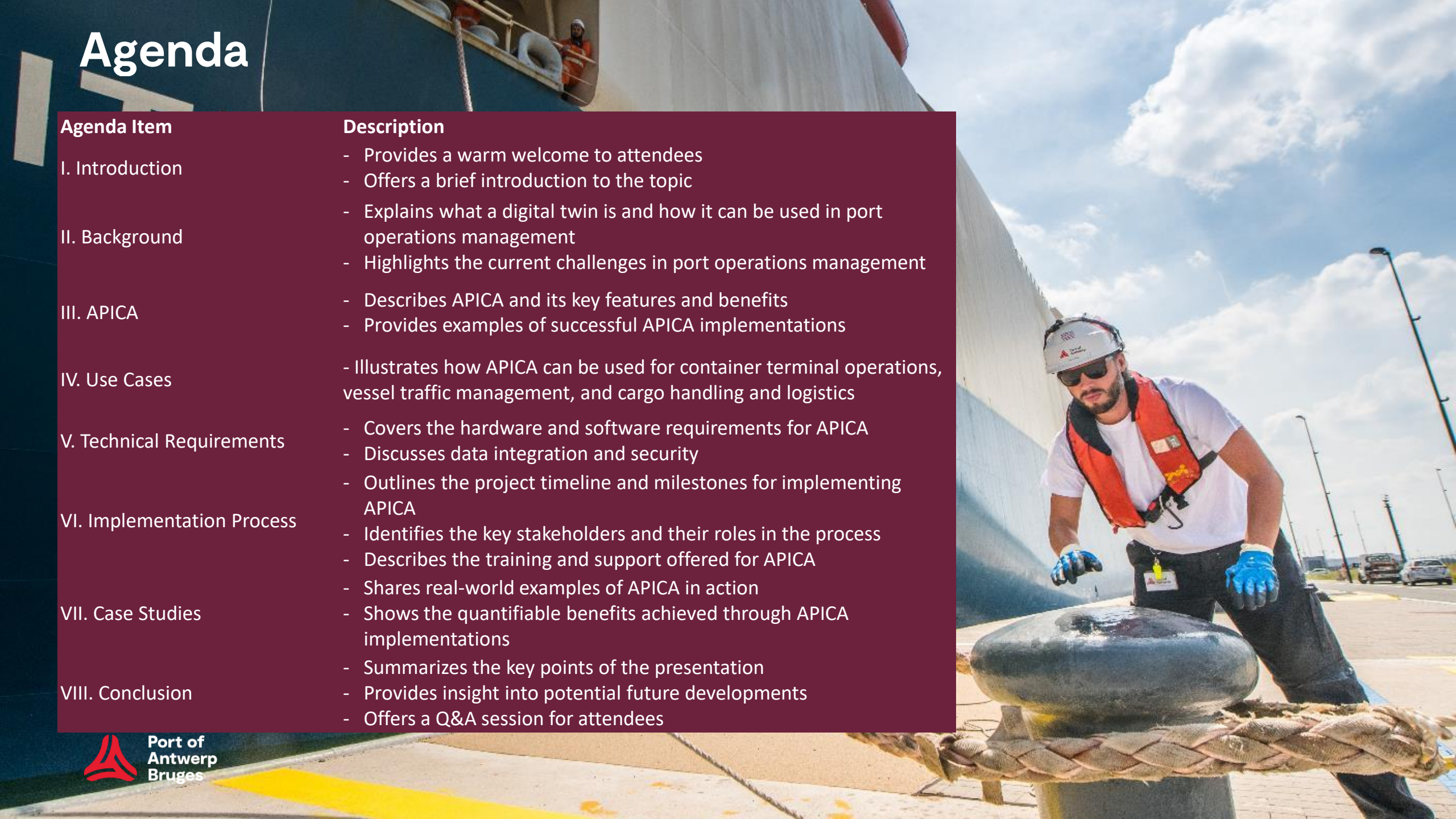
FuturePort Bilbao

“APICA: A Digital Twin for port operations management”

Port of Antwerp Bruges

Agenda

Agenda Item	Description
I. Introduction	- Provides a warm welcome to attendees - Offers a brief introduction to the topic
II. Background	- Explains what a digital twin is and how it can be used in port operations management - Highlights the current challenges in port operations management
III. APICA	- Describes APICA and its key features and benefits - Provides examples of successful APICA implementations
IV. Use Cases	- Illustrates how APICA can be used for container terminal operations, vessel traffic management, and cargo handling and logistics
V. Technical Requirements	- Covers the hardware and software requirements for APICA - Discusses data integration and security
VI. Implementation Process	- Outlines the project timeline and milestones for implementing APICA - Identifies the key stakeholders and their roles in the process - Describes the training and support offered for APICA
VII. Case Studies	- Shares real-world examples of APICA in action - Shows the quantifiable benefits achieved through APICA implementations
VIII. Conclusion	- Summarizes the key points of the presentation - Provides insight into potential future developments - Offers a Q&A session for attendees



Port of Antwerp Bruges

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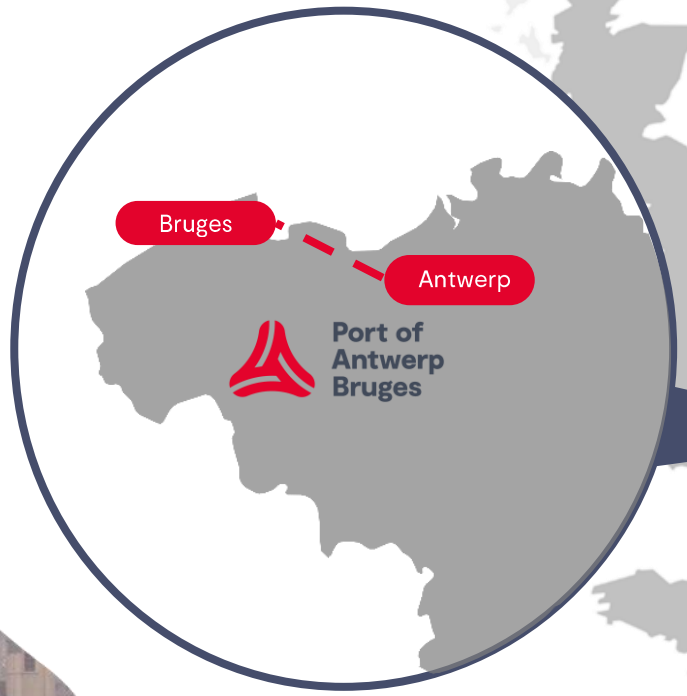
Port of Antwerp Bruges

Who we are

Port of
Antwerp
Bruges



A global port in the heart of Europe

One port
Two sites

Port of
Antwerp
Bruges

2nd largest port in Europe

Number one **export** port in Europe

Largest **car handling** port in Europe
3,507,461 million cars/year

Total throughput
287 mio tons/year

20,675
Seagoing vessels/year

Important **cruise** port in Benelux
547,374 passenger movements

Largest **chemical** hub in Europe

15% of EU **gas** market

Port of Antwerp Bruges

Belgium's most important economic driver

14,322
Hectares

1,400
Companies

€ 20,8 billion
Added value

4.5%
GDP

164,000 **jobs**
Direct and indirect

Energy transition
frontrunner

Port of Antwerp Bruges

What we do

Port of Antwerp Bruges

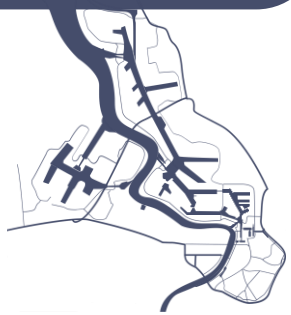
Unique ecosystem

Bruges

Container & cold chain | roro | gas

Antwerp

Container & cold chain | breakbulk | chemical hub



Frontrunner energy and digital transition

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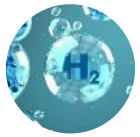
Frontrunner energy transition

Projects in energy, industry and shipping

Sustainable **Energy**

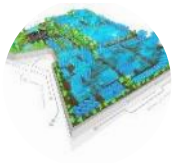
Expand Onshore wind production capacity Hyoffwind

Backbones for sustainable flows
(H2, CO2, waste heat & steam)

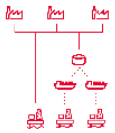


Hydrogen Import Coalition / Pilots

Sustainable **Industry**



NextGen District – hotspot for circular Economy



Antwerp@C – CCS

Power-to-Methanol
green methanol production (CCU)

Sustainable **Shipping**

Multi Fuel Port – alternative fuels on offer

Onshore power supply for vessels

Tugboats **on H2 & methanol**

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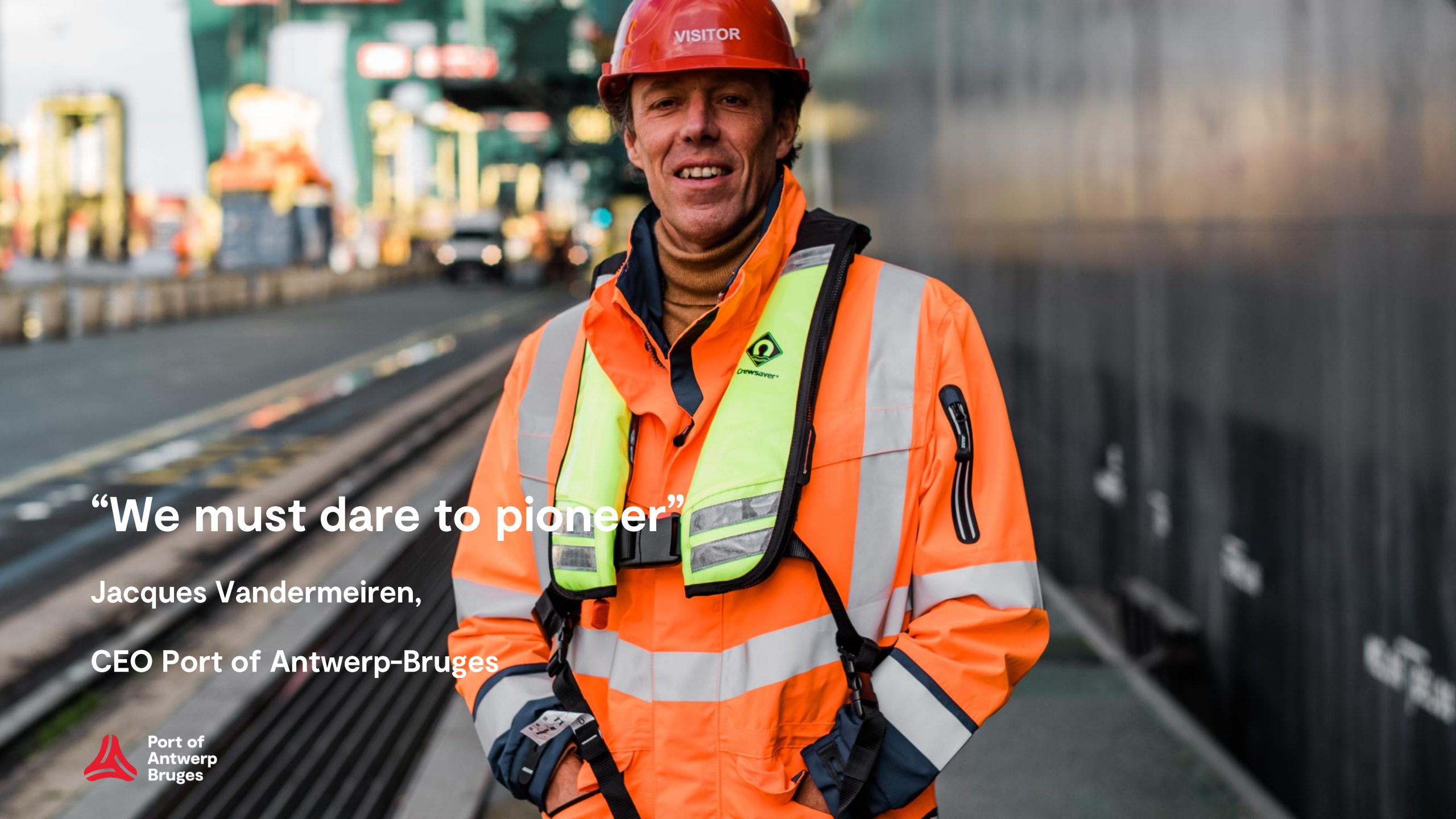

“We must dare to pioneer”

Jacques Vandermeiren,

CEO Port of Antwerp-Bruges

Port of Antwerp Bruges


Twins are relevant!

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Digital nervous system

Digital Twin is the capstone project

SENSORS

CAMERA

FIBER

RADAR

DRONE

NETWORK DATA STREAMS

ENTERPRISE ASSET MANAGEMENT

NAUTICAL PLANNING

GEOSPATIAL

DATA PLATFORM

TIMESERIES

OWN DATA

THIRD PARTY DATA

COMBINED DATA

MACHINE VISION

REAL TIME

USER EXPERIENCE

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Cherry on the cake – bringing all effort together

A (Port) Digital Twin ?

DE

WHAT IS A DIGITAL TWIN

A digital twin is a virtual replica
data to simulate its behavior and
complete and accurate represen
materials, and properties, as wel

Digital twins are used in various
transportation, and energy, to im
monitor equipment performance
simulate and test new products
reducing costs and risks associat

Digital twins can be created usin
machine learning algorithms, an
used to build and update the dig
optimize the physical asset or pr

DE

WHAT IS A PORT DIGITAL TWIN

A port digital twin is a virt
processes, and systems in
advanced analytics to crea
physical and operational

The digital twin technolog
enabling port operators t
Port digital twins can simu
operators to test different

A port digital twin typicall
movements, cargo handli
for forecasting and optim
shipping industry, port di
improve their operations

DE

What is the port of antwerp-bruges digital twin (named APICA)?

I'm sorry, but as a language model, I do not have access to real-time information on the status or specifics of the APICA digital twin port of Antwerp-Bruges. However, I can provide some general information on digital twins and their use in port operations.

A digital twin is a virtual representation of a physical object or system that allows for real-time monitoring and analysis of its performance and behavior. In the context of ports, digital twins can be used to simulate and optimize various aspects of port operations, including vessel traffic, cargo handling, and infrastructure maintenance.

The Antwerp-Bruges port is one of the largest ports in Europe, and it has been investing in digital twin technology to enhance its efficiency and sustainability. APICA (Antwerp Port Information and Control Application) is a digital twin platform developed by the port to enable real-time monitoring and analysis of various aspects of port operations. However, the specific details of the platform, including its port number, may not be publicly available.

Port of Antwerp Bruges

How to define your Digital Twin?

And be prepared for the road ahead…

Mission

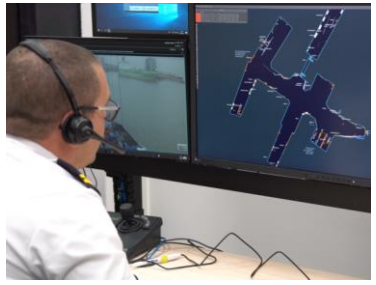
Scope

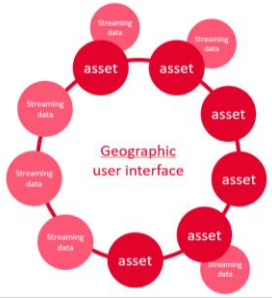
Target Group

Goal

Fluent traffic in a safe and sustainable Port.

(More) fluent traffic in a safe(r) and (more) sustainable Port, within the same territory.



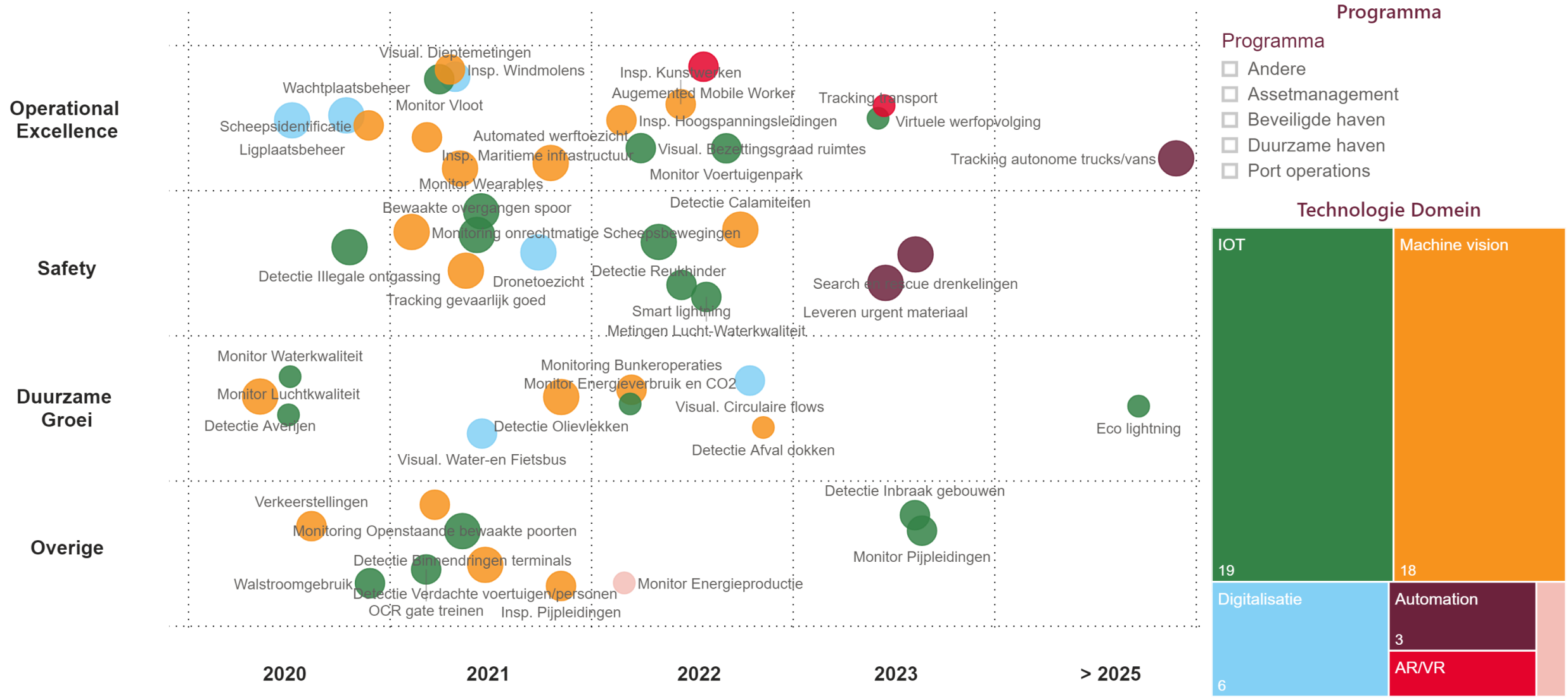


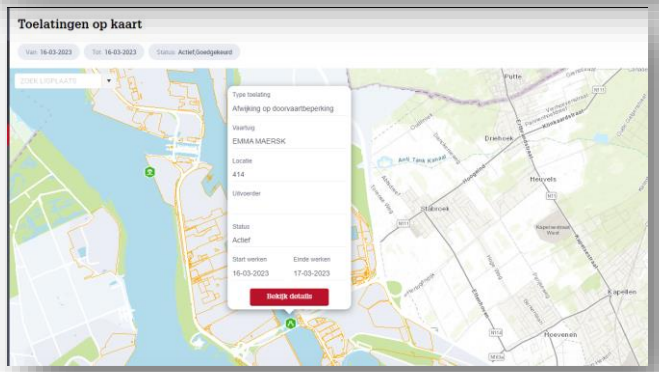
Situational awareness
Digital Twin of a territory

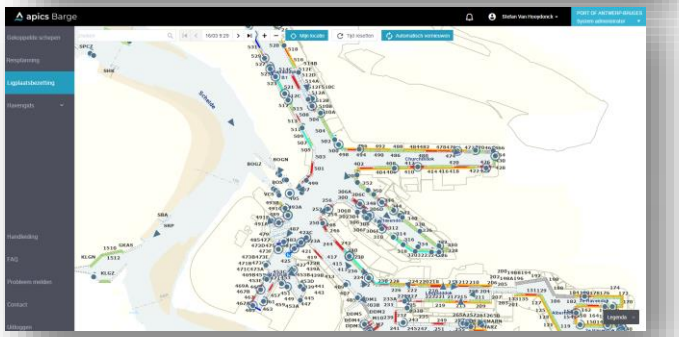
Port of Antwerp Bruges

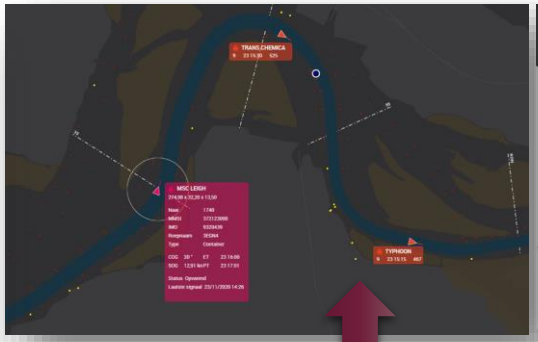
Digital Twin Roadmap

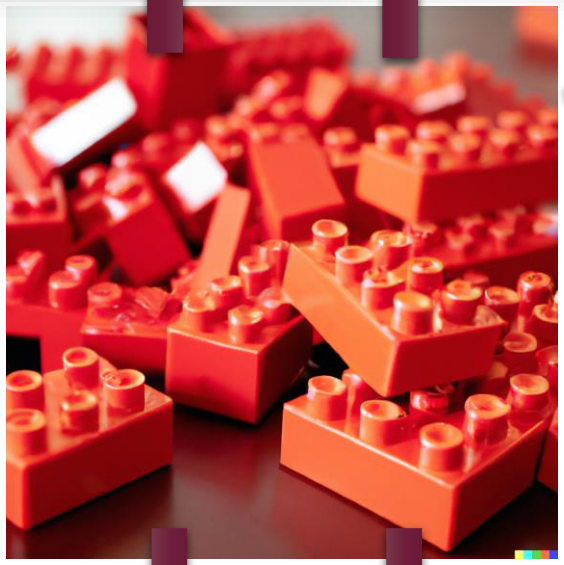
Digital Twin Roadmap

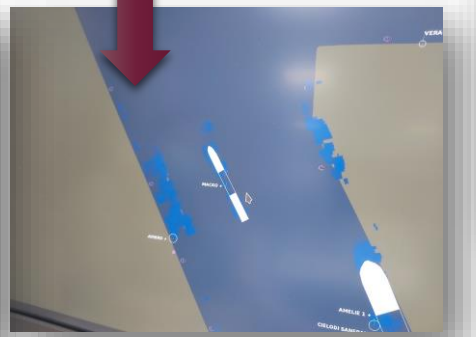


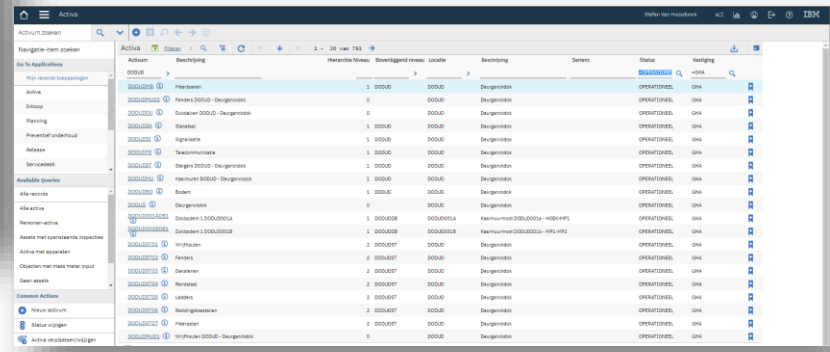


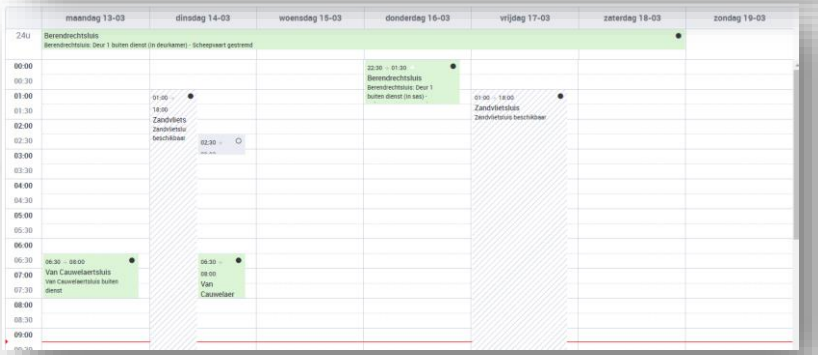


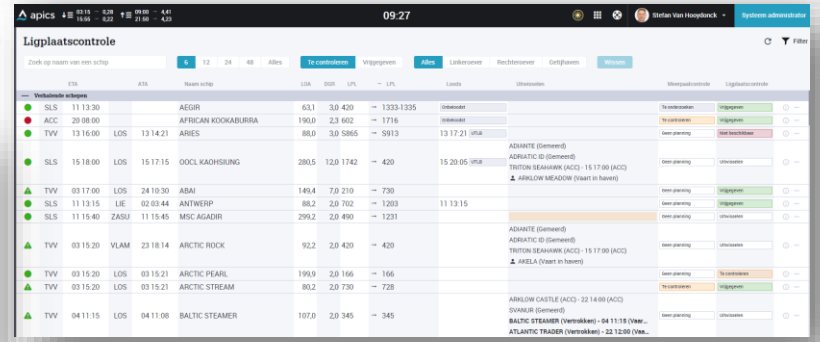












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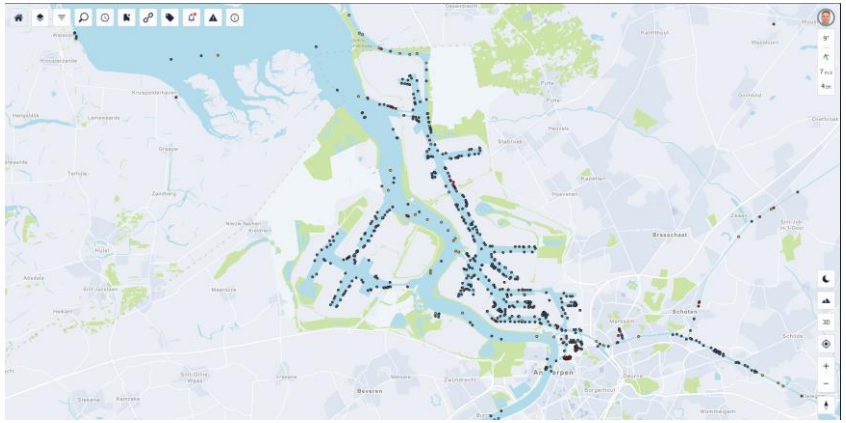
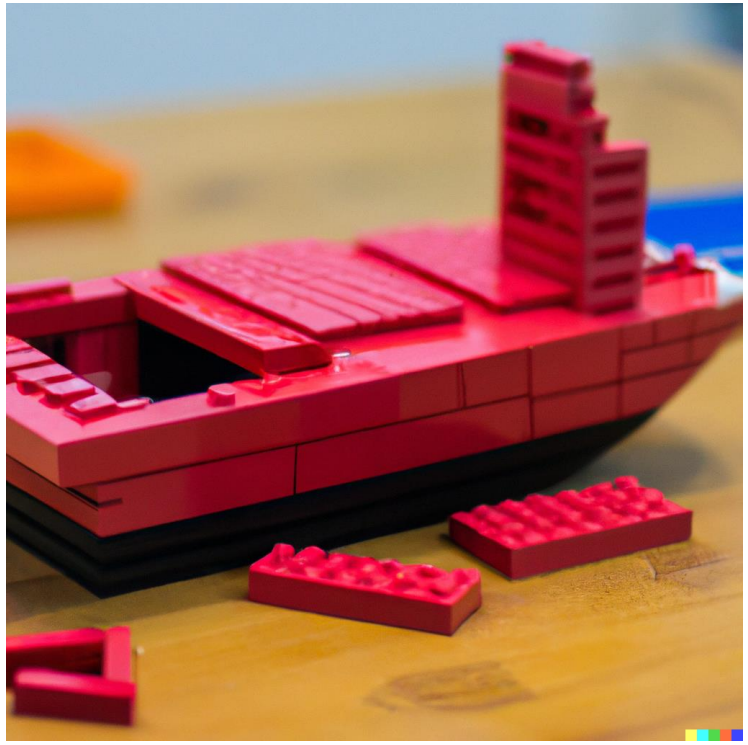
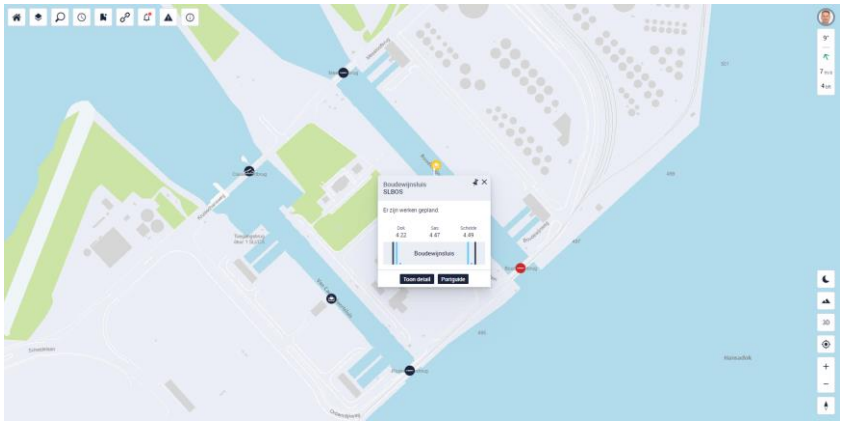
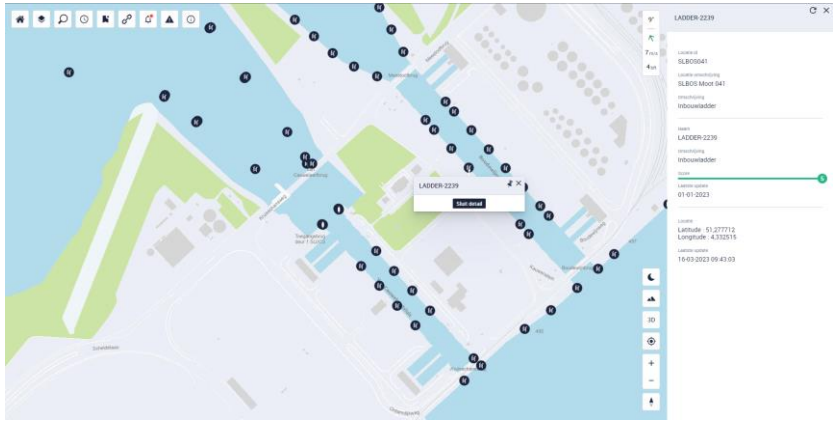
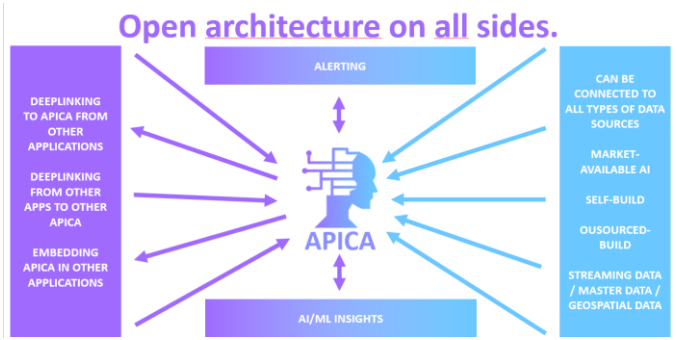
And Many More...











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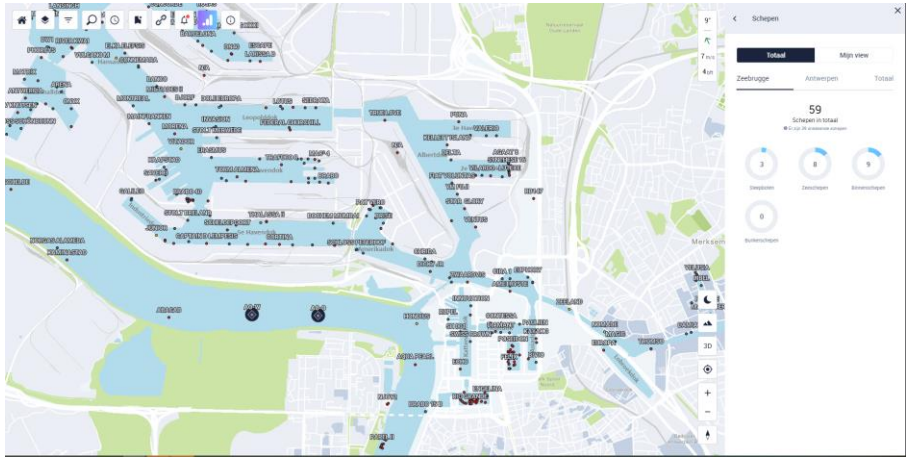
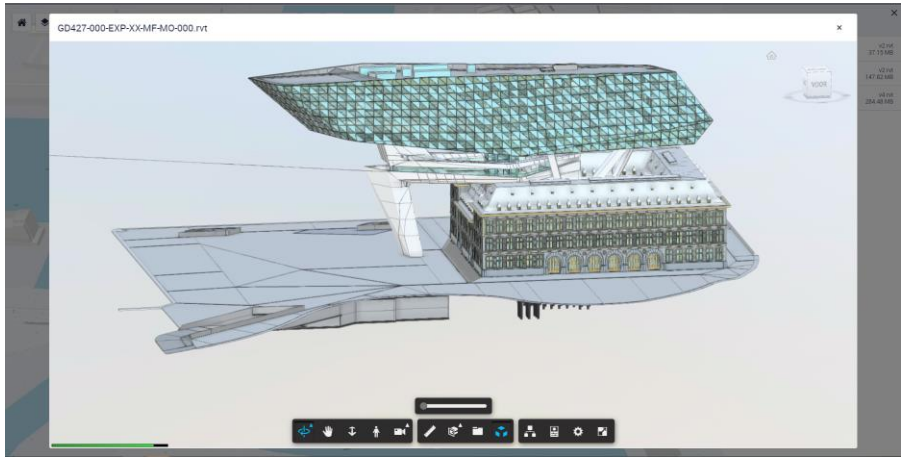
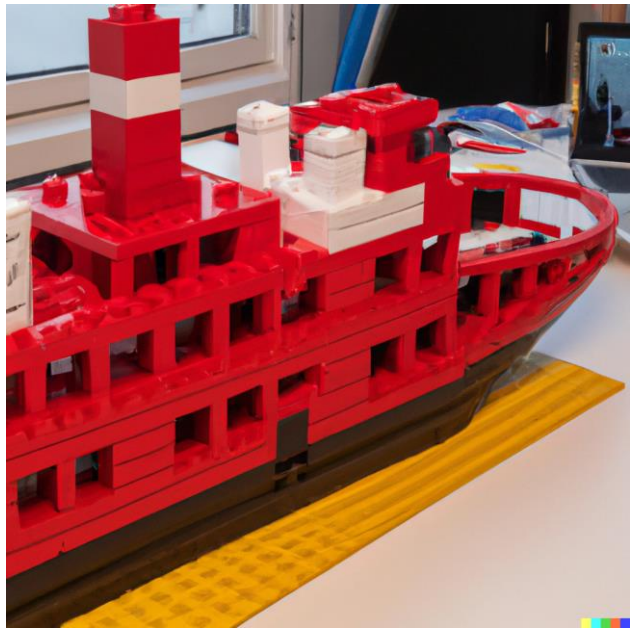
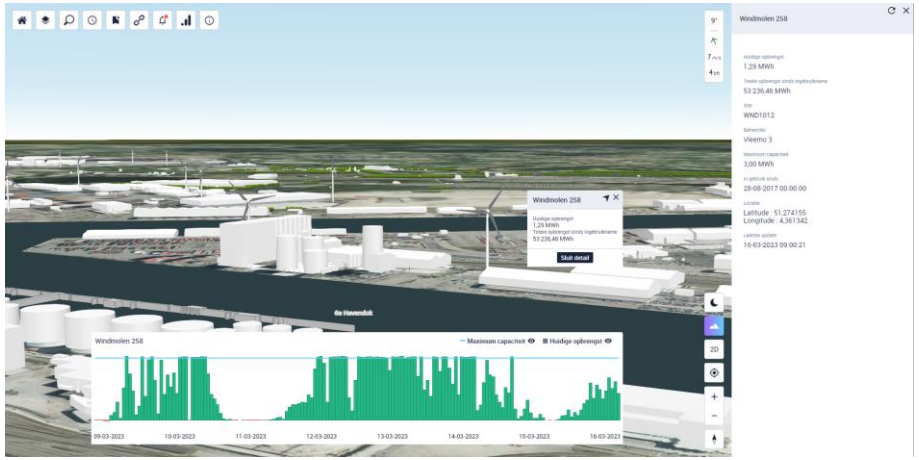
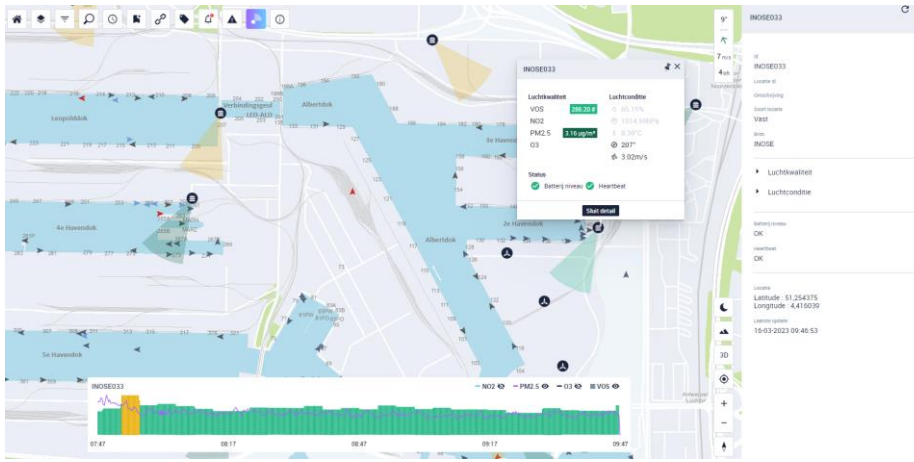
Building the skeleton...











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“Evolution by inspiration and iteration”

Situational awareness through the Digital Twin “APICA”

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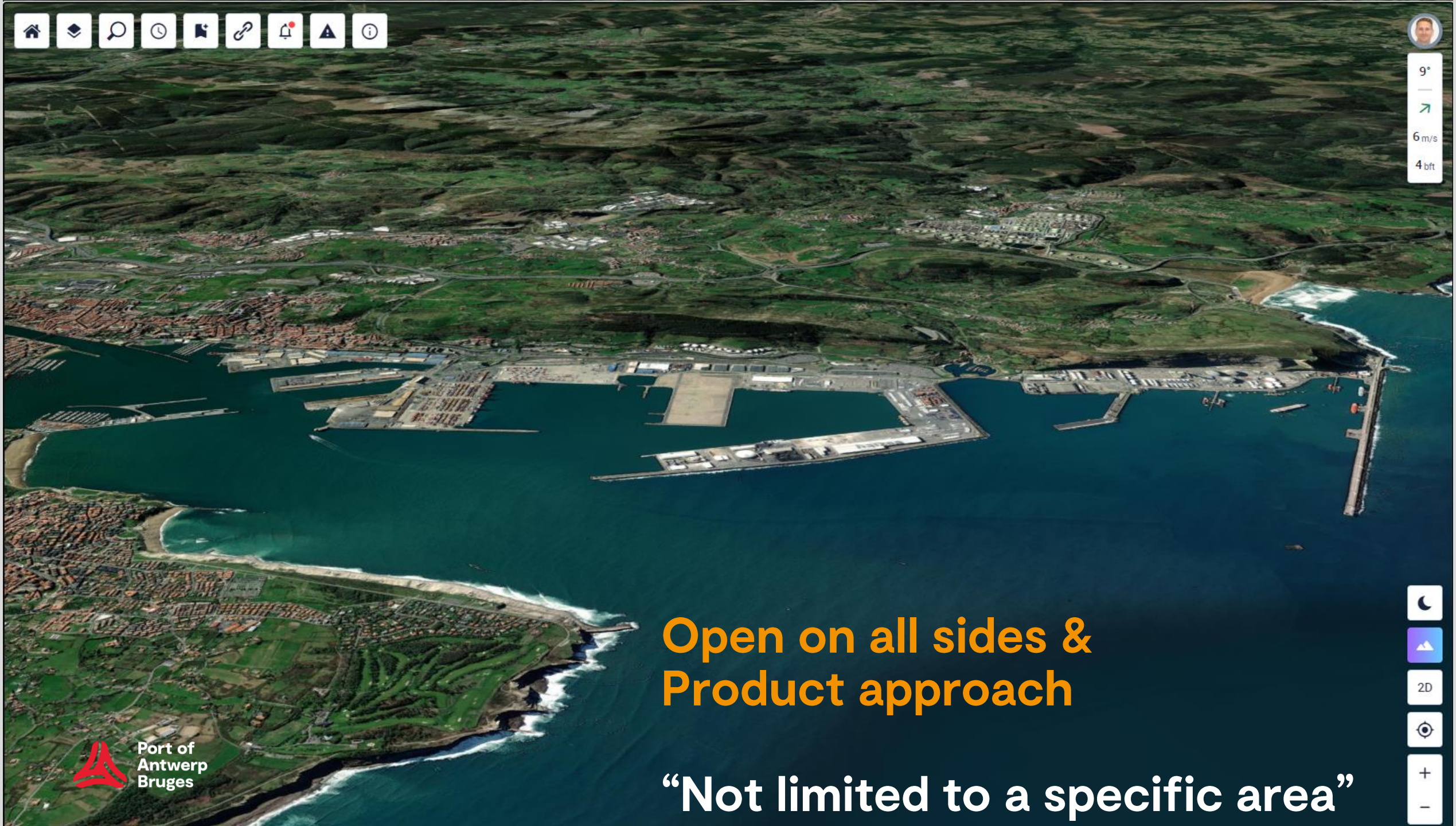
9°
6 m/s
4 bft
2D
Port of
Antwerp
Bruges
Open on all sides &
Product approach
“Not limited to a specific area”

Benefits for Port Operation Management

- Bringing real time insight into the port situation (nautical, infrastructure, environmental, meteo…)
- Gainging new insights based on (geographical) data connection across different layers
- Possibility to look back in time when investigating
- Augmented awareness by alerting and forecasting

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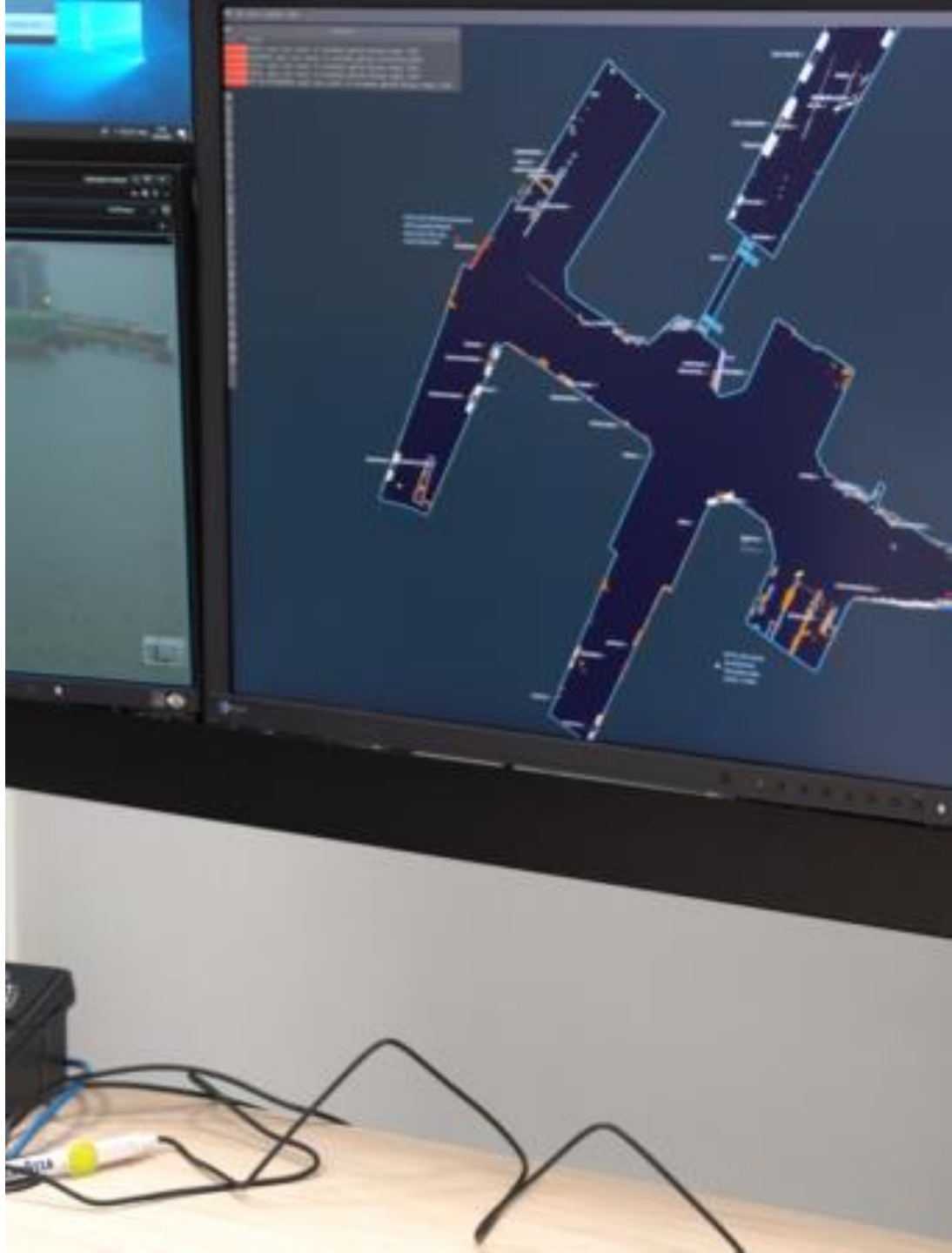


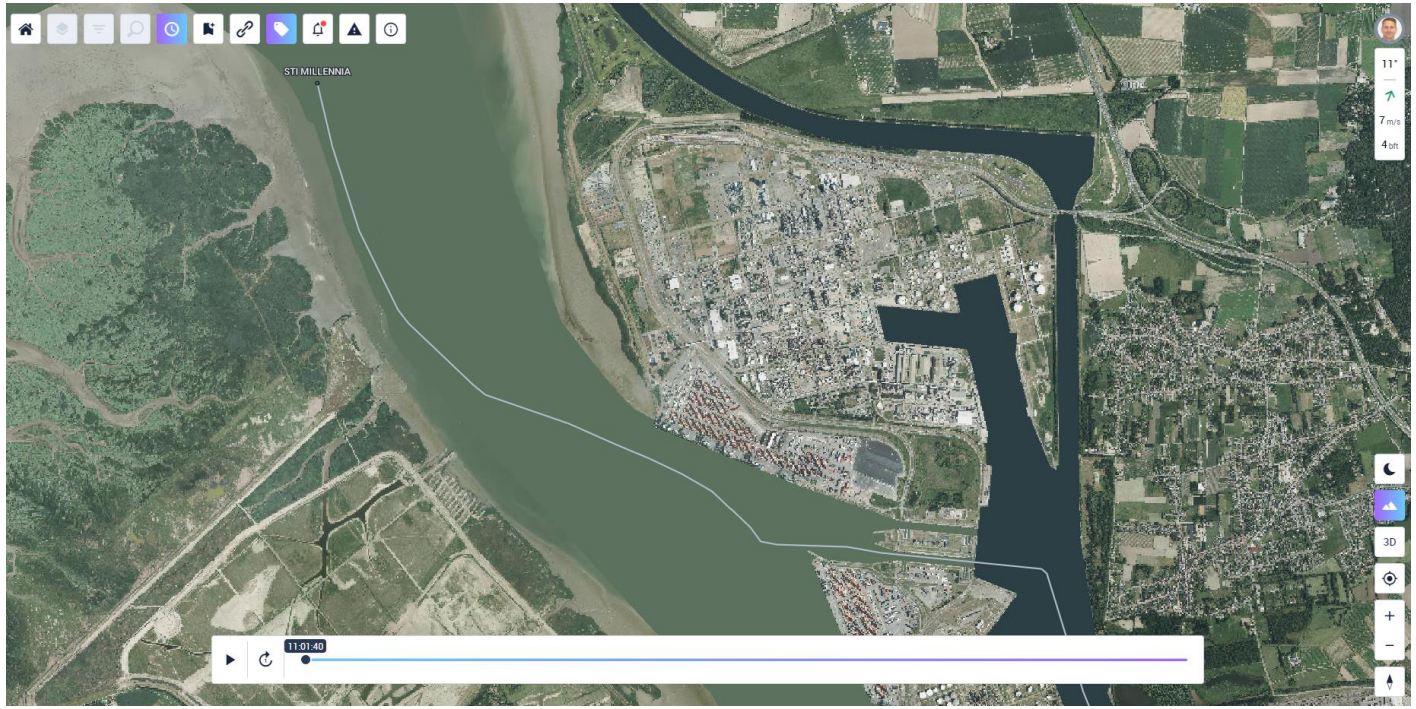
Traffic Management

Ongoing use case

PIONEERS

(https://pioneers-ports.eu/)

- Forecast of traffic simulation to 30min
- Based on historic traffic flow, lock planning, tidal windows, current and predicted traffic situation, vessel destinations,..
- Goal: to provide additional insights into predicted situation, possible dangerous situation
- Additionally, provide insights into the emission effect of the simulated situation



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MACOMI

Co-funded by the Horizon 2020 programme of the European Union

A (Port) Digital Twin

- ✓ Creating a new additional application is NOT the goal, creating a digital twin is a vision
- ✓ Define clear vision, scope, target group(s), goal when starting, BUT… don't be reluctant to change or evolve!
- ✓ Building step by step provides focus and tangibility. By evolution, it inspires and brings new insights
- ✓ Open architecture lowers the integration effort for new use cases
- ✓ Strong data management & integration platform is key

Advanced Port Information & Control Assistant

THANK YOU!

Port of Antwerp Bruges

Who am I?

Stefan Van Hooydonck

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Port of Antwerp Media (portofantwerpbruges.com)

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