



DocksTheFuture Conference “Defining the concept of the Port of the Future 2030”

COREALIS Project

Sustainable Innovative Footprints for Future Ports

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November 24th, 2020, Virtual Conference



COREALIS Overview - Facts & Figures



- ✓ Call identifier: H2020-MG-7.3-2017 “**The Port of the Future**”
- ✓ Duration: 01.05.2018 - 30.04.2021 (**36** months)
- ✓ EC funding requested: **5,150,540.00 €**
- ✓ Coordinator: Institute of Communication and Computer Systems (ICCS)
- ✓ **17** partners from **9** European and associated countries
- ✓ 4 Research Institutes, 5 Port operators/ Port Institute/ Port Authority, 4 Industry partners, 3 SMEs, 1 ITS Association
- ✓ Living Labs demonstrations in **Five European Port-Cities**, including 3 out of the top-5 in Europe





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 current and future challenges 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 Innovations

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

RTPORT

(a Model-Driven Real-Time control module supporting 5G smart terminal operations)

Brokerage Platform

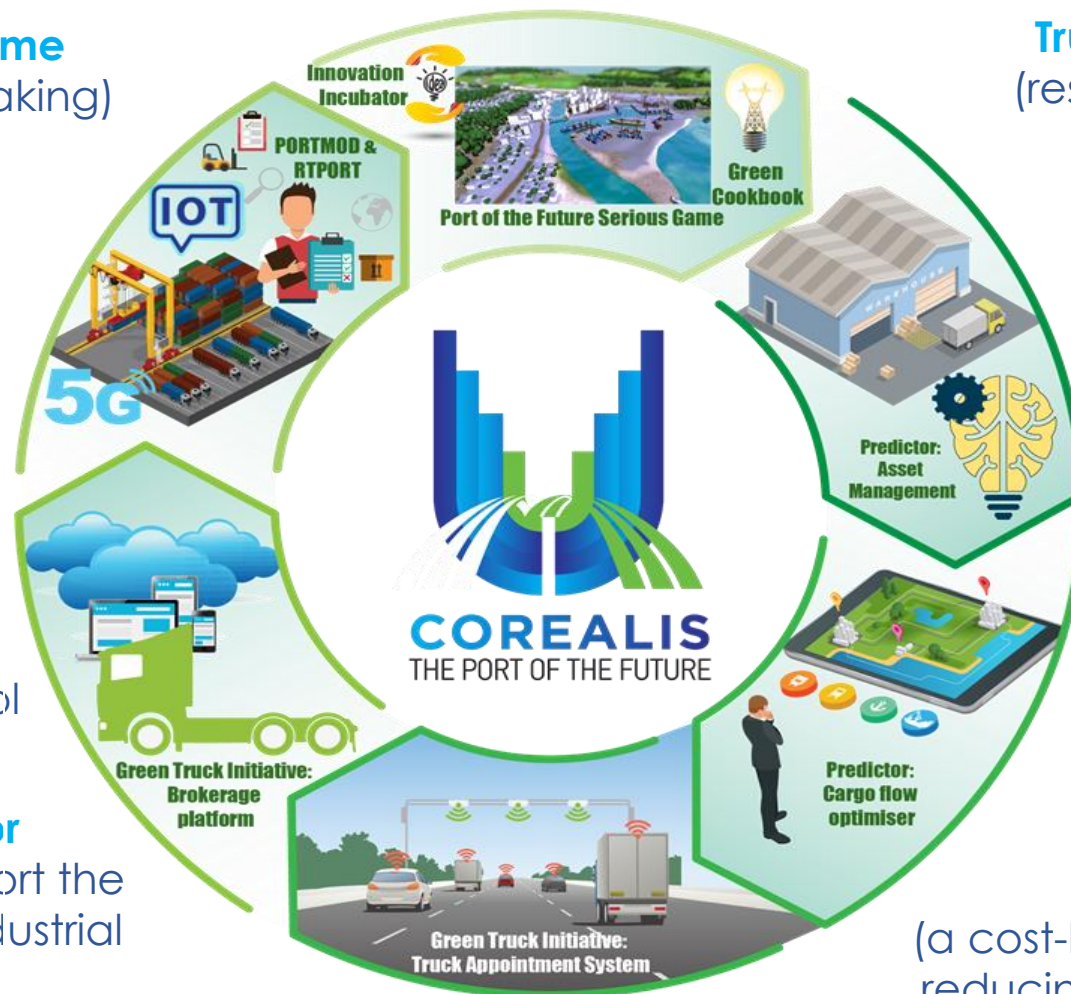
(Cloud-based marketplace for leasing and exchanging intra-port assets)

PORTMOD

(an optimization modelling tool for CT operations)

Innovation Incubator

(a scheme making the port the epicenter of the local industrial landscape)



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
(an optimization tool for ocean/rail/inland waterway cargo flows)

Predictor for Asset Management
(an optimization, machine learning tool for efficient use of port assets)

Green Cookbook
(a cost-benefit analysis and roadmap for reducing port's environmental footprint)



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	



COREALIS Cargo Flow Optimiser

Antwerp Port, Belgium



- ✓ Data multiplexing for cargo flow optimization
- ✓ Multimodal delivery modes alternatives presented along with their total distance, time, cost and CO₂ emissions
- ✓ Container waiting times minimized, reducing cost and Turn-Around-Times

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**





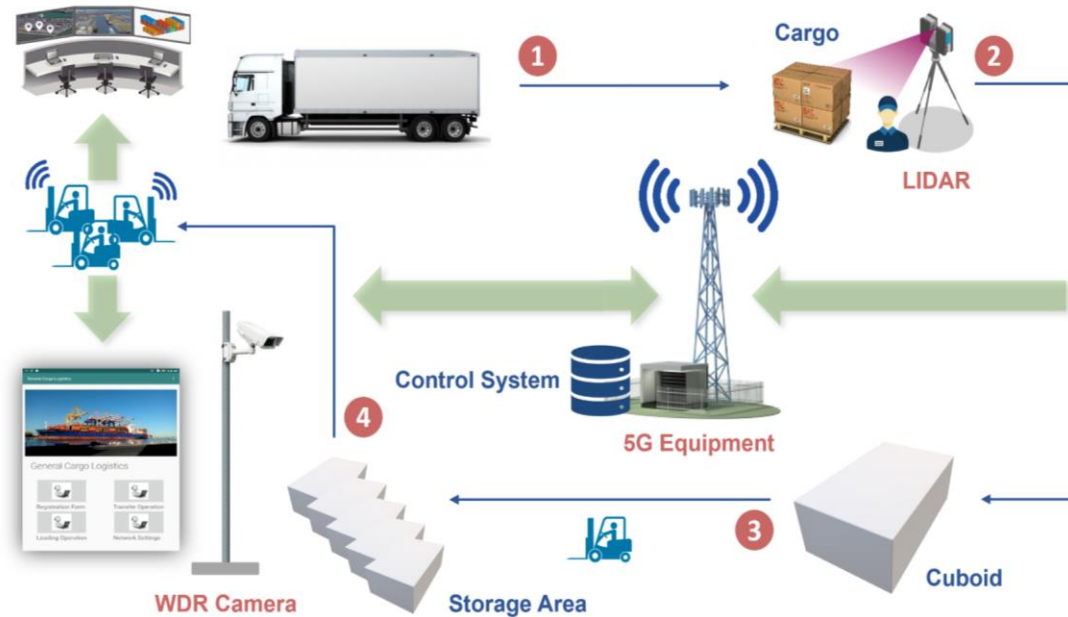
COREALIS RTPORT

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



Livorno Port, Italy



- ✓ High level of automation for the general cargo management process
- ✓ Increase of visibility of the cargo in the intra-terminal operations
- ✓ Reduction in number of moves required and total milage of yard equipment
- ✓ Safety improvement through the reduction of human presence in the port yard



COREALIS Truck Appointment System

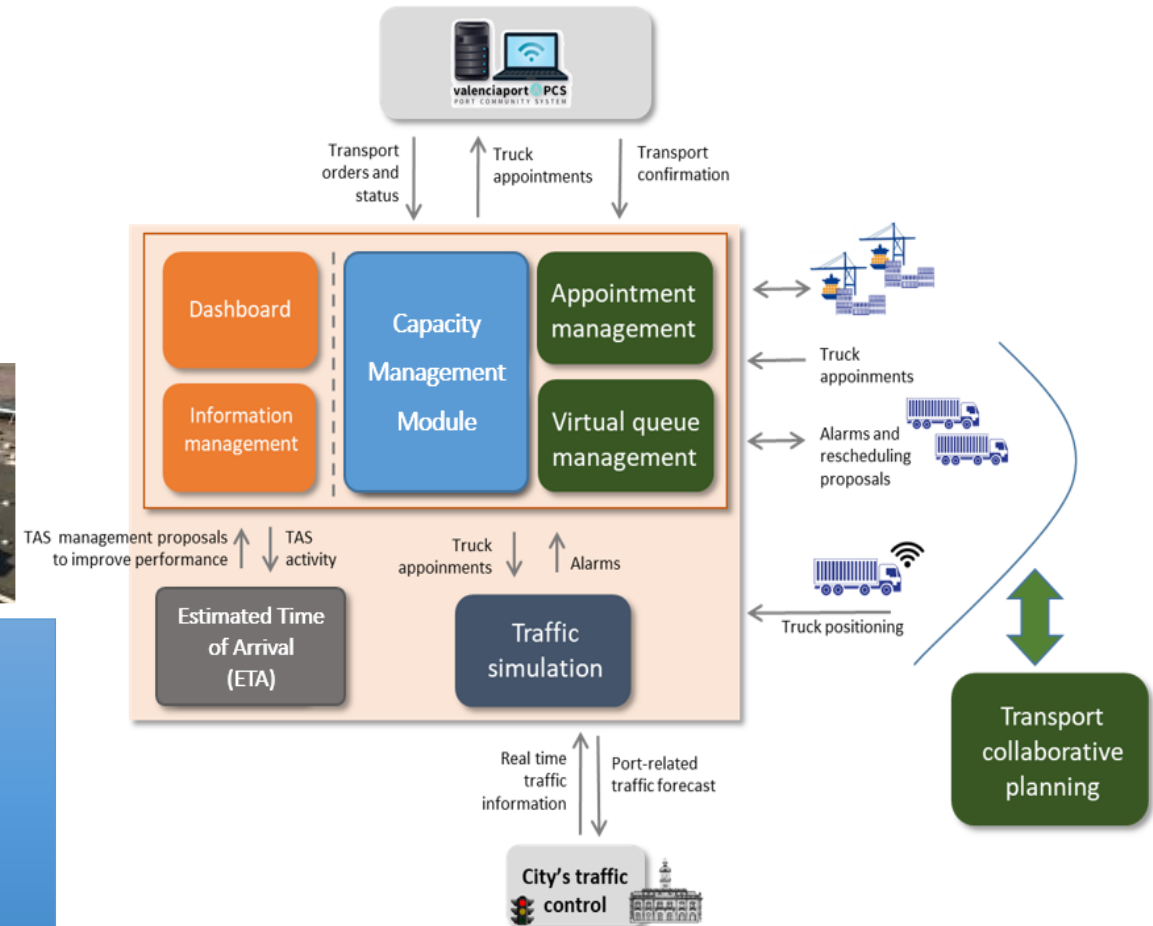
Valencia Port, Spain



Haminakotka Port, Finland



- ✓ Dynamic ETA and Re-scheduling
- ✓ Port operational flow optimization
- ✓ Reduction of Gate queues, port-city traffic and total milage run





COREALIS PREDICTOR



Equipment Data



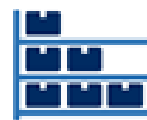
Maintenance Data



PdM. Schedules



Overview of Assets



Optimizing Purchases

Collecting and
Transmitting Data

Preprocessing Data and
Training of AI Model

Predicting Breakdowns

Utilizing Predictions

Piraeus Port, Greece



- ✓ Operational efficiency and elongated yard equipment life-cycle
- ✓ Reduced use of spare-parts, lubricants and tyres
- ✓ JIT spare parts inventory
- ✓ Current level of True Positive Predictions: 85%



COREALIS PoF Serious Game

Energy system

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

Government
Port authority
Financial investor

NGO
Terminal operator

SPECIAL NEWS

Jobless rate at highest since 1990

The unemployment rate is at a high. Please see here

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.

People

Employment

Recreation/culture

Safety

Planet

Ecosystems

Emissions

Climate vulnerability

Profit

Port profit

City-port benefits

Port operational efficiency

- ✓ 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 energy transition measures and their impact to the port



COREALIS Expected impact

1. Embracement of circular economy models in the port strategy and operations

2. Operational efficiency improvement, yard capacity optimization and streamlining of cargo flows without additional infrastructure investments

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



www.corealis.eu



[corealis_eu](https://twitter.com/corealis_eu)



[COREALIS EU Project](https://www.youtube.com/COREALIS_EU_Project)



[Corealis_eu](https://www.linkedin.com/company/corealis_eu)



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THANK YOU FOR YOUR ATTENTION



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This project has received funding from the European Union's horizon 2020 research and innovation programme under grant agreement No. 768994