FLEET OPERATIONS SOLUTION

The future of Safe Navigation in the Smart Marine Ecosystem

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Facts

300
VTMS are installed in more than

100 ports in   **55** countries

More than
3000000
of electronic charts sold worldwide

Transas collection includes
17000
electronic charts

Marine onboard equipment is used on more than
13000 commercial vessels and patrol boats of naval and Coast Guard fleets from over 100 nations.

More than **5500** marine simulation systems in
91 countries

More than
10000
electronic chart systems and several millions of electronic charts supplied

45%
world's marine simulation market

35%
Electronic Chart Systems world's market share

Ship Traffic Control Solution

River Information Services / Inland VTS

Over 25% of the global market of Port & Vessel Traffic Management Solutions

Automatic Identification System

Coastal Surveillance Systems

Vessel Traffic Monitoring Systems

Offshore Monitoring Solution

Transsas Simulation

CUSTOMERS

VISION

Fleet Operations Solution (FOS) is designed to achieve the highest level of safety at sea, increase fleet efficiency and simplify everyday tasks both ashore and on board.

With FOS, the operations are processed seamlessly, the compliance is guaranteed and the workload and costs are optimized.
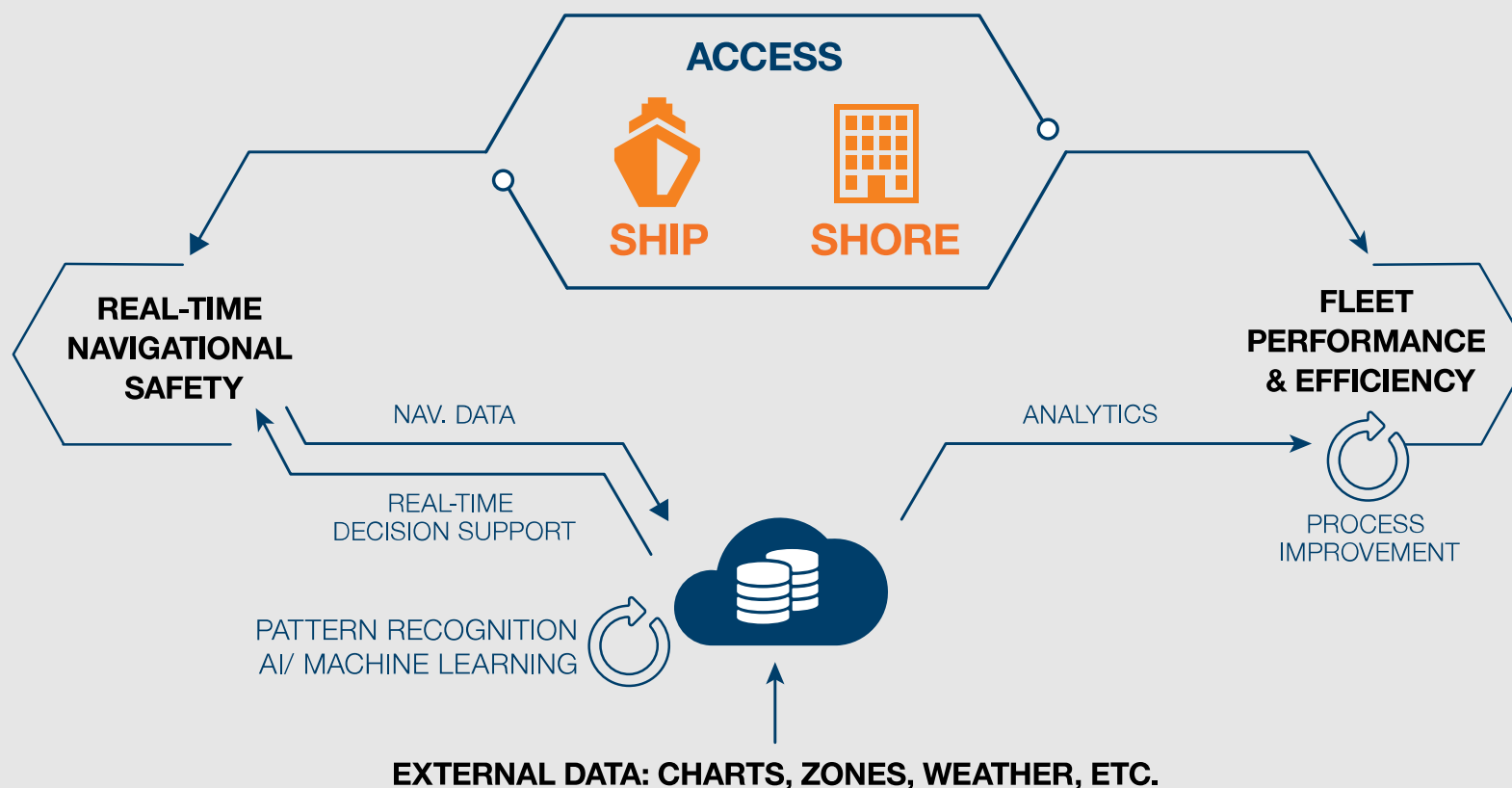
Environment

Efficiency

Safety

FOS unites all navigational processes and voyage data on a single platform making the crew and the operations center work as one.

Along the entire route, vessel and shore are exchanging the information in a secure environment to make sure that the ship arrives to the destination point safely, in time and with maximum fuel efficiency.

ACCESS

SHIP   **SHORE**

REAL-TIME NAVIGATIONAL SAFETY

FLEET PERFORMANCE & EFFICIENCY

NAV. DATA

ANALYTICS

REAL-TIME DECISION SUPPORT

PROCESS IMPROVEMENT

PATTERN RECOGNITION AI/ MACHINE LEARNING

EXTERNAL DATA: CHARTS, ZONES, WEATHER, ETC.

Far Beyond Vessel Tracking Solution

Advanced software applications facilitate routine tasks and decrease the workload allowing people to focus on their main objectives

With FOS it is possible to:

- Track the fleet in real-time mode and receive detailed information on each vessel

- Access the operational data anytime from anywhere on multiple devices

- Track operational performance with flexible KPIs

- Select the most efficient route optimized automatically in accordance with weather conditions

- Always have the latest and most recent charts and voyage data at hand for planning

- Ensure uptime of the navigational equipment and get timely support

- Get alarms and quickly respond to unusual ship behaviour and anomalies

- Help the crew to perform safe manoeuvres in situation of high stress or overwhelming traffic

- Constantly maintain the competence of the crew

Ship

- Real-time decision support for maneuvering

- Voyage planning

- Voyage anomaly detection

- Training
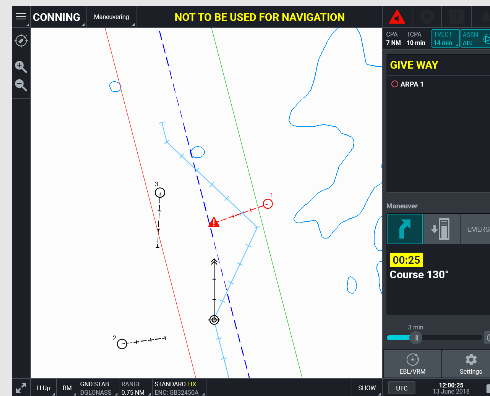
Fleet operations center

- Real-time monitoring and post voyage analytics

- Data collection

- Real-time decision support

- Reporting & benchmarking

- Voyage planning

- Training

- Centralized access via web interface or on tablets and smartphones

- Deployment on a local datacentre at the customer's office

- Crews access ECDIS, Radar and the planning station with the FOS interface
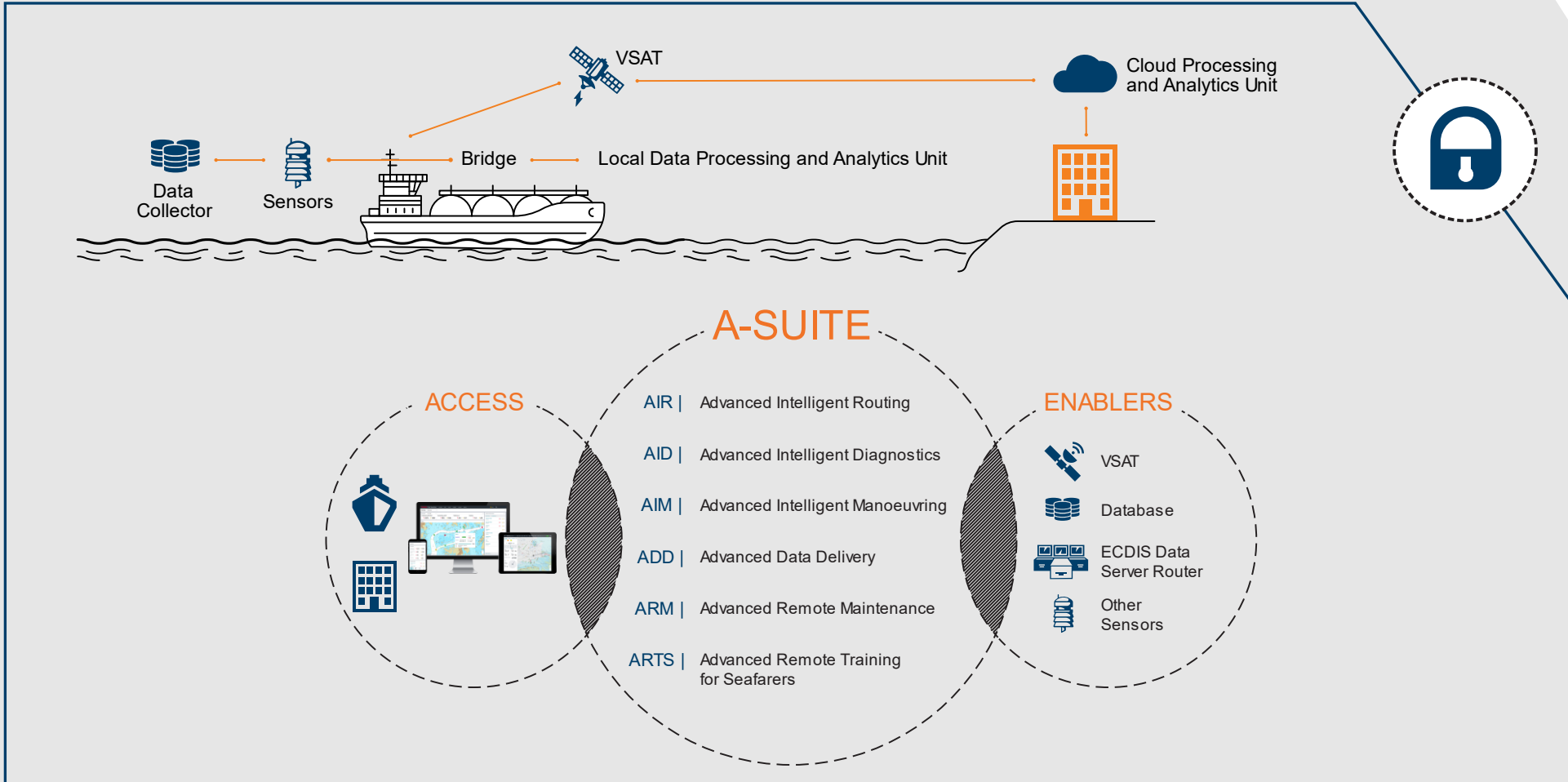
All tools and data are connected in one operating system with the ECDIS kernel at its core, building the basis for improved operational efficiency and safe processes, with all stakeholders having access to and relying on the same information.

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A set of connected intelligent applications inside FOS

Advanced software applications facilitate routine tasks and decrease the workload allowing people to focus on their main objectives.

A-Suite uses artificial intelligence to improve situational awareness and decision support on bridge and ashore.

- Analytics
- Decision Support
- Artificial Intelligence
- Planning
- Maneuvering
- Situational Awareness

A-SUITE

AIR | Advanced Intelligent Routing
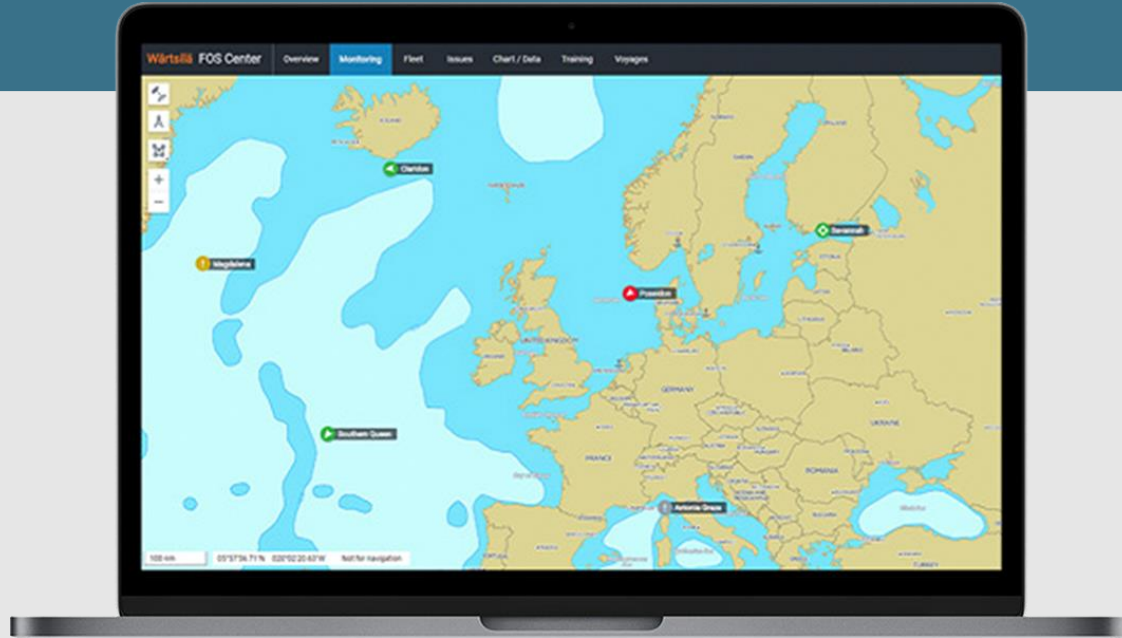
AID | Advanced Intelligent Diagnostics

AIM | Advanced Intelligent Manoeuvring

ADD | Advanced Data Delivery

ARM | Advanced Remote Maintenance

ARTS | Advanced Remote Training for Seafarers

FLEET TRACKING

Web-based SSAS-Tracking service that provides processing and distribution of SSAS Alerts and displays your vessel's position anywhere in the world anytime.

- Fleet tracking in accordance with SOLAS XI-2 Regulation 6

- Vessel tracking using a selection of terrestrial or space-based AIS services, or a combination of both options for improved accuracy

- Multiple connection options:

  - ShipGuard ISAT M2M/IsatData Pro terminals

  - Wide range of Inmarsat C and Inmarsat mini-C terminals
  - Fleet BroadBand terminals

AIR – ADVANCED INTELLIGENT ROUTING

AIR optimizes vessel route according to a variety of metocean data, as well as traffic separation schemes and regional regulations on acceptable fuel types, using artificial Intelligence technologies.
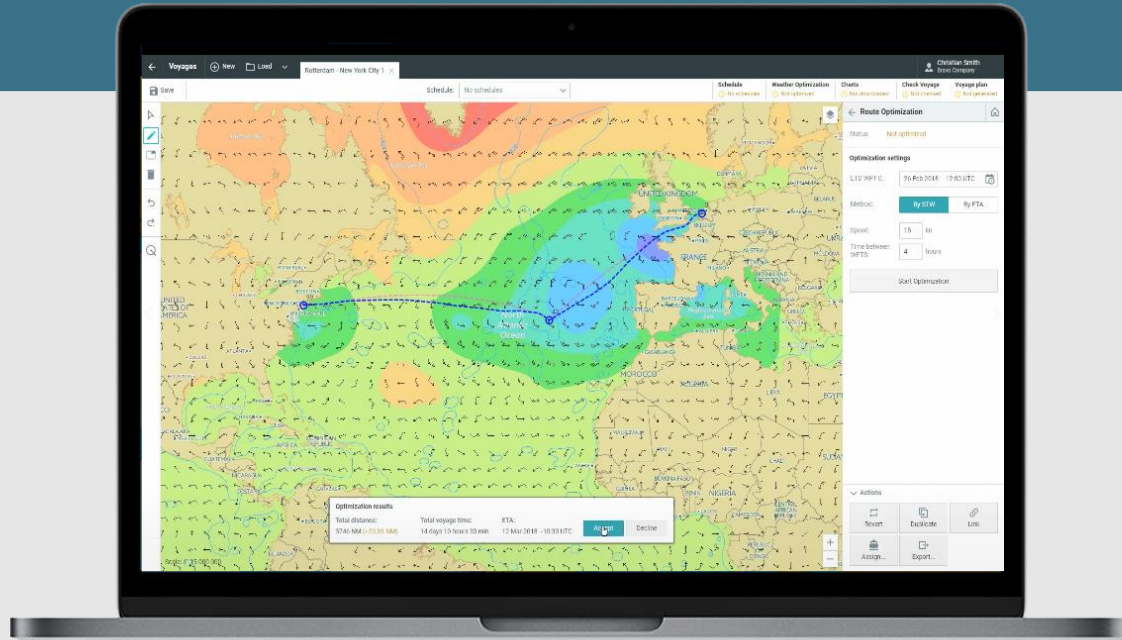
- Automated fastest and safe route generation and update

- Geometric and weather optimization

- Reduced bridge crew workload

- Efficient fuel consumption

- ECDIS integration

- Safety check and Voyage plan documentation.

# ADD – ADVANCED DATA DELIVERY

ADD automatically keeps the charts and planning tools updated and therefore compliant.

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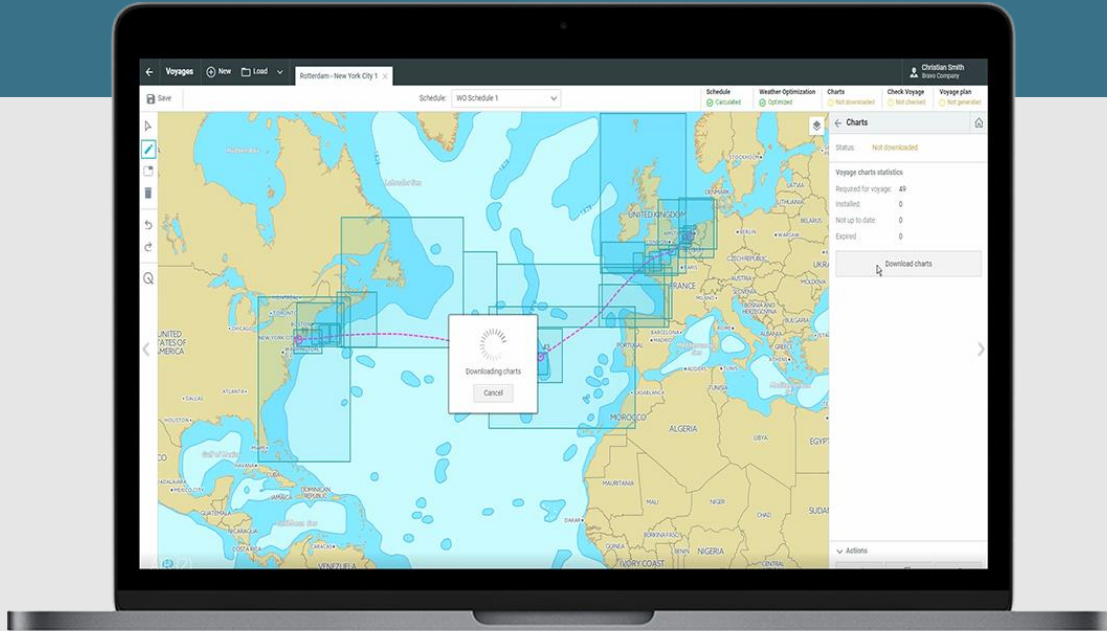
- Information is always available in the ECDIS notification centre

- Easy way to deliver official charts and data for the voyage

- All charts are available in the package and are paid with the same invoice

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AID – ADVANCED INTELLIGENT DIAGNOSTICS

AID detects anomalies, i.e. abnormal, unusual and/or dangerous patterns in ship behaviour, real-time and post voyage, in order to increase situational awareness, eliminate the possibility of human error and eventually, reduce risk.
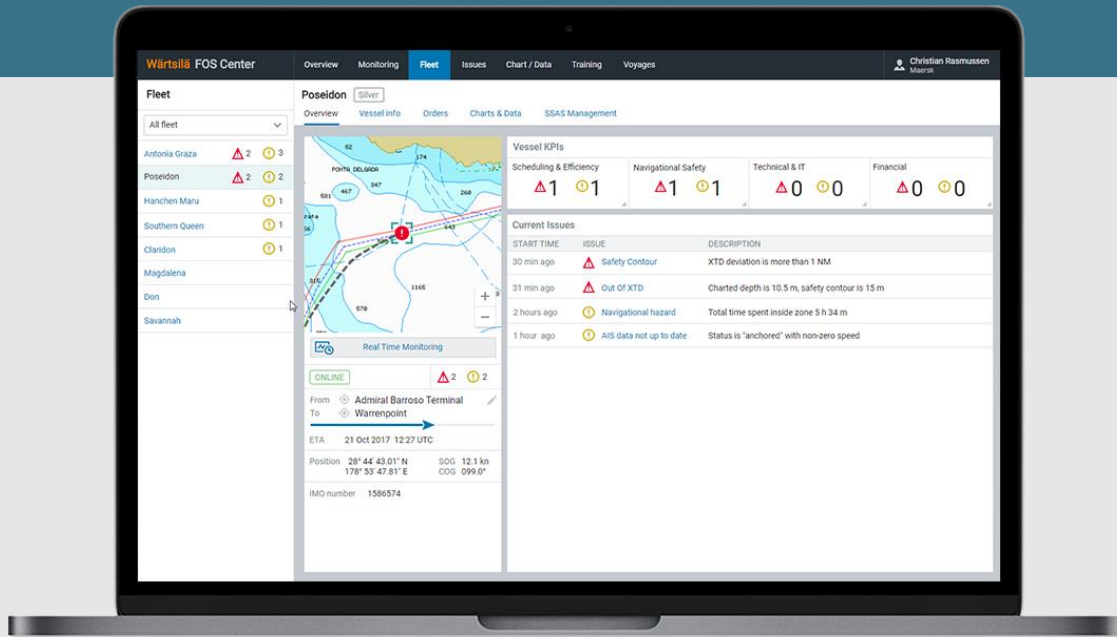
- Automatic anomaly detection and alerts

- Allows to foresee and prevent dangerous situations, including

  - Excessive / extreme manoeuvring

  - 'Near miss' collisions / grounding cases

  - Potential loss of ship stability and cargo shift problems

  - Dangerous hull / machinery loads

  - Ignoring critical navigational alarms

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ANOMALIES

| ◄ | August | ► | 2018 | Last 24 hours |

Mn	Tu	We	Th	Fr	Sa	Su
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Types
- [ ] All types
- [x] Navigational Safety
- [ ] Technical & IT
- [x] Scheduling & Efficiency
- [ ] Financial

Statuses
- [x] All statuses
- [x] Only active
- [x] Only inactive

Time	Anomaly	Type	Description
Now	● Safety Contour	Navigational Safety	Charted depth is 10.5 m, safety contour is 11.5 m
12:23	● Navigational hazard	Navigational Safety	Total time spent inside zone 5 h 34 m
11:18	● AIS data not up to date	Scheduling & Efficiency	Status is "anchored" with non-zero speed
21 Aug 23:40	● Safety Contour	Navigational Safety	XTD deviation is more than 1 NM
21 Aug 15:01	● AIS data not up to date	Scheduling & Efficiency	Status is "anchored" with non-zero speed
21 Aug 12:01	● Navigational hazard	Navigational Safety	Total time spent inside zone 5 h 34 m
20 Aug 23:40	● AIS data not up to date	Scheduling & Efficiency	Status is "anchored" with non-zero speed
20 Aug 13:40	● Safety Contour	Navigational Safety	XTD deviation is more than 1 NM
20 Aug 15:01	● AIS data not up to date	Scheduling & Efficiency	Status is "anchored" with non-zero speed
19 Aug 13:40	● Navigational hazard	Navigational Safety	Total time spent inside zone 5 h 34 m
19 Aug 15:01	● AIS data not up to date	Scheduling & Efficiency	Status is "anchored" with non-zero speed
19 Aug 12:43	● Safety Contour	Navigational Safety	XTD deviation is more than 1 NM
19 Aug 09:18	● AIS data not up to date	Scheduling & Efficiency	Status is "anchored" with non-zero speed

| 50 per page | |< < 2 of 7 > >| | UTC | **12:00:25** 13 June 2018 |

ARM – ADVANCED REMOTE MAINTENANCE

ARM provides remote support, diagnostics and preventive maintenance for the navigational bridge and satellite communication equipment.


- Remote support, diagnostics, performance analytics and preventive maintenance for the navigational bridge and satellite communication equipment

- Automatic software updates and fixes

- Service Desk access via Client FOS Application

AIM – ADVANCED INTELLIGENT MANEUVERING

Track prediction designed to improve situational awareness and reduce the probability of officer in-attention or poor judgment leading to an incident.
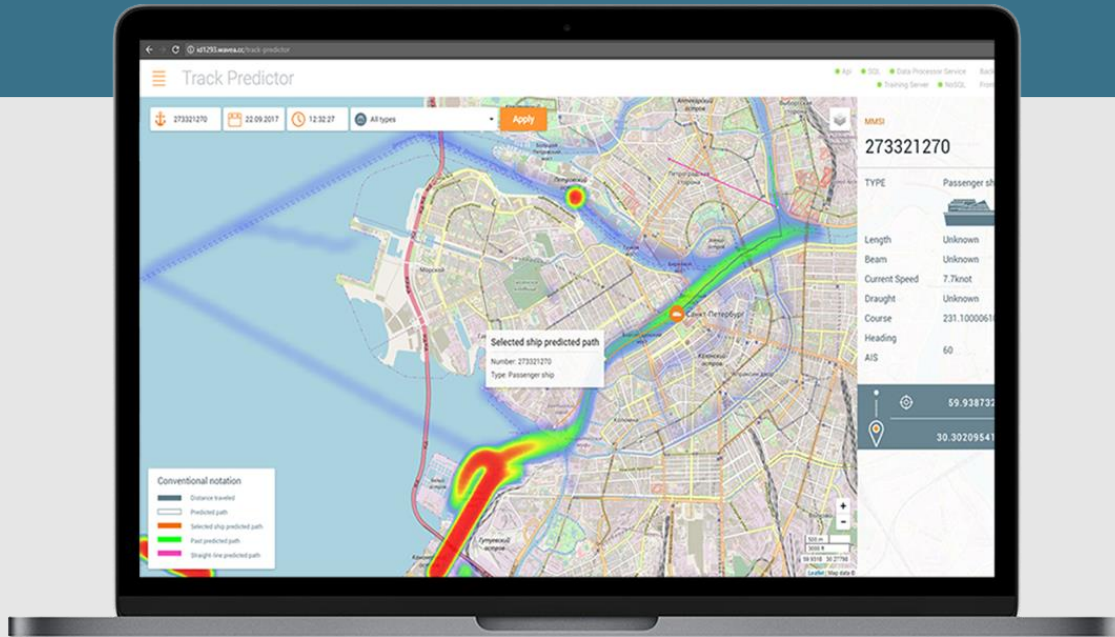
- 15-20 minutes reliable ship trajectory prediction for the area (98.5% accuracy)

- Recommendations of safe & efficient maneuvers to avoid collisions

- Prediction of potential collision and grounding events

- Identification of safety distance parameters applicable for the area

ARTS – ADVANCED REMOTE TRAINING FOR SEAFARERS
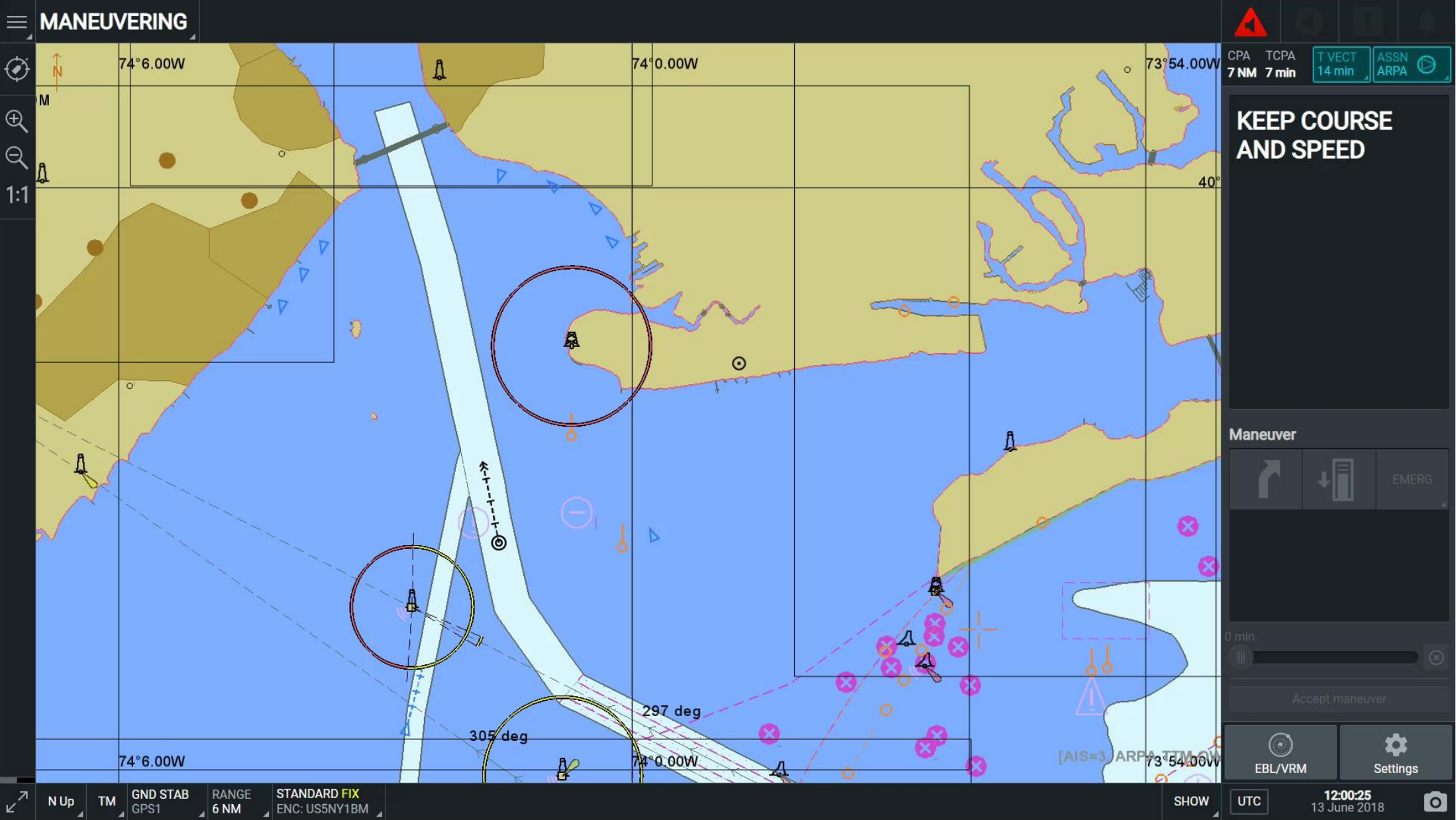
ARTS is an advanced e-learning solution. It provides online access to manufacturer approved type-specific training course featuring the original Navi-Sailor 4000 ECDIS software
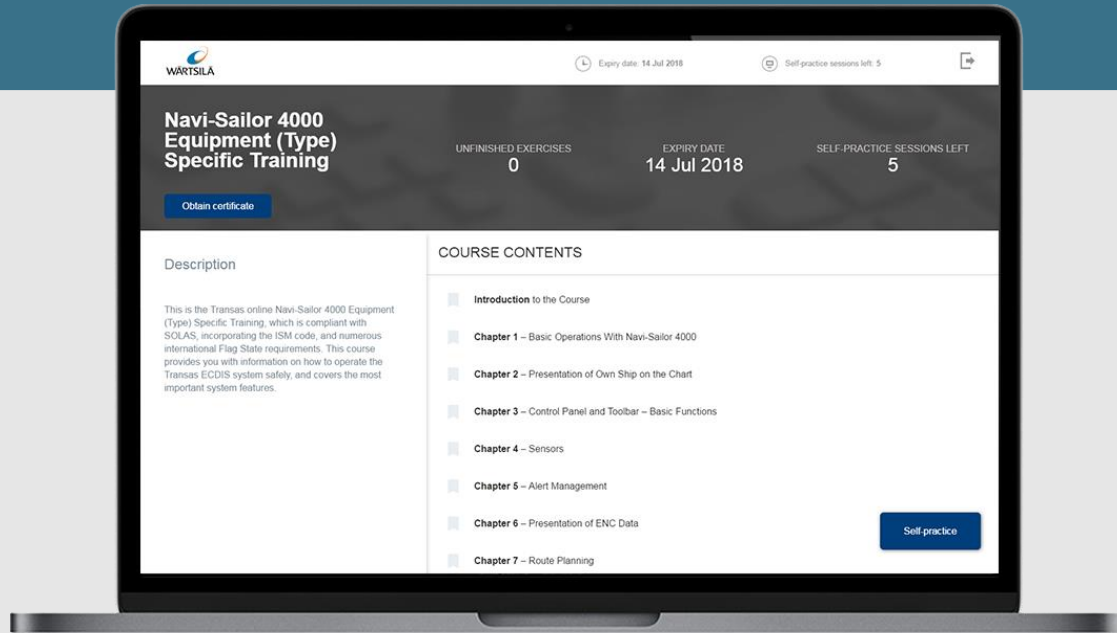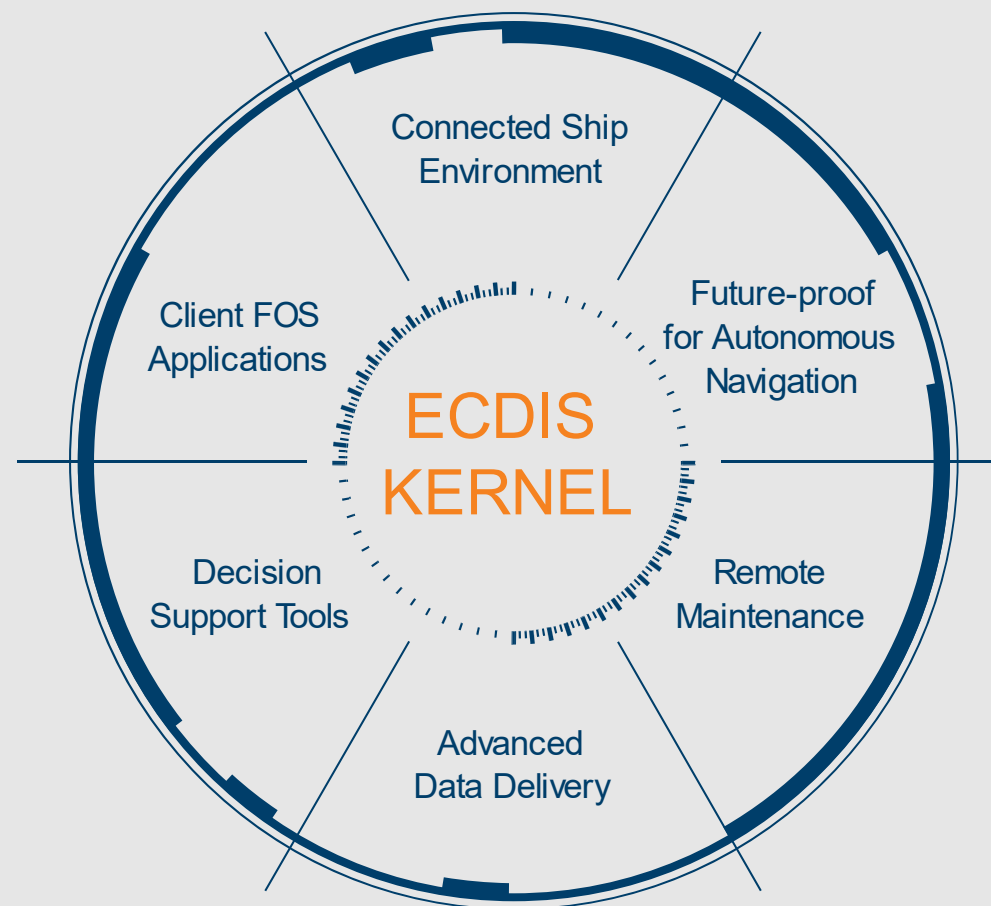

- Includes theoretical and practical sessions

- Manufacturer approved type-specific certificate confirming familiarization with the Navi-Sailor ECDIS and equipment

- Produced in accordance with the provisions, requirements and/ or guidance of:
  - SOLAS V/13, I/12, V/16, V/19.2.1.4-19.2.10, V/27, V/28, as amended
  - IMO MSC.1/Circ.1503/Rev.1
  - SOLAS IX/4-6,as amended
  - ISM Code clause 6,as amended
  - IMO STCW.7/Circ.24.

ECDIS

A complete connected Dual ECDIS solution as required by the IMO regulations compliant with the latest requirements.
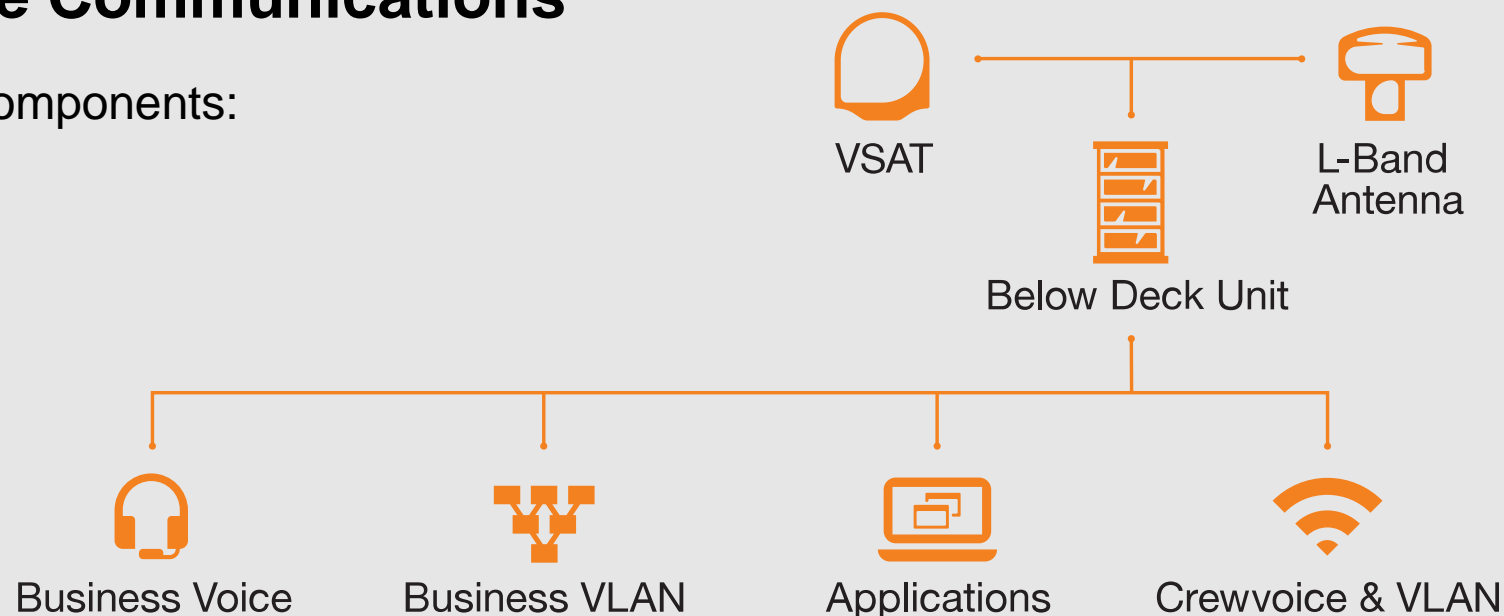
- Data Control Unit (DCU) – enables connection between the navigation system and data sensors.

- Data Management Server (DMS) – built-in on board data processing and storage solution.

- Telemetric Sensor (TMS) – built-in sensor providing smart collection of dynamic motion parameters for extended diagnostics and behaviour analytical services.

Connected Ship Environment

Future-proof for Autonomous Navigation

Client FOS Applications

ECDIS KERNEL

Remote Maintenance

Decision Support Tools

Advanced Data Delivery

ASAT – Agnostic Satellite Communications

The ASAT service includes 3 key components:

- VSAT Network

- VSAT Hardware

- Backup Solution

VSAT

L-Band Antenna

Below Deck Unit

Business Voice   Business VLAN   Applications   Crewvoice & VLAN

VSAT Network

The VSAT network coverage within the ASAT is comprehensive and supports a selection of carefully chosen global MIR and CIR plans. The coverage is build-up with 20+ satellites within the Ku-band, highly decreasing the effects of blockage zones (funnel, masts) and increasing the VSAT uptime on the vessel.

The network is future proof allowing higher bandwidth from HTS (High Throughput Satellites) to be included.

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Back Up Solution

The VSAT service requires a backup solution in case the VSAT is not available (blockage, interference or other reasons). It will ensure that the vessel can continue its business-critical applications and communications and call to shore.

Due to the nature of the service and availability, there is a high preference for Iridium or Fleet Broadband back up.

VSAT coverage   Iridium Backup
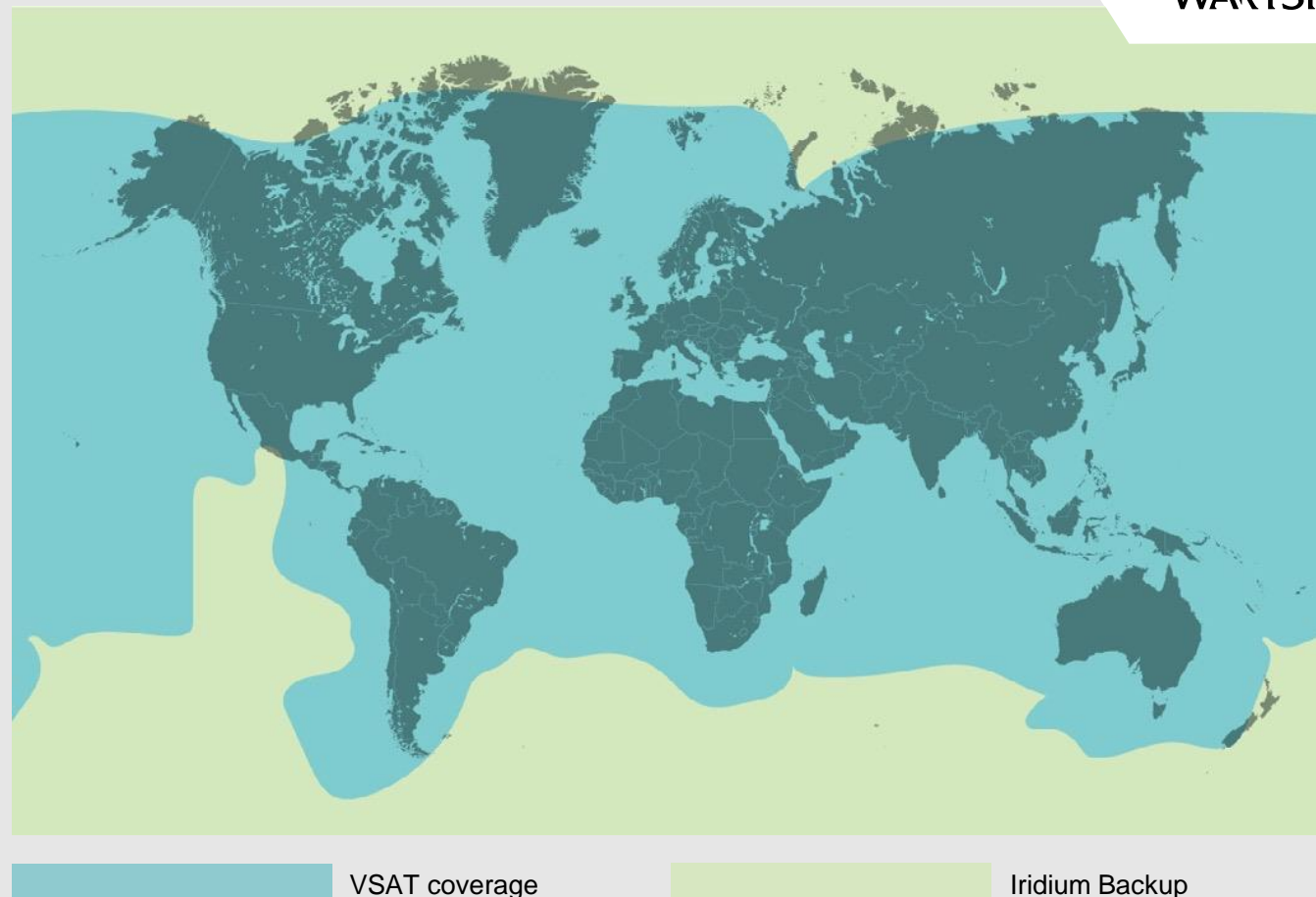
Other Sensors

Whilst FOS will collect (initially) vessel navigational and behavior (movement) sensor data, through our UNINAV interface you can collect multiple sensor data from other on-board systems and integrated this data into your Fleet Operations Centre or mobile device.

The best possible protection against cyber attacks

Sophisticated security compliant cloud platform
- Identity control
- Secure infrastructure
- Security applications
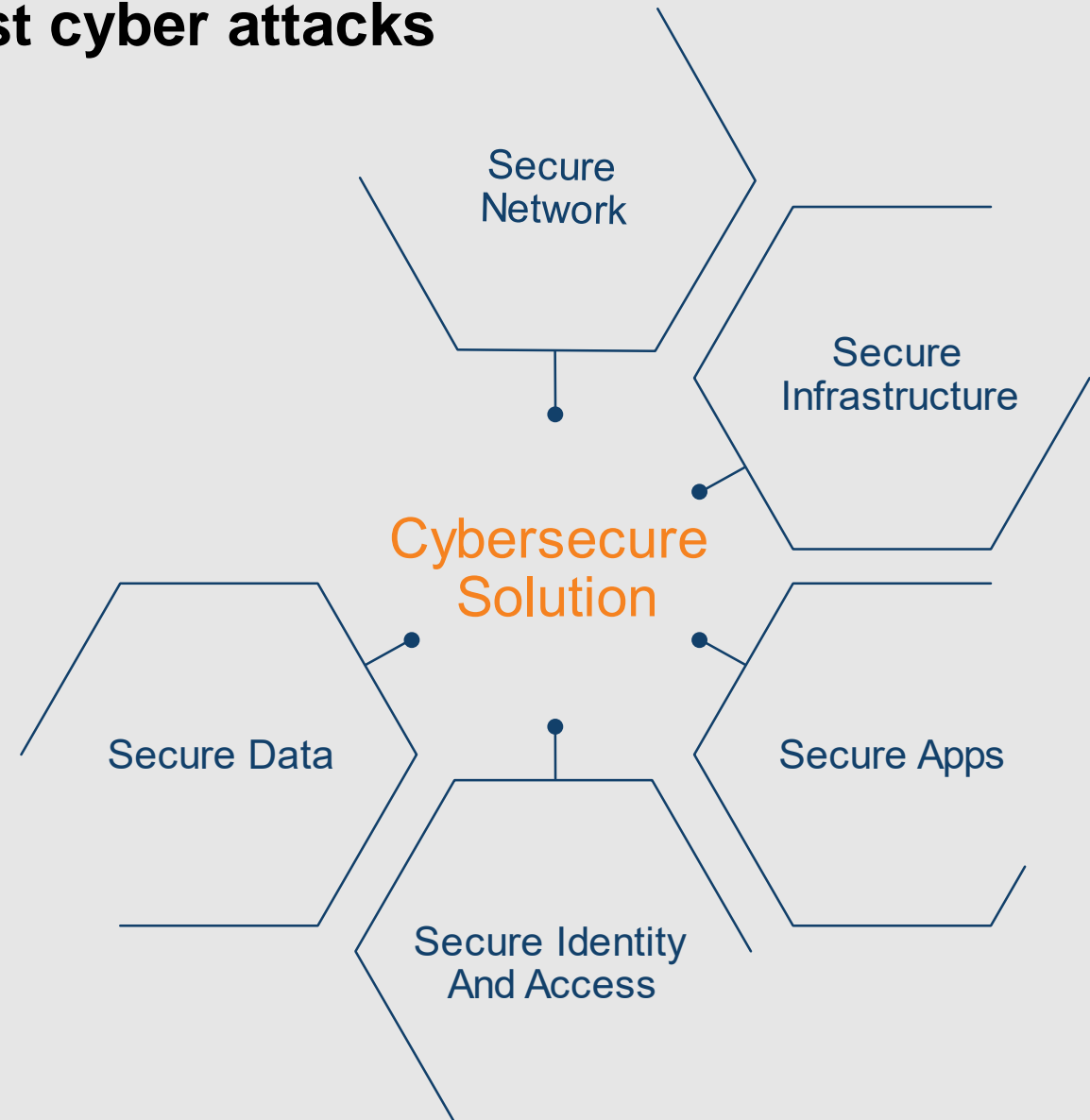- Compliant to the General Data Protection Regulation coming in force May 2018

VPN
- Firewall IEC 61162-460 standard approved

LAN business segmentation
- Business and private network segmentation with the traffic priority control

Data security validation
- Data integrity and validity checks.

Secure Network

Secure Infrastructure

Cybersecure Solution

Secure Data

Secure Apps

Secure Identity And Access

FOS

Future developments

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HOW

ENIRAM Entry (MVP)	ENIRAM Advanced
▪ Modelling of instantaneous fuel flow ▪ Reporting package ▪ C/P ▪ Speed ▪ MRV	▪ Continuous fuel consumption benchmarking & calibration (in AIR) ▪ Awareness (PPD modelling, industry KPIs) ▪ Technical Efficiency (fleet KPIs, Speed-fuel curves, Hull & propeller performance, engine SFOC) ▪ Voyage Efficiency (operational benchmarking, consumption analysis, performance analysis) ▪ Custom analytics

Advanced will require intergration to ship systems!

Roadmap – high level

MVP → **ENTRY** → **ADVANCED**

- Joint concept for marketing / showcase
  - AIR Fuel Benchmarking (Entry)
  - Reporting package
    - C/P reporting
    - Speed reporting
    - MRV reporting
- Technical feasibility confirmation for ENIRAM with Transas hardwarefunctionality

- Offering MVP as joint commercial package
  - Only Transas hardware
  - FOS w AIR Entry
  - Eniram Reporting package Entry

- Offering FOS + ENIRAM as commercially and technically integrated packages
  - FOS w AIR Advanced
  - Eniram Advanced services

- SMM Concept
- Q4 2018
- 2019