

Deploying new CAM and Logistics tailored services in real-life port- city areas with 5G-LOGINNOV

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5GLOGINNOV

Outline



- *Vertical industry: logistics*
- *Why 5G-LOGINNOV*
- *How are deployed new CAM & Logistics use cases*
- *At Glance –Living Labs overview*
- *Impact*
- *Conclusions*

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.



Vertical: logistics services



Data exchange



Data posting



Risk prediction



E-CMR



Visibility services



CO2 monitoring



Port services



Data sharing



Data collection



Marketplace



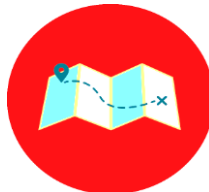
Custom services



Control Tower



Estimated Time of Arrival



Route planning



Data management

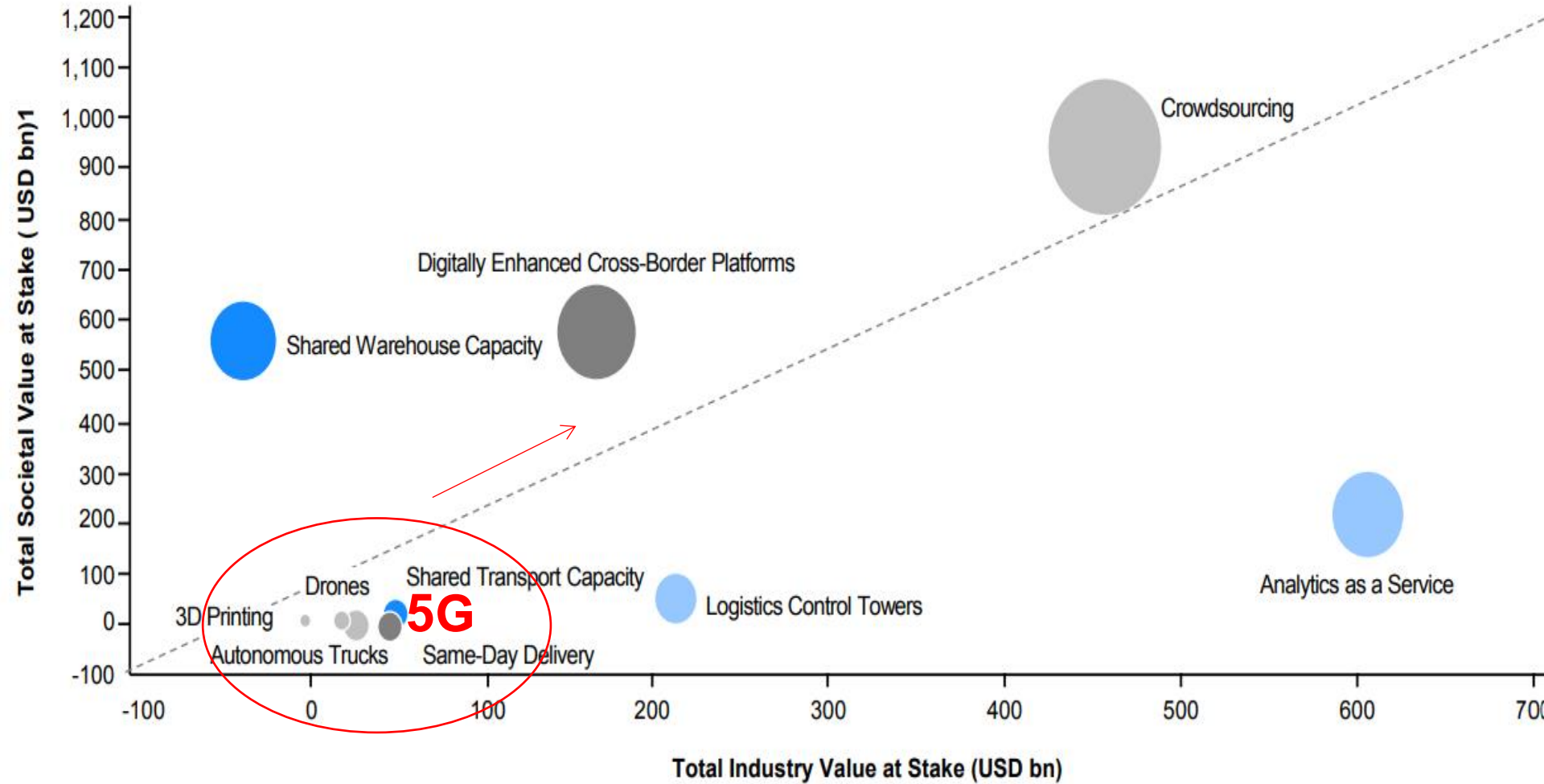


What else?



5GLOGINNOV

“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 logistics and Industry 4.0 sectors.
- 5G-LOGINNOV 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 vertical sectors contributing to the wider policy objectives of industry digitisation in the Digital Single Market.



Objectives



OBJECTIVE 1 (O1): Develop and Deploy Next Generation ports & logistics hubs operation system architecture integrated in 5G networks at three main ports in Europe: Athens (GR), Hamburg (DE) and Koper (SL) utilising new types of 5G IoT sensors and devices. WP1-3

OBJECTIVE 2 (O2): Optimise ports & logistics hubs operation and maintenance, for reducing their operational costs with innovative concepts and use cases

OBJECTIVE 3 (O3): Reduce significantly ports & logistics hubs operation emissions (CO2/NOX) and regulate the resulting freight traffic on the future 5G logistics corridor in EU including CAM truck platooning management

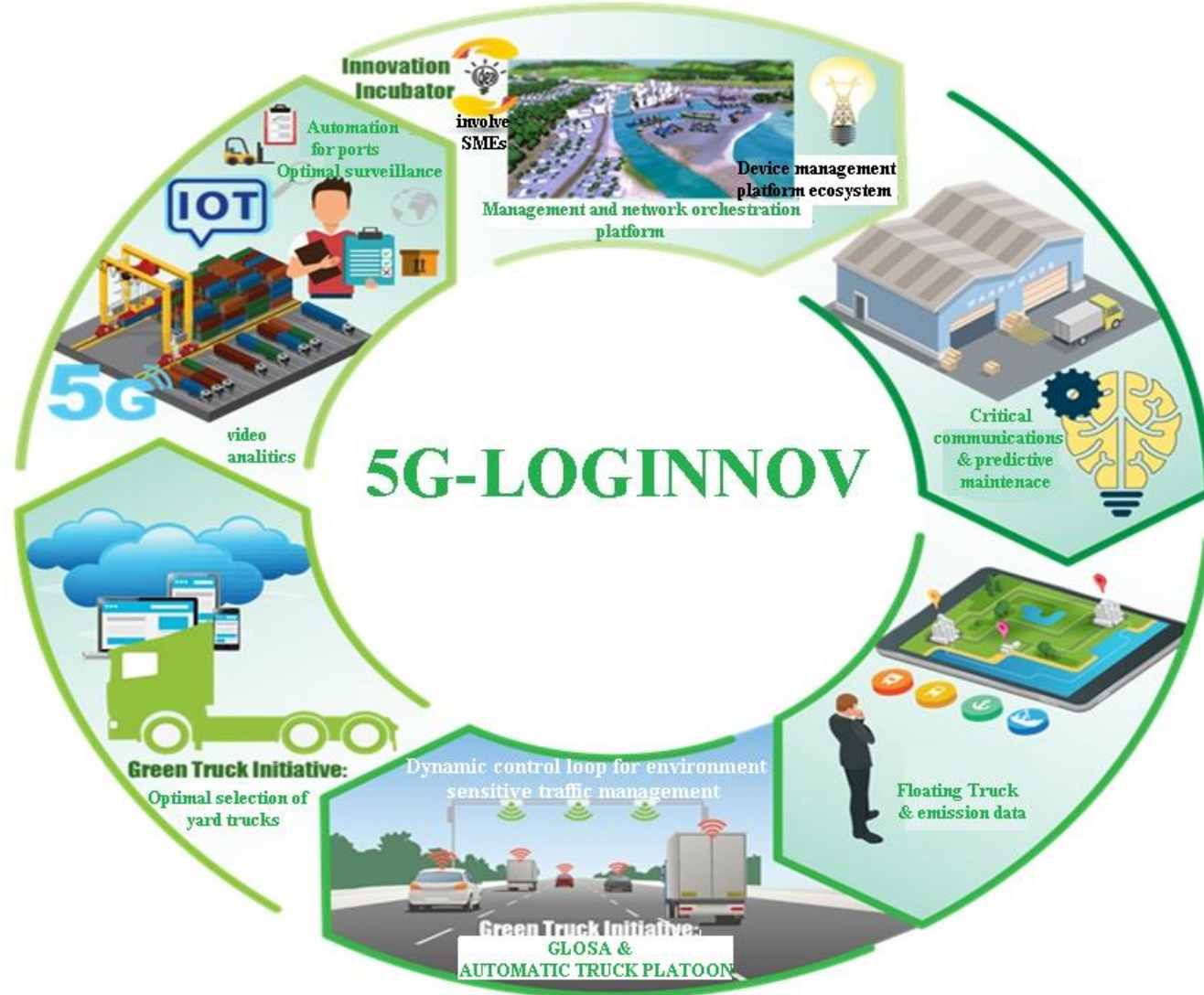
OBJECTIVE 4 (O4): Regulate the freight traffic generated by ports & logistics hubs on the future 5G logistics corridors in EU and integration of future Connected and Automated truck platoons-as 5G-LOGINNOV GREEN TRUCK INITIATIVE according to the EU GREEN DEAL program(December 2019)

OBJECTIVE 5 (O5): Boost ports & logistics hubs operation & maintenance innovation with involvement of new market actors including SMEs and Start-ups

OBJECTIVE 6 (O6): Support standardisation of 5G enabled Next Generation ports & logistics hubs operation system to ensure interoperability, platform openness and operation harmonisation around future 5G Logistics x-border corridors

OBJECTIVE 7 (O7): Support adoption and take up of 5G enabled Next Generation ports & logistics hubs operation system in Europe and beyond

Project concept



- deploy, evaluate and showcase the added value of 5G technology for Logistics and port operation in three (3) Living Labs:
 - Athens (GR)
 - Hamburg (GE)
 - Luka Koper (SV).
- major telecom industry stakeholders (MNOs, vendors, technology integrators)
- comprises also a palette of port-driven technological and societal innovations, tailored to realise the project objectives.
- following a **stakeholder driven approach**, considering the ports' and port-cities' main challenges in view of the major changes brought by ocean carriers and the shift to Industry 4.0 Logistics new era based on extended 5G features.

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



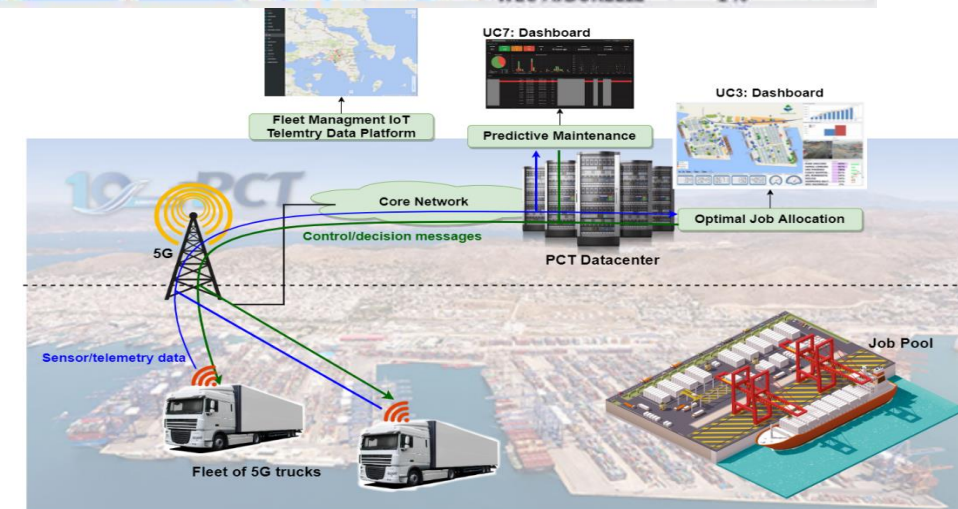
Port control, logistics and remote automation
Management and Network
Orchestration platform (MANO)
Business critical and mission critical communications



5G LOGINNOV

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

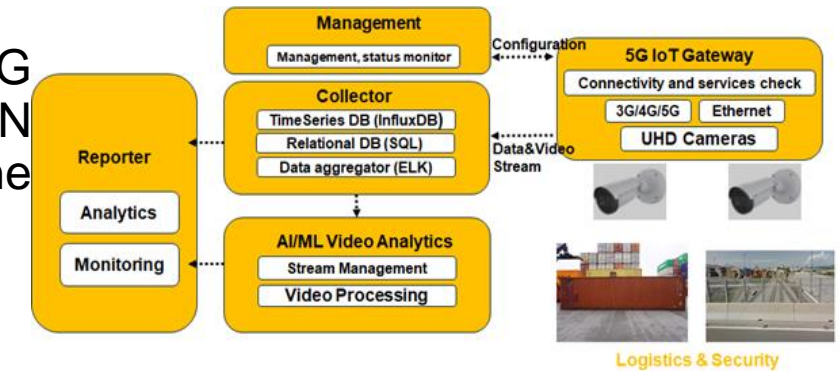
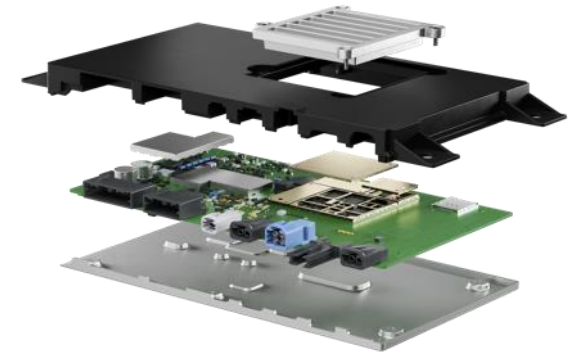
- Yard-truck as a 5G-IoT telematics device
 - Data sources: CAN-Bus, localization, other on-truck sensors (e.g., container presence)
 - Applications/use cases
 - Horizontal movement of containers in port operations (between stacking areas and loading/unloading areas for vessels and rail)
 - AI/ML approach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



5G-LOGINNOV – use cases of Living Lab Hamburg

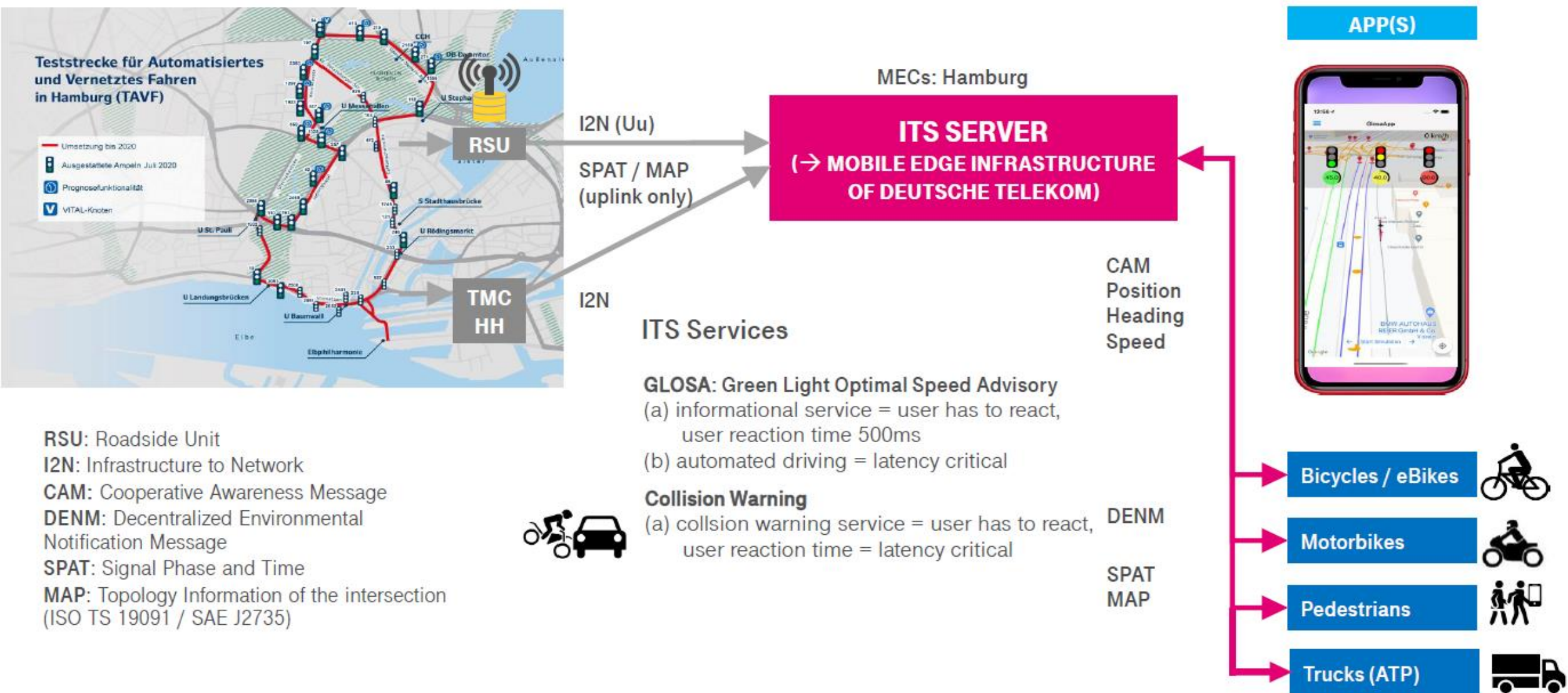


- 1) **Truck & Emission Data for Sustainable Traffic Management** based on 5G V2X in Hamburg
- 2) **Automated Truck Platooning using 5G based GLOSA** in the logistics corridor of Hamburg to **achieve low emission targets** for ports and hub-logistics
- 3) **Data exchange with SWARCO traffic management center.** Dynamic control loop for the reduction of CO2/NOx 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.



How does it work?



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)

Apps: GLOSA, EnTruck, et. al



vehicle pos / speed data (CAM)



5G

environmental data
aggregated movement data

Traffic Light Forecast
(SPAT/MAP)



Service Centre



Virtual
Traffic Management Centre

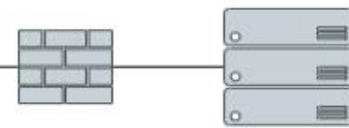
Traffic Signal
State [forecast]

Traffic Management
Strategy measures,
vehicle trajectories for
traffic control

other
environmental data



City Traffic Management
Centre(s)

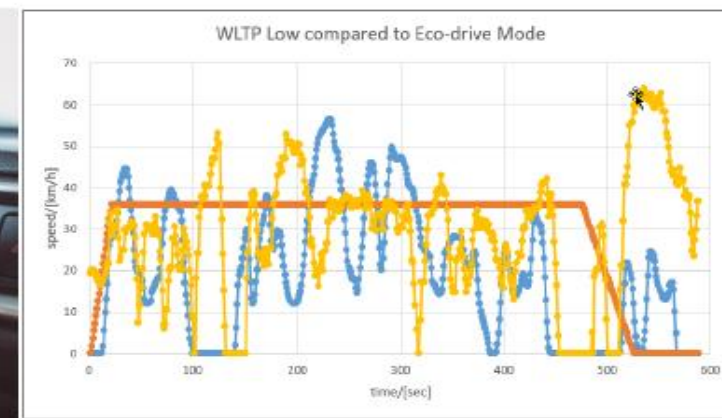


City access point
(e.g Urban Data Platform)

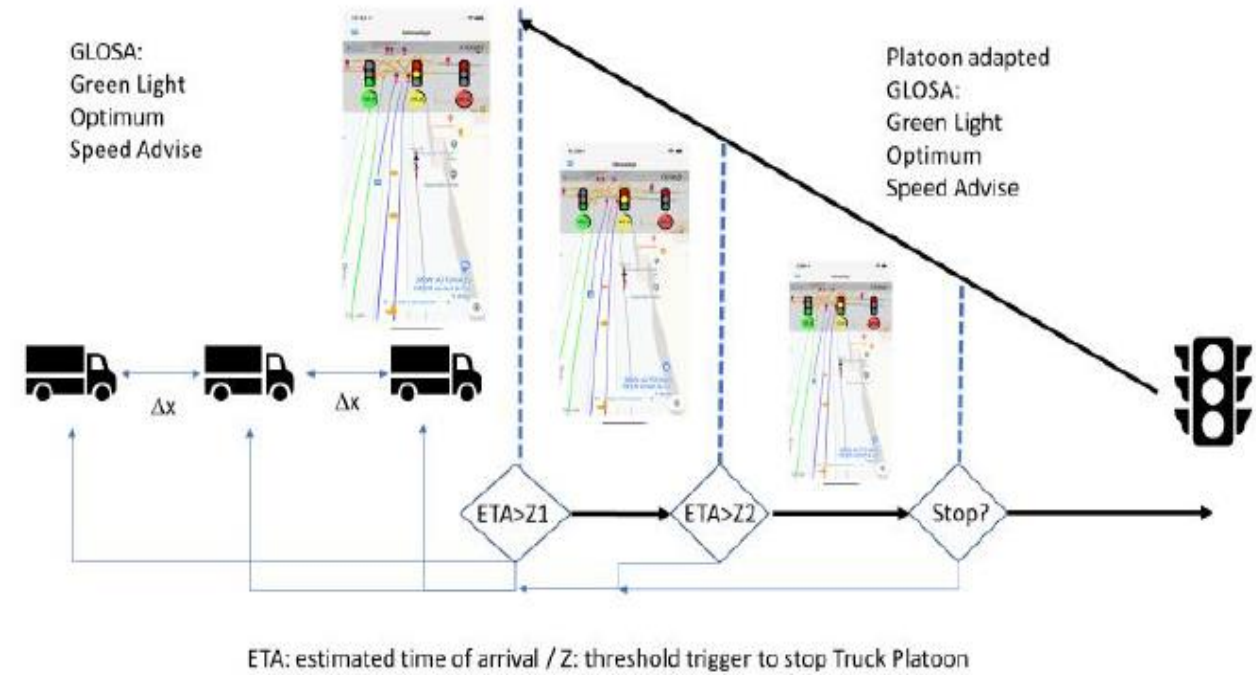
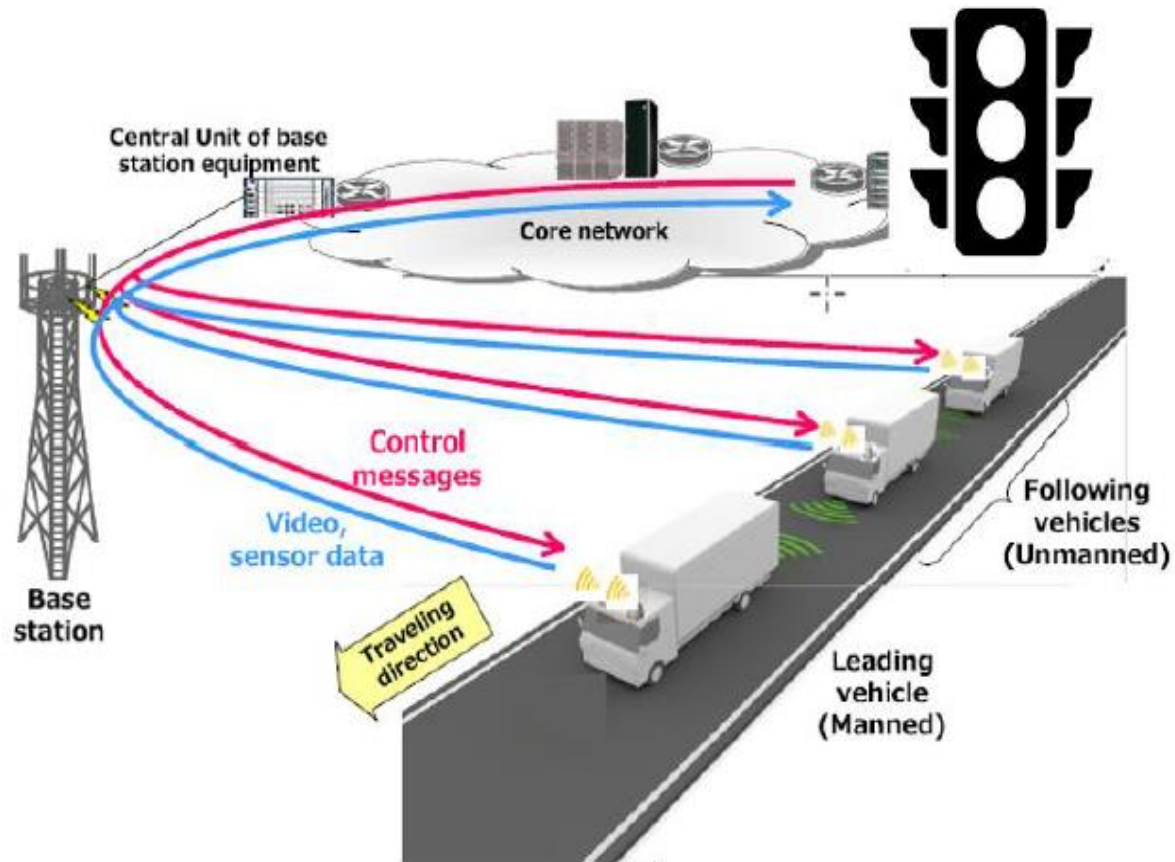
5G enabled FTED for Sustainable Traffic Management



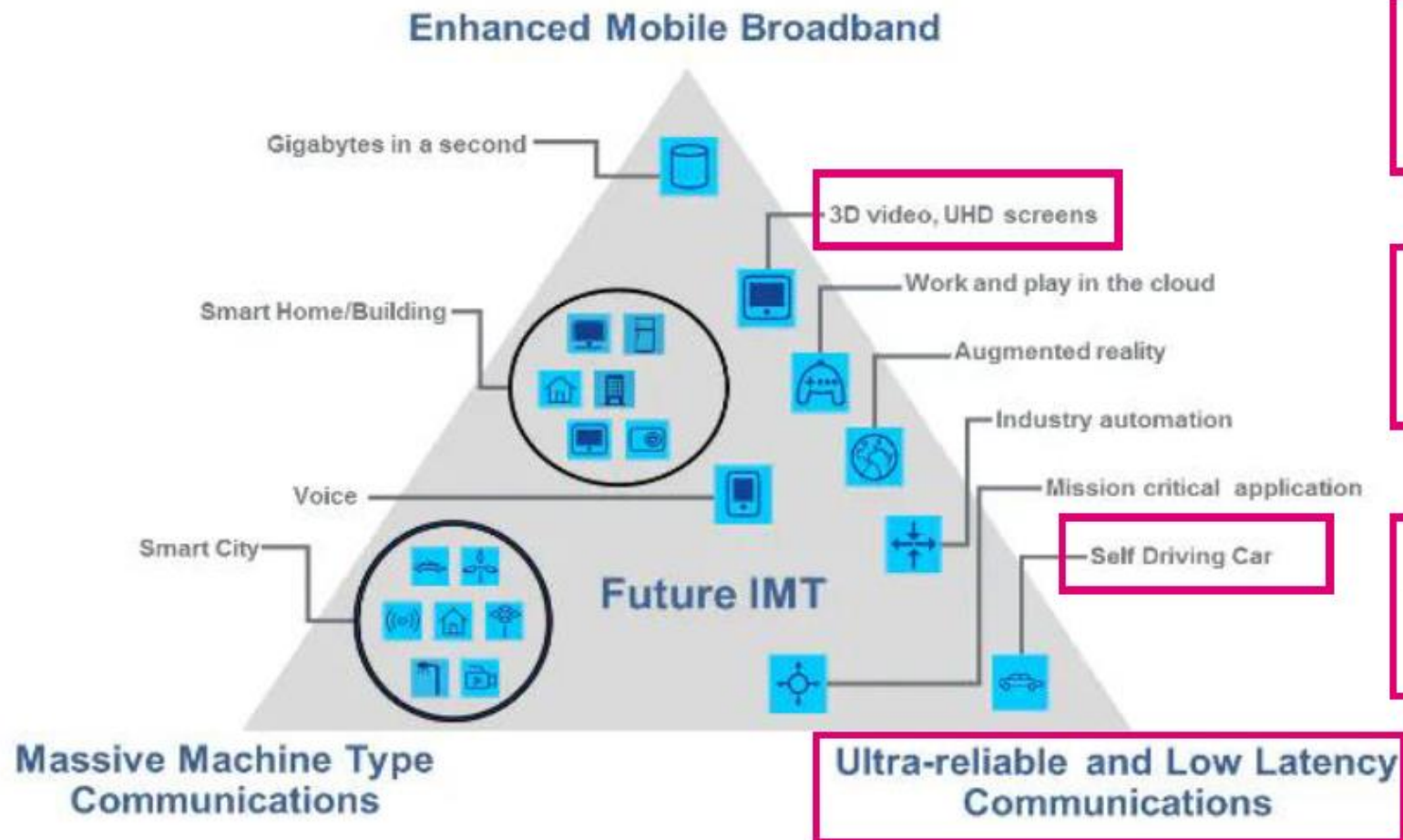
**Low Carbon
Mobility Management
(LCMM)**
World-wide first
ISO-23795-DIS
compliant



SPAT/MAP for 5G GLOSA Truck Platooning



5G ASPECTS COVERED IN 5G-LOGINNOV



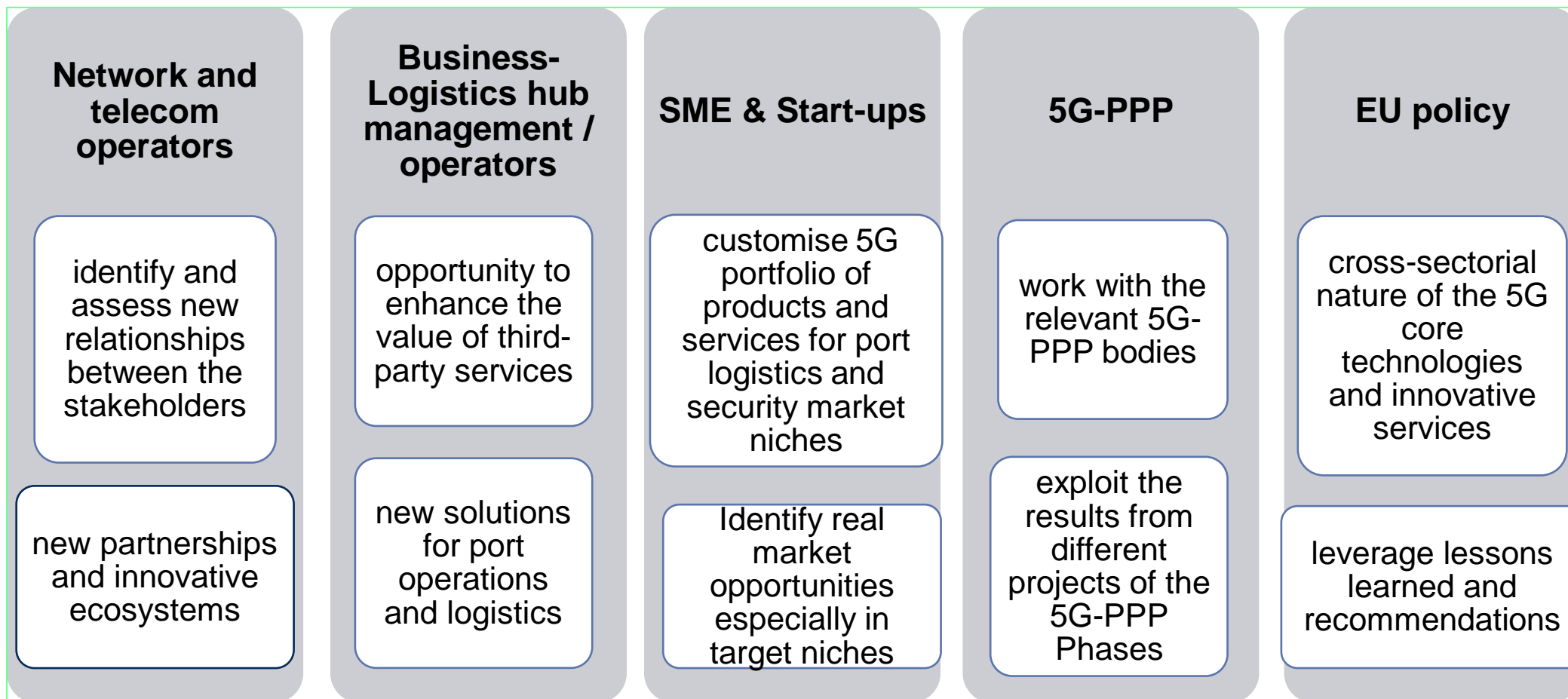
5G enabled Precise Positioning, MEC

Real-time tracking & enhanced visibility

Automated Truck Platooning:
<25ms cellular V2X /V2V



5G-LOGINNOV impact



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



5GLOGINNOV

Thank you for your attention!

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