



Mövenpick Grand Al Bustan - Dubai, UAE - 24 - 26 January 2023

# “Efficiency through simulation and Predictive Analysis of port operations”

Session 5B: Port Technology and Integrated Solutions: Transformation and Implementation of Smart Port Initiatives

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## **Who We Are**

DSP in numbers and our Core Business

**02.**

## **Context Insight and Challenges**

Port congestion, turbulence, high demand of logistics supply chain

**03.**

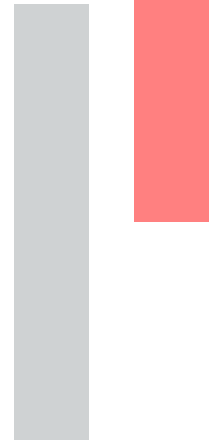
## **GEMINI**

The Digital Twin for your terminal

**04.**

## **Use Case (Cosco Shipping Ports Valencia)**

- Scope (respect ETD, optimize resources)
- Results (accuracy of the model, target SLA, resource reduction)



# Part 01

## Who We Are

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DSP in numbers and our Core Business

# International Group



Head Office Switzerland

Founded in 1986



Office the Netherlands

Founded in 2021



Office India

Founded in 2020



Office US

Founded in 2022





## Key figures

### DSP in numbers

**37**

Years in the shipping and port industry

**350+**

Projects completed worldwide

**20+**

Navis Certified consultants

**42+**

Industry Experts

**24/7**

Global help desk and support services

**10+**

Languages

**+40%**

DSP Product Installations in 2022

# Our core business

## TOS CONSULTING

DSP team supports the Terminal Operations in all the phases of the Terminal Operating System implementation, maintenance and support.

## BUSINESS INTELLIGENCE

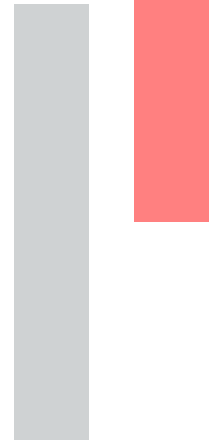
Product:  DATAVIEW

DATAVIEW is the Business Intelligence for your terminal showing you any data everywhere in one view.

## DIGITAL TWIN

Product:  GEMINI

GEMINI is our Digital Twin solution. GEMINI is a platform, bespoke on the characteristics of every single terminal organization, able to mirror decisions, strategies and show workers practice during real operations.



# Part 02

## Context Insight and Challenges

Port congestion, turbulence, high demand of logistics supply chain.



**New perspectives**



# Logistic: an unexpected journey

Manage the impossible



**MARCH, 2021**

Ever Given container ship blocks SUEZ Canal traffic.

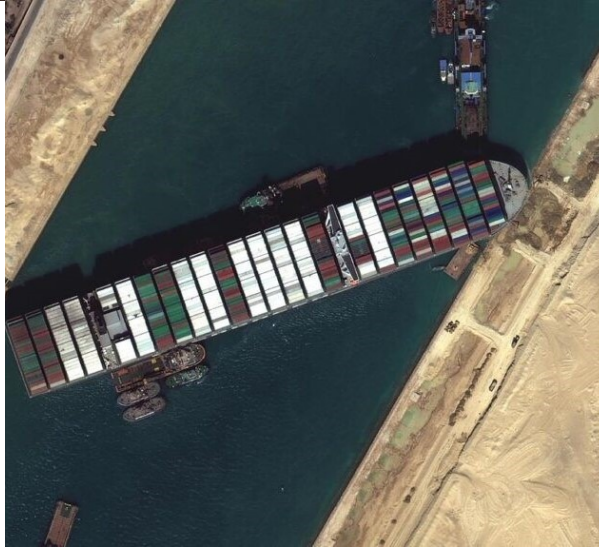


**APRIL, 2022**

Containers pile up at CHINESE ports as lockdown blocks trucks.

**2020 onwards**

Delivery Services See Historic Rise in Demand During Pandemic and still lasts



**OCTOBER, 2021**

Record-breaking 100 Ships anchored, waiting at LOS ANGELES and LONG BEACH Ports.





# Change Direction





# Innovate

You can't solve a problem on the same level that it was created. You have to rise above it to the next level. Albert Einstein



## Data Sharing

Internet of Things  
Open communication Layer  
Networking (radio, 5G)



## Digital Twin and AI

Digital Model to **mirror, simulate, emulate the reality.**

Artificial Intelligence to apply to the model and then to reality



## Automation

Process automation  
Remote Drive  
Autonomous drive



## Standardization

Talk the same language to speed up the digitalization process  
Interoperability

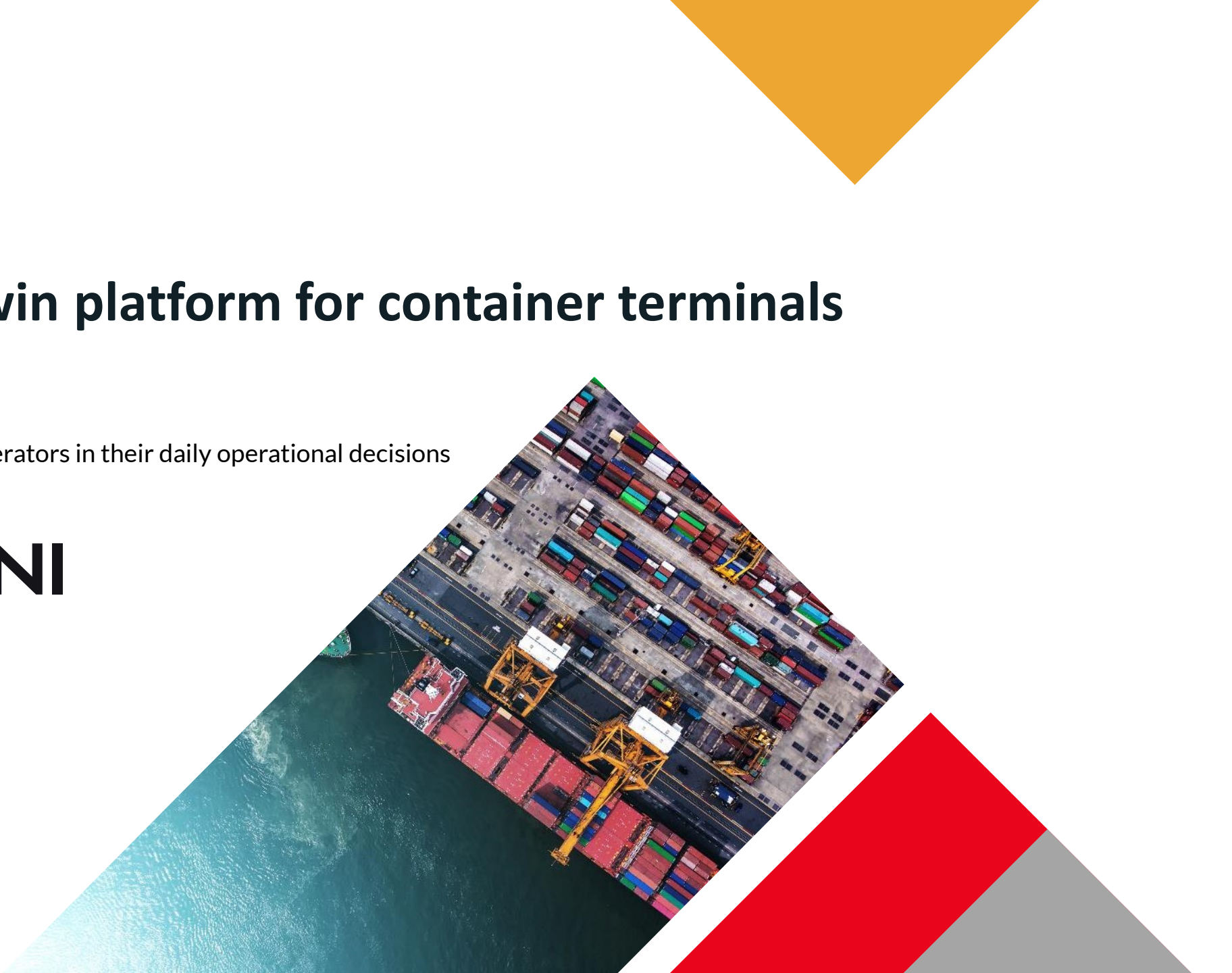


# Part 03

## GEMINI

# The Digital Twin platform for container terminals

Gemini supports terminal operators in their daily operational decisions





# Gemini: the modules

GEMINI combines operational, tactical and strategic optimization through operational databases (TOS), predictive analysis, simulation, scenario management, emulation, virtual commissioning.

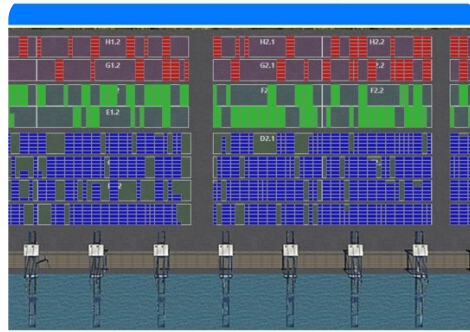
## Predictive Analysis



### Operations Optimization

«What if» scenario to identify ways to improve performance and increase profit.

## Simulation



### Concept Design

Evaluation of how a structured change affects the business scenario.

## Emulation



### Operations Empowerment

Validate, tune and improve planning and operations strategy.

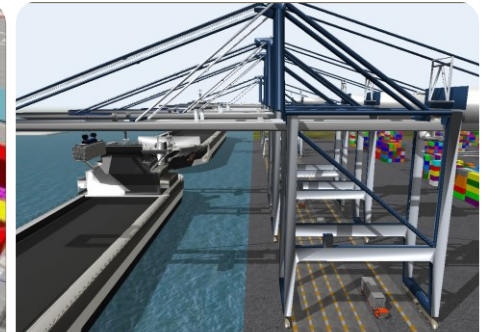
## 3D View



### Live Augmented Reality

Visualization of life operations with IOT data.

## Virtual Commissioning



### Engineering Optimization

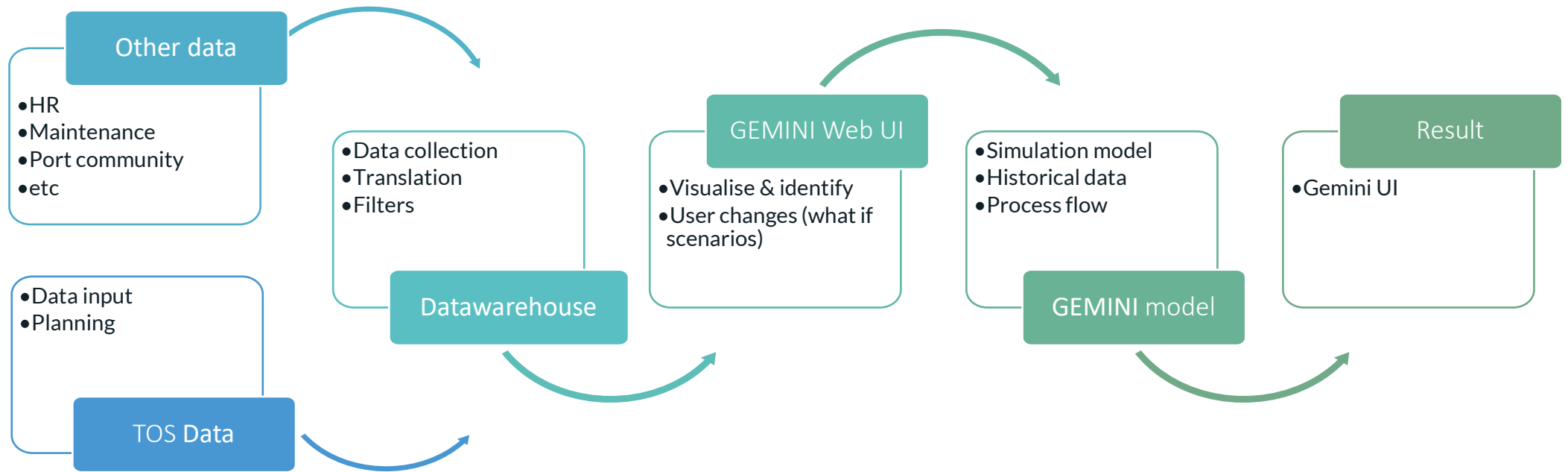
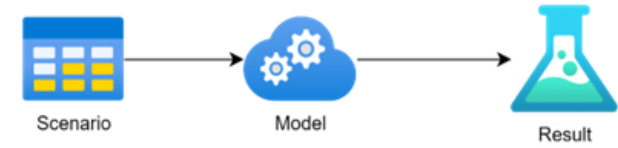
Crane Control Systems testing.

Powered by:  
**controlLab**





# Data flow



CLOUD



ON-PREMISE

# Part 04

## GEMINI Use case

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Cosco Shipping Ports Spain Valencia Terminal





## CSP Valencia terminal

Strategically located in the Mediterranean (at the port of Valencia, Spain), the terminal enjoys a hub position in the main maritime routes connecting Spain and Europe with other continents.

Its 2.3-km berthing line and 145-hectare yard, as well as a port railway terminal with direct connections to Madrid, Zaragoza and Bilbao and an automatic gate system for local cargo flows explain why CSPV is the benchmarking terminal in the Mediterranean.

Valencia terminal has a capacity of more than 4.5 M TEU, operated by 21 STS and 65 RTGs.



**CSP Spain**  
The Ports for ALL



# Terminal Challenges

Why going for a digital twin from the terminal operator point of view?

CSP Spain is always at the forefront on a technological level, they believe digital twins will be a revolution in the way container terminals make decisions, offering operational efficiency and avoiding dangerous situations, which will lead to safer and more efficient decision making, increasing the overall performance of the terminal.



## Berthing process

Avoid waiting time, increase berth occupancy and facilitate transshipment connection.  
STS work plan optimisation.



## Resource Assignment

To predict yard moves impact and equipment (RTG ITV) optimisation/resource assignment in relation to volume forecast



## Gate

Predict gate transactions volume, reduce turnaround time and make truckers happy.



## Equipment Maintenance

Predictive maintenance to plan intervention and increase mean time between failure and overall crane availability.



# Digital Twin – Predictive Analysis

Focus on

## Berthing process



- Respect ETD
- Monitor Moves that will be executed in the next shift/time estimations
- Efficient Crane Work Plan

## Resource Assignment



- Predict and optimise resources required for the next shifts
- Monitor Peaks and unproductive time

## Gate



- Truck flow, peaks and operational impact estimation
- Truck appointments

## Equipment Maintenance



- Schedule Planned Maintenance based on future equipment utilisation, actual worked hours/moves and forecast of non-operational windows (MMBF)

Production

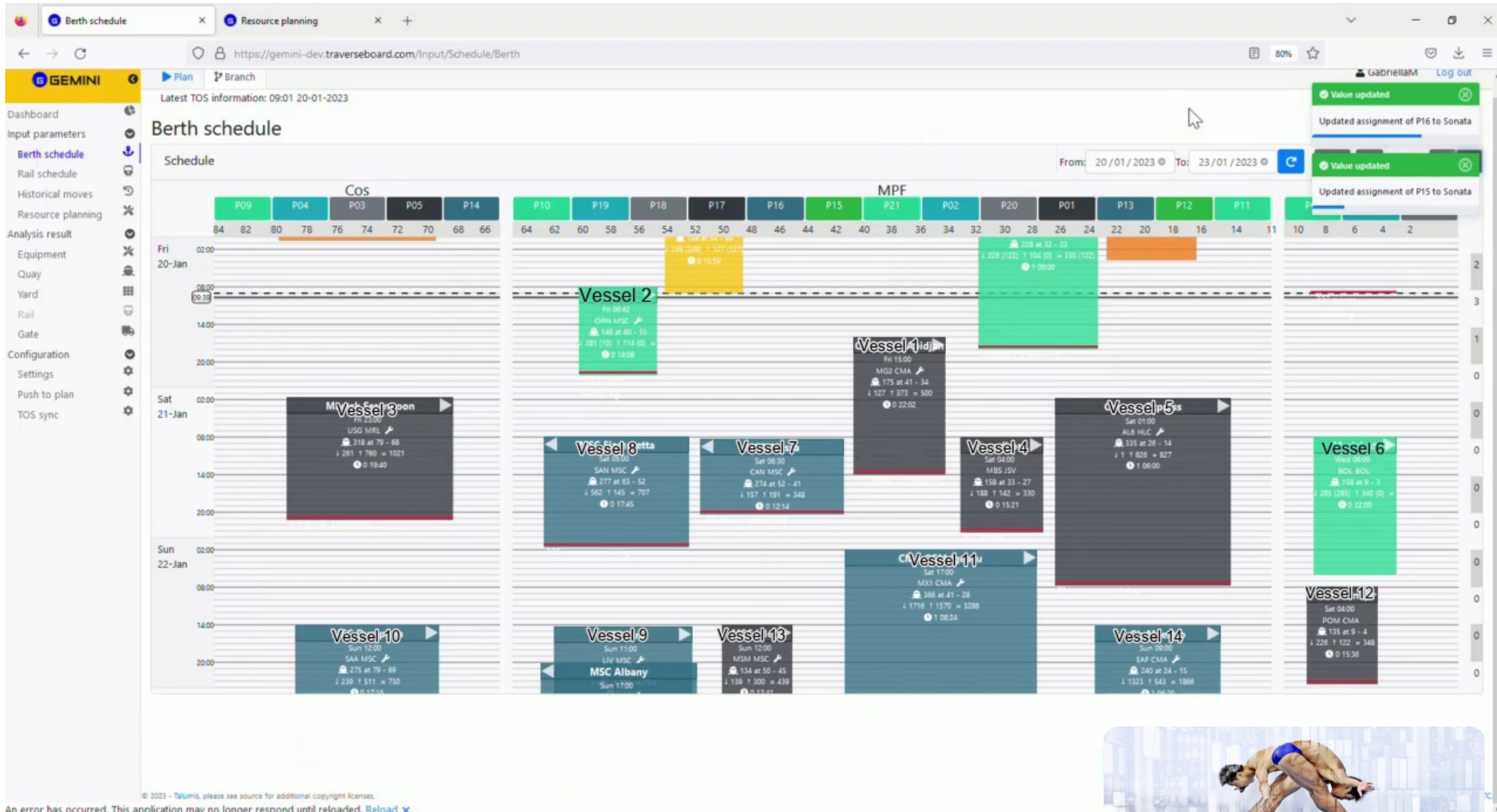
Roadmap





# Adjust Crane assignments and other resources

KPIS and prediction





# Dashboard

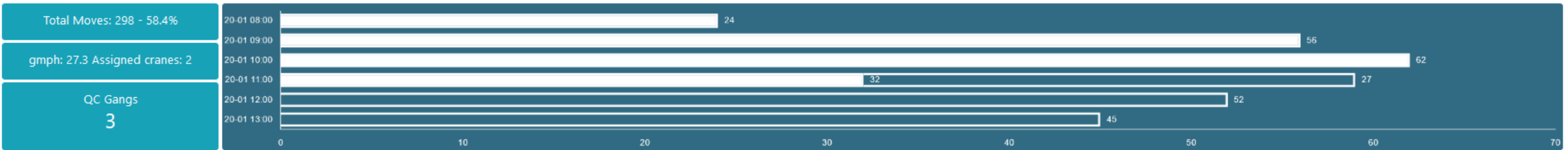
KPIS and prediction

## Dashboard

🕒 Friday 20 08:00-14:00

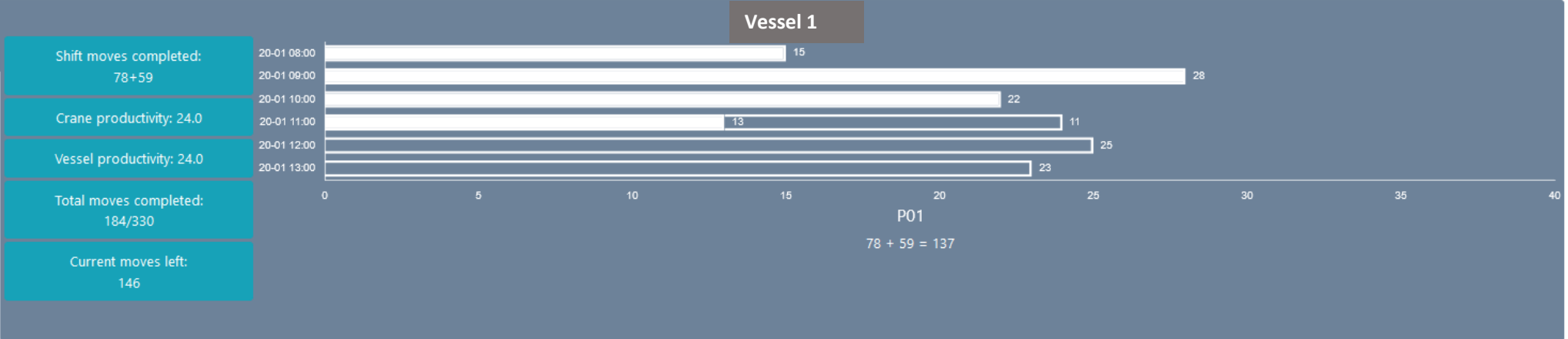
← Previous shift 02:00-08:00 2023-01-20      → Next shift 14:00-20:00 2023-01-20

Shift: Friday 08:00-14:00      Vessels: 2/3      Crane productivity & Shift productivity: 27.3 & 51.9      Moves: 174 + 124



**Vessel 1**  
78 + 59 - QC: 1

**Vessel 2**  
96 + 65 - QC: 1

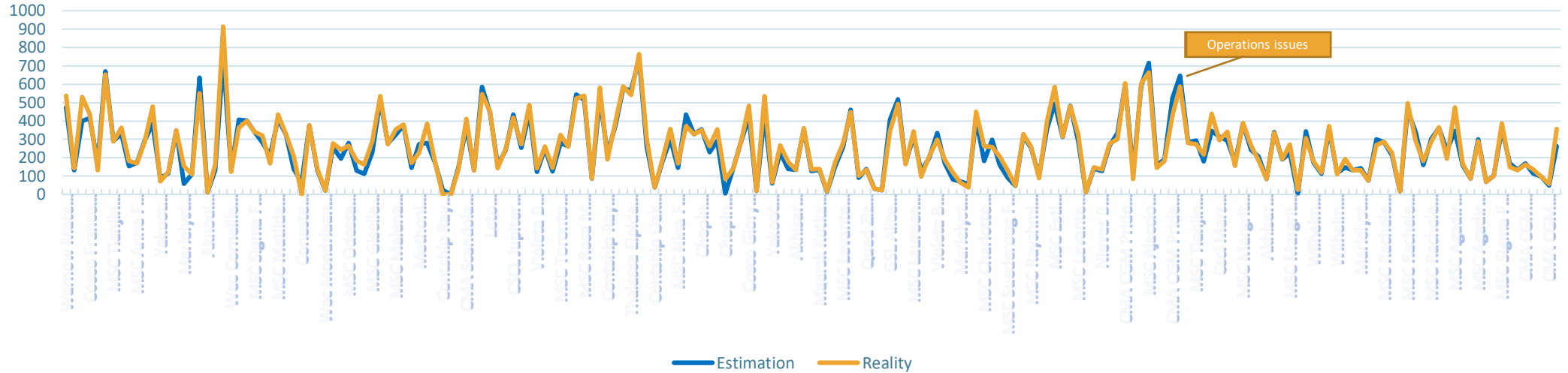




# Simulation vs Reality

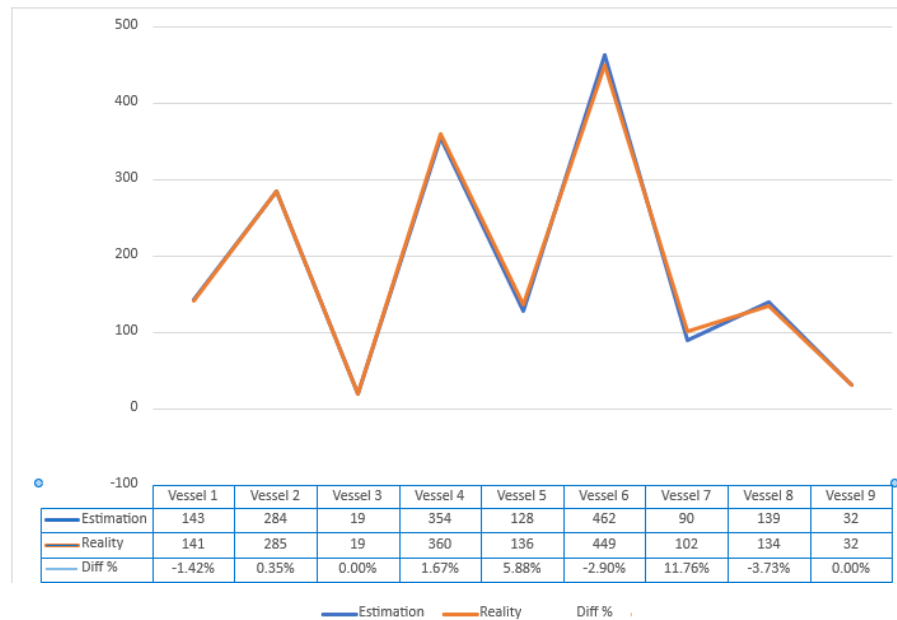
Moves by shift  
by vessel

Estimation 3  
shifts in advance



Moves by shift  
by vessel

Estimation 1  
shift in advance



5 % average variation from  
reality on 18 hours prediction



100 to 300 ms to run a scenario







Learn  
Innovate  
Together





**Change Perspective**

**Thank you**

Join us at our booth n.9

[www.dsp.team](http://www.dsp.team)

