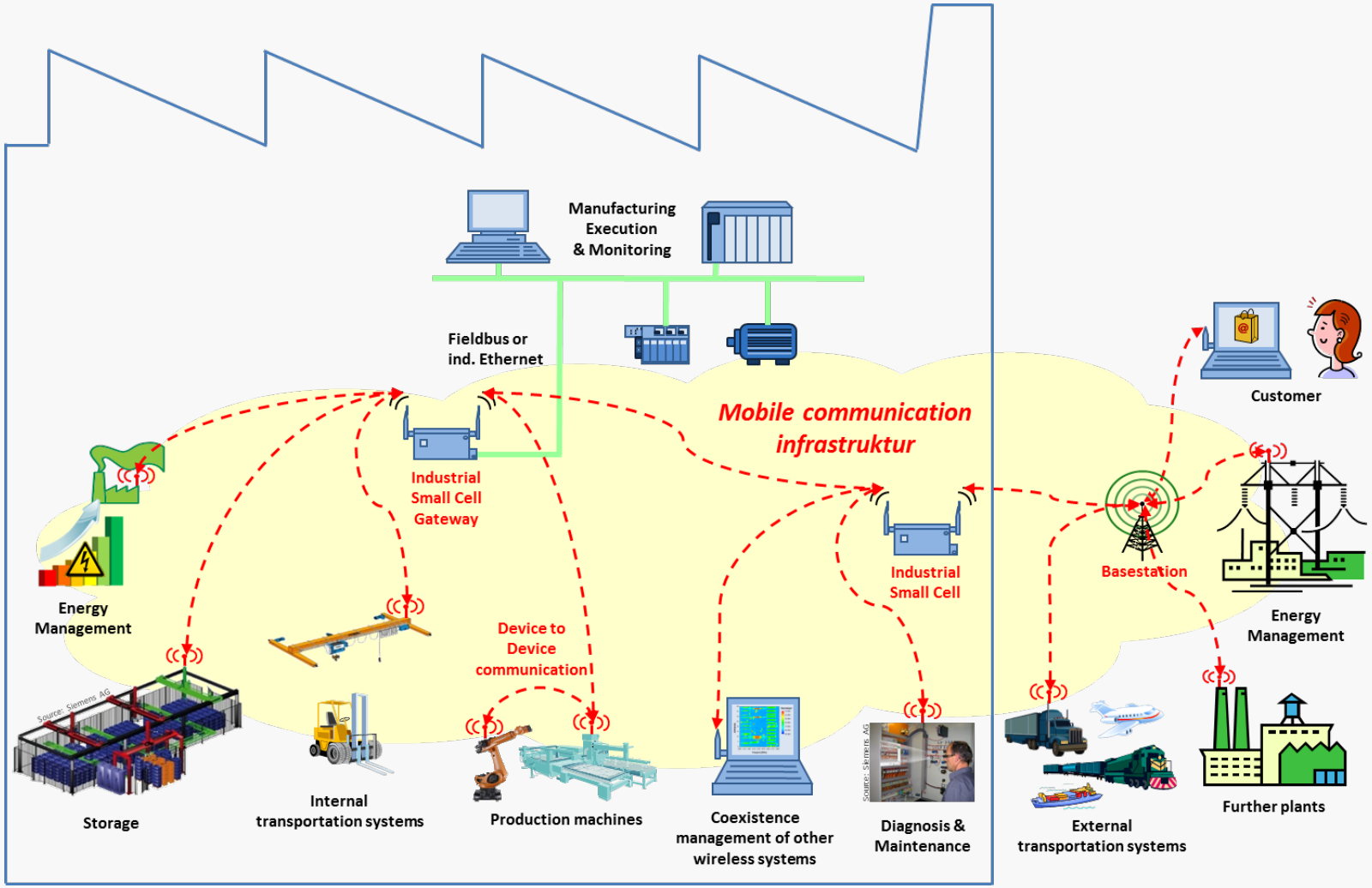
Motivation

- Today wireless industrial automation applications use short range device technologies mostly operating in ISM bands.
- These frequency bands are heavily utilised.
- It is expected that the situation worsens with future manufacturing concepts such as "Industrie 4.0".
- Furthermore, new regulations endanger real-time and deterministic behaviour of industrial wireless applications.
- Thus, there is the danger that such manufacturing concepts fail because of a missing adequate wireless communication infrastructure.
- The success depends essentially from a constructive cooperation between industrial automation and mobile communication.

Industrial Small Cells
Use Case



High Level Objectives

- Support of new application fields for mobile communication systems
- Design of mobile communication infrastructure concepts dedicated to the needs of future industrial automation application profiles
- Creating confidence in wireless communication for industrial applications with critical requirements and conditions
- Identification of requirements for future mobile communication technologies (5G)
- Development of new business models

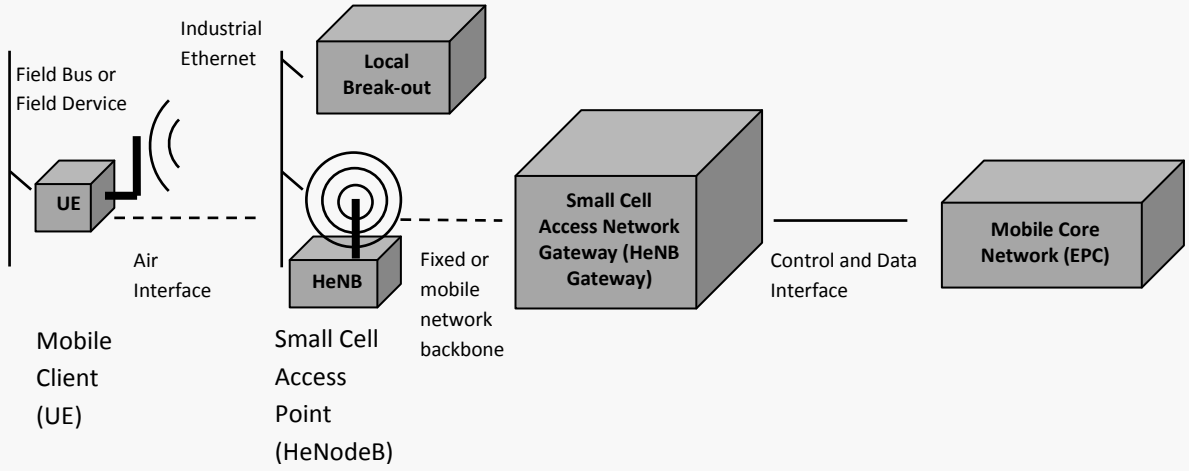
Technical Objectives

- Investigation and classification of small cell functionalities with respect to the requirements of industrial automation communication requirements
- Practical performance investigation of different small cell infrastructures and functional ranges
- Assessment with respect to the application profiles
- Consideration of life cycle aspects of communication products and systems with respect to digital factory (planning, design, commissioning, diagnosis, etc.)
- Development of concepts for the integration of small cell functionalities into automation systems and devices
- Investigation within a real industrial pilot
- Co-existence with other systems

Industrial Small Cells
Challenges and Architecture

- Mobile communication concepts that are suitable for the global market of the machine and plant construction
  - technical,
  - organisational and
  - financial requirements of industrial automation
- Global networking of locally managed Small Cells with direct access for users
- Enabler of IP(v6)

- Deterministic and reliable communication behaviour
- Application centric prioritisation and scaling of communication
- Security, safety and availability aspects
- Scalability: number of networked devices (controlled systems, UEs, …)
- “Plug and play”
- Partitioning of “real-time” and “non real-time” transmission resources in LTE



Industrial Pilot

- Pilot from Steel Industry is under consideration to be used for installation and approval of concept and technology

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Partners & Expertise

- Partners already involved
  - Germany
    - BVB Innovate (SME) + Urbato (SME), Engineering / Project Management Rollout Industrial Small Cell Demonstrator, Project Management
    - Nash Technologies (IND), Telecommunications, Small Cell Software
    - ifak e.V. (RES), wired and wireless automation, system design, system test
    - BFI (RES), applied research for process industry
    - ThyssenKrupp (IND), requirements, industrial pilot, validation → decision pending
    - …
  - France
    - Gemalto (IND), → decision pending
  - ….

Partners & Expertise

- Missing partners / expertise
  - Consortia from other European countries consisting of partners representing relevant roles including
    - End user
    - Machine manufacturer
    - Automation device / system manufacturer
    - Small cell device / system manufacturer
    - Mobile communication provider
    - Engineering tool developer
    - Standardization contributors
    - Related research organizations

Industrial Small Cells
Contact

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