NAPA Fleet Intelligence

Pekka Pakkanen

LVM, 2020-02-11

www.napa.fi

NAPA in Numbers

180 EMPLOYEES	11 COUNTRY OFFICES WORLDWIDE	95% OF SHIPS BUILT ANNUALLY DESIGNED BY NAPA USERS	INSTALLATIONS ONBOARD 2500+ VESSELS
30 YEARS	2500+ NAVAL ARCHITECTS USE NAPA DAILY IN THEIR DESIGN WORK	UP TO 20% SAVINGS IN FLEET OPERATIONS & MAINTENANCE WITH NAPA	€25 MILLION REVENUE IN 2019

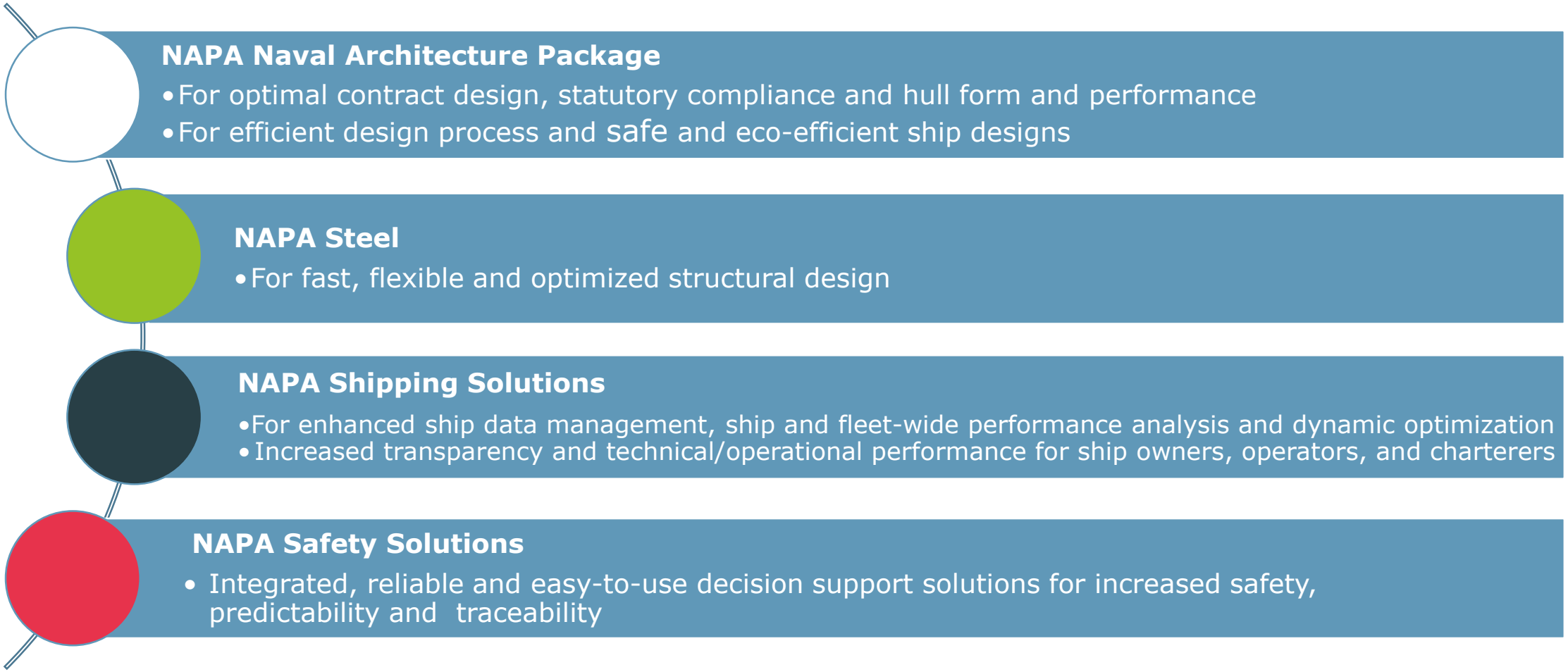
Global NAPA Team

NAPA Group - main office located in Helsinki, Finland

Global NAPA office network:

- **NAPA Japan** in Kobe
- **NAPA Korea** in Busan
- **NAPA China** in Shanghai
- **NAPA Singapore**
- **NAPA Romania** in Galati
- **NAPA USA** in Florida
- **NAPA in Greece** in Piraeus
- **NAPA in Italy** in Genoa
- **NAPA in Germany** in Hamburg
- **NAPA India**, Bangalore

NAPA Solutions for Safe and Efficient Ship Designs and Operations



NAPA Naval Architecture Package

- For optimal contract design, statutory compliance and hull form and performance
- For efficient design process and safe and eco-efficient ship designs

NAPA Steel

- For fast, flexible and optimized structural design

NAPA Shipping Solutions

- For enhanced ship data management, ship and fleet-wide performance analysis and dynamic optimization
- Increased transparency and technical/operational performance for ship owners, operators, and charterers

NAPA Safety Solutions

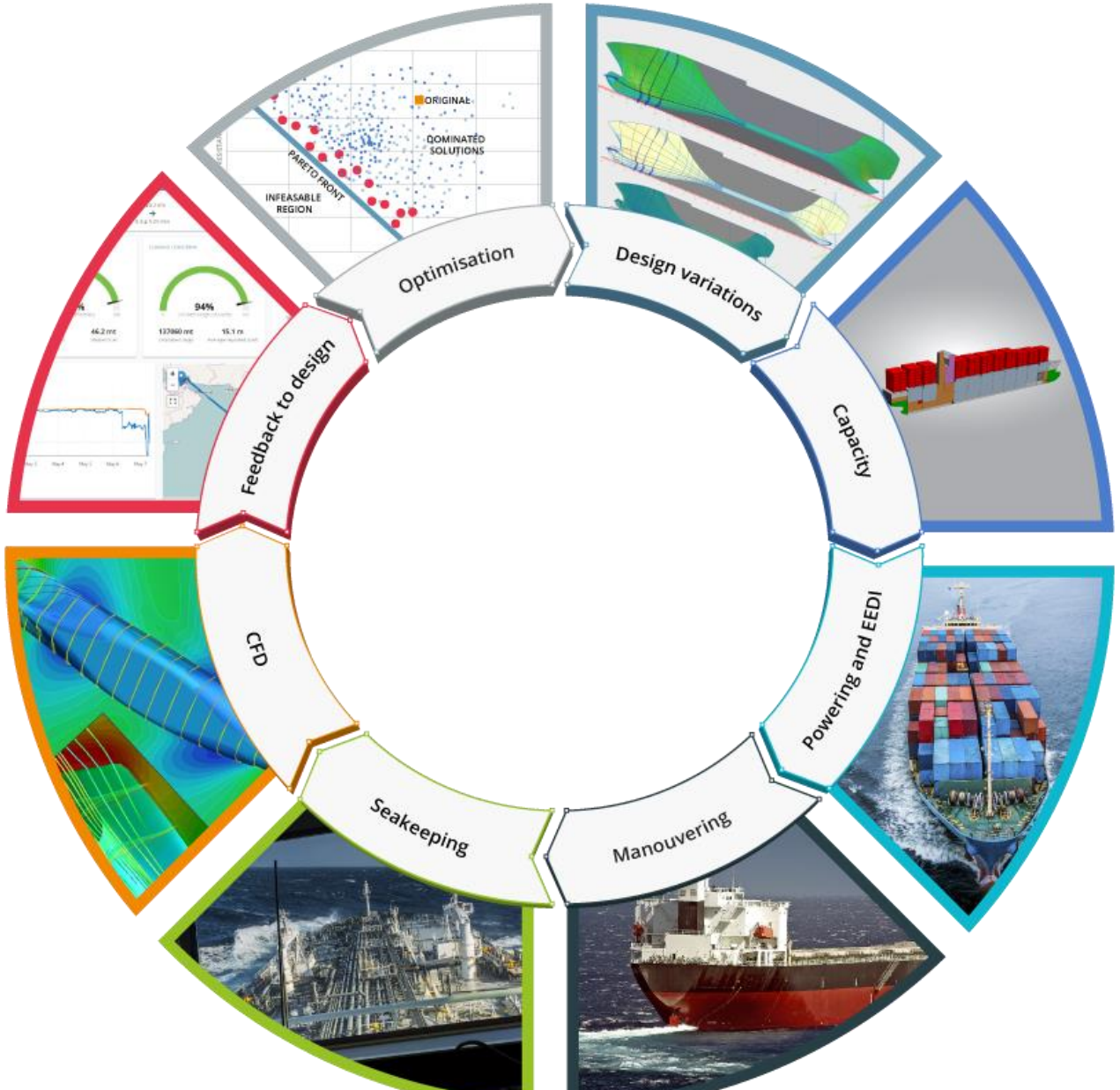
- Integrated, reliable and easy-to-use decision support solutions for increased safety, predictability and traceability

NAPA is the leading expert in Maritime Domain with unique combination of capabilities

- Versatile 3D Ship Model combined with vast variety of algorithms for all kinds of analysis calculations and simulations in NAPA
- Excellent mix of expertise and experience in staff of international team of 180 experts
- Close cooperation with leading ship designers, builders and operators
- All critical components owned and managed by ourselves
- Long proven track record in **developing successful IT solutions**
- Modern up-to-date development tools and technologies combined with vast amount of code and experience
- Very stable and wise owner, not greedy after quick money

NAPA throughout the design process

Ship design is an iterative process supported with NAPA 3D Digital Twin throughout the entire process, streamlining the workflow.



NAPA Shipping Solutions
for Intelligent Maritime Operations

Re-defining Future for Greener,
Smarter and Transparent
Maritime Industry

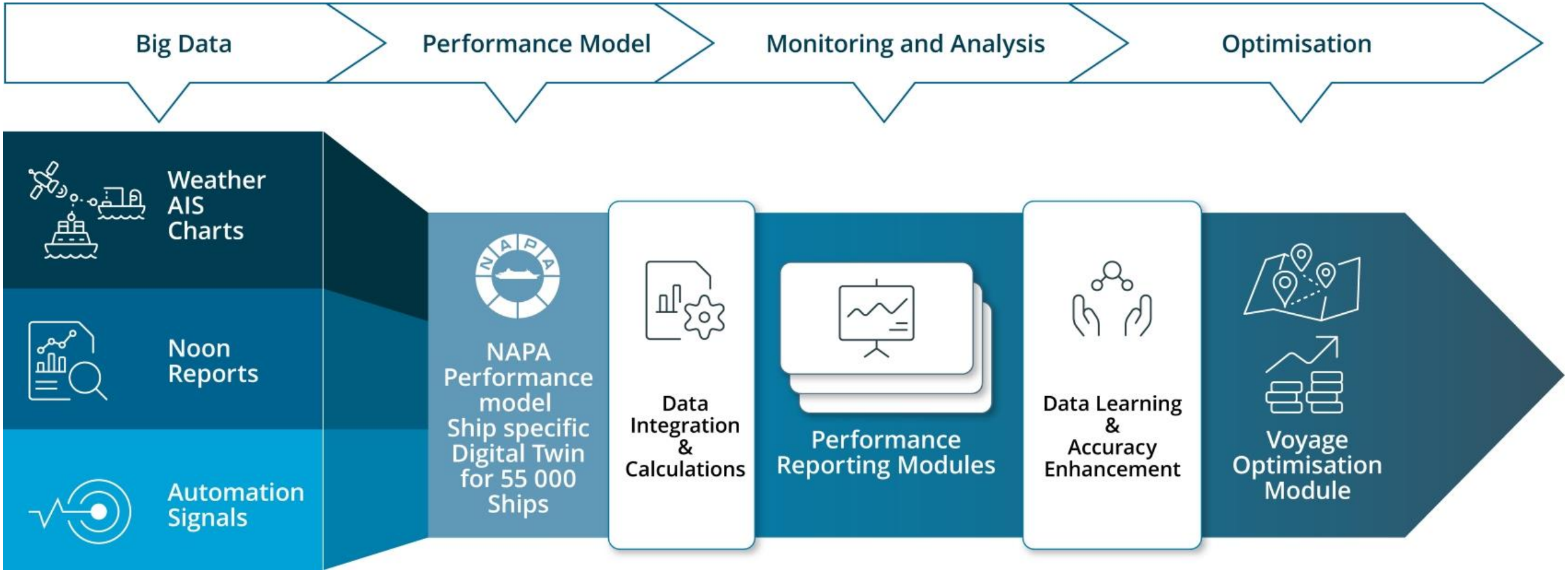
Background

- For monitoring vessel performance, operators tend to seek best-fit solutions as per each vessel's business scheme.

- Owned / long term chartered vessels
  - Often utilize high frequency auto-logging sensor data even though initial cost is somewhat high (in addition to noon reports)
- Short /spot term chartered vessels
  - Same approach as above is not always best solution in view of cost vs benefits.
  - Usually only AIS data and noon reports available.

➢Mixed fleets need a solution which can support both data sources

NAPA Fleet Intelligence uses the data sources that you have available to deliver insights and reports



Advanced algorithms and hydrodynamic calculations based on:

- Ship hydrodynamics models
- Naval architecture principles
- Experience on ship design

Chart data

AIS data

Global weather data

Noon reports

Automation signals

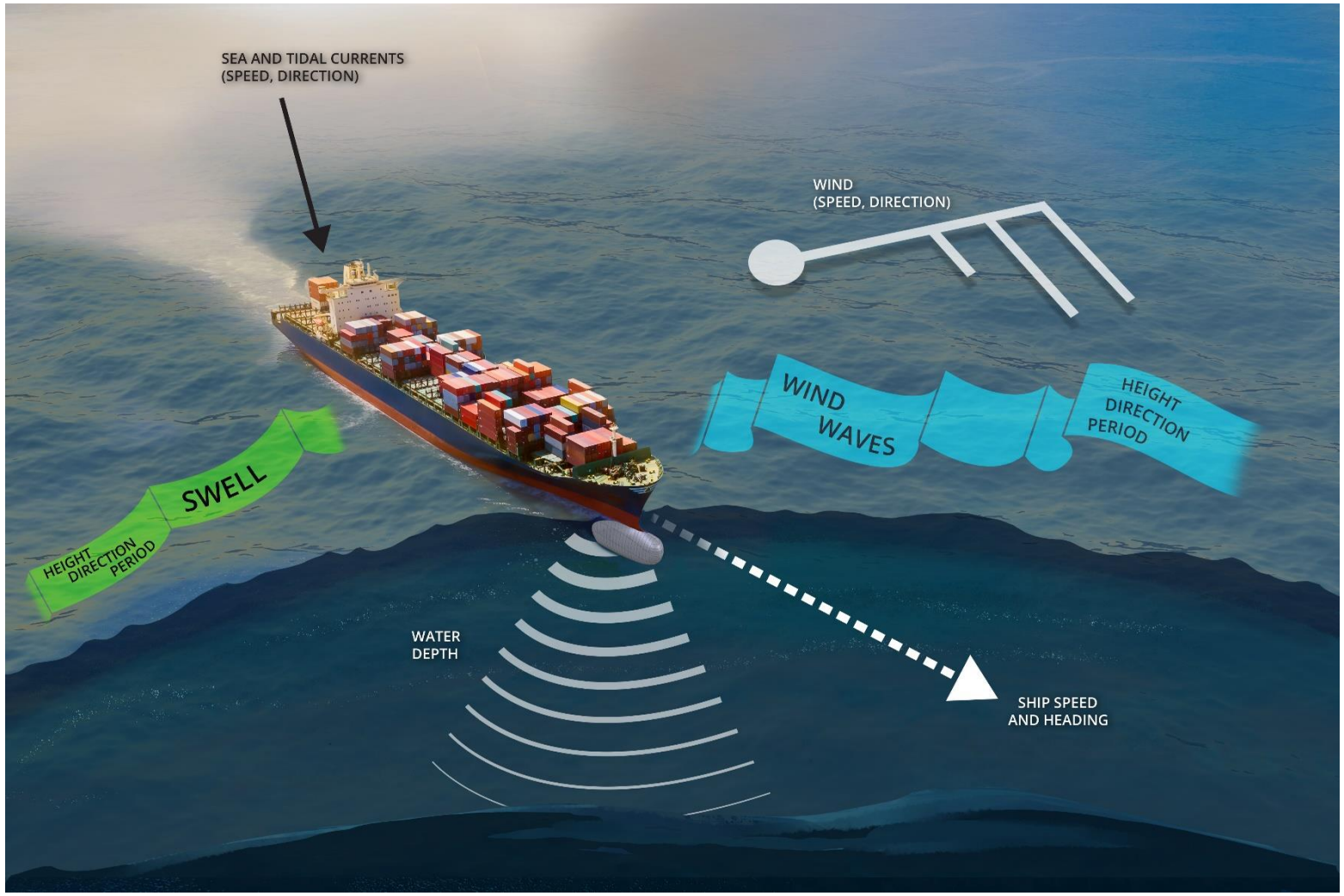
Digital Twin Ship Model - Big Data

- 55 000 ships
- Data learning and model accuracy enhancement

- Performance Monitoring
- Analytics and Reporting

Planning and Optimization of Operations

Considering environmental conditions



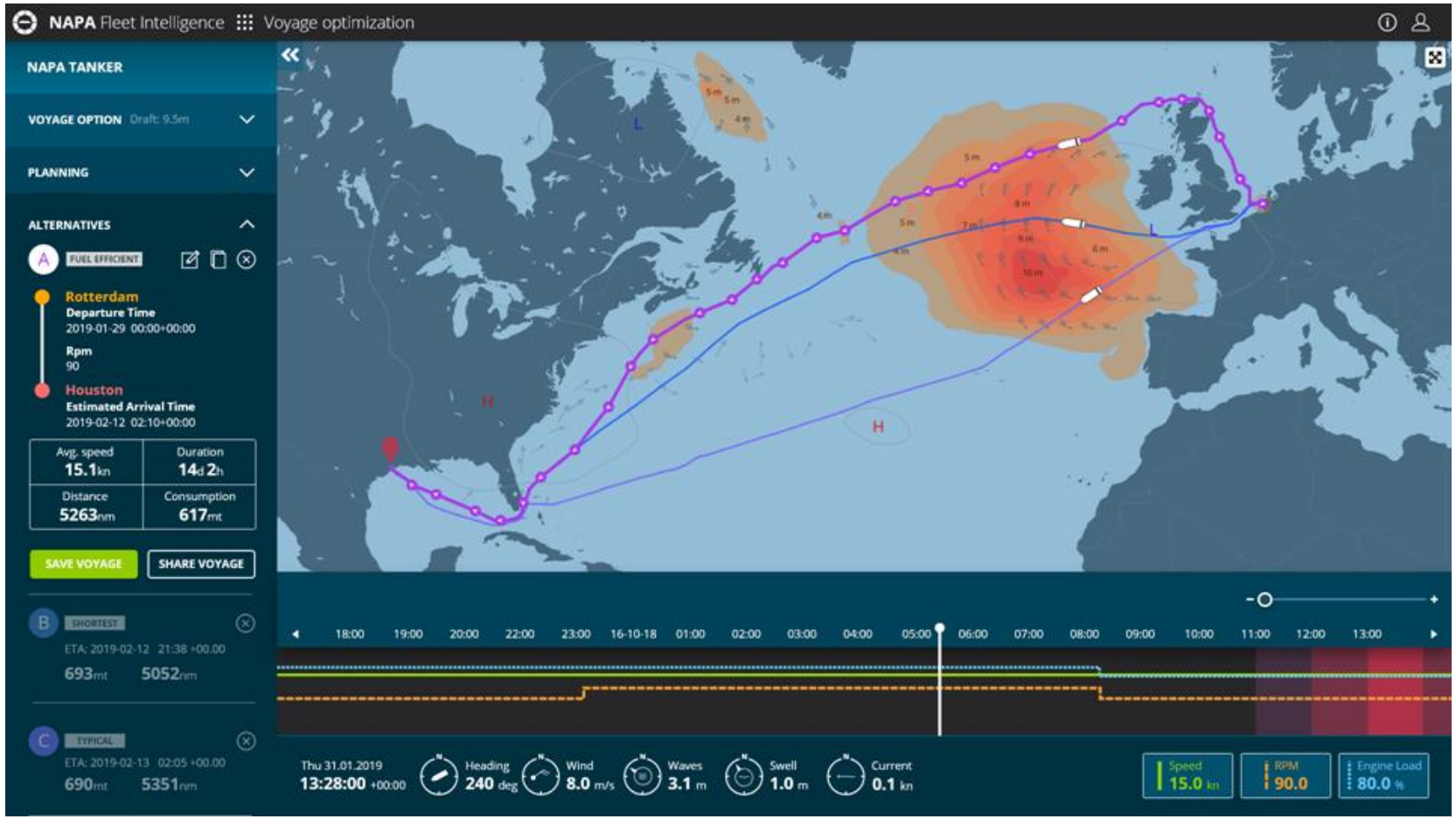
- Full hydrodynamic model
- Coupled effects of wind, waves, swell, current, shallow water
- Accounting for the propulsion and engine arrangement

- Solve force balance
- Find required thrust
- Solve propulsion RPM
- Calculate engine power
- Fuel Oil Consumption for every known location

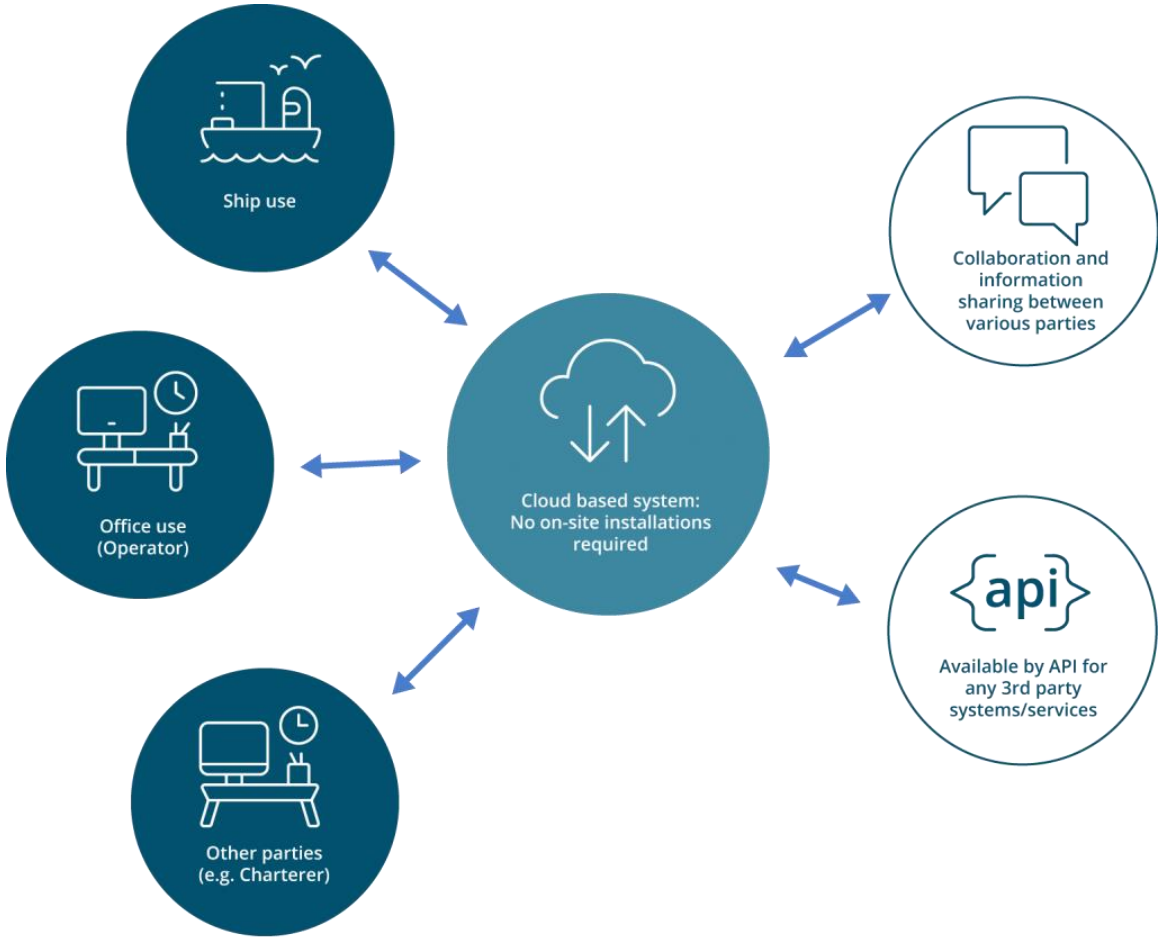
NAPA Voyage Optimization

An easy-to-use solution for improving operational efficiency by optimizing route and speed profiles for any sea passage.

As part of NAPA Fleet Intelligence, NAPA Voyage Optimization runs in your web browser and **doesn't require any hardware installations or initial investment**.



NAPA Voyage Optimization: How it works



- Browser-based module for **NAPA Fleet Intelligence**
- **Onboard and on-shore** tools, increased **communication** and awareness
- Intuitive and smooth **User Interface**
- Weather routing for multiple **voyage scenarios simulations** and comparisons on **ETA, fuel cost and safety**
- High accuracy **performance model** predictions for **all commercial ships**
- Even higher performance prediction accuracy when using additional data sources (noon reports, automation measurements)
- Available also as an **API for 3rd party integration**

NAPA Voyage Optimization

Quick Guide

Menu

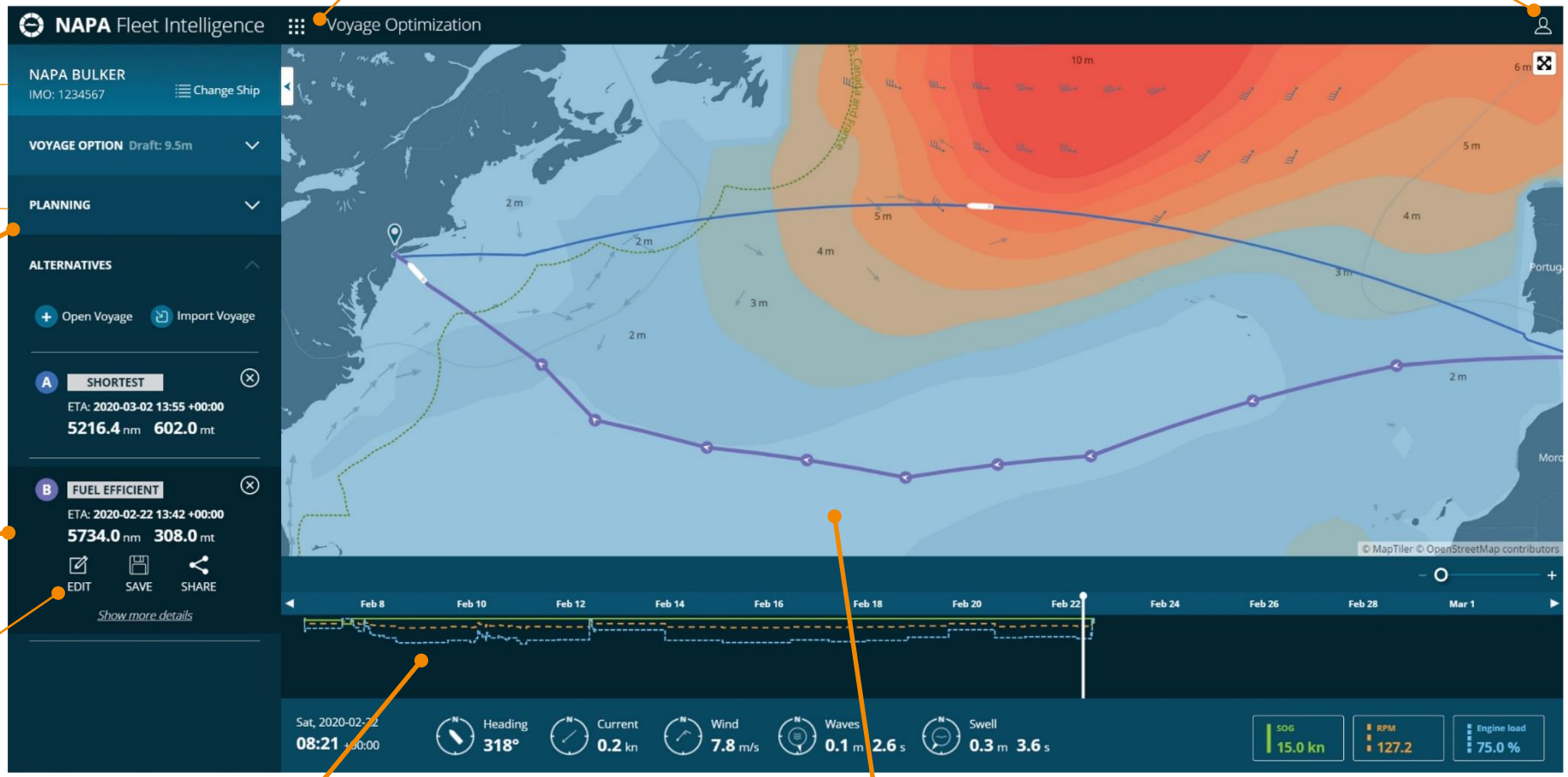
User account and settings

1 Select ship, and define departure and destination

2 Select optimization target
- Use constant speed, RPM or engine load
- Or optimize for desired ETA

3 Compare alternative routes

Edit, save or share

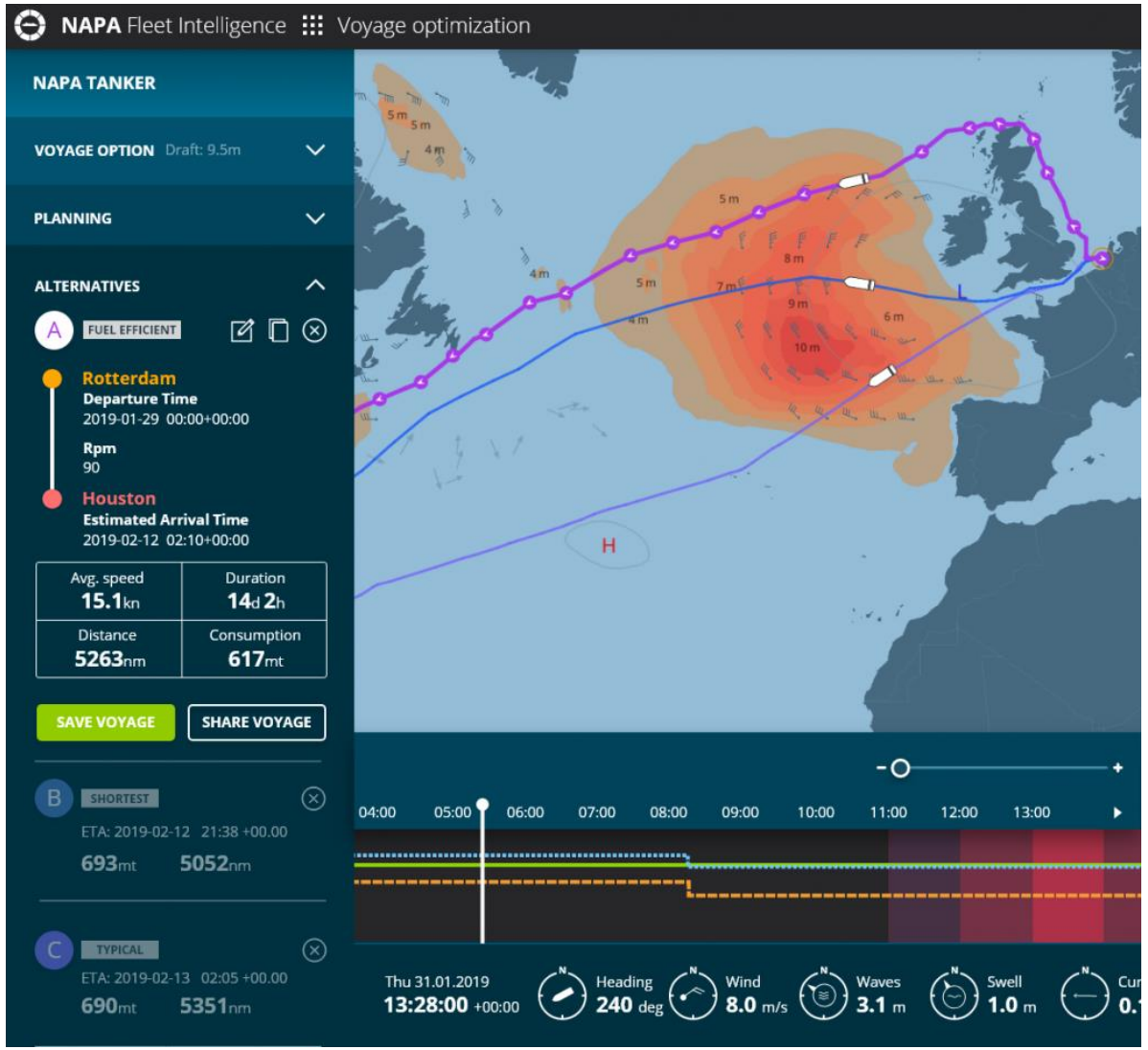


4 Use the time slider to see how weather varies along the route

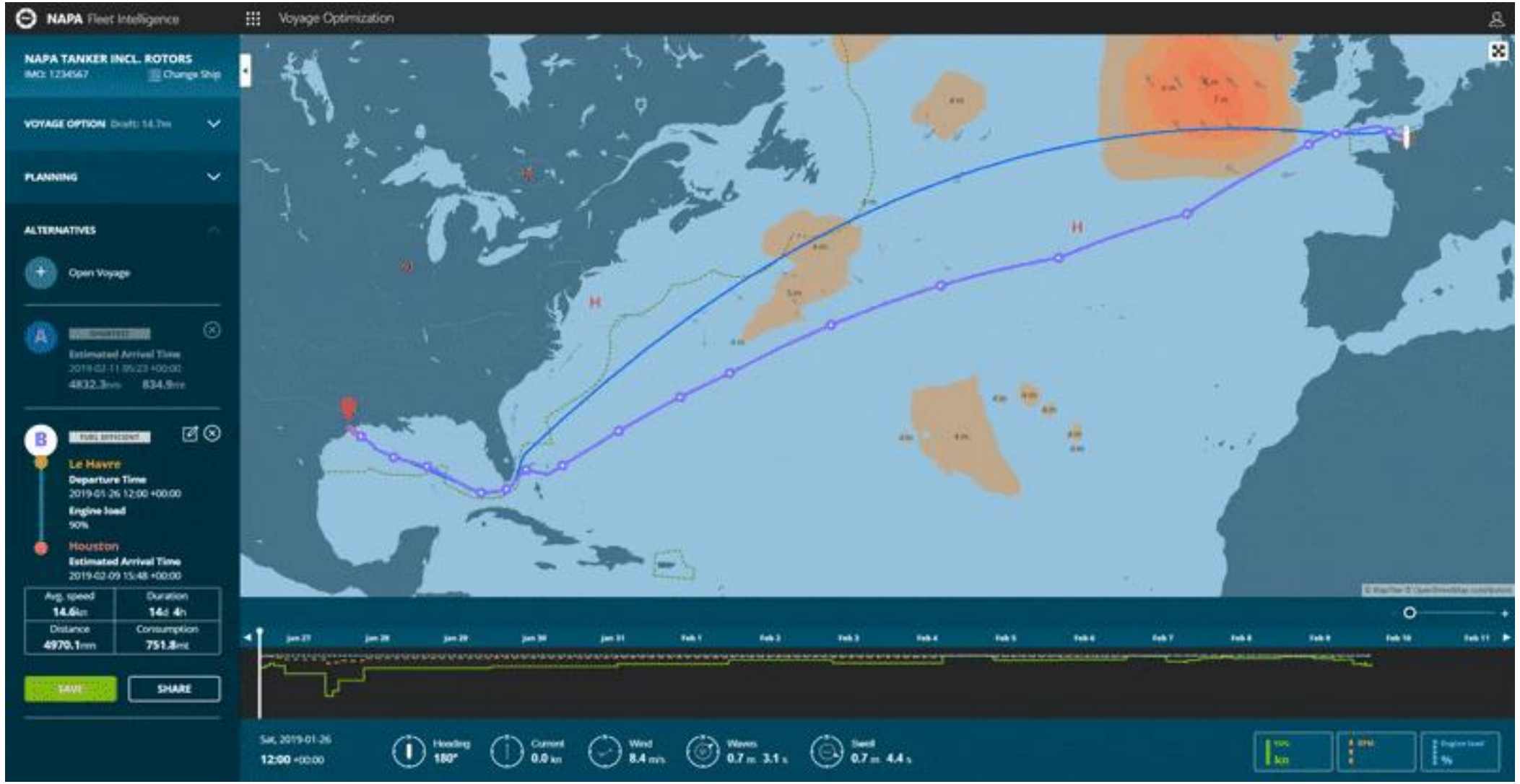
5 Zoom in and point on map to see more information on weather details and waypoints

Key features

- Weather routing using target speed, RPM, engine load or arrival time
- Multiple **route alternatives** provided for comparison
- Performance of the vessel calculated using **NAPA's proprietary performance model**
- Wind, wind waves and swell, sea and tidal current, water depth and additional safety limits taken into account
- Different fuel types and their properties included in the optimization
- Speed/RPM profile optimization considers avoidance of rough environmental conditions as well as **higher fuel costs at Emission Control Areas**
- Proposed route is produced using nautical chart material and is usually **ECDIS compliant**. Final verification for safe route will be done onboard with latest ENC materials and Temporary and Preliminary Notices to Mariners.

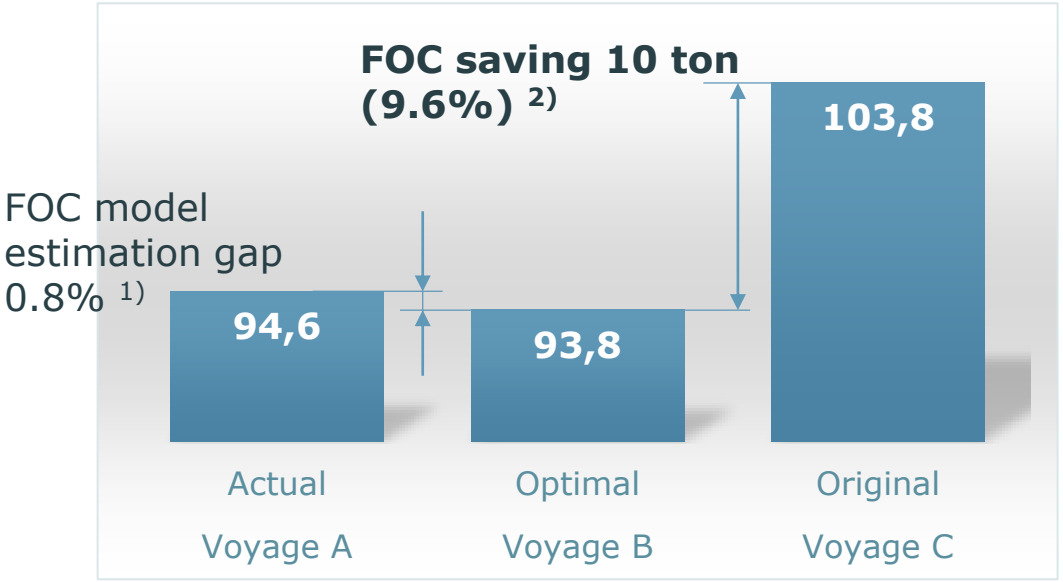


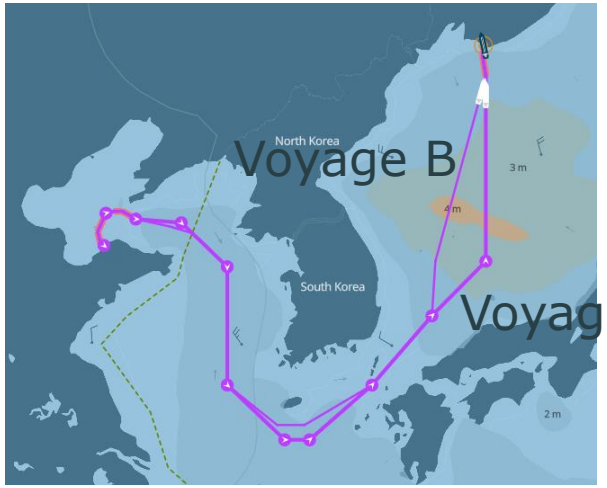
Map and weather information



Case 1, 20th of November 2019

Fuel consumption comparison



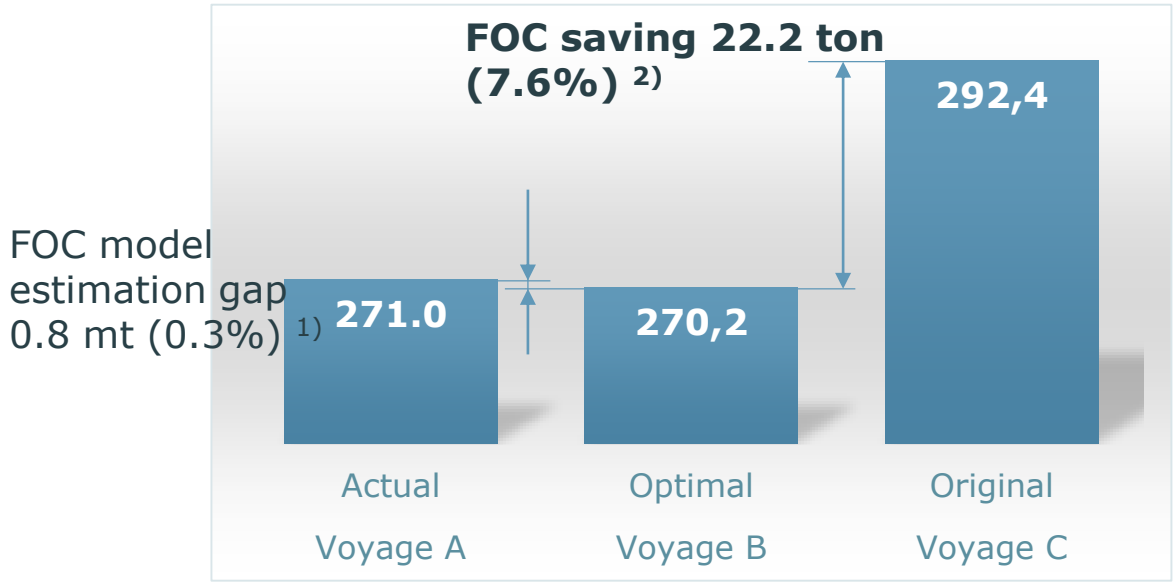


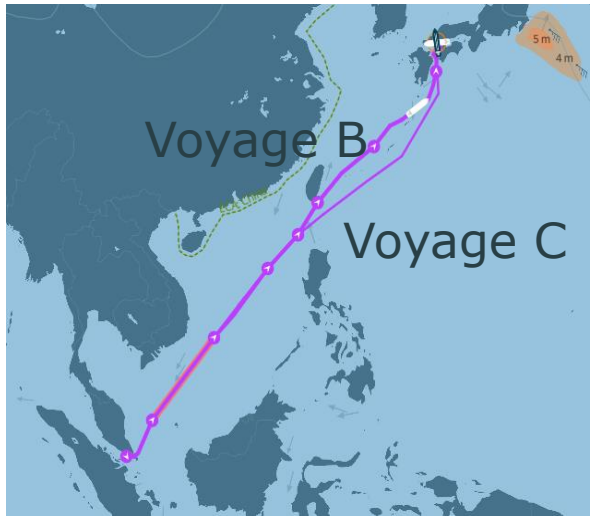
1) NAPA estimation vs. actual consumption of the voyage reported by captain
2) Optimal and original voyage in NAPA Voyage Optimization differ by 10 mt, meaning this voyage achieved 8% fuel saving due to the optimal route

20 Nov. 2019

Case 2, 26th of November 2019

Fuel consumption comparison





1) NAPA estimation vs. actual consumption of the voyage reported by captain
2) Optimal and original voyage in NAPA Voyage Optimization differ by 22.2 mt, meaning this voyage achieved 8% fuel saving due to the optimal route

25 Nov. 2019

Port call inefficiencies >> routing inefficiencies

Shipping businesses lose annually 18 billion USD due to ”Rush to Wait”

Captain Risto Kariranta, Director, Services, NAPA Shipping Solutions discusses how NAPA Fleet Intelligence can address a significant source of fuel inefficiency in the shipping industry

- https://www.napa.fi/shipping-businesses-lose-annually-18-billion-usd-due-to-rush-to-wait/

TEKNOLOGIA 16.12.2019

Port Call Optimization – Digitalisaatio ja tekoäly auttavat ennustamaan alusten saapumisaikoja

Digitalisaatio on voimakkaasti esillä Helsingin Sataman strategisissa kärkihankkeissa. Yksi kärkihankkeista on Tehokkaat satamatoiminnot, jossa yhtenä tavoitteena on digitalisaation keinoin tehostaa satamarakenteiden käyttöä.

- https://www.portofhelsinki.fi/verkkolehti/port-call-optimization-digitalisaatio-ja-tekoaly-auttavat-ennustamaan-alusten

3.6.9 Lack of data and information sharing

There is still a lack of available data for optimizing. For example, vessels’ expected arrival times to ports are not publicly available. In order to optimize ship operations this would be crucial information for shipping companies. Shipping companies might not even know beforehand what kind of scheduling systems the port they are calling have.

- https://www.traficom.fi/sites/default/files/media/publication/Traficom_maritime_digitalization_CO2_20190927_ABSTRACTS.pdf

Port call inefficiencies >> routing inefficiencies

- Several initiatives for improving the scheduling efficiency exist, but none of those is making the berth availability data publicly available.
- To support more efficient planning globally, the scheduled berth availabilities from ports and planned arrival times (and route plans) from ship operators should be public.
- If this happens, it will be easy to analyze whether the extra waiting is due to port not informing their availability properly or by ships not planning the voyages efficiently.
- In addition, Virtual Arrival clauses or other contractual changes between owner and charterer are needed, to avoid contradicting incentives.

In partnership with

MarineTraffic

A pioneer and leader in AIS based services, is providing weather routing services for their customers based on NAPA's ship performance models and optimization algorithms.

MarineTraffic

See more

ChartWorld

ChartWorld has generated a route network that allows NAPA to safely optimize voyages from port to port. ChartWorld is also embedding NAPA's ship performance and optimization algorithms inside their onboard tools related to voyage planning.

See more

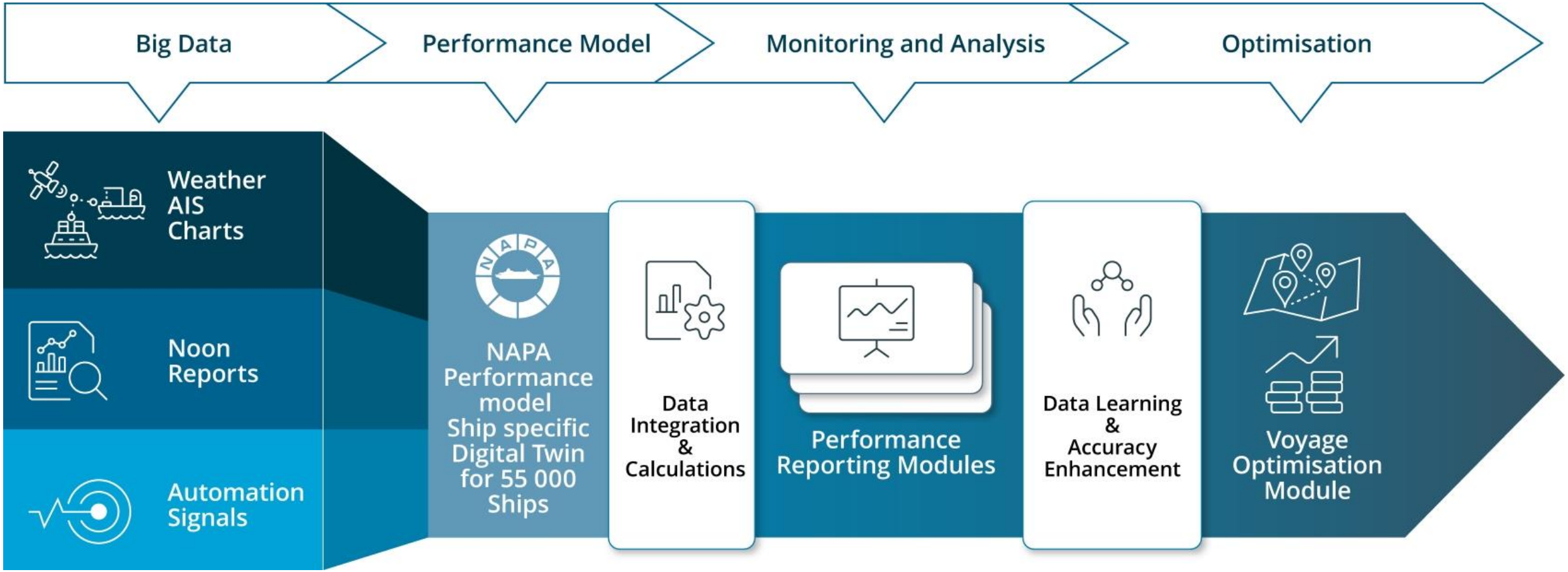
tidetech

NAPA's high quality ship performance evaluation or weather routing services are utilizing environmental forecasts, nowcasts and climatology models from tidetech

tidetech

See more

NAPA Fleet Intelligence uses the data sources that you have available to deliver insights and reports



Why NAPA?

- NAPA is the only performance optimization partner who can draw on **30 years' experience of 3D hull form design, big data and hydrodynamic calculations**. We've built our solutions based on data you won't find anywhere else. Put your performance optimization in the hands of the experts.
- 95% of ships built annually designed by NAPA users
- 30 years experience in 3D hull form design and hydrodynamics calculations
- 2500 onboard installations for 3D ships model based loading computer, monitoring and analysis