COREALIS
THE PORT OF THE FUTURE

COREALIS

At a glance

COREALIS Facts

- ✓ Call identifier: **H2020-MG-7.3-2017**
- ✓ Topic: "**The Port of the future**"
- ✓ Duration: 01.05.2018 - 30.04.2021 (**36** months)
- ✓ **17** partners from **9** European and associated countries
- ✓ 4 Research Institutes, 5 Port operators/ Port Institute/ Port Authority, 4 Industries, 3 SMEs, 1 ITS Association
- ✓ Demonstrations in **Five European Port-Cities**

COREALIS Living Labs

1. Valencia Port, Spain

2. Livorno Port, Italy

3. Antwerp Port, Belgium

4. Haminakotka Port, Finland

5. Piraeus Port, Greece

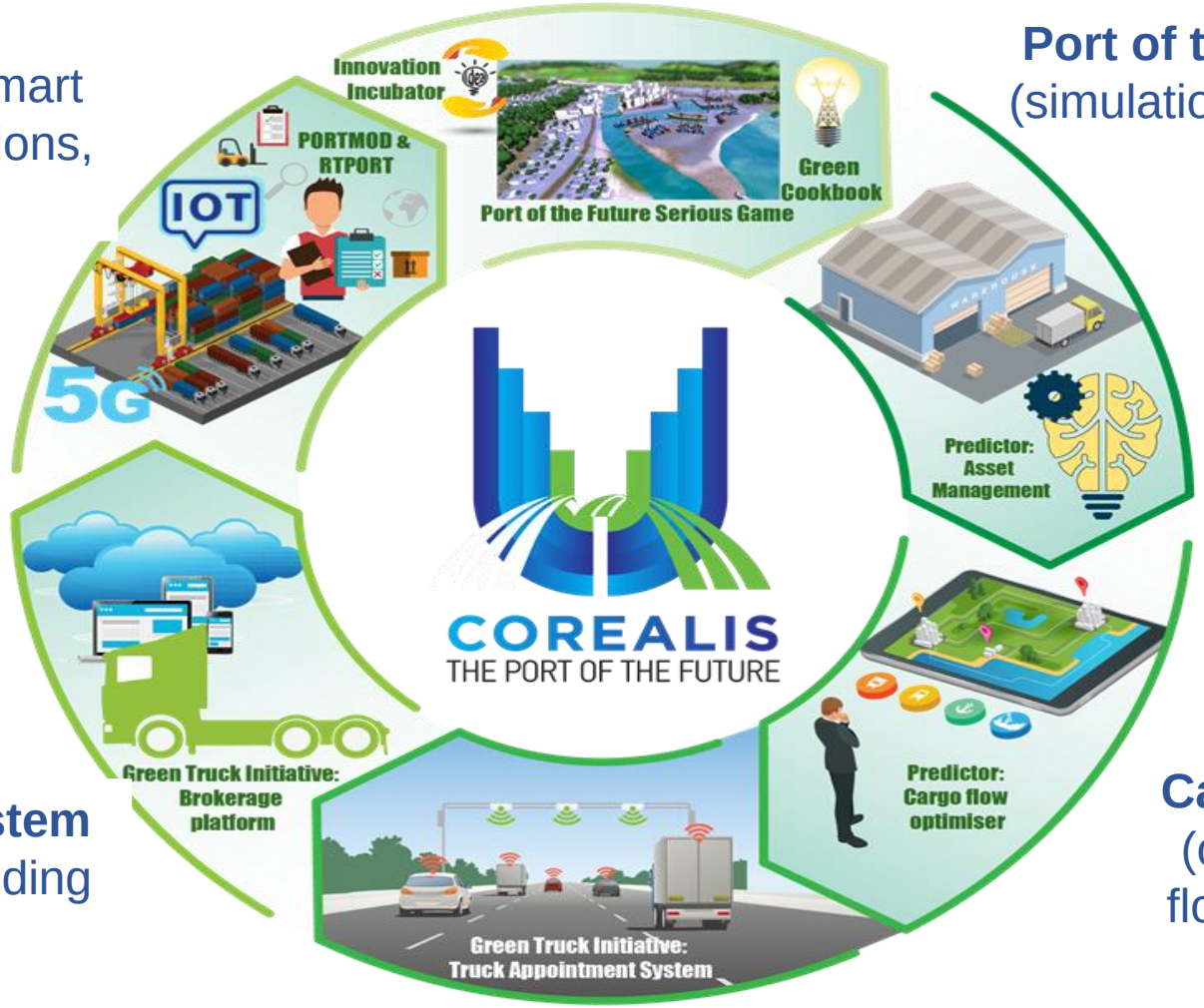
COREALIS Technologies

RTPORT
(5G-enabled smart terminal operations, IoT)

PORTMOD
(optimization planning tool for CT operations)

Brokerage Platform
(cloud based marketplace for leasing intra-CT trucks)

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



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

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

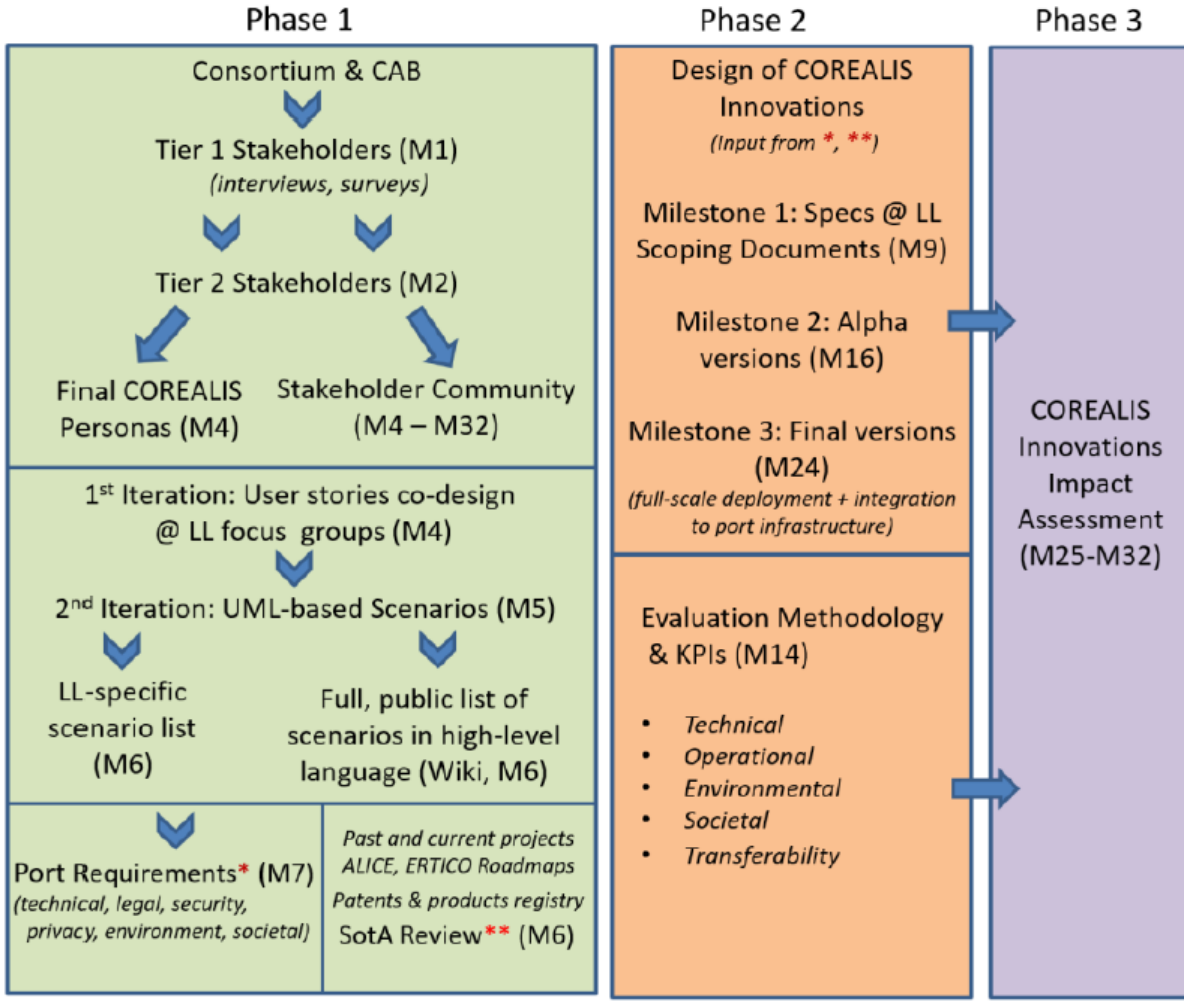
Predictor for Asset Management
(machine learning based Just in Time inventory)

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

COREALIS Stakeholder-driven Methodology

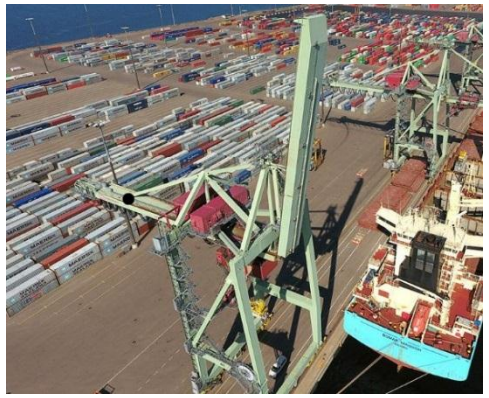
Stakeholder driven approach

- **Phase 1**: Scenarios & Requirements Phase (M1-M7)
- **Phase 2**:Technical Design and Development Phase (M8-M24)
- **Phase 3**: LL full-scale implementation and Impact Assessment phase (M25 - M32)



COREALIS Initial Results – HaminaKotka Port

1) **PORTMOD** a modelling tool that improves Container Terminal (CT) operations by simulation;
   i. Optimize stacking height and location
   ii. Evaluate new equipment solutions
   iii. Evaluate CT yard area layout changes



2) **Port of the Future Serious Game (PoFSG) :**
   i. Assist in the development of the energy transition scenario of the game: estimate the impact of new technologies and environmental issues.

COREALIS Initial Results –Port of Antwerp

Cargo Flow Optimizer:

- **Main goal:**
  - Aim is to minimize containers' waiting time at the port
  - Cargo flow prognoses for short, mid and long-term will be implemented to optimise the port infrastructure and promote modal share in inland connections
- **Expected benefits:**
  - Improve modal split towards rail and barge
  - Reduce the dwell time of containers in the port

Brokerage platform:

- **Main goal:**
  - Efficient flow of containers and more free space at terminals
  - Low demurrage due to equipment unavailability
- **Expected benefits:**
  - Proper use of port equipment – low idle time
  - Booking of equipment between terminals – no unnecessar investments

COREALIS Initial Results –Port of Livorno

Terminal Snapshot

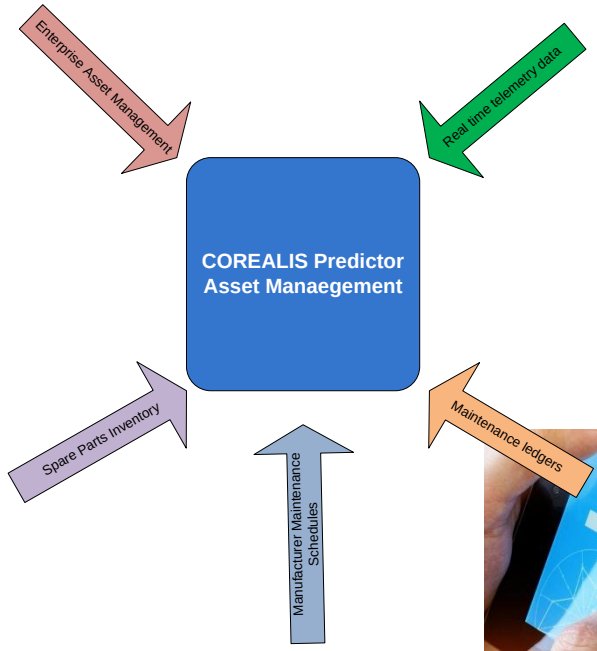
General Cargo & Yard Vehicles Management System

Enable **IoT** collecting and aggregating data via yard vehicles and implanted sensors (**oneM2M** standard).

Designing and setting up a pervasive **5G network** in a CT.

COREALIS Initial Results – Port of Piraeus

Predictor Asset Management:



Alpha version
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Objective: extent yard equipment lifecycle, improve yard equipment availability, reduce spare parts inventory cost & size

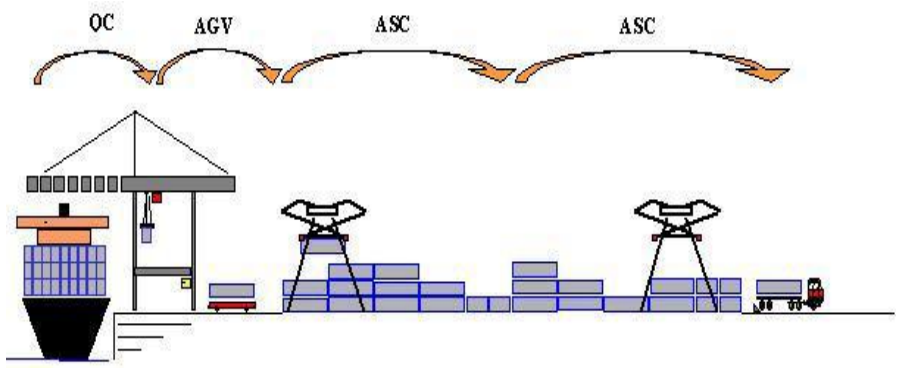
Predictor Asset Management in two steps:

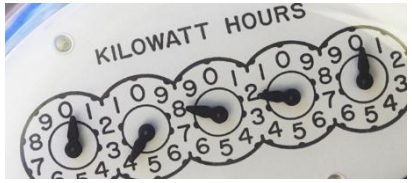
1. Predictive Maintenance:
   - Predictive Maintenance Equipment List
   - Predictive Maintenance Schedule
   - Learning Algorithm
2. Spare Parts Inventory:
   - Spare parts requirements based on Predictive Maintenance Schedule
   - JIT inventory

COREALIS Initial Results – Port of Piraeus

Energy Assessment

Objective: Reduce energy consumption in the Port of Piraeus and investigate feasibility of use of renewable energy sources

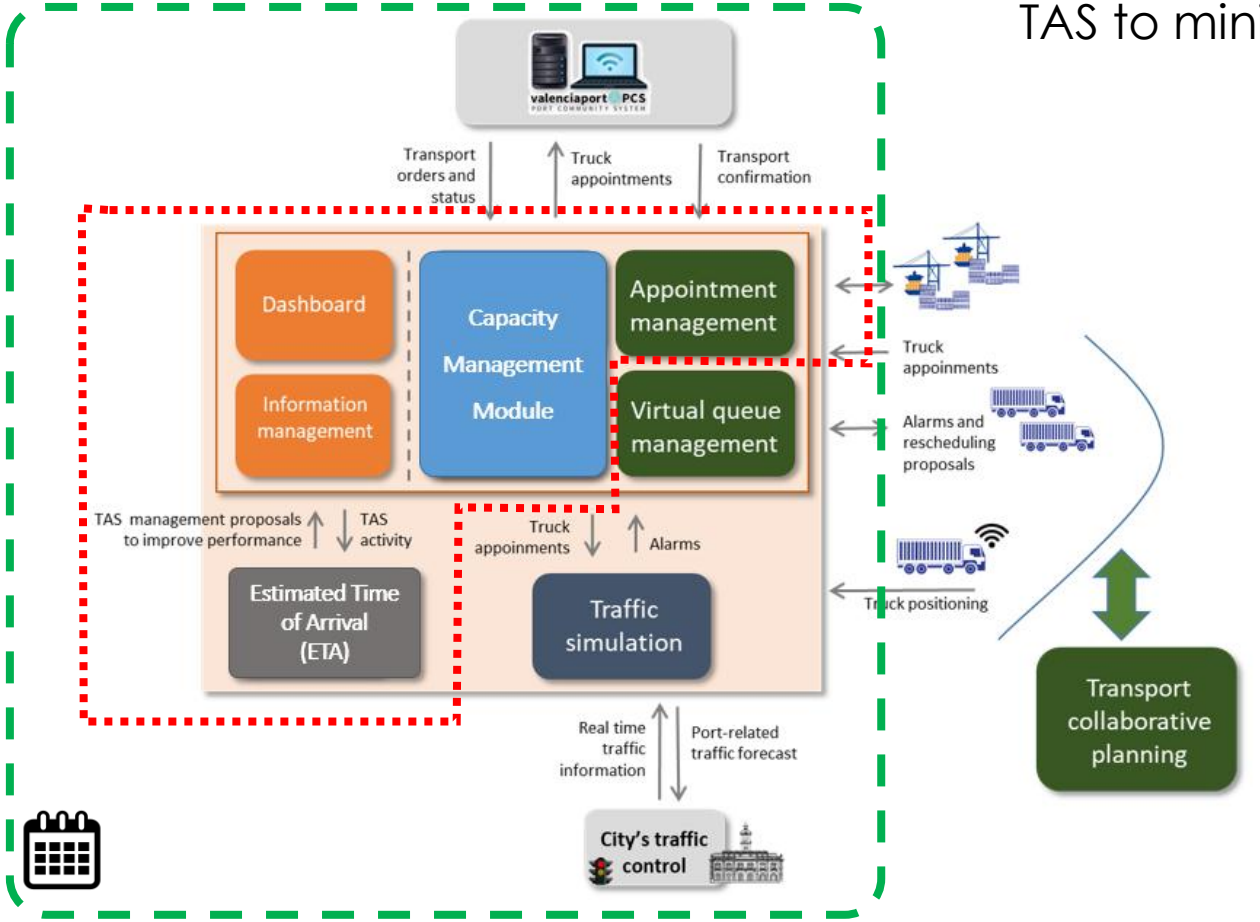




- **Isolate power fault sources and restore power to unaffected parts of the grid**
- **Long term planning of grid infrastructure**
- **Research and evaluate integration with renewable power sources**
- **Evaluate power storage feasibility at port premises**

COREALIS Initial Results – Port of Valencia

Truck Appointment System:



Objective: demonstrating advantages of an innovative TAS to minimize road transport impacts

TAS in two steps:

1. Simple TAS:
   - Appointment Management
   - Capacity Management
   - Dashboards
   - Simple ETA based on static position
2. Advanced TAS: (possible functionalities)
   - Full Integration with the PCS
   - Pre-Booking
   - Virtual queue
   - Accurate ETA
   - Integration with external sources

COREALIS impact to Port of the Future

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/truck, 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

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THANK YOU FOR YOUR ATTENTION

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