

# 5G in Finland Oulu Trials

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**NOKIA**



# Open 5G Ecosystem in Finland

## 5G Test Network Finland since 2015

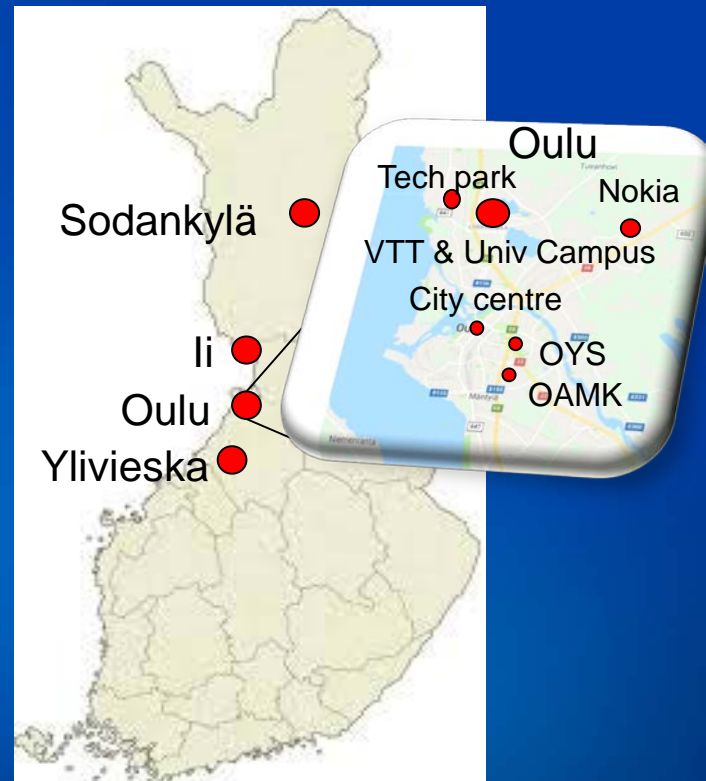
- Regulators, municipalities, academic institutes and businesses of different sizes cooperating to test and then launch 5G.
- Strong cooperation culture between all parties
  - FICORA - Finnish Communications Regulatory Authority
  - Business Finland
  - Technical Universities in Helsinki/Tampere/Oulu & VTT
  - Community of biggest cities
  - ICT industry
  - Operators

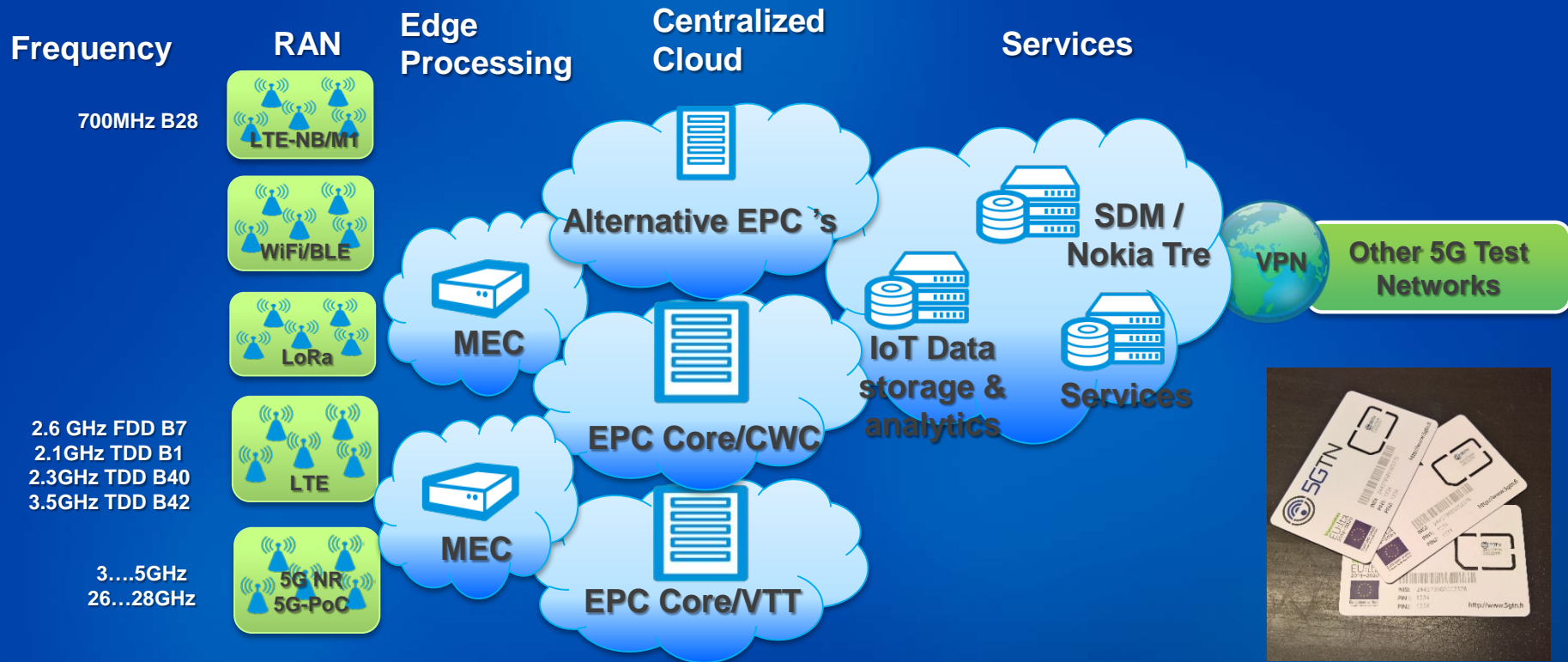
# 5G Network Launch Status

- Frequency auction completed
- Telia launched
  - operational pre-commercial 5G network in Helsinki's Telia 5G Arena.
  - Telia and Nokia launched one of the world's first industrial 5G environments in Oulu.
- Elisa launch in Helsinki and Tampere.

## Open innovation platform

- For experimenting 5G technology, business models and services
- Early Practical experience of future mobile network
- Used e.g. in 5GChampion with 5G connection between Finland and Korea during olympics
- Accessible interfaces – test options from components to solutions
  - 5GNR (<6GHz) NSA integrated
  - 5G PoC on mmWave for research
  - Open NB-IoT/LTE-M1 at city center





# How does it look ?



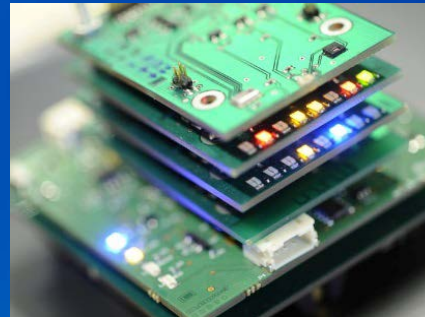
**5G**



**LTE Macros**



**LTE small cells**



**IoT sensors**



**Own SIM**

## Focus in applications and verticals

- Sensing care for long-term health and wellbeing
- Real-time cellular IoT monitoring for sport wearables
- 5G in media production and distribution

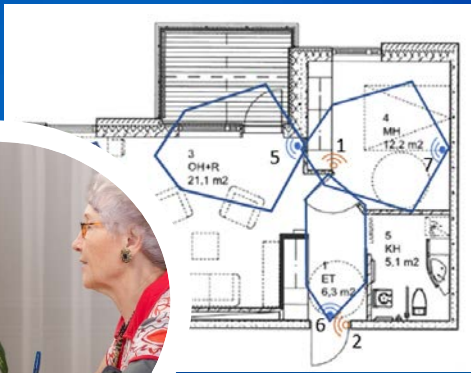
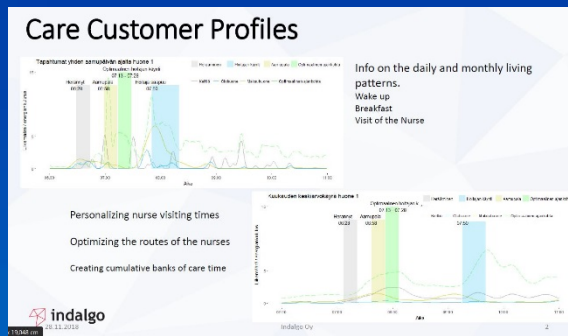
Developing and testing future use cases enabled by 5GTN

- eHealth in hospital and on wheels
- Digital Factory empowered by 5G
- Connected cars



## Better Life-Quality by Technology

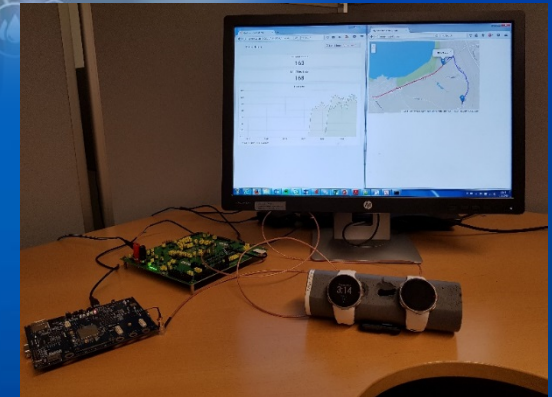
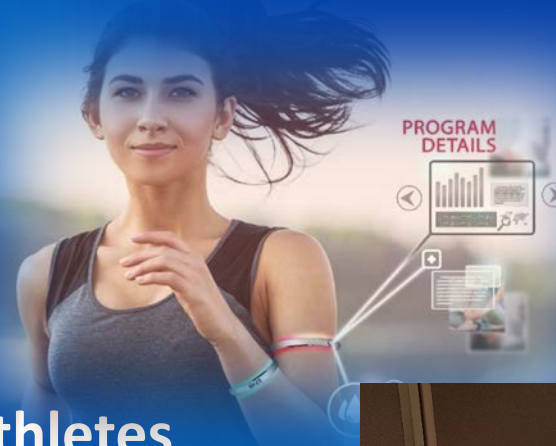
- 5G Assisted living for people with memory disabilities
- Good and efficient home care. Services for residents, relatives and personnel. Care on-demand
- Cooperation between Caritas, academia, ICT-ecosystem and city of Oulu





# Sport

- Wearables always connected
- Personalized services for individuals & professionals
- Position and heart rate of the athletes transmitted over 5GTN and visualized for "coaches" and "spectators"



## Media

5G network for live sports events, music festivals and TV programs.

- Fast production environment construction
- eMBMS enables efficient broadcasting to mobile users



## Latest Use Cases in Oulu

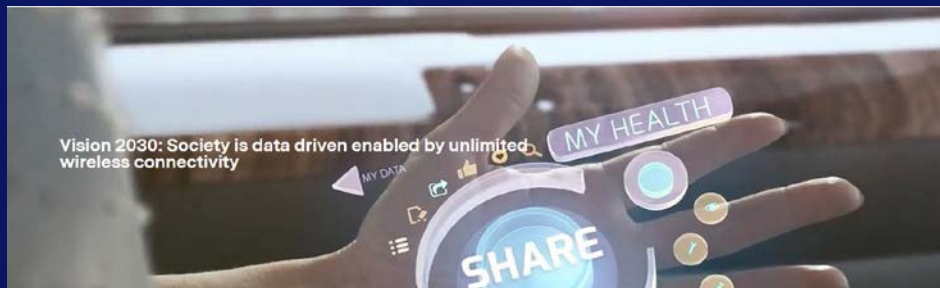
- Industry 4.0 in Nokia's Oulu Factory
- Industry experiments at Oulu Harbor
- Oulu building New Future Hospital
  - In 5G-Enhance: Remote learning /training for a real-time surgery
  - Wireless AR Assisted Operating Theatre
  - Eager to join National and International eHealth calls



# 6G

## 5GTN for 6GFlagship

- National Flagship for 2018-2026 granted by Academy of Finland
- 6G Enabled Wireless Smart Society & Ecosystem (6Genesis); volume 251M€.
- Operated by UOulu, in collaboration with: Nokia, VTT, Aalto University, BusinessOulu, Oulu University of Applied Sciences.



[www.6gflagship.org](http://www.6gflagship.org)

### RESEARCH AREAS:

#### Wireless Connectivity

Ultra-reliable low-latency communications



Unmanned processes

#### Devices & Circuit Technology

THz communications materials & circuits



Unlimited connectivity

#### Distiributed Computing

Mobile edge intelligence



Time critical & trusted applications

#### Services and Applications

Multidisciplinary research accross verticals



Disruptive value networks