



Practical applications of Industry 4.0 in Finland

Slovak-Finnish Industry 4.0 Day

June 17 2020

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Networks are unlocking productivity
like never before

5G as key building block for 4th industrial revolution



“Productivity isn’t everything
... but in the long run
it is *almost* everything”

– Paul Krugman, Nobel Prize in Economics

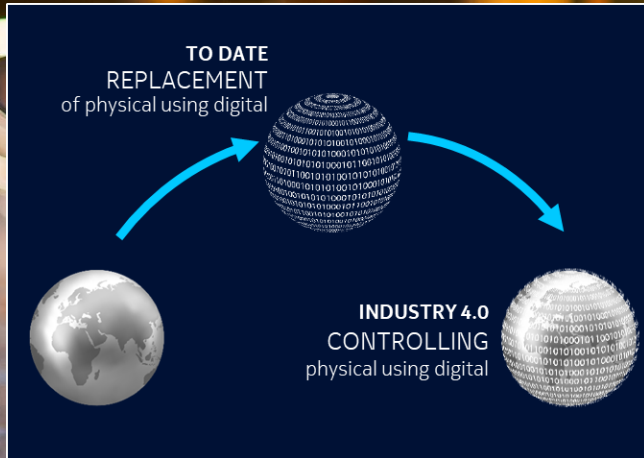


Our mission

Nokia Enterprise enables the **digitalization** of **asset-intensive** industries with **mission** and **business critical** needs providing **high performance networks** and **digital automation** solutions.



Unlocking productivity, in every industry



Industry 4.0 will not replace physical with digital, it will use digital to control physical assets (digital twins).

High-performance private networks

- Secure connectivity, at scale
- Ultra-high capacity
- Ultra-low latency
- Mission and business-critical reliability

Digital industrial automation

- Digitalizing every physical asset
- Converging ICT and OT
- Harnessing intelligence to drive productivity
- Optimizing operations

Large enterprise

| Webscale

| Transportation

| Energy

| Public sector

The background of the slide features silhouettes of an industrial robotic arm on the left and a worker wearing a hard hat on the right. They are set against a blurred background of colorful bokeh lights, suggesting a factory or industrial setting at night or in low light. The overall tone is professional and futuristic.

Industry 4.0 will deliver a massive increase
in productivity & economic value creation

Nokia's ambition

To bring the most complete
5G-ready private wireless solution
that meets industrial connectivity
and application requirements for
Industry 4.0 - **NOW**

4th Industrial Revolution at Nokia

The Conscious Factory and driving use cases

Infrastructure retrofit

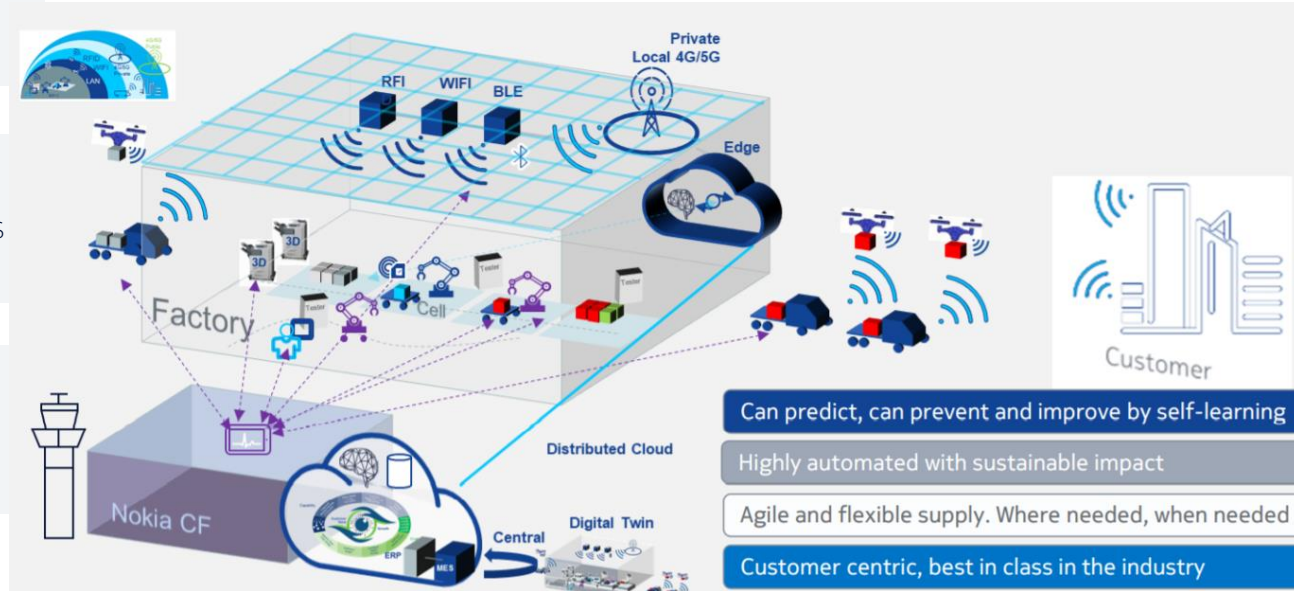
Condition monitoring and distributed sensing
Parallel testing and optimization

Mobility & robotic

Automated guided driving / flexible layouts
Intelligent robots

Smart production & intelligent tools

Video inspection & smart communication
IIoT data profits



Nokia Oulu factory in the spotlight

Advanced 4th Industrial Revolution Lighthouse

Welcome to Nokia Oulu Factory
Advanced 4th Industrial Revolution Lighthouse

Oulu New Product Introduction Factory



5G
ready

WORLD
ECONOMIC
FORUM

Proven success in deployment of Industry 4.0 technologies at scale

Powered by Nokia own technologies

#1

Private wireless network to speed up NPI line re-layout and bring reliable connectivity to all assets



#2

Flexible robotics to ensure high productivity and agility for continuous new ramp-ups



#3

Cloud-based digital twin enabling real-time process management



#4

Virtualization of new product introduction (NPI)



NDAC High Accuracy Indoor Positioning

For real-time location tracking

Precise location information
key enabler for
unlocking the benefits of
digitalization & automation in a
modern factory

Bluetooth SIG certified





HAIP in Nokia Chennai factory

4000 sq meters covered today



NOKIA | NOKIA DAC - Indoor Positioning Dashboard **Live track** Location history Heatmap Configuration

Select map Chennai_Factory X = 65.67 m, Y = 91.28 m

TAGS & GROUPS ▲

Filter items

- Warehouse ▼
3 items
- Trolley ▼
37 items
- Tester ▼
29 items
- AGV/AIV ▼
4 items

LOCATORS ▼

FIX POINTS ▼

SMT (Line 6&7) ICT & MFT Depanelling Press-fit Warehouse

Locators Fix points Average Set average Follow tag Hide Map opacity

#200 tags and growing

Asset tag



View asset locations in real-time

- Live track

- Choose your preferred view:
 - Single assets
 - Certain asset categories
 - All

Menu

[Live track](#)

[Past locations – location history](#)

[Past locations – heat maps](#)

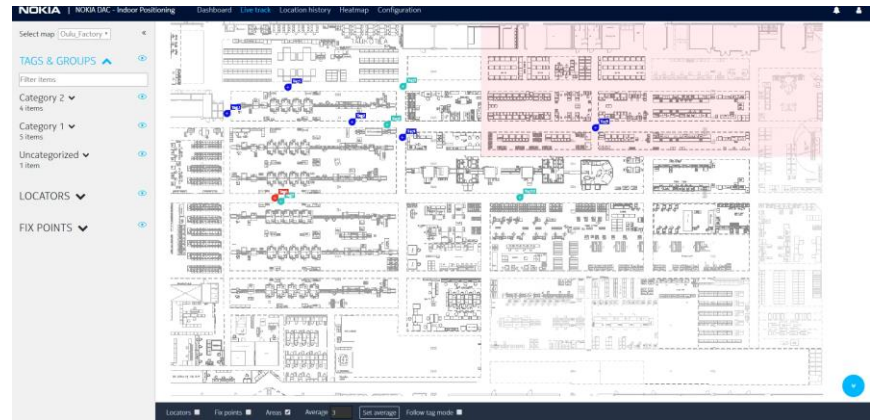
[Detect near collision](#)

[Geofencing](#)

[Follow tag](#)

[Dashboard](#)




[Mobile UI](#)

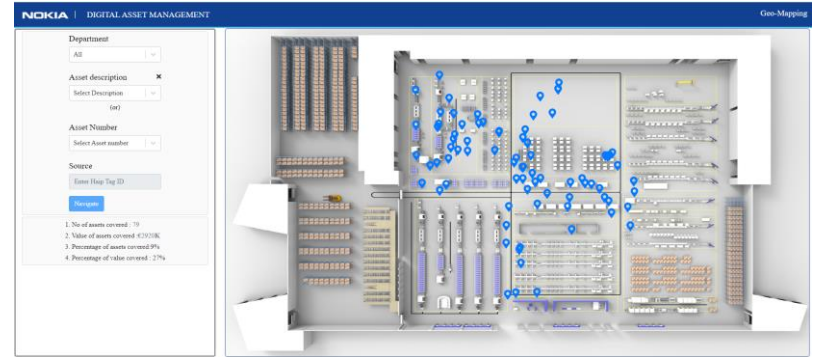


HAIP – Geo mapping of assets and route navigation “Search & navigate”

Integrate HAIP to existing asset mgmt. system

- 5500+ assets in the shop floor. Locating a specific asset challenging and time consuming
- Need to move testers/swap tester equipment to adapt to changing business requirements. Real time monitoring of location of equipment and vehicles is essential
- Manual tracking of asset utilization → digitalization need
- Asset distribution analysis made possible
- Enhance existing smart warehouse Putaway & Picking application with navigation
- Enhanced digital twin platform enriched with new information from HAIP

	Productivity and efficiency gains via visibility on asset utilization. Improved space optimization and layout management
	Time spent on searching for assets. Audit time & complexity “Single click asset audit”
	Assets found faster



COVID-19 Solution – Social Distancing using HAIP Collision Detection

PoC readiness

- Monitors whether people are following or violating the social distancing norms (2 meters)
- Layout optimization
- Staff safety
- Cost savings
- Decreased risk of litigations

- Select one/many tags to be checked for Social Distancing
- Create/modify a collision detection rule
- Every time any tagged people gets <2 mtr from any selected tag, the event is logged and can be visualized

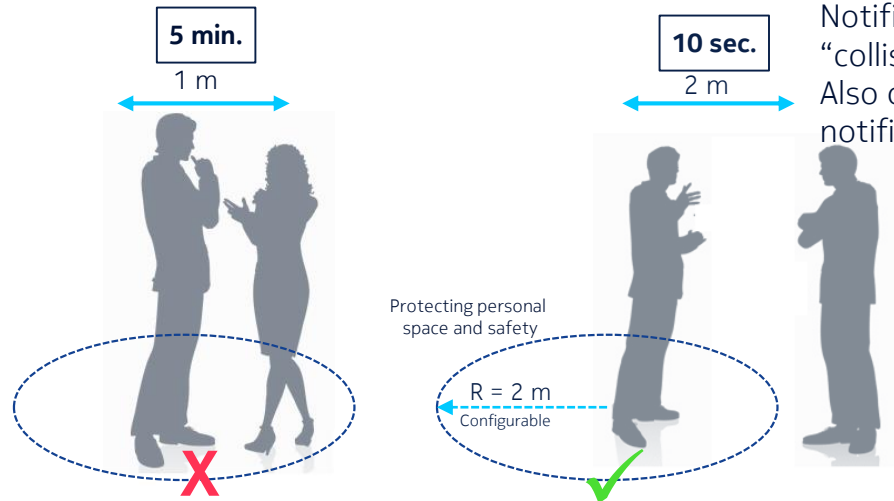
- Employees wear a tag and their interactions are tracked
- Interactions within specified distance (“collisions”) are automatically detected in real-time
- Dashboard notifications

New features soon

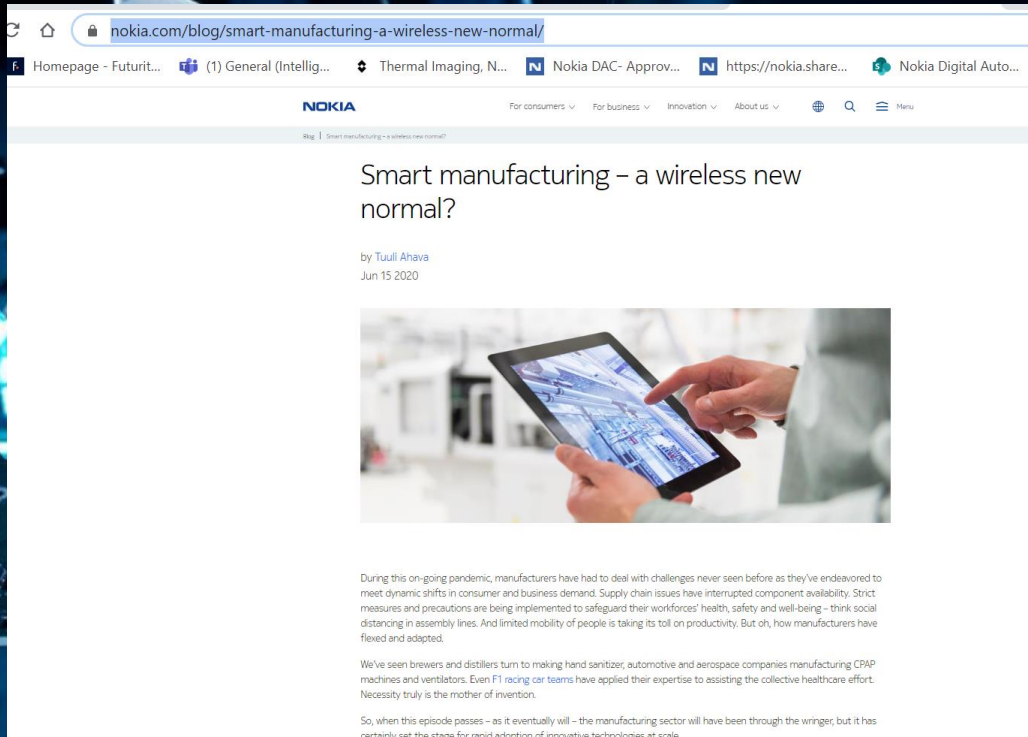
Time factor: how long person stays too close

Enhanced APIs for back tracking in case someone falls ill “who met whom”

Notifications sent about the “collision” events in real time. Also out of system notification (SMS, email, etc.)




Thank you!
www.dac.nokia.com



The screenshot shows a web browser displaying a Nokia blog post. The browser's address bar shows the URL nokia.com/blog/smart-manufacturing-a-wireless-new-normal/. The page header includes the Nokia logo and navigation links for consumers, business, innovation, and about us. The main content area features the article title, author information, a featured image of a person using a tablet, and several paragraphs of text discussing the challenges and innovations in manufacturing during the pandemic.

Smart manufacturing – a wireless new normal?

by Tuuli Ahava
Jun 15 2020



During this on-going pandemic, manufacturers have had to deal with challenges never seen before as they've endeavored to meet dynamic shifts in consumer and business demand. Supply chain issues have interrupted component availability. Strict measures and precautions are being implemented to safeguard their workforces' health, safety and well-being – think social distancing in assembly lines. And limited mobility of people is taking its toll on productivity. But oh, how manufacturers have flexed and adapted.

We've seen brewers and distillers turn to making hand sanitizer, automotive and aerospace companies manufacturing CPAP machines and ventilators. Even F1 racing car teams have applied their expertise to assisting the collective healthcare effort. Necessity truly is the mother of invention.

So, when this episode passes – as it eventually will – the manufacturing sector will have been through the wringer, but it has certainly set the stage for rapid adoption of innovative technologies as well.