O Futuro com 5G na Mobilidade

APDC Talkommunications - Ciclo "O Futuro com o 5G“

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Nokia Portugal

NOKIA


NOKIA
We create the technology to connect the world
The technology to keep everyone, everywhere connected has never been more important

Our 5G deal momentum is growing

104 commercial 5G deals

37 live 5G networks

Figures as of 30 October 2020

North America

AT&T, Bell, Shaw, dish, T-Mobile, TELUS, U.S. Cellular, verizon

Latin America

antel, SETAR

Europe

A1, BT, citycom, DB, elisa, free mobile, iliad, Imt, O2, orange, proximus, Salt., SALZBURG AG, SANDVIK, SFR, 3, Telia, Telefónica, vodafone, Vivo

Middle East & Africa

du, etisalat, ooredoo, mobily, ZAIN, STC

Asia-Pacific

docomo, docomo pacific, KDDI, kt, LG U+, OPTUS, SoftBank, SK telecom, Spark, StarHub, TPEC, tpg TELECOM, vodafone

Greater China

Gt, 中国移动 China Mobile, 中国电信 China Telecom, 中华电信, China unicom 中国联通, Taiwan Mobile, T STAR 台灣之星

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Nokia selected by NASA to build first ever cellular network on the Moon

Nokia selected by NASA as a partner to advance “Tipping Point” technologies for the Moon, deploying the first LTE/4G communications system in space and helping pave the way towards sustainable human presence on the lunar surface.

The network will provide critical communication capabilities for different data transmission applications, including vital command and control functions, remote control of lunar rovers, real-time navigation and streaming of HD video.

The solution has been designed to withstand the harsh conditions of the launch and lunar landing, and to operate in the extreme conditions of space.

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Future of mobility

Safer, less congested and sustainable smart roads

Nokia vision for Connected Vehicles

Meet automotive industry needs with **reliable and enhanced Cellular-V2X (C-V2X) communication technology** for the deployment of connected fully automated vehicles

Establish 5G as communication technology of choice, starting with advanced LTE capabilities

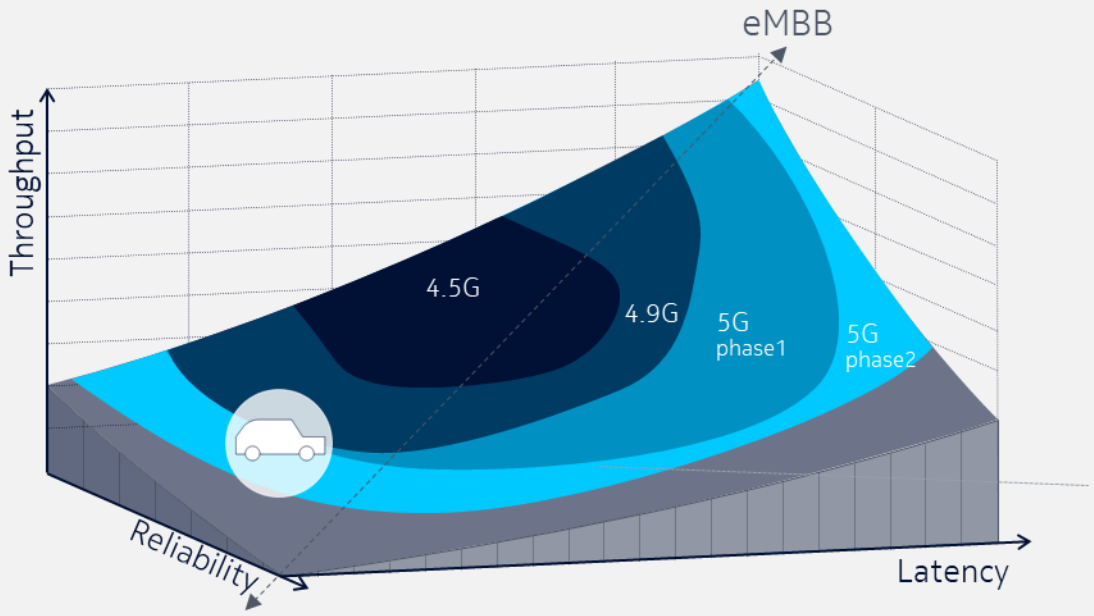
Drivers

- Increase safety - avoid fatalities and injuries in accidents
- Increase traffic efficiency - reduce CO2 emission
- Increase comfort

Why 5G

- Low latency, higher reliability
- Improved predictability of network capabilities
- Enablement of new business models via Network Slicing

5G relevant functionalities for Automotive



Requirements of automated driving

- Throughput 10-300Mbps
- E2E Latency 5ms-1s
- Reliability Very high

- 5G NR
- Ultra-Reliable Low Latency Communication (URLLC)
- Edge Computing (MEC)
- Network slicing

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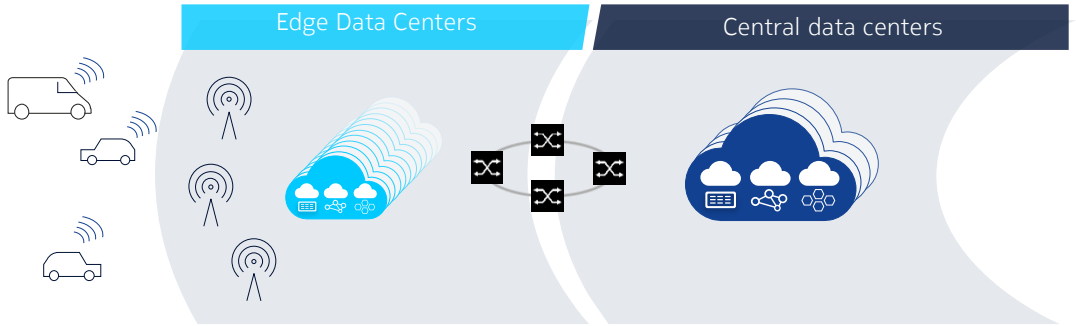
5G relevant functionalities for Automotive

Multi-Access Edge Computing (MEC)



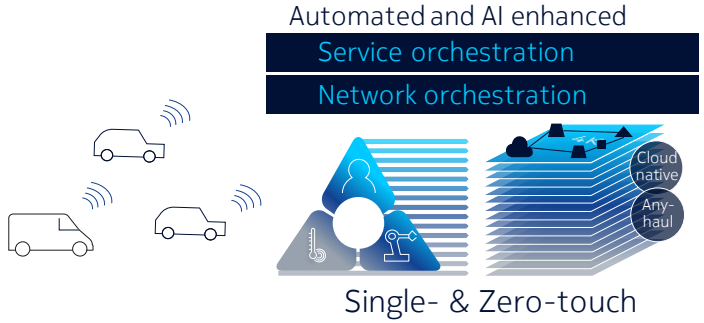
Benefits from low latency

- Distributed local aggregation, analysis of data
- Real-time generation of actions

Essential capabilities

- Life-cycle-management by the owners of the distributed MEC applications
- Support various cloud-based business models

Network slicing



Network Slicing creates new opportunities in the Automotive industry

- Infotainment
- Car manufacturers (OEM cloud connectivity)
- Map provider for HD map provisioning
- Cloud applications for Highly Automated Driving
- Car/ride sharing providers
- Traffic Management
- Tolling
- Fleet Management
- Car-insurance companies
- First responders

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Shaping the future of mobility with an ecosystem of partners

- Research with Nokia Bell Labs
- In-house product development
- Industry associations
- Industry partnerships
- Research partnerships

5GAA Automotive Association

The 5G Automotive Association (5GAA) is a global, cross-industry organization of companies from the automotive, technology, and telecommunications industries (ICT), working together to develop end-to-end solutions for future mobility and transportation services.

Experience & Ecosystem

- Car2X tests on German A9 with Continental, DT and Fraunhofer
- Nokia,Telefonica Spain and SEAT presented assisted driving in Segovia
- 5G vehicle teleoperated driving demonstration in China with automotive company FAW
- 5G connected car test with SoftBank Corp.

EU projects

5G CroCo - 5G Cross border trials for CCAM

5G CARMEN - Corridor initiative (ITA-AUS-GER)

5G CAR - The Vehicular 5G PPP phase 2 project

5G MOBIX - 5G Cross border trials for CCAM

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5G-MOBIX
5G for Cooperative, Connected and Automated Mobility

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 825496

5GMOBIX

ABOUT

- EU funded Innovation action (H2020-ICT-18-2018)
- November 2018 – July 2022
- 50 partners from 11 countries in Europe
- 10 non-EU funded partners from China and South Korea

OBJECTIVES

Accelerate deployment of 5G at cross-border areas

- Carry out trials along X-border corridors to assess 5G capabilities for CCAM
- Qualify the 5G-infrastructure and evaluate the benefits of 5G within the CCAM context
- Identify spectrum allocation gaps, contribute to standardisation and 5G CEF preparation

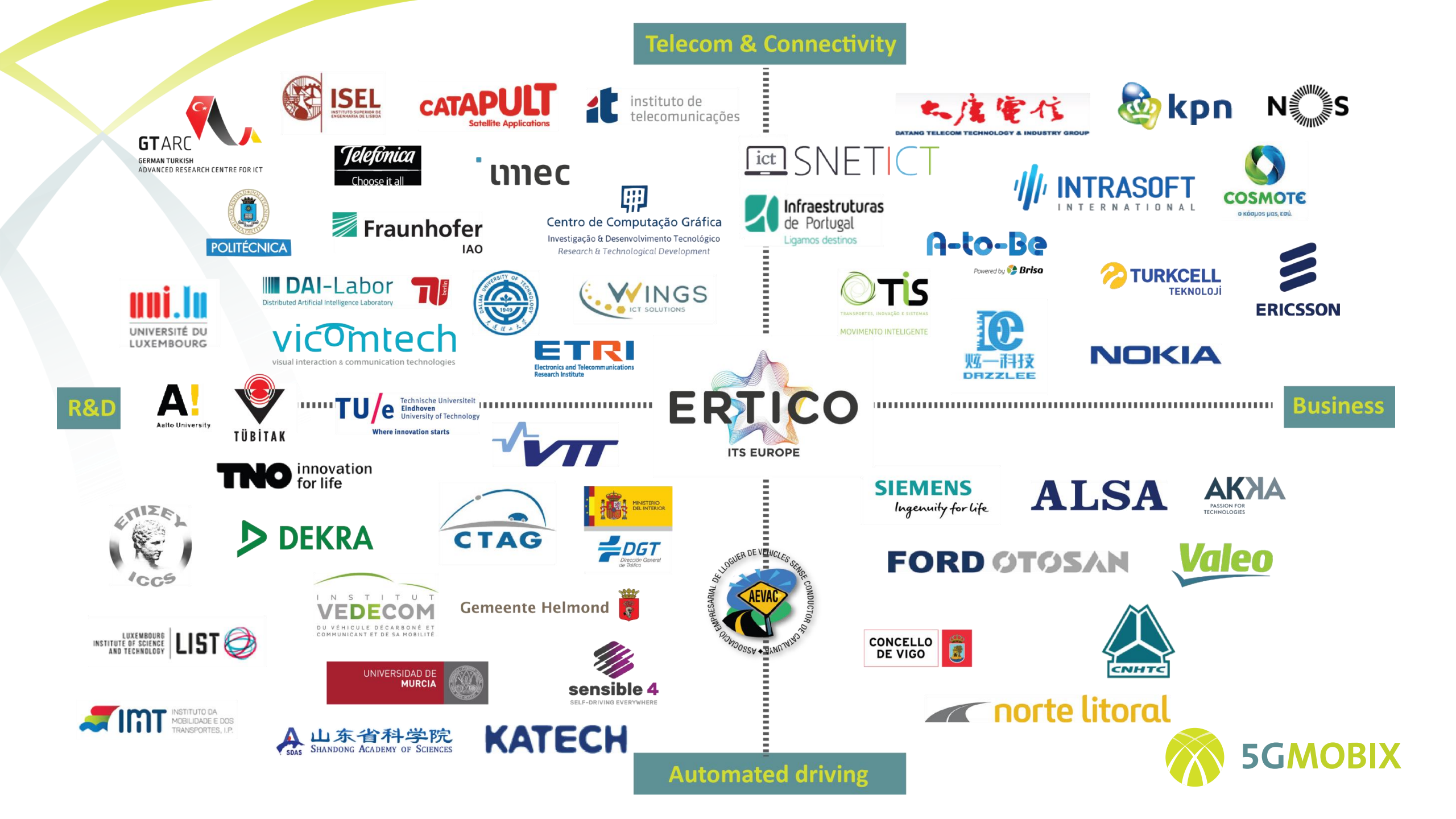
Technical

Business

Define deployment scenarios & recommendations including x-border context

- Perform cost/benefit analysis and impact assessment
- Identify new business opportunities for 5G-enabled CCAM
- Investigate legal, regulatory and security issues

5GMOBIX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R&D
Business
Automated driving
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ITS EUROPE
GTARC
GERMAN TURKISH
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ISEL
INSTITUTO SUPERIOR DE ENGENHARIA DE LISBOA
CATAPULT
Satellite Applications
instituto de telecomunicações
DATANG TELECOM TECHNOLOGY & INDUSTRY GROUP
kpn
NOS
Telefónica
Choose it all
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ict SNETICT
INTRASOFT
INTERNATIONAL
COSMOTE
o κόσμος μας, εσύ.
POLITÉCNICA
Fraunhofer
IAO
Centro de Computação Gráfica
Investigação & Desenvolvimento Tecnológico
Research & Technological Development
Infraestruturas de Portugal
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SDAS
山东省科学院
SHANDONG ACADEMY OF SCIENCES
KATECH
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5G-MOBIX Trials

LOCATIONS

- ***2*** Cross-Border Corridors (CBC)
- ***4*** complementary European Trial Sites (TS)
- ***2*** complementary Asian Trial Sites (TS)

NETWORK

- ***30*** 5G gNBs
- ***NSA*** Architecture (potential for evolving to ***SA***)

VEHICLES

- ***24*** SAE L4 automated vehicles

USE CASES

- ***5*** use case categories based on 3GPP TS 22.186, focusing on x-border operation

Advanced Driving	Vehicles Platooning	Extended Sensors	Remote Driving	Vehicle QoS Support

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GR-TR Cross-Border Corridor

Greece - Turkey

Kipoi – Ipsala site is a main entry point into EU territory for cargo, with heavy customs operations

Use Cases

- **Truck Platooning with See-What-I-See**
- **Assisted Truck border crossing**

Vehicle platooning is a method to efficiently drive several vehicles together.
In a platoon, vehicles are autonomously driven, forming a convoy and moving much closer together than what would be possible if driven by human drivers, like carriages in a train.
The reduced distance between vehicles results in greater fuel efficiency and reduced use of road space.

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ES-PT Cross-Border Corridor

Spain - Portugal

Porto – Vigo is a Pan-European X-Border 5G corridor for Connected and Automated Mobility

Use Cases

- **Private Automated vehicles**
  - Lane merge
  - Automated overtaking
  - HD Maps
- **Connected services in public transport fleet**
- **EV automated shuttle vehicles**
  - Automated operation
  - Remote control

X-border operation is the focus of 5G Mobix project. Telecommunication topics such as mobile coverage, inter-PLMN handover, alternative Roaming scenarios, inter-MEC connectivity and Service Quality/Continuity are intended to be tested/analysed.

5GMOBIX


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