DIGITALIZATION AND INNOVATION – ADAPT OR RESIST ??

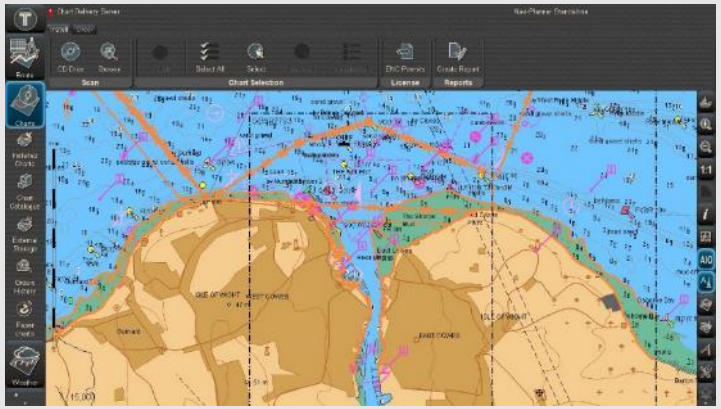
Unknowingly or Knowingly Digitalization and Innovation have been progressing….
Some of the examples are…

Navigation – POSITION FIXING / PASSAGE PLANNING

SEXTANT

PAPER CHARTS

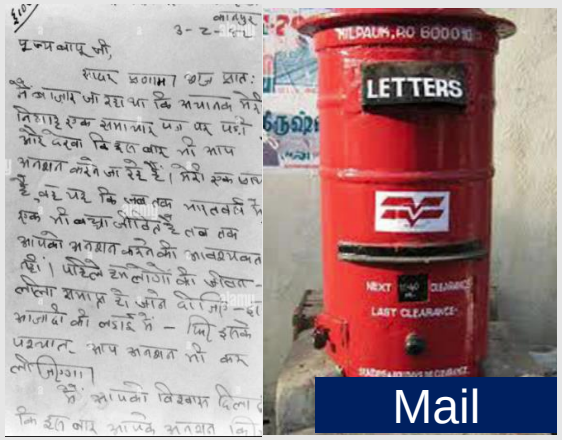
SAT NAV / GPS

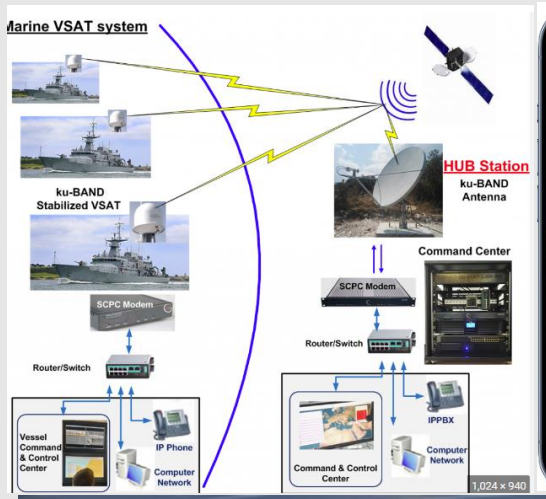


ELECTRONIC CHARTS

Digitalization journey - Analog to Digital

Communication –





Mail → Radio Telegraphy → Telex messages → Email → Chats → Video calls

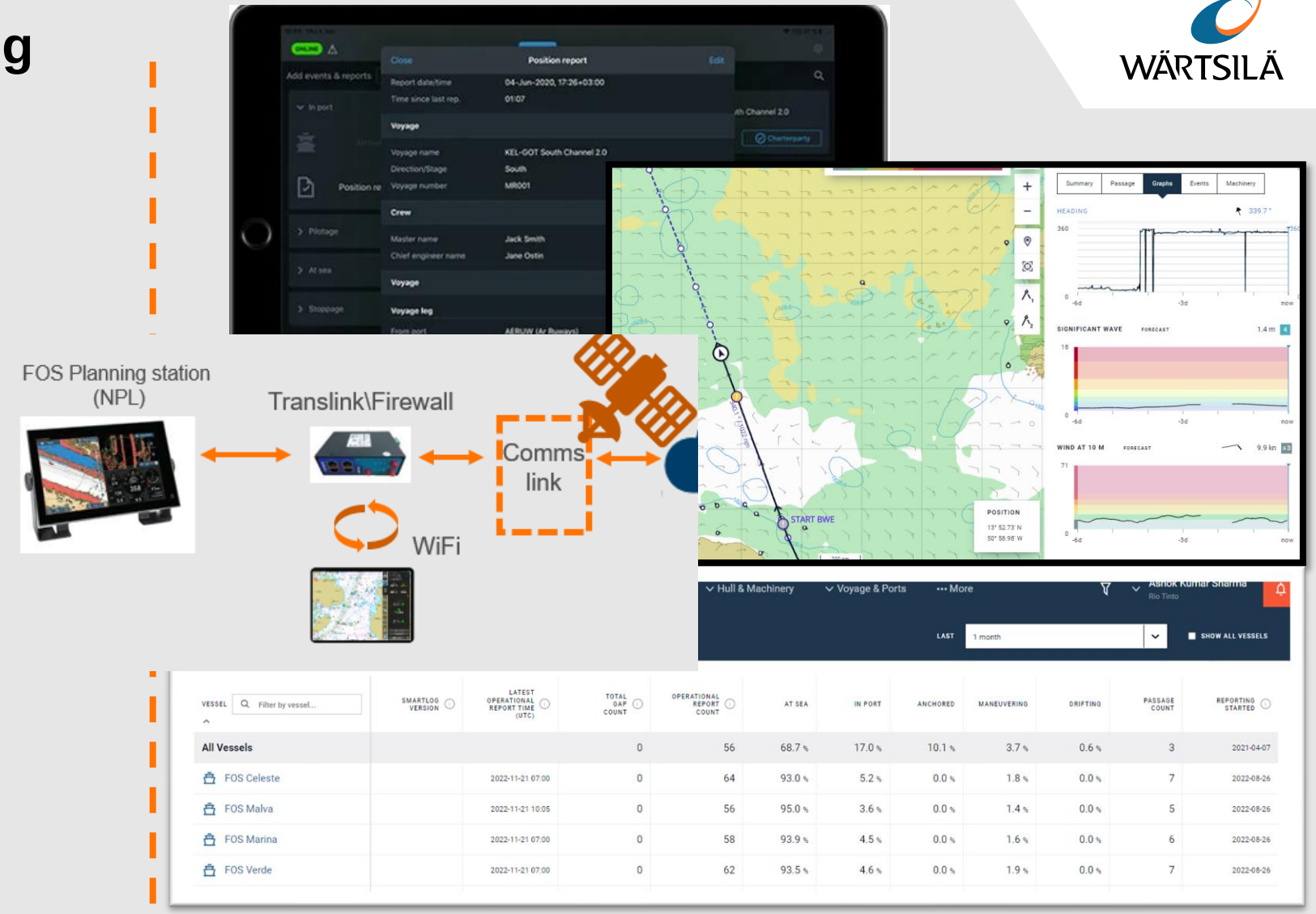
Digitalization journey - Analog to Digital

Vessel Reports & Monitoring

NOON REPORT

SHIP'S NAME (IN ABBREVIATE FORM)	: OPOW
VOYAGE NUMBER	: 12019
DATE (DD MM YY)	: 01-05-2012
LATITUDE AT NOON (DEG MIN N/S)	: N
LONGITUDE AT NOON (DEG MIN E/W)	: E
AVERAGE SPEED DONE SINCE LAST NOON REPORT	: KN
AVERAGE RPM	: RPM
WIND DIRECTION AND FORCE	: SE/2
SEA AND SWELL CONDITION	: SLIGH/LOW
RING FULL AWAY (DD HH MN)	: LT
DISTANCE TO GO	: NM
ETA:- PORT/ TIME	: LT
R.O.B.:- FRESH WATER (MT) FUEL OIL (MT) DIESEL OIL (MT) LUB OIL (M/E) (MT) LUB OIL (A/E) (MT) LUB OIL (HYD) (MT)	: 105 MT : 69.175 MT : 22.817 MT : 2260 LTR : 1210 LTR :
In Port:- ETC	:

REMARKS: VESSEL MOORED AT TANKSTORE SINGAPORE.

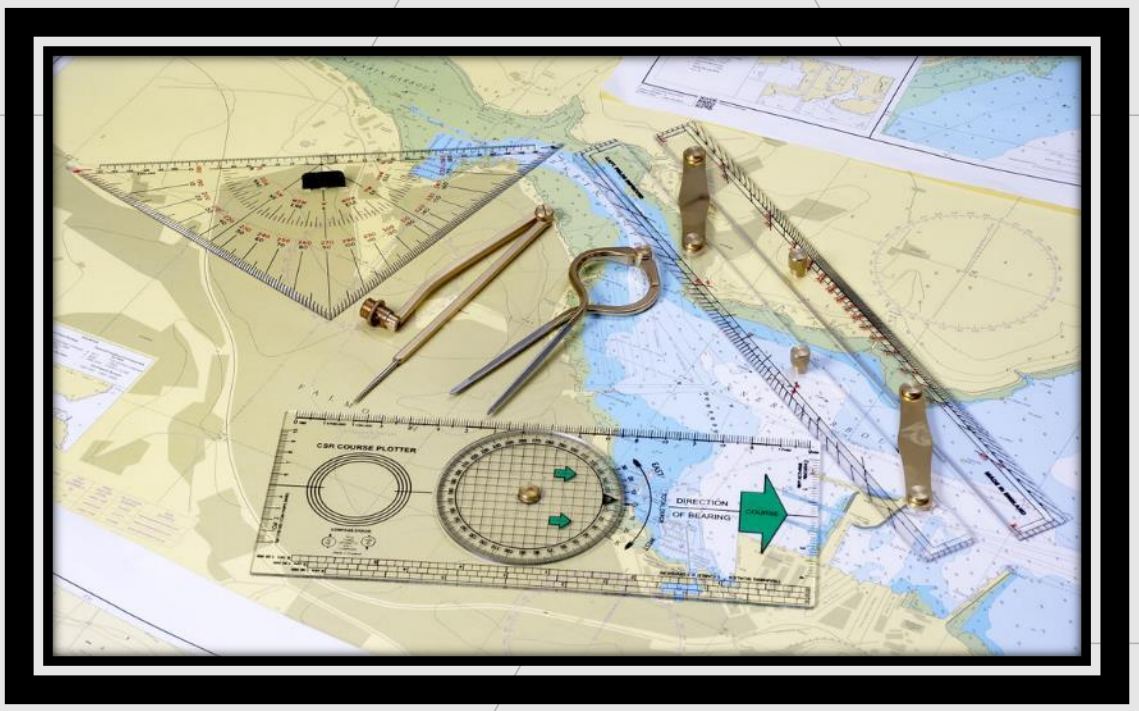


Manual, Human error

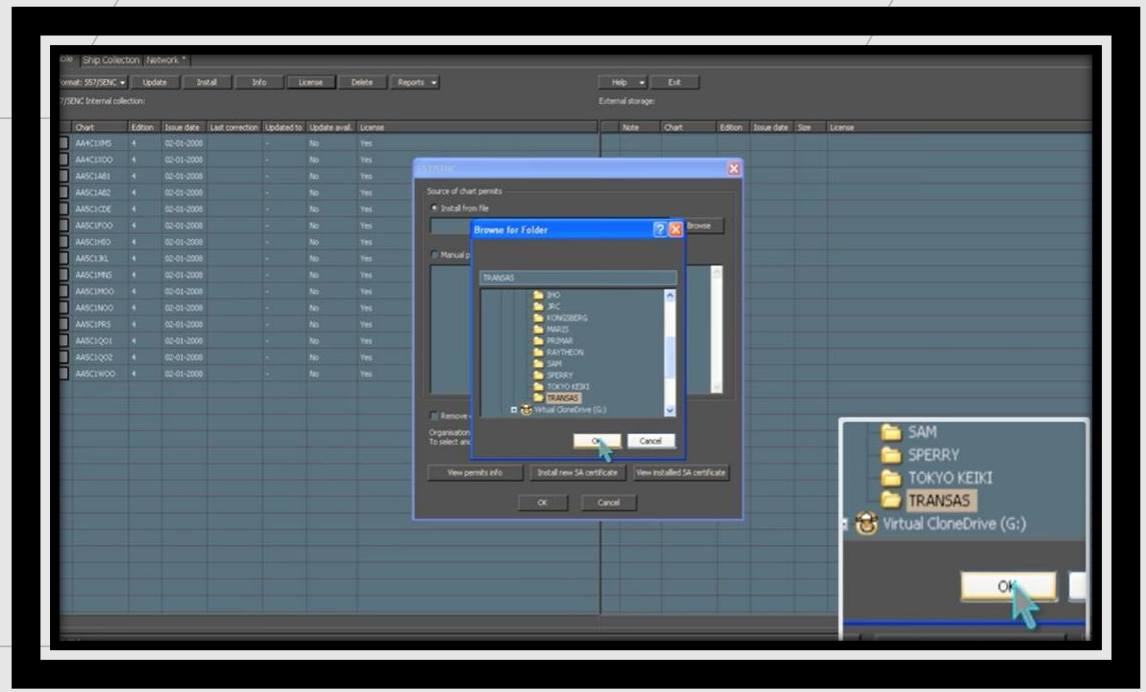
Hybrid, Reduced Human error

Digitalization journey - Analog to Digital

Chart Correction



Manual task, time consuming, error prone, judgement issue



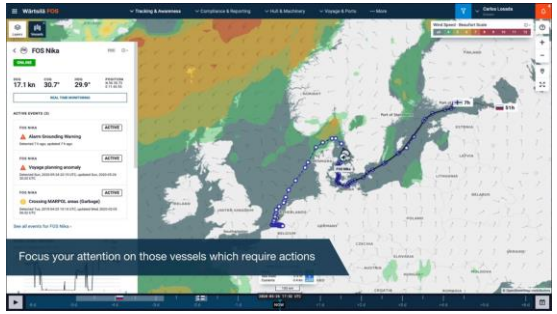
Automated, saves time, free of human error,

Digitalization journey - Analog to Digital


Is Digitalization causing disruption…?
Do We have Choice ??
Let us see…!

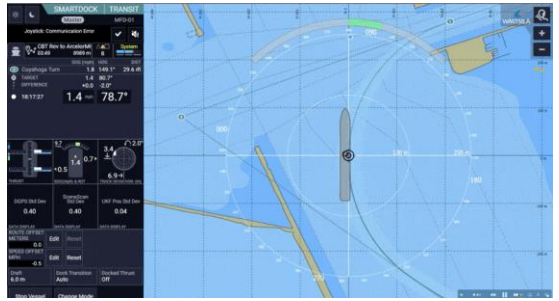
DIGITAL TRANSFORMATION TO UNLOCK SHIPPING'S POTENTIAL

Fleet Operations Solution



Integrated Vessel Control

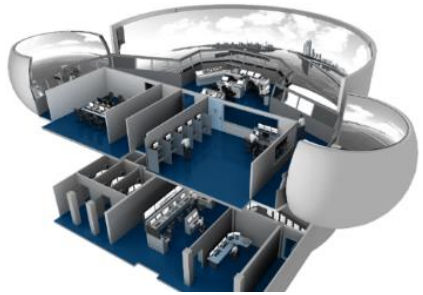
Autonomy Solutions

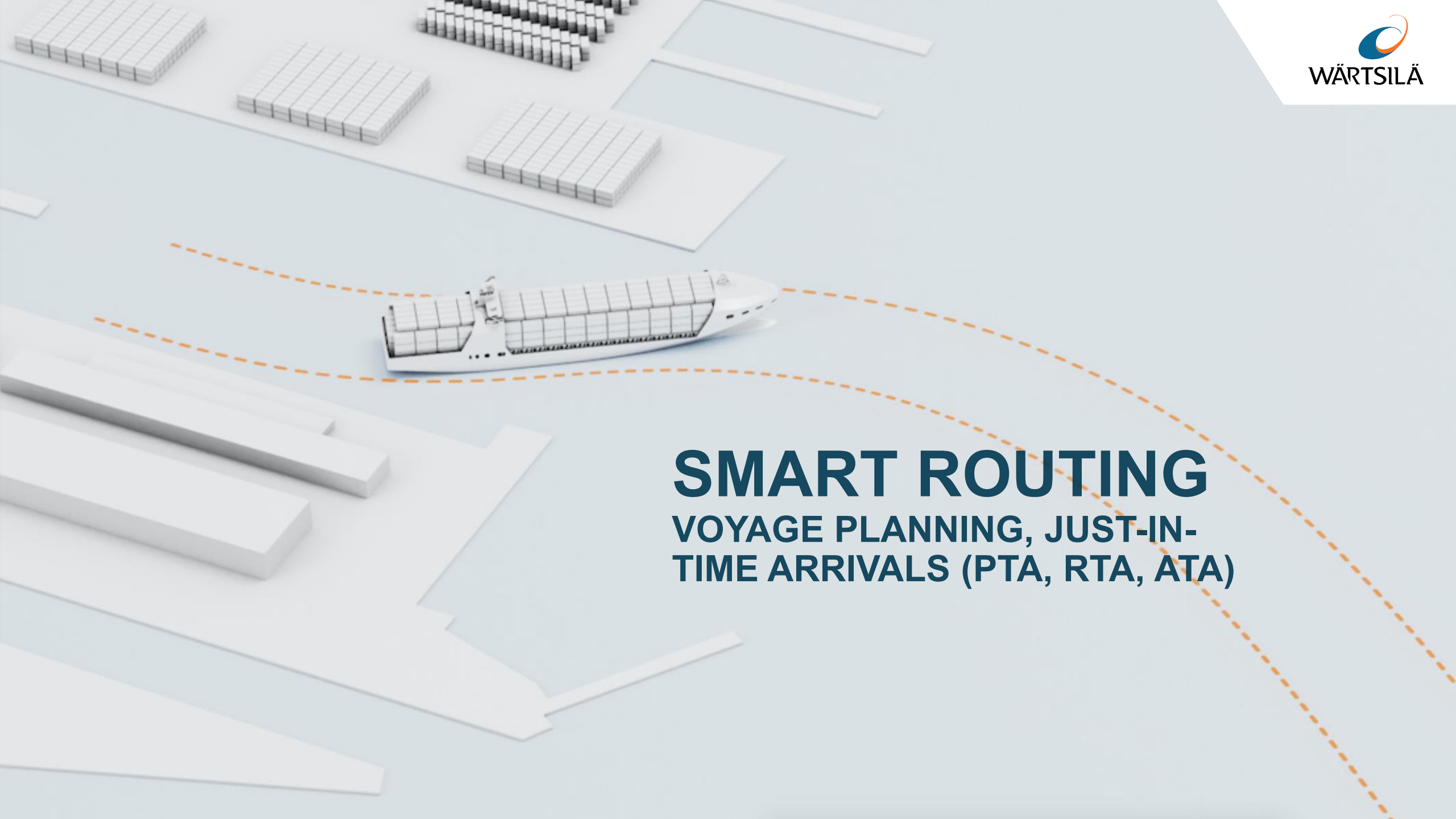


Port Operations Solutions

Dynamic Positioning

Training -Simulation Solutions





SMART ROUTING

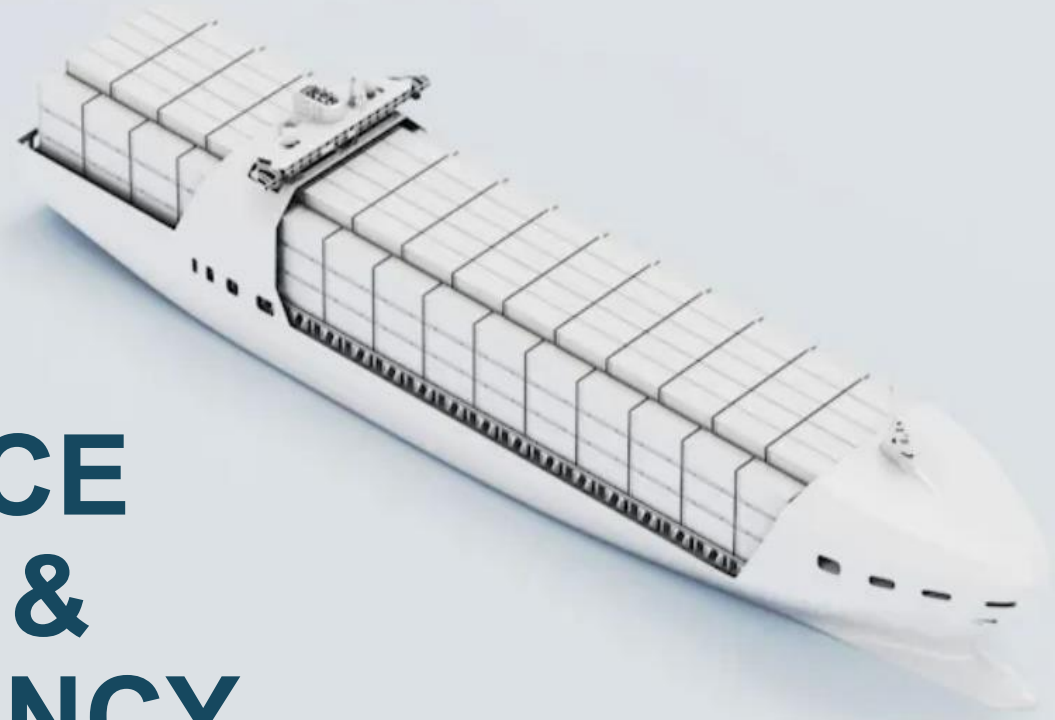
VOYAGE PLANNING, JUST-IN-TIME ARRIVALS (PTA, RTA, ATA)

Smart routing and voyage planning
Connecting Navigation and Automation to secure cloud

CONNECTED ECDIS

- Ship-to-shore connectivity
- Auto-routing and auto-voyage planning, wx optimizing
- Onshore tracking and awareness, fuel optimization,

WÄRTSILÄ



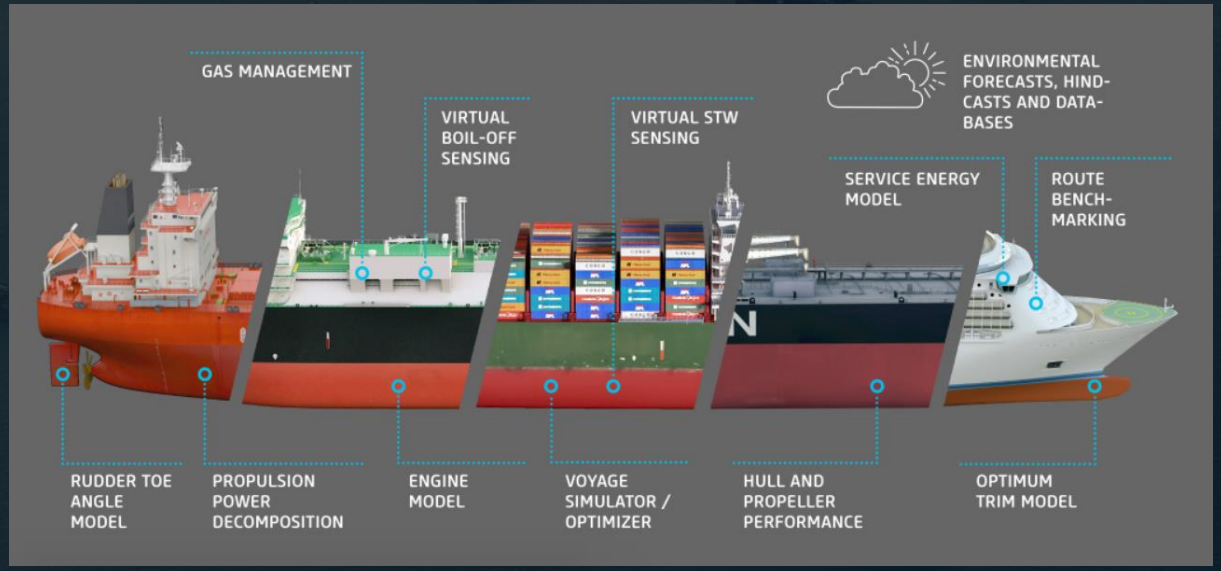
PERFORMANCE MONITORING & FUEL EFFICIENCY

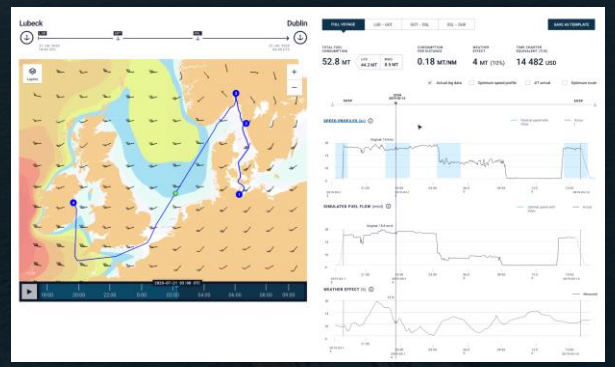
REAL-TIME FLEET TRACKING

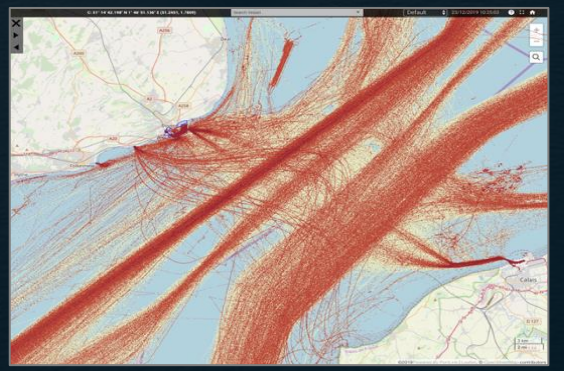
Performance Monitoring and Fuel Efficiency

BUSINESS INTELLIGENCE PLATFORM

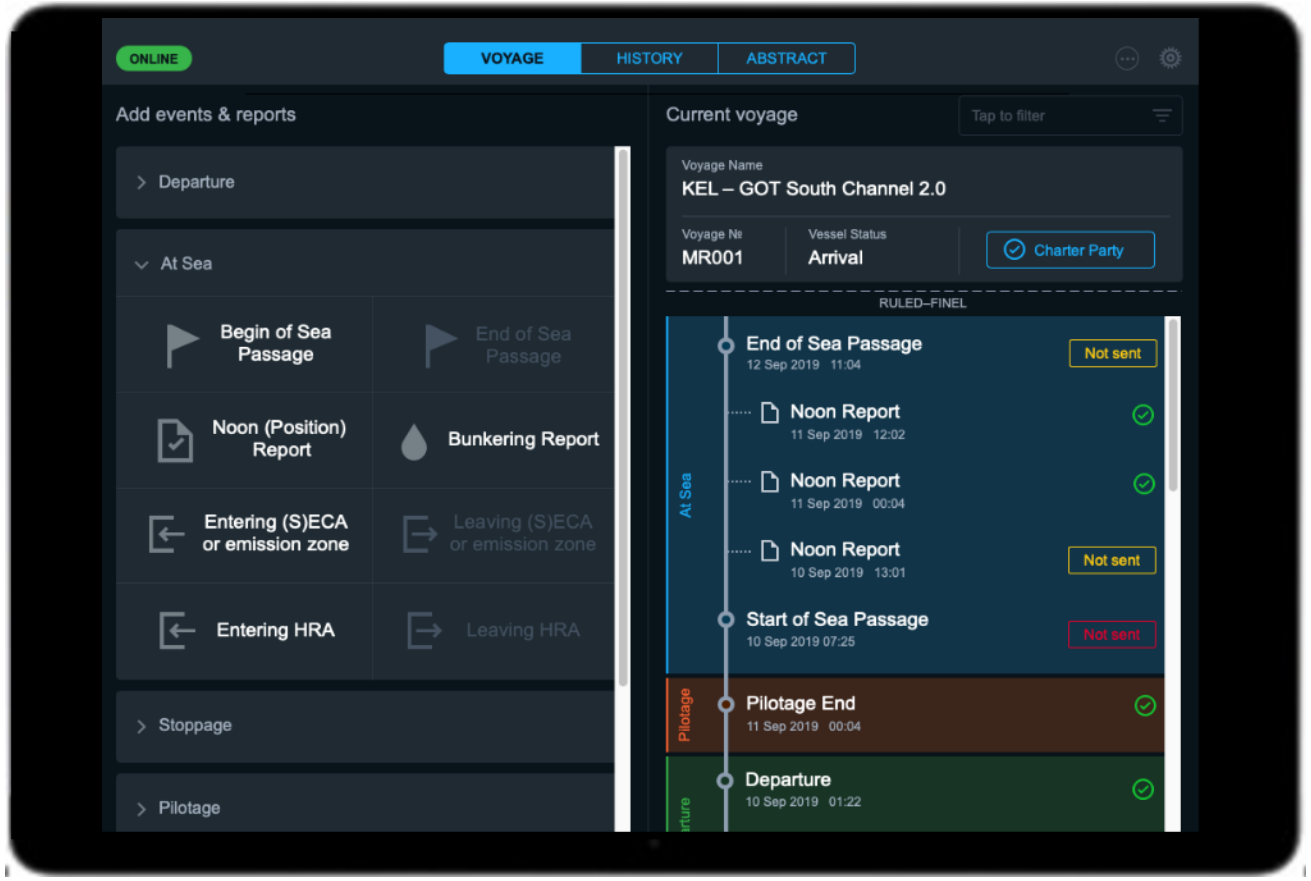
- Collections of data across the platform
- Dashboard KPI on performances, congestion, traffic density, emissions, dues…
- Analytics for forecast, investment decisions and optimization of processes and infrastructure
- condition based and Predictive maintenance







FIRST MOBILE USE CASE:
A CONNECTED BRIDGE ALLOWS FOR A NEW WAY OF SHIP-TO-SHORE REPORTING

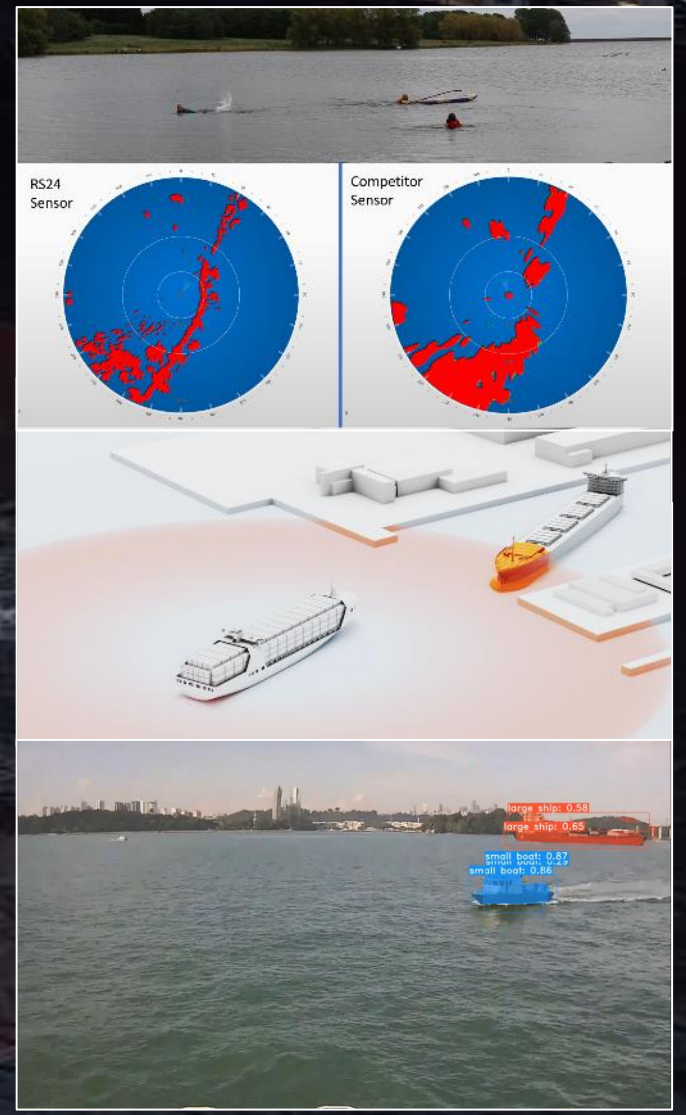


- Easy voyage time-stamp collection by push-button
- ECDIS data pre-filling
- Benchmarking data collection
- Plausibility checking
- Minimum manual data input

Situational awareness and collision avoidance

SENSOR FUSION

- Guard Circle
- Near field high resolution radar
- Maritime Video AI

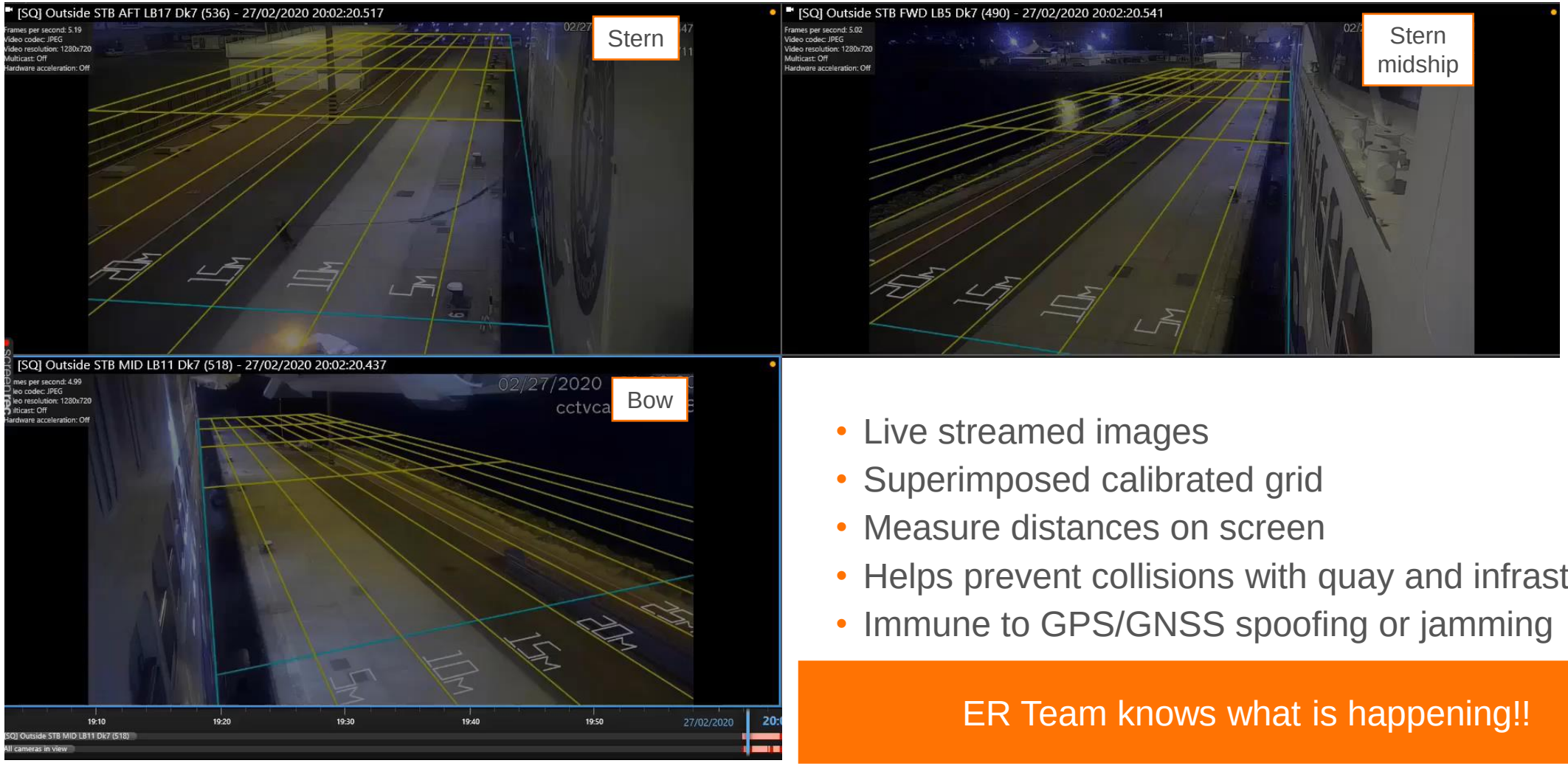


SMART PANORAMIC SENSOR SUITE

360 field of view

- Low maintenance cameras
- Calibrated for distance measurement
- AI hazard detection and object recognition
- Augmented reality user interface

SMARTQUAY (SQ) – FOR ASSISTANCE WITH DOCKING 入港辅助



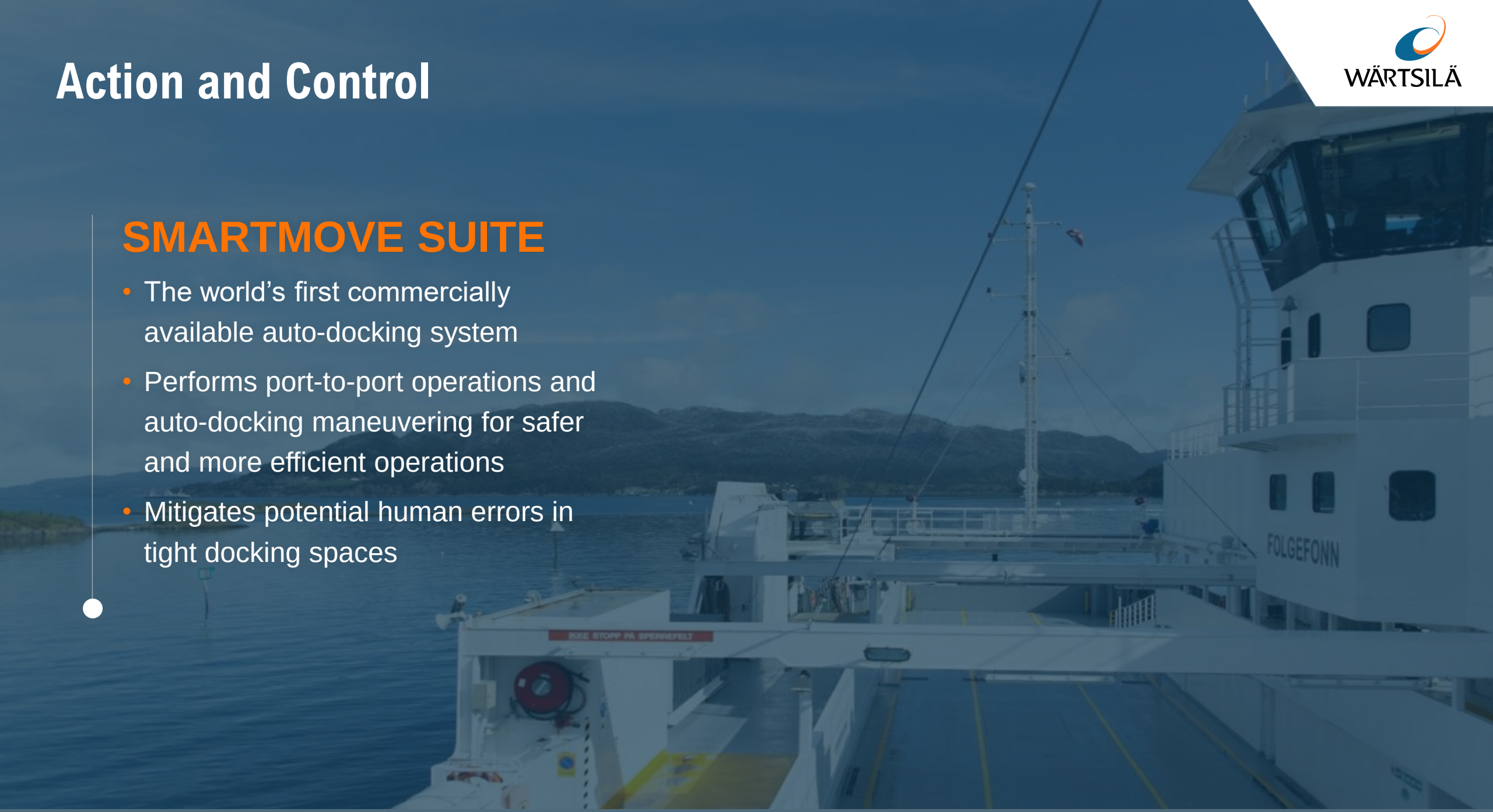
- Live streamed images
- Superimposed calibrated grid
- Measure distances on screen
- Helps prevent collisions with quay and infrastructure
- Immune to GPS/GNSS spoofing or jamming

ER Team knows what is happening!!

Action and Control

SMARTMOVE SUITE

- The world’s first commercially available auto-docking system
- Performs port-to-port operations and auto-docking maneuvering for safer and more efficient operations
- Mitigates potential human errors in tight docking spaces



CYSCAN WITH SMARTDOCK – FOLGEFONN FERRY

SmartDock

- **The world's first** commercially available auto-docking system

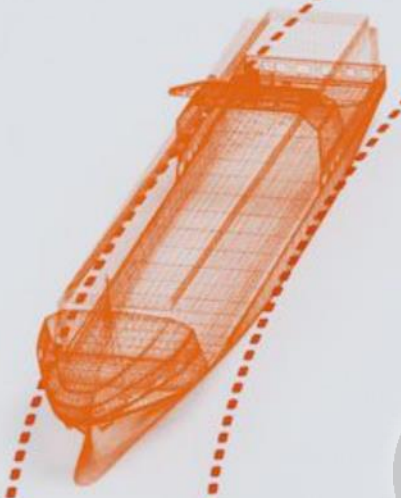
  世界上第一个商业上可用的自动对接系统

- Performs port-to-port operations and auto-docking maneuvering for safer and more efficient operations

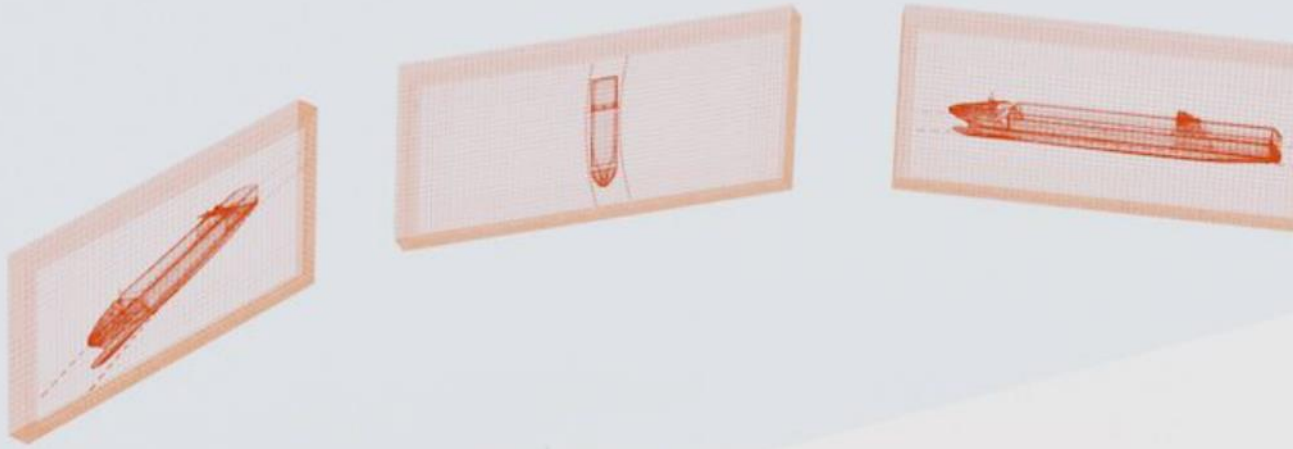
  行港口到港口操作和自动对接操作，使操作更安全、更高效

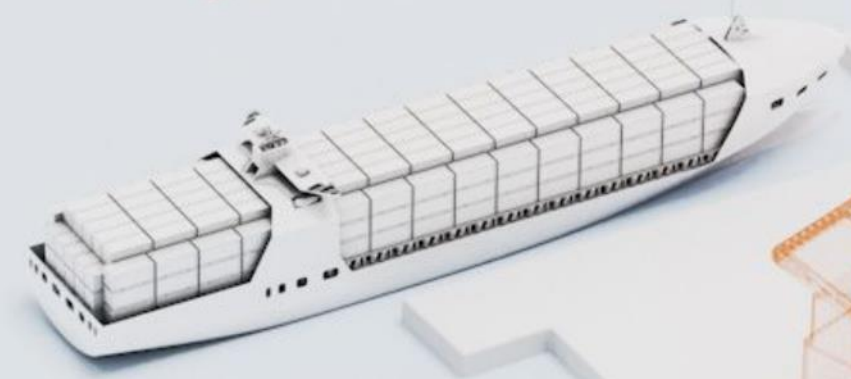
- Mitigates potential human errors in tight docking spaces

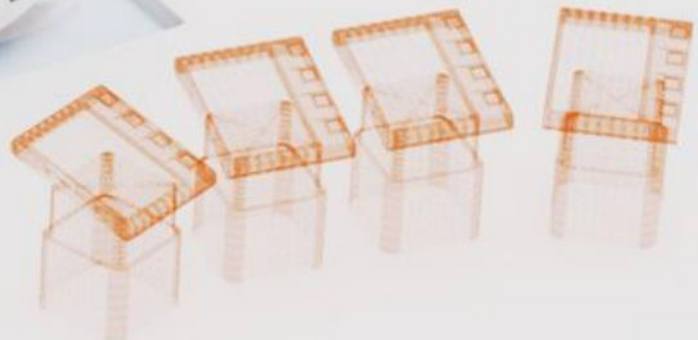
  减少紧密对接空间中的潜在人为错误



DECISION & LOGIC

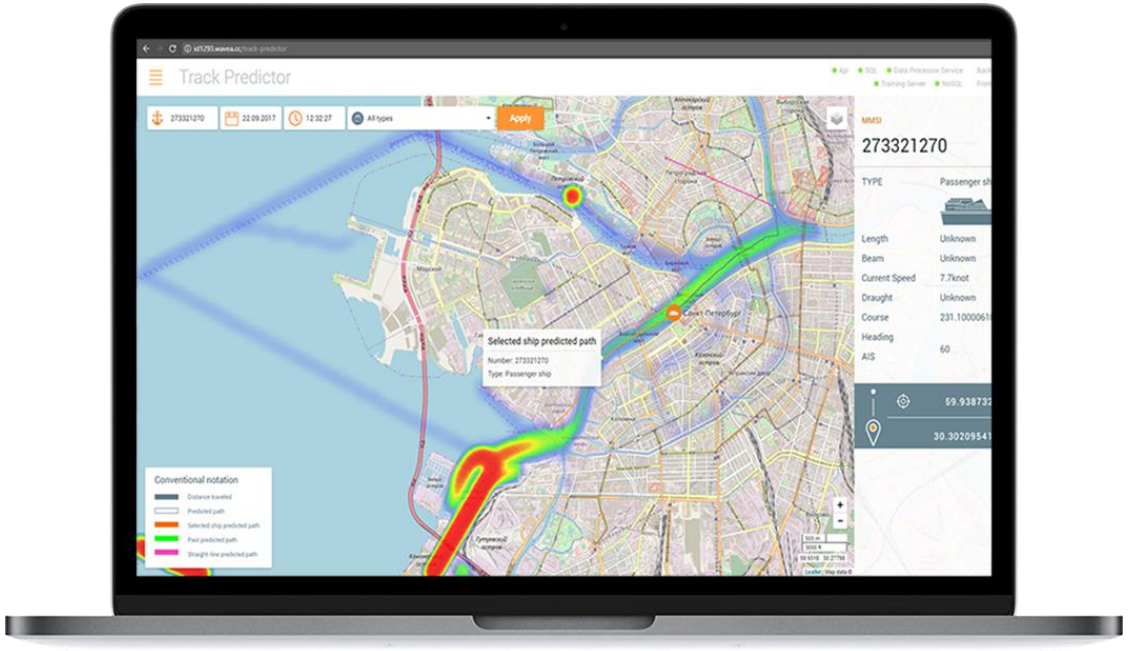






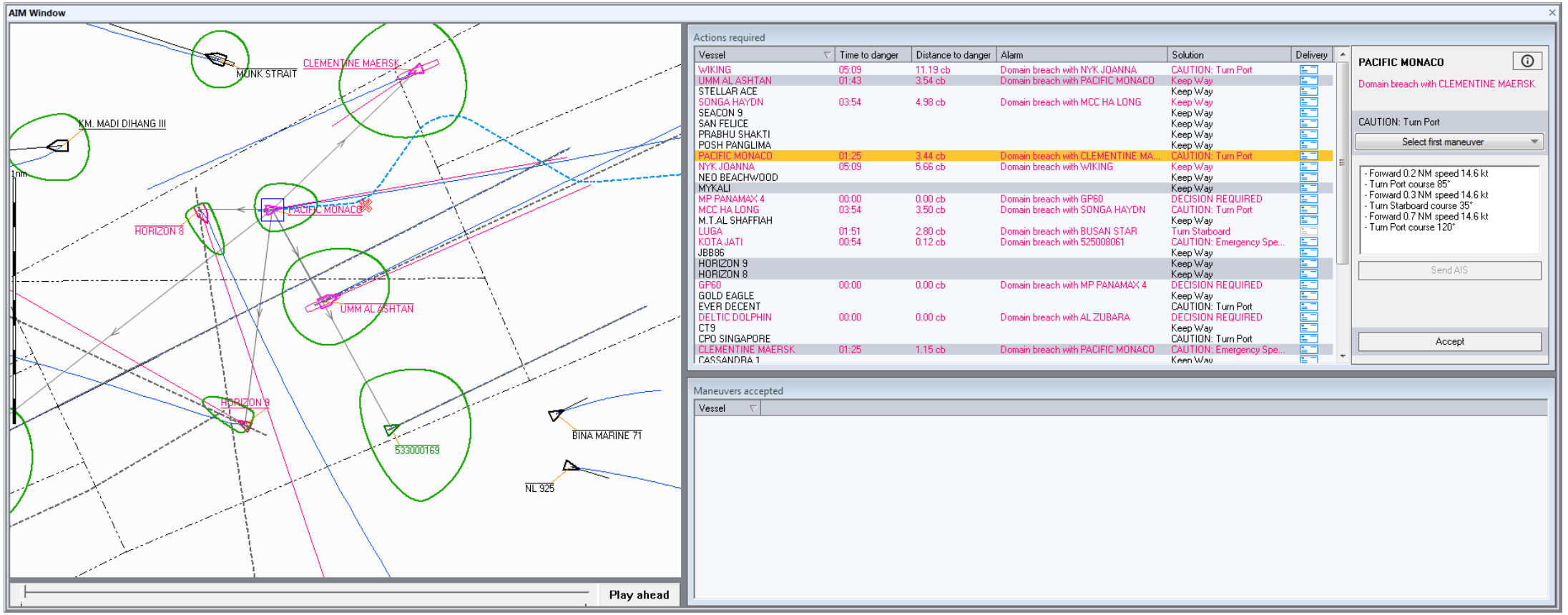
AIM – ADVANCED INTELLIGENT MANEUVERING

AIM is a path planning & track prediction AI designed to calculate the optimal route while accounting for collision risks detected by the situational awareness system



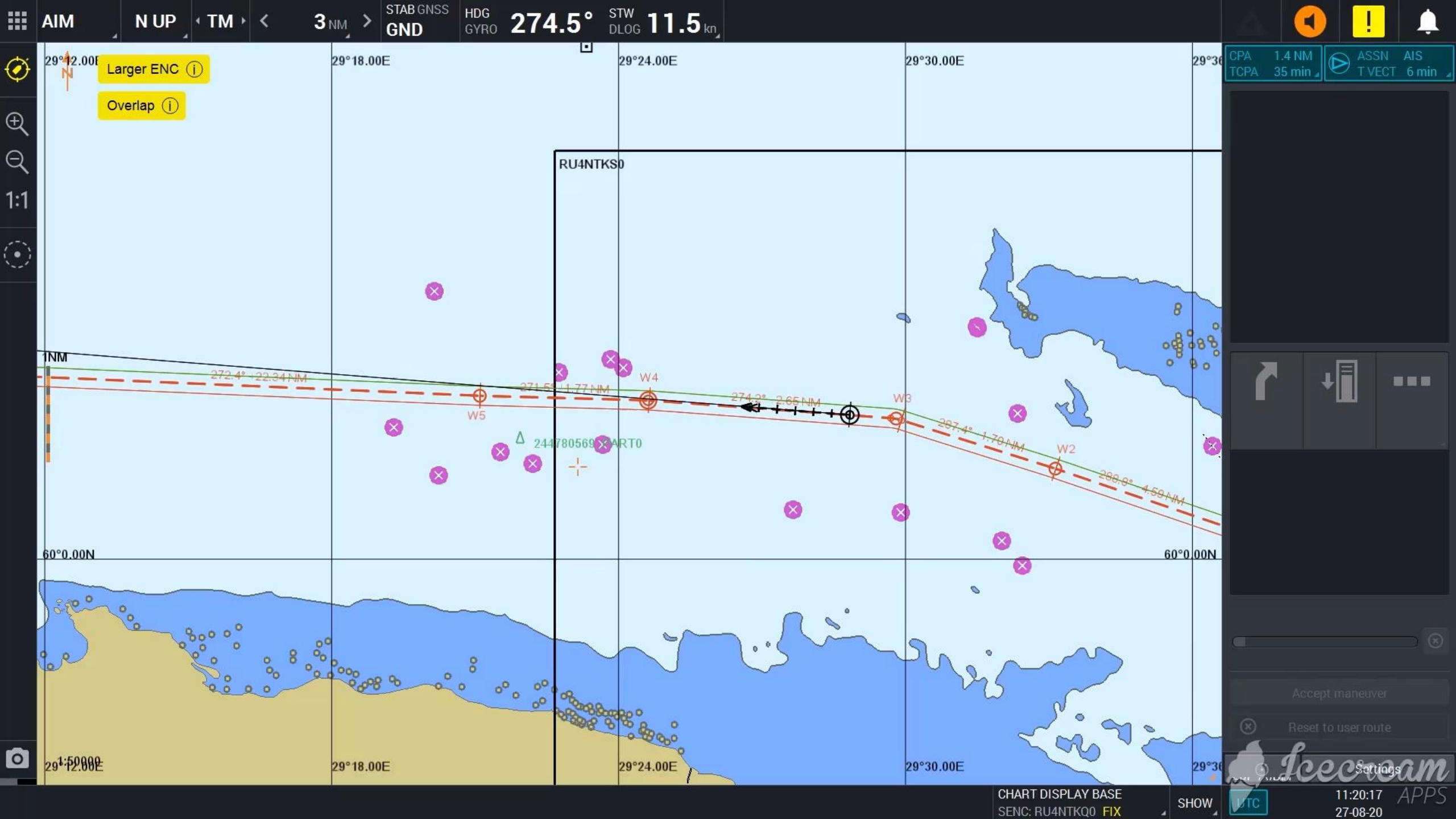
- 15-20 minutes reliable ship trajectory prediction for the area (98.5% accuracy)
- Recommendations of safe & efficient maneuvers to avoid collisions
- Prediction of potential collision and grounding events
- Identification of safety distance parameters applicable for the area

AIM – PATH PLANNING, COLREGS COMPLIANCE



COLREGs does not work by itself:

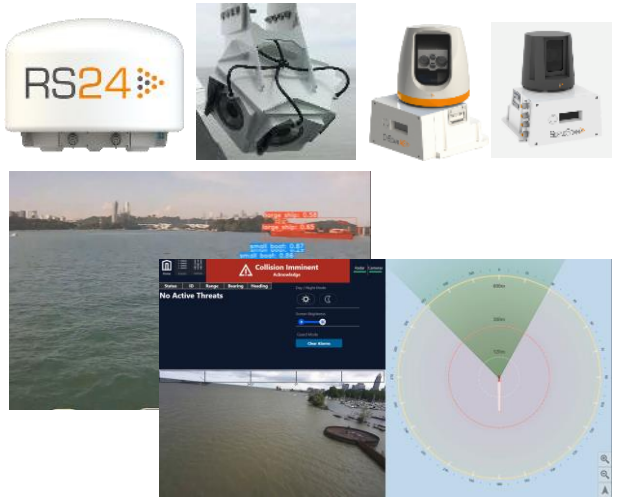
- System should identify safe distance based on statistical analysis for each navigation area.
- The system should raise an alert only when ships will soon be in dangerous situation according to their predicted tracks/planned routes and local maneuvering limits.
- Analysis and track calculation should include other dangers such as wave/wind dangers etc.
- That's significant step ahead compared to traditional "dead reckoning" and CPA/TCPA technique


AIM
N UP
TM
3 NM
STAB GNSS
GND
HDG
GYRO
274.5°
STW
DLOG
11.5 kn
CPA 1.4 NM
TCPA 35 min
ASSN AIS
T VECT 6 min
Larger ENC
Overlap
1:1
29°12.00E
29°18.00E
29°24.00E
29°30.00E
RU4NTKS0
W5
W4
W3
W2
272.4° 22.34 NM
271.5° 1.77 NM
274.2° 2.65 NM
287.4° 1.70 NM
288.8° 4.59 NM
60°0.00N
Accept maneuver
Reset to user route
Settings
1:50000
CHART DISPLAY BASE
SENC: RU4NTKQ0 FIX
SHOW
UTC
11:20:17
27-08-20

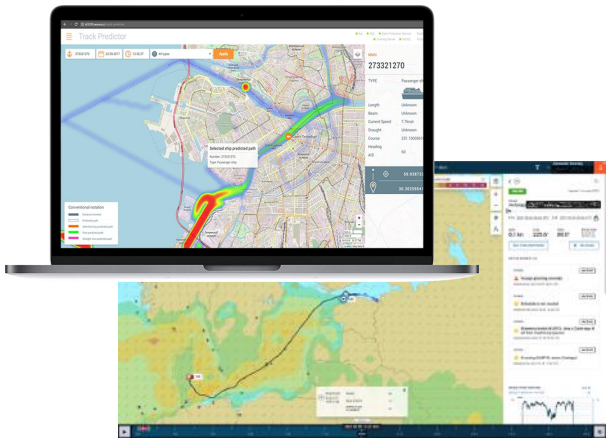
BUILDING BLOCKS OF AUTONOMY

APPLICATIONS

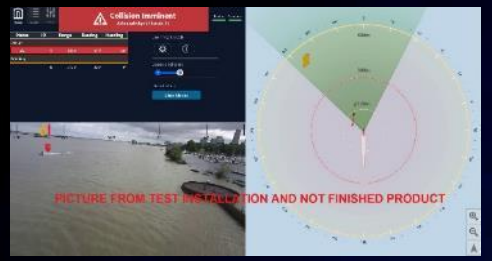
SITUATIONAL AWARENESS



DECISION & LOGIC



ACTION & CONTROL



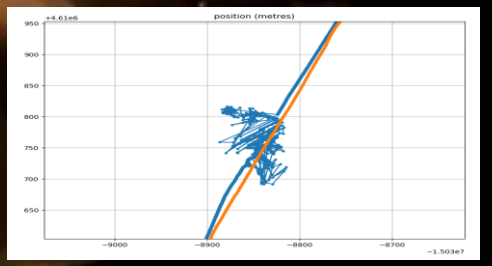
AutoLookout detects and tracks small watercraft by two modalities

SmartMove automatically drives the ship precisely along a route

AUTOMATED

SmartDock automatically docks your vessel – and undocks it once ready

SceneScan SLAM provides GNSS independent position in urban canyon



PULLING TOGETHER DIVERSE TECHNOLOGIES

Terminal
Transparent control
of logistical process

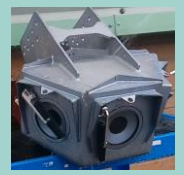
5G network

Vessel Traffic Service
Closes the loop from monitoring to
controlling unmanned ships

UNMANNED

EMISSION FREE

SPECS
(optical)

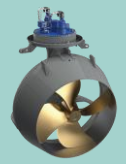


RS24
(high-res radar)

CyScan AS
(targeted laser)

SmartMove
(trajectory control)

Electric propulsion



ZES-pack
(battery)

Multi-modal near-field
object detection

GNSS independent
positioning

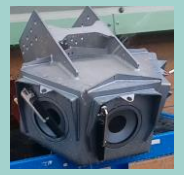
Electric drive train

TO BE BUILT ON PROVEN GROUND

UNMANNED

EMISSION FREE

SPECS
(optical)



RS24
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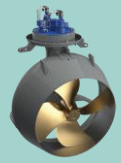


ZES-pack
(battery)

Multi-modal near-field object detection

GNSS independent positioning

Trajectory control

Electric drive train

Summer 2021
Bird's Eye View function on ULCS delivered by SPECS

2019
IntelliTug pioneers near-field situational awareness

2018
Ferry "Folgefonn" conducts world's first auto-docking in Norway

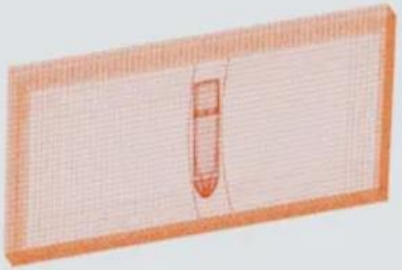
2020
Laker "American Courage" automatically negotiates the "Crooked River"

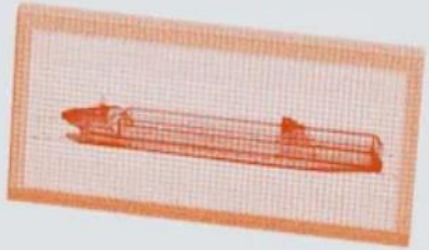
September 2021
First shipment of Heineken beer being delivered on an electric inland barge with modular and containerized battery

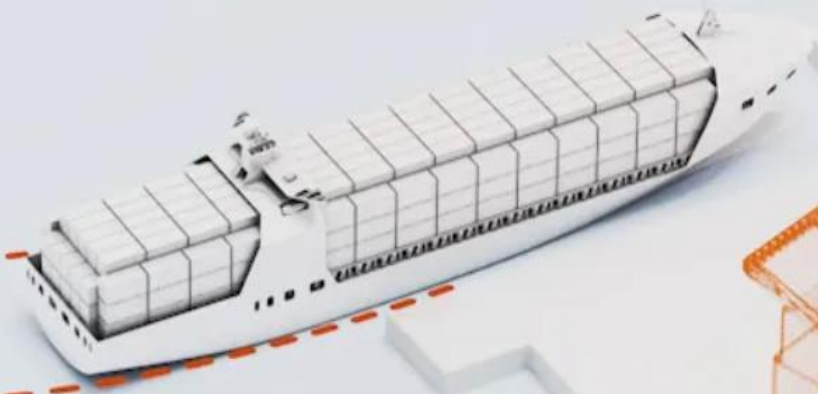
CO2 still left in here…

ONSHORE SOLUTIONS

FLEET OPERATIONS, SIMULATION & TRAINING, SHIP TRAFFIC CONTROL







HOW IT WORKS

WÄRTSILÄ

Onshore
Fleet Operations
CyberSecure

Scenario 3
3rd-Party ECDIS
CyberSecure

Scenario 2
Wärtsilä
Navi-Planner
CyberSecure

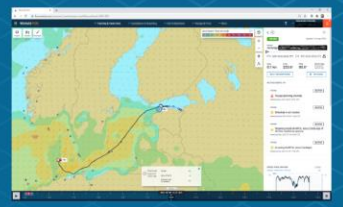
Scenario 1
Wärtsilä ECDIS
CyberSecure

Port
CyberSecure

RTA
ETA
RTA
ETA

Wärtsilä Navi-Port
JIT Solution

Fleet Operations Solution



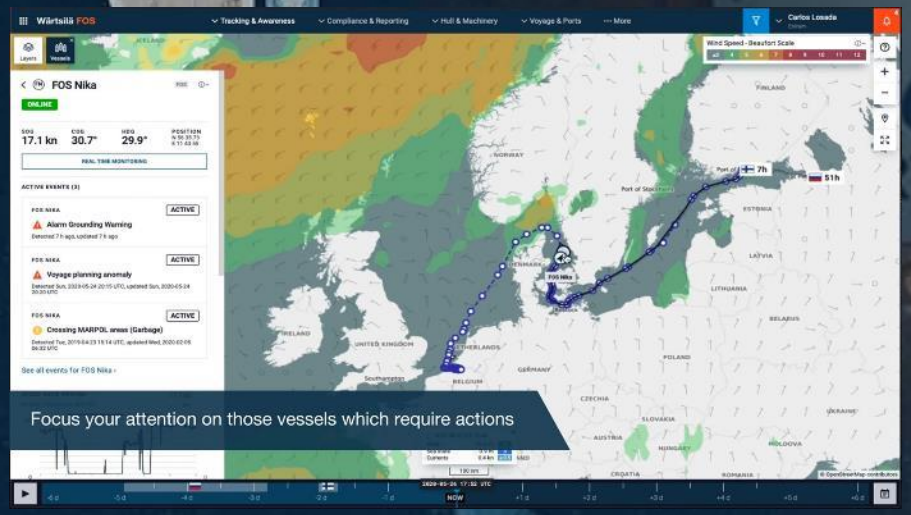
Planning Station

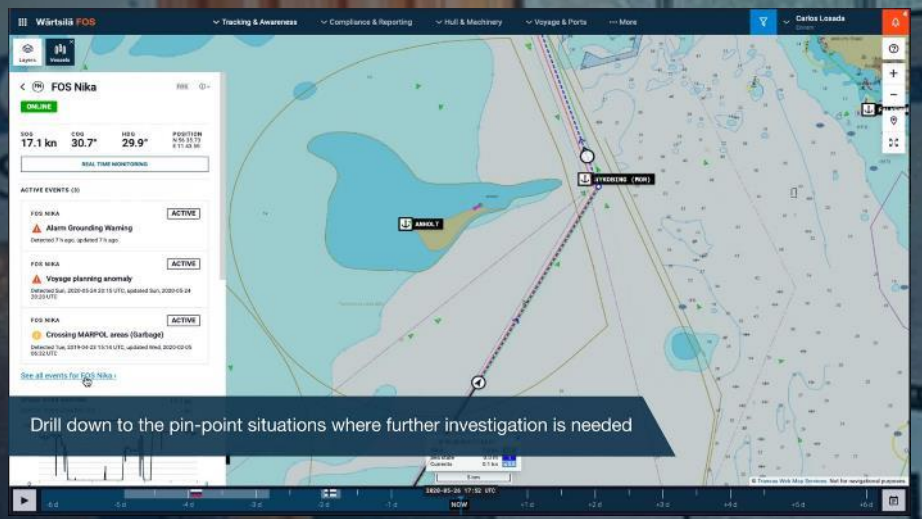
Navi-Port

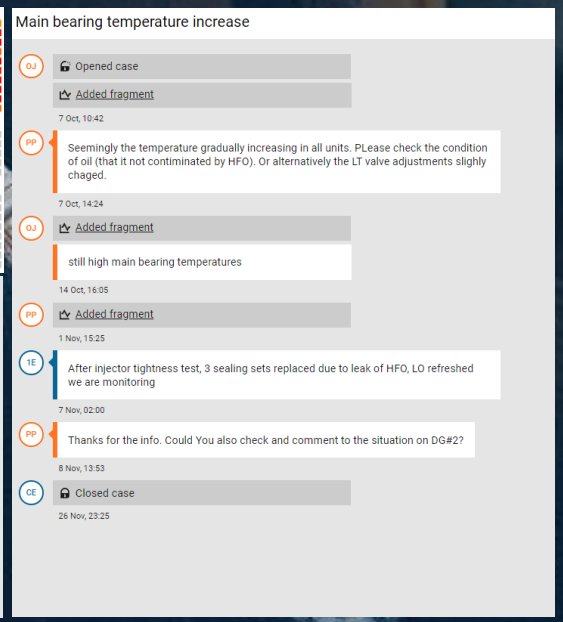
FLEET OPERATIONS AND MONITORING

- Fleet Operation Solution
- Connected Automation & condition-based monitoring
- Digital twinning

FLEET OPERATIONS AND MONITORING



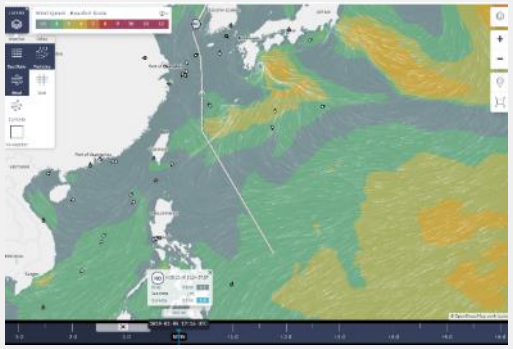




WÄRTSILÄ FLEET OPTIMISATION SOLUTION (FOS) FOR REMOTE MONITORING

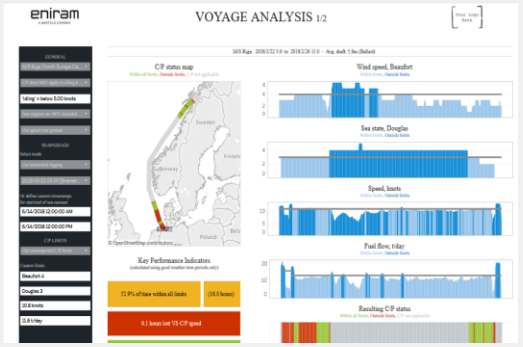
Tracking & Awareness

Full transparency of navigation, i.e. for emergency response. Real time and predictive situation awareness



Compliance & Reporting

Ensuring Charter Party and Environmental compliance (e.g. MRV)



Voyage & Ports

Optimize voyage and speed behaviour as well as port stays

Engine & Hull

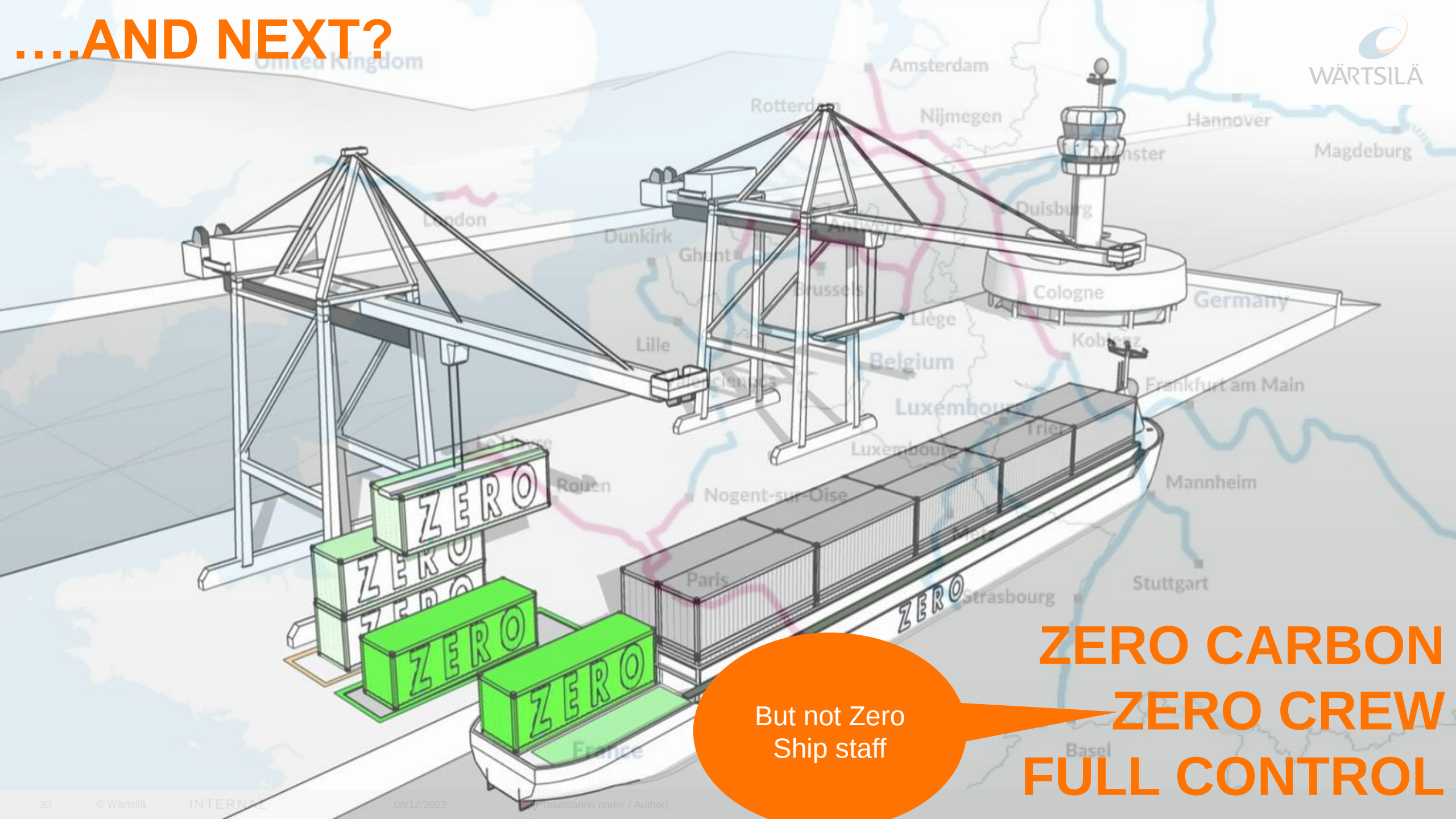
Optimize hull, propeller and engine condition as well as engine usage

Onshore solutions and training

REMOTE PILOTAGE AND DIGITAL TWINNING

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

….AND NEXT?



ZERO CARBON
ZERO CREW
FULL CONTROL

TRAINING & SIMULATIONS

TOMORROWS SEAFARER LEARNS IN A DIFFERENT WAY

- Digital Natives
- Expect technology in learning
- Graphical and bite-sized
- Crave autonomy in learning
  - Self paced
  - Self directed
  - With freedom of how the learn
  - Interactive (not passive)
- We must allow our user to utilize modern blended learning techniques that appeal to generation Z

SMART REALITIES – SR/XR/VR/AR

SMART REALITIES

are an important extension of the Wärtsilä Smart Simulation platform, with several Extended Realities Proof of Concept projects in progress

TECHNOLOGY

will drive future immersive applications and regulations will have to adapt

REALISM

Core mathematical, physical and hydrodynamic modelling will still be critical

CLOUD SIMULATION

- Training solutions through cloud based simulation
- Instructor led classes or student led instruction at their preferred pace
- Training anywhere, anytime, and ‘on demand’ via a browser
- Connection to Learning Management System/s

Bring in Transparency (stake holders see same information),
Integrated Decisions (stake holders including shipstaff),
Break Silos - Integrated Systems
Synergize Ecosystem,

LET US HARNESS THE DIGITAL TRANSFORMATION AND MOVE WITH THE CHANGE

THANK YOU!