

# WÄRTSILÄ

## SMART PORT SOLUTIONS AND DIGITALIZATION OF PORT CALL

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

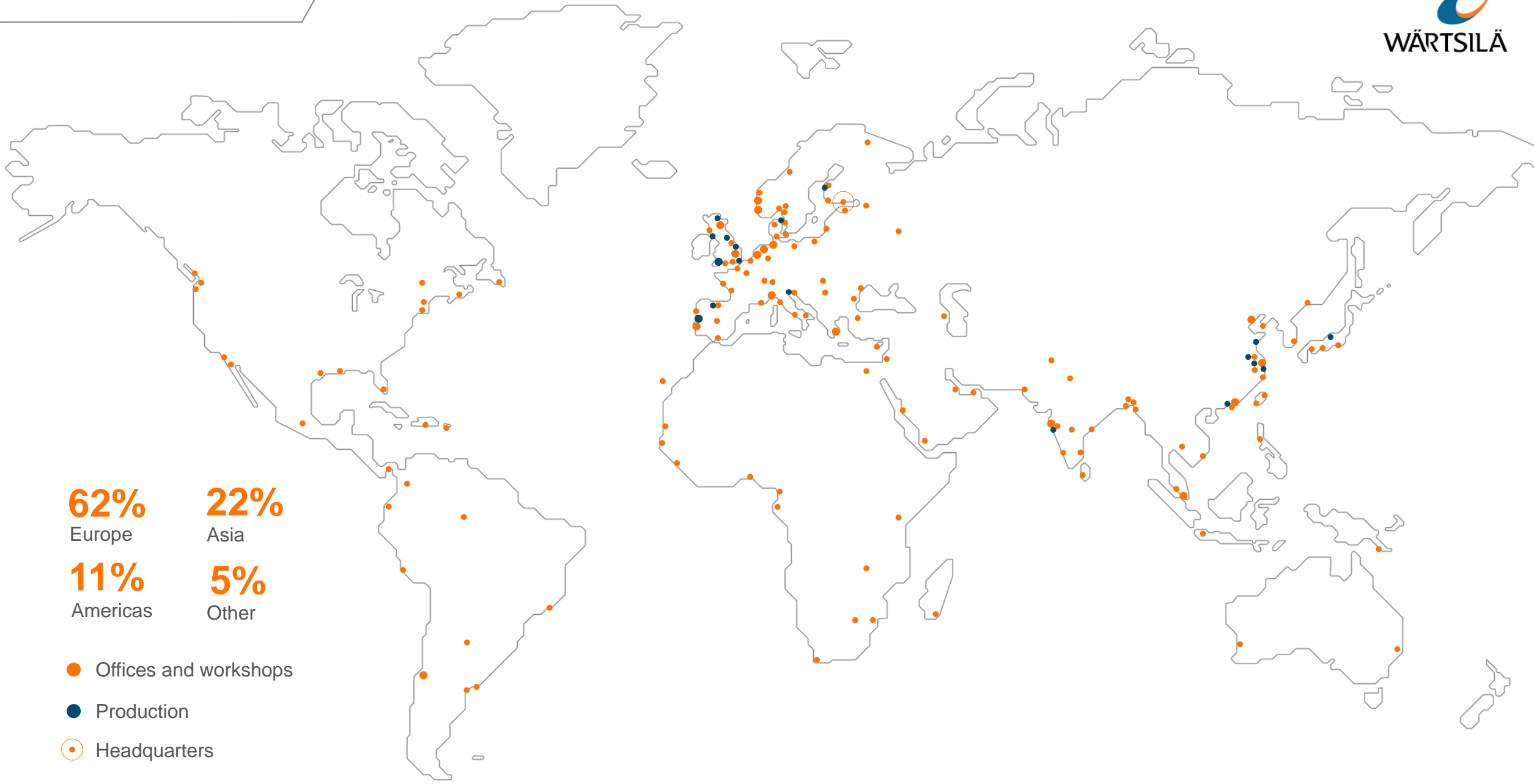
**200 LOCATIONS**

OUR PERSONNEL APPROX.

**17,800**

NATIONALITIES

**139**



**62%**  
Europe

**22%**  
Asia

**11%**  
Americas

**5%**  
Other

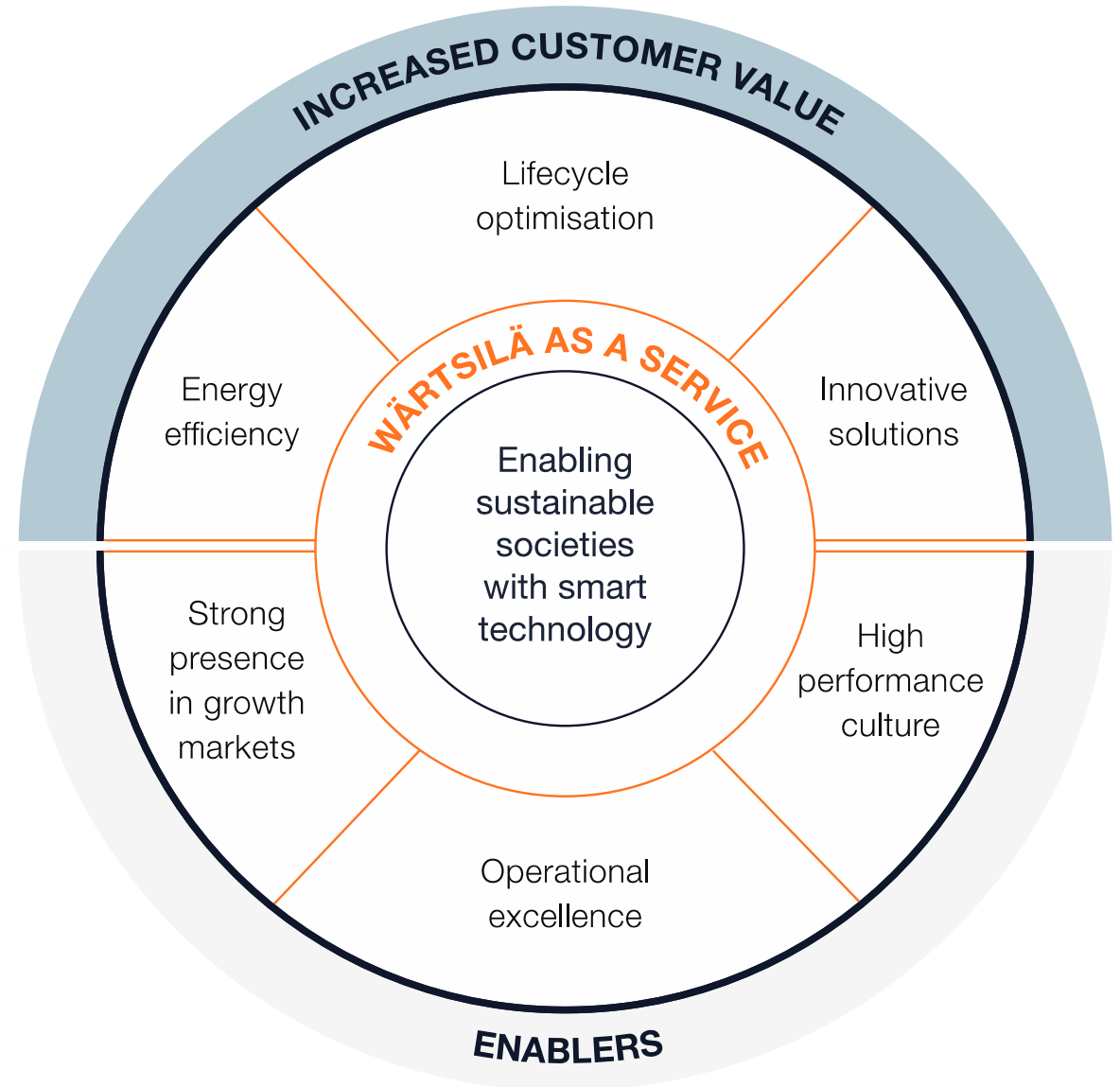
- Offices and workshops
- Production
- Headquarters

# ENERGY

Leading the path towards a 100% renewable energy future

# MARINE

Leading the industry transformation towards a Smart Marine Ecosystem



**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

**346**

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?

*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*

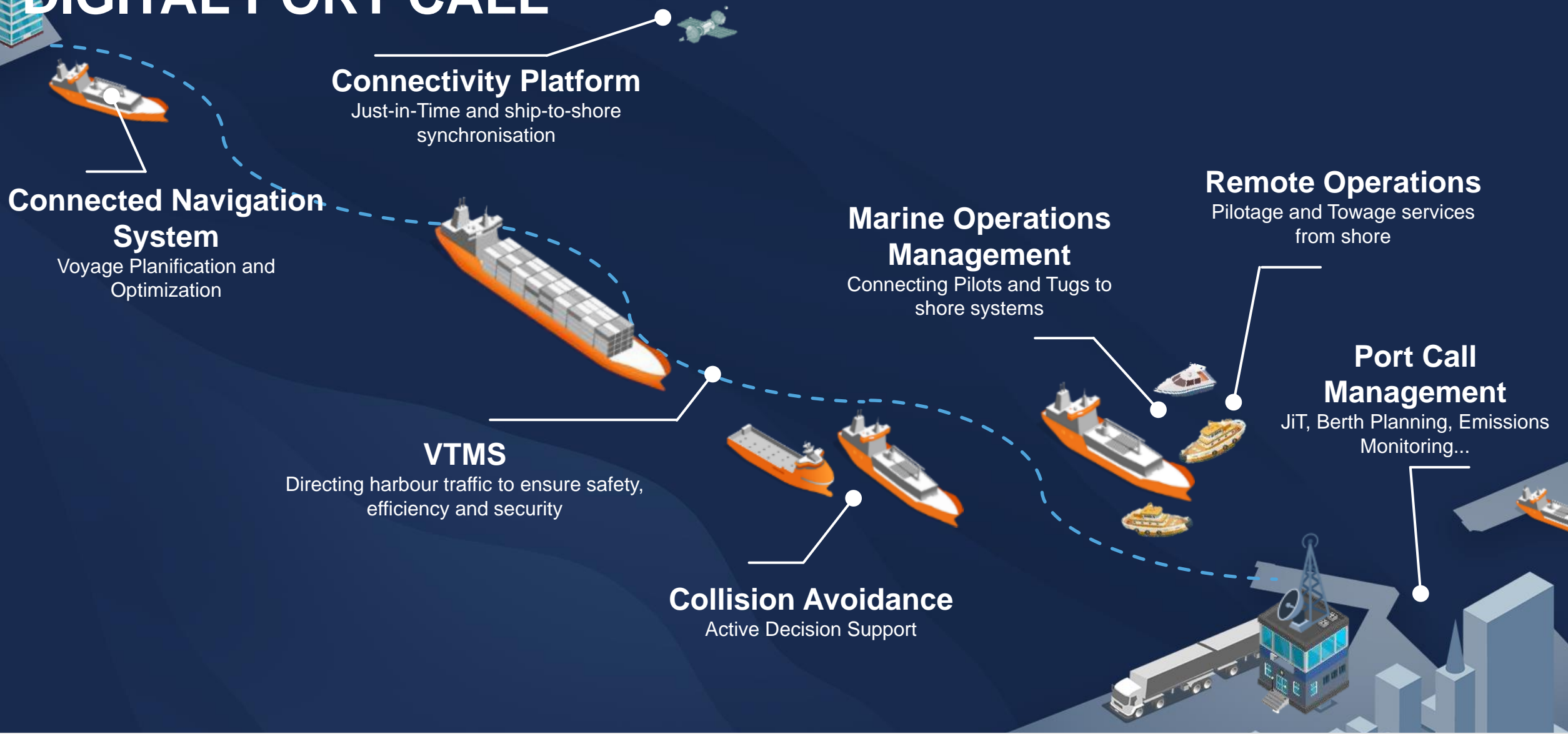
*Reliable and prompt updates provided during the port call*

*No delays in cargo operations and submitting documents*

*Administrative requirements managed and notified in advance*

**Synchronisation, Coordination, Optimization**

# CONNECTED ECOSYSTEM ENABLES DIGITAL PORT CALL





# 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



# STEP 2

## Direct ETA Communication between Vessels and Ports

### NAVI-PORT

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

ONSHORE FLEET  
OPERATIONS



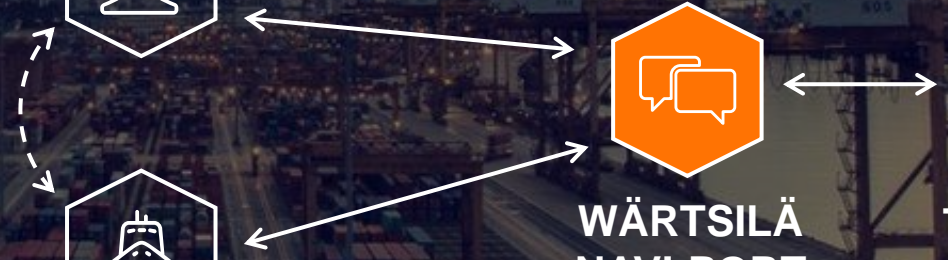
NAVIGATION  
SYSTEM



WÄRTSILÄ  
NAVI-PORT



TERMINAL /  
PORT



# Just In Time – Unlocking benefits for the Maritime Industry

## BEFORE

High fuel consumption to reach destination

High GHG emissions during voyage and at anchor

Elevated risk levels when entering / leaving port as a result of congestion

Poor coordination of ALL the stakeholders

High volume of telephone and email comms. between vessels, fleet operations and ports

## ADOPTION OF JUST-IN-TIME

Reduce significantly fuel burn during the voyage by optimizing the vessel's speed

Global GHG emissions reduction and elimination at anchor

Increased safety because of fewer vessels around the port area

Better visibility to plan for operations

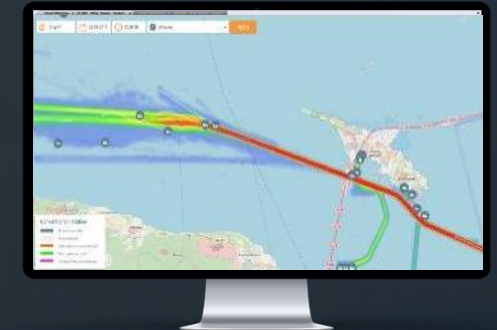
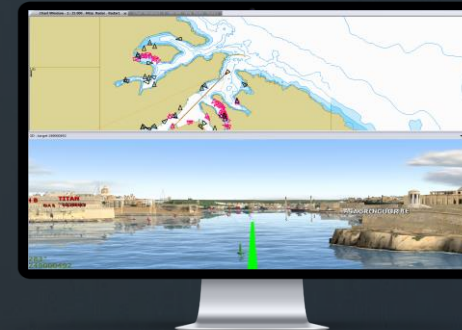
Increased efficiency by reducing the manual workload

# 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

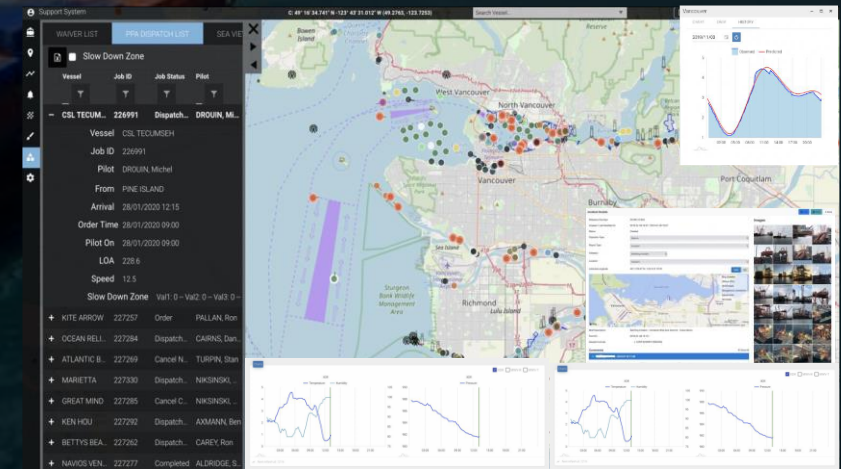


# STEP 4

## 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

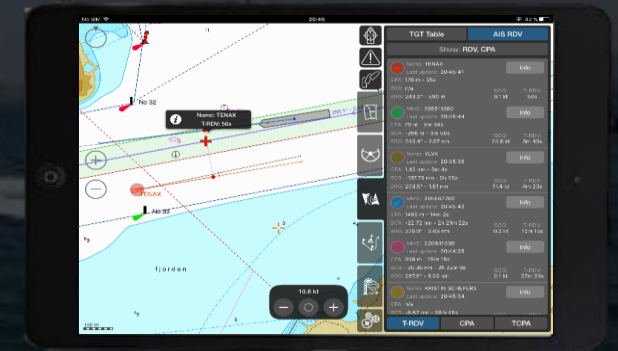


# STEP 5

## 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

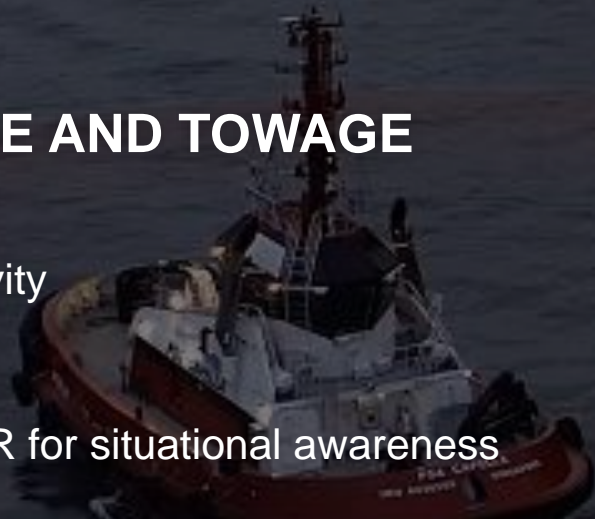


# STEP 6

## Remote Operations Towards Autonomous Shipping

### REMOTE PILOTAGE AND TOWAGE OPERATIONS

- Ship to shore connectivity
- Intelligent Fairway
- 3D environment and VR for situational awareness

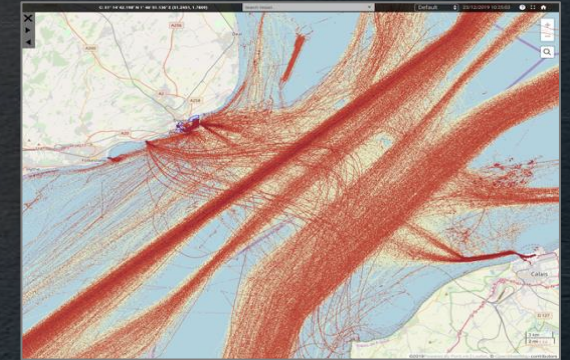
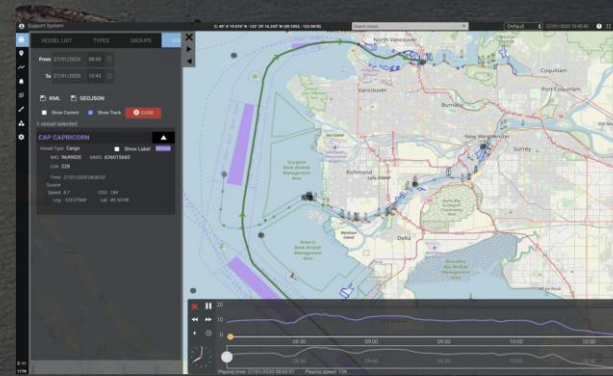


# STEP 7

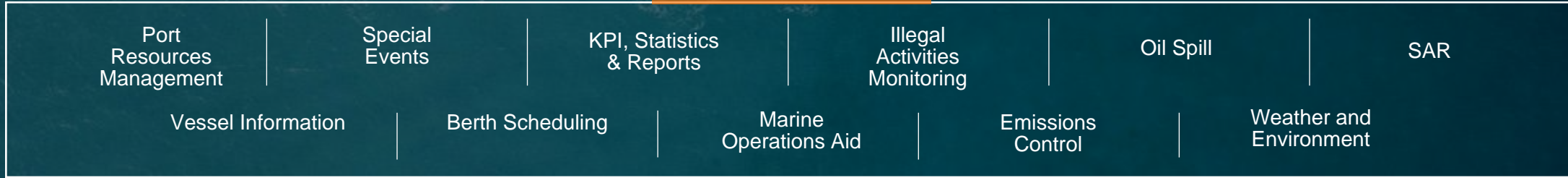
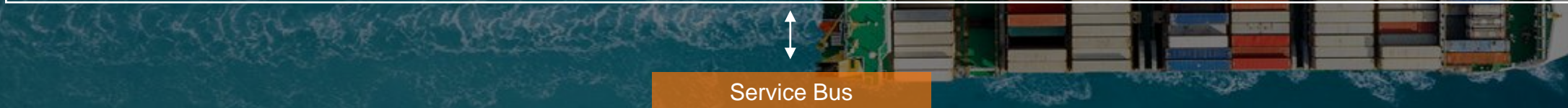
## Turning Data into Actionable Insights

### 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







**External Services**

- International Databases
- LRIT
- Weather Services
- ENAV Services
- 3<sup>rd</sup> 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



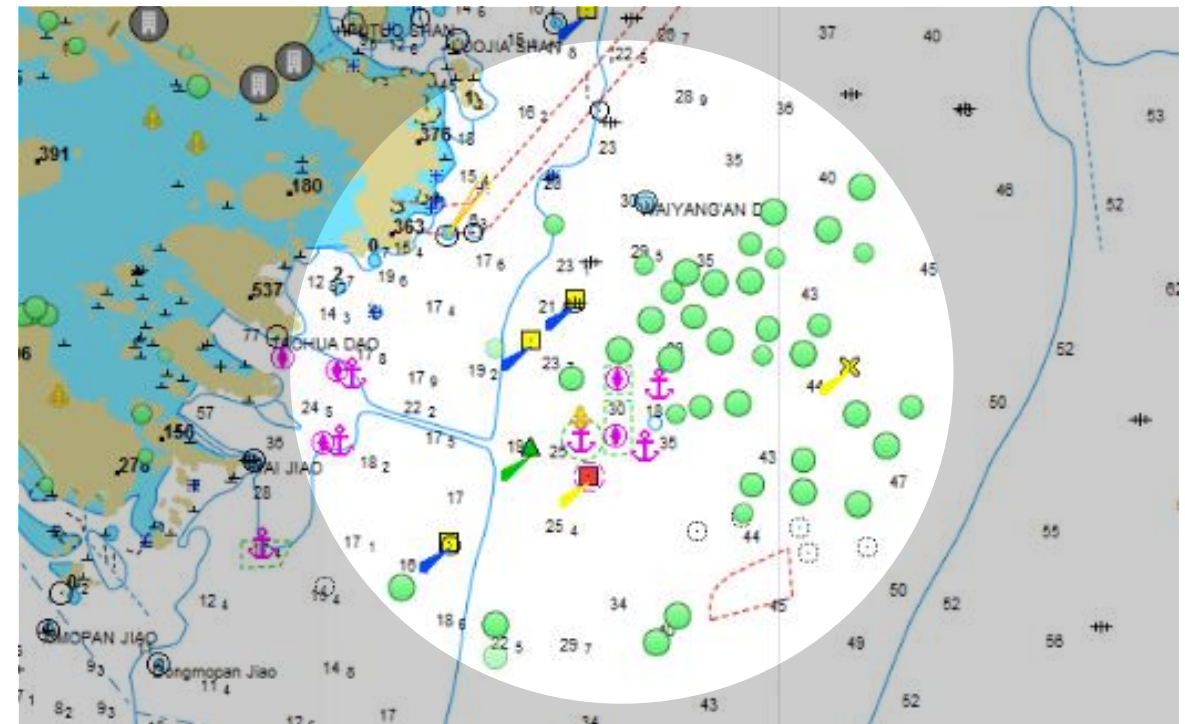
Vessel queue and waste time and money



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

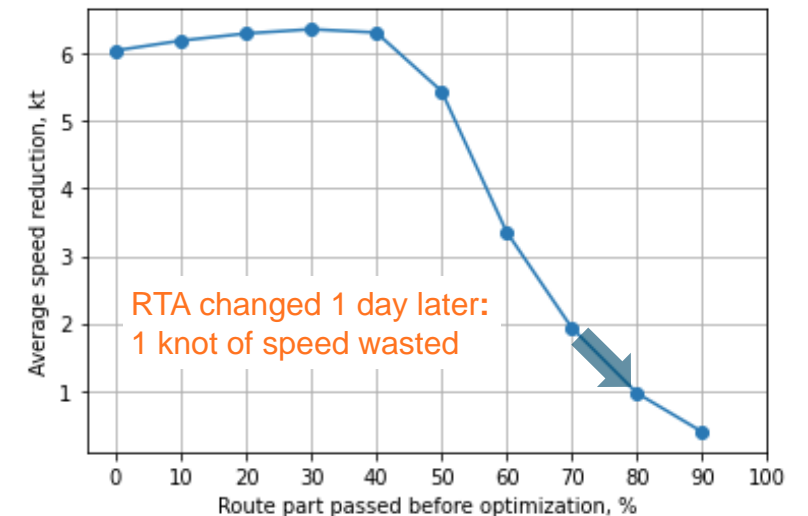
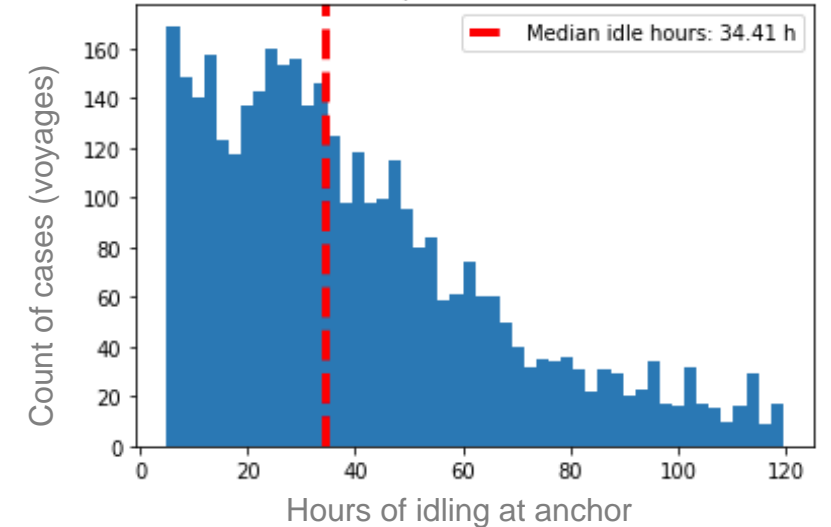
## EFFICIENCY ANALYSIS

### 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



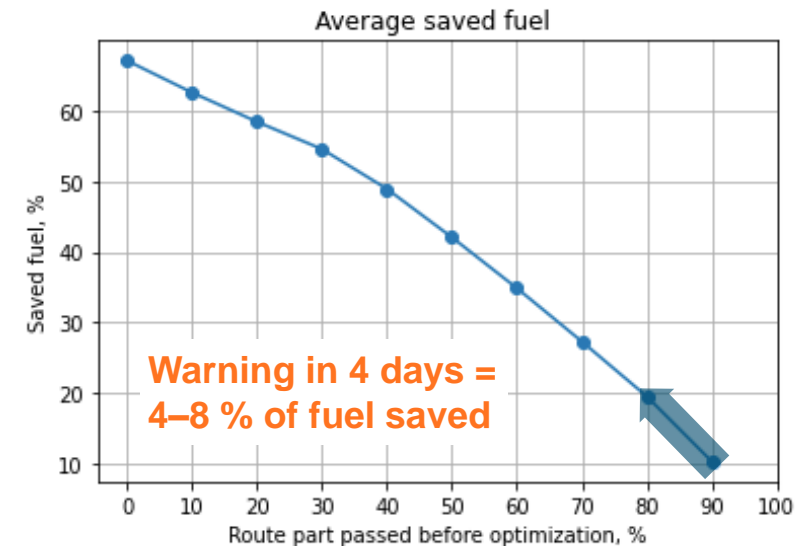
# CASE STUDY / ROTTERDAM

## METHODOLOGY AND DATA

- 25 % of vessels **lose 15–30 %** of the fuel and over-emit CO<sub>2</sub>\* which is equivalent to 4–8 % of fuel and CO<sub>2</sub> **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.



\*1 ton of fuel ~ 3 tons CO<sub>2</sub>

# CASE STUDY / ROTTERDAM

## POTENTIAL SAVINGS

### 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
- Porto do Açu
- Tanger Med
- Callao
- Singapore
- Valencia
- Antwerp
- Rijeka
- Vancouver
- Varna



### FLEETS

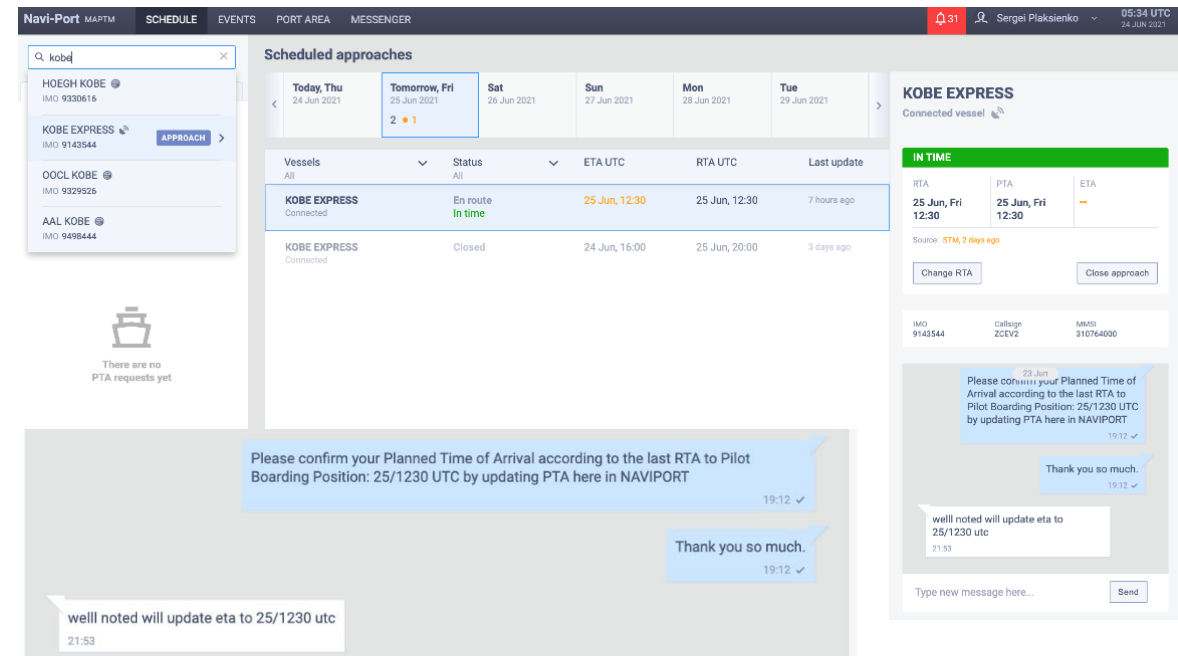
- MSC
- DFDS
- Anglo-Eastern
- Wan Hai
- Stolt
- Carisbrooke
- Wilson



# REFERENCES

## WORLD FIRST DIGITAL PORT CALL EVER

- 10 June Discovery of FOS vessel **Kobe Express**: expected to be in **Tanger Med** 24/06 from Cartagena, Columbia. For any previous port call she always been waiting for 8h in average.  
**+15 days prior arriving**
- 13 June Kobe Express is in Cartagena: updates for SW on a bridge.
- 17 June Kobe Express is seen in Navi-Port now.
- 21 June First contact ship-to-shore. Not reliable communication yet, the crew do not reply to the port in timely manner.  
**+5 days prior arriving**
- 22 June Communication with the Captain established, short training provided.
- 23 June RTA time from Tanger Med sent. Speed reduced from 17kn in the morning down to 15kn mid-day, 11kn in the evening.
- 25 June Kobe Express finally arrived at Tanger Med, Terminal 3. Approx. 26 tons saved, 10,000 USD (75 tons of CO<sub>2</sub>).  
**Potential wating time without ETA change: 15h 50m**  
 Estimation made based on FOS data



The screenshot displays the Navi-Port interface with the following components:

- Search Panel:** Search for 'kobe' showing results for HOEGH KOBE (IMO 9330615), KOBE EXPRESS (IMO 9143544), OOCL KOBE (IMO 9329525), and AAL KOBE (IMO 9498444).
- Scheduled approaches:** A calendar view for June 2021. The 25th (Friday) is highlighted with '2' arrivals and '1' departure. A table below shows:
 

Vessels	Status	ETA UTC	RTA UTC	Last update
KOBE EXPRESS	En route In time	25 Jun, 12:30	25 Jun, 12:30	7 hours ago
KOBE EXPRESS	Closed	24 Jun, 16:00	25 Jun, 20:00	3 days ago
- KOBE EXPRESS Details:** Shows 'IN TIME' status, RTA of 25 Jun, Fri 12:30, and PTA of 25 Jun, Fri 12:30. Includes a message: 'Please confirm your Planned Time of Arrival according to the last RTA to Pilot Boarding Position: 25/1230 UTC by updating PTA here in NAVI-PORT'.
- Chat Log:**
  - 21:53: "we'll noted will update eta to 25/1230 utc"
  - 19:12: "Thank you so much."
  - 19:12: "Please confirm your Planned Time of Arrival according to the last RTA to Pilot Boarding Position: 25/1230 UTC by updating PTA here in NAVI-PORT"
  - 19:12: "Thank you so much."

Wärtsilä Navi-Port successfully tested in Tanger Med in collaboration with Hapag-Lloyd and Anglo-Eastern Ship Management



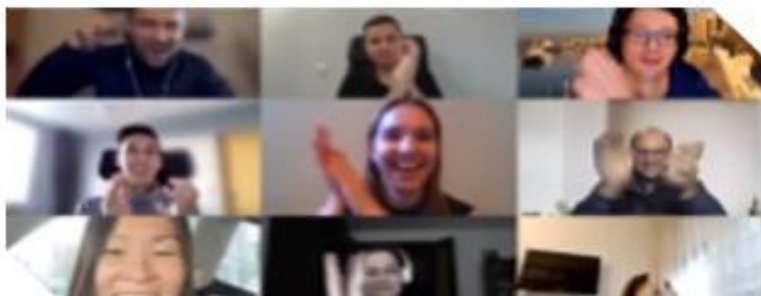
# ADDITIONAL TECHNOLOGIES WITH SOLUTION PARTNERS

- Port Management and Information Systems
- Terminal Operating Systems





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

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