5G for smart manufacturing: Latest status on the trials

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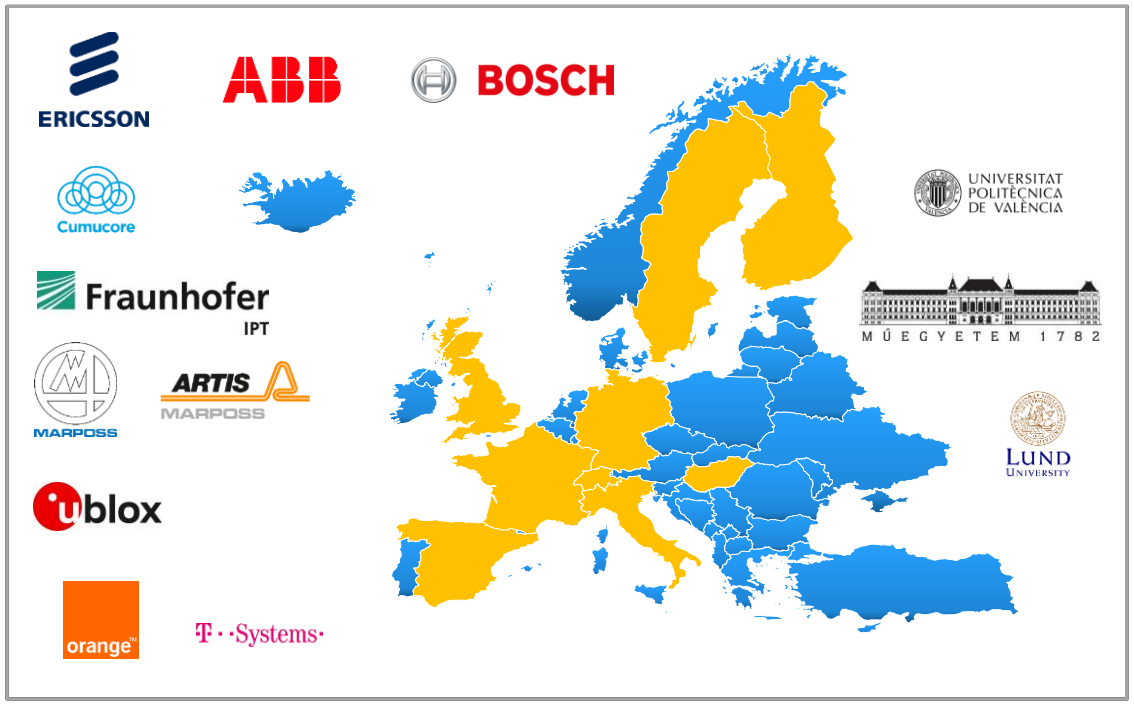
5G-SMART project facts

EU H2020 project within ICT-19 call: “Advanced 5G validation trials across multiple vertical industries”

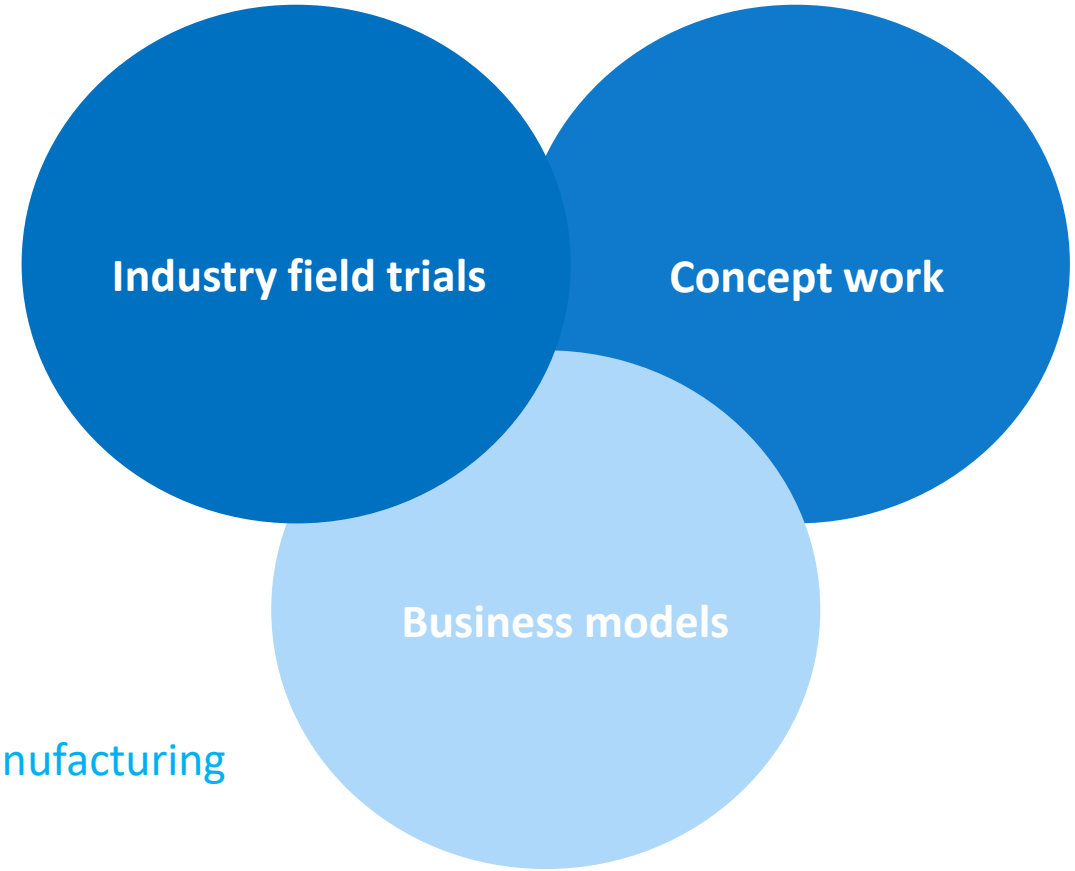
- Coordination:
  - Project coordinator: Ericsson
  - Technical coordinator: ABB
- Consortium:
  - Information and communications technology: 39%
  - Operational technology: 47%
  - Academia: 14%
- Duration:
  - Duration: June ’19 – November ’21



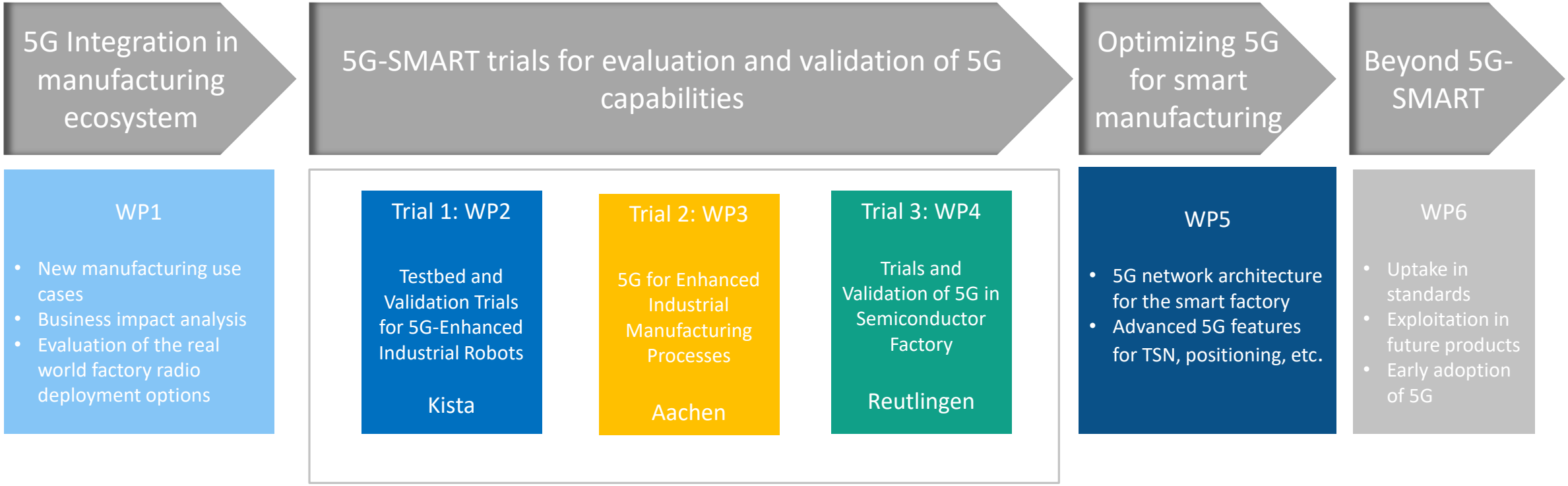
5G-SMART objectives

- **Industry field trials:**
  - Demonstrate, evaluate and validate 5G-systems in industry field trials for smart manufacturing
- **Business models:**
  - Identify viable business models for smart manufacturing
- **Concept work:**
  - Develop new 5G technology features, 5G radio deployment and network architecture options

5G smart will show how 5G can boost smart manufacturing

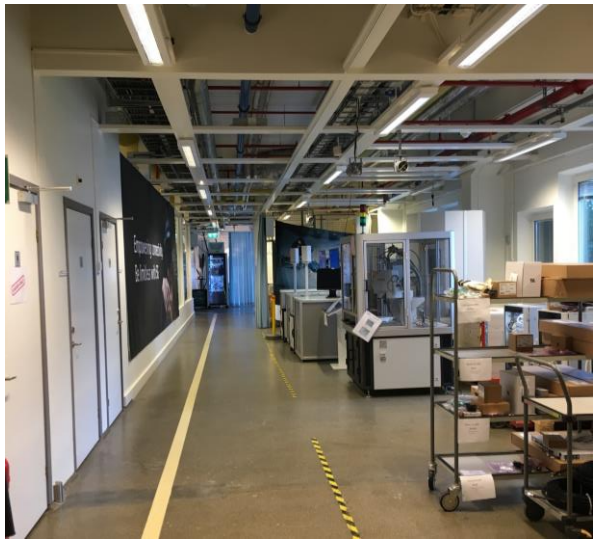


Project structure



5G Trial sites overview

Ericsson smart factory
Kista, Sweden



Fraunhofer IPT shopfloor
Aachen, Germany

Bosch semiconductor factory
Reutlingen, Germany

5G Trial sites overview

Ericsson smart factory Kista, Sweden

- Test area of approx 50 m^2 close the production line in the Ericsson smart factory
- 5G non-standalone
- NR highband 28 GHz
- LTE midband 1.8 GHz

Fraunhofer IPT shopfloor Aachen, Germany

- Indoor (2600 m^2) and outdoor area in close relation with the Industry Campus Europe
- 5G non-standalone (5G standalone planned for ’21)
- NR midband 3.7-3.8 GHz
- LTE midband 2.3 GHz

Bosch semiconductor factory Reutlingen, Germany

- Approx 8000 m^2 cleanroom factory floor
- 24/7 - operation
- 5G standalone
- NR midband 3.7-3.8 GHz

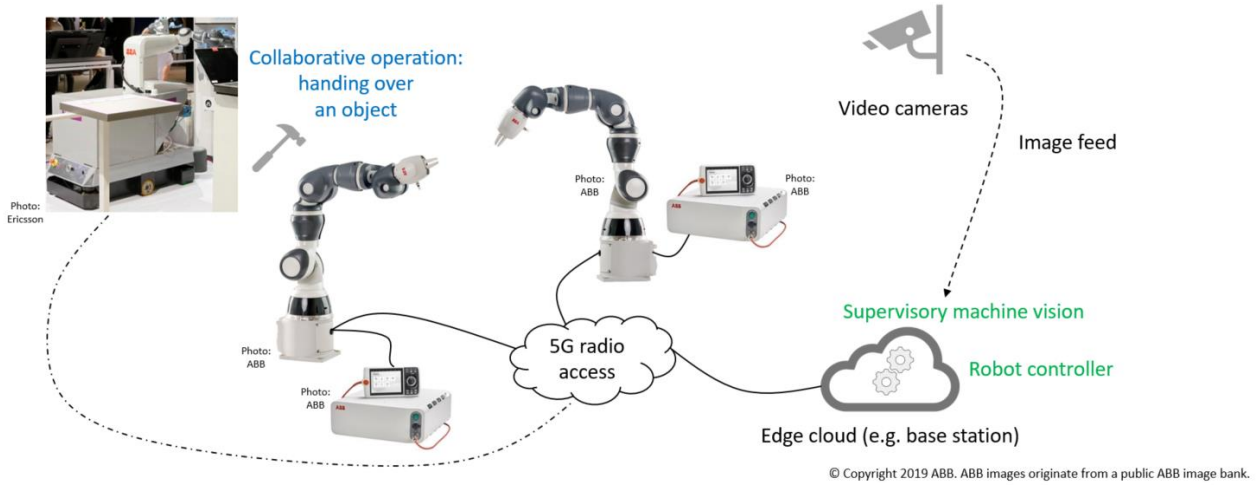
Ericsson smart factory

USE CASES

- 5G-connected robots and remotely supported collaboration of connected robots
- Machine vision assisted real-time human robot interaction over 5G
- 5G-aided visualization of the factory floor

CHALLENGE

- Seamless operation with major control functionalities being moved to the edge cloud:
  - Motion planning, robot localization, map building, human localization, AR processing



LATEST STATUS

- 5G deployment finalized. ✓
- Use case development ongoing.

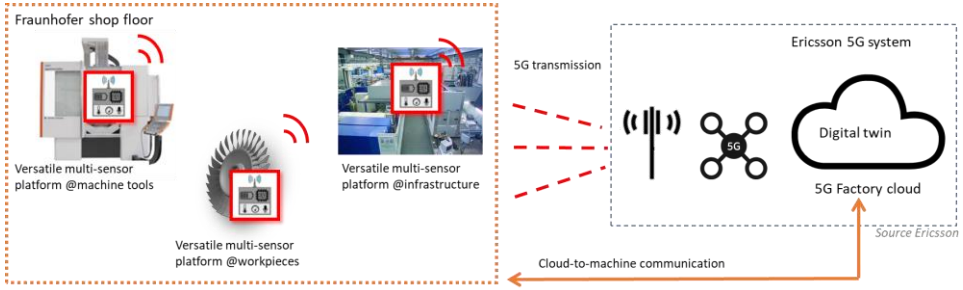
Fraunhofer IPT shopfloor

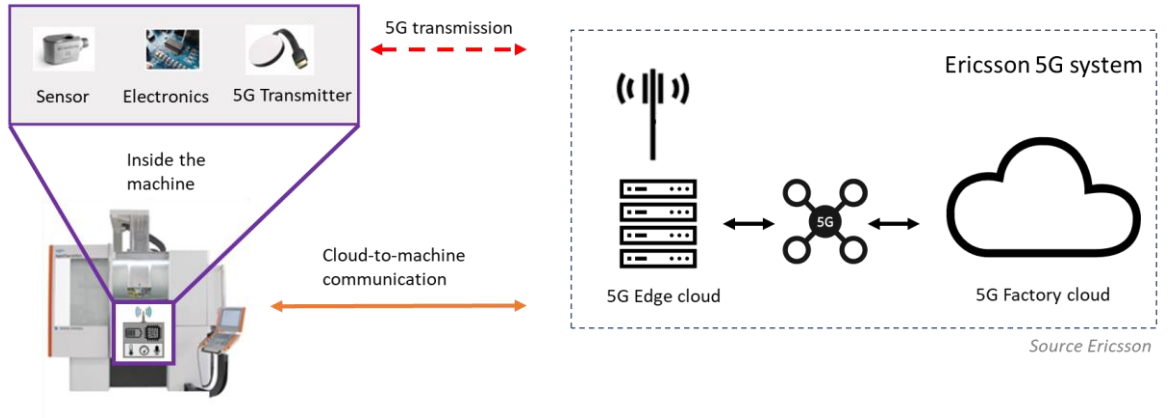
USE CASES

- 5G for wireless workpiece monitoring, Acoustic Emission Monitoring
- 5G versatile multi-sensor platform for digital twin

CHALLENGE

- The signal processing will be performed on an edge gateway or by cloud computing.





LATEST STATUS

- 5G Deployement finalized. ✓
- Use case development on site ongoing.
- First demo ready. ✓
- Evaluation/validation ongoing.

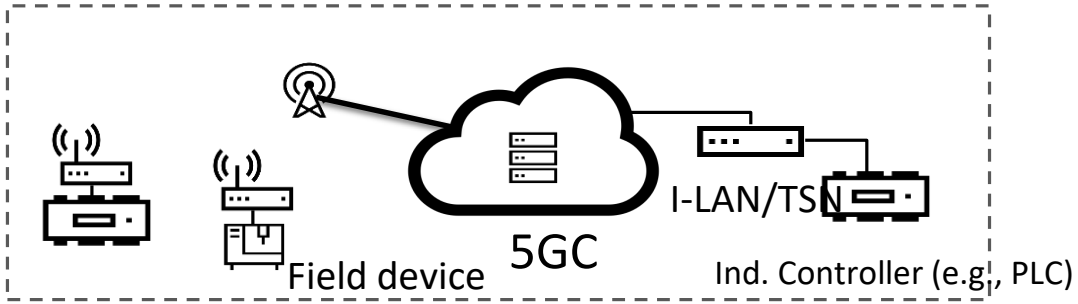
Bosch semiconductor factory

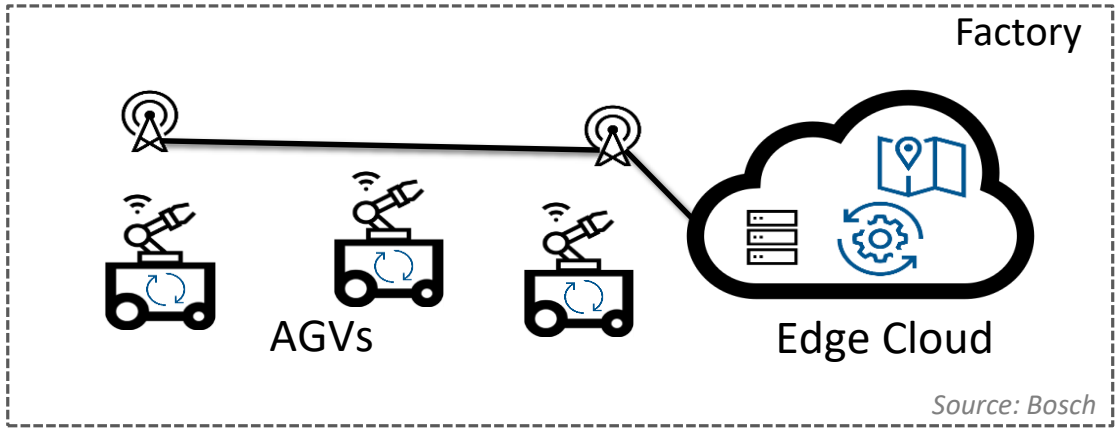
USE CASES

- Cloud-based mobile robotics
- TSN/Industrial LAN over 5G

CHALLENGES

- Reliable, low-latency communication between centralized intelligence and local intelligence and I/O devices, strict QoS guarantees, time-synchronization between domains





LATEST STATUS

- 5G Deployment finalized. ✓
- Use case development ongoing off-site.

Bosch semiconductor factory

- MEASUREMENT CAMPAIGN
  - Channel measurements and modeling in a semiconductor factory @ 3.7 GHz and 26 GHz
  - Electromagnetic compatibility (EMC) test on very sensitive semiconductor and sensor production equipment
- CHALLENGES
  - Operational factory environment with very strict requirements like safety and clean-room certification.

LATEST STATUS

- Channel measurement campaign finalized. ✓
- EMC tests finalized. ✓
- Evaluation ongoing.

Summary and outlook

- All 5G-SMART trial sites are now operational.
- Use case development ongoing for all sites.
- Evaluation and validation planned during 2021 with final results ready in Q4 2021.

Thank you for listening!

Thank you

5G-SMART Grant Agreement No. 857008

”The 5G-SMART project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 857008”

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