5G-LOGINNOV trials at Trials WG meeting
14 March 2022

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ERTICO-ITS EUROPE
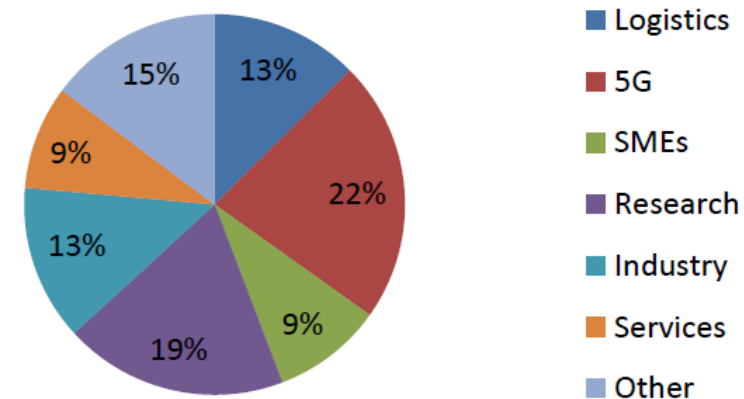
Project Fact Sheet

- **The H2020 Innovation Action 5G-LOGINNOV has a project duration of 36 months with project start 1st of September 2020**

- **The 5G-LOGINNOV consortium has 15 members from 8 European countries (BE, ES, FR, IT, RO, GR, SI, DE)**

- **Members represent stakeholders from Logistics, Automotive and Telecom Industry working closely with Infrastructure operators and Research Institutes – SMEs and Start-Ups will be integrated for future 5G market uptake across Europe**

- **Total budget: 7,926,474.29**

EC contribution	5,999,702.00 euro

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 957400

Per type of partner

Legend:
- Logistics
- 5G
- SMEs
- Research
- Industry
- Services
- Other

Pie chart values: 13%, 22%, 9%, 19%, 13%, 9%, 15%

5GLOGINNOV

Project partners

Vertical: logistics industry

AN OPEN PROBLEM

- **Supply chain efficiency largely depends upon data and information** – how it is collected, processed, stored, updated, interpreted, understood, and exploited.

- **On operational level,** actors need real- time information, to be able to make effective decisions.

- **On tactical and strategic levels**, transportation systems need increased connectivity.

- **Existing systems are currently not linked to each other,** thus missing the opportunity to optimize the performance of their cooperation.

- There is the need of **new solutions for connecting logistics** information systems with different characteristics, intra- and cross-company, for immediate (real-time) exchange of information.

5G**LOGINNOV**

Vertical: logistics services

Data exchange

Data posting

Risk prediction

E-CMR

Visibility services

CO_2 monitoring

Port services

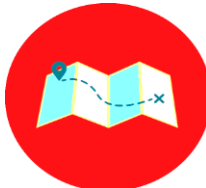Data sharing

Data collection

Marketplace

Custom services

Control Tower

Estimated Time of Arrival
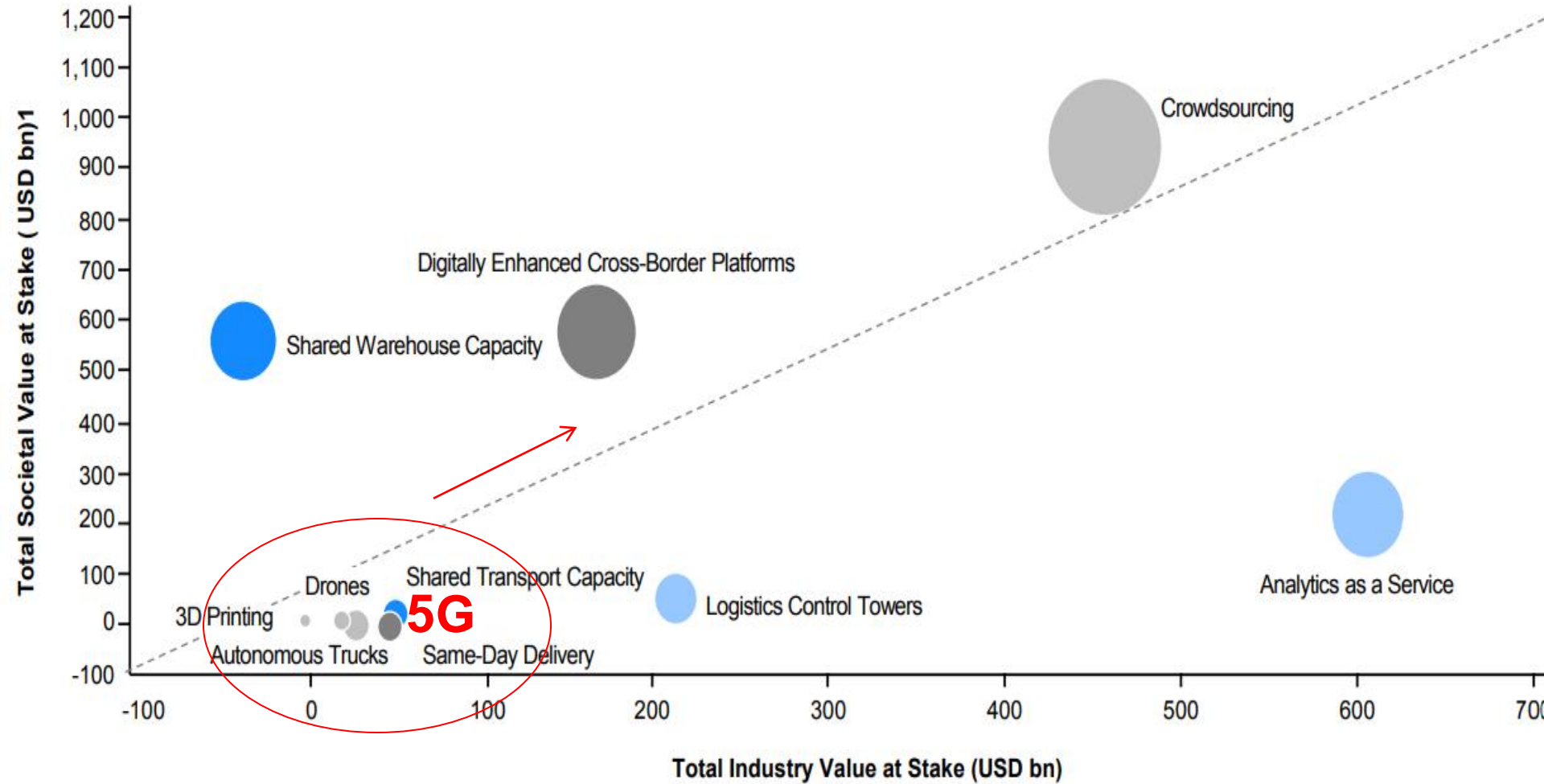
Route planning

Data management

What else?

5G**LOGINNOV**

"Show me the Money" from Digitalisation in Logistics

Why 5G-LOGINNOV

- ports are essential for the European economy and for economic growth: 74% of goods exported or imported to the EU are transported via its seaports.
- **Cargo volumes** are increasingly **higher:** with an expected 57% rise by 2030 – while they are also **arriving in a shrinking number of vessels**
- Cargo port operators need to comply with **increasingly stricter environmental regulations** and societal views for sustainable operations.
- 5G is the convergence technology for the new generation of mobile networks, expected to be massively deployed starting from 2020.
- **5G promises also to address the diverse and rather demanding performance requirements of a wide range of use cases.**
- 5G-LOGINNOV is supported by **5G technological blocks: new generation of 5G terminals** for future Connected and Automated Mobility(CAM)
- new types of **Internet of Things-5G devices**, data analytics, **next generation traffic management and emerging subsets of 5G networks functions.**
- through 5G-LOGINNOV, ports will minimize their environmental footprint to the city, they will **decrease disturbance** to the local population through a significant **reduction in the congestion around the port**

How are deployed new CAD & Logistics

- 5G-LOGINNOV aims to support the **new generation of 5G-CAD terminals**, **new type of IoT-5G connectivity devices** through **technical solutions, business models and priority scenarios** by deploying new **CAD and Logistics as a Service in real-life port-city areas (Hamburg, Athens, Luka-Koper=intelligent hubs & network optimisation-**multi/ synchromodal transport &optimise the logistics network**)**.

- 5G-LOGINNOV's central innovation is to build a first-class European industrial supply side for **5G core technologies and new IoT-5G devices** (e.g. slicing, eMBB, uRLLC, mMTC, MEC, 5G-NR) with global market footprints.

- The project will have a strong impact in the **logistics industry**, as the innovative use cases deployed in the three Living Labs will test and evaluate **5G-enabled services during the project**.

- The project has a strong interest in the emergence of new market players, such as SMEs and start-ups, taking advantage of the growing adoption of distributed cloud computing technologies in 5G networks and making possible open innovation at service level in the <u>logistics and Industry 4.0</u> sectors.

- 5G-LOGINNNOV contributes to the emergence of global standards and **globally harmonised frequency bands for 5G** in the context of related developments at the level of global bodies like **3GPP, ITU and 5G standards (Rel. 16/17**).

- Being part of the third 5G PPP phase implies supporting the development of a "lead" market involving cooperation models with key <u>vertical sectors</u> contributing to the wider policy objectives of industry digitisation in the Digital Single Market.

5G LOGINNOV

AT GLANCE: LLs

Piraeus-Athens

Optimal selection of yard trucks

- Installation of a 5G access point on yard trucks
- e.g., 5G latency, precise localization services, etc.

Optimal surveillance cameras and video analytics

- Installation of connected 4K surveillance cameras
- AI/ML solution for, e.g., container seal presence, human presence detection, social distancing
- **Predictive Maintenance**
- 5G access point installed on yard vehicles
- AP will collect and forward in real time with low latency telemetry data over the 5G network

Hamburg

5G-LOGINNOV Floating Truck & Emission Data (FTED)

5G-LOGINNOV 5G GLOSA & Automated Truck Platooning (GTP)- under 5G-LOGINNOV Green initiative

5G-LOGINNOV dynamic control loop for environment sensitive traffic management actions (DCET)

Luka Koper

Port control, logistics and remote automation
Management and Network
Business critical and mission critical communications

5GLOGINNOV

5G-connected Yard/External-trucks in port operations

- Yard-truck as a 5G-IoT telematics device
  - Data sources: CAN-Bus, localization, other on-truck sensors (e.g., container presence)
  - Applications/use cases
    - Horizontal movement of containers in port operations (between stacking areas and loading/unloading areas for vessels and rail)
    - AI/ML approach for predictive maintenance service

- External truck as a 5G-IoT device
  - Real-time tracking of external assets (tracking, expected arrival, traffic, etc.)
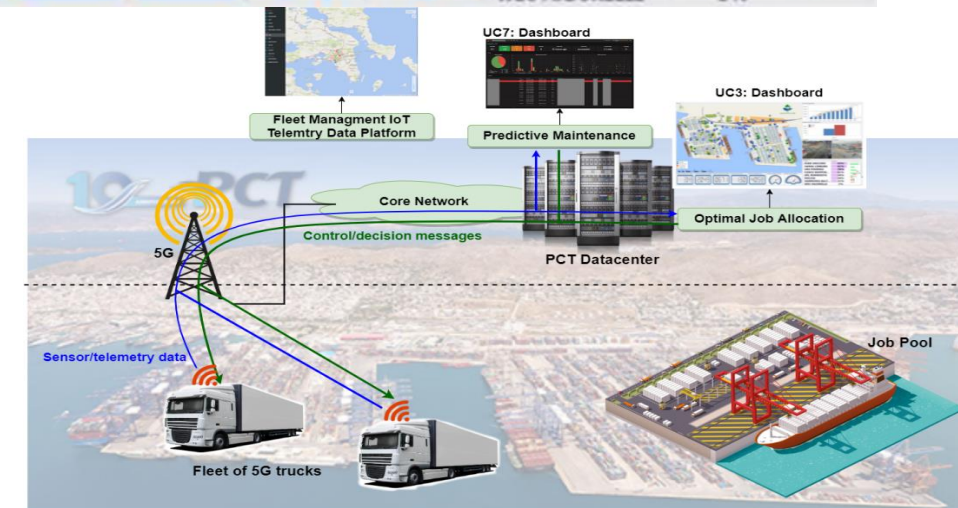
The 5G-LOGINNOV automation for ports: port control, logistics and remote automation

- **Target 1:** Port control, logistics and remote automation *(port machinery equipped with industrial cameras for transferring images to CNS system | identification of container markers | detection of structured damage)*

- **Target 2:** Port infrastructure monitoring and remote metering with 5G IoT *(operating machine monitoring* by means of capturing and transfer of the key information | positions, usage and other telematics metrics from operating terminal vehicles)*

- **Target 3:** resilient 5G based network services *(alternative 5G connectivity capabilities to the established operational WLAN network, supporting data transfer redundancy between the operational port infrastructure and the operations centre)*

Logistics & Security
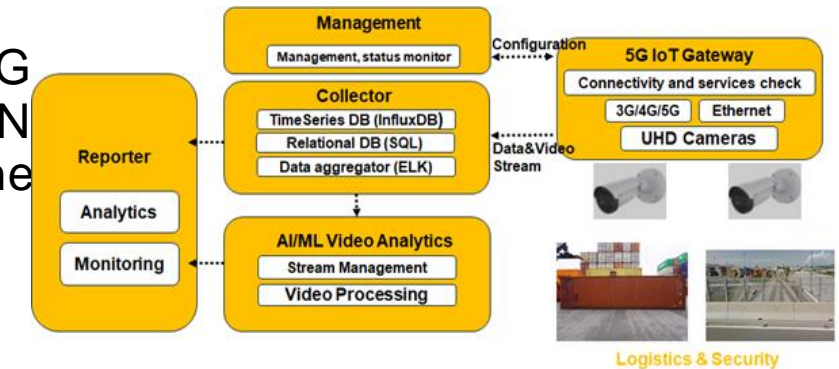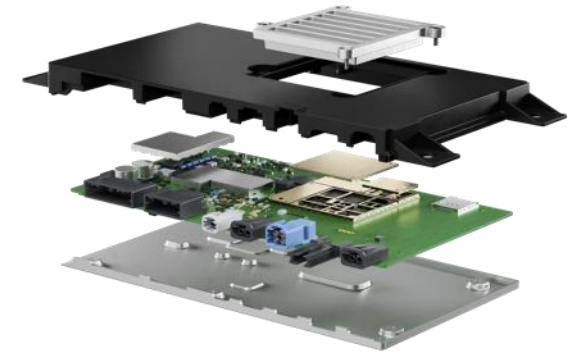
5G LOGINNOV

5G-LOGINNOV – use cases of Living Lab Hamburg

1) **Truck & Emission Data** for **Sustainable Traffic Management** based on 5G V2X in Hamburg

2) **Automated Truck Platooning** using 5G based GLOSA in the logistics corridor of Hamburg to **achieve low emission targets** for ports and hub-logistics

3) **Data exchange with SWARCO traffic management center.** Dynamic control loop for the reduction of CO_2/NO_x emissions from trucks by **avoiding Start-Stop events** by using GLOSA technology

With **5G-LOGINNOV,** ports will **minimize their environmental footprint to the city.** They will decrease disturbance to the local population through a **significant reduction in the congestion** around the port.

5G LOGINNOV

How does it work?

Teststrecke für Automatisiertes und Vernetztes Fahren in Hamburg (TAVF)

- Umsetzung bis 2020
- Ausgestattete Ampeln Juli 2020
- Prognosefunktionalität
- VITAL-Knoten

RSU

TMC HH

I2N (Uu)

SPAT / MAP (uplink only)

I2N

MECs: Hamburg

ITS SERVER
(→ MOBILE EDGE INFRASTRUCTURE OF DEUTSCHE TELEKOM)

APP(S)

CAM
Position
Heading
Speed

ITS Services

GLOSA: Green Light Optimal Speed Advisory
(a) informational service = user has to react, user reaction time 500ms
(b) automated driving = latency critical

Collision Warning
(a) collsion warning service = user has to react, user reaction time = latency critical

DENM

SPAT
MAP

RSU: Roadside Unit
I2N: Infrastructure to Network
CAM: Cooperative Awareness Message
DENM: Decentralized Environmental Notification Message
SPAT: Signal Phase and Time
MAP: Topology Information of the intersection (ISO TS 19091 / SAE J2735)

Bicycles / eBikes

Motorbikes

Pedestrians

Trucks (ATP)

5G LOGINNOV

Apps: GLOSA, EnTruck, et. al

5G

vehicle pos / speed data (CAM)

environmental data
aggregated movement data

Traffic Light Forecast
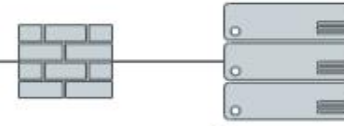(SPAT/MAP)

Service Centre

Virtual
Traffic Management Centre

City Traffic Management Centre(s)

City access point
(e..g Urban Data Platform)

Traffic Signal State [forecast]

Traffic Management Strategy measures, vehicle trajectories for traffic control
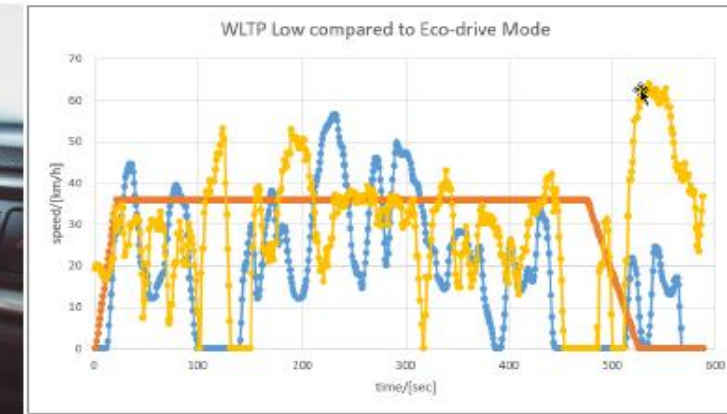
other environmental data

5G enabled FTED for Sustainable Traffic Management

SKYLARK
Precise Positioning Service

Low Carbon Mobility Management (LCMM) World-wide first ISO-23795-DIS compliant

#GREENMAGENTA
WENIGER KRAFTSTOFFVERBRAUCH UND TREIBHAUSGASE DURCH LOW CARBON MOBILITY MANAGEMENT

WLTP Low compared to Eco-drive Mode

5GLOGINNOV

5G ASPECTS COVERED IN 5G-LOGINNOV

Enhanced Mobile Broadband

Gigabytes in a second

3D video, UHD screens

Work and play in the cloud

Smart Home/Building

Augmented reality

Voice

Industry automation

Smart City

Mission critical application

Future IMT

Self Driving Car

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications
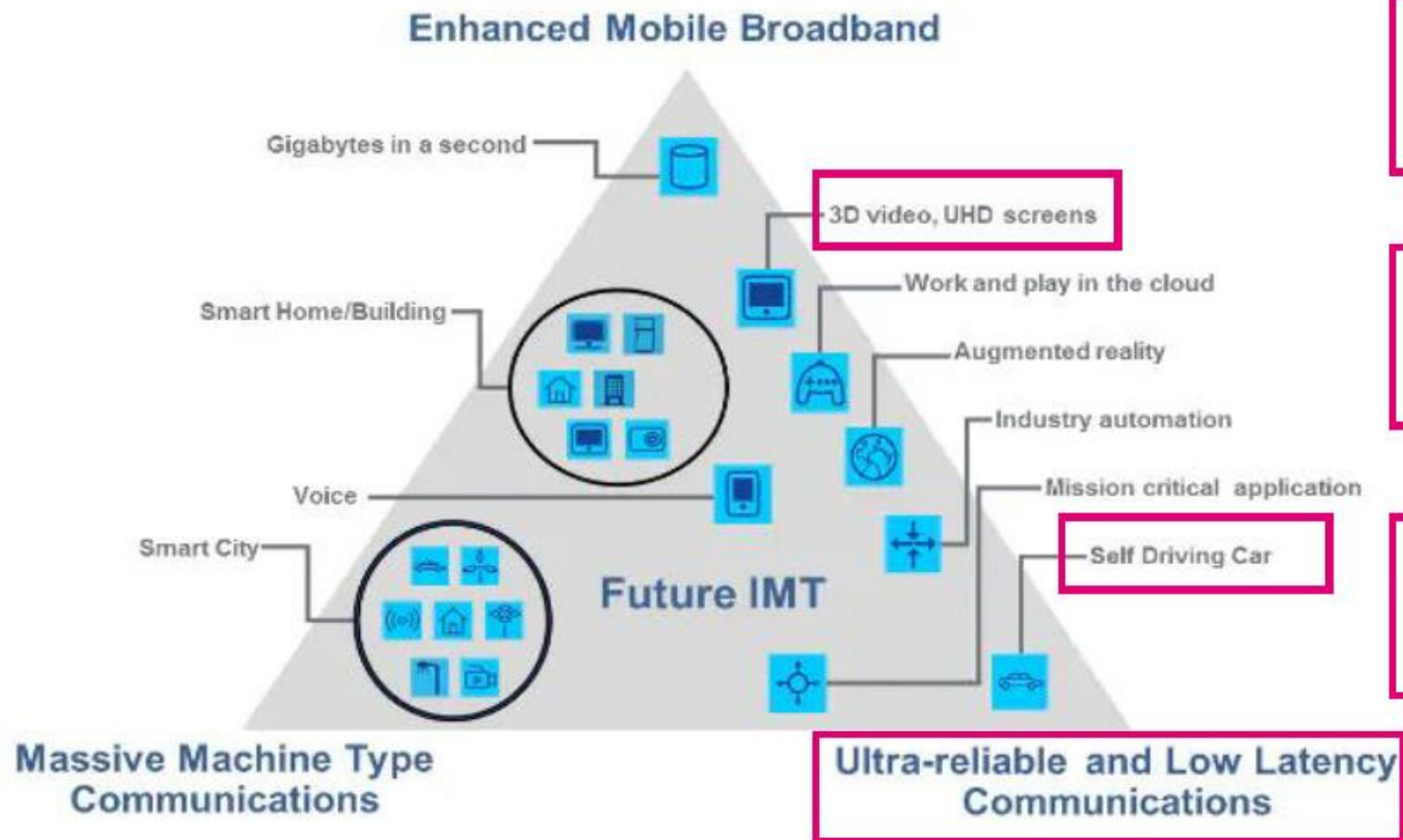
5G enabled Precise Positioning, MEC

Real-time tracking & enhanced visibility

Automated Truck Platooning: <25ms cellular V2X /V2V

5GLOGINNOV

5G-LOGINNOV→Future of Logistics

- **TRUST**: Trust is the basis of the 5G-LOGINNOV. To use the data, the data consumer must fully accept the data owner's usage policy.

- **NEW BUSINESS ECOSYSTEM**: new innovative solutions for port operations and logistics, Identify real market opportunities especially in target niches for SMEs

- **STANDARDIZED INTEROPERABILITY**: is implemented in different variants and can be acquired from different vendors.

- **VALUE ADDING APPS**: includes also services for data processing, data format alignment, and data exchange protocols.

- **DATA MARKETS**: 5G-LOGINNOV enables the creation of novel, data-driven services that make use of data apps, cross-sectorial nature of the 5G core technologies and innovative services.

- **PI**: 5G-LOGINNOV enables the creation of new ICT infrastructure to support operations in future PI logistics networks

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5GLOGINNOV **Thank you for your attention!**

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