COREALIS

Project Overview

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COREALIS Facts & Figures

- ✓ Topic: "**The Port of the future**"

- ✓ Duration: 01.05.2018 - 30.04.2021 (**36** months)

- ✓ Coordinator: Institute of Computers and Communication Systems

- ✓ **17** partners from **9** European and associated countries

- ✓ 4 Research Institutes, 5 Ports, 4 Industry partners, 3 SMEs, 1 ITS Association

- ✓ Living Labs in **Five European Port-Cities** including 3 out of the top-5 in Europe

COREALIS Piraeus Living Lab

Antwerp Port, Belgium

Piraeus Port, Greece

Valencia Port, Spain

Livorno Port, Italy

Haminakotka Port, Finland

COREALIS vision-main goals

COREALIS proposes a **strategic**, **innovative framework**, supported by **disruptive technologies**, including Internet of Things (IoT), data analytics, next generation traffic management and emerging 5G networks, so that cargo ports can face <u>current and future challenges</u> regarding:

- *Optimization of port operations*

- *Reduction of environmental footprint*

- *Increase of efficiency & reduction of traffic within and around ports*

- *Sustainability of the socioeconomic development of the port and its surrounding area*

COREALIS at a glance

https://www.youtube.com/watch?v=Ijt8n0ec0o8

COREALIS Innovations

Port of the Future Serious Game
(simulation tool for decision making)

RTPORT
(5G-enabled smart terminal operations, IoT)
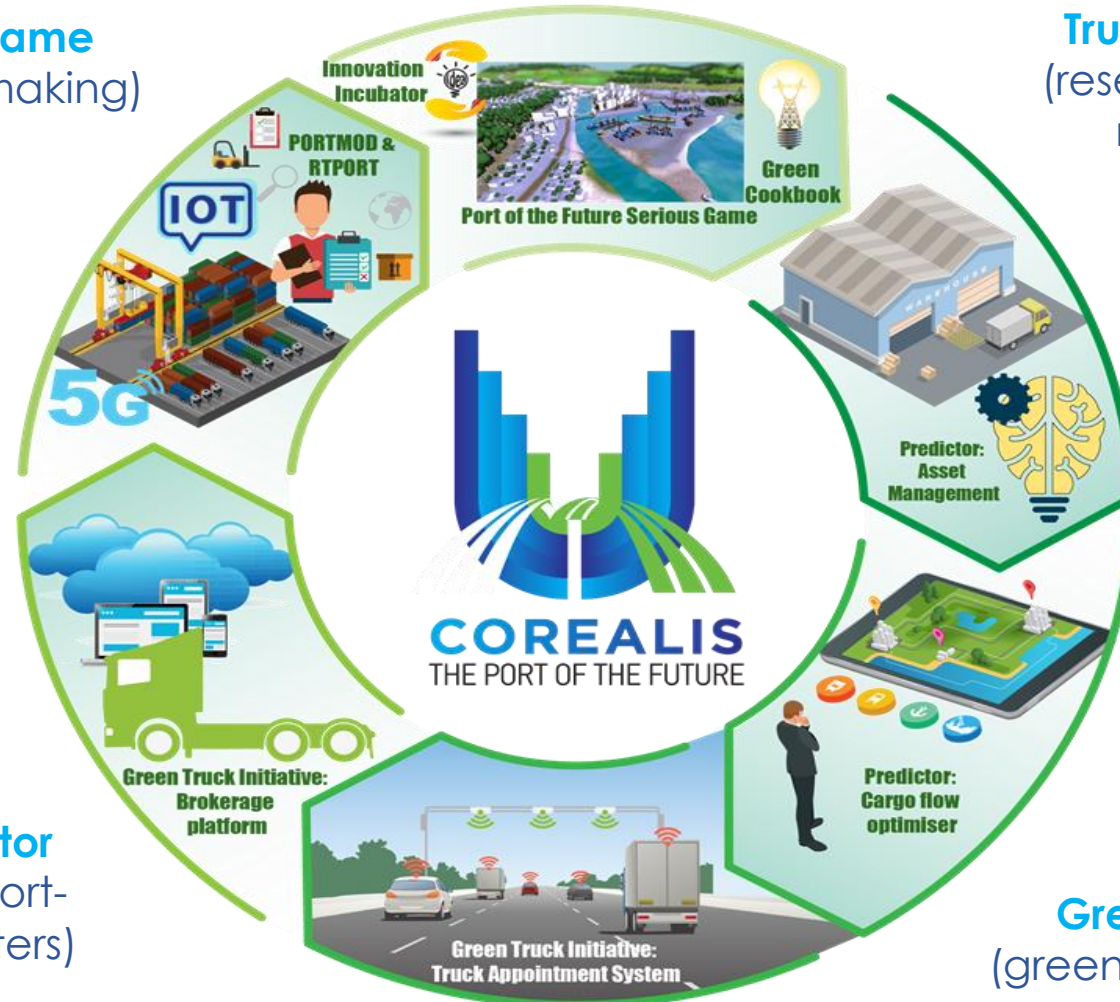
Brokerage Platform
(cloud based marketplace for leasing intra-CT trucks)

PORTMOD
(optimization planning tool for CT operations)

Innovation Incubator
(development of port-city innovation clusters)

Truck Appointment System
(reservation system including real-time traffic data)

Just-In-Time Rail Shuttle Service
(feasibility study for key port-hinterland corridors)

Cargo Flow Optimiser
(optimization of cargo flows ocean/rail/inland-waterway)

Predictor for Asset Management
(machine learning based Just in Time inventory)

Green Cookbook
(green energy solutions)

Matrix of COREALIS Demos & Innovations

	Hinterland connectivity			Intra-Terminal operations				Decision making/ Innovation		
	TAS	**Brokerage platform**	**JIT Rail Shuttle Service**	**Cargo Flow Optimiser**	**Predictor / Asset Mgmt**	**PORTMOD**	**RTPORT**	**Energy assessment & Green cookbook**	**PoF Serious Game**	**Innovation Incubator**
Valencia	X		X							X
Piraeus					X			X	X	
Livorno						X	X		X	
Antwerp		X		X						
Haminakotka	X					X			X	

RTPORT - Model Driven Real Time Control Module
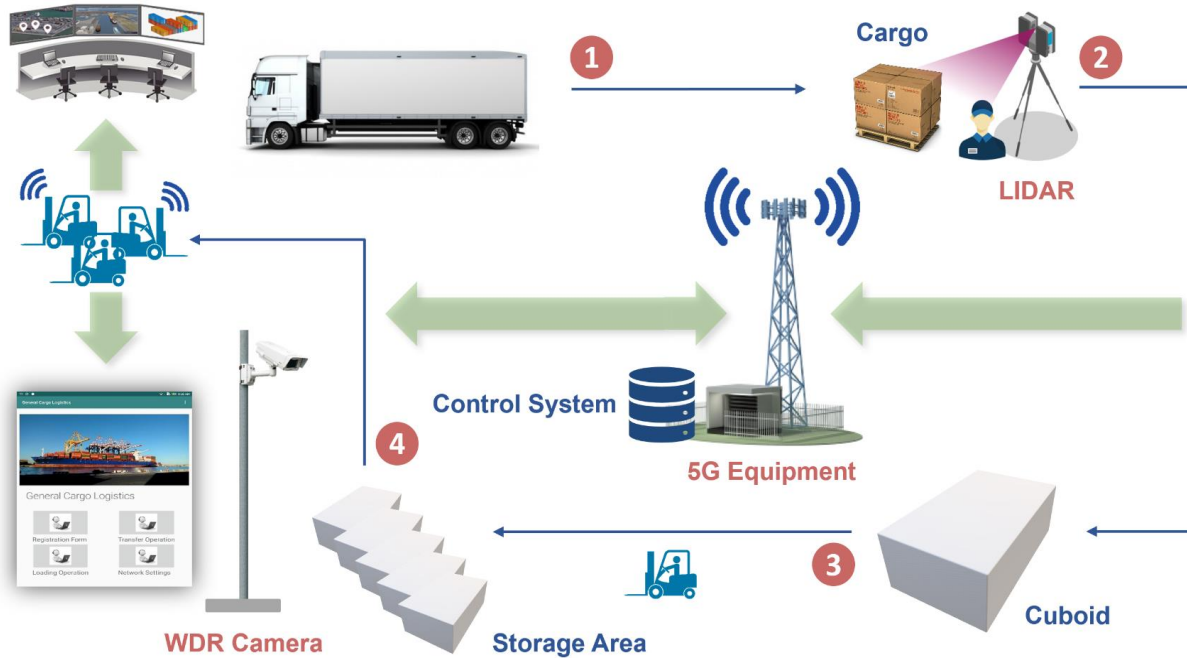
Livorno Port, Italy

Real time control of operations, collecting data from both yard vehicles and implanted sensors (including cameras).

On-Line analytical processing.

Taking operating decision.

Snapshot Terminal Status

Integration with TPCS

✓ High level of automation for the general cargo management process

✓ Increase of visibility of the cargo in the intra-terminal operations

Cargo Flow Optimiser

Antwerp Port, Belgium

Terminal input

- Terminal occupancy
- Containers arriving / leaving time stamp
- Inland mode of transport expected

Current transportation environment

- Current inland connections
- Capacity of transport connections

- Prediction availability of inland transport routes according to:
  - Transportation time
  - Cost of the route

Optimization model

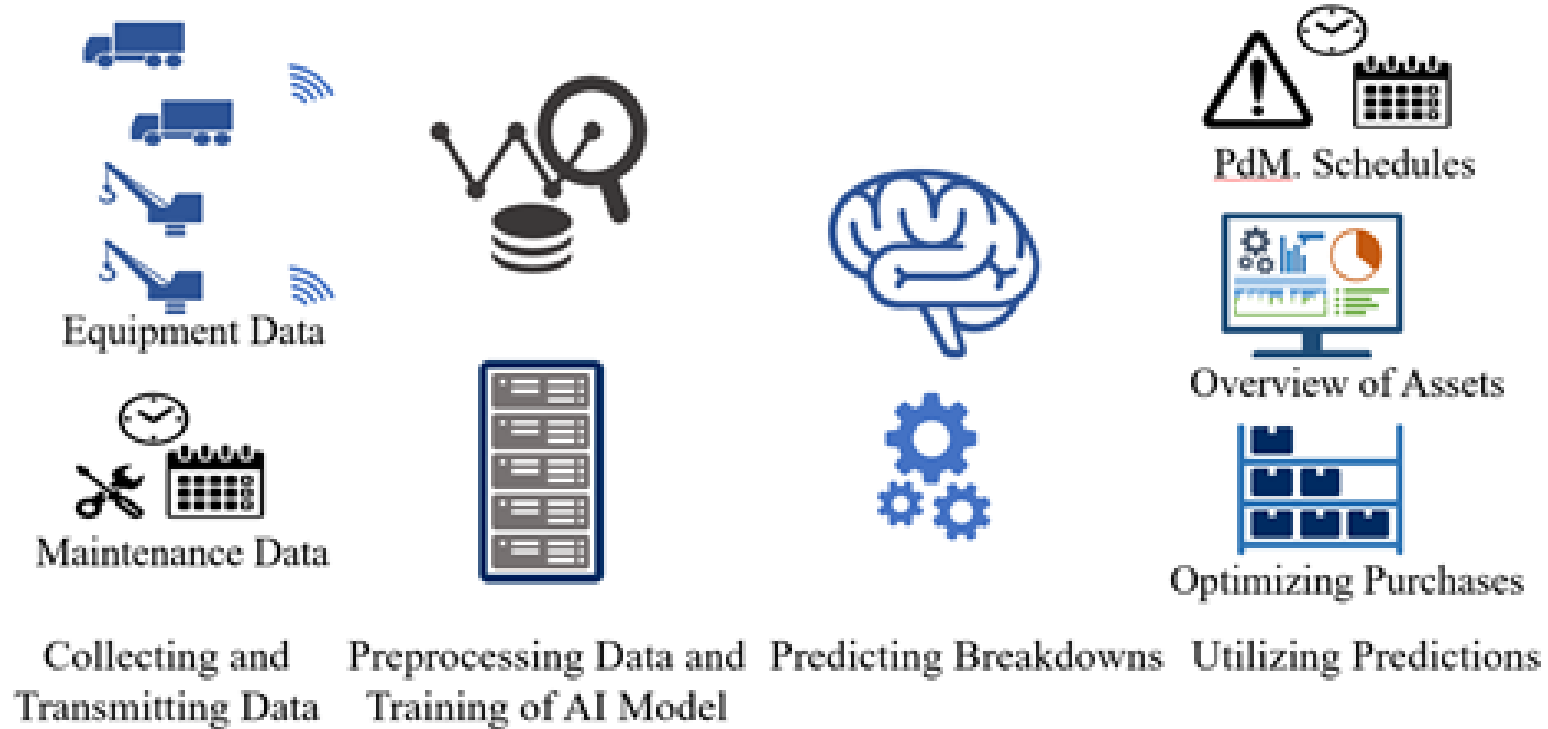- Proposition of new transport shared services on-demand

✓ Data multiplexing for cargo flow optimization

✓ Big Data analytics and prognoses based on barge and rail ETAs

✓ Container waiting times minimized, reducing cost and TATs

Predictive maintenance

Equipment Data

Maintenance Data

Collecting and Transmitting Data

Preprocessing Data and Training of AI Model

Predicting Breakdowns

PdM. Schedules

Overview of Assets

Optimizing Purchases

Utilizing Predictions

Piraeus Port, Greece

✓ Contributes to a fully interconnected system with better estimations between the relevant logistic entities, closer to the vision of Physical Internet.
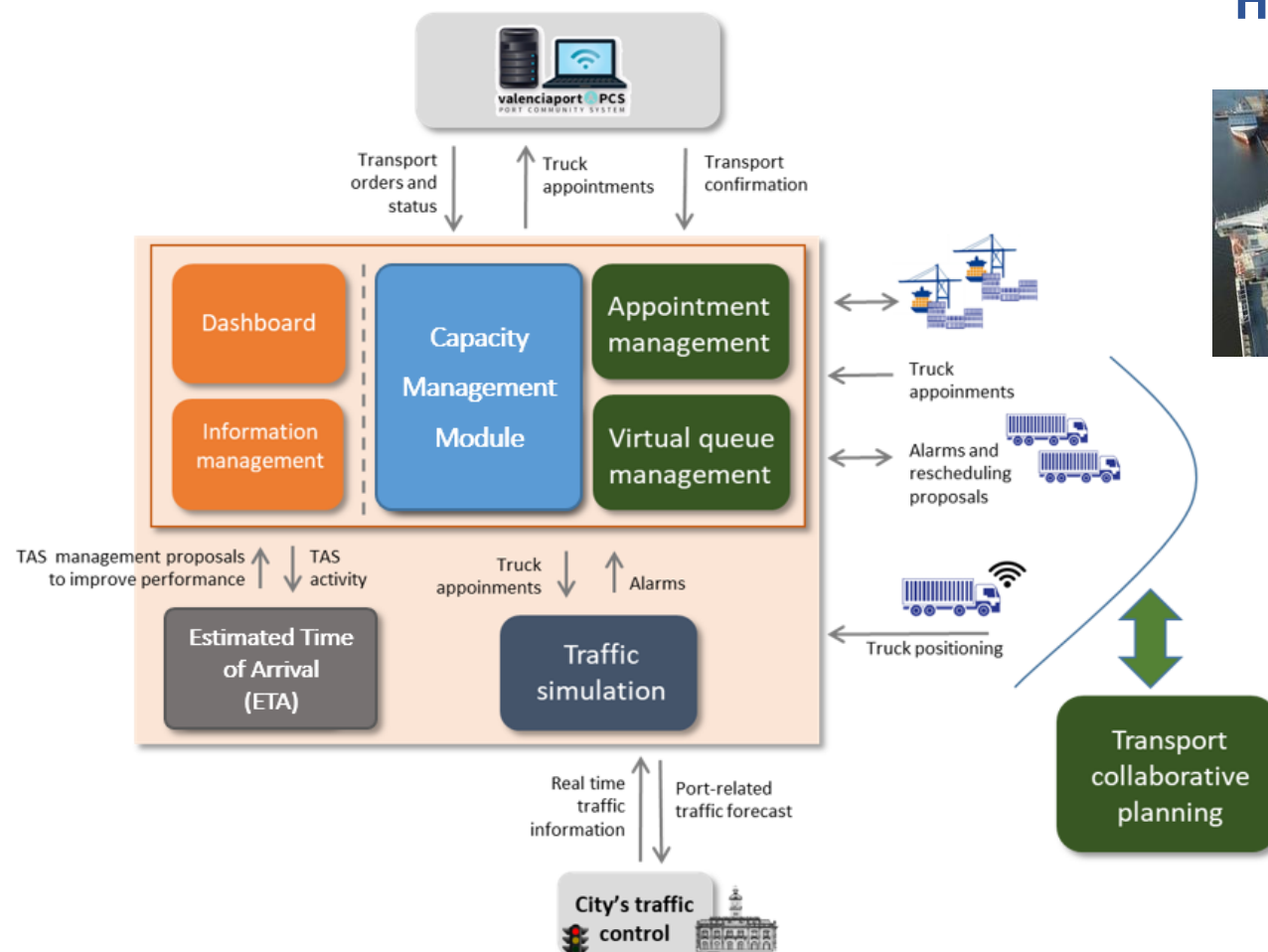
Truck Appointment system

Haminakotka Port, Finland

Valencia Port, Spain

- ✓ Cargo visibility
- ✓ Dynamic ETA and Re-scheduling
- ✓ Port operational flow optimisation

Brokerage Platform
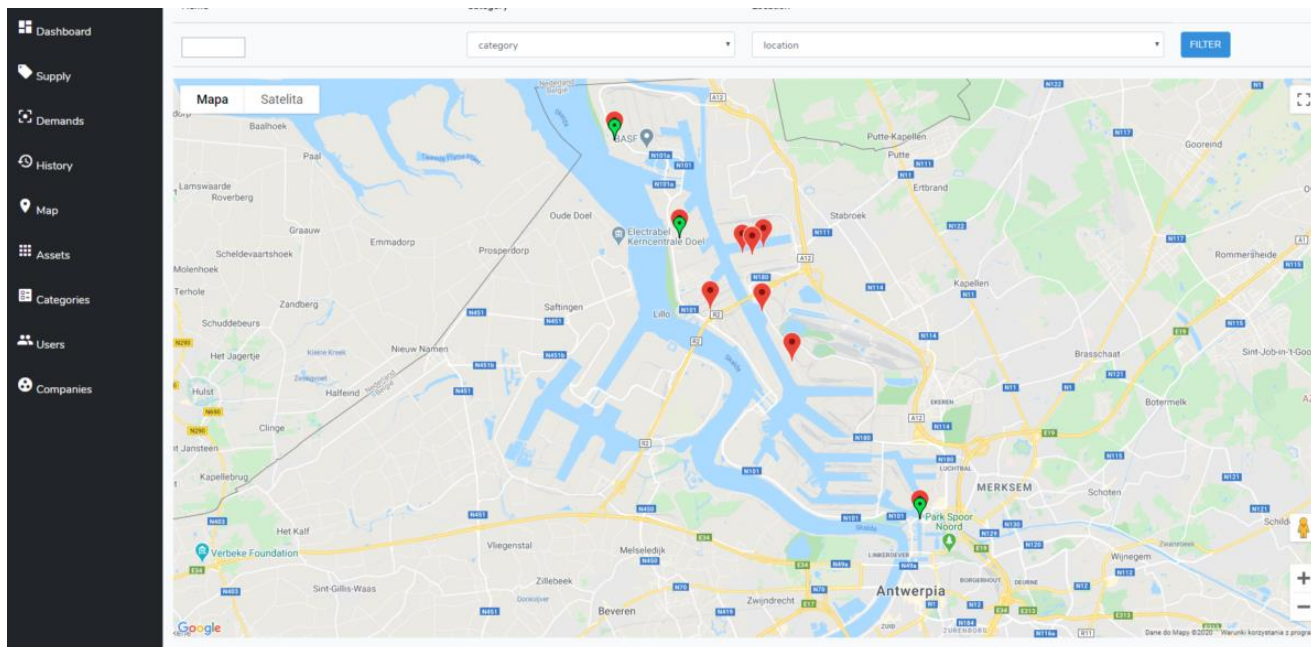
Antwerp Port, Belgium

- ✓ Facilitates optimization of the use of specialized equipment
- ✓ Calculates needs of the equipment based on recorded demands
- ✓ Offers a localization service for available resources
- ✓ Automatic matchmaking and manual booking options
- ✓ Provides enhanced planning of equipment and services to the port

PoF Serious Game

Government
Port authority
Financial investor

NGO
Terminal operator

People
- Employment
- Recreation/culture
- Safety

Planet
- Ecosystems
- Emissions
- Climate vulnerability

Profit
- Port profit
- City-port benefits
- Port operational efficiency

Provide on-shore power to ships
Use onshore electrical power supply for moored vessels as an alternative to onboard fuel-based power generation

Upgrade handling equipment
Purchase new or upgrade existing handling equipment to automate cargo handling activities

SPECIAL NEWS
Jobless rate at highest since 1990
The unemployment rate is sky high. There are big

SPECIAL NEWS
Hurricane Corealis hits port
A huge hurricane has hit the port and shut down port activities for days. Companies ask for better protection, else they will relocate their activities.

- ✓ Decision Support for medium and long-term strategic decisions for sustainable port-city development
- ✓ Awareness of potential consequences of climate change and adaptation measures
- ✓ Awareness of measures for energy transition and its potential consequences

Expected impact

1. Embrace circular economy models in the port strategy and operations

2. Improve operational efficiency, optimise yard capacity and streamline cargo flows without additional infrastructural investments

3. Reduce the port's environmental footprint associated with intermodal connections and the surrounding urban environment for three major transport modes, road, rail and inland waterways

4. Enable the port to take informed medium-term and long-term strategic decisions and become an innovation hub of the local urban space

www.corealis.eu

corealis_eu

COREALIS EU Project

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THANK YOU FOR YOUR ATTENTION

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