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Lessons Learned: Digital Twin at the Port of Rotterdam

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High Level Training on Digital Twin applications in Port ecosystems, Venice 28th Jan 2025

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Agenda

Why **Digital Transformation**

PortMaps as a Foundation

People & **Processes**

Applications of the **Digital Twin**

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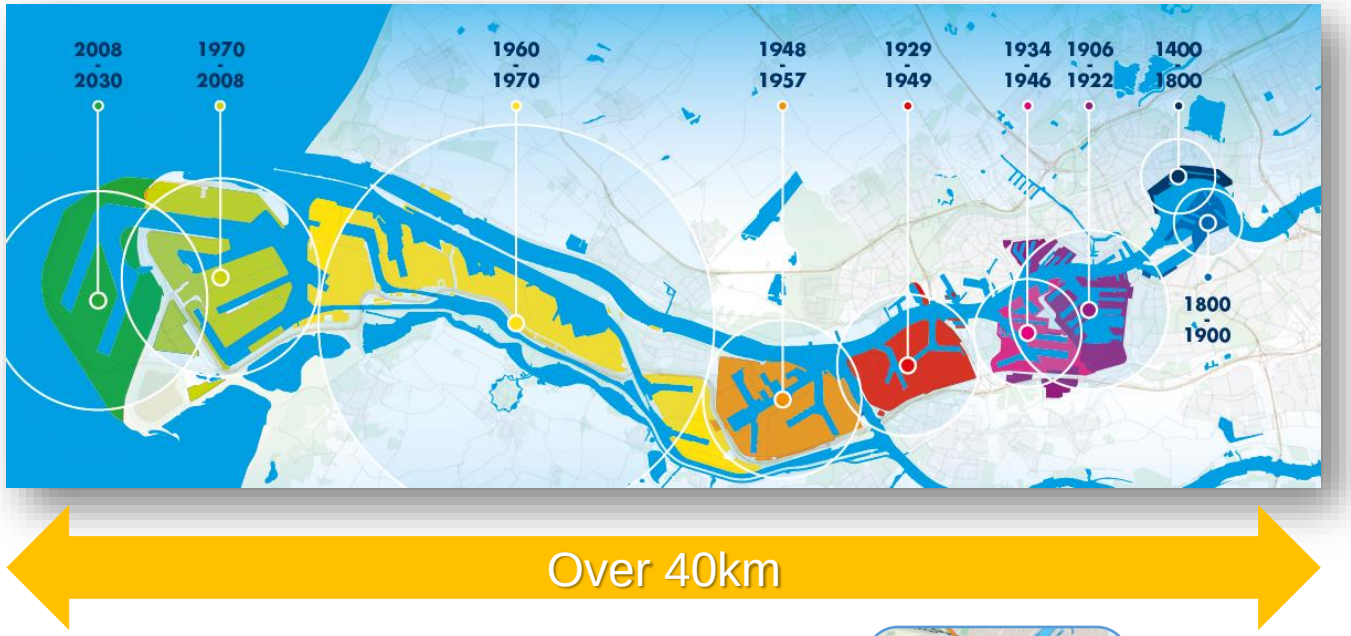
Why **Digital Transformation**

The Port and City of Rotterdam have developed over **centuries**

Maasvlakte is now **mostly developed**

Rotterdam is a Land Lease Port

Physical growth not possible/economical, shifting focus to optimizing operations



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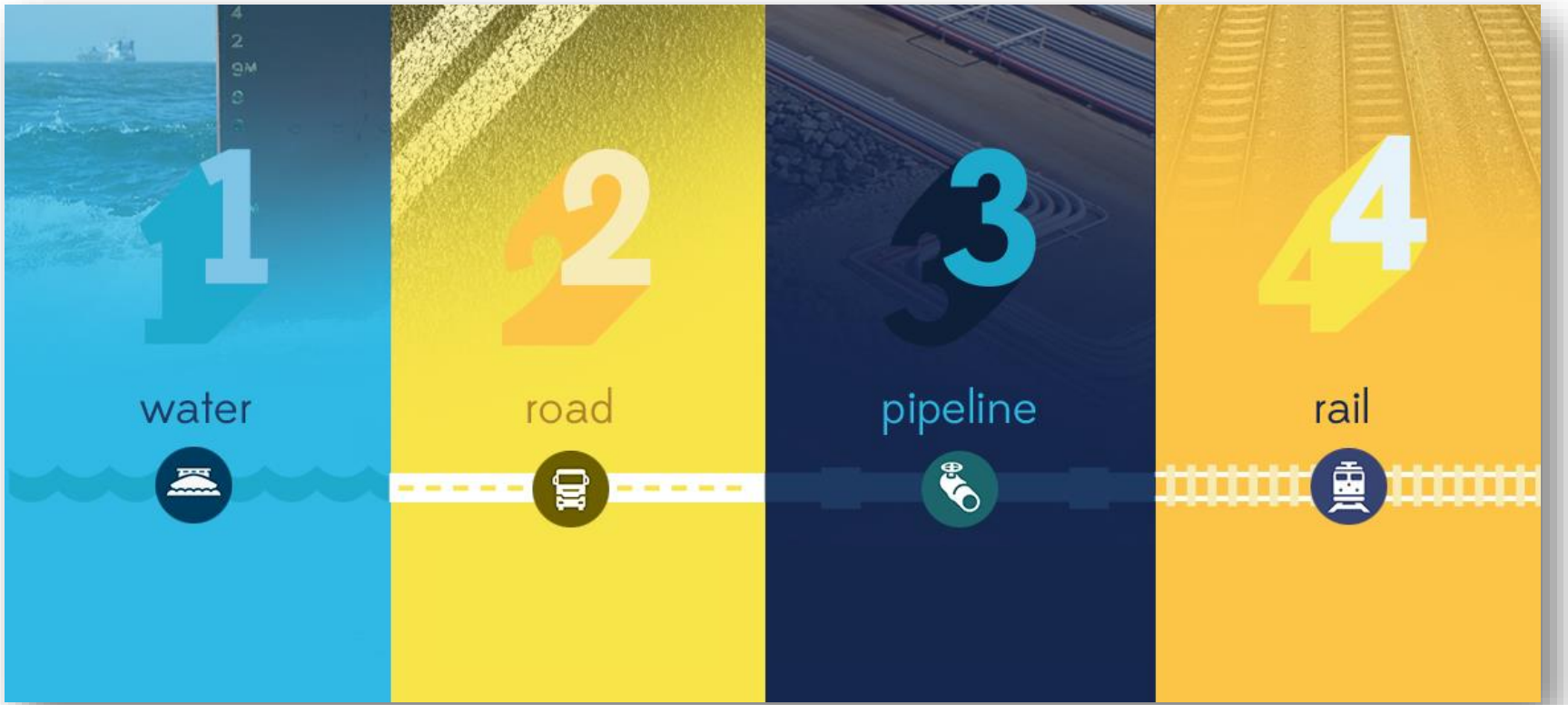

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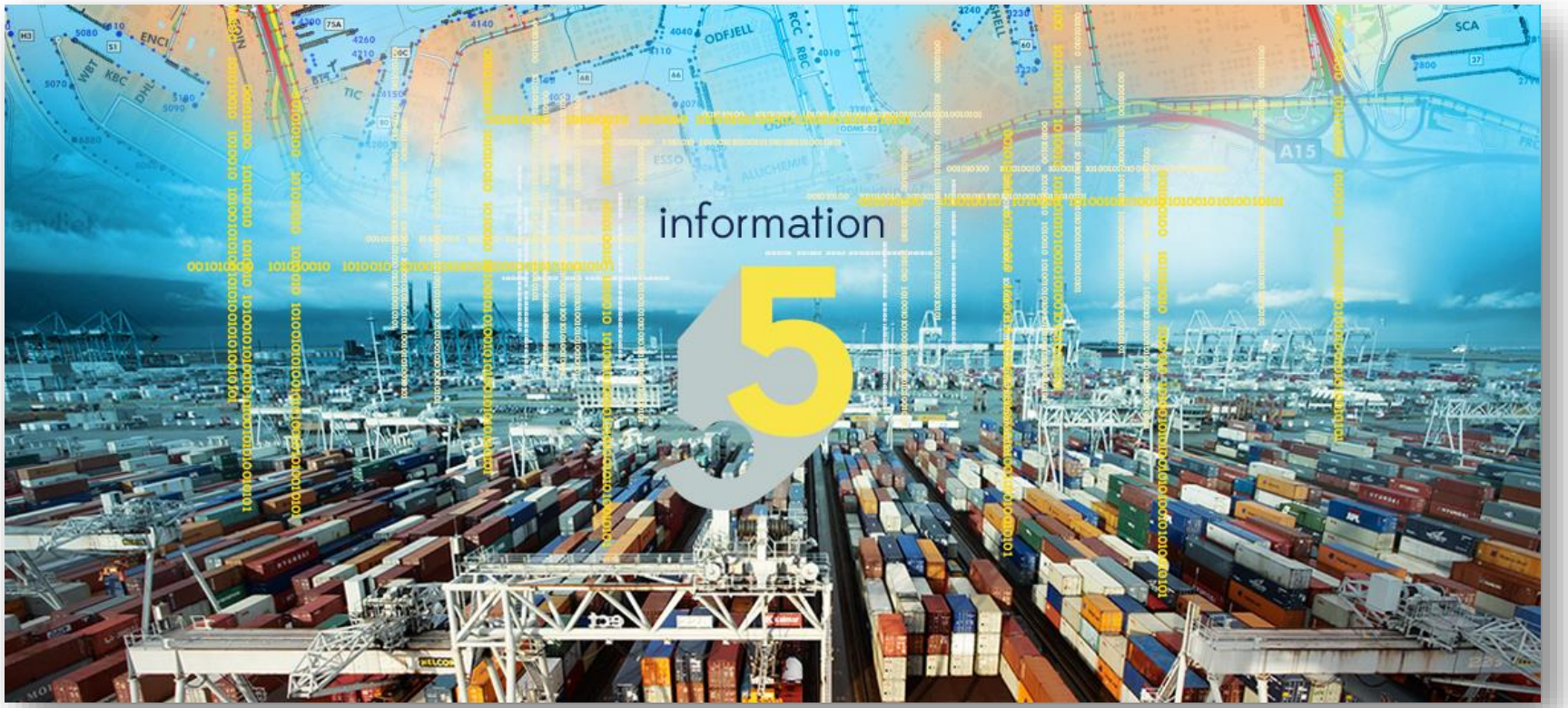

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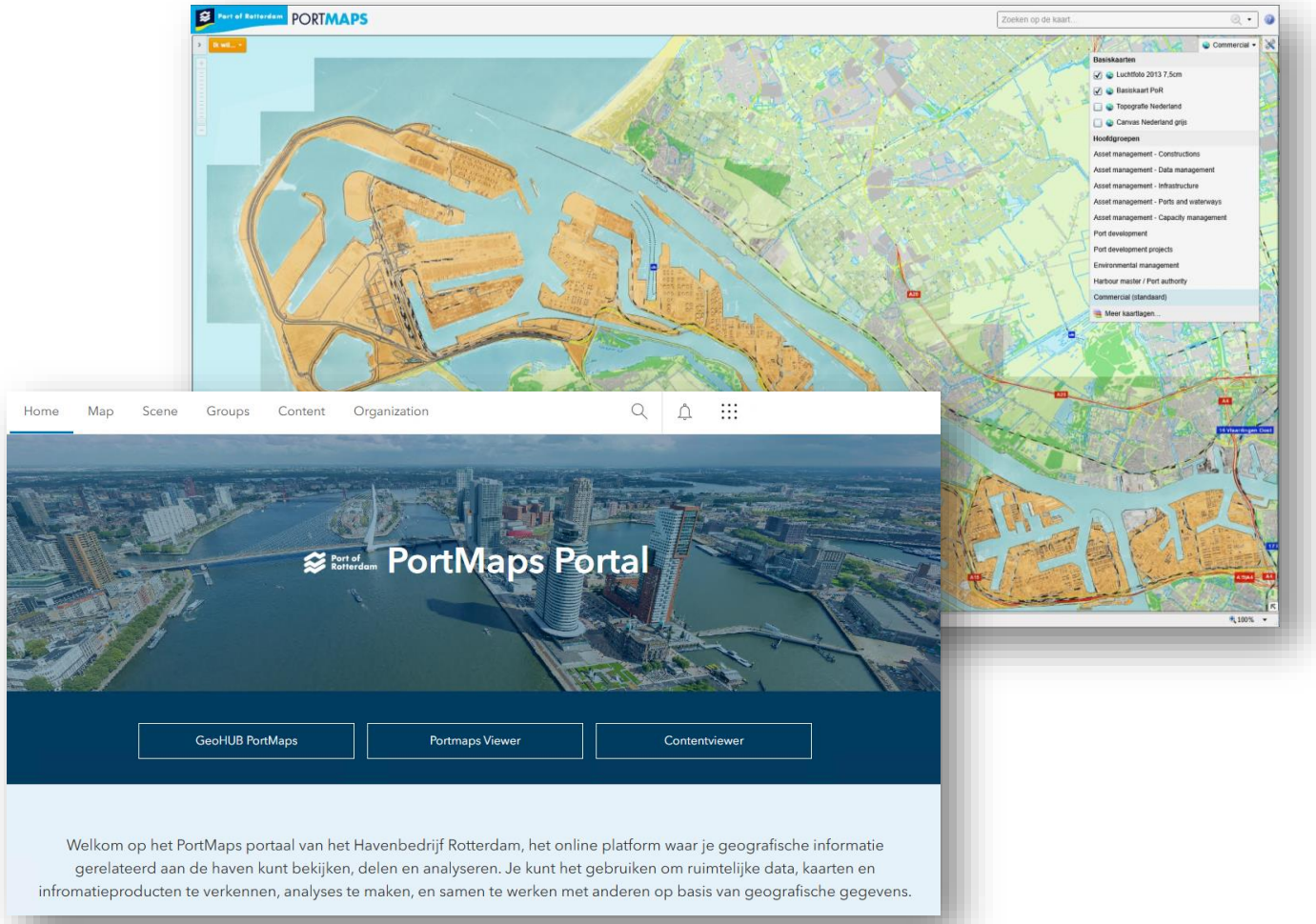
Building **PortMaps**

PortMaps was established as the foundational geospatial system of record - **GIS**

Focus on **Asset Management**

GIS is one system of many at PoR - **System of Systems**



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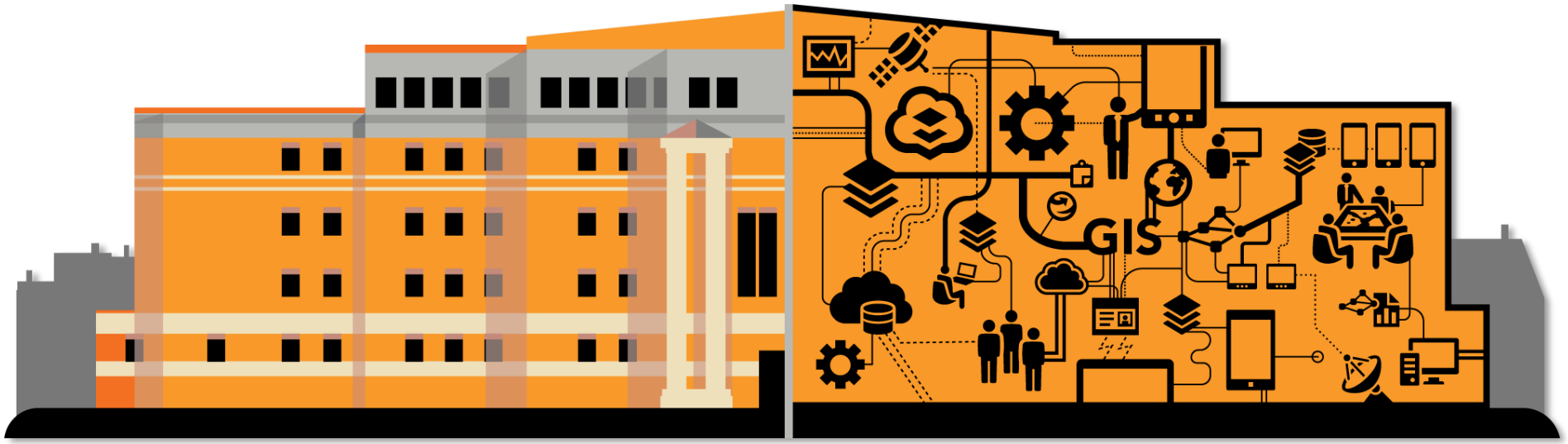
System of **Systems**

ERP **GIS** **CAD** **IoT**



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People and **Processes**

All kinds of people at a Port – not just technologists

Must Be Easy to Use - **Three Clicks or Less**

Next generation workforce

- Evolution from physical to digital

Start with Asset Management

- Expand to other departments

People and Processes

Challenges:

- ***Resistance to change*** – "Because we've always done it that way"
- Systems are owned by many separate teams across the Port
- Data is maintained across many systems
- ***Single Point of Truth*** – Reduce duplication of data across systems
- Changes take time – Realizing changes can take *weeks / months / years*

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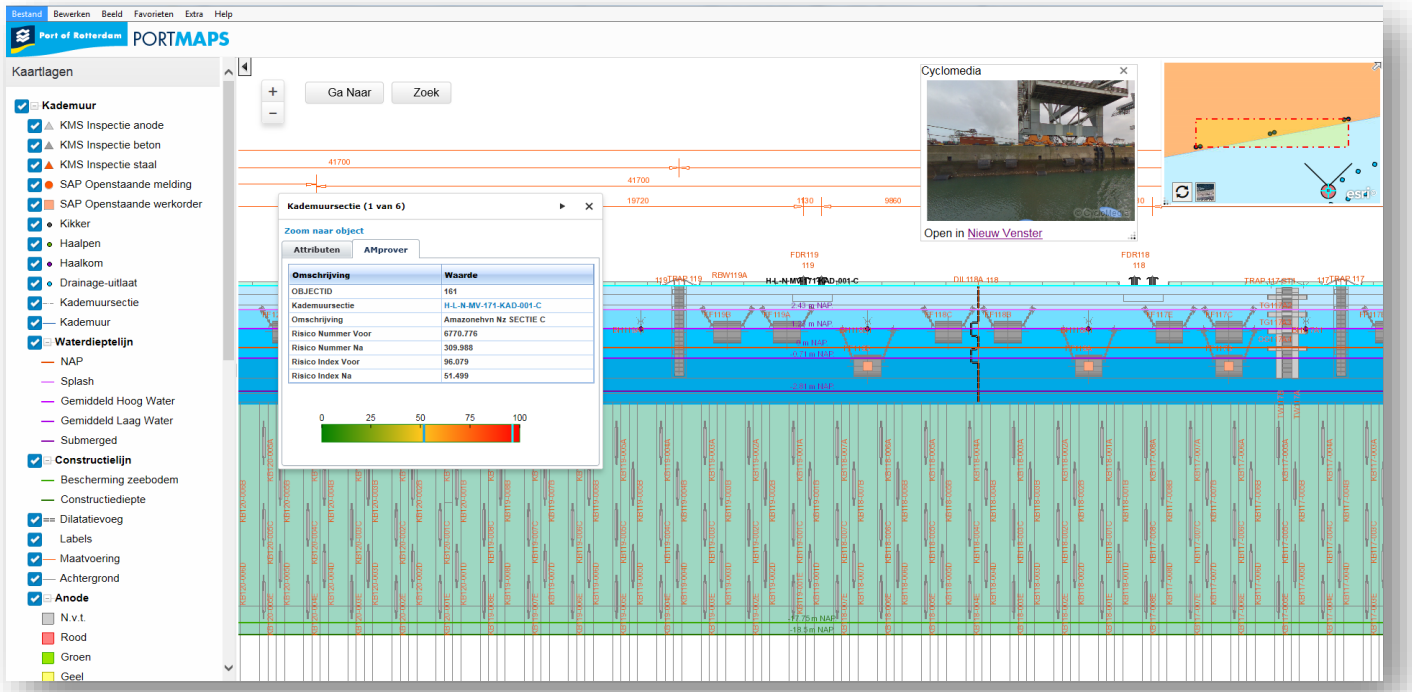
Data for **Asset Managers**

Quay Wall Management

Modeling **Asset Health**



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Water as an Asset

Survey & Dredging **Operations**

Leasing water

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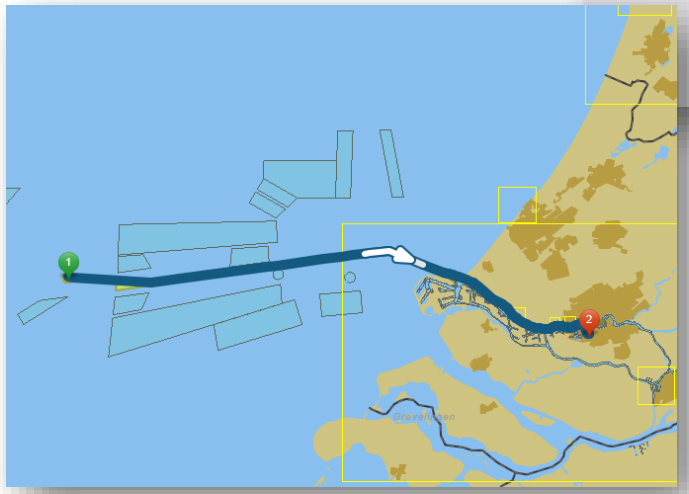
Toward a **Digital Twin**

Current and **predictive** data integration

Safety

- If not now, when?



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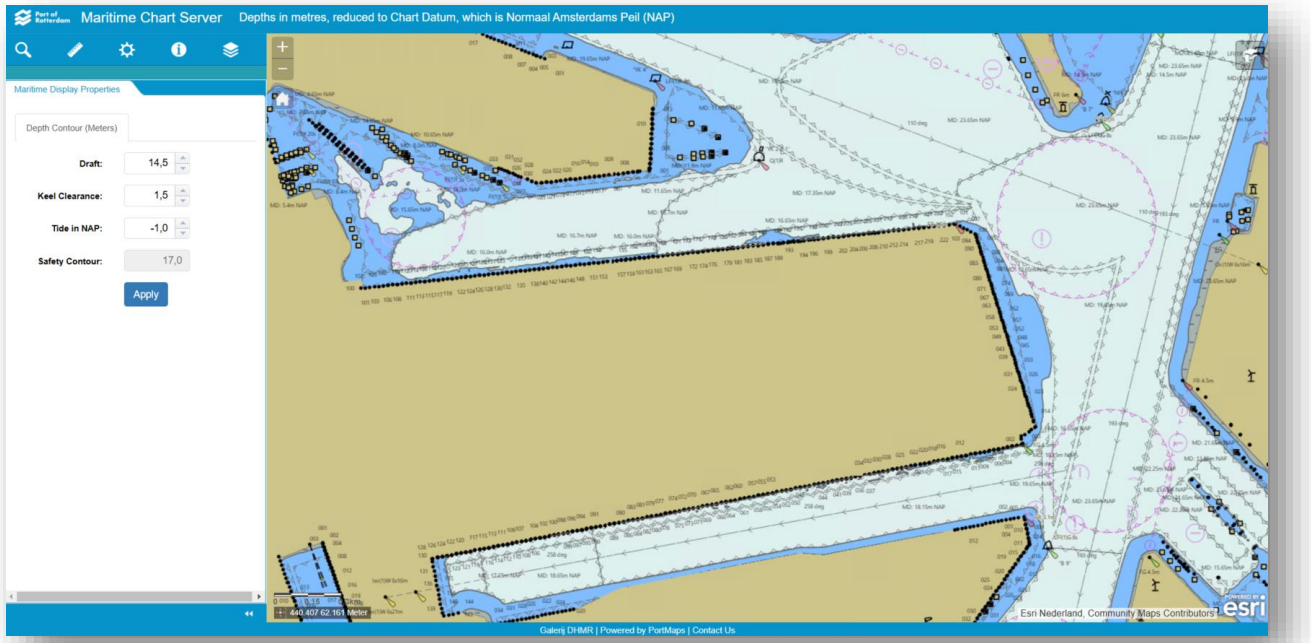
Real-time Decision Making

Electronic Navigational Charts (ENC)

For Pilots &

Harbour Coordination Centre



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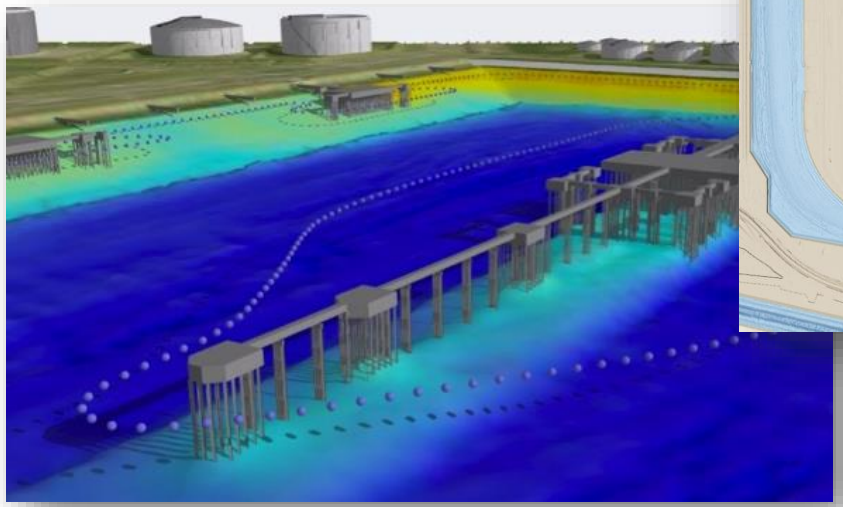
Port **Development**

Construction Management in multiple dimensions

3D Land & Water

3D Assets



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Hydrologic and Meteorological **Monitoring**

Digital Twin

Challenges

- Critical systems must have a Service Level Agreements (SLA)
- Systems and workflows must be architected for 24x7 operations
- The organization must have ***support***
  - System Owners
  - IT Support
  - Application Support
  - Data Support

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Lessons Learned: In Conclusion

The Digital Twin at the Port of Rotterdam:

- Is about digital transformation, not just a twin
- Is multidimensional – 2D, 3D, and 4D
- Is *not* only BIM data integration with GIS
- Is about improving Port Operations *today* and in the *future*

Digital Twin: **Getting Started**

1) **Identify changemakers** – know who can influence, own, and make decisions. Execute a plan.
2) **Finding your starting point** – build a GIS, a database, and a portal for users to access the DT.
3) **Architect for success** – but plan for future growth. Start small, but think big.
4) **Educate your staff** – ensure that ownership comes from within the port.
5) **Be prepared to fail** – not every application will bring value, focus on those that do.

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