# Unlocking Maritime Efficiency with AI-Powered Vessel & Voyage Optimisation

Christian Nicolas Treu

Danelec

# Speaker at a Glance

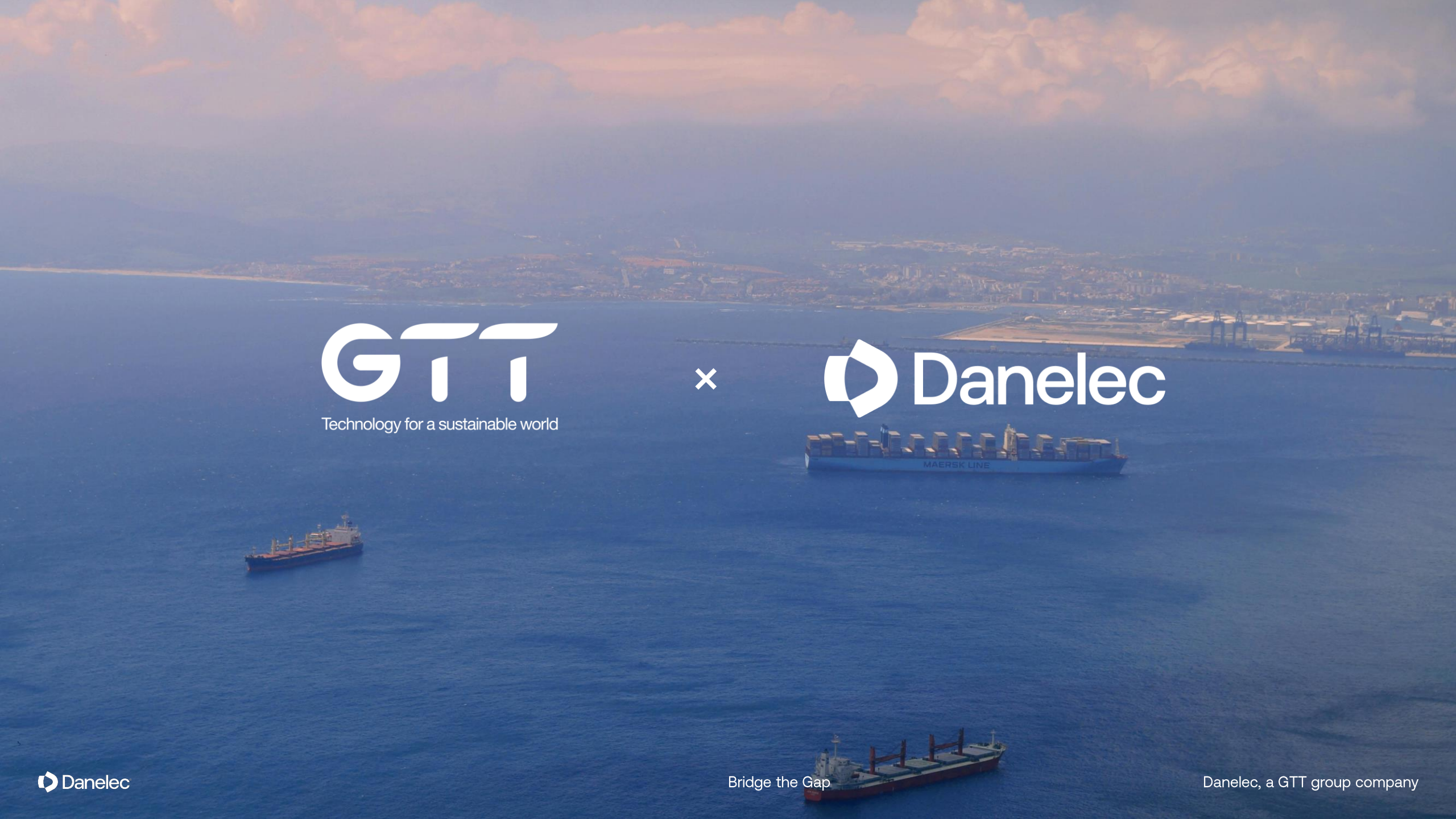
**Christian Treu**
Vice President, Revenue

Christian Treu brings 20 years in maritime and software industries.

Today, Christian is heading up the commercial ship performance teams at Danelec.

Background sailing in the Danish Navy.

Advisory board on Shipping and trade programme at Copenhagen Business School


GTT
Technology for a sustainable world
×
Danelec
MAERSK LINE

# GTT at a Glance

Our mission is to conceive cutting-edge technological solutions for an improved energy efficiency. We bring our passion for innovation and our technical excellence to our customers, in order to meet their transformation challenges. The GTT teams are the cornerstone of this mission. Committed and united, we are determined to contribute to inventing a sustainable world.

A French technology and engineering company with more than 60 years of experience in the design of decarbonisation technologies

1st place of mid size companies for patent applicants at the INPI

**CORE BUSINESS**

**Further reducing LNGC $CO_2$ footprint**
Enabling better energy efficiency and reducing vessel construction & operating costs

- Improvement of containment system performance
- GTT Next1
- Efficool
- 200k Slow Steaming LNGc design

**LNG AS FUEL**

**Offering the best technologies for alternative fuels**
Enabling decarbonisation of the maritime industry, address new vessel segments

- Recycool
- Onboard and Onshore Carbon Capture
- VLCC
- PCTC

**DIGITAL SOLUTIONS**

**Designing new digital solutions dedicated to the maritime industry**
Offering cutting-edge monitoring & optimising solutions

- Weather routing
- Maintenance optimisation solution
- Emission measurement
- Performance optimisation solution

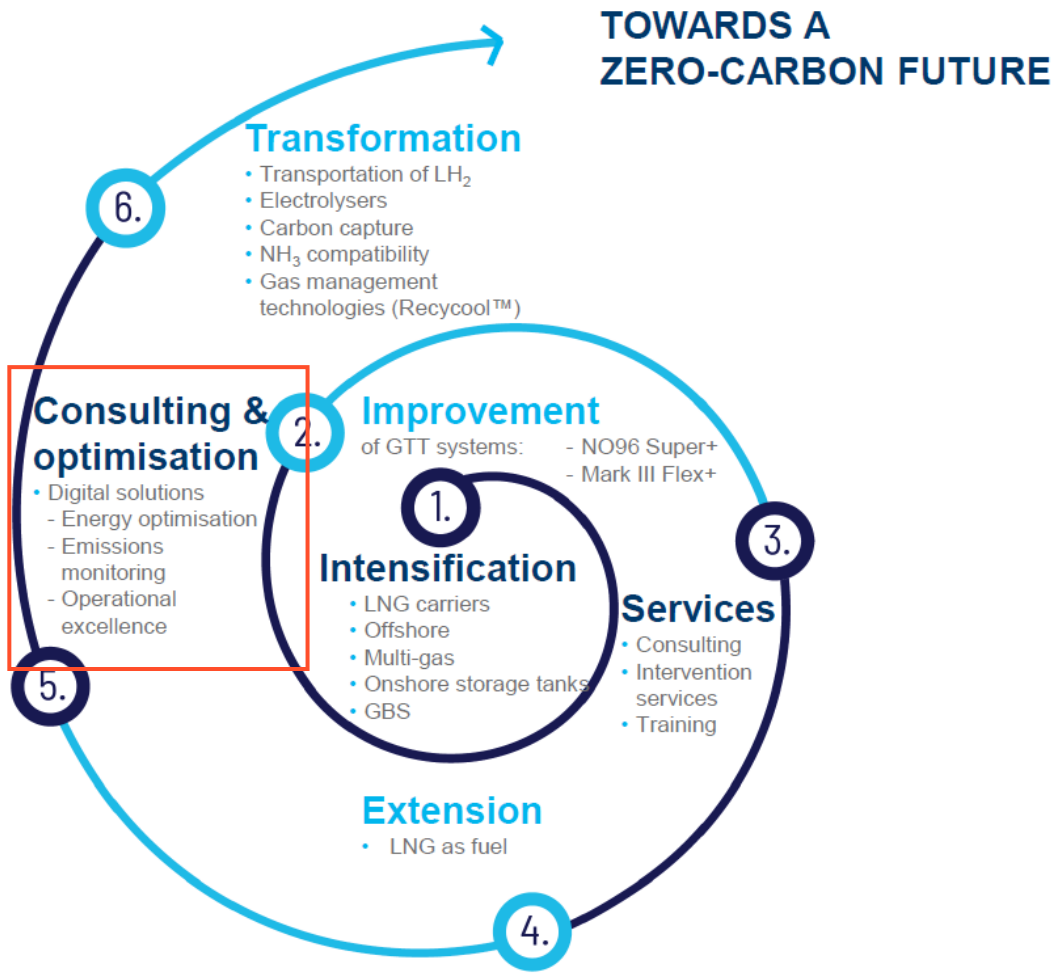
**ZERO CARBON SOLUTIONS**

**Preparing today the solutions of tomorrow**
Enabling the evolution of the energy mix

- LH2 carrier basic design
- $LH_2$ cargo containment system
- $NH_3$ storage and transportation
- Electrolysers

Key figures (2025) → Revenue: 861 M€ / 1100 Employees

# The Digital Activity is Part of GTT Strategic Roadmap




GTT's ambition is to become a leading player in digital technology, a vital tool in the decarbonisation of the maritime industry.

ascenz marorka  Danelec  Vessel Performance Solutions

# Digital Business Unit at a Glance

Danelec®

+

ascenz marorka

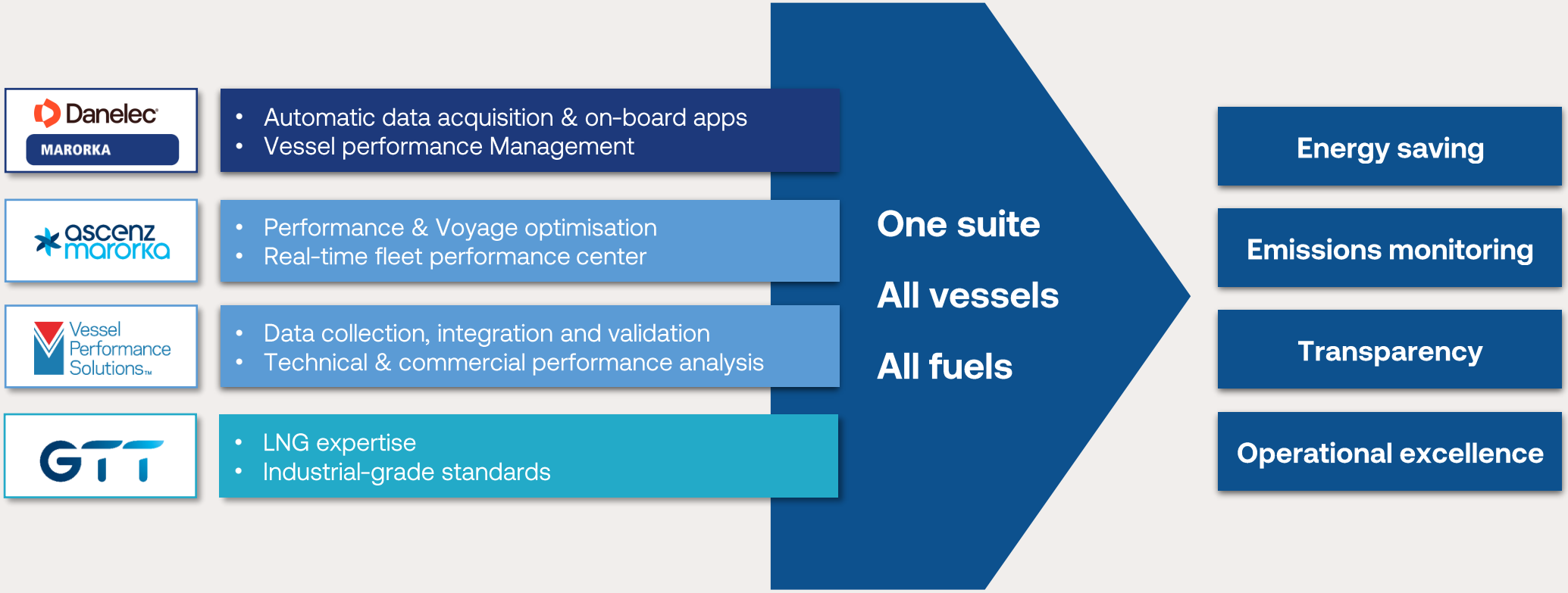
+

Vessel Performance Solutions™

| | |
|---|---|
| +30 | Years in business |
| +300 | Employees |
| +200 | Partners |
| +10% | Fuel Savings Delivered |
| +17,000 | Vessel Installed Base |
| +1,5 trillion | Onboard Data Points Captured in 2024 |

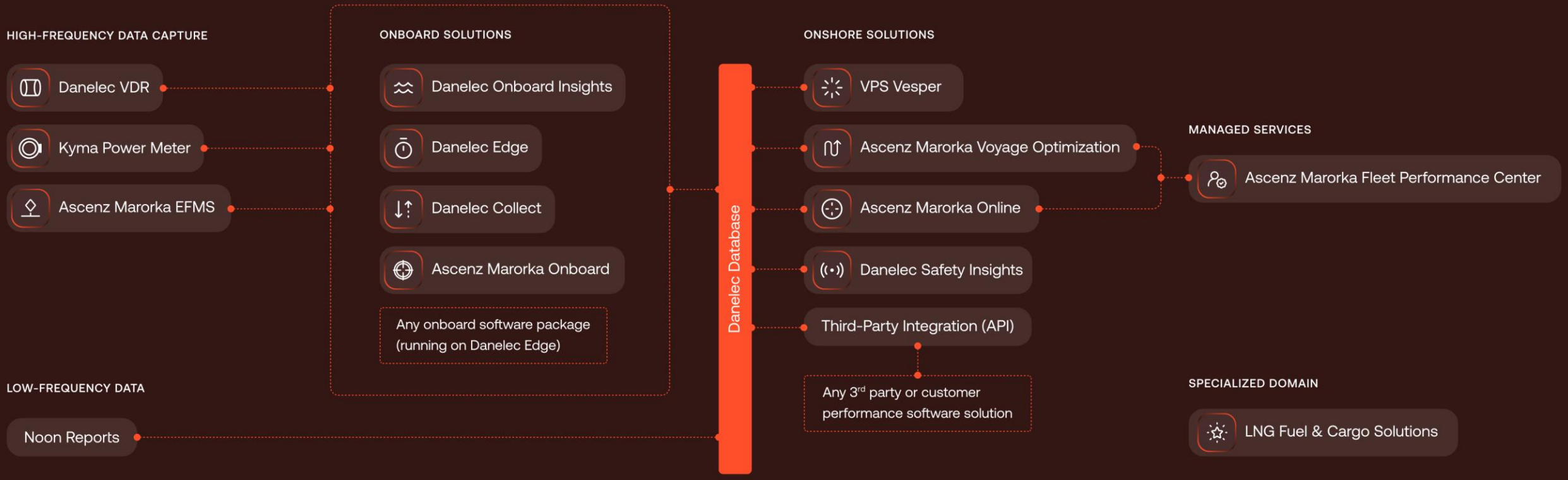
# Our Joint Value Proposition & Product Portfolio

## Future Ready Platform




- 4 main clusters: France, Denmark, Singapore, Greece
- Teams in Norway, Germany, China, India, Bulgaria, UAE, UK, USA, Mexico, Taiwan, Nigeria, Malaysia, Portugal

# Together, Danelec, Ascenz Marorka and Vessel Performance Solutions provide an integrated ecosystem that connects onboard data capture, vessel performance analytics and voyage optimization.



# One ecosystem. Every insight. Zero blind spots.

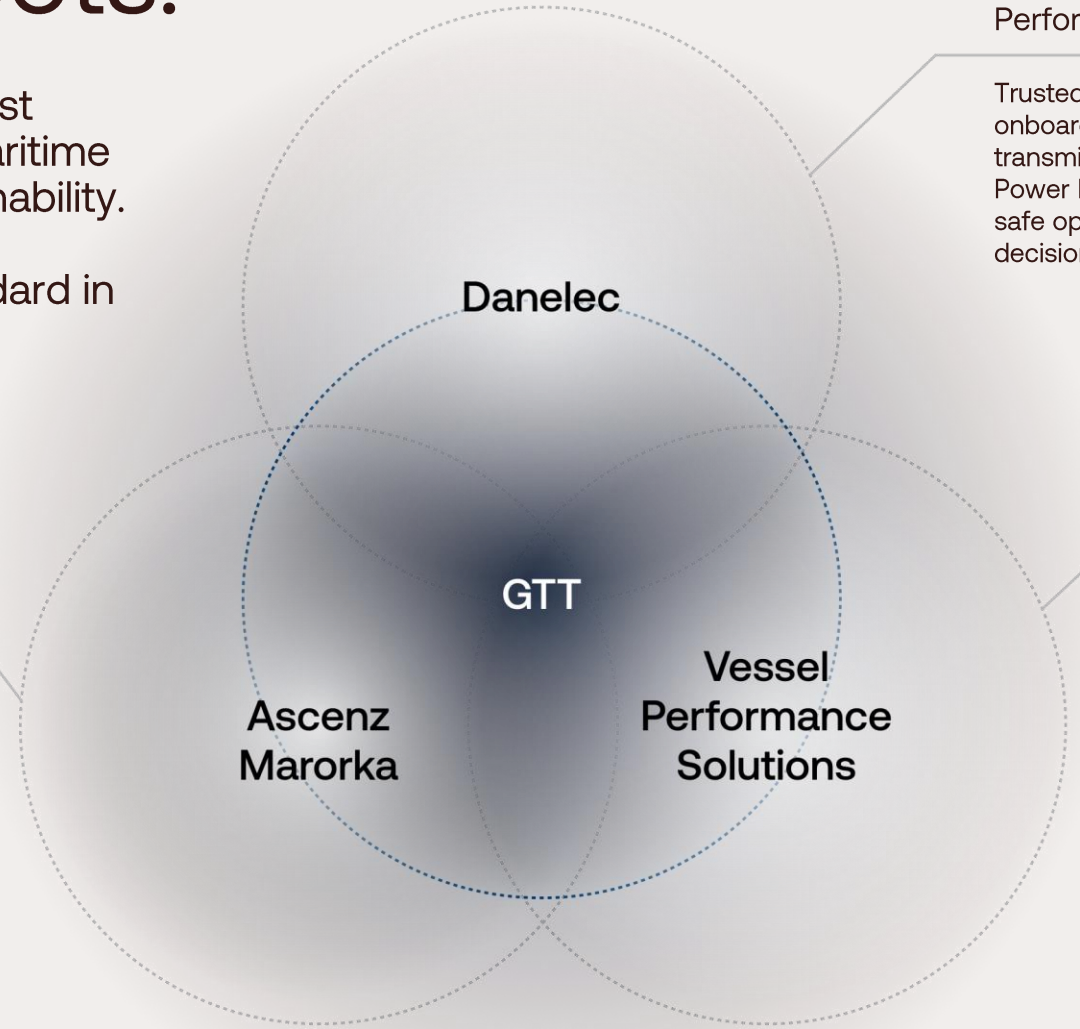
Uniting to deliver the world's most advanced digital platform for maritime safety, performance, and sustainability.

It's the beginning of a new standard in maritime digitalization.

## Danelec

Onboard Data Infrastructure, Safety & Performance Optimization

Trusted hardware and intelligent software solutions for onboard data capture, edge computing, and real-time transmission, including Voyage Data Recorders, Shaft Power Meters, and performance analytics platforms, enable safe operations, regulatory compliance, and smarter decisions at sea and ashore.




## Vessel Performance Solutions

Actionable Vessel Analytics & Compliance Reporting

Turning operational data into performance gains. Helping shipowners and operators optimize fuel efficiency, monitor engine and hull condition, benchmark voyages, and automate emissions compliance.

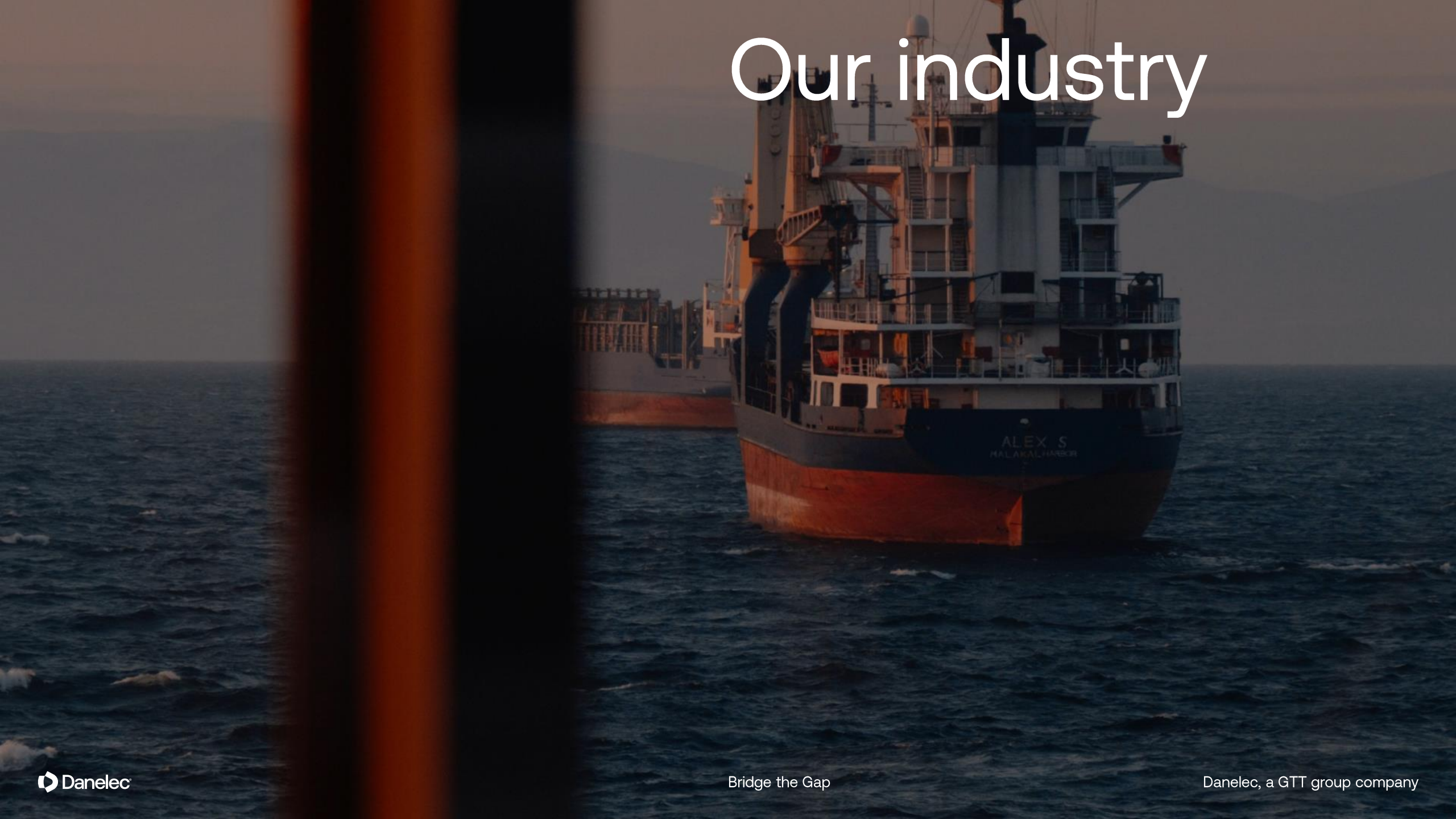
## Ascenz Marorka

Smart Shipping & Voyage Optimization

Advanced digital solutions to optimize voyage planning, fuel consumption, and cargo handling, especially for LNG and tanker segments. Smart Shipping platform combining real-time analytics, AI-driven route optimization, and predictive tools to improve performance, reduce emissions, and support data-driven decisions across the fleet.

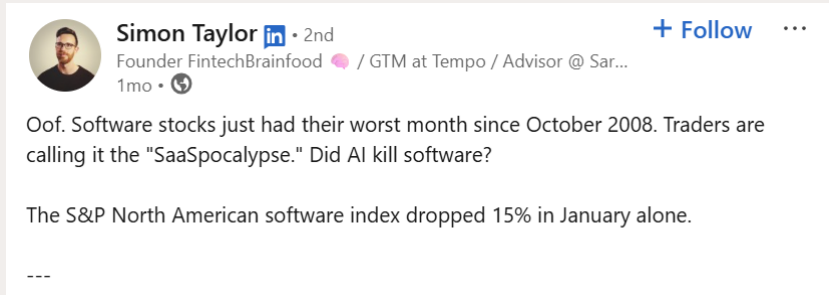
A combined installed base of solutions on over 17,000 vessels.

# Our industry



# Before discussing the maritime industry, let's first consider the software landscape.

Collapse in the software industry – also impacting our industry...



Something structural is happening to software. Not a product cycle. Not a platform shift in the usual sense.

**A deeper restructuring of who sits between data and action, and what that means for every company that has built on the assumption that the answer was a human.**

# Shipping 2026: The 4 Forces Reshaping the Industry

Four main topic that we will discuss in 2026.

## Decarbonization

- Fuel transition
- IMO 2050
- Carbon pricing

## Geopolitics

- Red Sea / Hormuz
- Routing risk
- Insurance costs

## Digital Ship Performance

- AI routing
- Fuel optimization
- Predictive maintenance

## Supply Chain Resilience

- Regional trade
- Port automation
- Reliable logistics

Bottom line: Data + low-carbon vessels will define the next shipping leaders

# Decarbonization

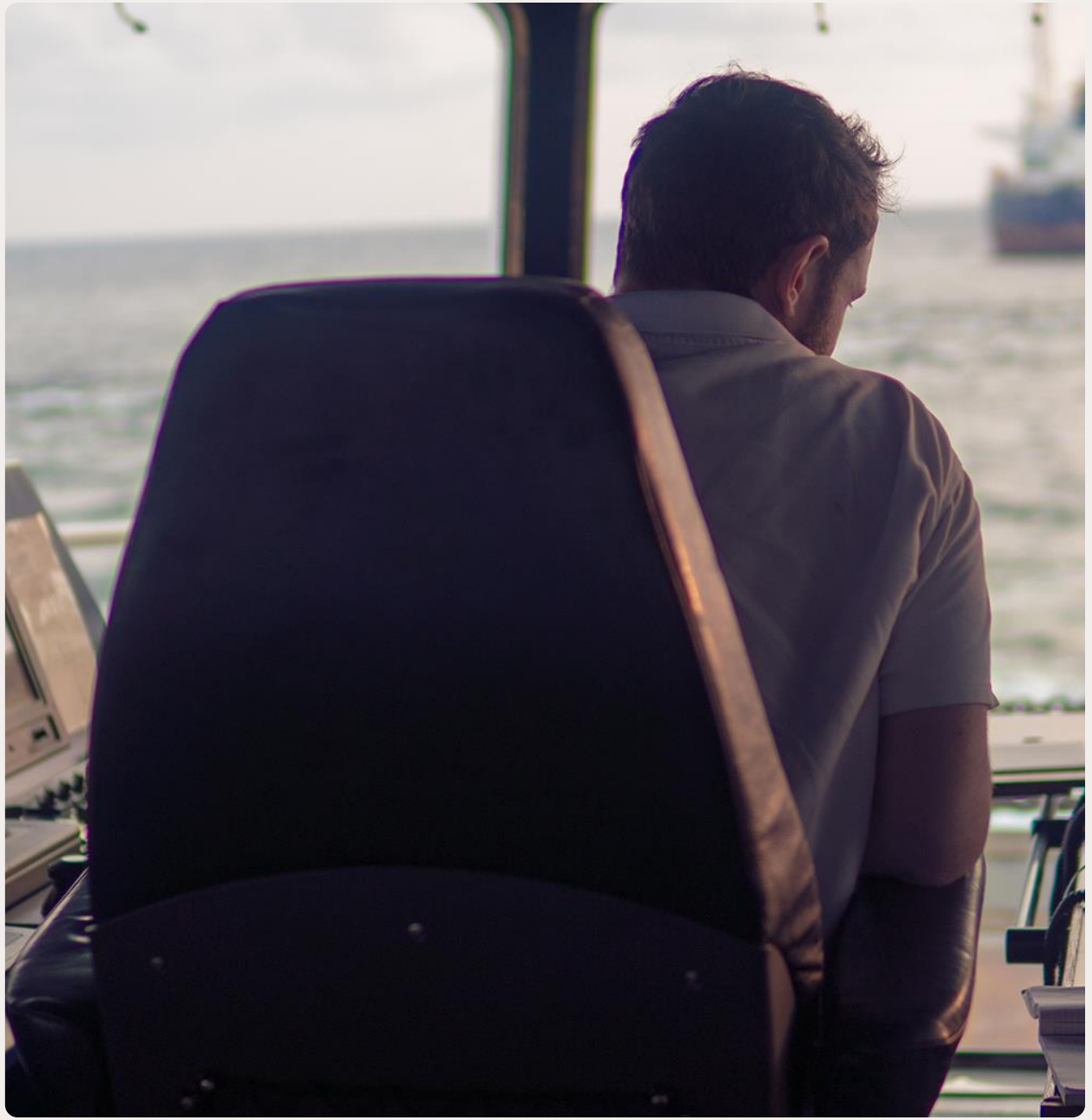
Shipping is under huge pressure to cut emissions.

- The **International Maritime Organization** targets net-zero shipping emissions by 2050.
- The European Union has already brought shipping into the **Emissions Trading System** (ETS), forcing operators to pay for carbon.
- Ships must now meet **Carbon Intensity Indicator** (CII) ratings or risk losing charter opportunities.
- This is forcing massive decisions:
- What fuel to use? (methanol, LNG, ammonia, hydrogen)
- Retrofit or scrap ships?
- Invest in dual-fuel engines?

The transition could require **over $1.4 trillion in industry investment by 2050***.

**For shipowners, fuel strategy and emissions performance now affect asset value and charter rates.**

*https://www.shipfinex.com/blog/maritime-industry-challenges?utm_source=chatgpt.com



# Geopolitics

Recent examples include:

- Attacks on tankers and container ships in the **Strait of Hormuz**
- Drone strikes targeting oil tankers
- Ships stranded or rerouted due to conflict

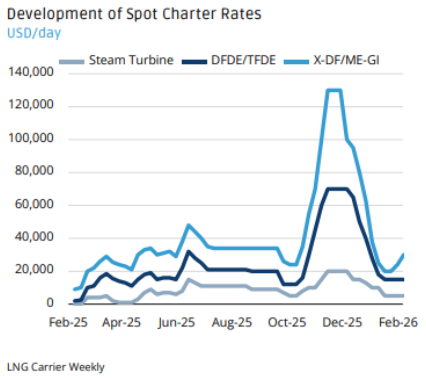
Around **20% of global oil trade** passes through Hormuz, so disruptions there can ripple across global freight markets.

**Security risk is now a core operational factor in routing and insurance.**

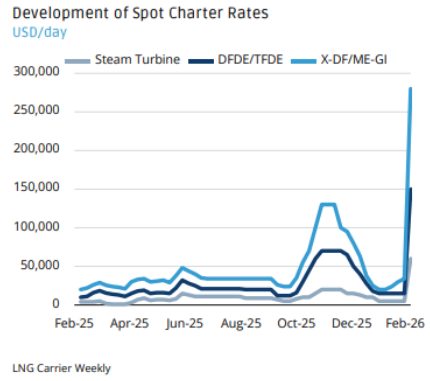
## Oil Prices


## Spot Price for LNG

### Week 8




### Week 10



# Supply Chain Resilience

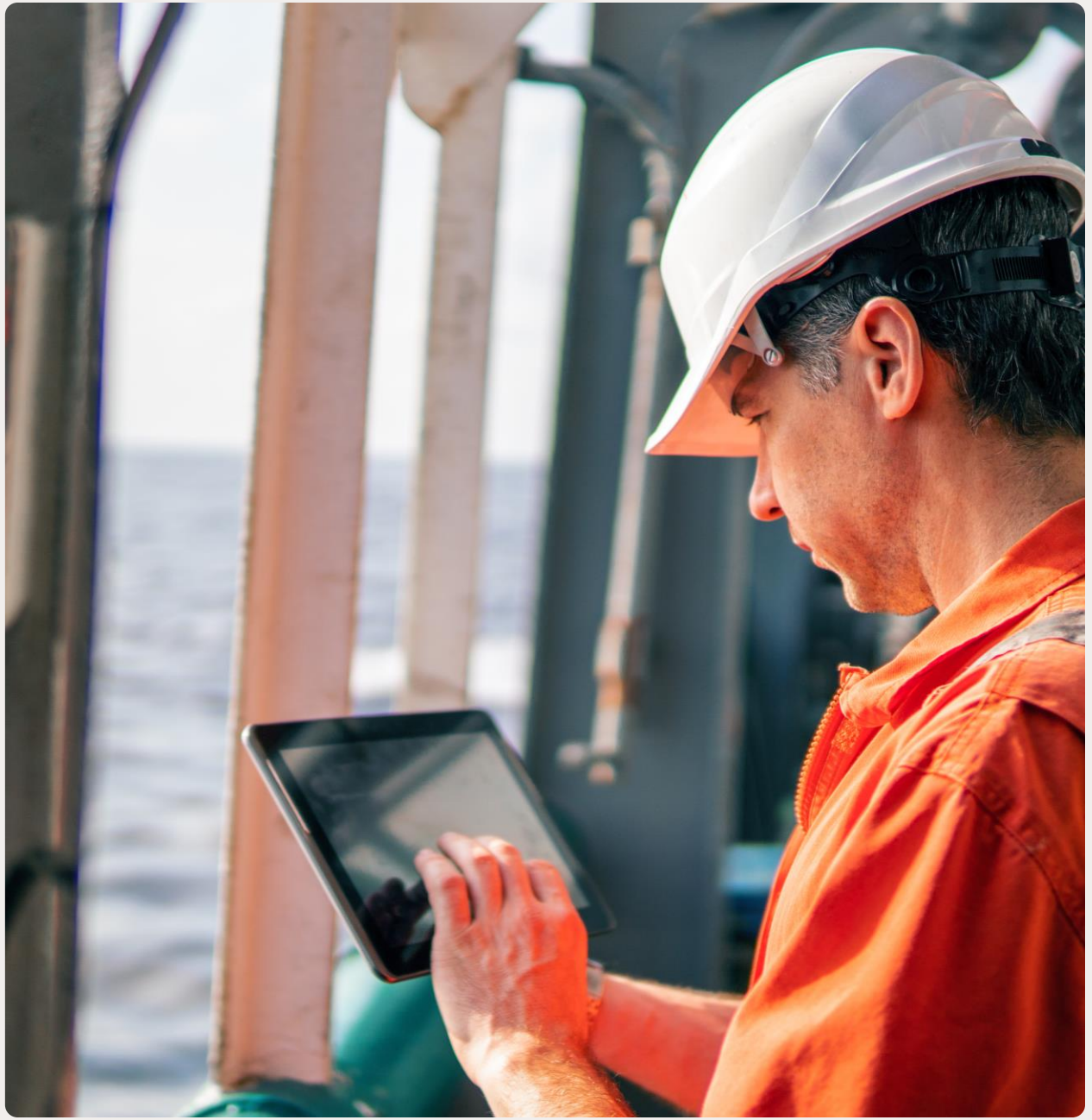
Ships are becoming data platforms.

Operators increasingly use:

- AI route optimization
- Real-time fuel and engine monitoring
- predictive maintenance
- electronic bills of lading
- smart port systems

These tools can **reduce fuel consumption by 5–10%** and improve turnaround times significantly.

**The competitive advantage is shifting toward data-driven operations.**

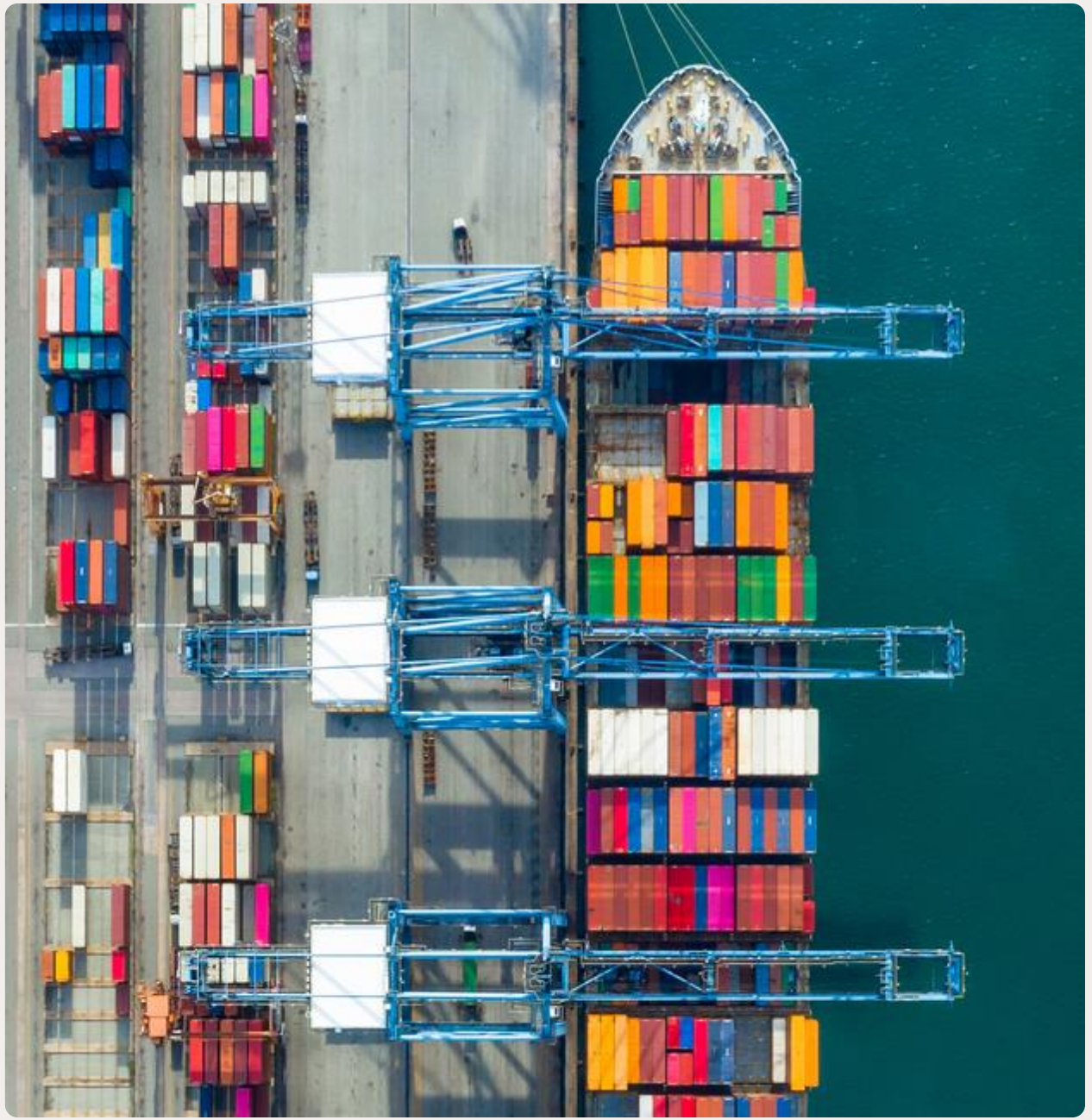


# Digital Ship Performance

- More regional manufacturing
- New shipping corridors

- AI-driven logistics planning
- Ports themselves are becoming **“smart logistics ecosystems”** with automation and robotics.

**The focus is no longer just cost, but reliability and resilience.**



# We Can Only Do Something About This...

## Decarbonization

- Fuel transition
- IMO 2050
- Carbon pricing

## Geopolitics

- Red Sea / Hormuz
- Routing risk
- Insurance costs

## Digital Ship Performance

- AI routing
- Fuel optimization
- Predictive maintenance

## Supply Chain Resilience

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Bottom line: Data + low-carbon vessels will define the next shipping leaders

# The Maritime Industry is Full of Promises

Fuel savings. Emissions reductions. Digital efficiency.
What's missing is provable impact at scale.

**SmartPropulsion: A Game Changer for Reducing Fuel & Ensuring Compliance**

**Engine Management System Promises 10% Fuel Savings**

**TotalEnergies adopts digital tools to cut fuel use and emissions**

Nicole Deslandes May 6, 2025 2 min read

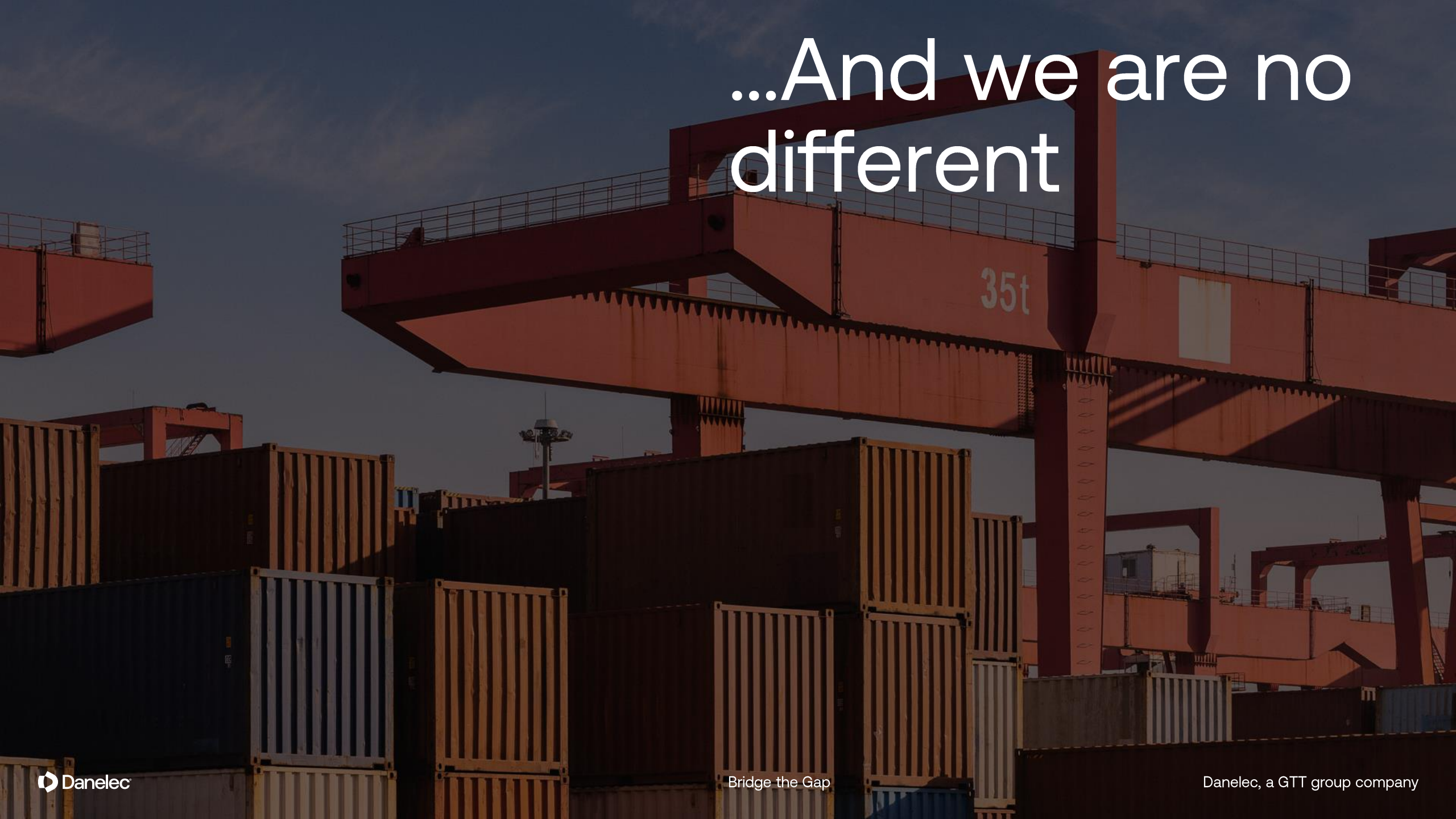
AI SYSTEM UPGRADED TO HELP SAVE FUEL AND CUT EMISSIONS

Jun 18, 2024 | Marine electronics & digitalisation news

....and the Market is Highly Saturated...

# +400 Solution Providers in the Performance Space

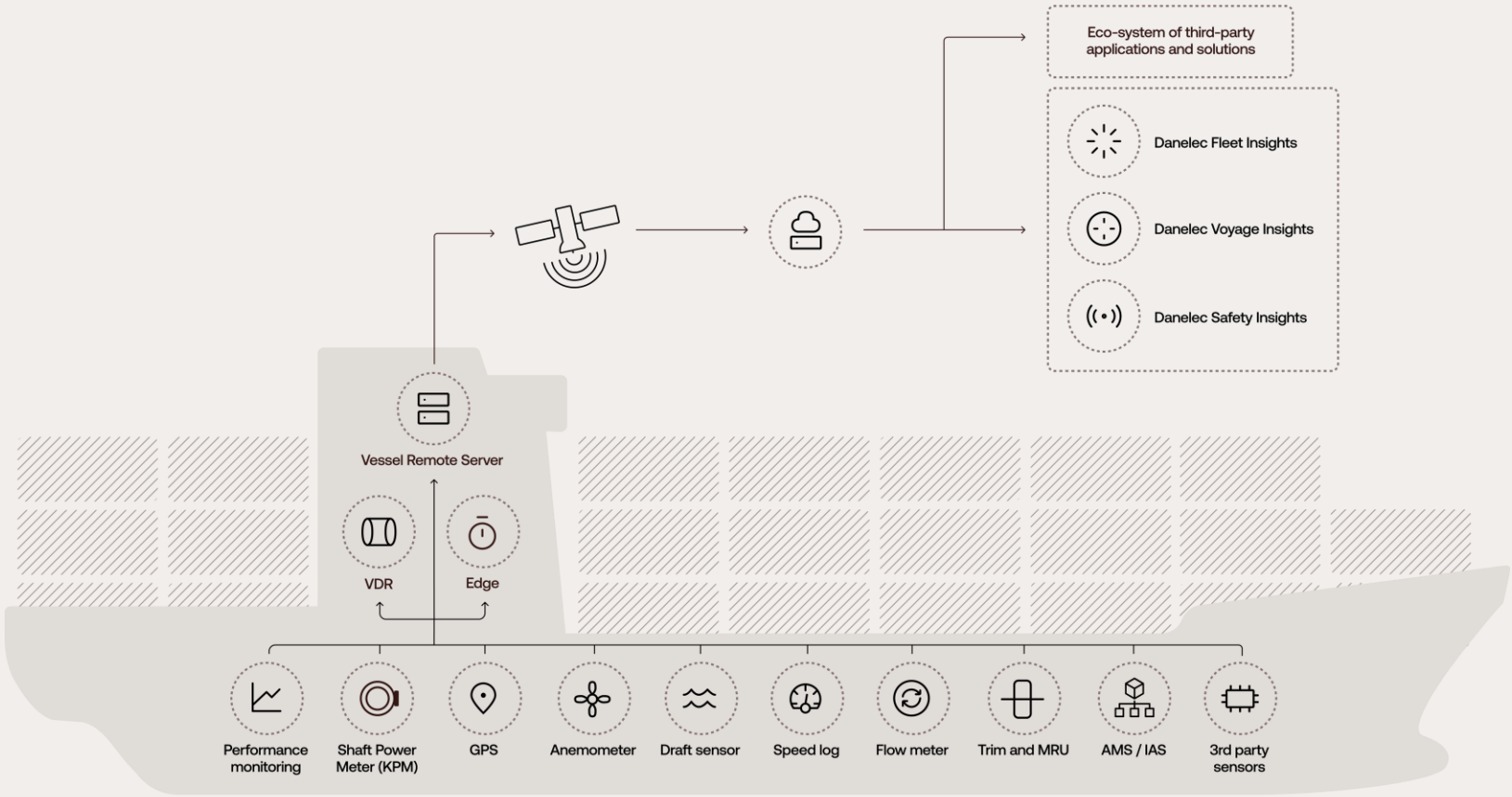
With +400 solution providers offering performance optimization tools — from fuel efficiency systems to data-driven voyage analytics — the maritime sector faces an increasingly crowded landscape.




# ...And we are no different

# Danelec Drives Deep Cost Reductions

Across all products, estimated annual savings of $237K* per ship of combined fuel and payroll costs.




| | |
|---|---|
| $120k | Technical Performance Optimization |
| $96k | Voyage Optimization |
| $3k | Emissions Compliance |
| $5k | Data Quality |
| $13k | Data Collection HFD / LFD |

*Key Assumptions:
1) Average annual vessel consumption is 6,020 MT as per MEPC-79-6-1 | 2) Fuel Cost assumption of $600 / MT | 3) Fleet Analyst Salary is assumed to be $57,233.50


...But we are different in one way

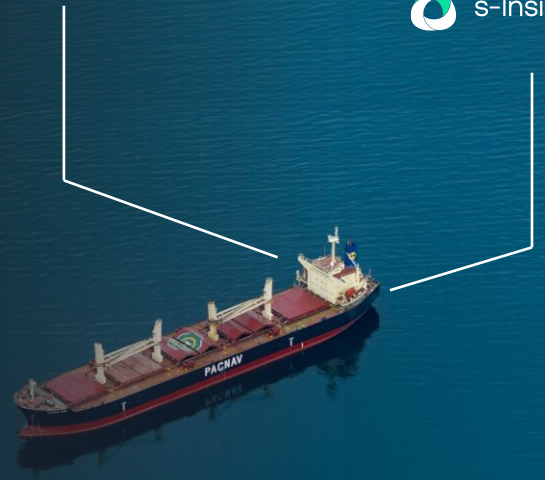
# We do not believe in silos and we cannot decarb the industry alone – we need to work together Especially in times of uncertainty...

NAVTOR

- St NavStation
- Re NavReporting
- Dl Digital Logbooks

StormGeo

- s-Routing
- s-Planner
- s-Insights




**Despite complexity of digital infrastructure...**

## The Average Commercial Vessel Runs 40-60 Digital Onboard Applications

A typical commercial vessel, relies on a wide array of onboard applications to ensure smooth operations, safety, and compliance with regulations. From the vast expanses of cargo ships to the complex equipment on LNG Carriers, these vessels are powered by a myriad of digital tools, each playing a crucial role in their journey across the oceans.

# Why

## A recent market study identified a change in ship owner preference

2020

Best-of-Breed Player

### Customer Feedback 2020

*I don't see that the platforms deliver the must have applications today. We are skeptical towards the broader position*

*Platforms and broader players are more expensive without adding more value to us*

*Only benefit of a platform is the common user face. However, this advantage is not big enough compared to using the best solution*

*We are skeptical towards becoming too reliant on a single vendor. We are essentially giving away a lot of power*

2024

Fully Integrated Player

### Customer Feedback 2024

*We want to consolidate as much as possible. These systems (energy efficiency) are very interlinked, and keeping them together reduces complexity and makes them easier to use*

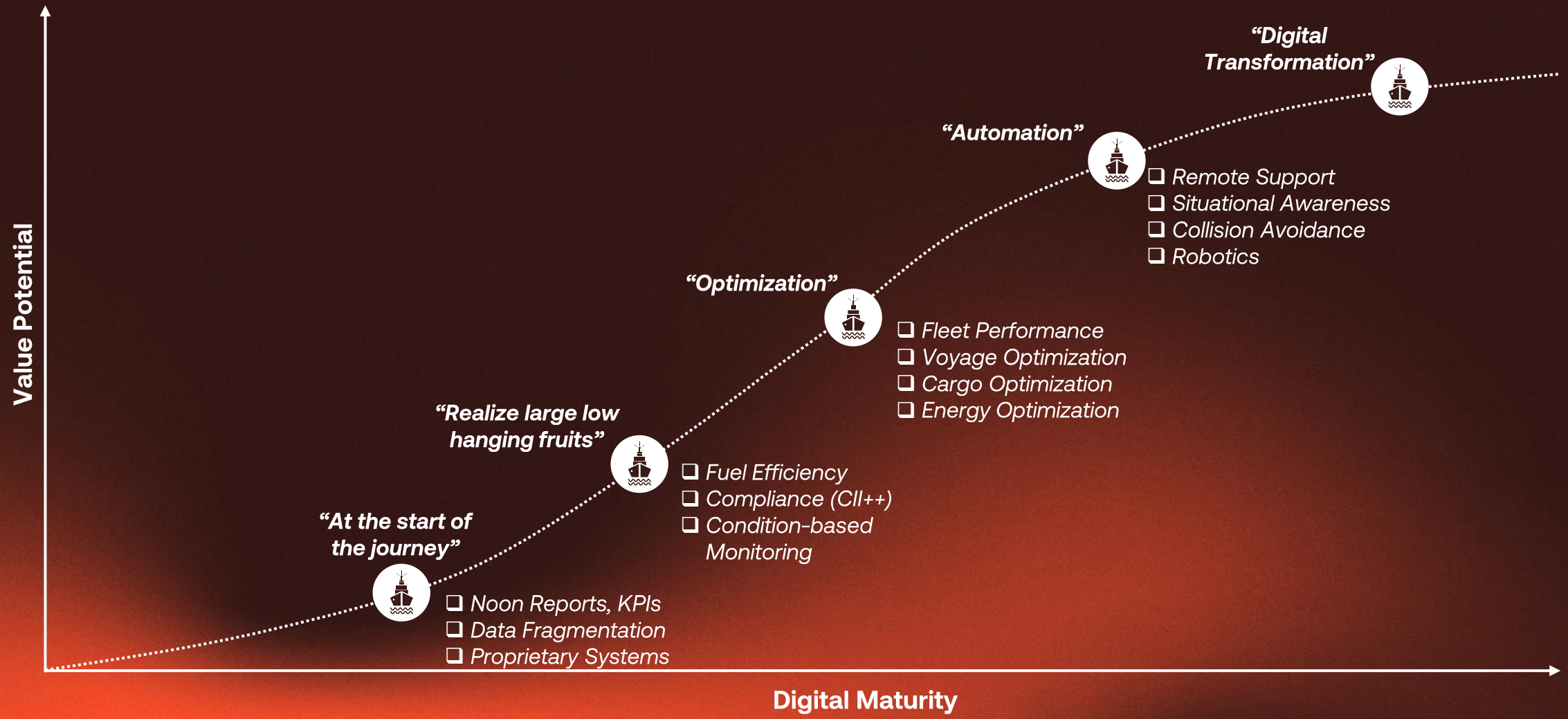
*The clear trend is that owners want one vendor covering everything.*

*Currently there are much talk about integrating this and many are doing so.*

*The vendor of the performance tools and voyage optimization should be the same as the systems are very interlinked. In a few years, everyone will look at "the full solution"*

# What ingredients can you work

# Digital Maturity Score



# How to get started

- Start with what you already have: noon reports
- Build trust through data quality improvements
- Progress step by step into sensor-based and high-frequency data
- Unlock advanced optimization and AI when ready

# How do we unlock Efficiency with AI-Powered Voyage Optimisation

# A Modern, State-of-the-art and Forward-looking Solution

Multi-objective and multi-criteria algorithms answering all use cases

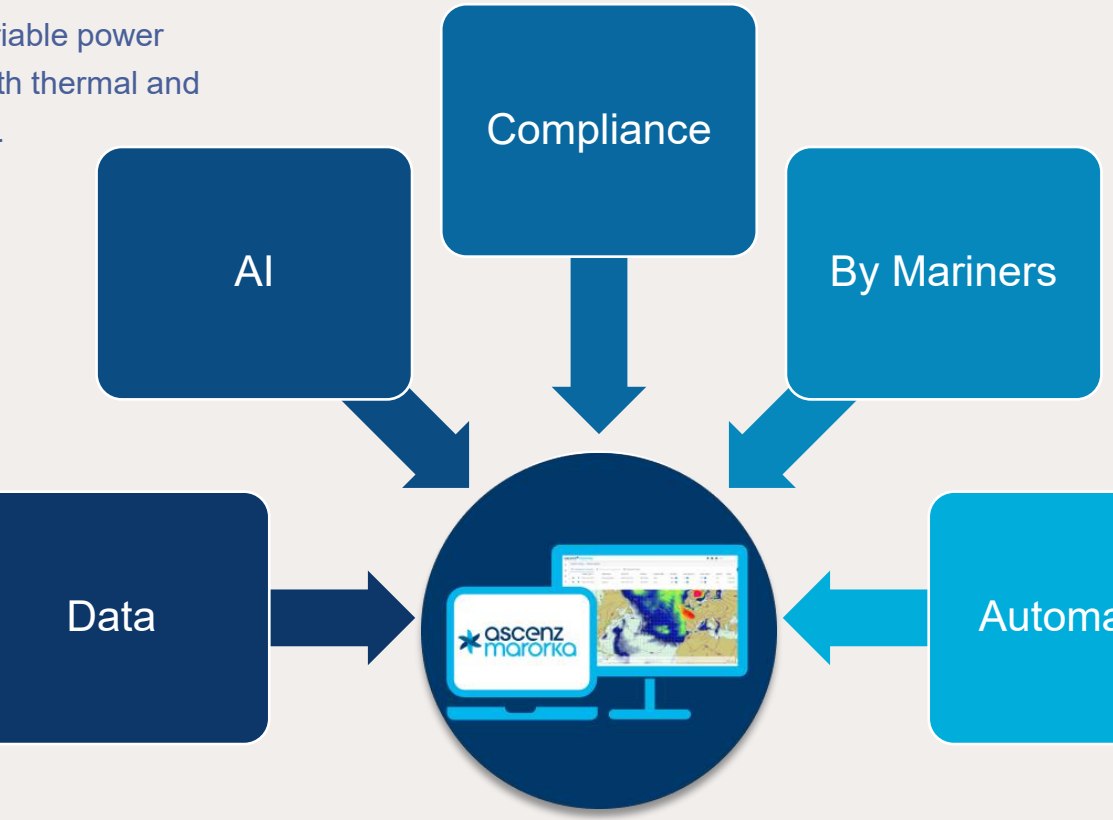
Constant and variable power algorithms for both thermal and wind propulsions.

Emissions-controlled area

CII and EU-ETS support

User experience designed by mariners, for mariners

Highly qualified service teams focusing on expertise, not low value repetitive tasks




Data, with high frequency data sources for weather and safety

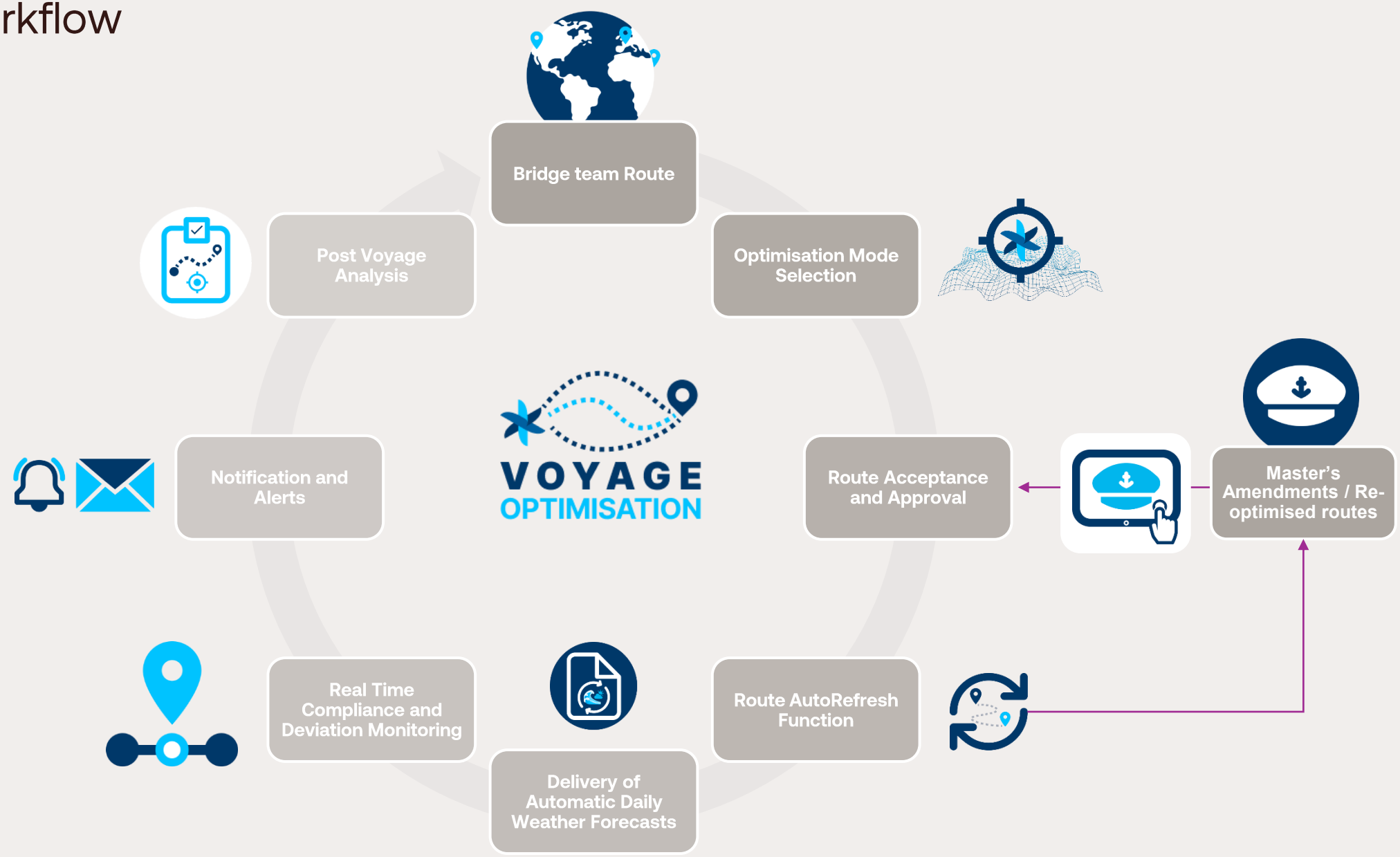
Weather modelling, with combined models

Ship modelling, with weather impact

Automation and cloud native

API ready

# Process Workflow



# Real-time Fleet Performance Centre

- Paris, Singapore, Vancouver shore-based services for a round-the-clock service
- Provides expert services to shipowners, charterers and ship managers on top of the Ascenz Marorka routing solution
- Team of seasoned mariners with extensive expertise in navigation, meteorology, vessel performance management, LNG operations and offshore operations ensuring a holistic approach to fleet optimisation
- 7/365 phone or email availability for Captain & Company assistance
- Officers available for training during Company's onboarding

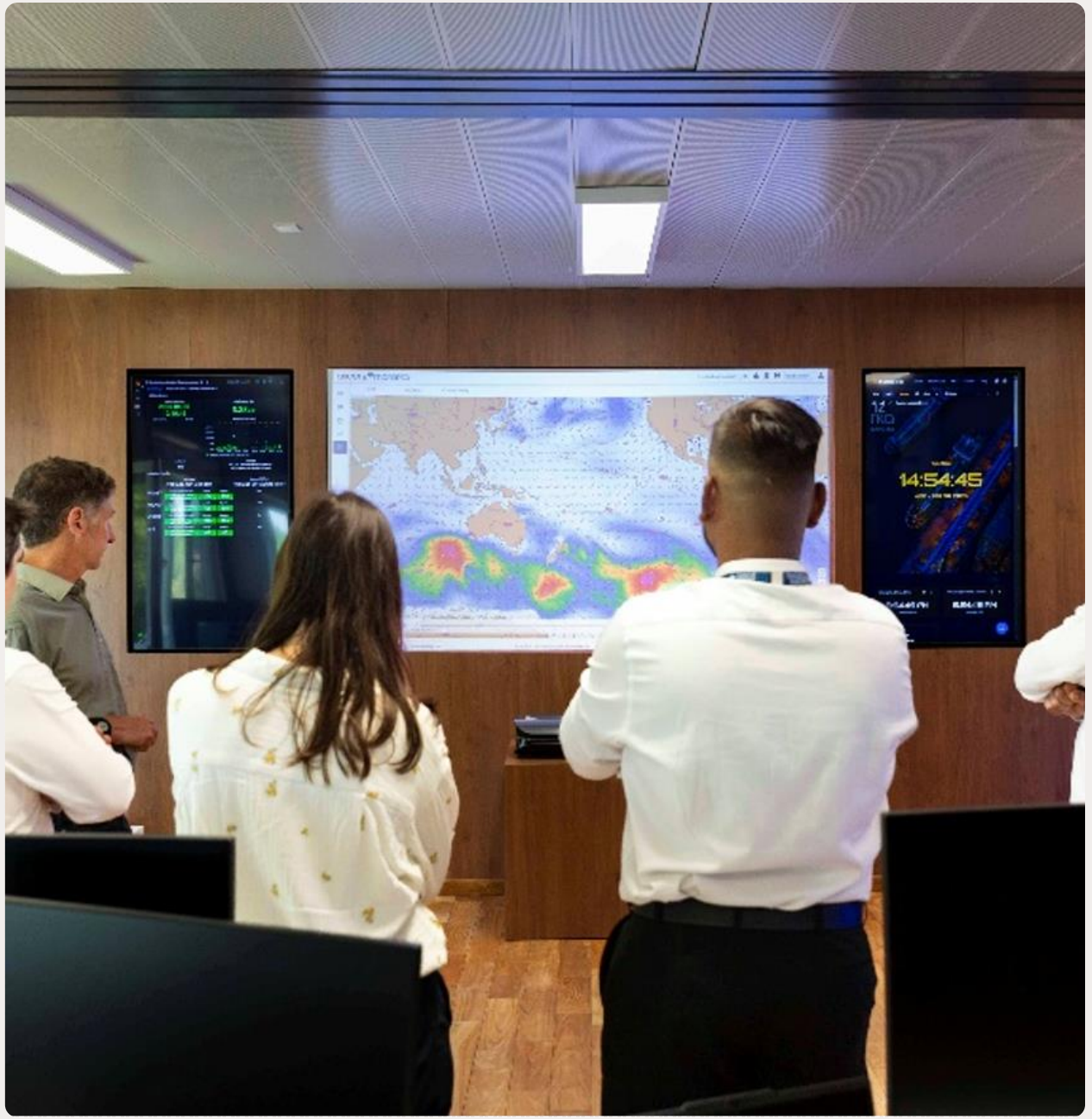

Navigation

Meteorology

Ship performance

LNG

Offshore



# Model Quality Assessment – How Danelec Works With Models

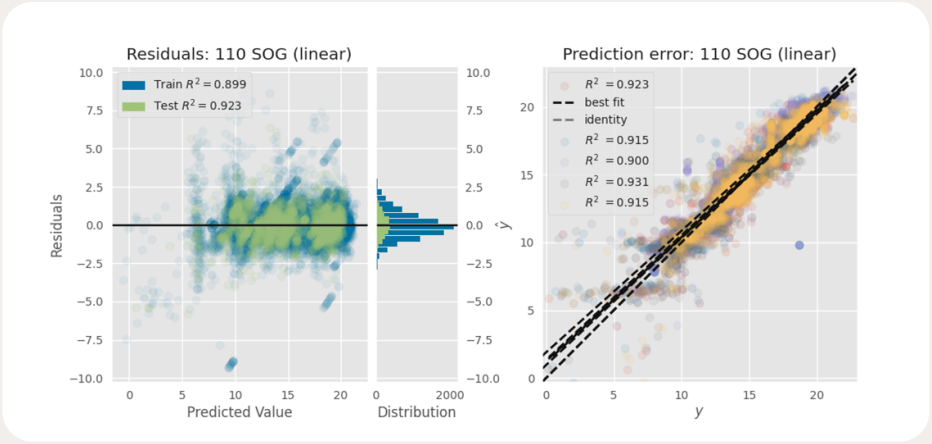
Historical data predictive accuracy

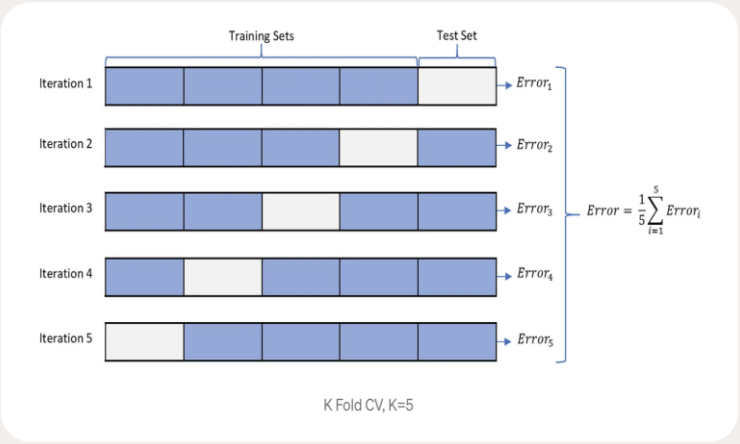
Model accuracy is based on comparison between model predictions and “true” historical data

We use K-Fold Cross-Validation to repeatedly train the model on different subsets of data (training sets),
We compensate for typical weather-related autocorrelation in the training data when creating the training folds

Consistency with physical expectations and model ability to interpolate/extrapolate beyond strict limits of training data

Live voyage forecasts and post-voyage accuracy assessment




# Use cases

# Use Case

10 container vessels operating in Asian and Middle Eastern waters. Over a 9-month period, the difference in results was striking:

→ 5 vessels relied on noon reports
→ 5 relied on HFD sensor data

## Fuel Savings

HFD-equipped vessels saved **645 metric tons**

Noon Vessels saved **50 metric tons**

## Cost Savings

HFD-equipped vessels saved **$399,900**

Noon Vessels saved **$30,100**

## Environmental Impact

HFD-equipped vessels saved **2,013 metric tons** of CO2

Noon Vessels saved **151 metric tons** of CO2

## Use Case

Log-in Logística Intermodal partnered with **Danelec** to enhance voyage profitability and sustainability. The solution was first deployed on **2 container vessels operating between Buenos Aires and Fortaleza**.

Over **439 sailing days**, the operational impact was measured.

→ Just-in-time arrival strategies supported by machine learning models
→ Optimization based on weather forecasts and sea conditions

### Fuel Savings

**Vessel A:** 2.4% reduction in fuel consumption and emissions over **363 voyage days**

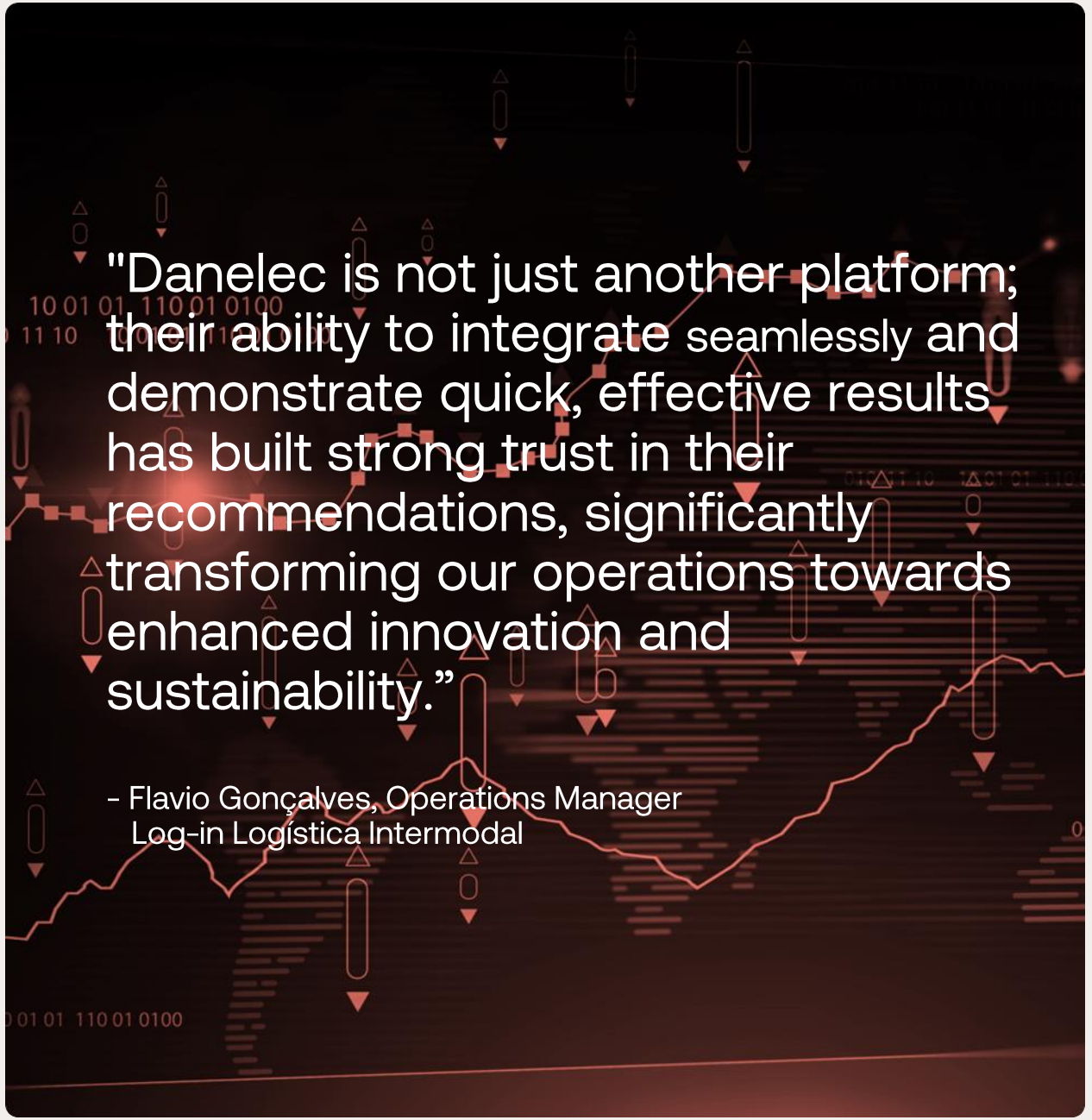
**Vessel B:** 5.9% reduction in fuel consumption and emissions over **76 voyage days**

### Cost Savings

The combined saving exceeded **$410,000**

### Environmental Impact

The combined emission reduction totaled **1.279 metric tons** of CO2



# Use Case

A bulk operator used dynamic voyage optimization to receive optimal operating recommendations during a 29-day voyage from Australia to Asia.

The objective was to reduce fuel consumption and emissions while maximizing voyage profitability.

## Fuel Savings

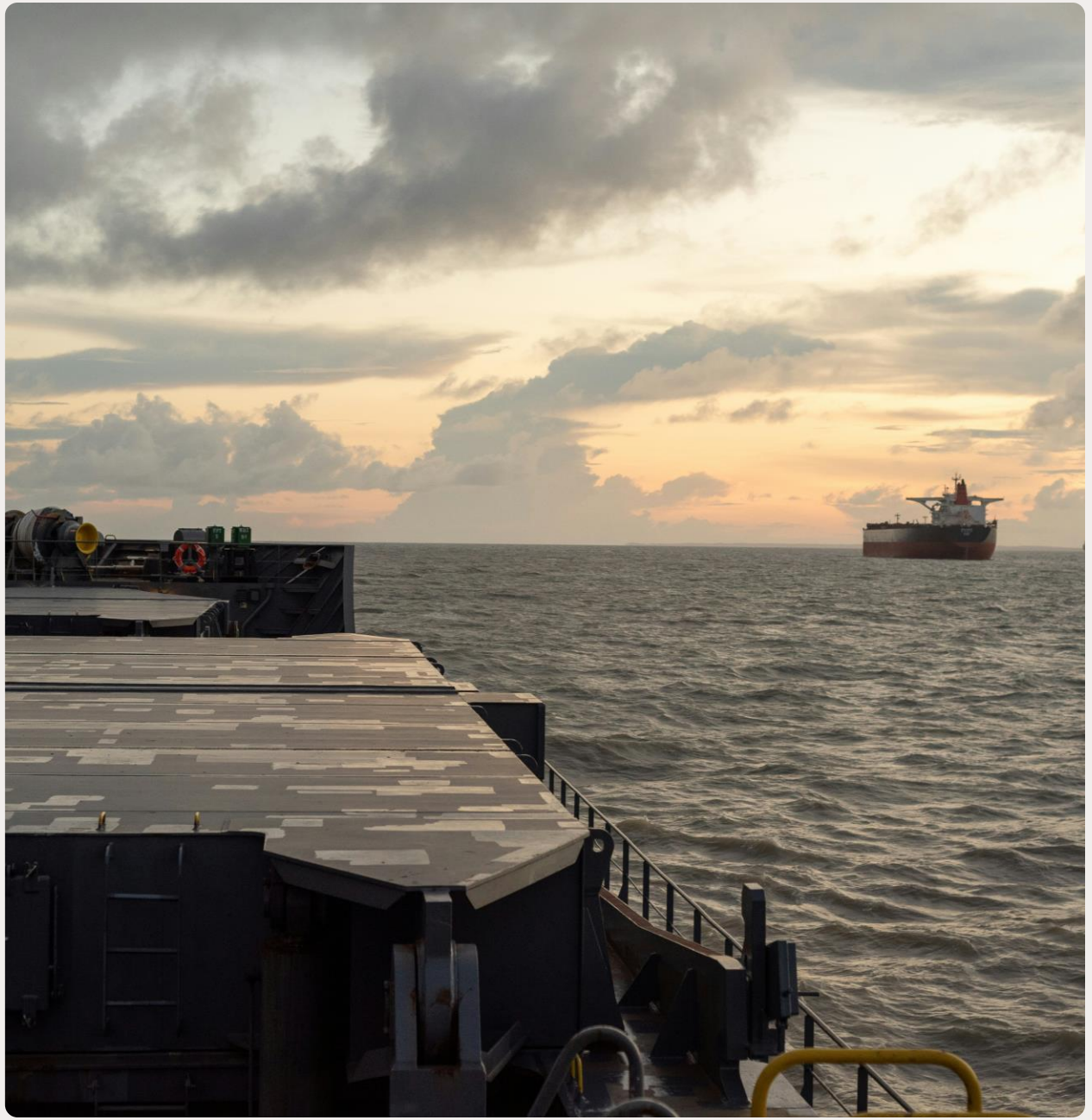
**114 metric tons** of fuel saved on a single voyage of 29 days

## Cost Savings

Single voyage saving exceeded **$55,000**

## Environmental Impact

The combined emission reduction totaled **450 metric tons** of CO2



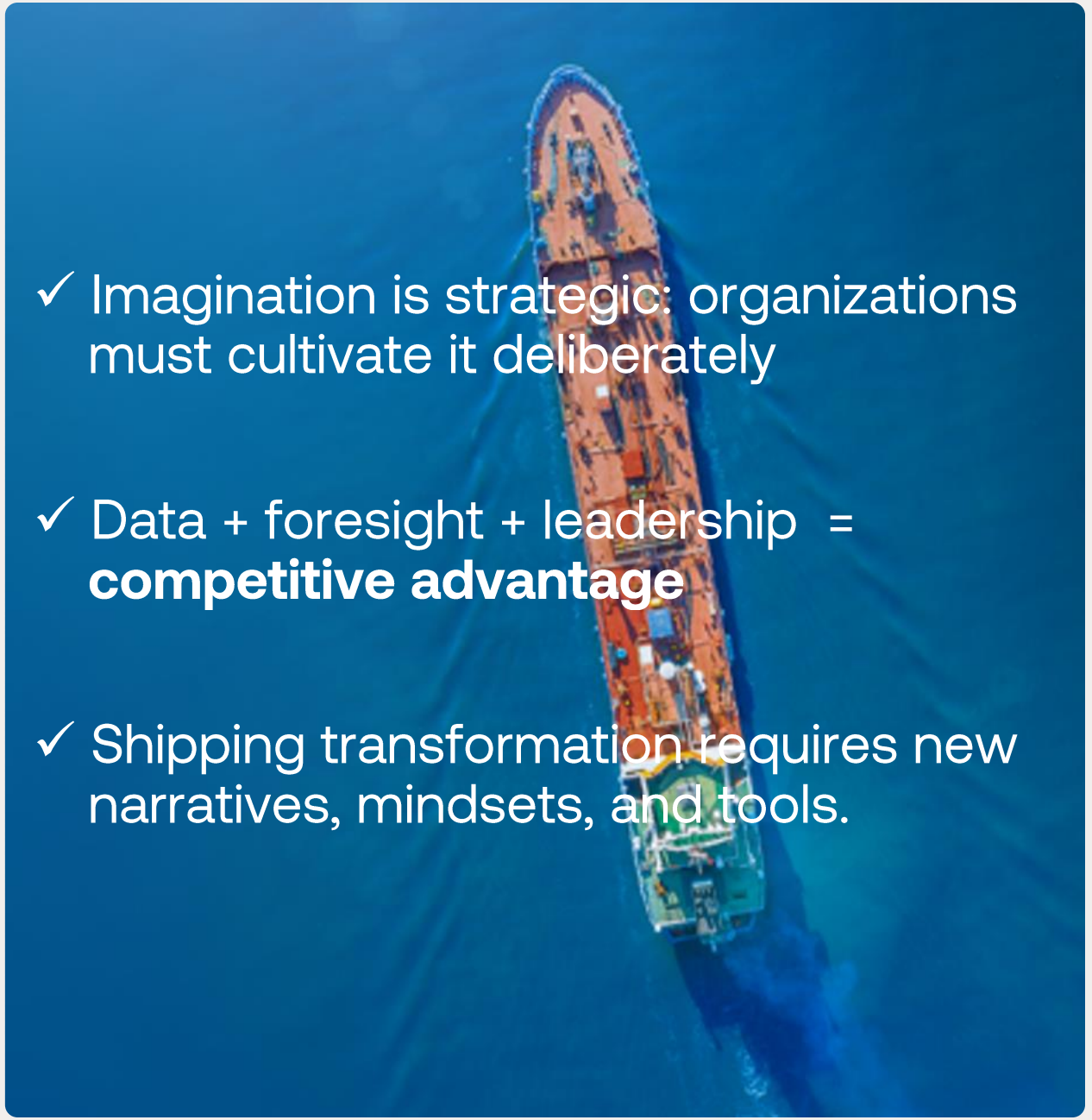
# Conclusion

***13 vessels = combined savings of  USD ~1 million***

***...this is only done with AI and human layer approach***

# To Conclude

- Shipping companies should force vendors to work together
- Break down silos internally in between IT, technical, operations and chartering teams – FIND common KPIs – it makes it easier for us to do business with you.
- Be clear on Vessel and Voyage Optimisation KPIs – apply same core principle
- Don't buy the cheapest solutions in the market - Buy something that is sustainable
- Why develop your own ?



# Thank you.

Download the
*From Data to Action* report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