Efficiency optimization towards decarbonization

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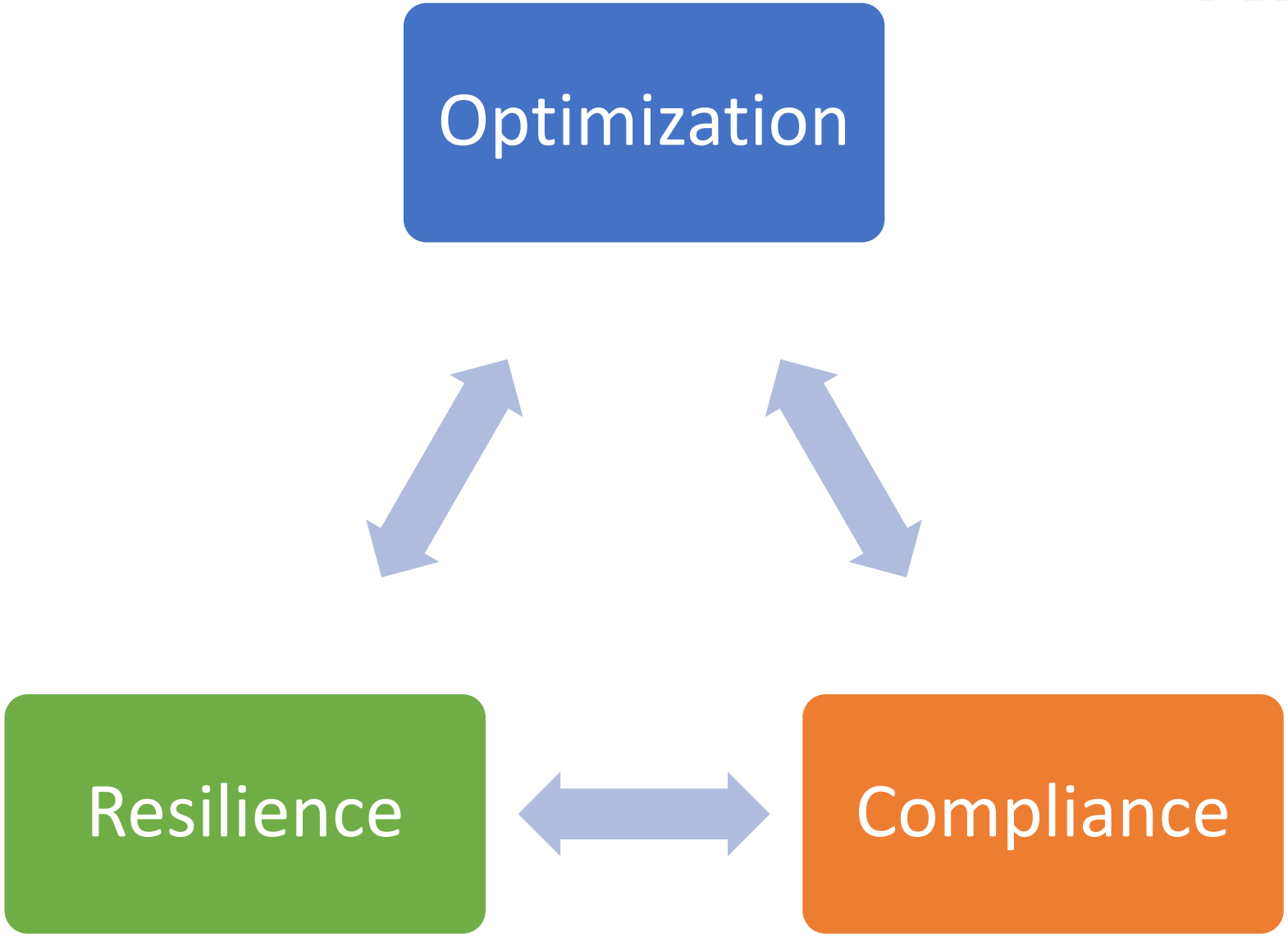
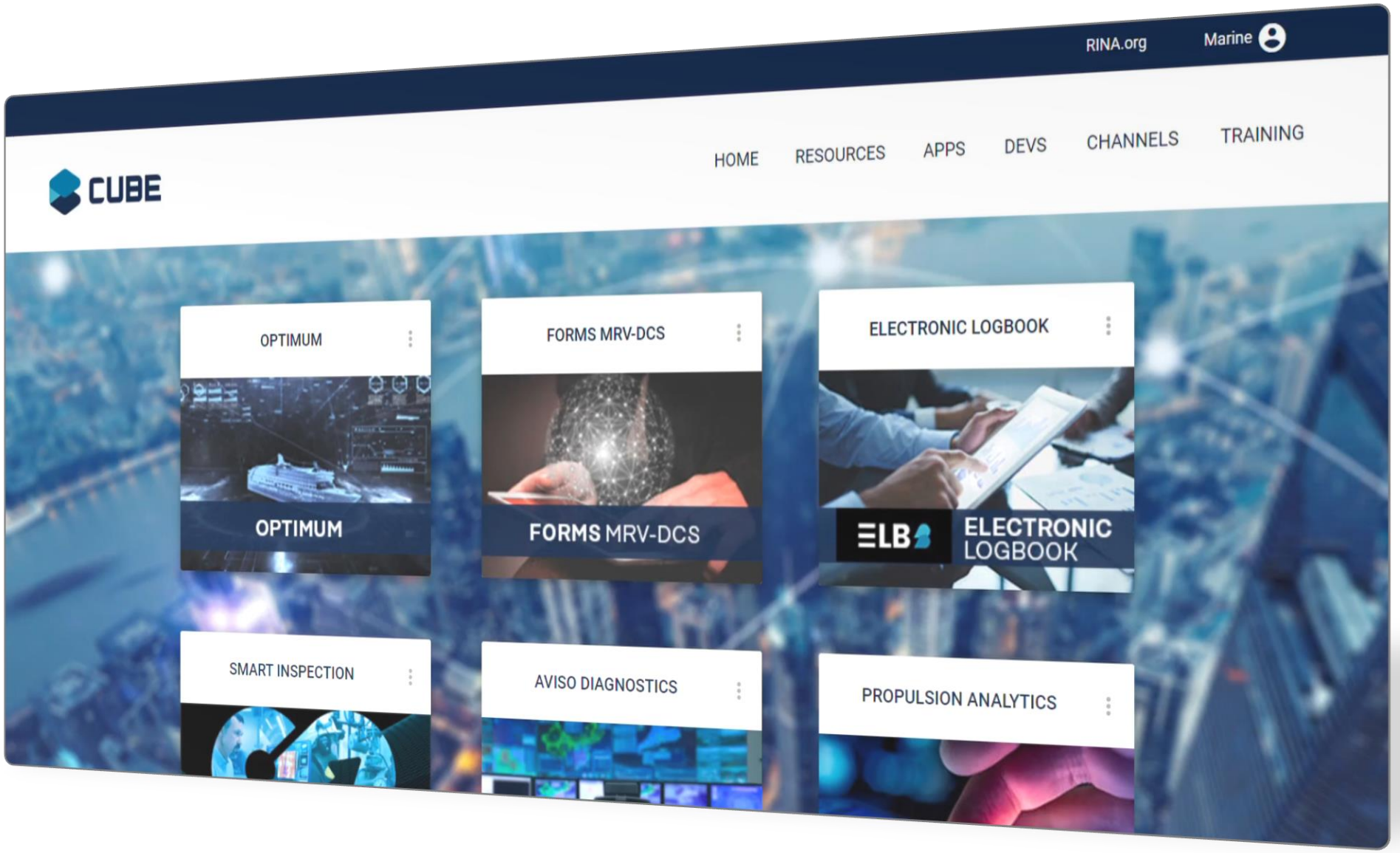
Digital Transformation

RINA is supporting marine market to the 3 major challenges that faces.
Digitalization is one of the pillars to support customers to successfully and efficiently manage their business.



Digital Transformation - RINA CUBE

RINACube is the platform of digital services for RINA Customers. A unique environment with full set of **business core and value-added applications** developed by RINA and through strategic partnership with specialized external providers.



The RINA Digital portfolio in a nutshell

OPTIMIZATION

COMPLIANCE

RESILIENCE

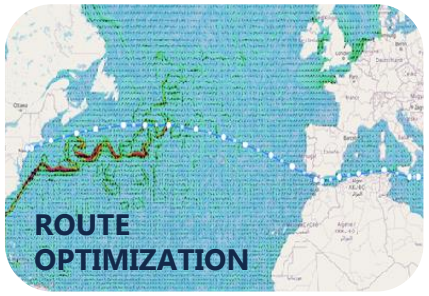
OPTIMUM

Fleet performance management suite, creating value from vast amount of data.

SERTICA

Fleet Management System streamlines maritime operations.

Leonardo Info



Plan the most cost-effective route and meet CII target.

FORMS MRV-DCS

Making crew reporting easier and allow compliance with EU & IMO regulations.

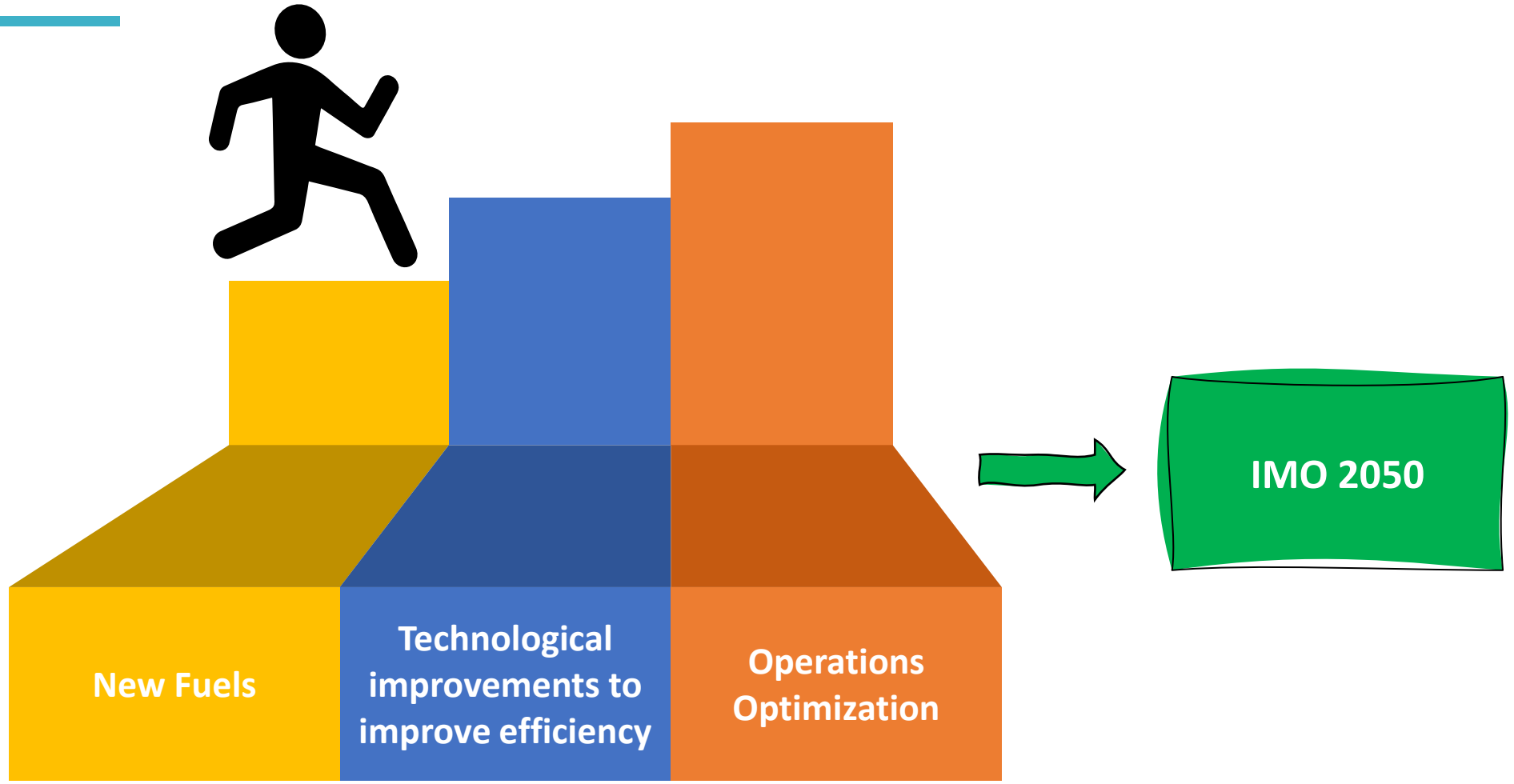
SOFTWARE

Stand-alone application or bundle with HazMat Expert support service.

ELECTRONIC LOGBOOK

Electronic Logbooks for simplified and verified reporting of onboard operations.

Boosting efficiency towards Decarbonization



Fleet performance management and digitalization can play a key role in monitoring efficiency, proving and ensuring compliance with the upcoming regulations.

OPTIMUM Performance Management

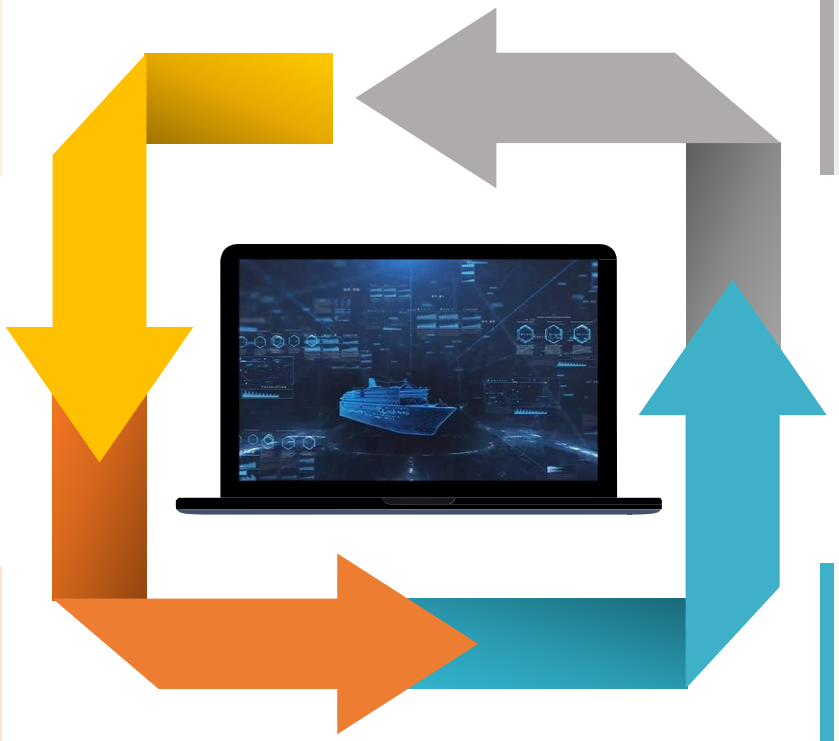
OPTIMUM is a modular digital solution to ease the fleet performance management and optimization, that helps monitor, control of risk levels, maintenance status and performance and overcome the upcoming decarbonization challenges.

Monitor through Data Collection

- Navigation
- Automation
- Manual input
- APIs with external tools

Performance Optimization

- Create performance targets
- Trim optimization
- Voyage Optimization



Manage Efficiency

- Real time monitoring
- Comply with regulations
- ML methods
- CO_2 savings

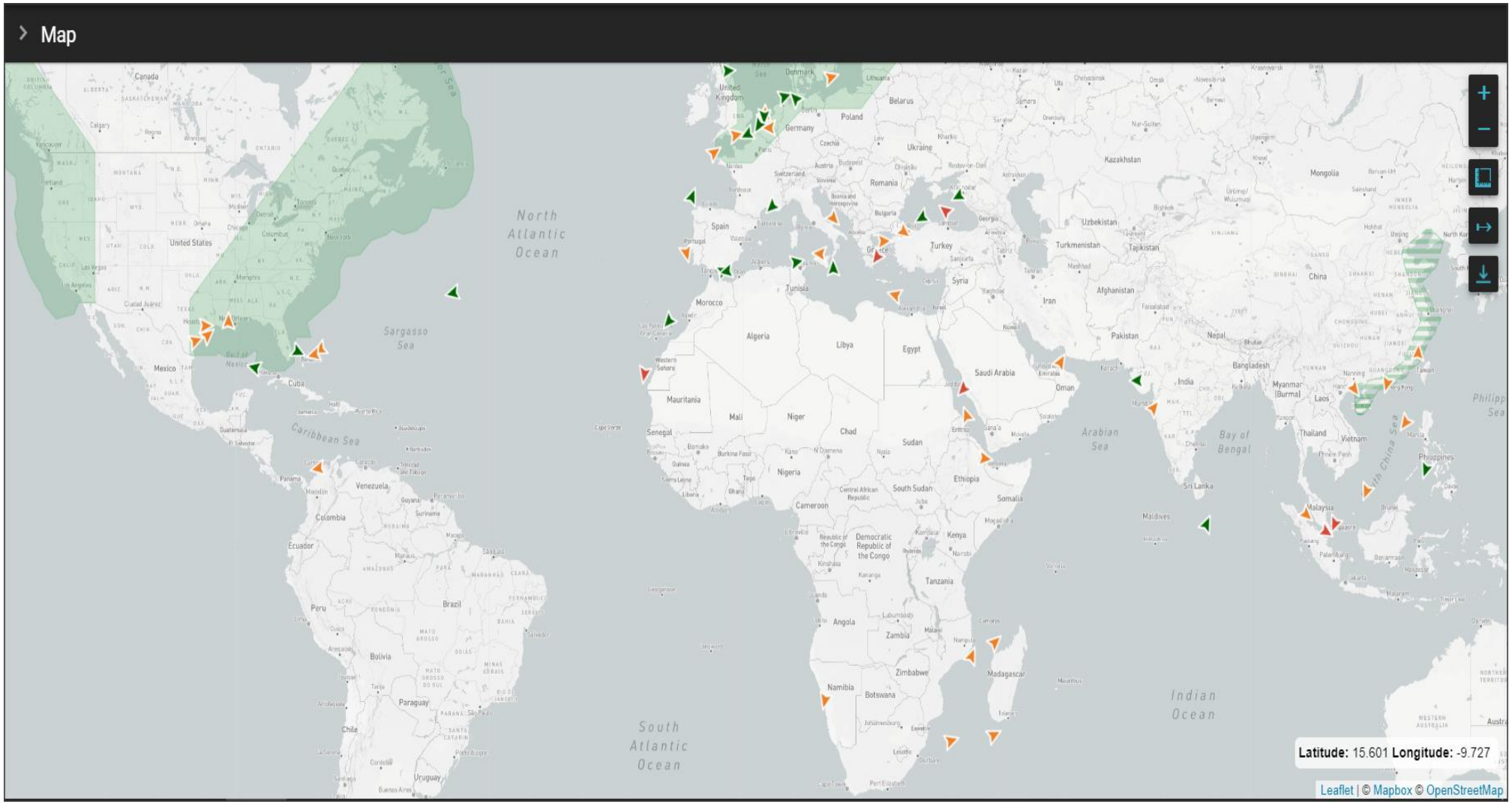
Analyze Data

- Drydock analysis
- Maintenance analysis
- Compare vessels/fleets

OPTIMUM Performance Management - EASY MONITOR

Understand ship energy efficiency status over time using KPIs.

Monitor Fleet Efficiency

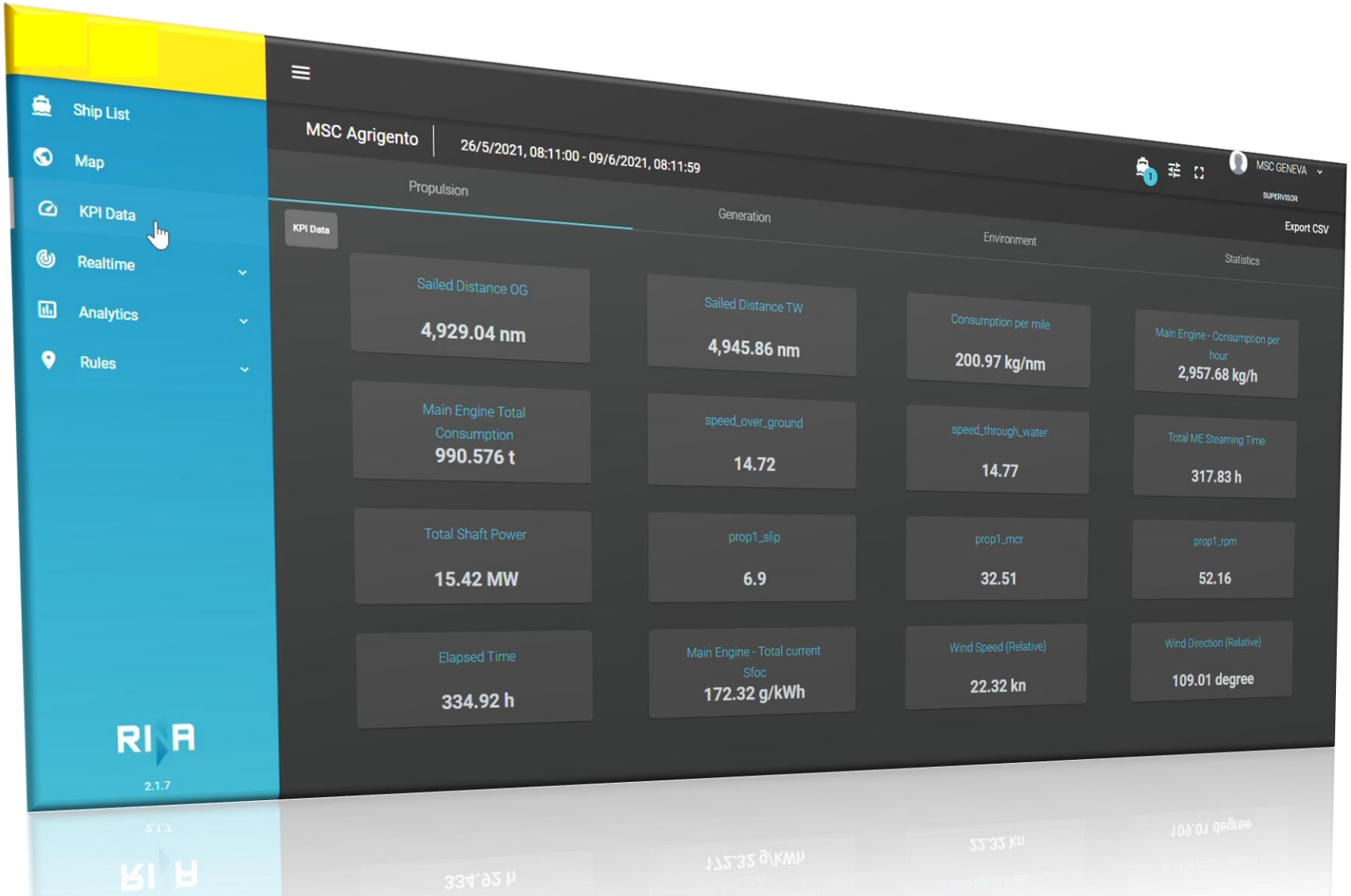


OPTIMUM Performance Management – KPI monitor

Monitor KPIs

KPI

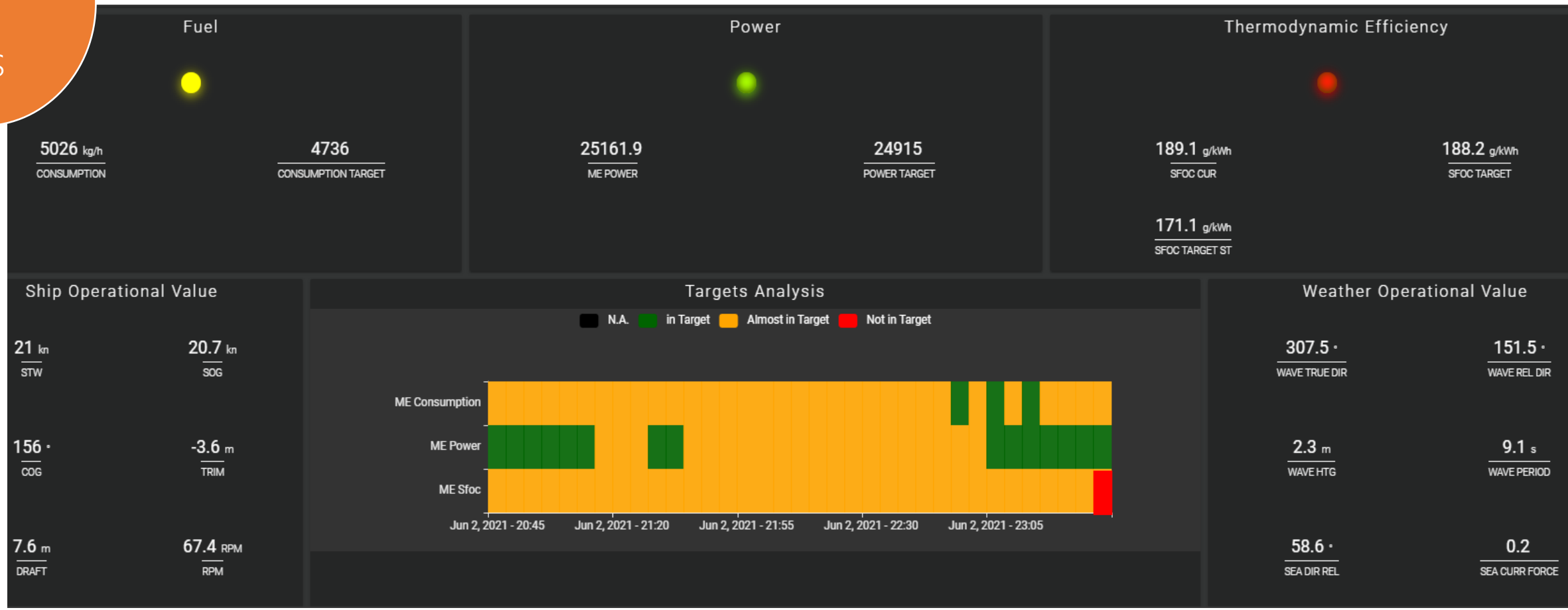
- Review main KPIs related to Propulsion, Generation, Environment
- Extract the data from the Statistics section
- Apply filters and different periods



OPTIMUM Performance Management - TARGETS set-up

Continuously benchmark actual values and understand ship efficiency over time.

Monitor using Targets



OPTIMUM Performance Management - TARGETS set-up

Monitor using Targets

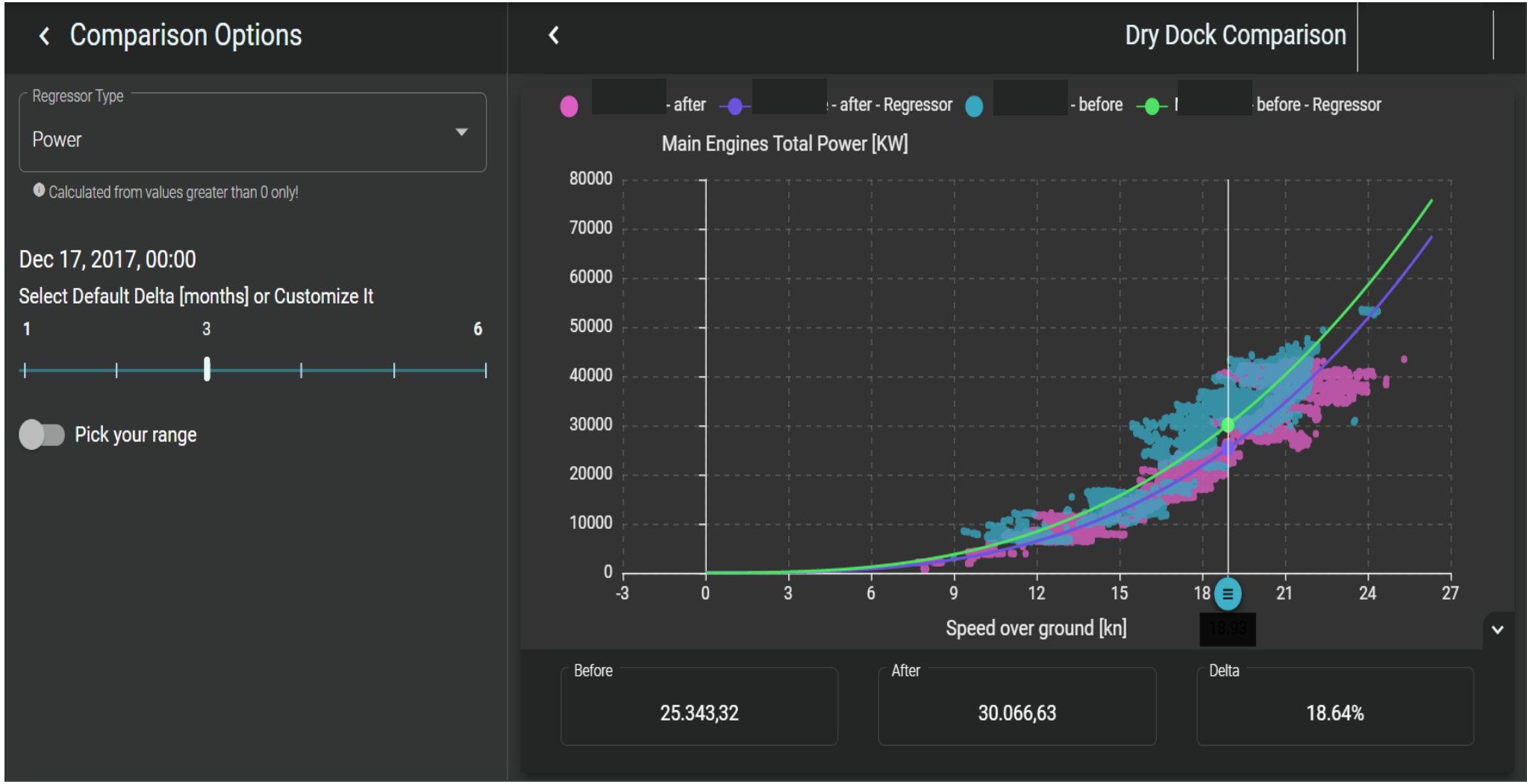
TARGETS

- Predict target power to notice performance decrease
- Machine Learning
- ISO + ITTC method

OPTIMUM Performance Management - ANALYZE

Evaluate the real impact of each refitting action on the ships' performance.

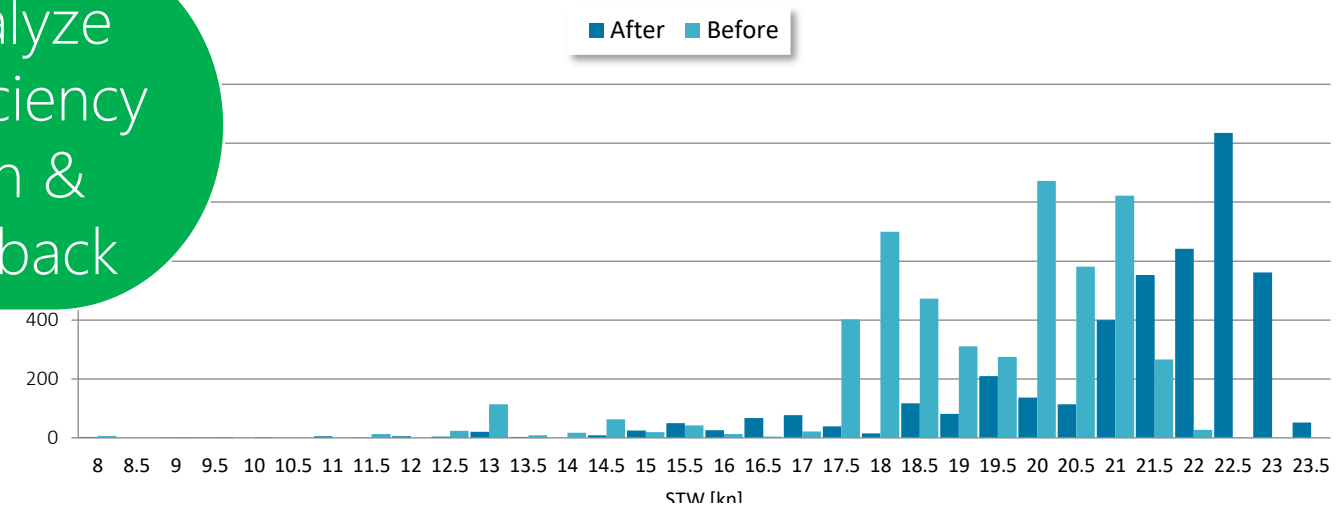
Analyze Dry Dock Analysis

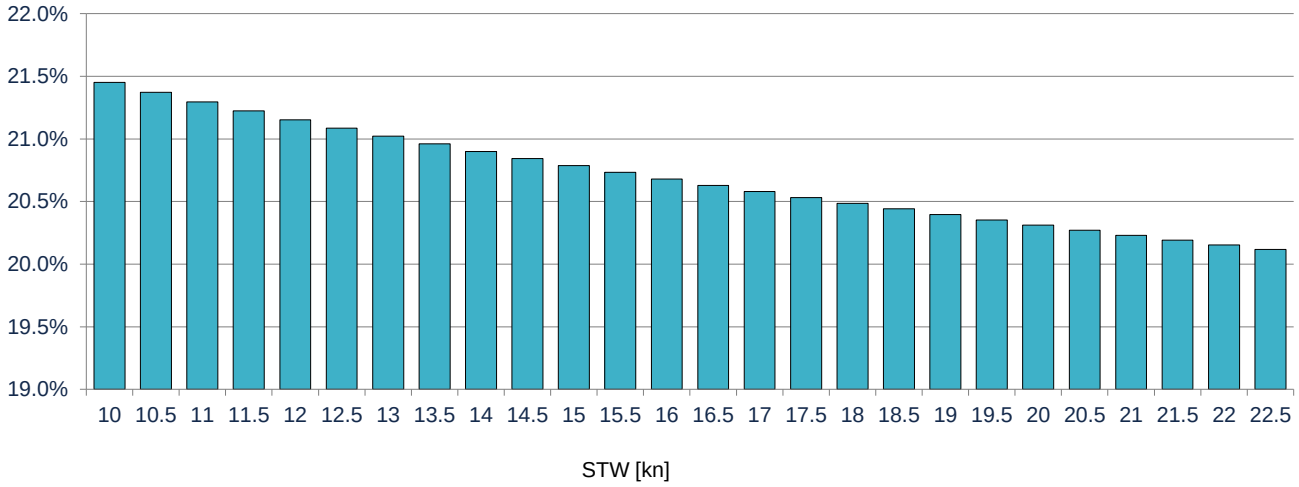


OPTIMUM Performance Management - ANALYZE

Evaluate effective gains in terms of power and consumption reduction.

Analyze Efficiency Gain & Payback





FUEL CONSUMPTION:
127 t/Day @ 21 kn

FUEL SAVING:
25 t/Day @ 21 kn

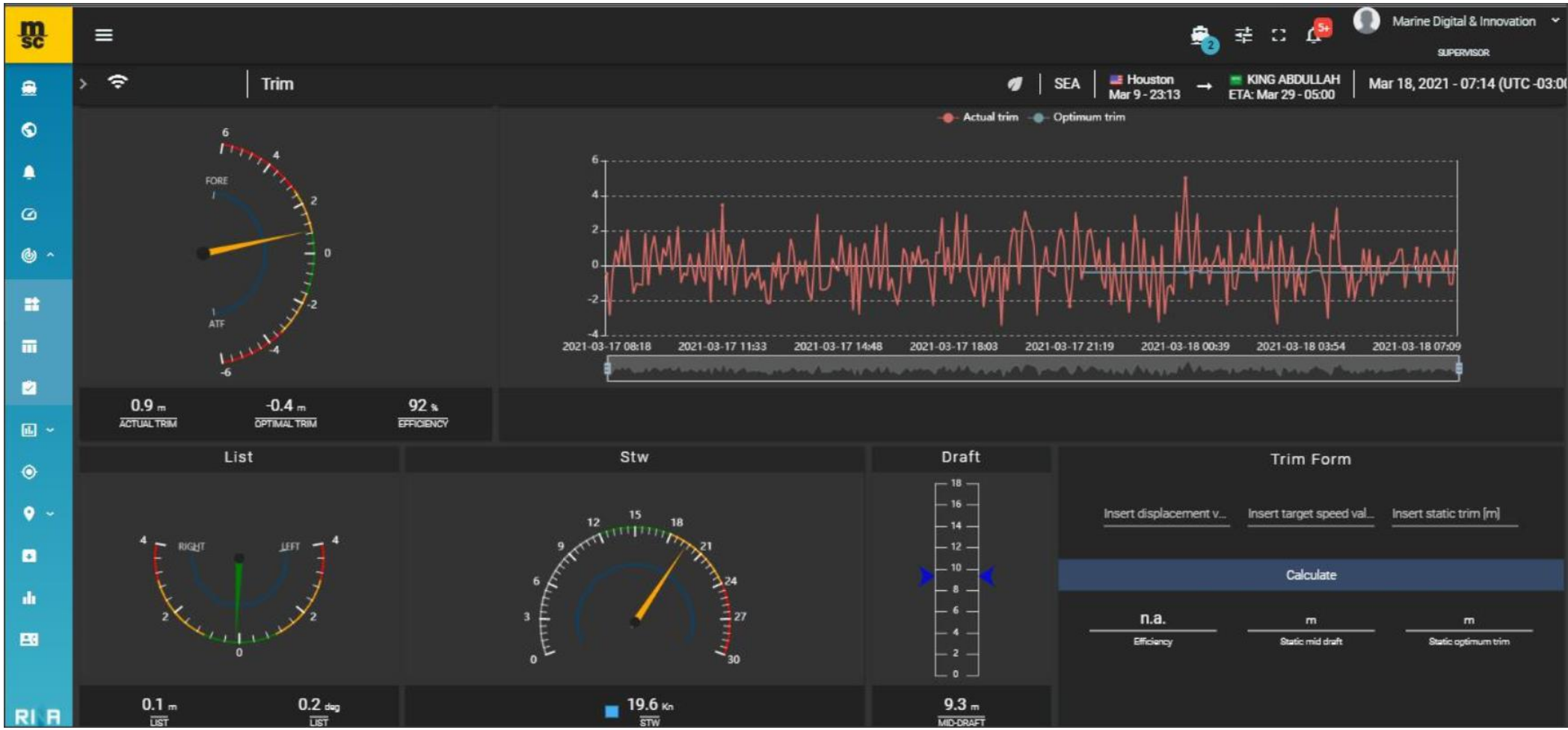
CO_2 SAVING:

78,6 t/Day @ 21 kn

OPTIMUM Performance Management – OPTIMIZE Trim

Benchmark actual trim based on CFD calculations or sea trials.

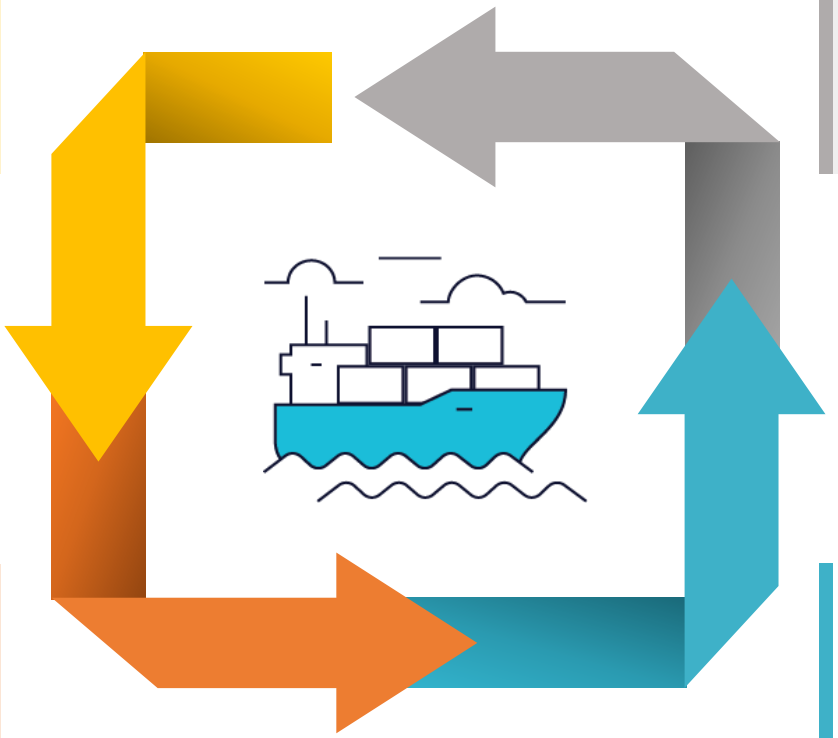
Optimize Trim



Comply with new regulations - Voyage Optimization

Model route through AI

Monitor CII, EEOI over time



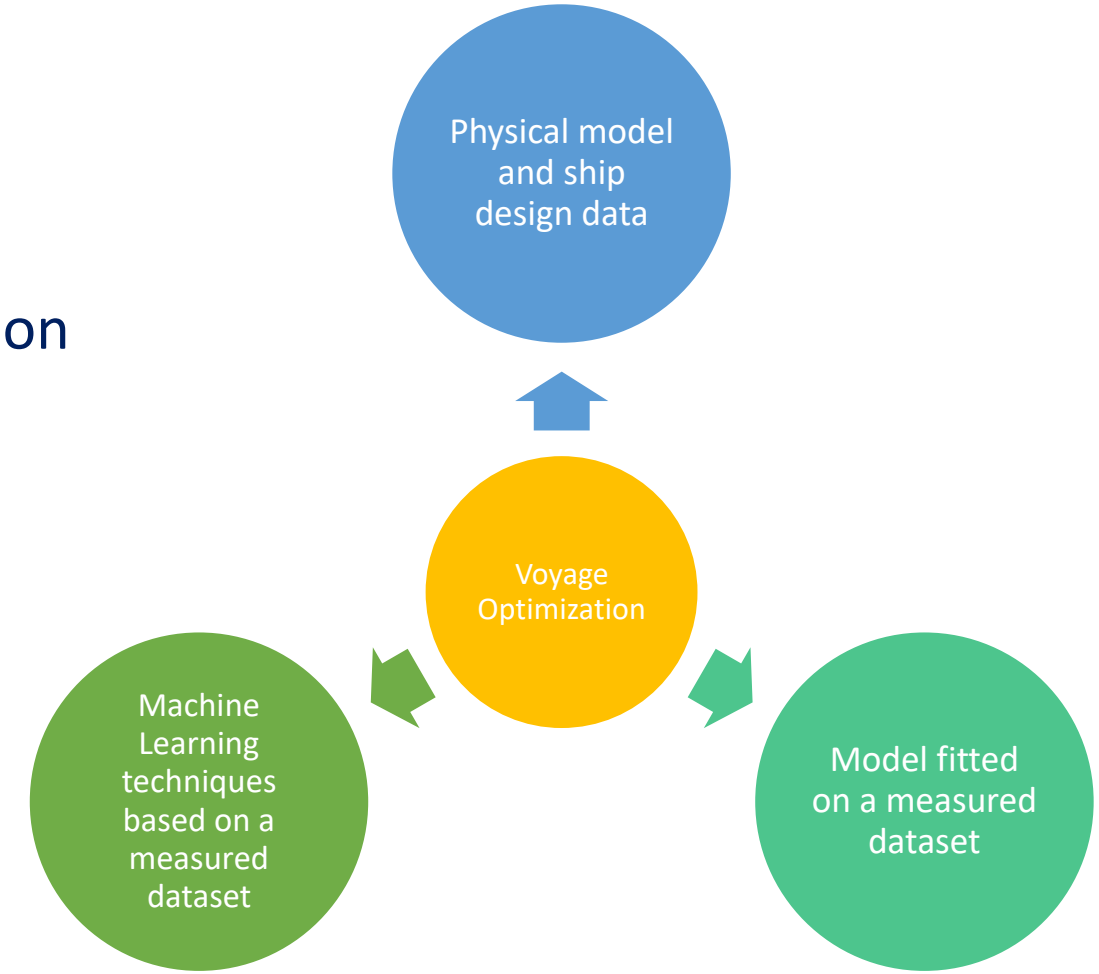
Voyage planning with a specific ship, ETD, ETA

Optimize route

ACCURATE

Ship response modeling with various techniques.

- Shall the ship reduce the speed?
- Shall the ship be more loaded?
- Is the ship going to meet targets on a specific trade?
- Shall I deploy a different ship on this trade?



UPDATED

The optimal route can be updated during the voyage based on new metocean forecasts, actual ship position, new constraints.

Meteorology

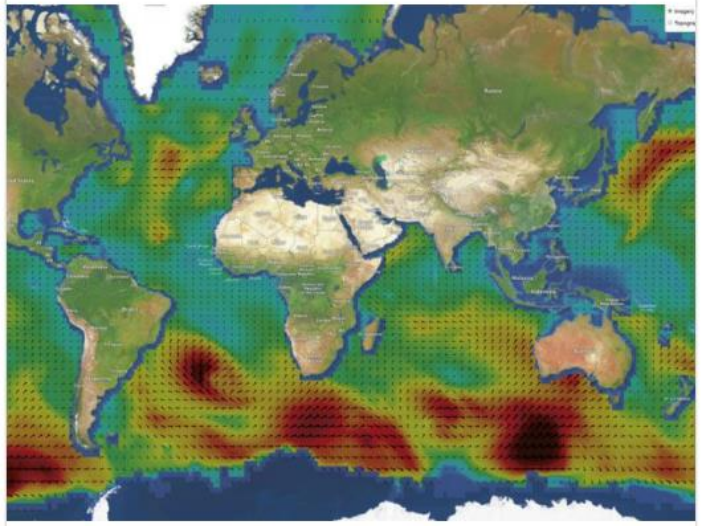
Wind Speed And Direction

Atmospheric model displaying wind at 10m above surface and mean sea level pressure

Update frequency: 4 per day

Resolution: 0.5°
Forecast Length: 10 days
Timestep: 3h
Longitude: 180w - 180e
Latitude: 90s - 90n
Source: NOAA NCEP Global Forecast System

Waves



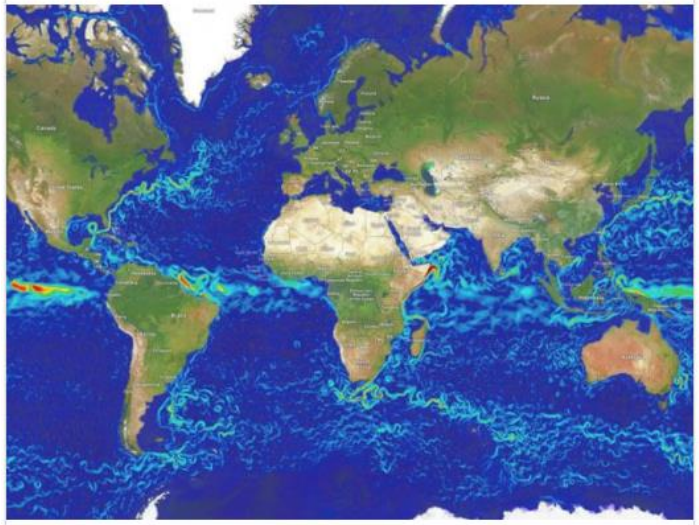
Global Primary Wave

Wave model displaying significant wave height and primary direction

Update frequency: 1 per day

Resolution: 0.20°
Forecast Length: 5 days
Timestep: 3h
Longitude: 180w - 180e
Latitude: 80s - 90n
Source: Copernicus Marine Environment Monitoring Service

Currents



Global Combined Currents

Operational Analysis and Forecast Model of combined tidal and ocean currents

Update frequency: 1 per day

Resolution: 0.1°
Forecast Length: 7 days
Timestep: 60min
Longitude: 180.00w - 179.90e
Latitude: 70.00s - 69.90n
Source: Tidetech proprietary model

TAILORED

Apply constraints and minimize different target measures.

Optimize

- Shortest route
- Minimize the fuel consumption or CII/EEOI.
- Minimize cost [$]

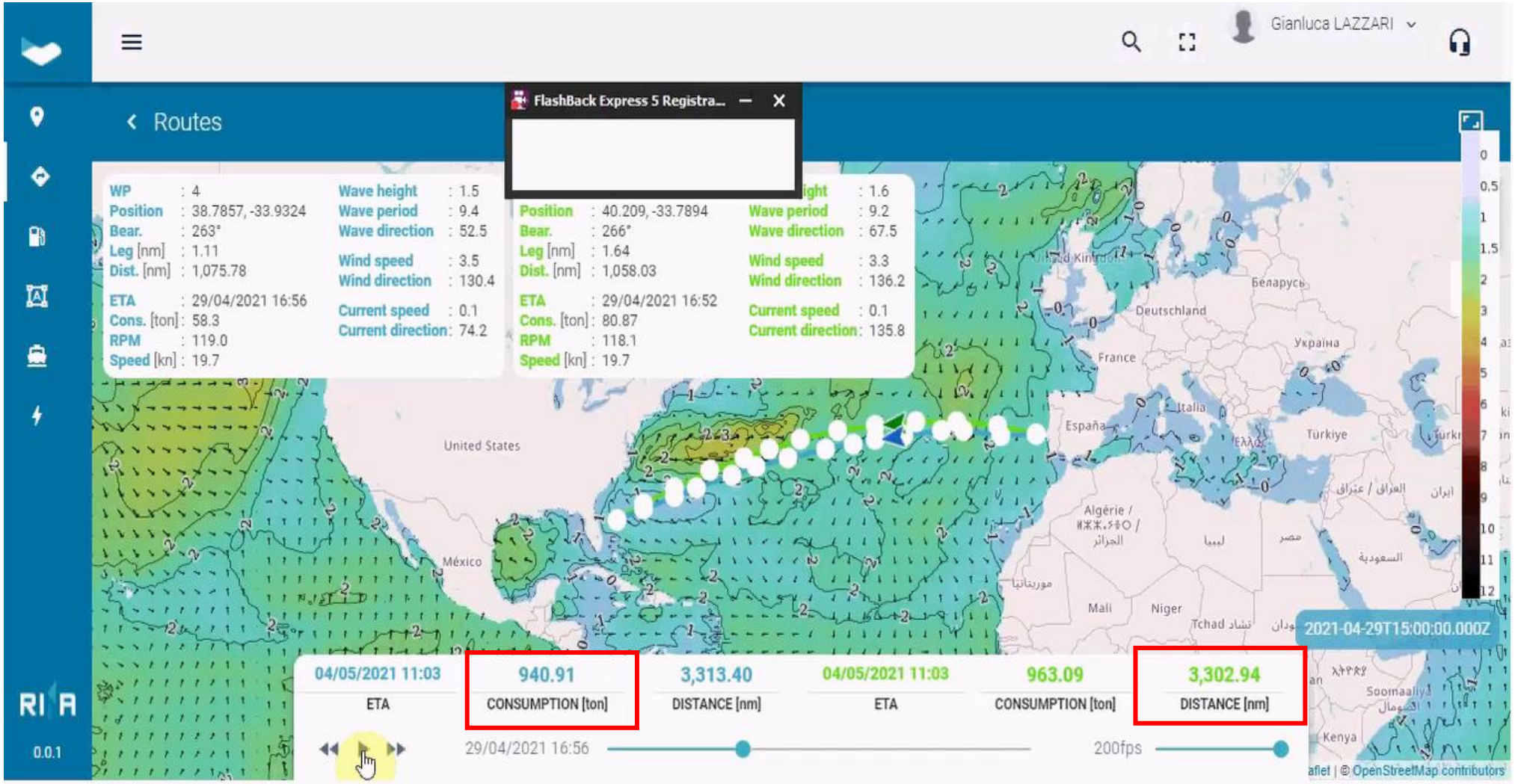
Constraints

- ETA
- Minimum ROB
- Avoidance of specific areas
- Extreme weather avoidance
- Maximum power
- Speed and RPM ranges

CII	EEOI	Cost [$]	Consumption [ton]	Distance [nm]	Saving [%]
34.97	30.02	1,489,539	453.04	2,827.34	/
33.75	28.97	1,410,071	446.28	2,836.15	5.34
34.72	29.8	1,479,507	451.64	2,827.34	0.67
36.05	30.95	1,536,147	442.04	2,828.71	-3.13
37.77	32.42	1,580,777	444.99	2,854.56	-6.13
40.38	34.66	1,701,070	435.86	2,847.60	-14.20
39.6	33.99	1,729,432	452.25	2,838.36	-16.11

COMPLY

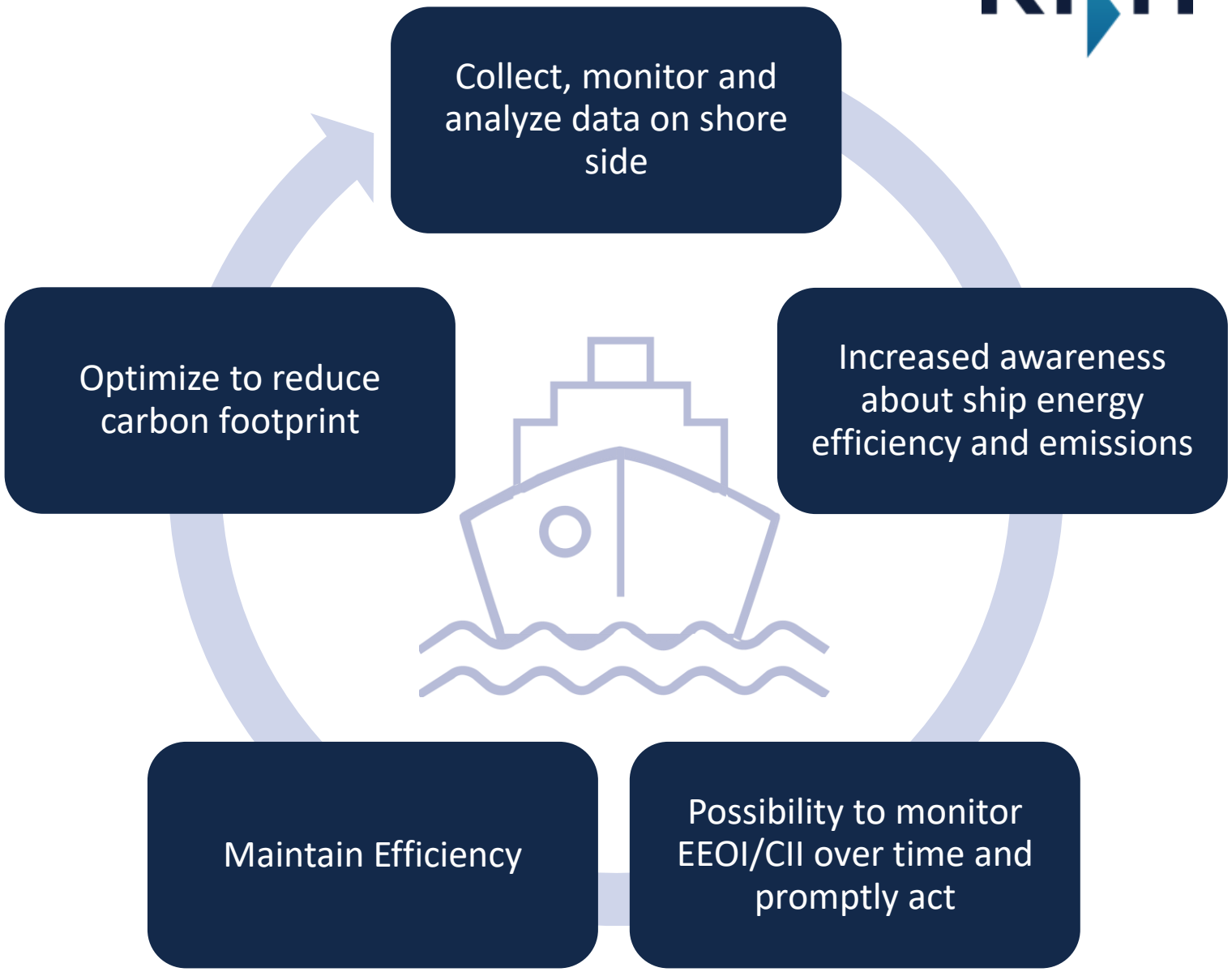
Grant real saving in terms of fuel, money and EEOI/CII.



Virtuous Cycle

IMPROVED SHIP ENERGY EFFICIENCY
and
OPTIMIZED OPERATIONS

will play a key role in allowing the maritime sector to meet targets set out in the Initial IMO Strategy on reduction of GHG emissions from ships.



Thank you for you attention!

For additional information, please contact
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RINA

Make it sure, make it simple.