

Piraeus-Athens Living Lab Use Cases

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Athens Living Lab overview

ICCS & Position of the I-SENSE group



ICCS stands for the Institute of Communication & Computer Systems, Athens, Greece.

A public scientific & technological institute which undertakes advanced research in the field of electrical, electronic and computer engineering & technologies.



- 12 research units;
- 24 research labs;
- scientific personnel: more than 800 researchers;
- contracts with EC, National Authorities and Agencies, Industry



RESEARCH TEAMS

**Intelligent
Transport Systems**

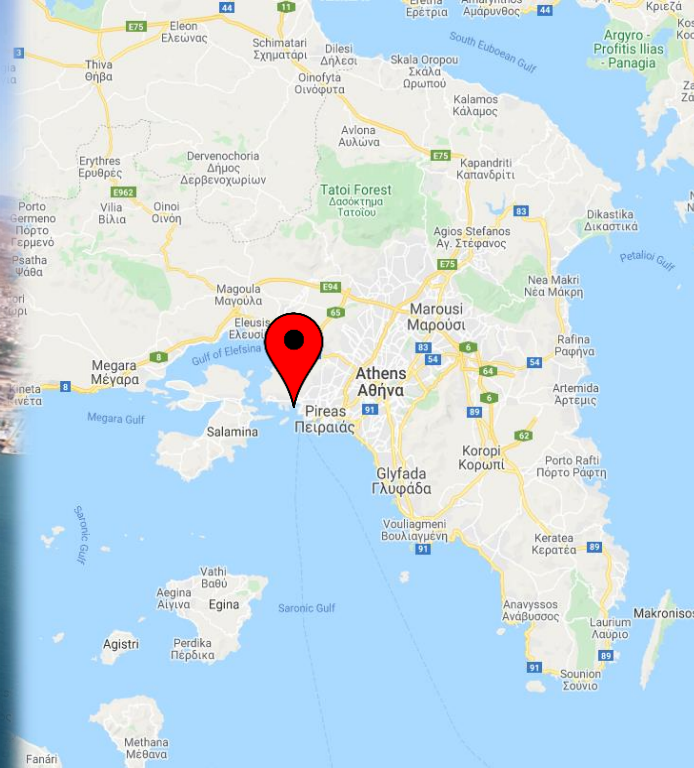
**Smart Integrated
Systems**

*Sensors, Communication,
Platforms*

**Crisis
Management and
Secure Societies**

Technology and Innovation

Piraeus Port as a maritime junction point for transports

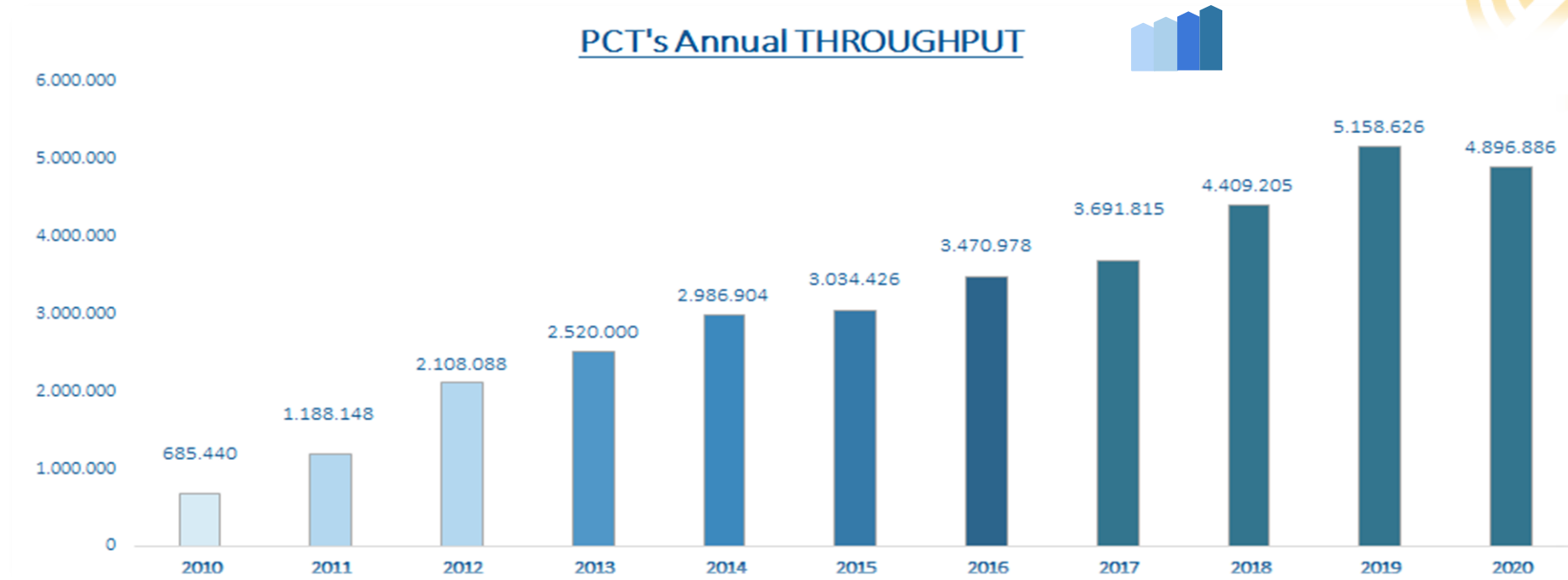


PIRAEUS CONTAINER TERMINAL

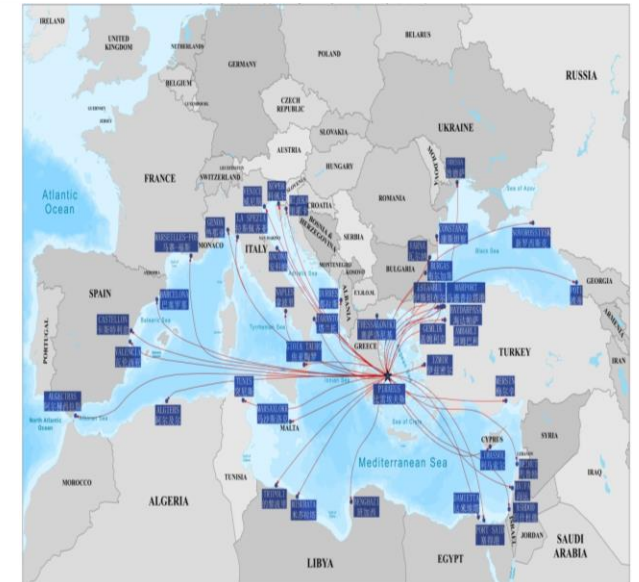
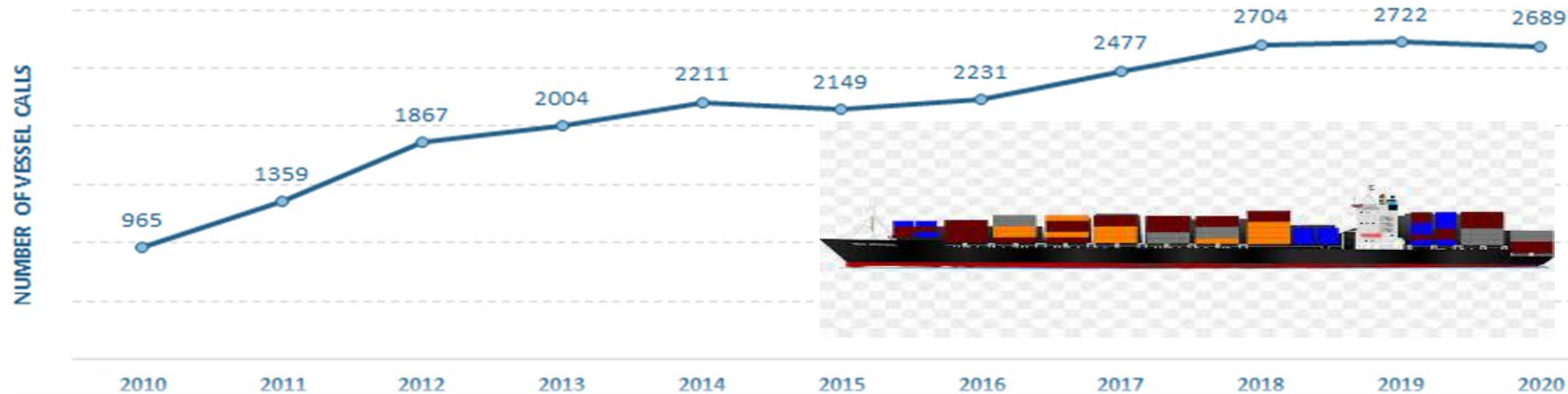
2021



10 years of continuous growth



Vessel Calls Per Annum



5G-LOGINNOV Goals and Expectations



- Improve operational efficiency of port operations of Piraeus port
 - Reduce the traffic congestion in the port (traffic jams and quay side queues within the container terminal, sub-optimal container job allocation based only truck availability pools)
 - Redistribute the traffic in the port based on real-time truck location (external truck coordination)
- Reduce the cost of operations
 - Predictive maintenance service of yard trucks
 - Automation for ports: port control, logistics and remote automation (far-edge computing analytics services with NFV-MANO support)
- Reduce the environmental footprint of port operations
 - CO2 emissions, fuel consumption, travel distance, etc.
- Improve employee safety
 - Human presence detection in risk-areas (far-edge computing analytics services with NFV-MANO support)

- **Partners**

- Piraeus Container Terminal S.A, PCT (Living Lab)
- Vodafone (MNO)
- Institute of Communications and computer systems, ICCS (Living Lab Leader)



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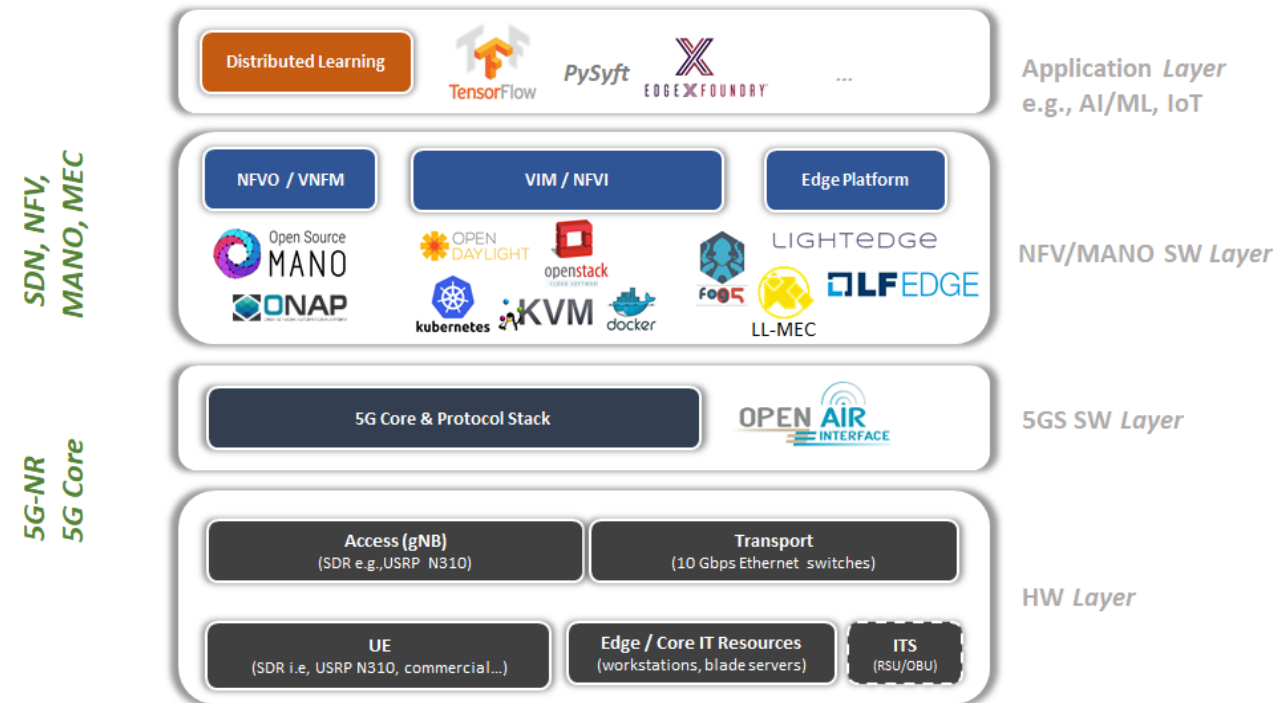
Use Cases

The background is a solid dark blue. On the left side, the text "Use Cases" is written in a white, bold, sans-serif font. To the right of the text, there are several light blue, curved, abstract shapes that resemble stylized waves or concentric arcs, creating a sense of movement and depth.

The ICCS 5G TestBed: Technologies in a Nutshell

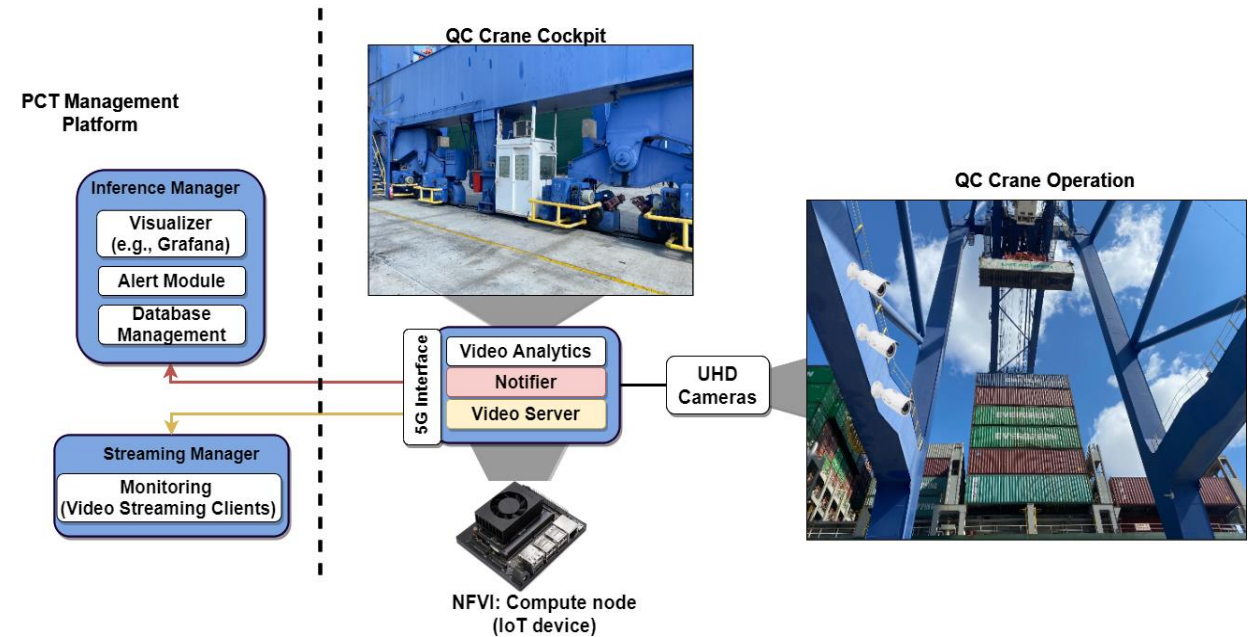
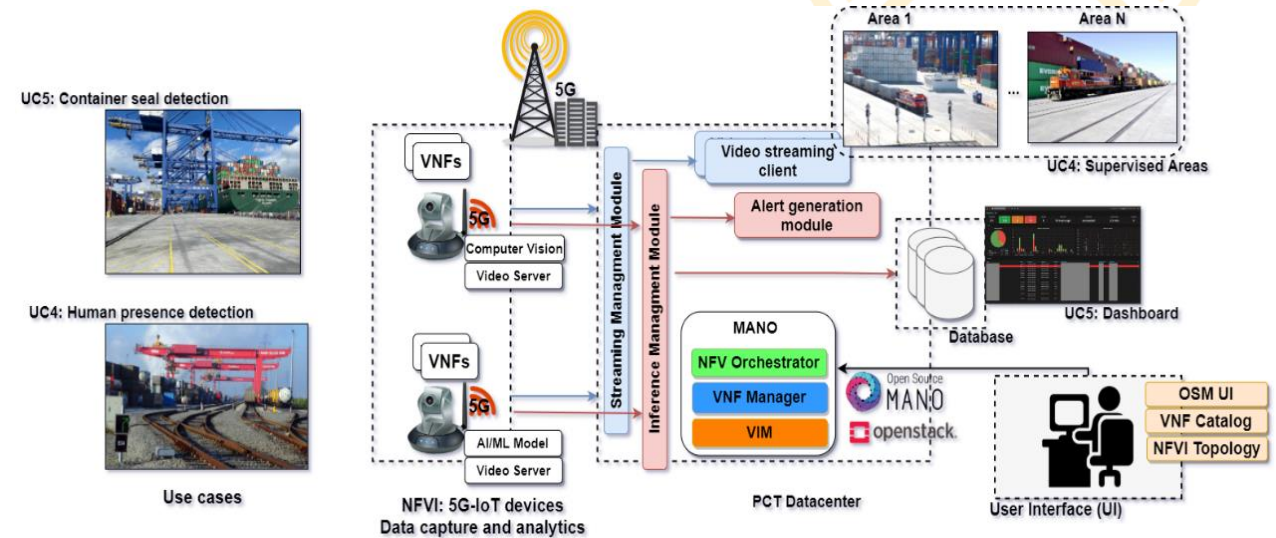


- 5G New Radio and 5G Core
- Network Functions Virtualization (NFV)
- Management and Orchestration (MANO)
- Mobile/Multi-access Edge Computing (MEC)
- Software Defined Networking (SDN)
- Distributed AI/ML



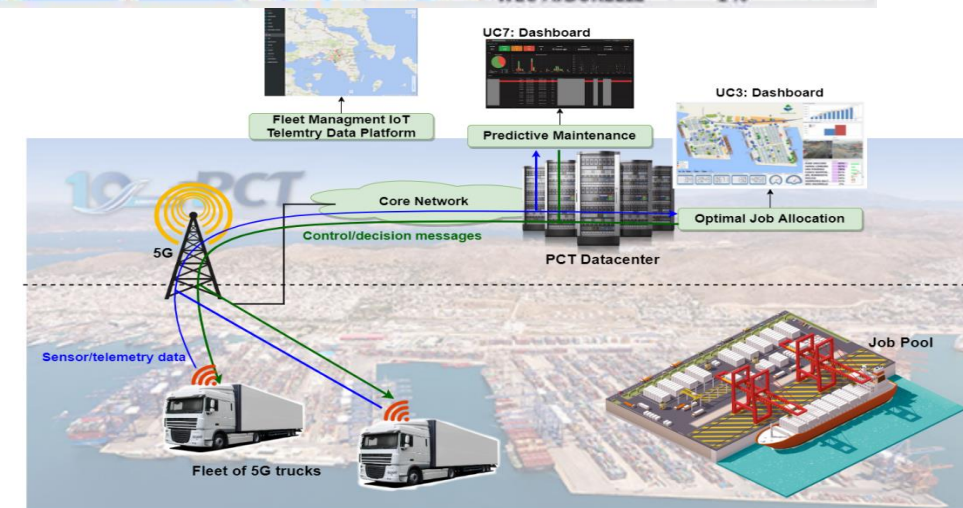
5G-IoT and Video analytics with NFV-MANO support

- 5G-IoT device design tailored to the Living Lab needs
- Far-edge computing approach for computer vision analytics
 - Human presence, risk detection
 - Container seal detection
- NFV-MANO support (day0 – day2)
 - Service orchestration (VNFs, CNF, PNFs,)
 - Video analytics
 - Monitoring and alert generation
 - Life cycle management
- Open source solutions
 - commercial off-the-shelf (COTS) hardware
 - Facilitate interoperability across heterogeneous port facilities



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.)



Thank you!



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Back up

5G-LOGINNOV Scope



- Develop and deploy Next Generation ports & logistics hubs operation system architecture, integrated in 5G networks
 - Optimize/automate ports & logistics hubs operation and maintenance
 - Reduce operational costs and the environmental footprint of port operations
 - Implement and deploy a Green Truck initiative using CAD/CAM & automatic truck platooning
 - Boost innovation with involvement of new market actors including SMEs and Start-ups
 - Support adoption and standardization of 5G-LOGGINNOV innovations in Europe and beyond
- Deploy, evaluate and showcase the added value of 5G technology for Logistics and port operation in three Living Labs: Athens (GR), Hamburg (GE) and Luka Koper (SV).

