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

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

**PORTMOD**
(optimization planning tool for CT operations)

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

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

**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)
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.
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 unnecessary investments
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.
Predictor Asset Management: 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

Alpha version Sep 19

Port of the Future, 04th April 2019
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
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

Truck Appointment System:

**Objective:** COREALIS Initial Results – Port of Valencia

Truck Appointment System:

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

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# COREALIS impact to Port of the Future

<table>
<thead>
<tr>
<th>1. Embrace circular economy models in the port strategy and operations</th>
<th>2. Improve operational efficiency, optimise yard capacity and streamline cargo flows without additional infrastructural investments</th>
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<td>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</td>
<td>4. Enable the port to take informed medium-term and long-term strategic decisions and become an innovation hub of the local urban space</td>
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THANK YOU FOR YOUR ATTENTION

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