FuturePort Bilbao

"APICA: A Digital Twin for port operations management"





Agenda

Agenda Item

I. Introduction

II. Background

III. APICA

IV. Use Cases

- V. Technical Requirements
- VI. Implementation Process

VII. Case Studies

VIII. Conclusion



Description

- Provides a warm welcome to attendees
- Offers a brief introduction to the topic
- Explains what a digital twin is and how it can be used in port operations management
- Highlights the current challenges in port operations management
- Describes APICA and its key features and benefits
- Provides examples of successful APICA implementations

- Illustrates how APICA can be used for container terminal operations, vessel traffic management, and cargo handling and logistics

- Covers the hardware and software requirements for APICA
- Discusses data integration and security
- 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
- Shares real-world examples of APICA in action
- Shows the quantifiable benefits achieved through APICA implementations
- Summarizes the key points of the presentation
- Provides insight into potential future developments
- Offers a Q&A session for attendees

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Port of Antwerp Bruges













2nd largest port in Europe



Largest chemical hub in Europe

547,374 passenger movements



15% of EU <mark>gas</mark> market







What we do





Unique ecosystem



Container & cold chain | roro | gas

Antwerp

Bruges

Container & cold chain | breakbulk | chemical hub



Frontrunner energy and digital transition



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**

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Multi Fuel Port – alternative fuels on offer



Onshore power supply for vessels



Tugboats on H2 & methanol



"We must dare to pioneer"

VISITOR

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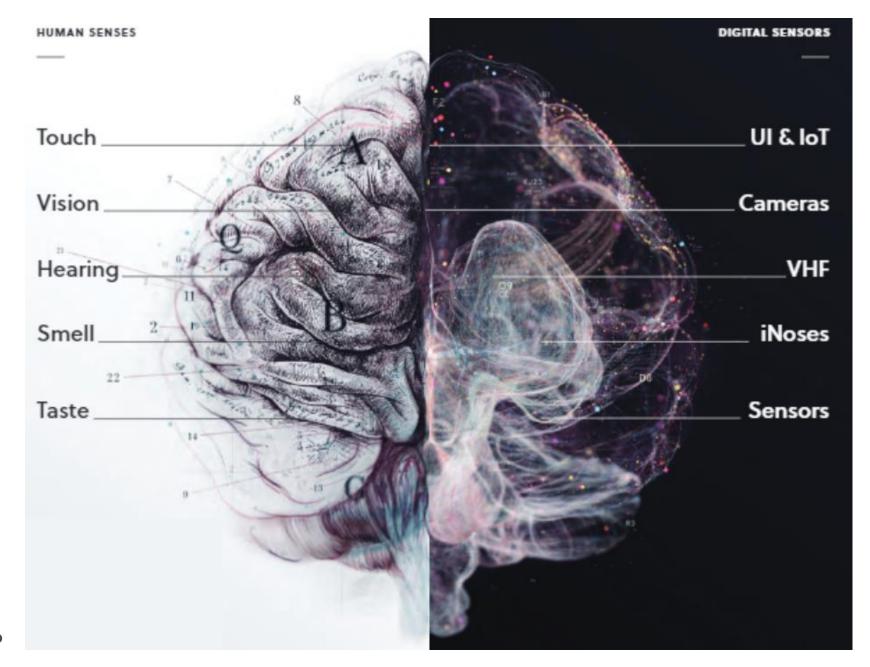
Jacques Vandermeiren,

CEO Port of Antwerp-Bruges





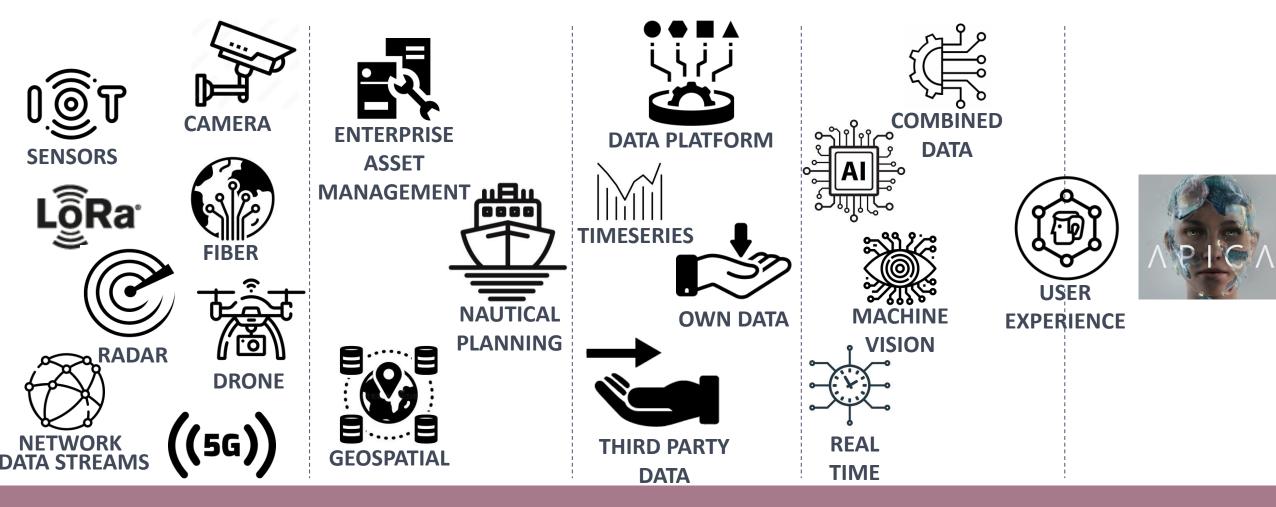
Twins are relevant!







Digital Twin is the capstone project



Port of Antwerp Bruges

Cherry on the cake – bringing all effort together

A (Port) Digital Twin?

WHAT IS A DIGITAL TWIN

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

Digital twins are used in various transportation, and energy, to in monitor equipment performance simulate and test new products a 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 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 to Port digital twins can simu operators to test different

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

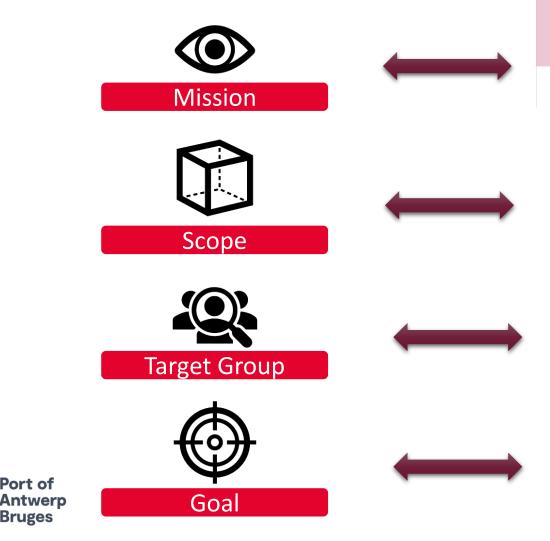
A digital twin is a virtual representation of a physical object or system that allows for realtime monitoring and analysis of its performance and behavior. In the context of ports, digital twins can be used to simulate and optimize various aspects of port operations, including vessel traffic, cargo handling,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



How to define your Digital Twin?

And be prepared for the road ahead...



Fluent traffic in a safe and sustainable Port.

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



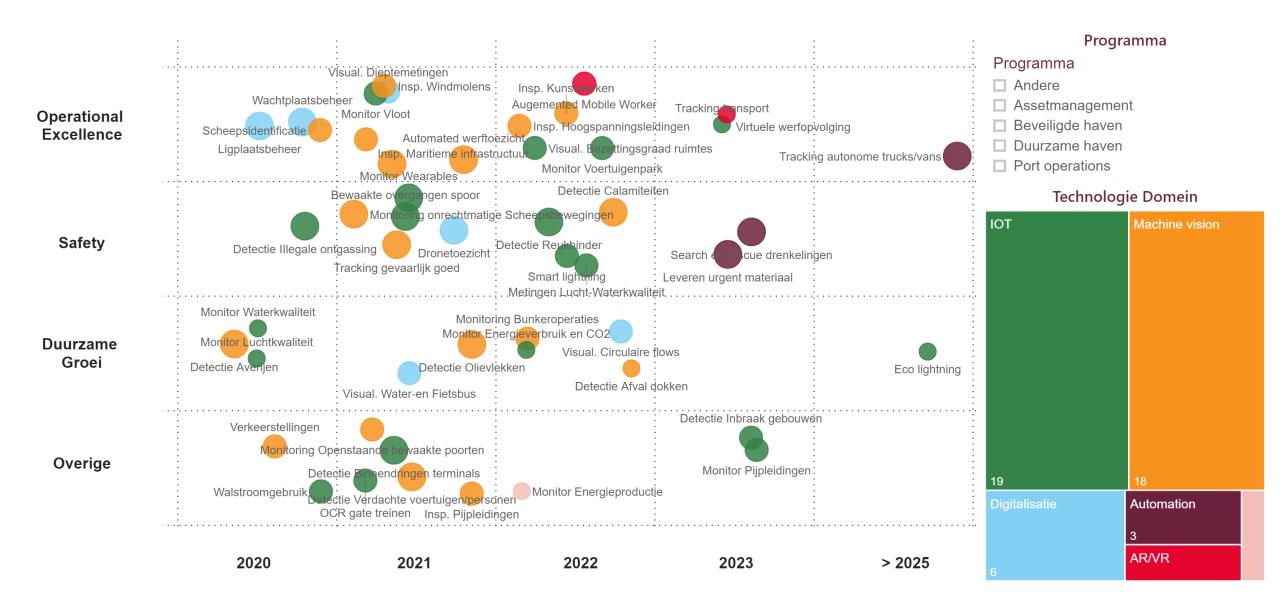


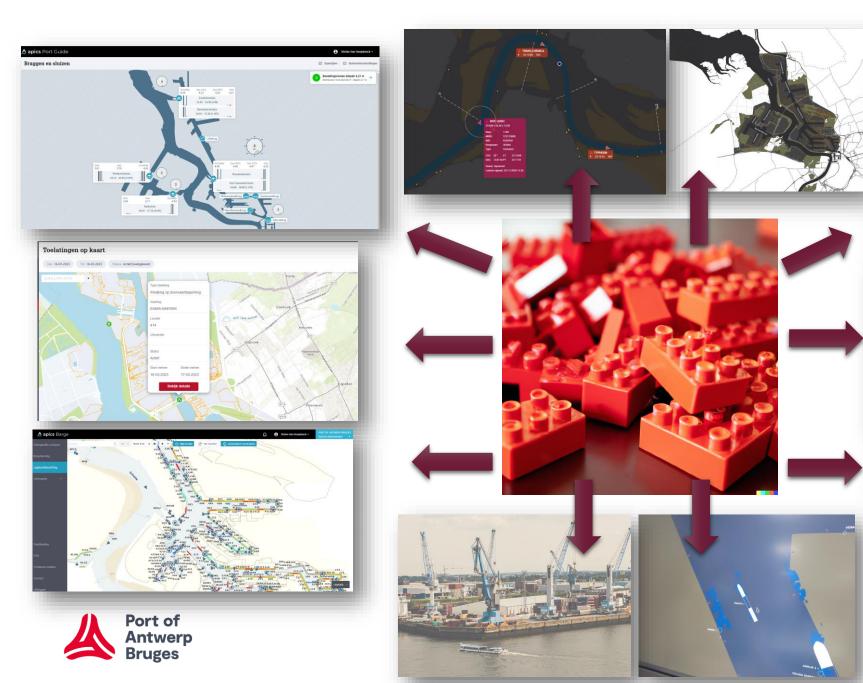




Situational awareness Digital Twin of a territory

Digital Twin Roadmap



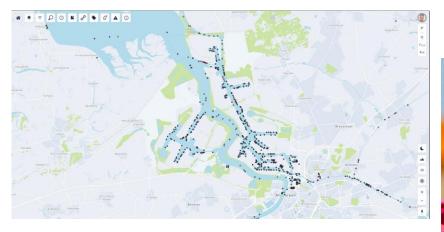


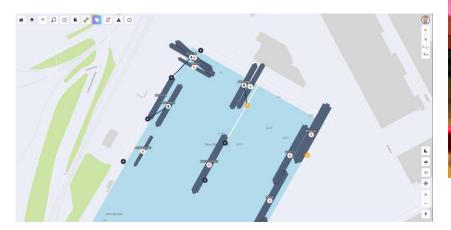
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And Many More...









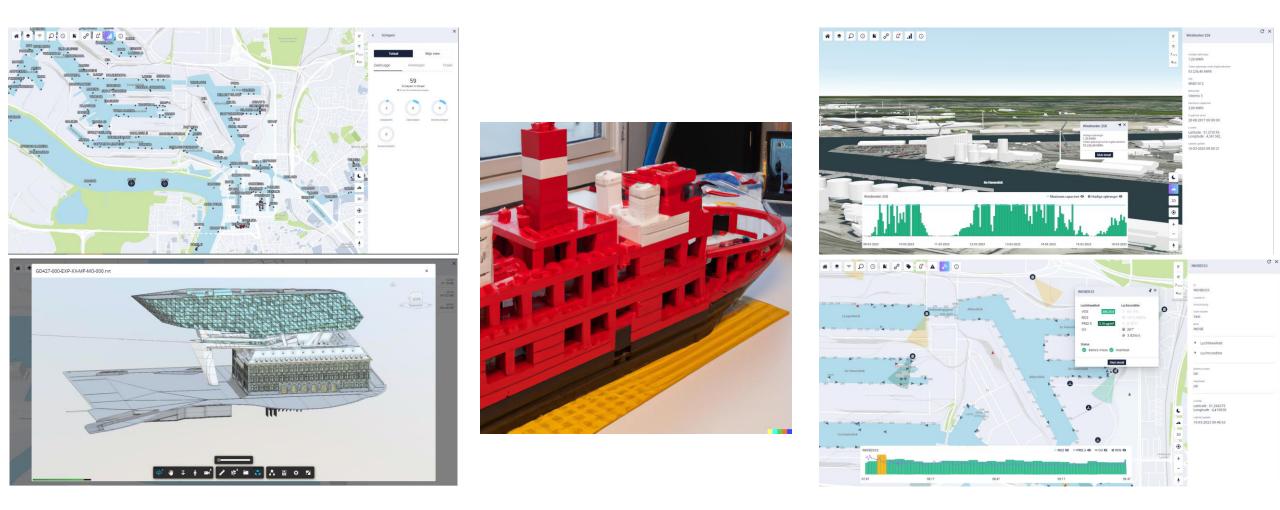
Open architecture on all sides.







Building the skeleton...





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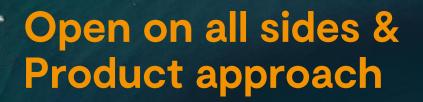
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Situational awareness through the Digital Twin "APICA'





"Not limited to a specific area"

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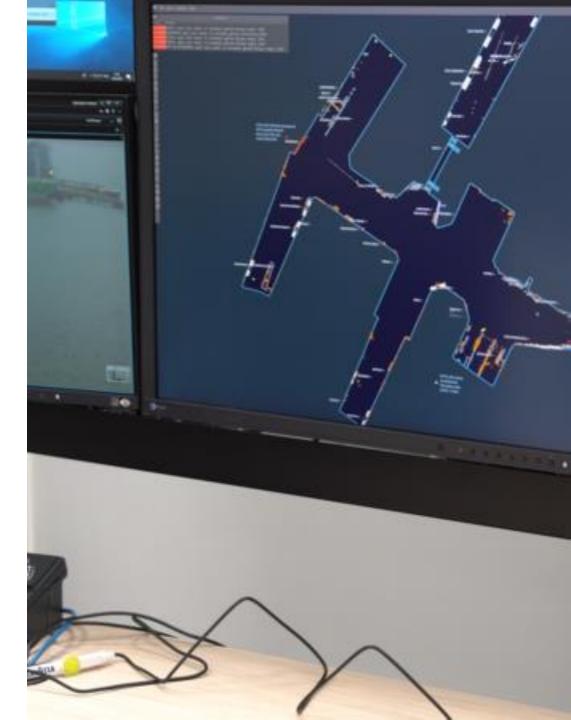
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Port of Antwerp Bruges

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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





Traffic Management Ongoing use case



- 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









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!



Who am I?

Stefan Van Hooydonck

Business Solution Architect

Project Lead: Operational Digital Twin



Stefan.vanhooydonck@portofantwerpbruges.com





Port of Antwerp Media (portofantwerpbruges.com)

