Outline

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- **Overview**
- **Objectives**
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- **Pilot sites**
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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
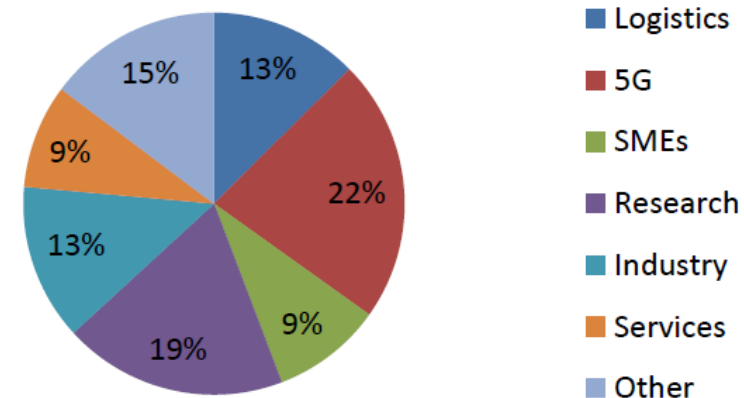
- Total budget: 7,926,474.29

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

- Logistics 13%
- 5G 22%
- SMEs 9%
- Research 19%
- Industry 13%
- Services 9%
- Other 15%

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Project partners

Why 5G-LOGINNOV (I)

European Framework for digitalisation in Logistics:

- 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**
- Logistics makes up 14% of total GDP in EU
- 11,2 Million people are employed in the EU Logistics sector
- EU accounts for 19% of world exports and imports
- Cargo port operators need to comply with **increasingly stricter environmental regulations** and societal views for sustainable operations.
- Simplification of legal rules and administrative procedures at all levels
    - There remains also an urgent need to further reduce administrative burden by simplifying and harmonising transport and compliance documents and procedures. Progress has been made e.g. in the maritime eManifest, but the e-CMR consignment note for road freight
- Improving access to information on EU multimodal and logistics services
    - it is paramount for logistics users to dispose of accessible, accurate and reliable information about multimodal and logistics services in the EU.
- Digitalisation and innovative technologies –
    - equal access to data and data exchange, integration and interoperability of information systems (new, existing and across borders) are key issues to be addressed, along with (cyber-) security, anti-fraud and safety aspects which are critical for the communication among businesses and authorities.
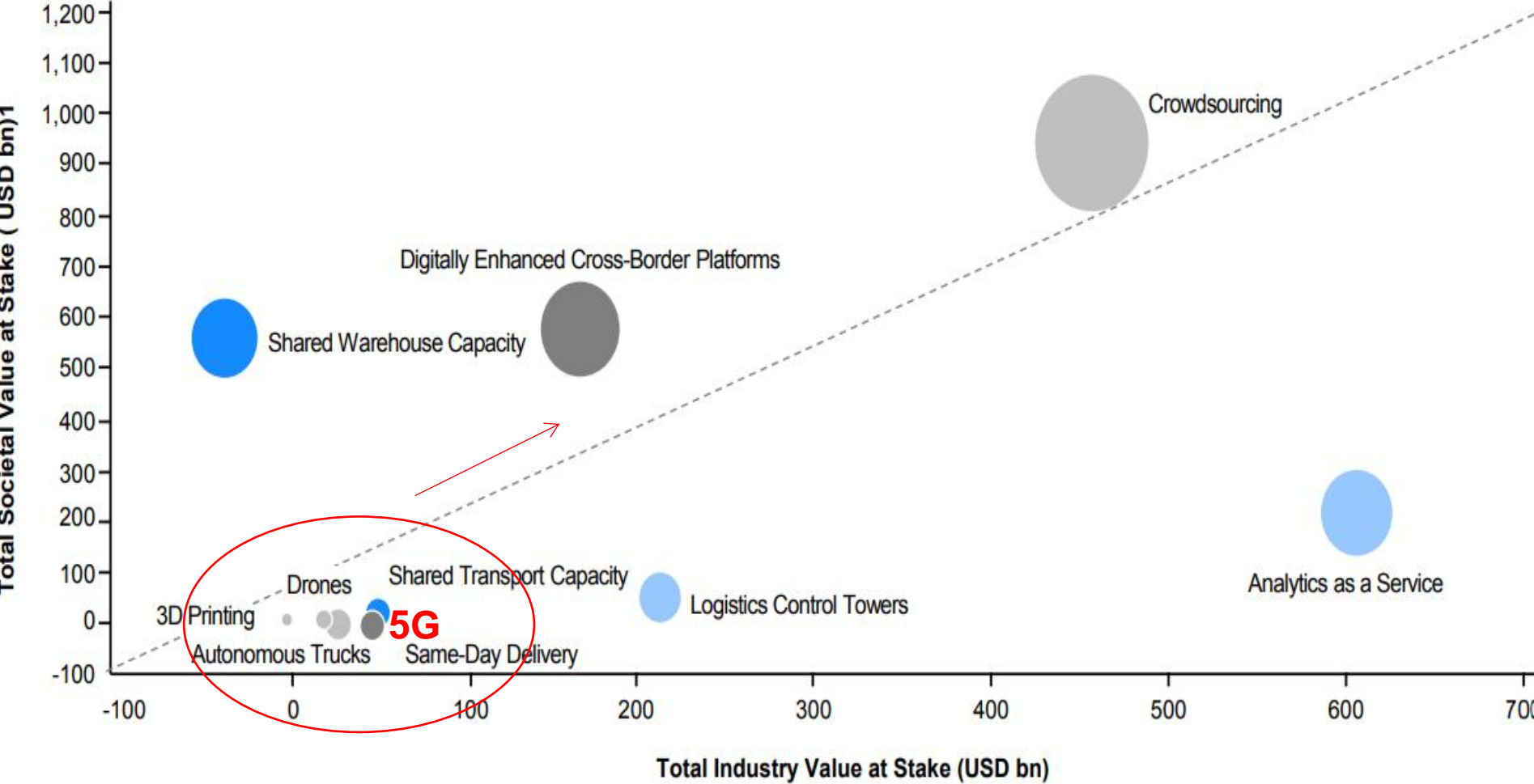
Why 5G-LOGINNOV (II)

- 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**

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"Show me the Money" from Digitalisation in Logistics

Bubble chart: Total Societal Value at Stake (USD bn) vs Total Industry Value at Stake (USD bn)

- Crowdsourcing
- Digitally Enhanced Cross-Border Platforms
- Shared Warehouse Capacity
- Analytics as a Service
- Drones
- Shared Transport Capacity
- 3D Printing
- Autonomous Trucks
- 5G
- Same-Day Delivery
- Logistics Control Towers

Legend:
- Delivery Capabilities
- Shared Logistics Capabilities
- Logistics Services
- Information Services

Overview

- 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**.

- 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.

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Objectives

OBJECTIVE 1 (O1): Develop and Deploy <u>Next Generation ports & logistics hubs operation system</u> 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.

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

OBJECTIVE 3 (O3): <u>Reduce significantly ports & logistics hubs operation emissions</u> (CO_2/NOX) and regulate the resulting freight traffic on the future 5G logistics corridor in EU including CAM truck platooning management

OBJECTIVE 4 (O4): <u>Regulate the freight traffic</u> generated by ports & logistics hubs on the future <u>5G logistics corridor</u>s in EU and integration of future <u>Connected and Automated truck platoons</u>-as 5G-LOGINNOV GREEN TRUCK INNITIAVE according to the EU GREEN DEAL program

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

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

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

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Project concept
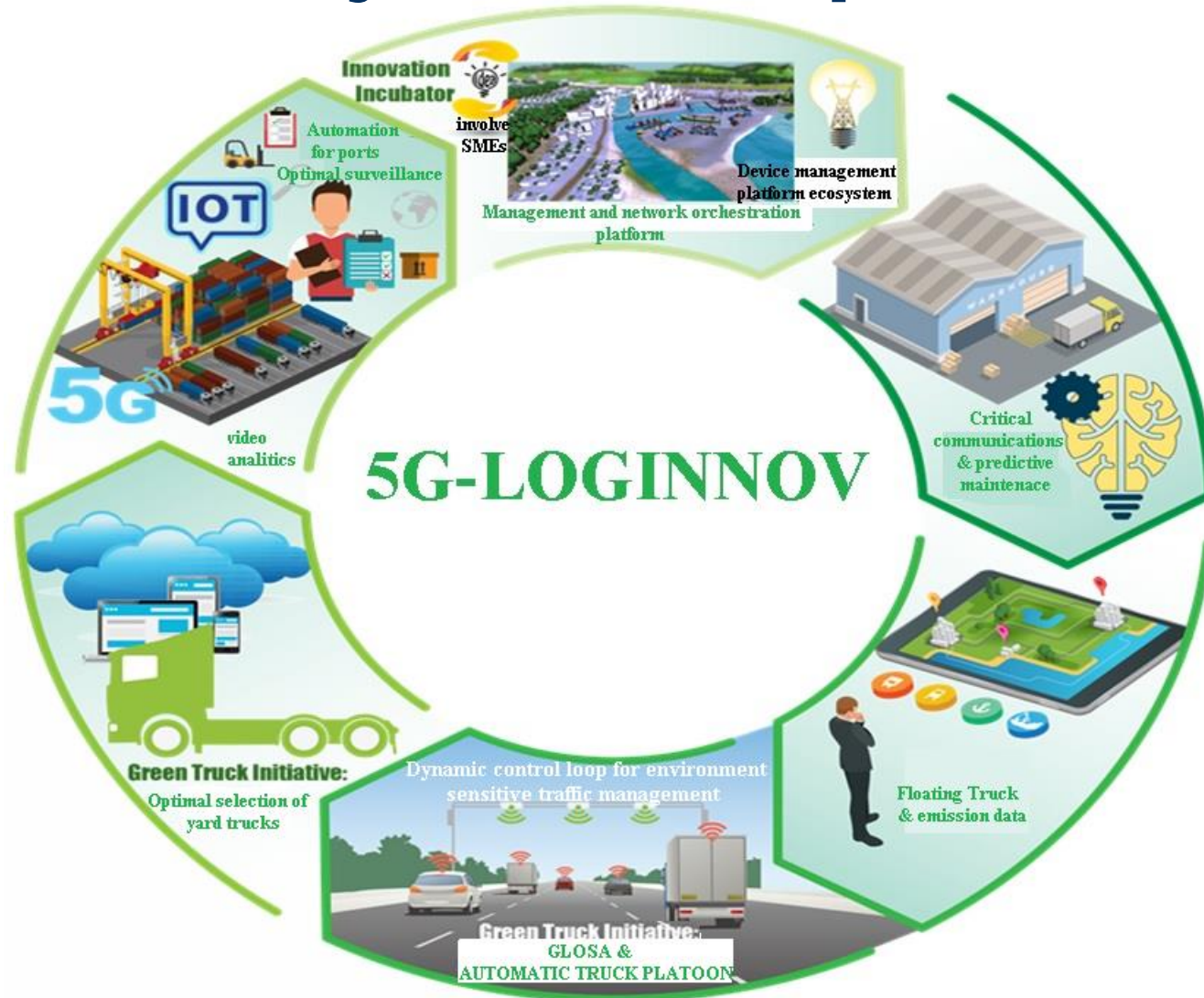
- deploy, evaluate and showcase the added value of 5G technology for Logistics and port operation in three (3) Living Labs:
  - Athens (GR)
  - Hamburg (GE)
  - Luka Koper (SV).
- major telecom industry stakeholders (MNOs, vendors, technology integrators)
- comprises also a palette of port-driven technological 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.

Positioning of the project

	TRL level								
	1	2	3	4	5	6	7	8	9
Management and Network Orchestration platform									
Device Management Platform Ecosystem									
Optimal selection of yard trucks									
Optimal surveillance cameras and video analytics									
Automation for ports: port control, logistics									
5G mission critical communications in ports									
Predictive Maintenance									
Floating Truck & Emission Data implemented									
GLOSA & Automated Truck Platooning									
Dynamic control loop for environment sensitive TM									

- 5G-LOGINNOV will extend the 5G features.
- The start and target TRLs for the main technological components are presented.
- Due to its inter-disciplinary nature, 5G-LOGINNOV works on different items with different TRLs; some elements are closer to concepts and testing of prototypes, while others are closer to the market

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AT GLANCE: LLs

Piraeus-Athens

Hamburg

Luka Koper

- **UC3**: Optimal selection of yard trucks
- Installation of a 5G access point on yard trucks
- e.g., 5G latency, precise localization services, etc.

UC4: 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
- **UC7**: 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

UC8/9: 5G-LOGINNOV Floating Truck & Emission Data (FTED)

UC10: 5G-LOGINNOV 5G GLOSA & Automated Truck Platooning (GTP)- under 5G-LOGINNOV Green initiative

UC11: 5G-LOGINNOV dynamic control loop for environment sensitive traffic management actions (DCET)

UC1: port control, logistics and remote automation
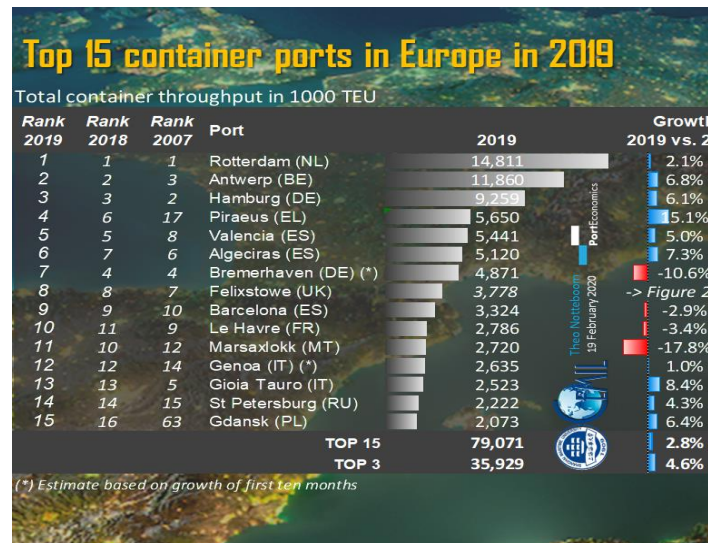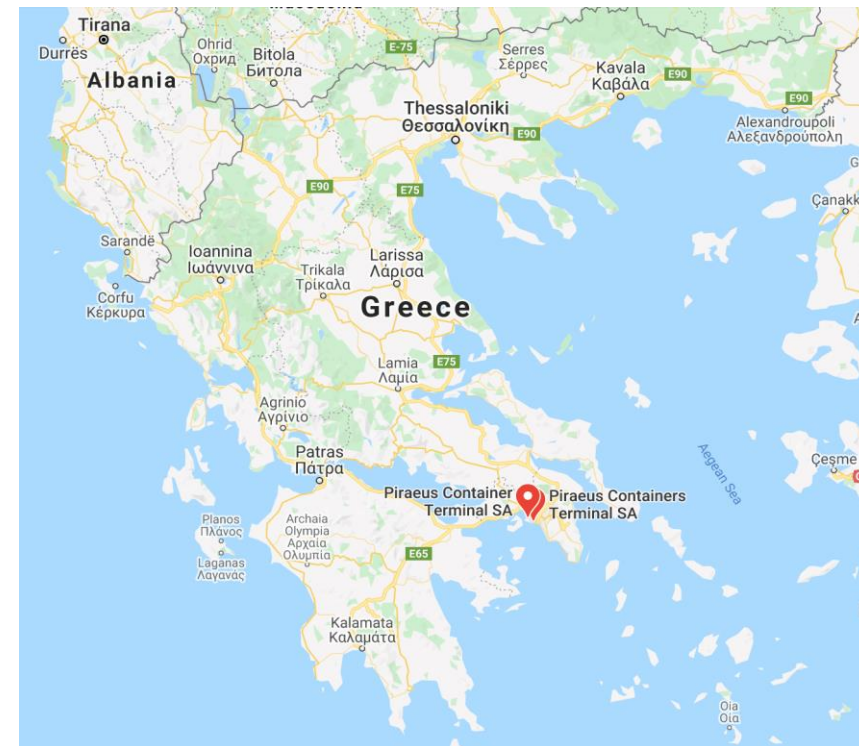**UC2**: business critical and mission critical communications

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Piraeus-Athens LL Overview

- Athens Port, Greece (Partners involved: **ICCS**, **PCT**, **VODAFONE**)

Video Surveillance APP Instance
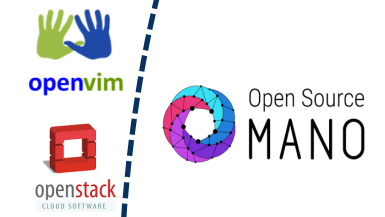
Container Status APP Instance

Application

4K video resolution

NFVO / VNFM

VIM / NFVI

MANO platform

5G NSA: 4G Core - EPC

5G SA: 5G Core

5G Core & Protocol Stack (Open Source or pre-commercial)

Core Network

Access (gNB) (SDR e.g.,USRP N310, or pre-commercial)

RAN – 5G NR

Container seal detected

VM/Container

GPU – ML/AI model

nrUE (SDR e.g.,USRP N310, or pre-commercial)

VM/Container

GPU – ML/AI model
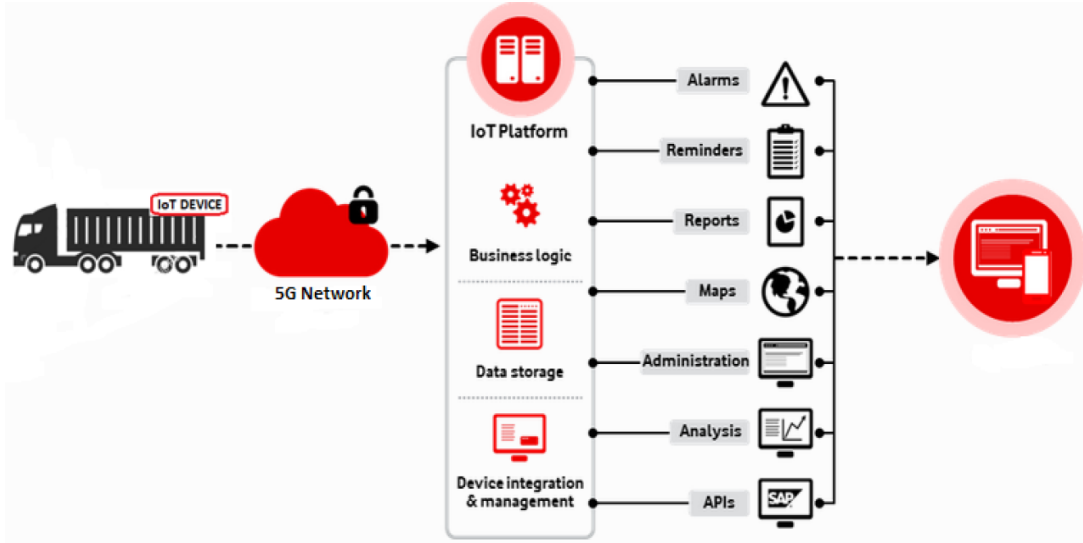
nrUE (SDR e.g.,USRP N310, or pre-commercial)

Far edge computing

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Predictive Maintenance

Optimal allocation of container jobs to trucks

- **5G access point will be installed on trucks**

- Collect and forward in real-time with low latency telemetry data over the 5G network to the MANO platform

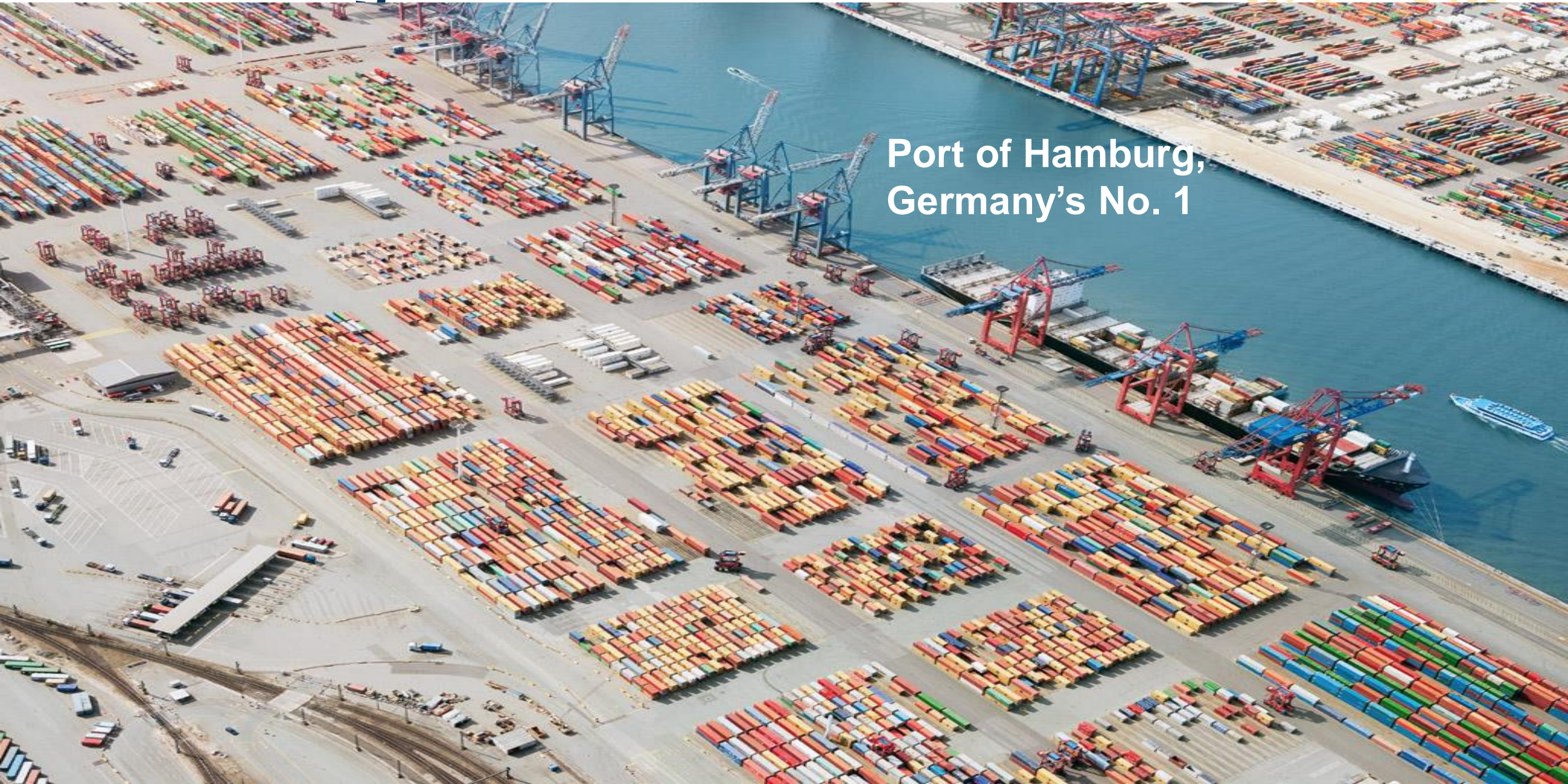- PREDICTOR tool was developed through the COREALIS project (768994/MG-7.3-2017)

- Current implementation based on WiFi (driven from insights of INTE-TRANSIT 5187/2C-MED12-05 project)
  - Sub-optimal localization of trucks: suboptimal traffic management, increased operational costs, increased CO_2

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Port of Hamburg, Germany's No. 1

Use Cases

- **Use cases related to Floating Truck & Emission and Automated Truck Platooning**

  UC8/9: 5G-LOGINNOV Floating Truck & Emission Data (FTED)

  UC10: 5G-LOGINNOV 5G GLOSA & Automated Truck Platooning (GTP)-under 5G-LOGINNOV Green initiative

  UC11: 5G-LOGINNOV dynamic control loop for environment sensitive traffic management actions (DCET)

- **Collaboration with** Local administration (I.T.S. Policy Committee)

Luka Koper LL Overview

Port of Koper, Koper municipality, Adriatic Sea, Slovenia

# UC1: 5G-LOGINNOV Management and Network Orchestration platform (MANO)

- **Target:** automated deployment and life cycle management (MANO) of network and services VNF (Virtual Network Functions) components for the addressed vertical scenarios – rMON 5G IoT Platform

MBL – Management Business Logic
CBL – Collector Business Logics
MA – Measurement Agent
TSDB – Time Series Database
DEXT – Data Extractor
RTAA – Real Time Advanced Analytics

UC5: 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 / exposure to TOS| identification of container markers | detection of structured damage)*

- **Target 2:** port infrastructure monitoring and remote metering with 5G IoT to SCADA *(operating machine monitoring and leak detection identification with water sensors)*

- **Target 3:** resilient 5G based network services *(supporting data transfer redundancy between operational port infrastructure and operations center)*
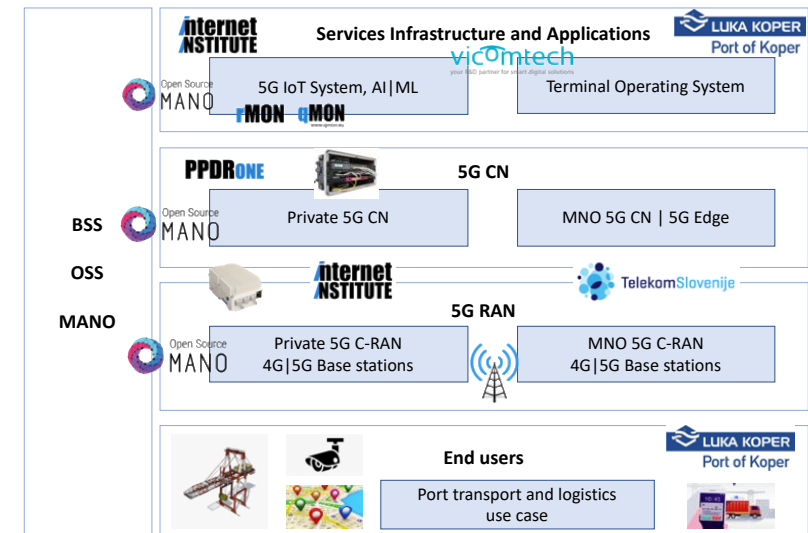
UC6: The 5G-LOGINNOV 5G mission critical communications in ports

- **Target 1:** A real-time video surveillance use case *(body-worn cameras | portable video surveillance cameras | drone-based surveillance)*

- **Target 2:** private security operations management and support *(personnel/team status monitoring | positioning and triage operations support with dedicated mobile applications)*

- **Target 3**: network reliability and resilience using public and standalone 5G networks

5G-LOGINNOV impact

Network and telecom operators	Business-Logistics hub management / operators	SME & Start-ups	5G-PPP	EU policy
identify and assess new relationships between the stakeholders	opportunity to enhance the value of third-party services	customise 5G portfolio of products and services for port logistics and security market niches	work with the relevant 5G-PPP bodies	cross-sectorial nature of the 5G core technologies and innovative services
new partnerships and innovative ecosystems	new solutions for port operations and logistics	Identify real market opportunities especially in target niches	exploit the results from different projects of the 5G-PPP Phases	leverage lessons learned and recommendations

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5G-LOGINNOV benefits

Better event management

More efficiency and better resilience

Fewer costs, less administrative burden

New business opportunities

Enhanced supply chain visibility

Fewer CO2 emissions

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Thank you for your attention!

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