1,000 Ships Equipped with TGAIN

6 Learnings on Inland Shipping Automation

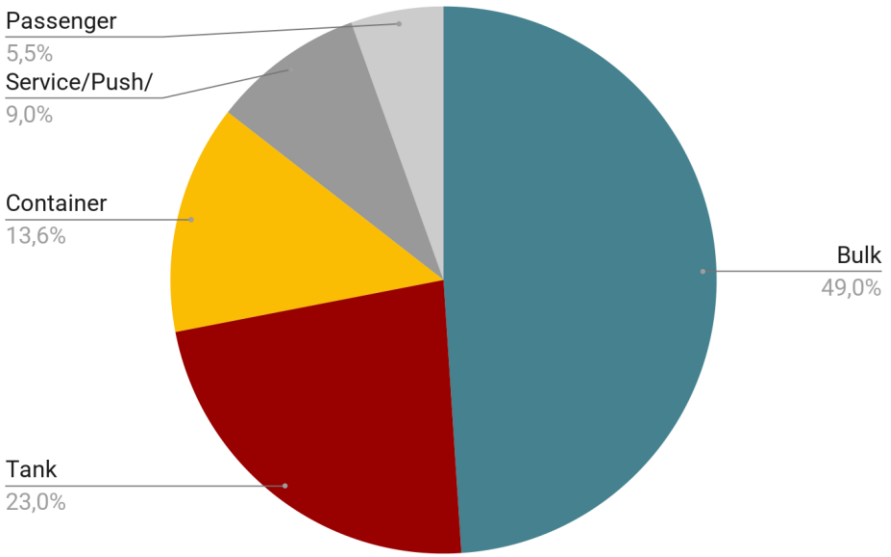
Evert Bulcke | Tresco Group

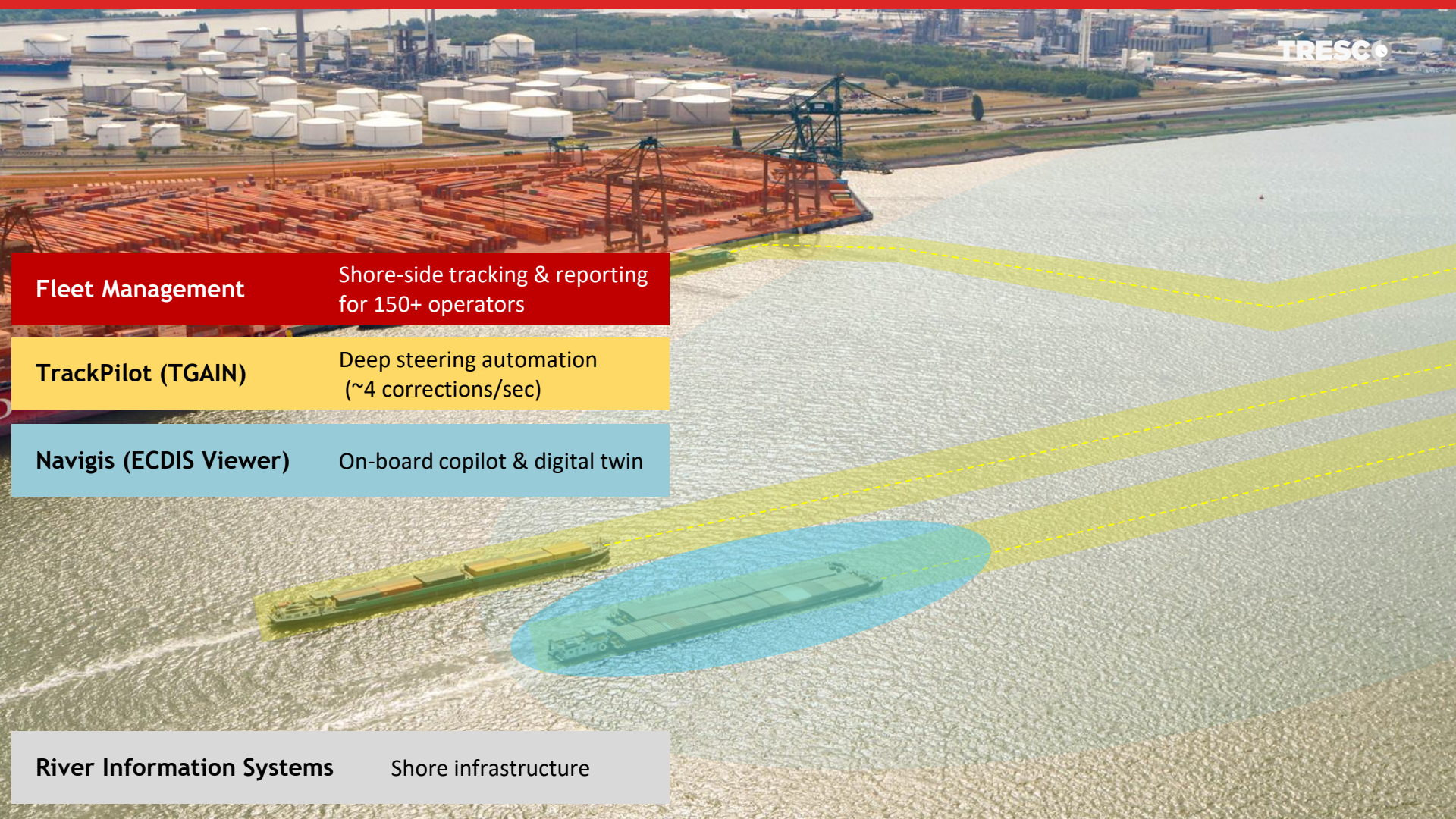
Via Danube | Vienna | June 16 2026

Tresco Group

Navigation · Automation · Data

°1998	Founded in Belgium
~9,000	Vessels equipped
21	Countries served




Fleet Management
Shore-side tracking & reporting for 150+ operators
TrackPilot (TGAIN)
Deep steering automation (~4 corrections/sec)
Navigis (ECDIS Viewer)
On-board copilot & digital twin
River Information Systems
Shore infrastructure

Congestion & crew shortage = levers for automation

Modal shift imperative

1 barge (130m) ≈ 80 trucks
Trucks: ~25% of tonne-km. IWT: only ~5%.
EU target: +25% IWT share by 2030.

Crew shortage crisis

~42,000 workers, aging workforce.
Few new skippers entering.
New ships can't sail without crew.
Automation = force multiplier.

Both forces create structural demand for automation across the value chain

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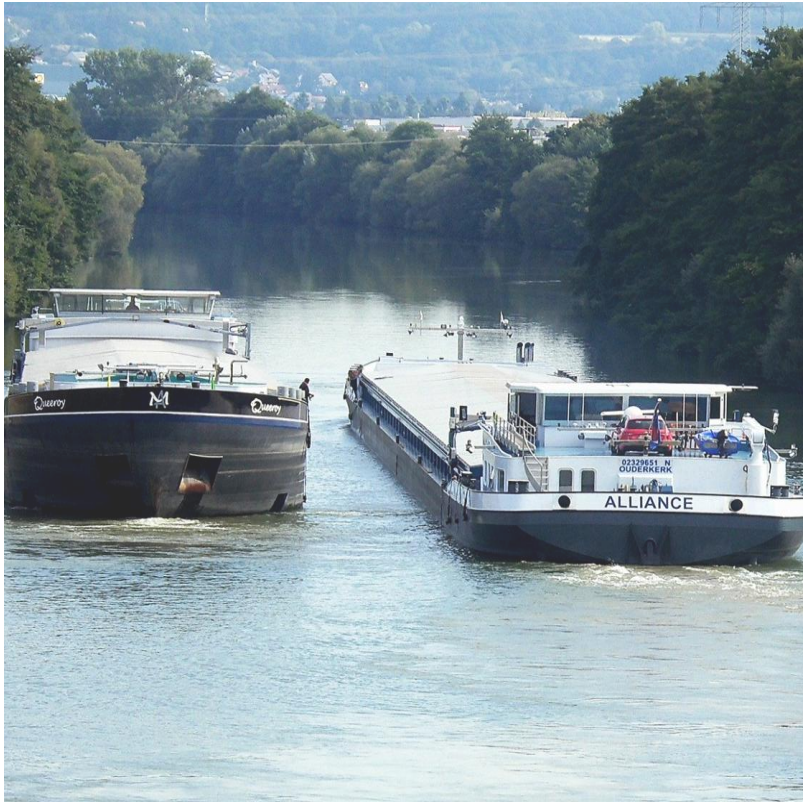
1 Inland ≠ Sea Going

AL0	**Manual**	Manual navigation
AL1	**Steering-assist**	Basic heading hold
AL2	**Partial automation**	Auto track-following (TGAIN/TrackPilot)
AL3	**Conditional**	Auto-navigate + collision avoidance, intent-sharing
AL4	**High automation**	Auto-steer canal stretches, human for locks
AL5	**Full autonomous**	System handles locks, mooring, all navigation

Narrow waterways, dense traffic, locks with ≤30 cm margins, strong currents → precision requirements far exceed open sea



2 TGAIN as gamechanger

Current state: AL2

TrackPilot follows
pre-defined, **dynamic** tracks
on rivers /canals
with **minimal** steering effort.

AIS auto-following available
for convoy sailing.

Growth: 10% today
→ ***30% market penetration***

Telemetry (last 2 months):

Total: **3,039,469 km**
With TTP: **2,211,830 km** (+/- 75% of all km's sailed is trackpilot)
~890 active vessels

2 TGAIN + …

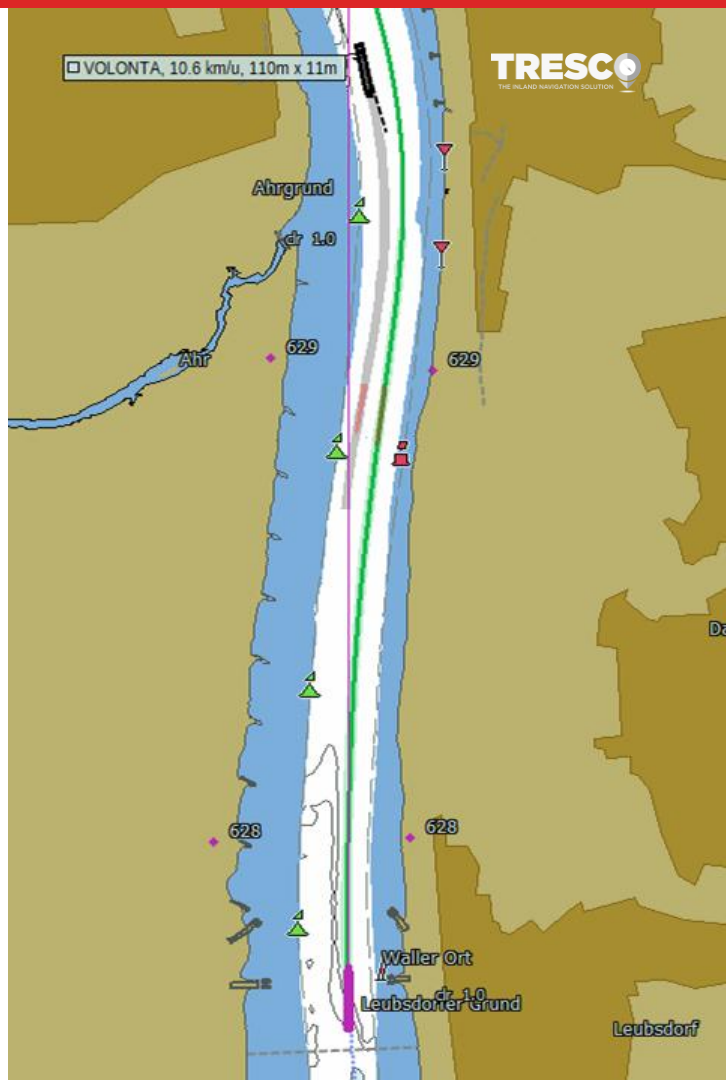
Intention sharing → AL3

Standardized communication for predictable traffic encounters

Broadcasting planned routes via LTE/AIS/VDES lets vessels coordinate in real time — boosting safety and efficiency.

Lock problem → AL4/5 blocker

≤30 cm margins.
R&D targets shore-based GNSS/VDES + LiDAR to automate lock entry.



3 Innovation needs strong ROI

*Going from 10% to 30% needs **new arguments***

How TrackPilot saves fuel

- Minimises rudder activity through earlier and more frequent (~4 /sec) microcorrections
- Fewer/smaller rudder movements
  → less hydrodynamic resistance
  → lower fuel.

IMO cites TGAIN as efficiency measure (GreenVoyage2050).

~5 - 15%

fuel saving
(practice overall 3+ hours)

€ €1,000

1,600 L
saved per month

3 Fuel efficiency: *a nuanced picture*

Rhine trials data

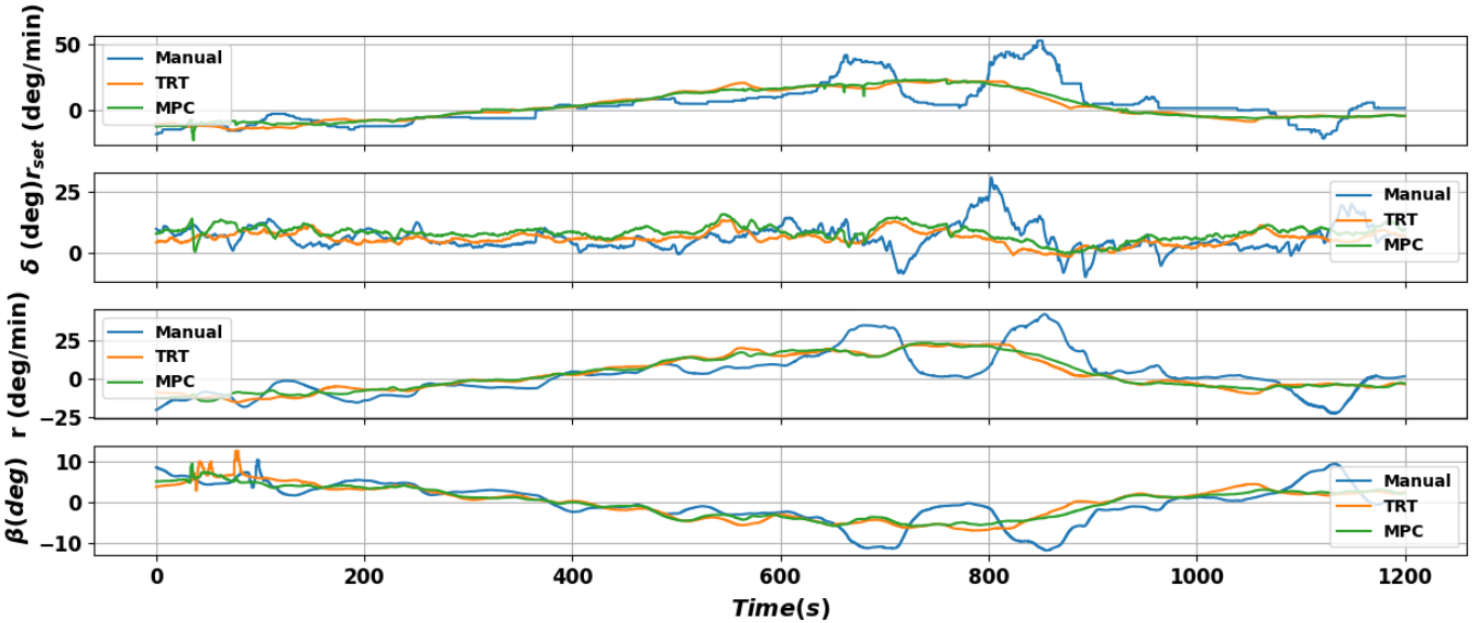


Figure 1: The manual steering results (blue lines) deviate significantly from the ideal (TrackPilot) paths (orange and green) in an upstream scenario; δ is the rudder angle, r is the turning rate, □ is the crab (drift) angle and r_{set} is the requested turning rate from the pilot.

3 Fuel efficiency: *a nuanced picture*

Rhine trials data

Condition	Segment	Fuel saving	Mechanism
Loaded, upstream	Straight	**~5%**	Reduced drift angle & rudder corrections
Loaded, upstream	Bends	**~19–25%**	Shorter path + minimal rudder drag
Empty, downstream	Straight	**~1–2%**	Low resistance baseline; modest gains
Empty, downstream	Bends	**~5–8%**	Still tighter track than manual
90-min trip	Mixed	**~1.8% (~13 L/hr)**	Alert captain steers well on short runs
6-hr trip	Mixed	**~4.4% (~31 L/hr)**	Fatigue effect; trackpilot smoothing emerges
3+ hr trips	Overall	**~5–15%**	Consistent with industry field test range

Key insight: TrackPilot's many small corrections replace the fewer, larger rudder movements of a fatigued helmsman → shorter, tighter path through bends → 15–25% savings in the most demanding conditions.

Over long voyages, gains compound as human attention declines.

4 Innovation needs user buy-in

*Going from 10% to 30% needs **new arguments***

"I am the TrackPilot"

Initial skepticism: experienced skippers see automation as a threat to identity and skill.

The resistance phase

"Safe & comfortable"

"I am considerably less tired during and after the voyage."

The adoption phase

What we learned about adoption

1. Let skippers discover ROI themselves — **on-board demos** beat slide decks
2. The **comfort** argument wins faster than the efficiency argument
3. **Peer recommendation** is the #1 sales channel
4. Technology must augment the skipper, ***not replace***

4 Are skippers *educated* to use automation?

"Do the boatmasters / skippers get the right education to use new automation technologies properly?"
— Mario Sattler

Current reality

For TGAIN (AL2), existing ES-QIN competence framework is sufficient (PLATINA3/CESNI).

- **T**GAIN is in the market — upskilling need is immediate.
- Short familiarization courses recommended for system control.

Most learning is peer-to-peer on board.
Powerful, doable — but not scalable.

What's needed

- E-learning platforms for TGAIN familiarization (PLATINA3 rec.) — scalable, multilingual.
- At AL3+, shift toward 'soft skills': ***communication, awareness, monitoring.***
- *Aviation & maritime parallel:* ***operator*** → ***supervisor*** *role shift.*
- **R&D programs should include competence impact analysis from day one.**

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5 Remote sailing: ROCs need on-board automation

A lot of misconceptions in regulatory circles: "remote = automation"
→ automation precedes ROCS's

Remote Operations Center

Captain controls vessel from shore. All sensor data (position, video, radar) transmitted in real-time.

Connectivity revolution

5G and Starlink ubiquity makes reliable ship-to-shore data transfer a reality in 2026.

Crew multiplier

One qualified captain can oversee many ships in sequence.
Reduced onboard crew addresses shortage. → **TGAIN**!

Regulatory note: onboard watcher remains required — a non-licensed watchkeeper

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6 Data spillover effects → On-shore valorization

Staff shortage on shore too

Lock operators, port staff facing same crunch. Locks close at night. Rotterdam port congestion critical.

Reduced errors & time

Ports/locks pull ***vessel data*** from network. Cuts radio mis-hearings, speeds traffic management, locking/docking.

Terwijl de wachttijden bij containerafdeling oplopen, daalt de overslag in de Rotterdamse haven

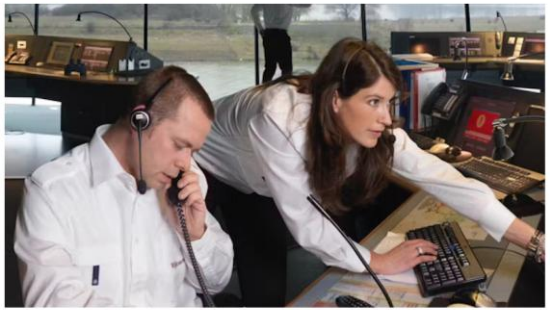
Binne

BOOS

Hansweert volledig gestremd door personeelsgebrek Rijkswaterstaat

De sluizen bij Hansweert zijn dinsdag 11 juli vanaf 23.00 uur tot 6.00 uur woensdag volledig gestremd vanwege personeelsgebrek bij Rijkswaterstaat. KBN is met stomheid geslagen. 'Het loopt nu echt de spuigaten uit bij Rijkswaterstaat', zegt Leny van Toorenburg. Individuele schippers als Adrie Kuup zijn woest. 'Dit is een hoofdvaarweg, Rijkswaterstaat gooit toch ook niet de A2 even dicht?'

René Quist · Hansweert, 11 juli 2023, 18:22



Personeelsgebrek is vooral in de provincie Zeeland een groot probleem voor Rijkswaterstaat. © Foto Rijkswaterstaat

STREMMING

Rijkswaterstaat kan 's nachts geen personeel vinden, dus gaat sluis Grave dicht in het donker

Het lukt vaarwegbeheerder Rijkswaterstaat niet om de roosters omtrent de

Perfecte storm verlamt Rotterdamse haven

Nog nooit was de congestie zo groot in de Rotterdamse haven. Wachttijden van 60 tot 70 uur zijn eerder regel dan uitzondering voor de binnenvaart. Schuttevaer duikt deze week diep in de verstopte haven die ooit de grootste was in de wereld. Wat zijn de oorzaken, wat zijn de gevolgen? Deel 1: Een 'perfect' storm raast over de Europese containerhavens.

René Quist · Rotterdam, 15 juli 2025, 07:32

Innovation as answer to user needs AND sector needs
— fleet + navigation software convergence gives shore colleagues operational insight.

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Future Vision

Growing the inland shipping market
*from the **inside** out*

From vessel to supply chain

The value in inland shipping is moving ashore. Tresco must follow it.

HISTORICAL TECH

Vessel-centric

We see the vessel.
We don't see the cargo.
We don't see the schedule.
We don't see the fleet owner's P&L.

Our data stays on the bridge. It never reaches the people who make commercial decisions.

TODAY & TOMORROW

Fleet intelligence

Emission reporting
ISO 14083 compliant CO_2/NOx per voyage. Charterers and majors need this.

Real-time ETA
Lock/bridge waiting times, weather, water levels. Reliable arrival windows for terminals.

Engine & fuel analytics
Virtual fuel gauge. Consumption per km, per cargo type. Fleet-wide benchmarking.

HORIZON

Logistics operating system

API integrations
Planners, forwarders, terminals, authorities.

Cargo optimisation
Vessel + cargo + route = optimal allocation.

Multimodal handover
Barge → truck → rail: seamless data.

Marketplace
Transaction-based pricing on fleet data.

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