

Smart Ports and Digital Transformation

Terry Bills
Esri

GIS – Enabling
a Smarter World



Digital Transformation

“...just about every modern organization is scrambling to harness the potential of digital technology to get a competitive edge... Companies are engaged in a dizzying array of digital initiatives.”

Nick Ismael
Information Age

Digital Transformation

- The Standish Group Chaos Report found that only 29% of IT project implementations are successful, and 19 percent are considered utter failures.
- Research shows that 70 percent of complex, large-scale change programs don't reach their stated goals. McKinsey 2016
- 90 percent of digital projects fail to meet expectations and only deliver incremental improvements. Couchbase 2017

Digital Transformation

- Digital transformation is the process by which organizations leverage technology to more effectively improve their performance, and better achieve their mission goals.
- Digital transformation is really about business transformation, which redefines the interaction of people, process and technology.
- Business outcomes need to drive the digital transformation efforts, and not the other way around. ***Technology should come last, not first.***
- Management's leadership in establishing an organizational culture conducive to change has been a hallmark of successful initiatives to date.

Global Port Challenges

- Fluctuations in World Demand and Global Supply Chains
- Changes in the Way We Finance and Operate Ports
- Ageing Infrastructure / Changes in Facility Utilization
- Enterprise Risk Management
- Green Ports





1

water



SHIP MOVEMENTS
1,000,000 PER YEAR
3,000 PER DAY



2

road



PERSONNEL EMPLOYED
30,000 PER YEAR
ROAD TRANSPORT



3

pipeline



RAW CRUDE OIL
215M BARRELS PER YEAR
(BOE) ROTTERDAM TO ANTWERP

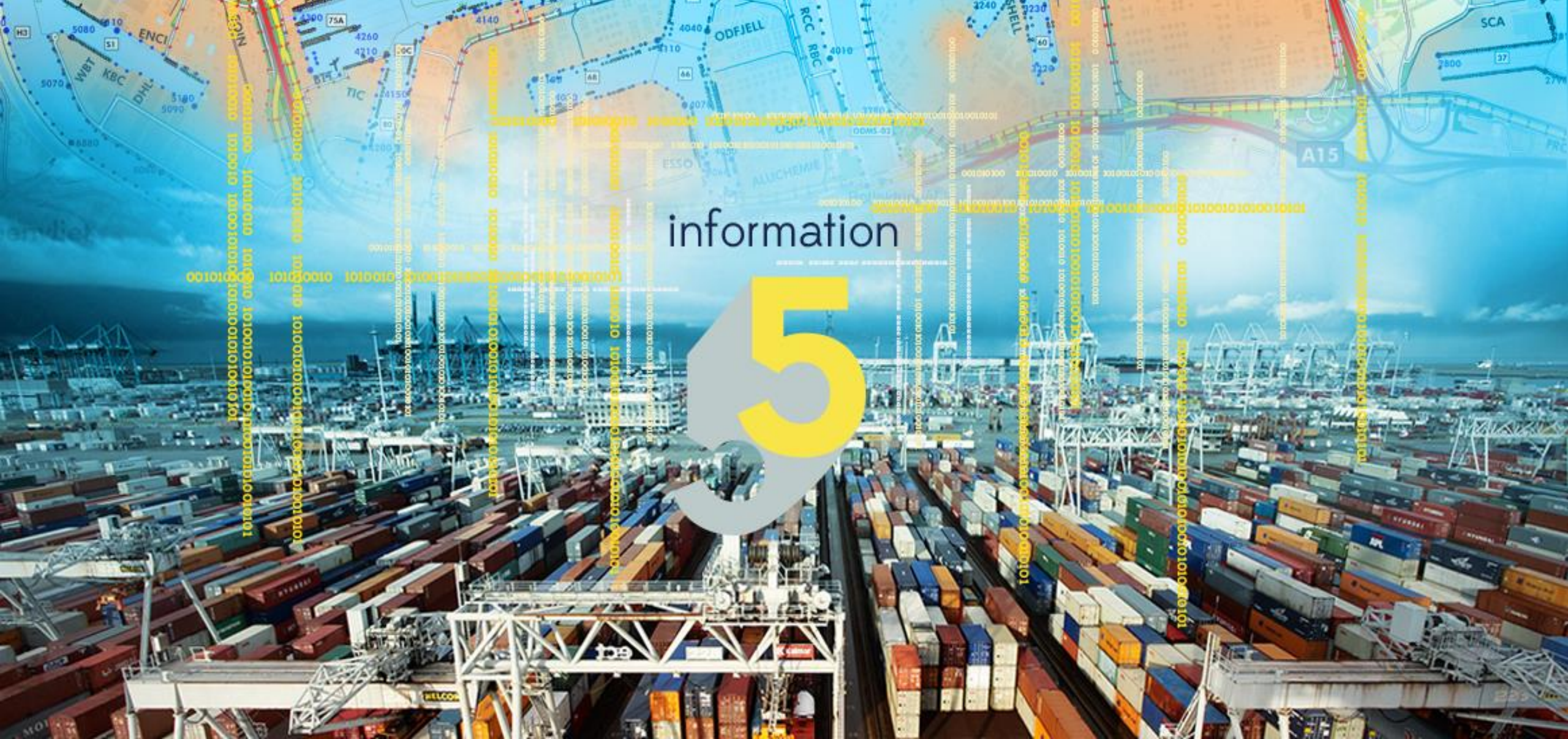


4

rail



730,000 TRAIN CARS
2,000 PER DAY

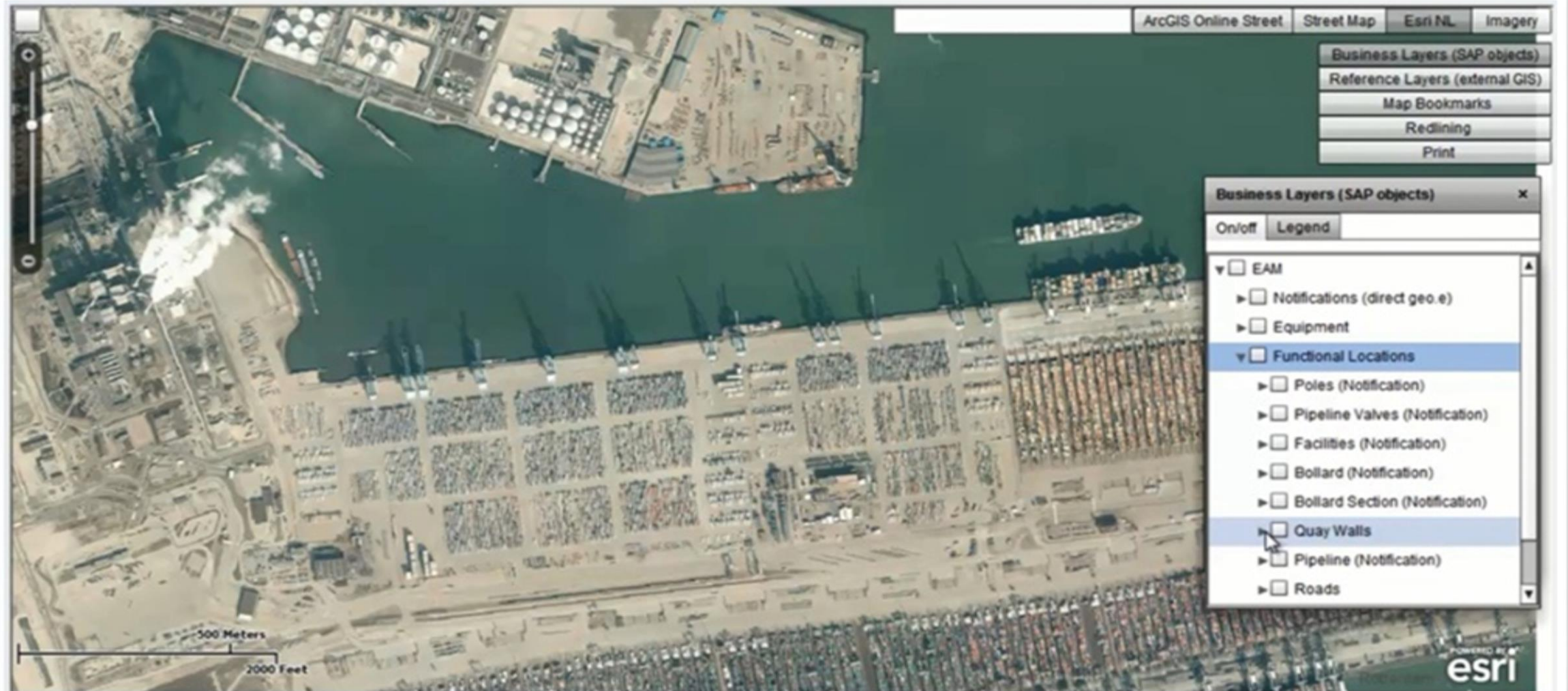


**Port of
Rotterdam**

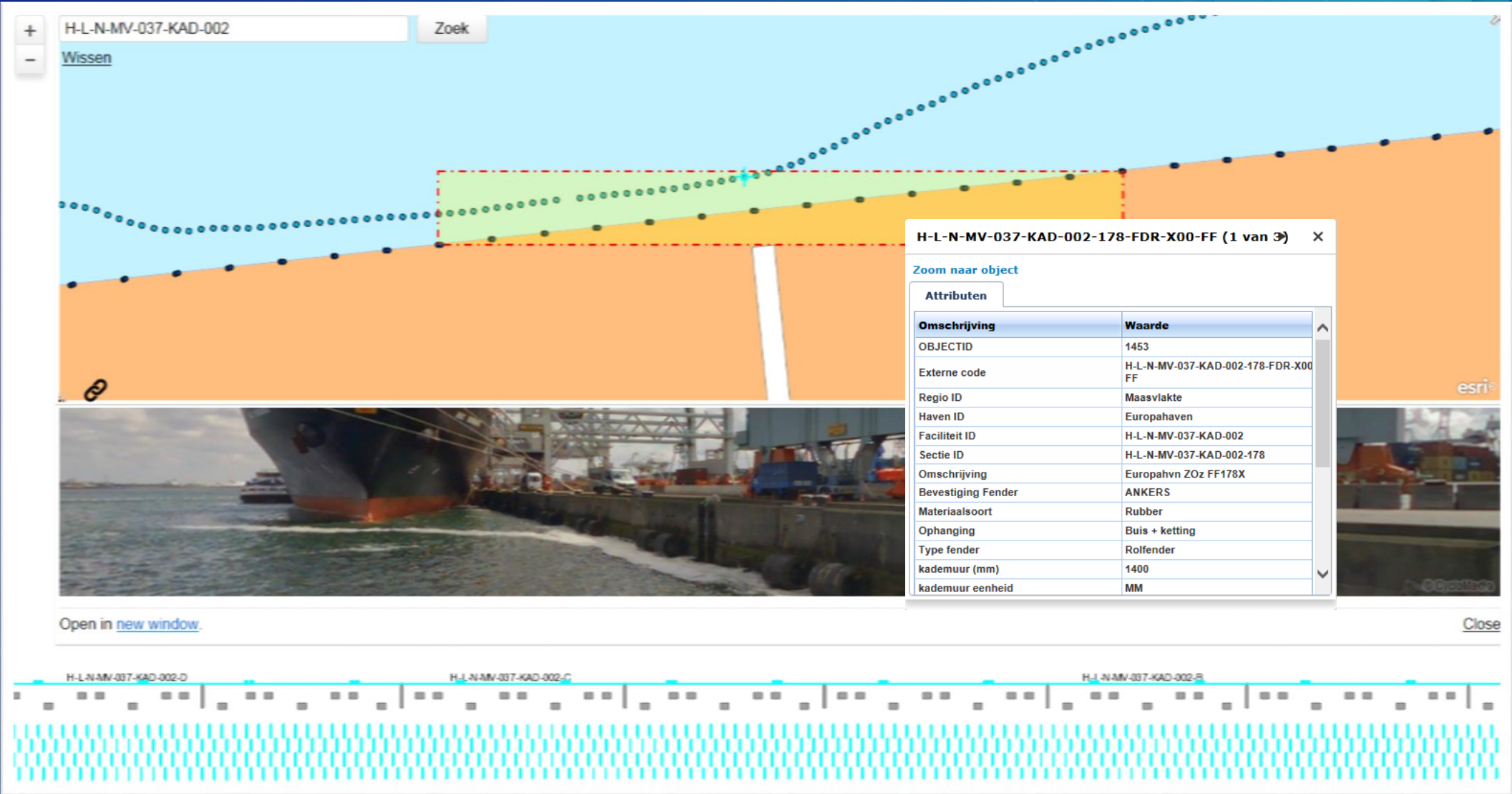
Key Transformational Areas – Operational Excellence

- Strategic Asset Management
- Smart Infrastructure – Dynamic Environment Monitoring
- Real Time Operational Control Systems
- Modal Optimization
- Seamless Supply Chain
- Enterprise Information Integration

Strategic Asset Management



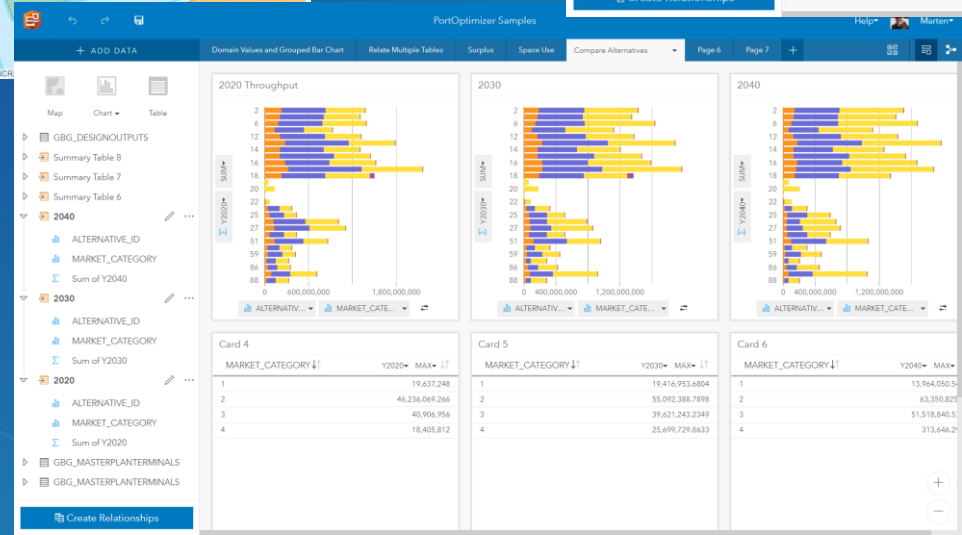
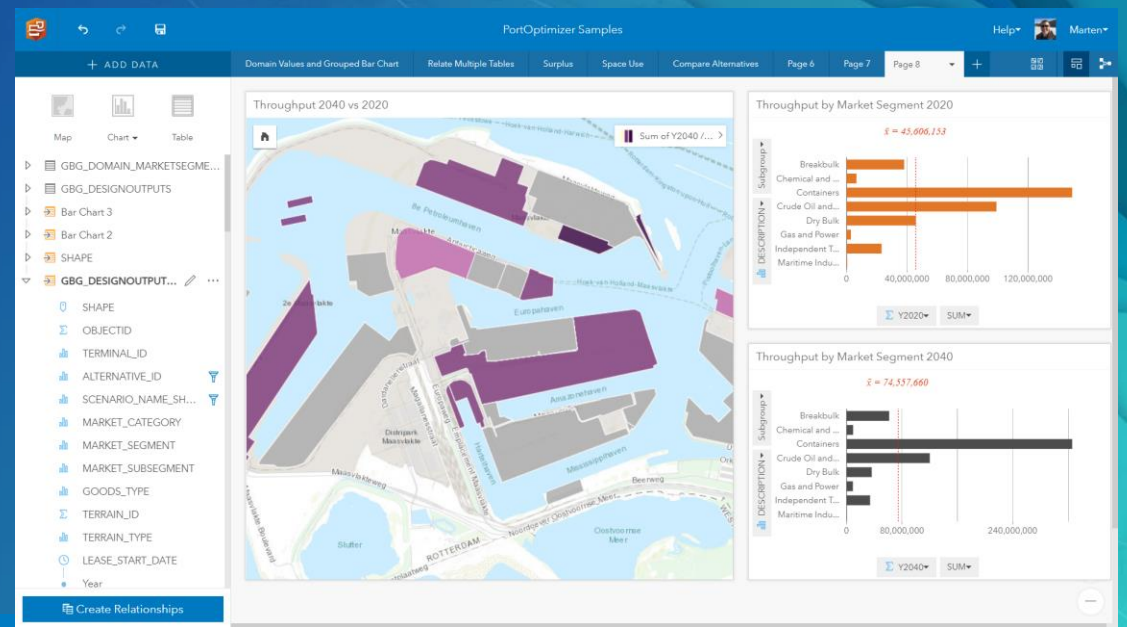
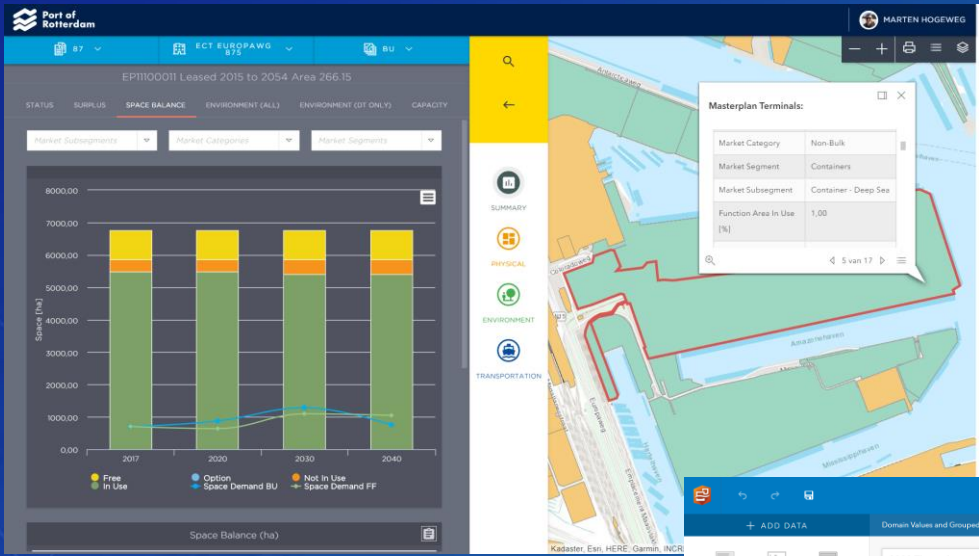
Strategic Asset Management



Strategic Asset Management: ISO 55000



Strategic Asset Management

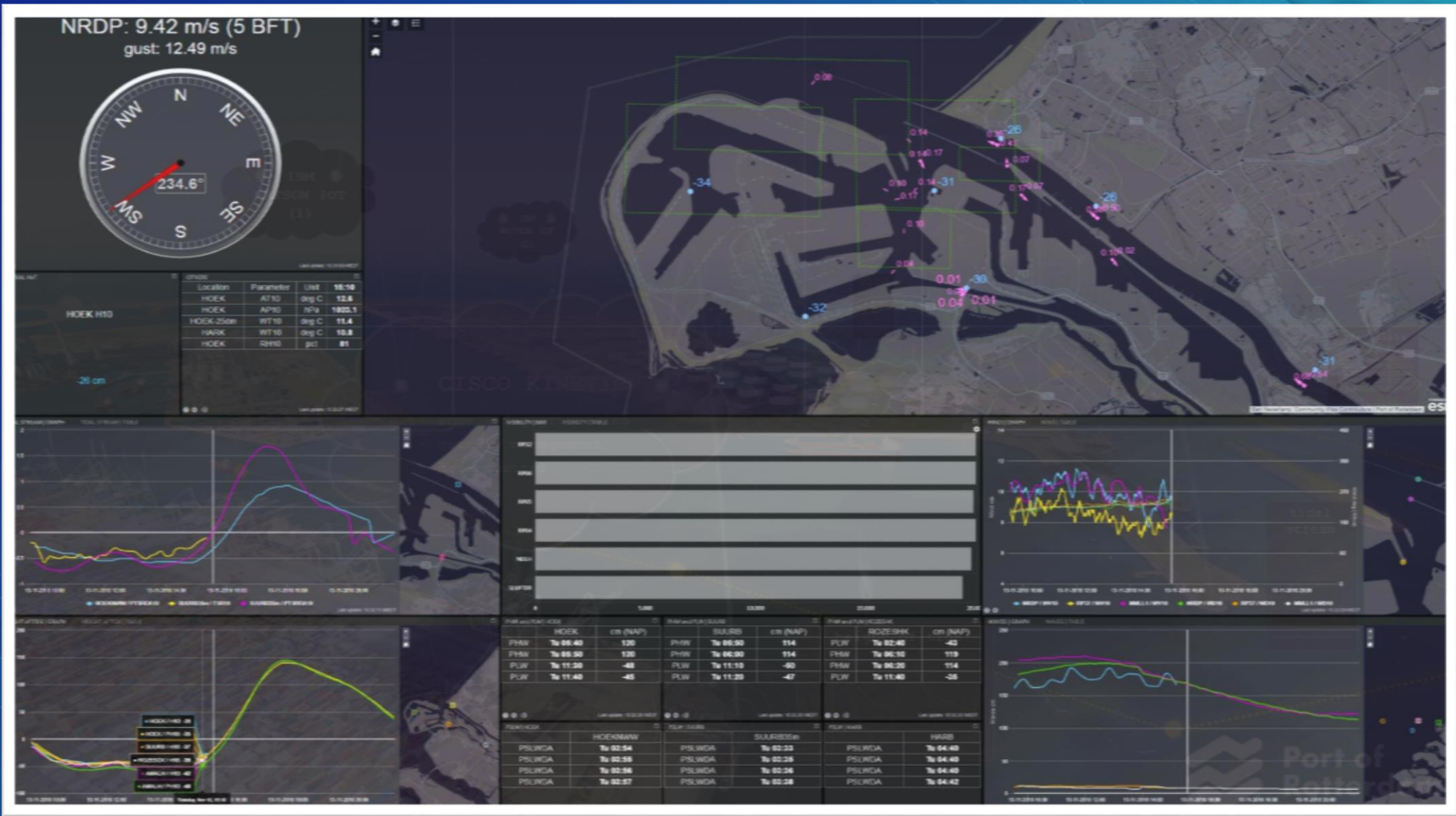


Smart Infrastructure: Digital Twin



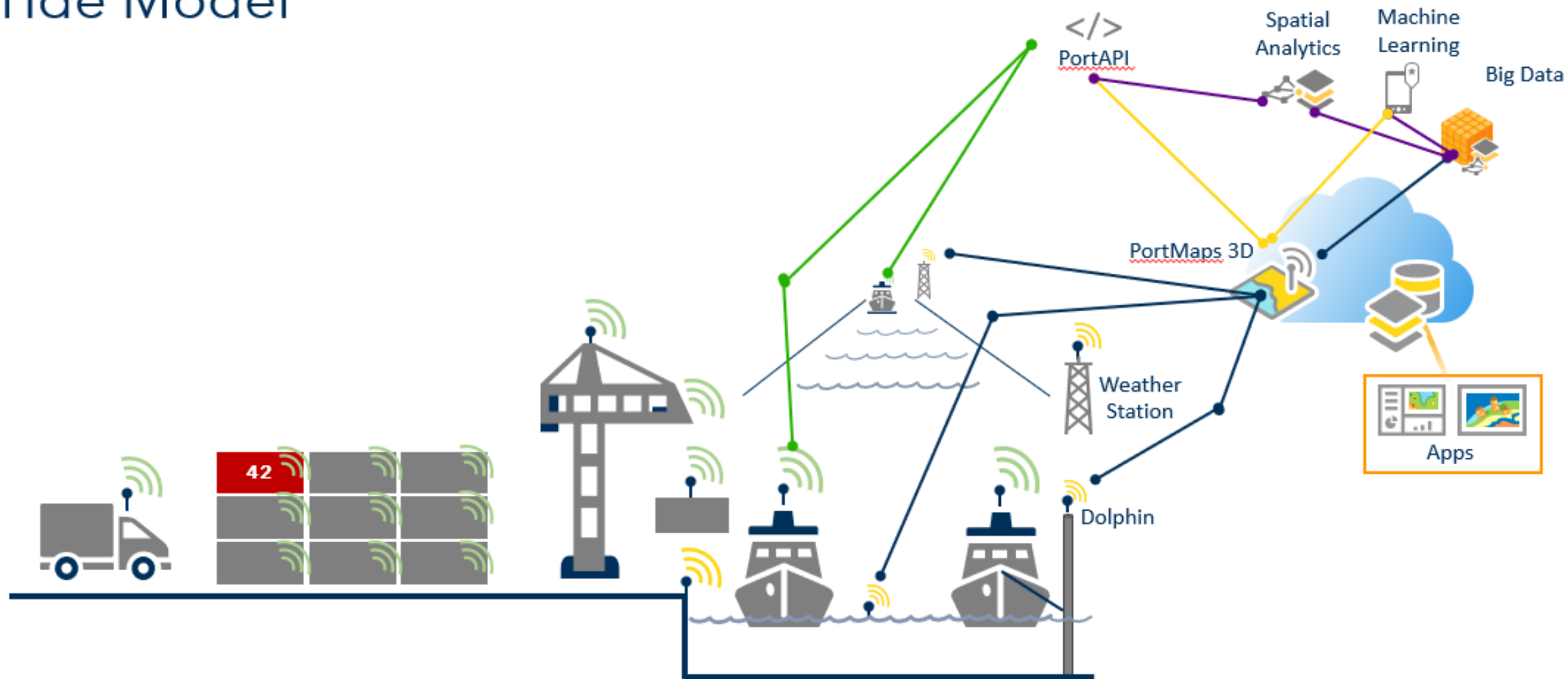
Smart Infrastructure

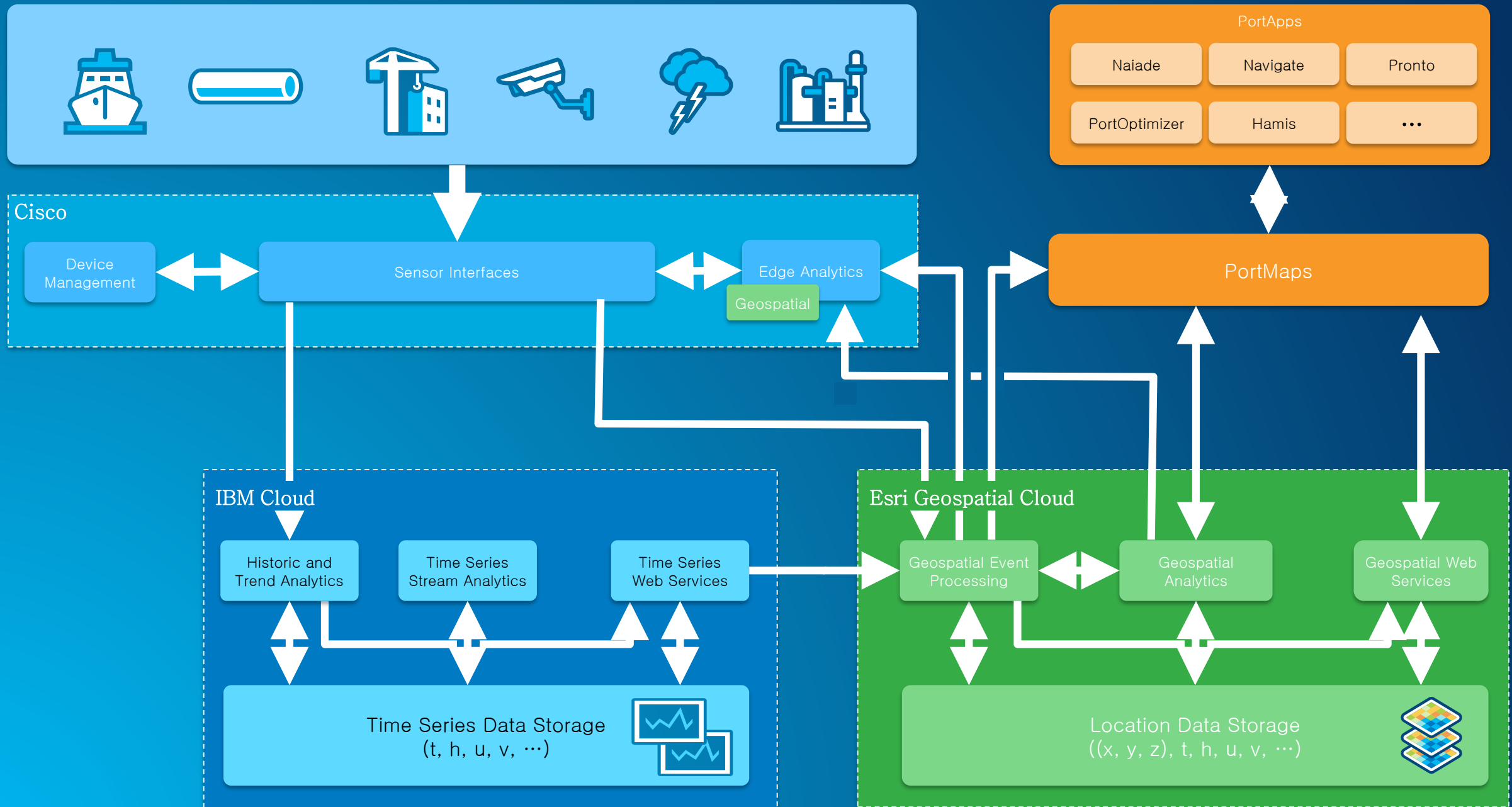
<https://www.portofrotterdam.com/weather-tide/desktop/>



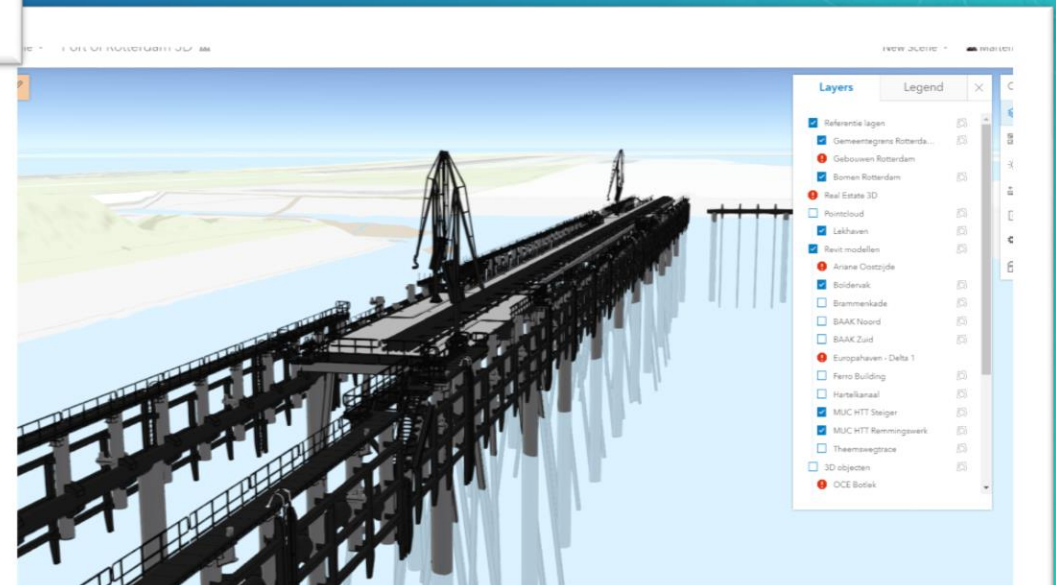
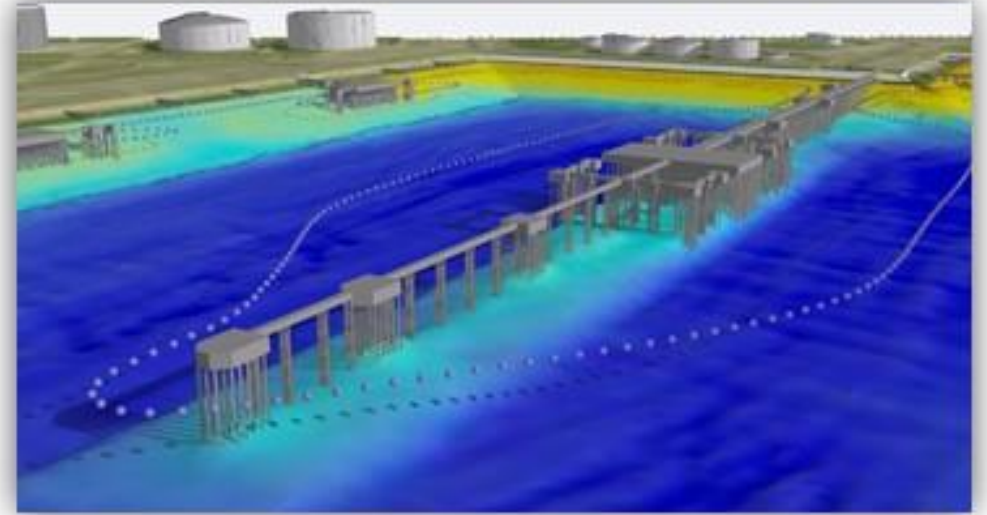
Smart Infrastructure

Tide Model

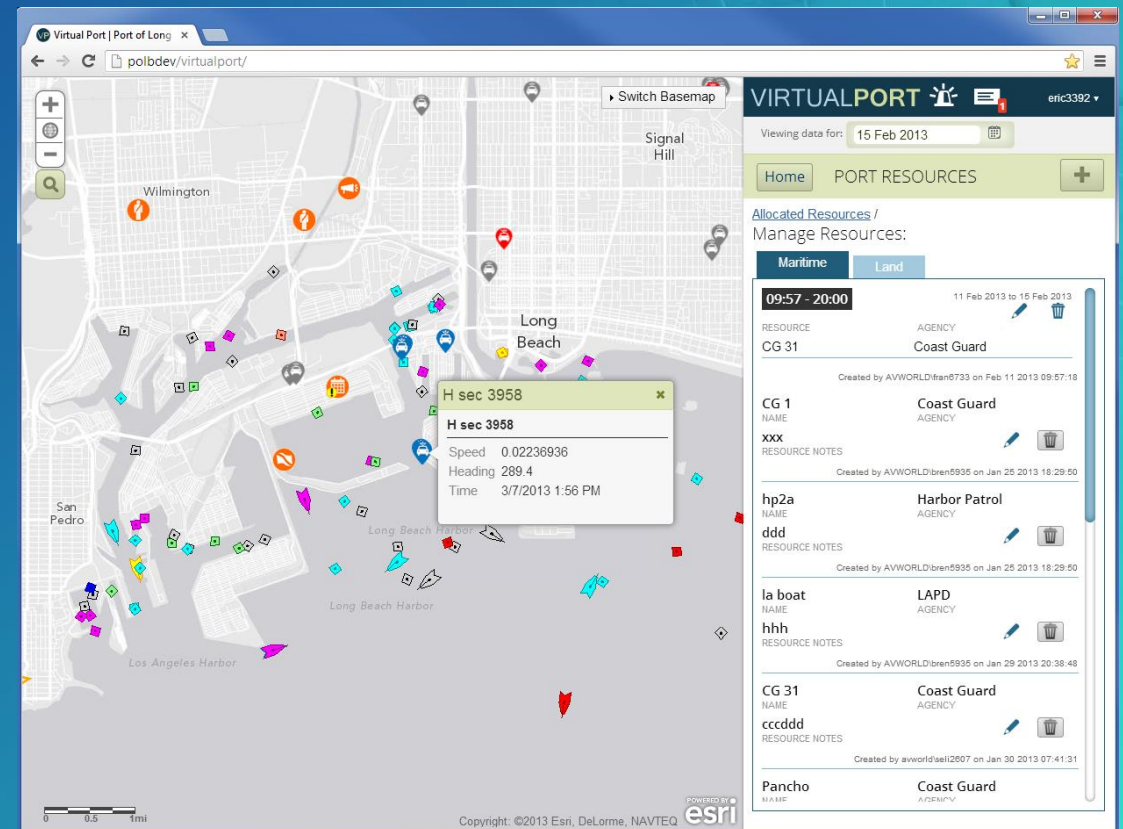
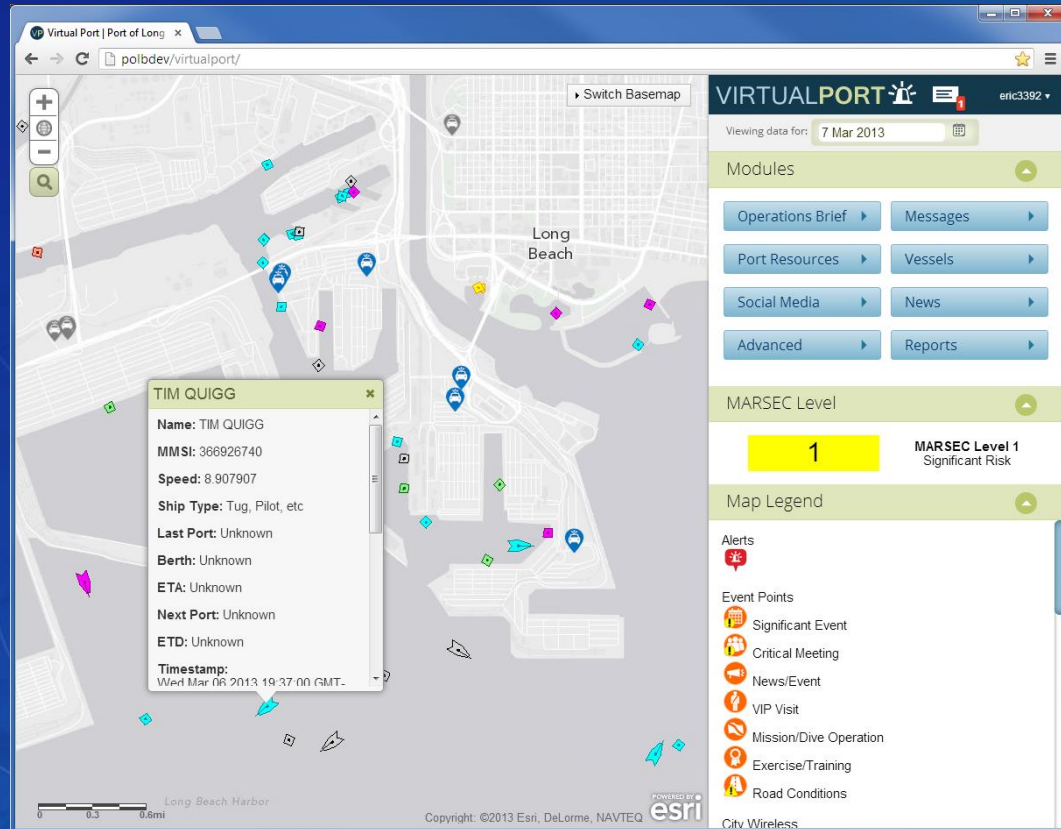




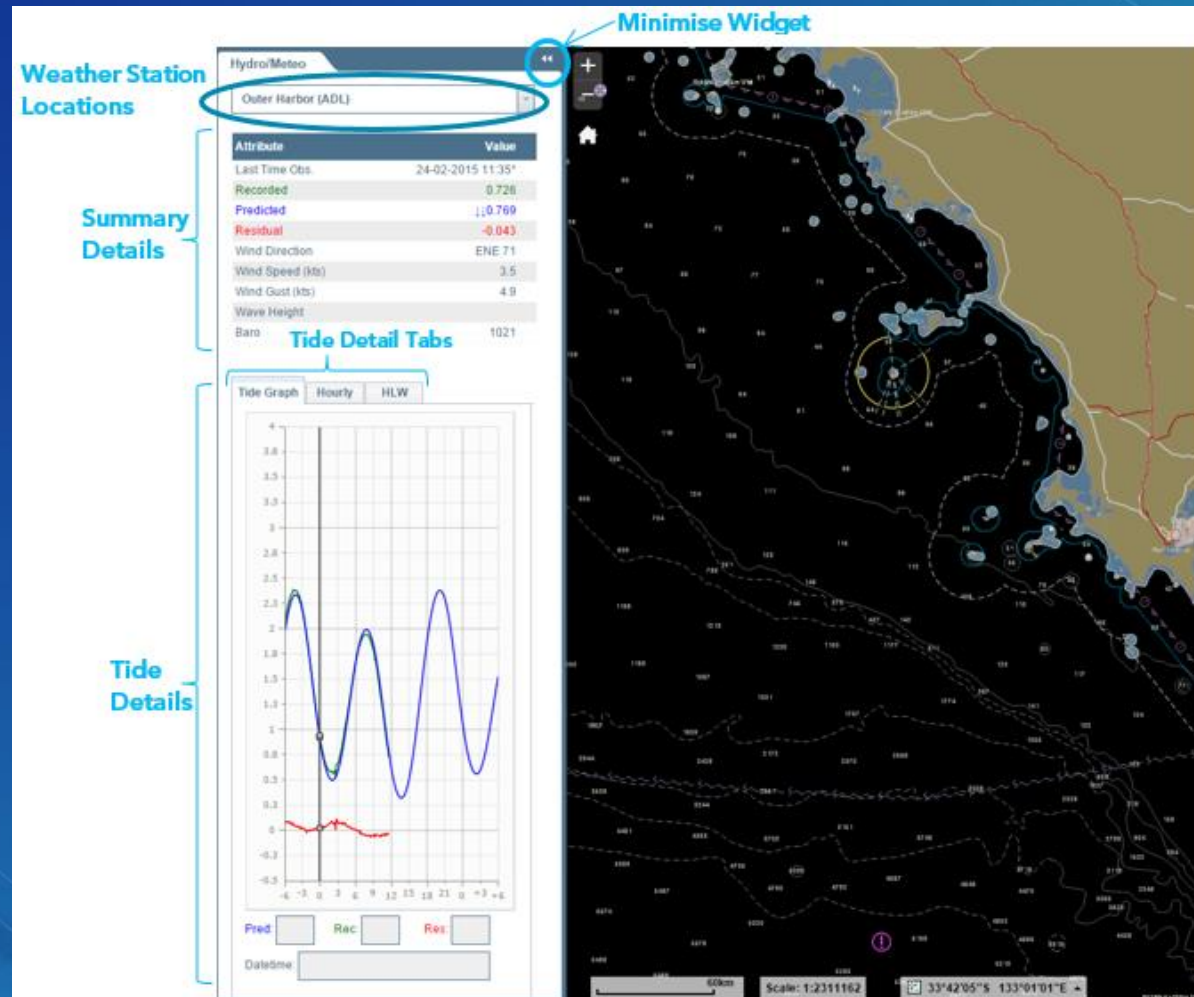
3D



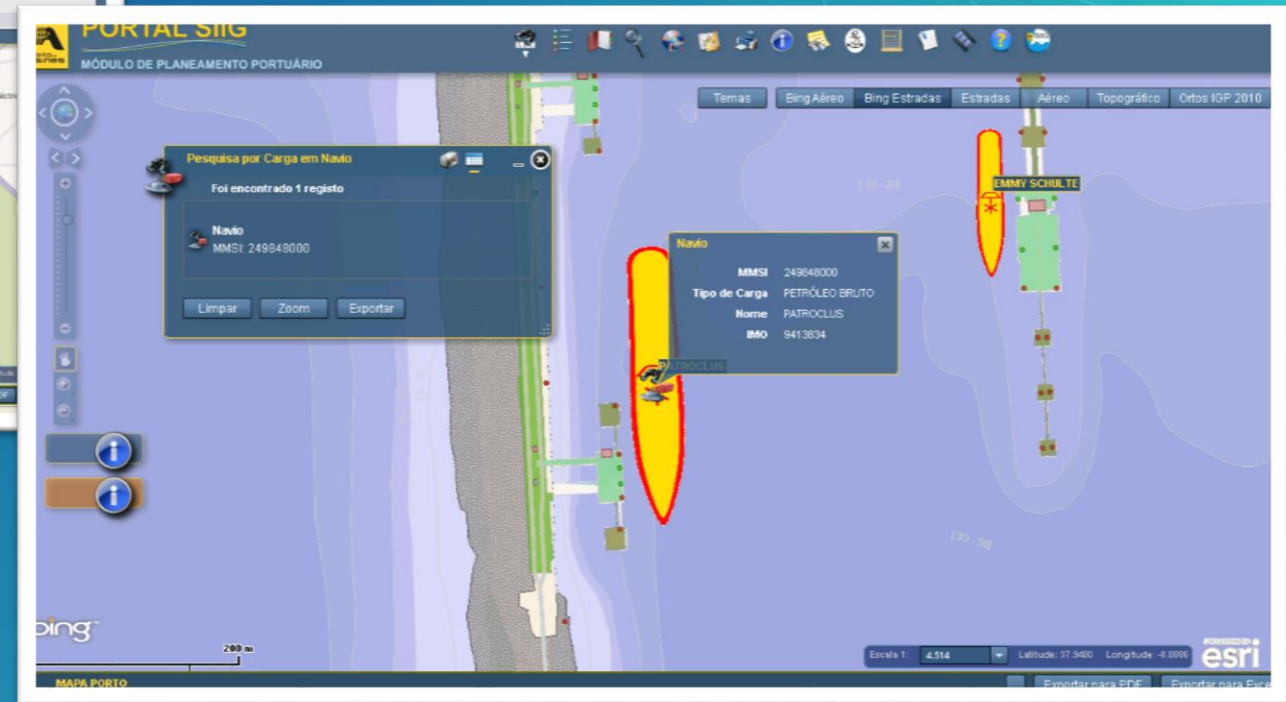
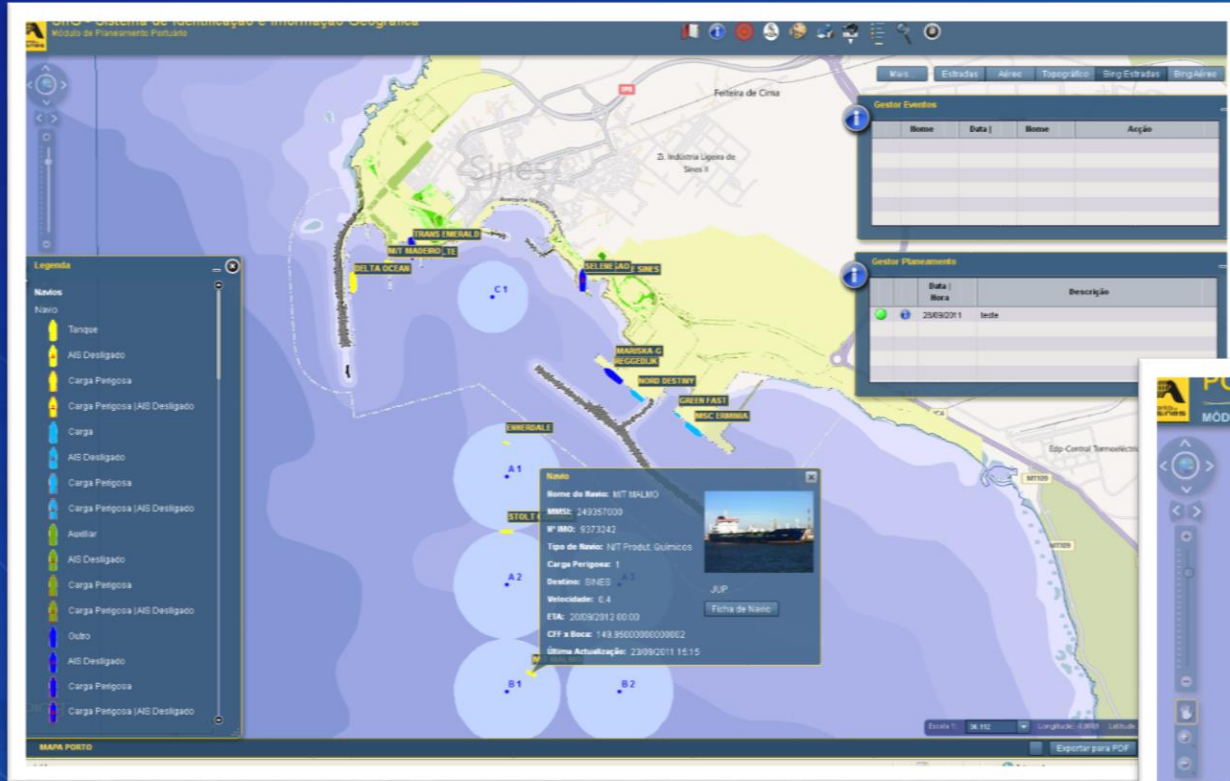
Real Time Operational Control Systems



Real Time Operational Control Systems: Flinders



Real Time Operational Control Systems



Intermodal Inefficiencies

Money can't solve US landside bottlenecks in container shipping

Bill Mongelluzzo, Senior Editor | Oct 25, 2018 6:11PM EDT

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Money can address some factors, but until several key checkpoints in a container's journey address operational inefficiencies, bottlenecks will persist, consultants and industry executives said at the JOC Inland Distribution Conference this week in greater Chicago. Photo credit: Shutterstock.com.

Drayage is opaque, inefficient, and ripe for digitization

John Paul Hampstead, Associate Editor • 12/11/2018

🔥 235 📖 3 minutes read



Inefficient Intermodal Terminals Slowing Supply Chain, Execs Say

This story appears in the Sept. 28 print edition of Transport Topics.

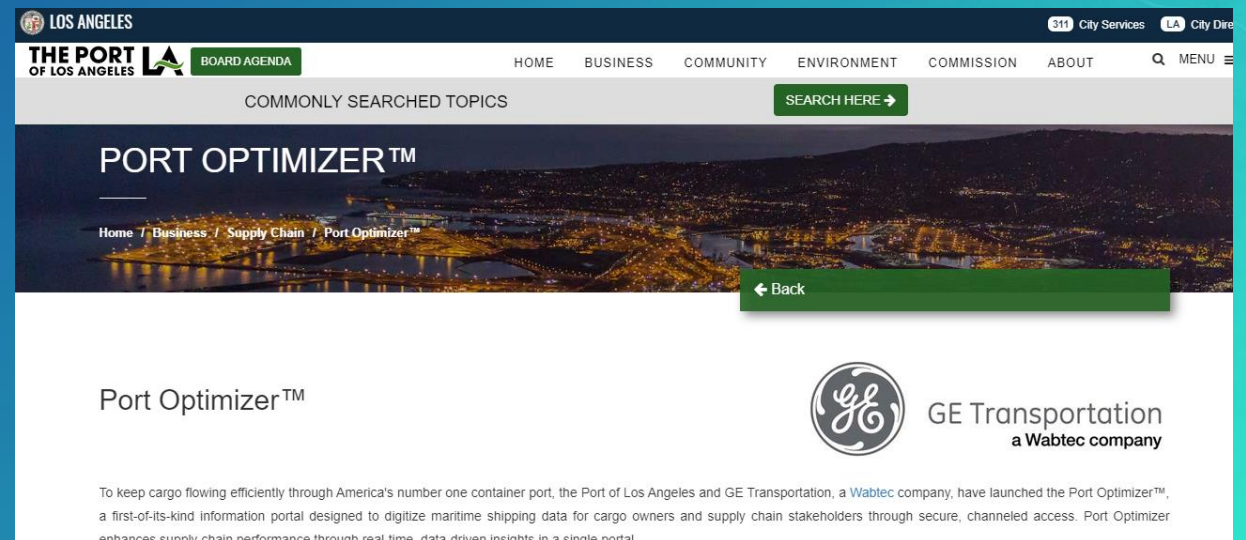
FORT LAUDERDALE, Fla. — Efforts to improve intermodal productivity continue to be frustrated by inefficient terminal operations that punish truckers.

“Coordinated Data Responses”

Port Community Systems



Port Community Systems



Inter-Modal Optimization



Inter-Modal Optimization: Operations Research

Complex Adaptive Systems, Publication 3
Cihan H. Dagli, Editor in Chief
Conference Organized by Missouri University of Science and Technology
2013- Baltimore, MD

Simulation Modeling and Analysis of Complex Port Operations with Multimodal Transportation

Mariam Kotachi^{a*}, Ghaith Rabadi^{b,c}, Mohammad F. Obeid^d

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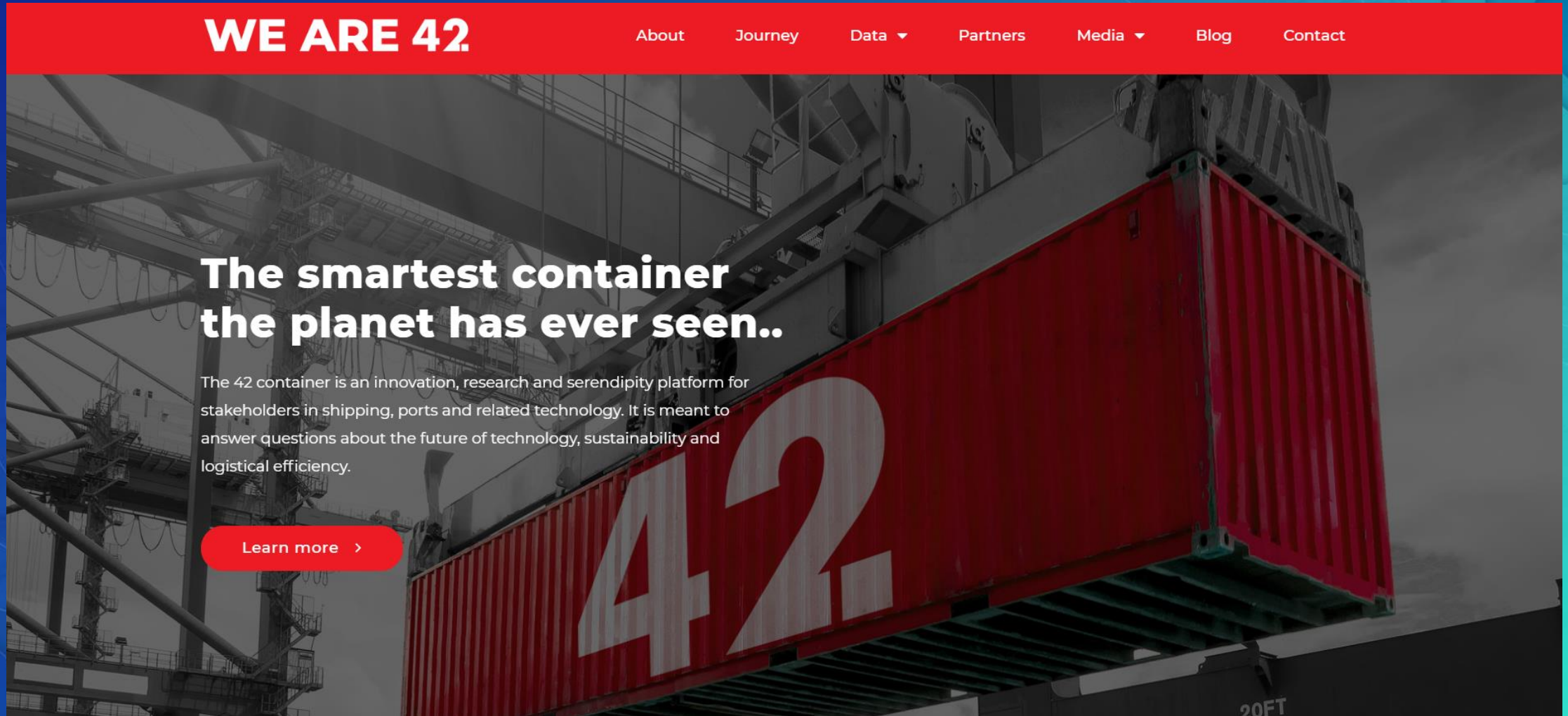
^d*MSVE Department, Old Dominion University, Norfolk 23529 Virginia, USA*

Abstract

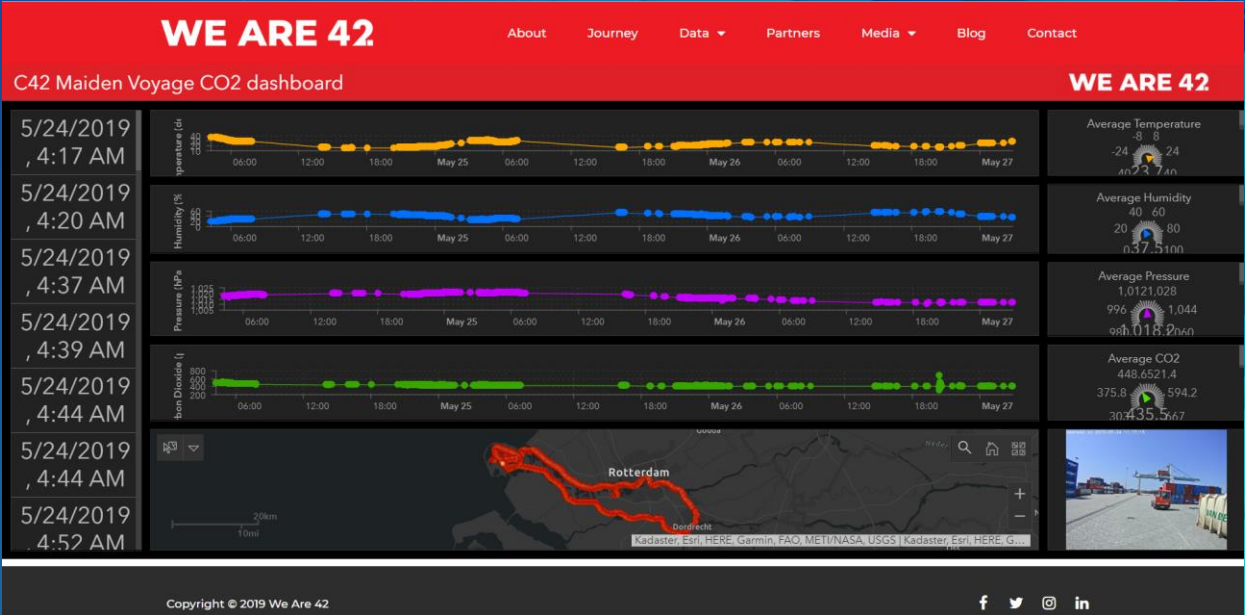
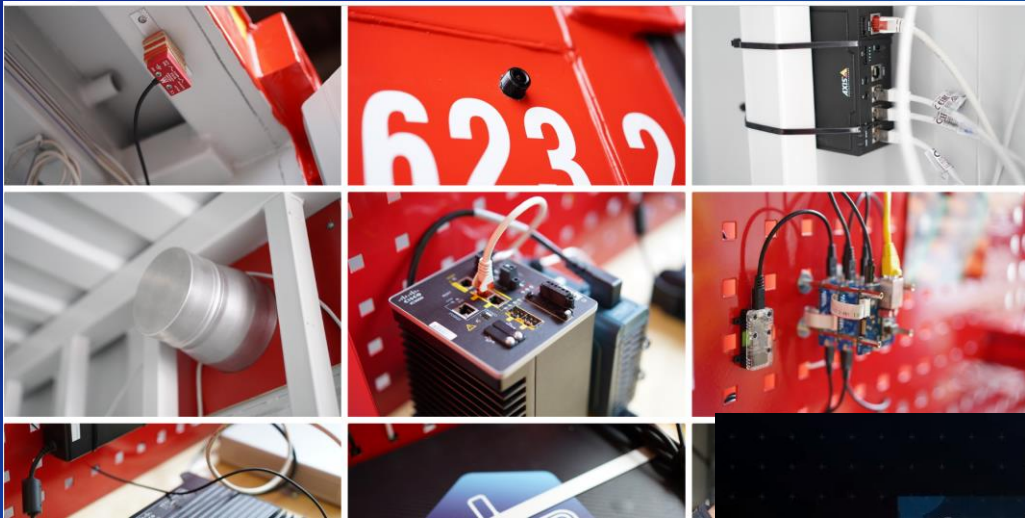
World trade has been increasing dramatically in the past two decades, and as a result containers exchange has grown significantly. Accordingly, container terminals are expanding to meet this increase and new container ports have opened. Ports with one or more container terminals are considered complex systems in which many resources, entities and transporters interact to achieve the objective of safely moving containers delivered by ships inland as well as loading containers delivered by trucks and rail onto ships. Ports with multimodal transportation systems are in particular complex as they typically operate with ships arriving to one or more terminals, multiple quay cranes, rubber tyred gantry cranes, trains, and trucks delivering containers of different types to terminals.

Seamless Supply Chain

<https://weare42.io/>




Seamless Supply Chain



Seamless Supply Chain

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Real-Time Container Tracking And Spatial Analytics Powered By Location Intelligence

BY ESRI

FRONTIER ID


GEO DATA COLLISION

GEO V1



Various industries have been dramatically changed by a "digital transformation" movement or implementation of the Internet of Things (IoT) throughout their organization. We see lots of discussion and examples of autonomous vehicles on land.

G197580 The-Digit...pdf


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Powering the Digital Supply Network

Enterprise location intelligence



Supply chain leaders keep pace with the demands of their complex global network.





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Enterprise Information Integration

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PortMaps Viewer



[Galerij Asset Management](#) [Galerij DHMR](#) [Galerij POR-Online](#) [Galerij Port Development](#)

Welkom op het PortMaps portaal van het Havenbedrijf Rotterdam. Het PortMaps platform stelt zich tot doel om alle geo-informatie gerelateerd aan de haven beschikbaar te stellen. Via het PortMaps portaal heeft u direct toegang tot de verschillende informatie producten en de PortMaps Viewer.

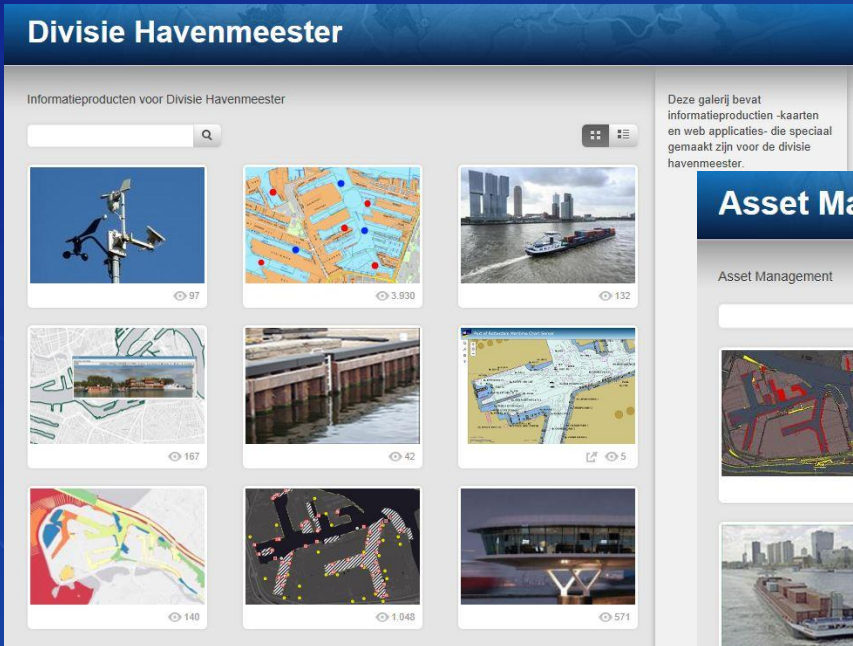
Heeft u vragen? Stuur een berichtje naar portmaps@portofrotterdam.com

Enterprise Information Integration

Divisie Havenmeester

Informatieproducten voor Divisie Havenmeester

Deze galerij bevat informatieproducten -kaarten en web applicaties- die speciaal gemaakt zijn voor de divisie havenmeester.

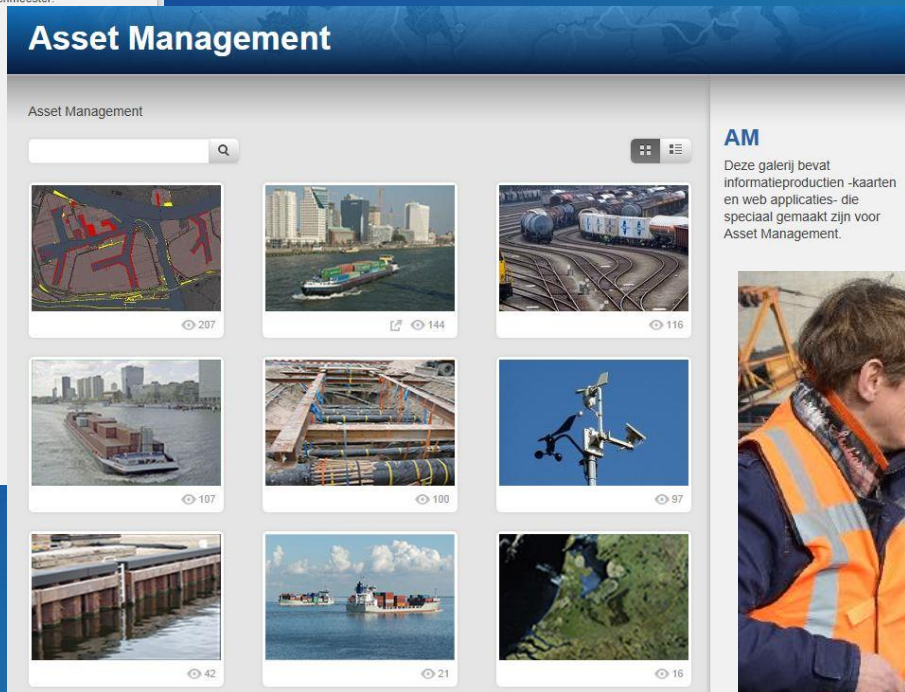


The gallery displays a grid of 9 information products for the Divisie Havenmeester. Each product is represented by a thumbnail image with a view count icon in the bottom right corner. The products include: a ship at a port (97 views), a map with red and blue dots (3,930 views), a ship in a harbor (132 views), a map of a harbor area (167 views), a close-up of a harbor structure (42 views), a map of a harbor area (5 views), a colorful abstract map (140 views), a map with yellow dots (1,048 views), and a ship at a port (571 views).

Asset Management

Asset Management

Deze galerij bevat informatieproducten -kaarten en web applicaties- die speciaal gemaakt zijn voor Asset Management.



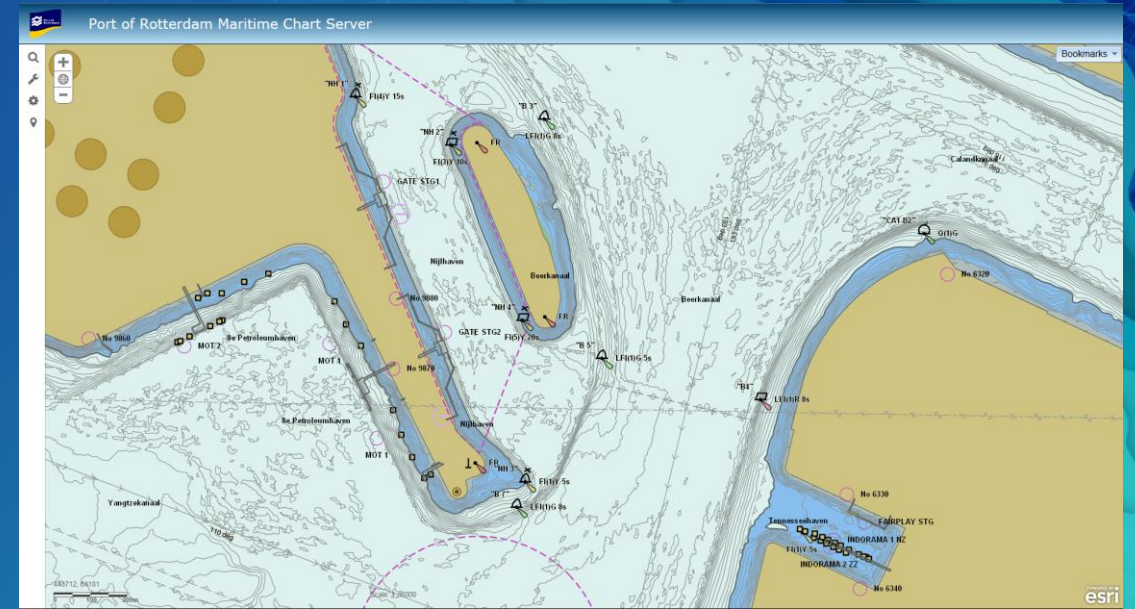
The gallery displays a grid of 9 information products for Asset Management. Each product is represented by a thumbnail image with a view count icon in the bottom right corner. The products include: a map with red and blue dots (207 views), a ship in a harbor (144 views), a map of a harbor area (116 views), a ship in a harbor (107 views), a map of a harbor area (100 views), a ship at a port (97 views), a close-up of a harbor structure (42 views), a ship in a harbor (21 views), and a map of a harbor area (16 views).



Enterprise Information Integration



Port Harbour Master



Maritime Charts



Bathymetry



esri

THE
SCIENCE
OF
WHERE