WÄRTSILÄ

SMART PORT SOLUTIONS AND DIGITALIZATION OF PORT CALL

INTERMODAL AFRICA 2022

FOUNDED IN 1834

GLOBAL LEADER

in sustainable solutions for the marine and energy markets

COMPARABLE OPERATING RESULT
275 MEUR

ORDER INTAKE
4,359 MEUR

NET SALES
4,604 MEUR

OPERATIONS IN OVER
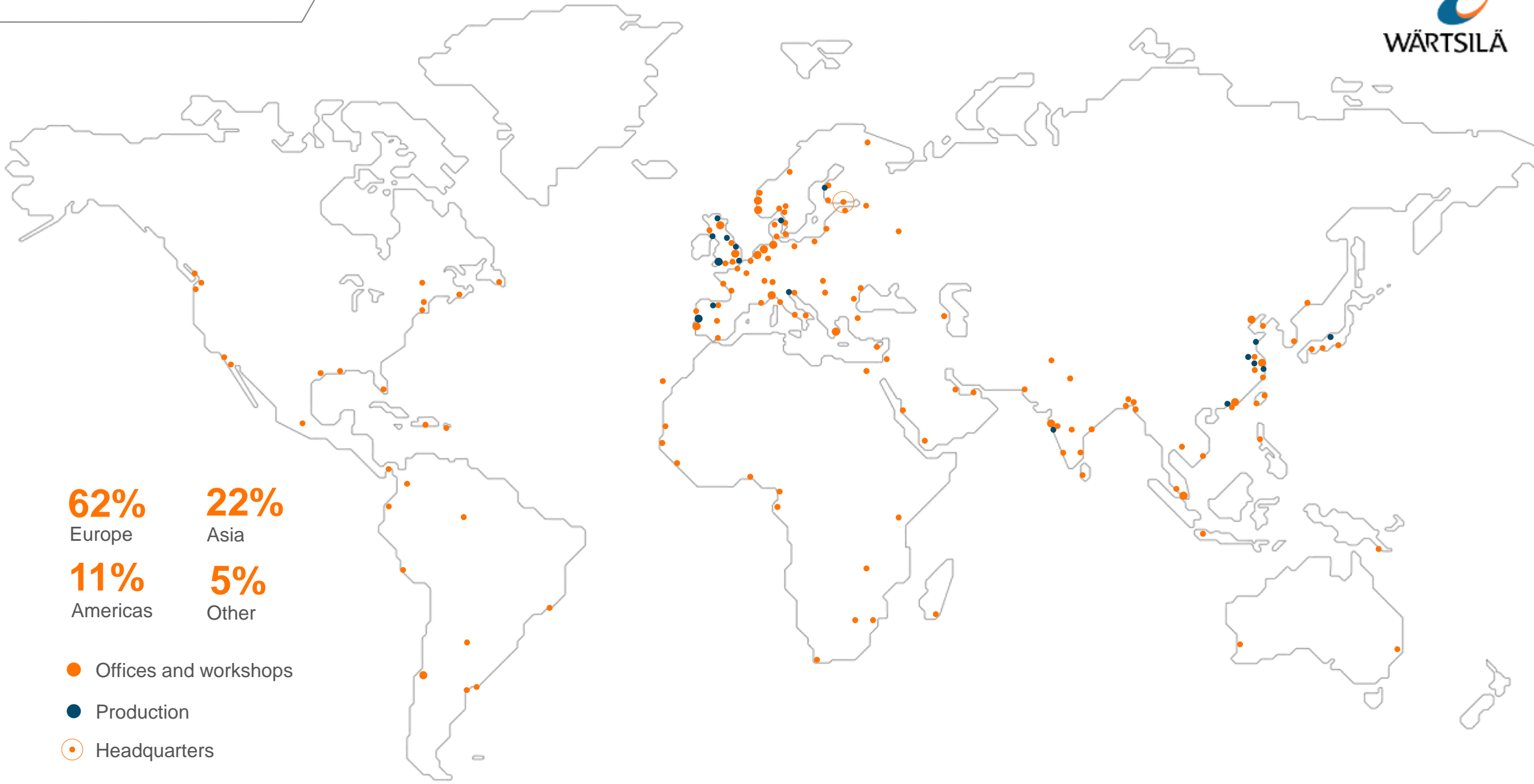**200 LOCATIONS**

OUR PERSONNEL APPROX.
17,800

NATIONALITIES
139

62%
Europe

22%
Asia

11%
Americas

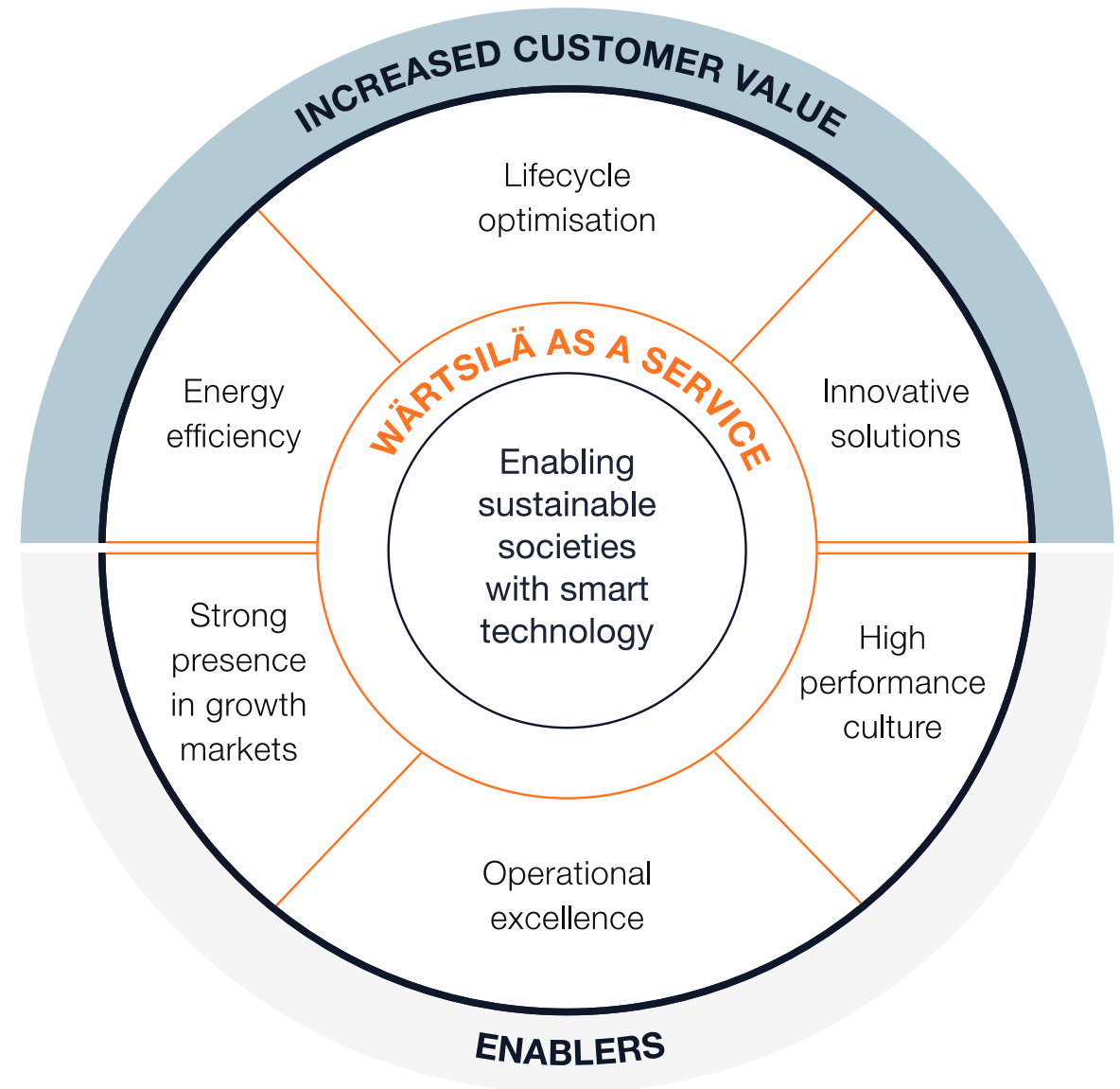**5%**
Other

● Offices and workshops

● Production

⊙ Headquarters

ENERGY

Leading the path towards a 100% renewable energy future

MARINE

Leading the industry transformation towards a Smart Marine Ecosystem

INCREASED CUSTOMER VALUE

Lifecycle optimisation

WÄRTSILÄ AS A SERVICE

Energy efficiency

Innovative solutions

Enabling sustainable societies with smart technology

Strong presence in growth markets

High performance culture

Operational excellence

ENABLERS

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5,000
vessels sail into the future with our integrated navigational bridges

10,000
vessels find the best routes possible with our ECDIS, including charts and publications

12,000
vessels left inefficiencies behind with our automation systems

1,000
vessels benchmark their fuel efficiency with our fuel performing monitoring

5,500
of our simulators prepare seafarers in maritime schools around the world

1,500
pilots said goodbye to worry lines with our pilot personal unit

350
Systems at port/country level to ensure traffic without jams with our port solutions

SMART PORTS
refers to the application of digital technologies to improve their operational **predictability**, **efficiency**, and **capacity utilization**

Technologies

Big data & data analytics
AI / Machine Learning
Cybersecurity
Smart Sensors & Drones

Automation
Image/Video analytics
Wireless communication
Predictive maintenance

Applications

Digital Port Call
Terminal Operations

Inland Port Access
Infrastructure Management
Energy Transition

Processes are digitized, data is standardized, communities are connected

What is an ideal port call?

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Smooth cooperation amongst the different operators

Safe and green operations

A common situational awareness picture

Pilot and tugs are ready upon arrival and departures

Accurate information throughout the call

Well-coordinated between the different parties

Good visibility of the berth availability

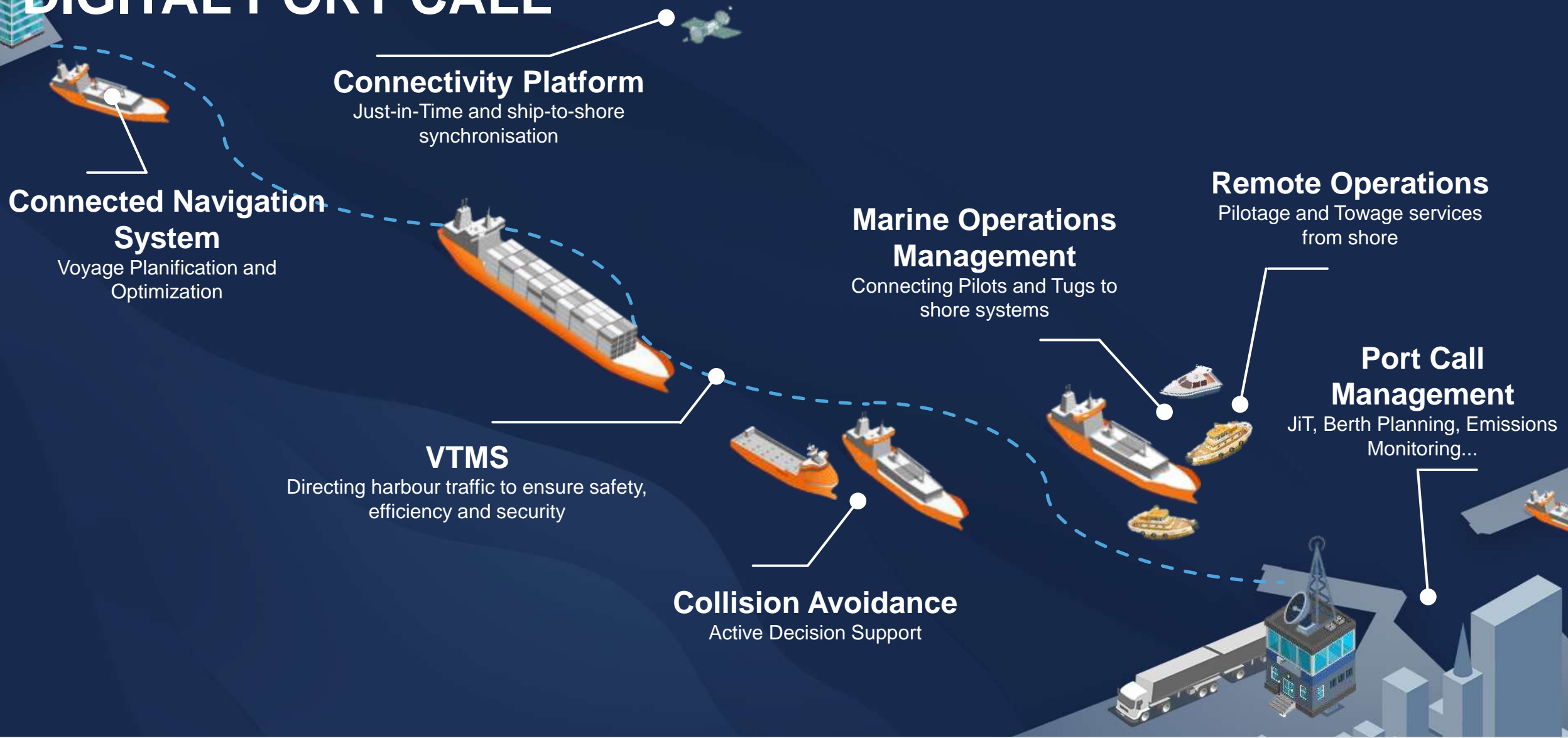VTS operators are provided with all the correct information

Reliable and prompt updates provided during the port call

Administrative requirements managed and notified in advance

No delays in cargo operations and submitting documents

Synchronisation, Coordination, Optimization

CONNECTED ECOSYSTEM ENABLES DIGITAL PORT CALL

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Connectivity Platform
Just-in-Time and ship-to-shore synchronisation

Connected Navigation System
Voyage Planification and Optimization

Remote Operations
Pilotage and Towage services from shore

Marine Operations Management
Connecting Pilots and Tugs to shore systems

Port Call Management
JiT, Berth Planning, Emissions Monitoring...

VTMS
Directing harbour traffic to ensure safety, efficiency and security

Collision Avoidance
Active Decision Support

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STEP 1

Connecting the Navigation System to the Cloud

CONNECTED ECDIS

- Ship-to-shore connectivity (port and fleet operations)
- Auto-routing and auto-voyage planning,
- Onshore tracking and awareness, fuel optimization

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STEP 2
Direct ETA Communication between Vessels and Ports

NAVI-PORT

- Just-in-Time communication platform
- Enabling ship-to-shore coordination

ONSHORE FLEET OPERATIONS

NAVIGATION SYSTEM

WÄRTSILÄ NAVI-PORT

TERMINAL / PORT

Just In Time –
Unlocking benefits for the Maritime Industry

| BEFORE	ADOPTION OF JUST-IN-TIME
High fuel consumption to reach destination	Reduce significantly fuel burn during the voyage by optimising the vessel's speed
High GHG emissions during voyage and at anchor	Global GHG emissions reduction and elimination at anchor
Elevated risk levels when entering / leaving port as a result of congestion	Increased safety because of fewer vessels around the port area
Poor coordination of ALL the stakeholders	Better visibility to plan for operations
High volume of telephone and email comms. between vessels, fleet operations and ports	Increased efficiency by reducing the manual workload

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STEP 3

Ensuring Safe and Efficient Ship Traffic

SMART VESSEL TRAFFIC MANAGEMENT

- E-Navigation & Ship-Shore connectivity

- Active decision-support tools

- 3D situational awareness

- Collisions prediction and data analytics
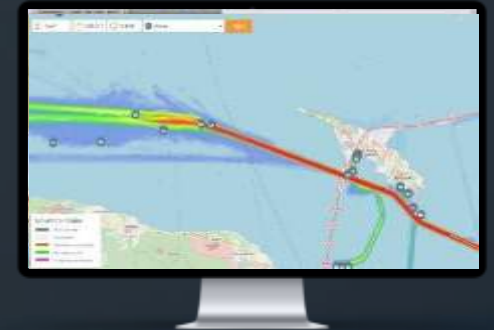
ACTIVE DECISION SUPPORT

- Predict collisions and groundings 20 min ahead

- Alternative routes using COLREG

- Delivery of recommendation to Vessel

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STEP 4

Streamlining Port and Terminal Operations

AUTOMATED PORT MANAGEMENT AND INFORMATION SYSTEM

- Manage the ship's visit from arrival to departure

- Dynamic berth scheduling and Just-in-Time arrival

- Intelligent Resources and Services Planning

- Share data with port communities

STEP 5

Safe and Coordinated Marine Services

CONNECTED MARINE OPERATIONS SYSTEM

- Carry-onboard device

- Connection with shore systems

- Job planning, dispatch and fleet monitoring

- Aid for Navigation, Docking and Mooring operations

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STEP 6

Remote Operations Towards Autonomous Shipping

REMOTE PILOTAGE AND TOWAGE OPERATIONS

- Ship to shore connectivity

- Intelligent Fairway
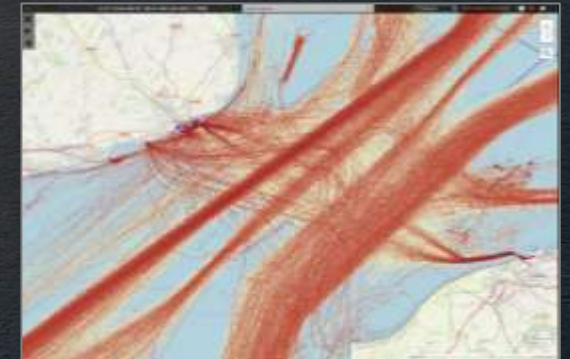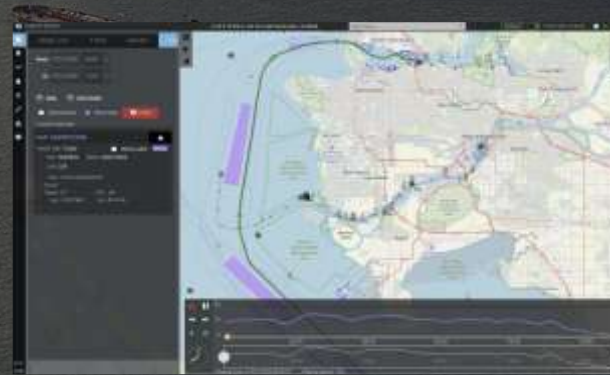
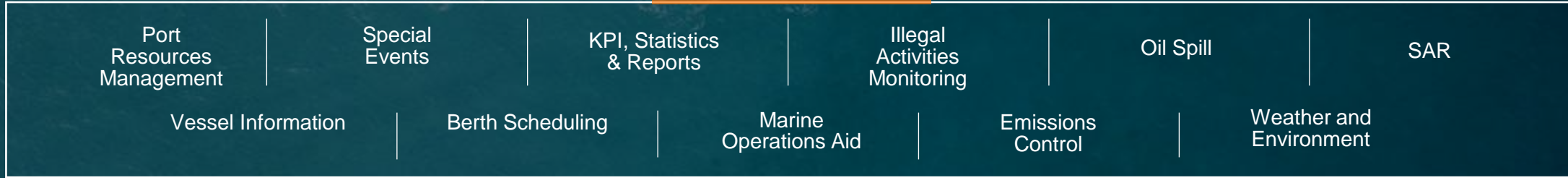- 3D environment and VR for situational awareness
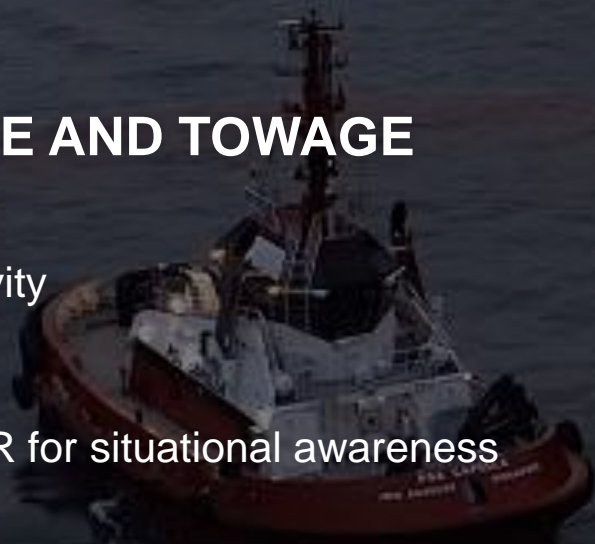
STEP 7

Turning Data into Actionable Insights

BUSINESS INTELLIGENCE PLATFORM

- Collections of data across the platform

- Dashboard KPI on performances, congestion, traffic density, emissions, dues…

- Analytics for forecast, investment decisions and optimization of processes and infrastructure

A DIGITAL PLATFORM TO LEVERAGE DATA

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VTS Operations

Ship Agents, Owners

Offshore Installations

Coastal Surveillance Systems

Crisis Management Centres

SAR Centres

Pilotage Services

Port Terminals Operators

Port Authorities

Vessels

WÄRTSILÄ DIGITAL PORT CALL
Platform

Customs

National/Regional Governance

Service Bus

Port Resources Management	Special Events	KPI, Statistics & Reports	Illegal Activities Monitoring	Oil Spill	SAR
Vessel Information	Berth Scheduling	Marine Operations Aid	Emissions Control	Weather and Environment	

External Services

- International Databases
- LRIT
- Weather Services
- ENAV Services
- 3rd Party Systems

Sensors Services

- Radar
- AIS
- EOS
- Weather and Environment Monitoring
- GMDSS
- Additional Sensors Services

Added Value Services

- Active Decision Support Service
- Data Analytics Services
- Incident Management Service
- Route Management Service

PORT CONGESTION
EFFICIENCY KILLER FOR BOTH PORTS AND VESSELS

Maritime industry is losing about **85B dollars** each year because port calls are not coordinated transparently nor on time
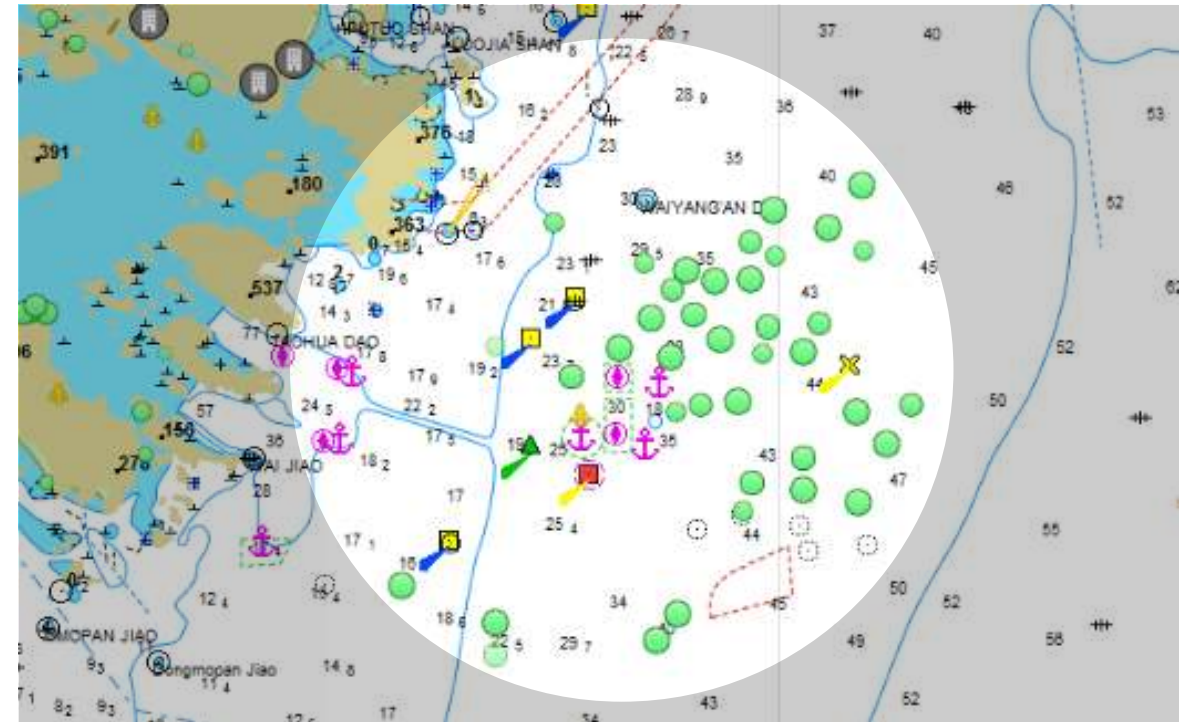
Vessel queue and waste time and money

Ports can't provide service when congested

Being afraid of congestion, ports and canals invest a lot into excess infrastructure that is not used for most of the time

CASE STUDY / ROTTERDAM
METHODOLOGY AND DATA

PORT OF ROTTERDAM
Period of time: January–December 2019

Based on:

- AIS data
- FOS data, real-time data from **972** FOS vessels
- Weather, environmental and chart data: WNI, NOAA, S-57 charts
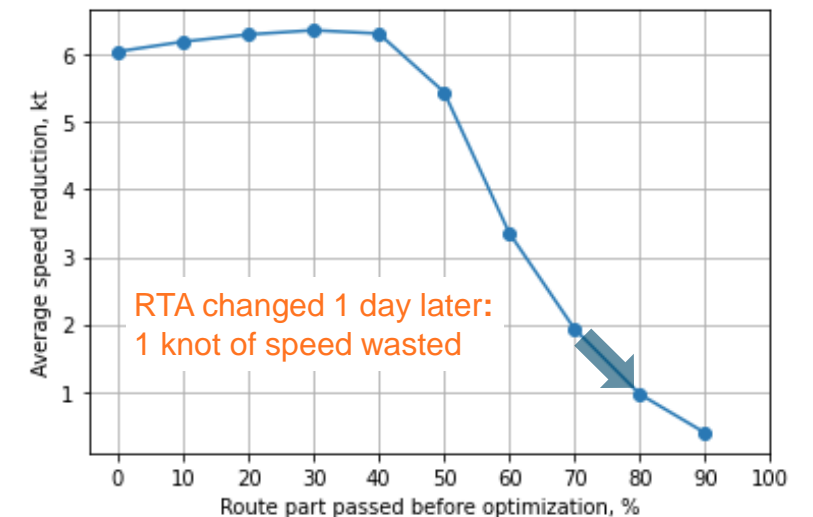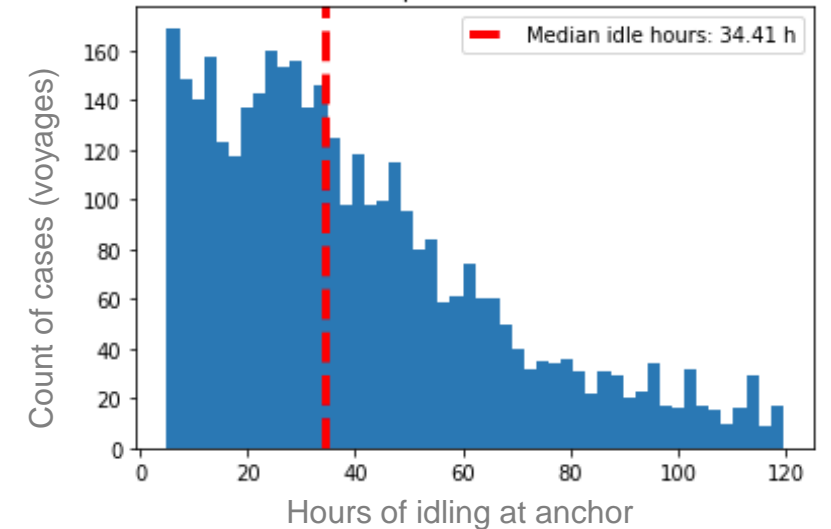
CASE STUDY / ROTTERDAM

EFFICIENCY ANALYSIS

IDLING ON ARRIVAL

- 24 % of all ships are idle for 12–120 hours
  Mean idle time 34 hours, or 32 % of time at sea

- 34 % of tankers are idle for 12–120 hours
  Mean idle time 39 hours, or 33% of total time at sea

- 33 % of container ships are idle for 12–120 hours
  Mean idle time 33 hours, or 34 % of total time at sea

UNNECESSARY SPEEDING

- Instead of idling, ship would slow down if they were warned in advance

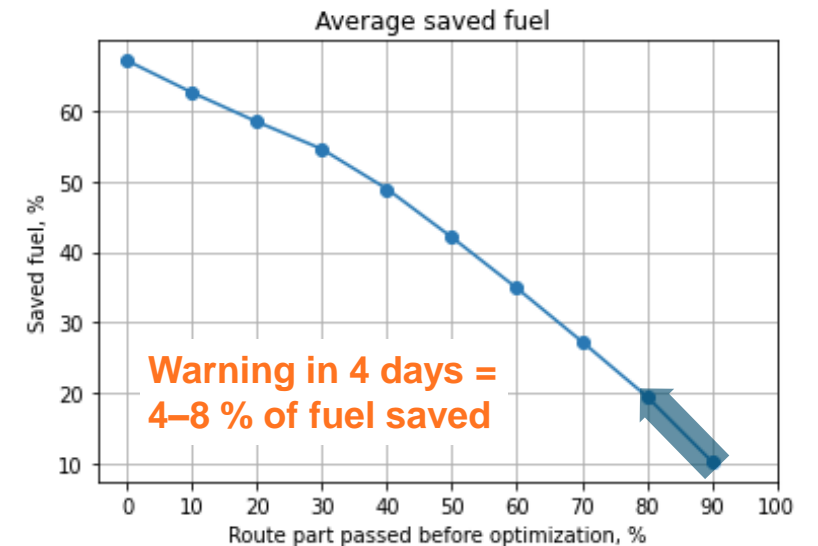- Rule of thumb: 1 day of belated warning costs 1 kn of extra speed

CASE STUDY / ROTTERDAM
METHODOLOGY AND DATA

- 25 % of vessels **lose 15–30 %** of the fuel and over-emit CO_2[*] which is equivalent to 4–8 % of fuel and CO_2 **among all fleet**

- 7 % of fleet operational time is wasted

To avoid this, all involved parties (ship, agent, fleet management, terminals) should be continuously exchanging updates on RTA, ETA, and ETD time, and ships must be warned in 2–4 days about port congestion or potential idling period.

Average saved fuel

Warning in 4 days = 4–8 % of fuel saved

Saved fuel, %

Route part passed before optimization, %

*1 ton of fuel ~ 3 tons CO_2

CASE STUDY / ROTTERDAM
POTENTIAL SAVINGS

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VESSELS

Fuel
21 %
Total fuel savings
for all vessels

Time
10 %
Total time saved
for all vessels

Money
50M USD
Total fuel savings
for all vessels

PORT

Waiting time
**Decrease by 25 hours
on average**

Considering all vessels that visited Rotterdam in 2019

Calculations can be done for your special case

INDUSTRY MOVING TOWARDS JIT

IMO-GIA JIT roundtable

Sea Traffic Management

BIMCO clause
on Virtual Arrival

EU Commission's
Directorate-General for
Mobility and Transport
(DG MOVE)

International Taskforce
Port Call Optimization

Digital Container
Shipping Association

JIT Arrival Guide

REFERENCES
PIONEERS OF JIT FRONTIER

PORTS AND TERMINALS

- Hamburg
- Tanger Med
- Singapore
- Antwerp
- Vancouver

- Porto do Açu
- Callao
- Valencia
- Rijeka
- Varna

FLEETS

- MSC
- Anglo-Eastern
- Stolt

- DFDS
- Wan Hai
- Carisbrooke
- Wilson
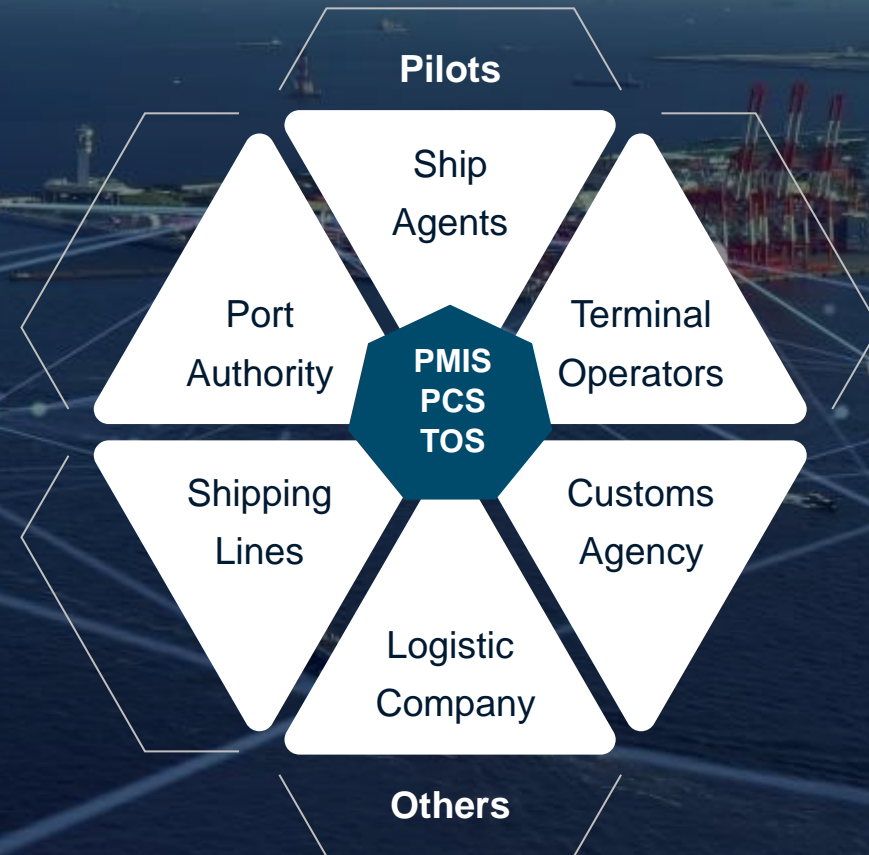
AWARDS

The FOS-NaviPort project won this year's Seatrade Port and Terminal Digital Technology Award

RS24 Radar won Innovation of the Year Award 2021 by Offshore Support Journal

Cloud Simulation Solution won the 2021 SMART4SEA Training Award

PARTNERSHIPS

Partnered with the **Maritime and Port Authority of Singapore**

Partnered with **Microsoft** to strengthen our Edge platform and industrialise IoT

Partnered with **China Class Society and Tianjin** Port Group

Partnered with **Weathernews** to enhance smart data solutions

Connecting the
Smart Marine Ecosystem

Emre Cebecioglu
Sales Manager

Emre.Cebecioglu @wartsila.com