

Palvelurobotiikka teollisuudessa ja sen infrastruktuuri

Green ICT Keski-Suomi: Robotiikan rooli
kestävässä liiketoiminnassa 3.3.2023

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Telia



Tänään aiheina

- Projektin tausta & palvelurobotiikka yleisesti
- Telian esimerkkiprojektit – Taika & Frans
- Privaattiverkot ja robottien infra
- Kysymykset & Vastaukset



Projektin tausta & palvelurobotiikka yleisesti



MULTI-PURPOSE ROBOTICS?

Multi-purpose service robotics as operator business" (MURO) project studies new technologies and multi-purpose robot enabled services and business models. The scope of the project is on autonomous, mobile service robots that are used indoors or outdoors e.g. in last mile deliveries, maintenance, surveillance and customer service.

According to MURO vision, heterogeneous multi-purpose service robot fleets are in shared use among stakeholders operating in same building and customers purchase MURO aided services from MURO operators. As a result of the project, MURO companies create a common total offering combining new kinds of multi-purpose robots, related software solutions and services for international markets. Multiple new technological innovations will be created as a result of robot and software R&D.

MURO project is conducted in cooperation with the following companies: Avertas Robotics, GIM Robotics, K.Hartwall, KONE, Navitec Systems, Nokia, Solteq, Telia, Trombia Technologies and VTT.

MURO project is a two-year project (2021-2023). Total budget of the Business Finland funded co-innovation project is app. 4.9M€.

Funded by
**BUSINESS
FINLAND**

avertas
robotics

Dimalog



K.HARTWALL
Logistics Efficiency through Innovation



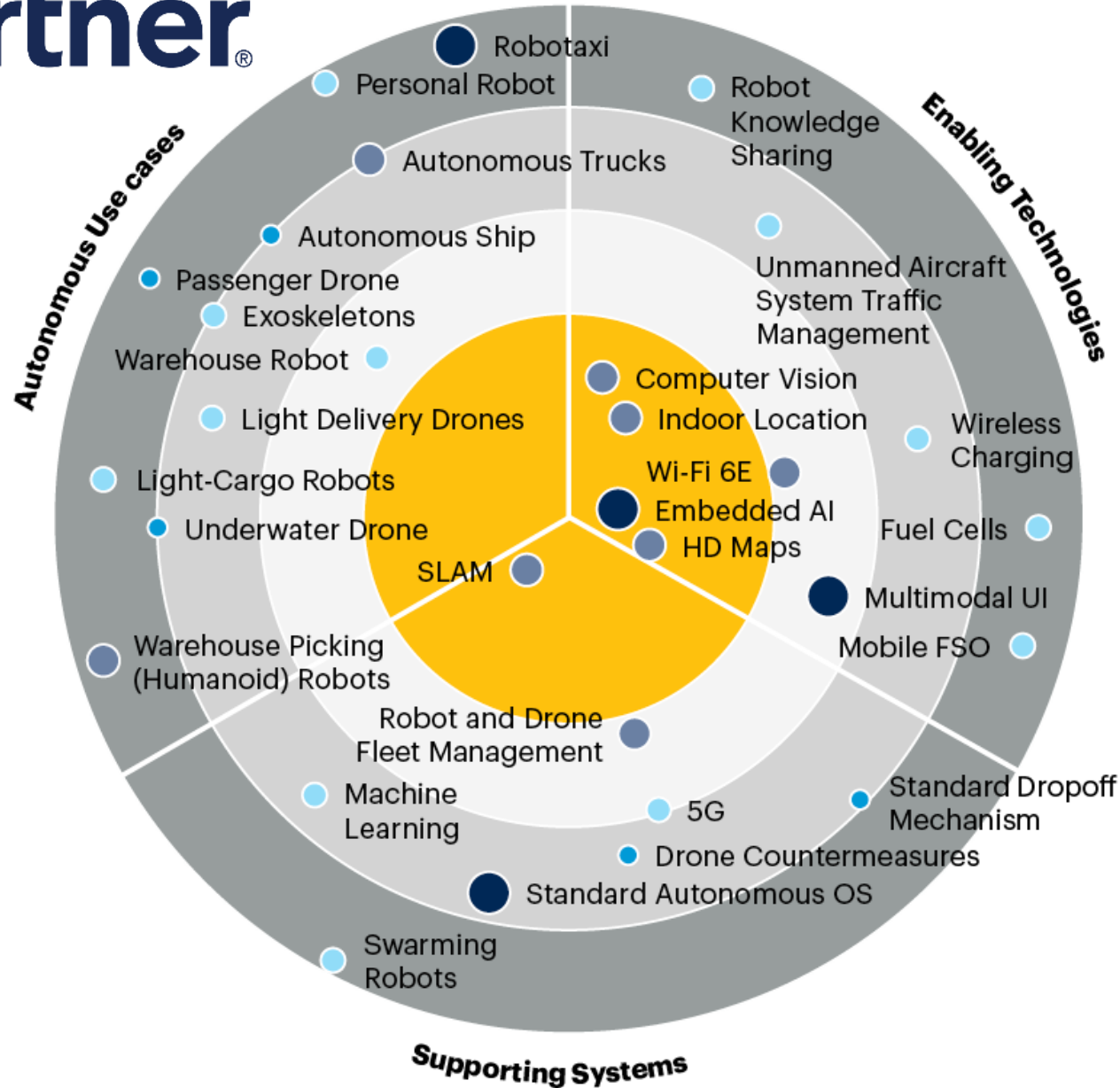
SOLTEQ



TROMBIA

VTT

Impact Radar for Drones and Mobile Robots



Range

- 6 to 8 Years
- 3 to 6 Years
- 1 to 3 Years
- Now (0 to 1 Years)

Mass

- Low
- Medium
- High
- Very High

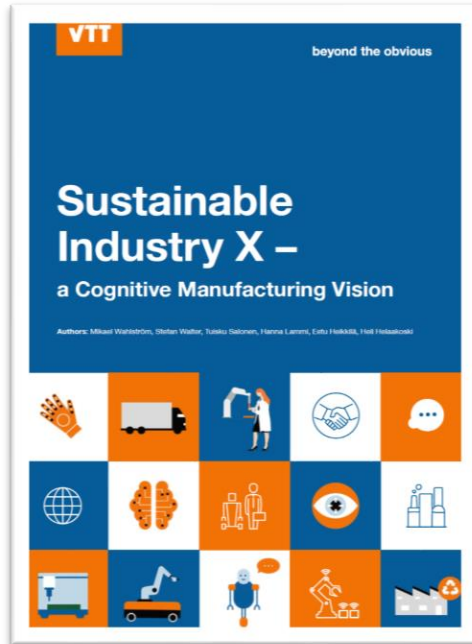
Gartner Emerging Technologies and Trends Impact Radar: Drones and Mobile Robots

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Why Service Robotics?


1. Robots are for 3D – Dull, Dirty, Dangerous
2. You should go beyond human senses
3. Robots should run with the data



Use Case 3: Cyber-physical remote maintenance team

Matti is a service technician for a production line manufacturer. In his work he focuses on consultation and customer support, obtaining information about a given situation or machinery state, clarifying problems, finding and analysing faults, and maintenance and assembly of replacement parts. Matti's aim is to make sure that his company's production lines operate smoothly at their customers' sites without much downtime, increasing a line's operational lifetime, and ensuring that customers are satisfied.

Increasing market fluctuations, the need for agile responses and world-wide service offerings broaden the complexity of knowledge and activities required to deal with customer and maintenance demands. Ideally, Matti could do all this remotely. By relying on digital technology, which provides a comprehensive picture of the problem at hand and allows guidance of local personnel and resources, Matti could concentrate on soft skills, showing understanding and acting in an advisory and empathetic manner. What technology solutions exist to make Matti's work easier?



<p>Aims:</p> <ul style="list-style-type: none"> • Reducing downtime • Satisfied customers • Cost-effective maintenance • Extending operational lifetime of machinery 	<p>Technologies:</p> <ul style="list-style-type: none"> • 5G • Sensors and IoT • Digital twin • Augmented reality • AI 	<p>Challenges:</p> <ul style="list-style-type: none"> • At times high work volume • Risk of losing customers • Not having an answer to a problem – deep knowledge of resources available required • Understanding what customers want
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Outcomes:

- Unmanned operation or maintenance
- Fast service on site
- Serving multiple customers
- Significant increase on the service level
- Learn about new innovations and research in the technology sector

<p>2020–2025</p> <ul style="list-style-type: none"> • Remote maintenance and maintenance done by autonomous robots becomes common place, but still with significant service personnel in the field • Communication infrastructure develops so that sensor technology and IoT allow remote machine state detection and diagnosis • Digital twin and augmented reality technologies employed in high value facilities • Artificial intelligence provides decision support and reduces complexity for service personnel 	<p>2025–2030</p> <ul style="list-style-type: none"> • Digital twin technology widely used in remote control and maintenance • Augmented reality works fluently to assist local personnel in factories as digital guides • Artificial intelligence widely employed for automatic detection, notification and ordering of supplies and replacement parts • Cyber-physical systems operate across supply chains to include many companies and production lines for advanced detection of delays and bottlenecks in supply
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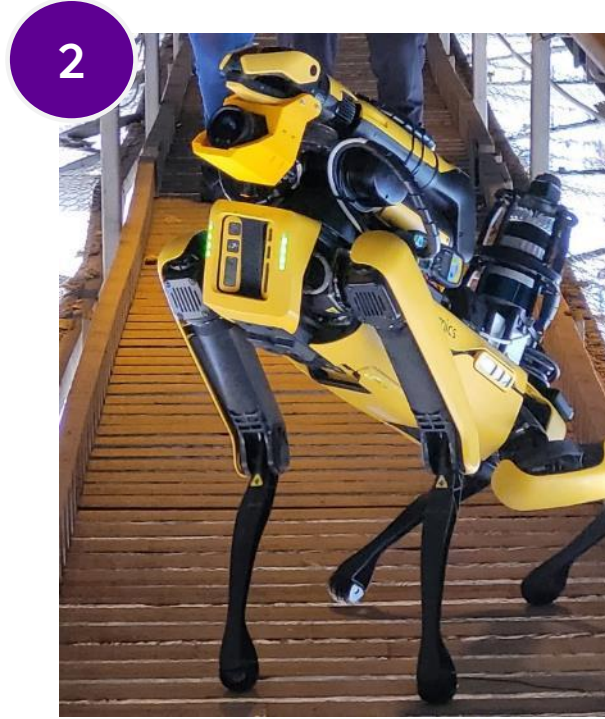


Telia's innovation cycles in Multi-purpose Robotics



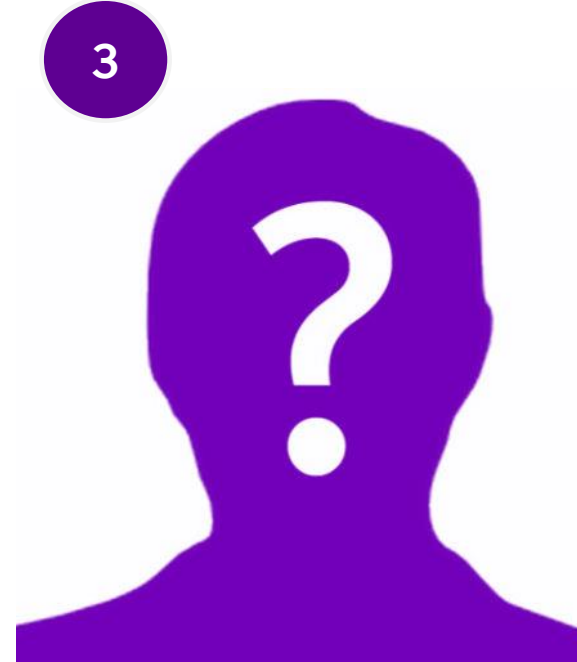
Food delivery robot – Taika

- Autonomous delivery operations, including ability to use elevators and to navigate the busy shopping mall independently
- 5G connected Edge computer - video analytics capabilities to support various tasks in footfall analytics and facility management



Industrial Robotics – Frans

- 4-legged mobility in industrial sites (construction, process industry and mining) with extensive data capture (Lidar, thermal camera, gas detectors) capabilities over 5G and with Edge processing
- Remote presence and video analytics



Innovation cycle 3 - open



Innovation cycle 4 - open





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FINLAND**

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TRIPLA**

 **TRIPLA**
ORIGINAL BY SOKOS HOTELS

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Digitized
manufacturing
& logistics.



Haaga-Helia



Fiuge

FAFA'S

**HAN
KO
SUSHI**

PANCHO VILLA

KONE


SECURITAS

VTT
beyond
the obvious





Taika robotti – Mall of Tripla & facility mgmt





Boston Dynamics



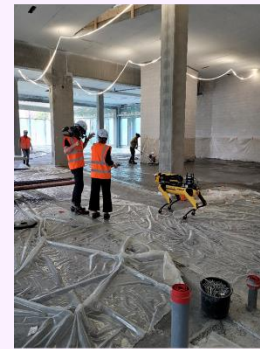
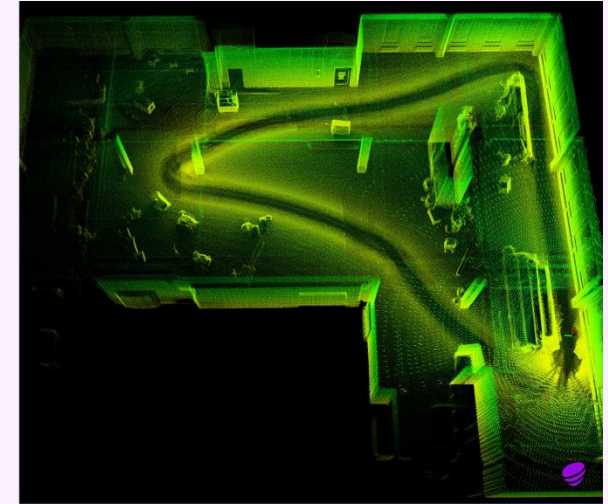
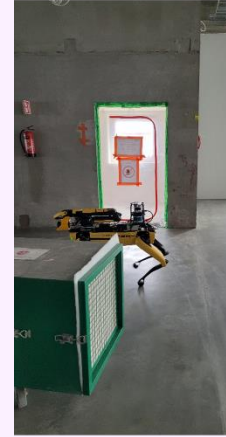
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Frans tarkemmin









TEOLLISUUDEN KYVYKKYYDET

Luotettavuus
Ennakoitavuus
Skaalattavuus
Jatkuvuus

5G

Reaaliaikainen
analytiikka

Hyper
automaatio

Tehokkuuden
nostaminen

Työntekijöiden
uudet kyvyt ja
työkalut

Autonomiset
järjestelmät

Joustavat
valmistus
menetelmät



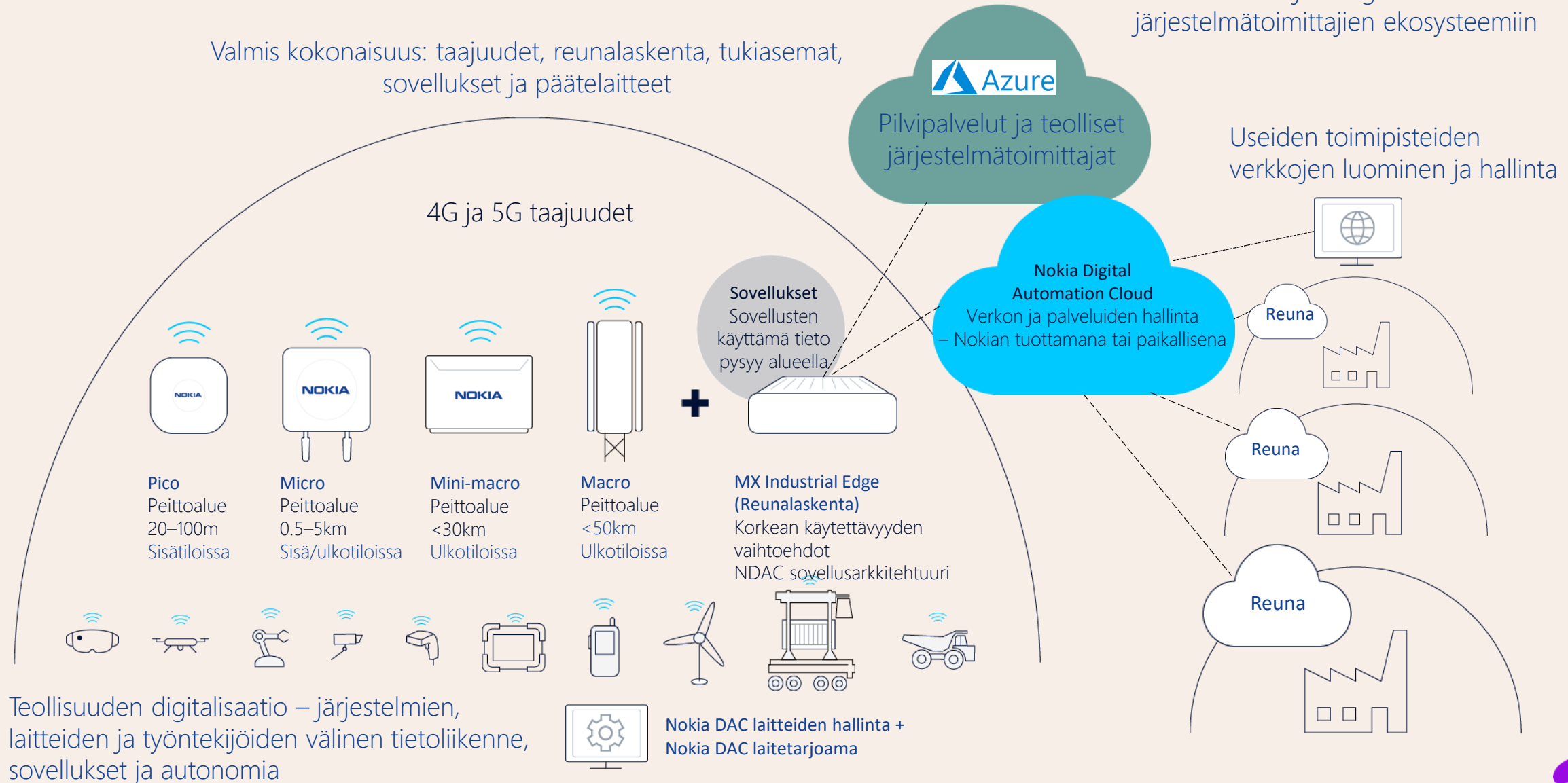
Teollisuuden 5G privaattiverkko



Privaattiverkko

Valmis kokonaisuus: taajuudet, reunalaskenta, tukiasemat, sovellukset ja päätelaitteet

API rajapinnat, tietojen tallennus, reunalaskenta ja integroituminen teollisten järjestelmätoimittajien ekosysteemiin



Nokia Digital Automation Cloud (NDAC)





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Linkkejä materiaaleihin

Telian Frans robottikoiran video

<https://www.youtube.com/watch?v=R8MTrcODD7Q>

VTT:n tutkimusmateriaali

<https://cris.vtt.fi/en/publications/sustainable-industry-x-kohti-suomalaista-teollisuusvisiota-ja-age>

Gartner Tech Radar

[Gartner Emerging Technologies and Trends Impact Radar Report \(thalesgroup.com\)](https://www.gartner.com/doc/reports/2024/01/24/emerging-technologies-and-trends-impact-radar-report)



Lämmin kiitos!

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