



COREALIS D.3.1 Webinar

Asset Management and port strategies: Software and infrastructure possibilities

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Outline

- 1 Asset Management in ports and terminals**
- 2 Terminal Operations Management**
- 3 Software for planning container terminal layout**



Asset Management in ports and terminals

Port asset management typically includes the following aspects:

- Infrastructure management i.e. infrastructure monitoring and development)
- Property i.e. capital management
- Utility management and maintenance management

To manage these aspects, ports traditionally use separate systems, for instance, for:

- Asset management
- Terminal operations
- Finance
- Procurement and inventory
- Human resource
- Payroll
- Management of processes and workforce



Asset Management in ports and terminals

Typical IT-solutions include AMS, EAM, GIS and ERP:

- **AMS:** Asset Management System which is designed to monitor and maintain items of value, such as tangible assets (e.g. cranes, quay walls) and intangible ones (e.g. intellectual property, financial assets).
- **EAM:** Enterprise Asset Management which gives real-time visibility into asset usage, manages assets' lifecycle and energy consumption.
- **ERP:** Enterprise Resource Planning System which includes EAM and/or AMS
- **GIS:** Geographic information system and GIS-based asset management which leverages geospatial and temporal data about the port.



Asset Management in ports and terminals

Several IT-Solutions are available on the market, some examples are provided in the table below.

Company name and website	Main system or software	Category	Description
Assetic http://www.assetic.com/	Assetic Assets	AMS	Assetic Assets is an intelligent asset register pre-configured for over 100 asset classes. Cloud based technologies for port asset management.
ESRI http://www.esri.com/ http://www.arcgis.com/	PortMaps	GIS	ArcGIS platform called PortMaps. Port of Rotterdam Ensures a Resilient Future with ArcGIS.
Envecon https://envecon.com/ports-and-terminal/	e.g. LogStar-products, SEAM	ERP, EAM	Envecon offers end to end solutions for Ports and Terminals, including ERP and EAM systems.
SAP https://www.sap.com/	SAP ERP	ERP	SAP ERP incorporates the key business functions of an organization. One of the market leaders in the business.
IBM https://www.ibm.com/products	e.g. Maximo,	EAM	Maximo, when combined with the power of IoT data from people, sensors and devices, can provide warning signals from assets—reducing unplanned downtime and increasing operational efficiency.



Terminal Operations Management

Terminal operations management consist of:

- Planning activities
- Control and optimization activities
- Decision-making processes

Ports use terminal operations software and systems (TOS) to manage port and harbor facilities and services.

Such comprehensive systems provide:

- A single view for operations
- The possibility to meet fast and smart decisions
- An improved operational efficiency



Terminal Operations Management

There are many commercial software and automation system providers on the market. Popular solutions are listed below:

Company name and website	Main system or software	Category	Description
ABB https://new.abb.com/ports	Multiple	Automation systems, remote crane operation.	ABB offers automation and electrical systems for container and bulk cargo handling.
Accenture https://www.accenture.com/	Accenture port solutions	Portfolio of technology systems and consulting services.	Accenture Port Solutions is a portfolio of technology systems, as well as consulting and outsourcing services, built on vast industry knowledge and experience with leading ports and transportation providers worldwide.
Kalmar www.kalmarglobal.com	Multiple	Terminal automation, container handling.	Kalmar Global provides cargo handling solutions and services to ports, terminals, distribution centres and heavy industry around the globe. One in four container moves around the globe being handled by a Kalmar solution.
Navis www.navis.com	SPARCS N4	Terminal Operating Systems (TOS) for Ports and Terminals.	The Navis N4 terminal operating system (TOS) represents more than 27 years of experience and innovation that enables terminals to optimize their operations and move cargo smarter, faster and more efficiently.



Terminal Operations Management

- **Maintenance tasks** are central to asset management strategies, as they are directly related to the functioning and availability of port operations. They are included in EAM, ERP or CMMS.
- The most common strategies are: Emergency (breakdown/run-to-failure maintenance), preventive (scheduled/routine) maintenance, predictive maintenance (PdM), and reliability-centered maintenance (RCM). They are described below.

Strategy	Summary	Cost to Implement	Pros	Cons
Run to Failure	Fix when it breaks	Low	Ideal for low priority equipment	Can lead to runaway repair costs
Preventive	Maintenance on a predetermined schedule	Average	Best strategy to implement without expertise	Inefficient schedules compared to PdM or RCM
Predictive	Condition based monitoring triggering work orders	High	Timely and informed monitoring. More insight into causes of breakdowns	Expensive to set up – only cost effective for critical assets
RCM	Investigation of failure modes to determine best maintenance strategy	Highest	If executed properly, provides the most efficient maintenance schedule	Infeasible for most organizations that are not “elite”



Software for planning container terminal layout

- For container layout planning, simulation modules can be used to find the best layout and compare various kinds of operation systems and a combination of equipment types.
- The most prominent commercial simulators are CHESSCON and CONTROLS
- Further solutions include CONTSIM, CYBERCUBE and general discrete event simulators such as Arena and Anylogic
- Planning and simulation can be performed separately or jointly, as a recent project suggests.



Asset Management Examples in COREALIS



COREALIS technologies will be implemented in five living labs in prominent ports in Europe: Antwerp, Piraeus, Valencia, Livorno and Kotka.

In these ports, various software and infrastructure tools are used for asset management. We cite here some examples:

- In Piraeus LL, a predictive maintenance solution is under development. This solution relies on data from the EAM, TOS and the telemetry system for the trucks, in order to predict when maintenance is required.
- In Valencia LL, a truck appointment system (TAS) is under development, which relies on the fleet management system that delivers information about the trucks, namely their positions and utilization.
- Auto-gate systems that interact with the TAS, JiT Rail and platform sharing systems.





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THANK YOU FOR YOUR ATTENTION

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