Oulu TestBed Assets & 5G VIIMA

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Nokia / University of Oulu
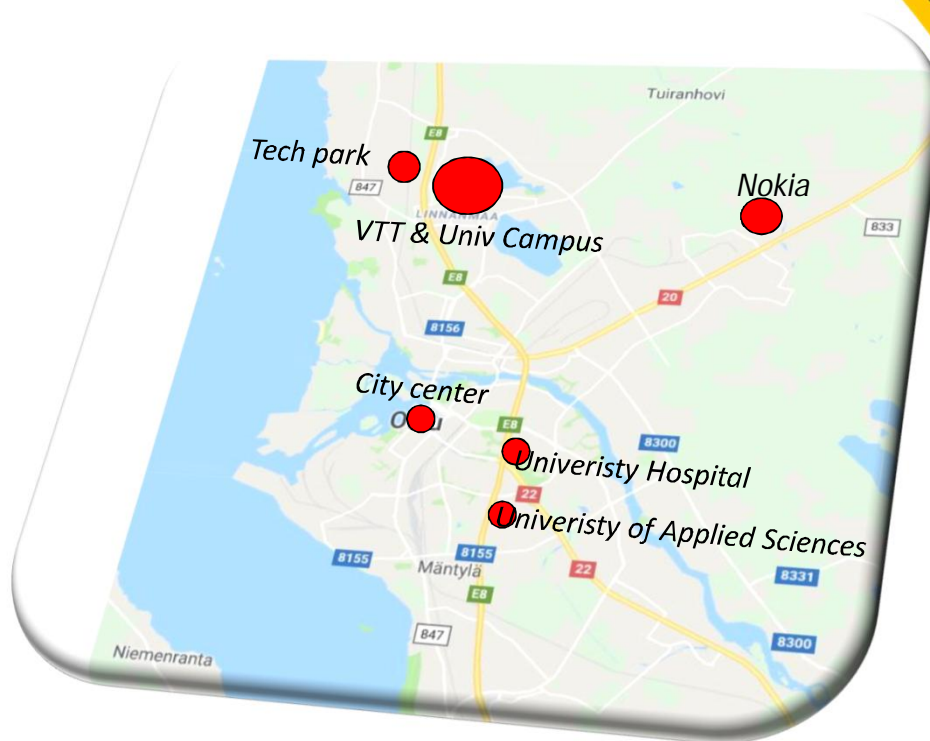
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Oulu 5G activities

5G development in Nokia Oulu campus, in collaboration with Oulu University & VTT, ICT companies in Oulu region and business verticals

§ 5G commercially launched

§ 5G manufacturing in Oulu

§ Open test and experimentation networks up and running.

§ Oulu University Hospital
§ Oulu University campus
§ VTT campus
§ Vertical deployments

Real 5G up and running

5GTN

Radio coverage in the urban area

5GNR (<6GHz) NSA integrated

800MHz @26/28GHz 10Gbps

NB-IoT/LTE-M1 opened

WiFi, BLE, LoRa

5GNR

Hybrid Beamformer

LTE small cells

Own SIM

www.5gtn.fi
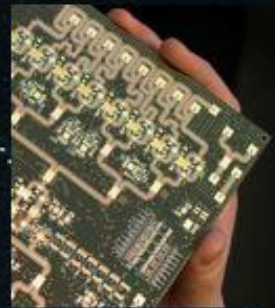
5G TestNetwork - Co-creation Platform

Wireless Connectivity
Numerous frequency bands & unlicenced wireless access

Testing Devices & Solutions
Diverse sensor network and virtualized functions

Devices and Experts
Test session support. Device loan

5GTN Community
Technical updates and news, ecosystem cooperation

Vertical use cases
Care, eHealth, Conscious Factory, 5G Media, Self-driving car, Energy

700 MHz

2.1 GHz

2.3 GHz

2.6 GHz

3.5 GHz

26 … 28 GHz

NVR @ xx GHz ….THz

5G TEST NETWORK
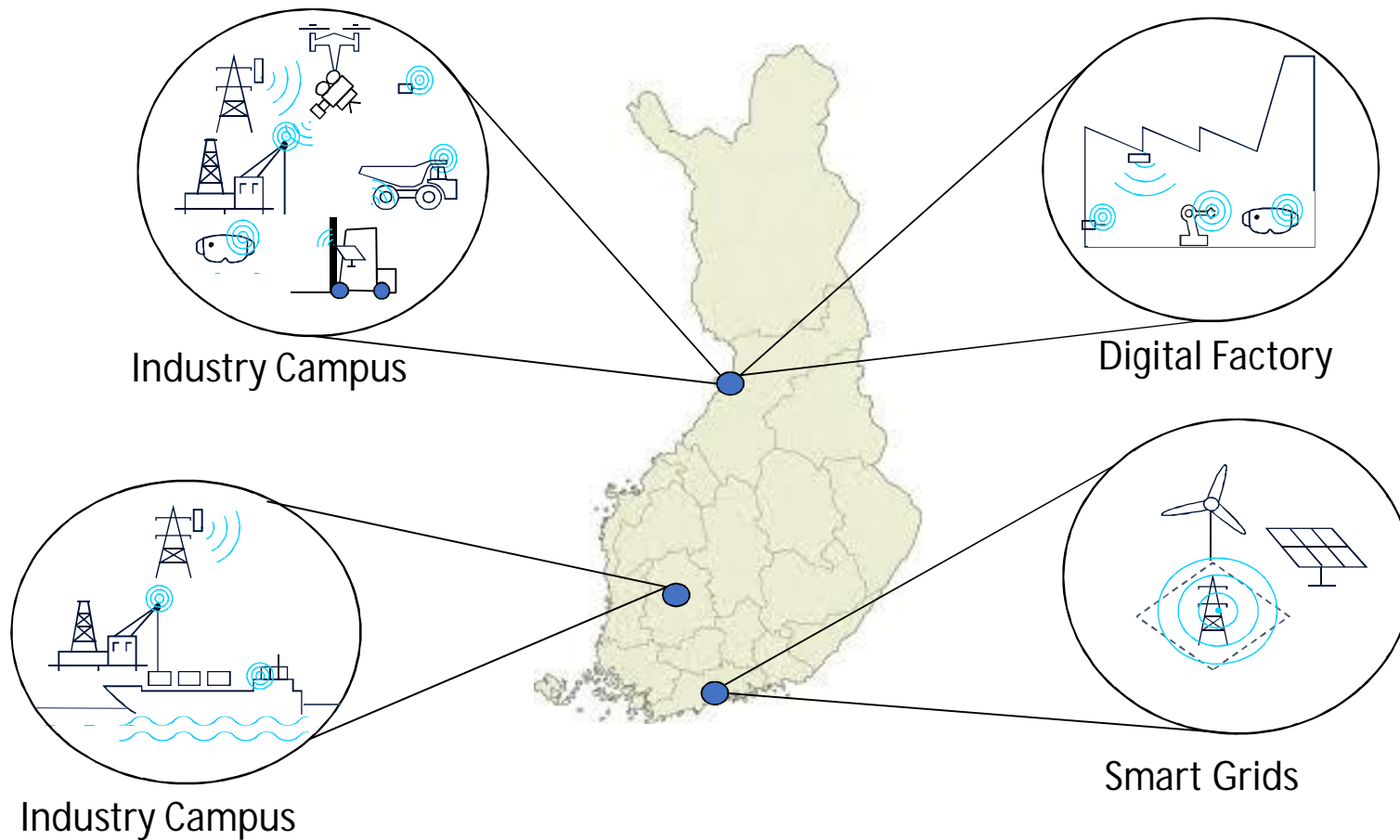
5G TN

DISCOVERIES FOR TOMORROW

5GTN | LTE | IoT | 5G PoC | 5G NR | 5G+

5G VIIMA – 5G Vertical Integrated Industry for Massive Automation

Four locations for 5G Industry Research and Experiments

Industry Campus

Industry Campus

Digital Factory

Smart Grids

5G VIIMA:
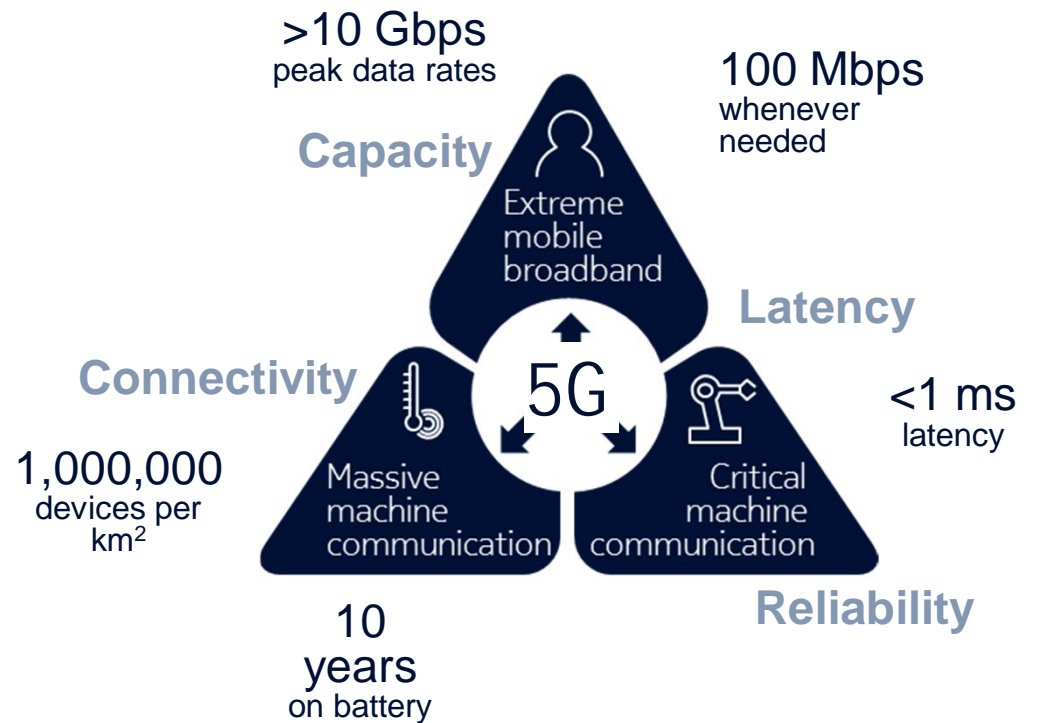- 7 academic
- 22 industry
- 3 other parties
13 industry projects

Total Volume 16M€
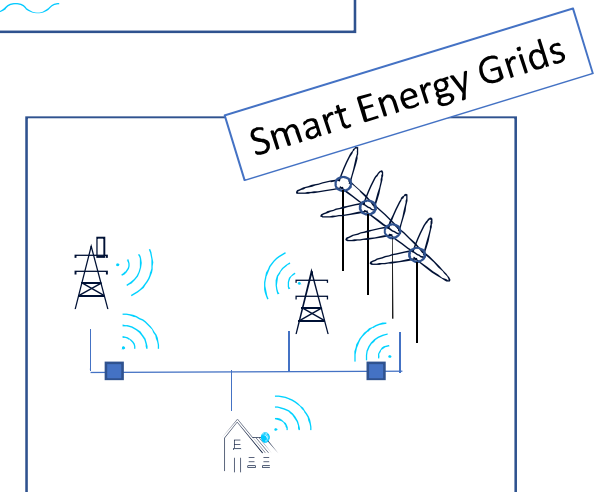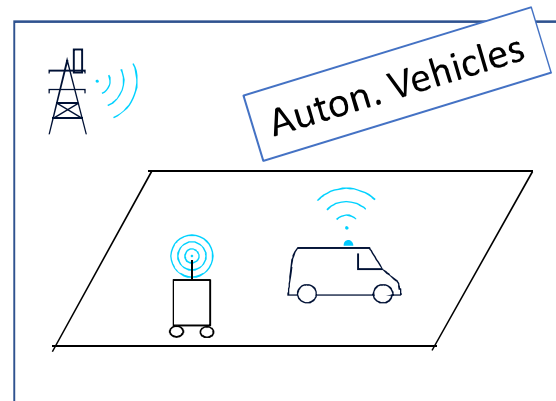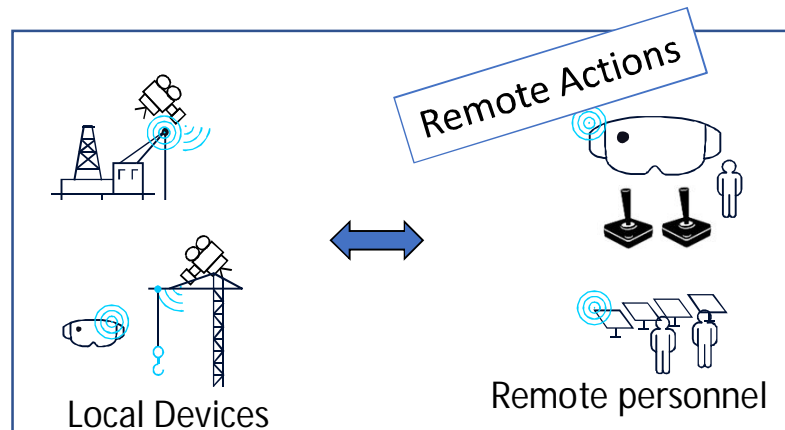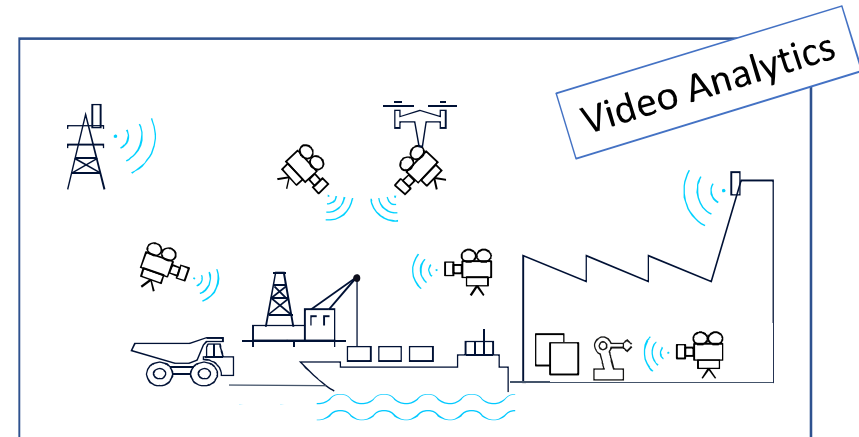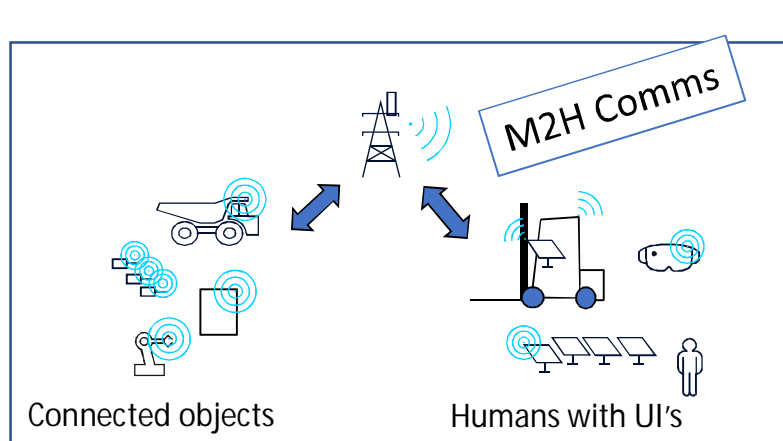- Industry 10M€
- Academy 6M€

Funded by
Business Finland

Push for Critical 5G Network Technology Enablers...

- Live 5G & 4G - Interaction between local and wide-area network
- 5G-Modems integrated to machines
- edge cloud for service creation
- Network reliability to fulfil industry requirements (URLLC)
- Guaranteed quality per network user and/or service with slicing
- Accurate (<1m) indoor and outdoor positioning

>10 Gbps
peak data rates

100 Mbps
whenever needed

Capacity

Extreme mobile broadband

Latency

<1 ms
latency

Connectivity

5G

Reliability

1,000,000
devices per km^2

Massive machine communication

Critical machine communication

10 years
on battery

...Together With Relevant Industry Assets

M2H Comms

Connected objects

Humans with UI's

Video Analytics

Remote Actions

Local Devices

Remote personnel

Auton. Vehicles

Smart Energy Grids

To Solve Critical Harbour Services

- Location tracking of moving vehicles
- Navigation for visiting trucks
- Weather condition information with sensors and/or cameras
- Cargo identification and tracking
- Cranes collecting cargo data using camera and/or sensors
- Warning solution for moving vehicles
- Autonomous drones and maintenance vehicles
- Remote control of cargo handling equipment
- Remote control of work machines with AV excellence

Piloting 5G Promises in a Factory

- Gathering and identifying process data from real-time video streams
- Wireless sensing in industrial environment
- Secure and Industry-relevant solution with edge processing
- Remote management with haptic response
- Asset tracking utilizing high accuracy indoor positioning
- Virtualization of physical resources
- Smart assets
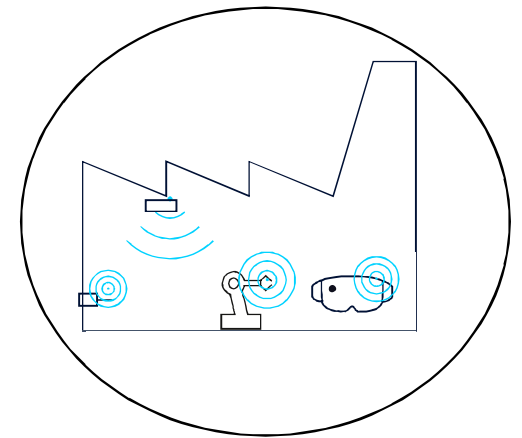
And to Address Challenges of the Future Electric Power System
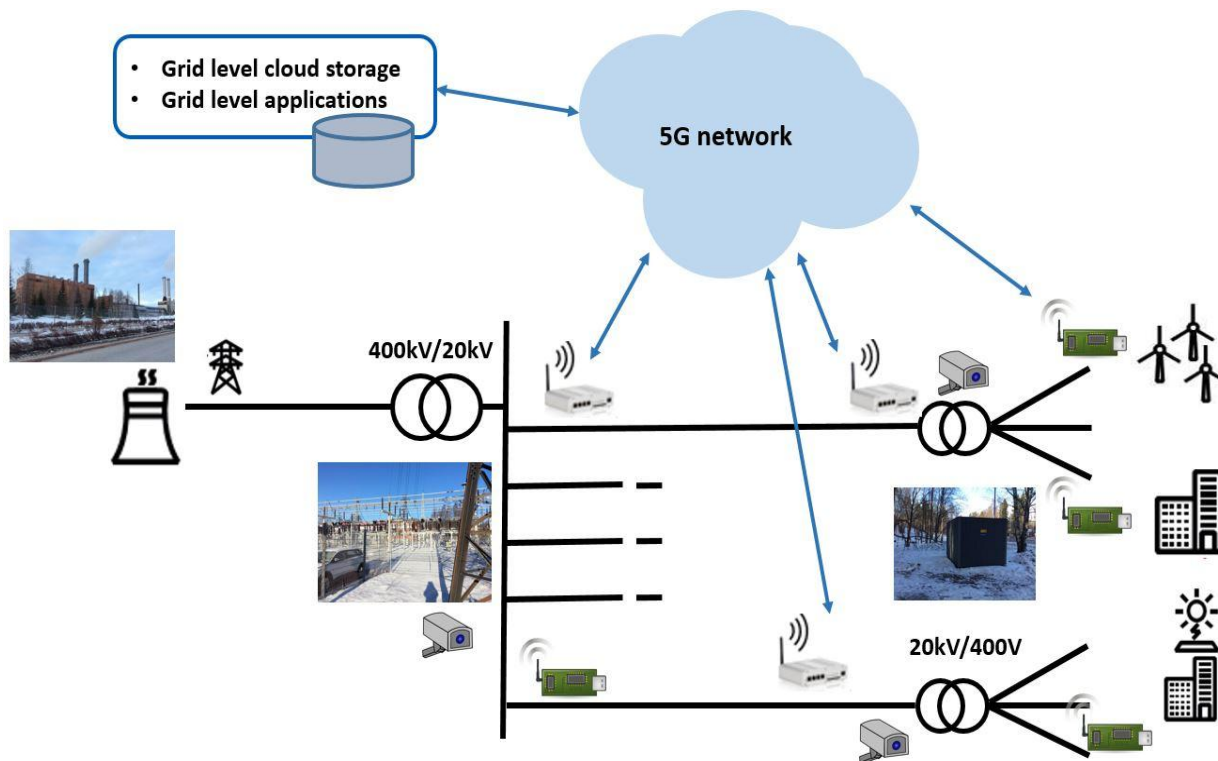
- Protected 5G solution
- Multipoint measurements for reliability and availability
- Security components
- AI data processing and fault location components
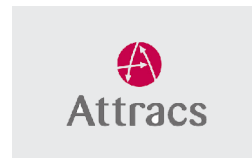
Stay Tuned for VIIMA News