Annex 3

ENAV24-6.1.1.4

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NORWEGIAN COASTAL ADMINISTRATION

The Use of digital communication technology in VTS

Norwegian approach

Richard Aase, Senior Engineer

Tokyo, March 12th 2019

The Norwegian Coastal Administration

- National agency for safe navigation, coastal management and preparedness against acute pollution.
- An advisory and executive agency of the Ministry of Transport and Communications.
- Facilitates shipping as an *efficient*, *reliable* and *green* transport option.

Director General
Einar Vik Arset

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Overall goals and vision

- Promote safe and efficient seaways.
- Ensure sufficient width and depth in the fairway.
- Prevent marine accidents and acute pollution.

VISION:

To make our coast and waters the safest and cleanest in the world.

Vision and Goals

- Our vision is to make our coast and waters the safest and cleanest in the world.
- Our goals are to:
  - Facilitate navigability and contribute to efficient and competitive shipping.
  - Ensure safe voyage in Norwegian waters and oceans to prevent accidents.
  - Limit climate emissions and reduce the environmental impacts of shipping.
  - Prevent and limit environmental damage caused by acute pollution.

Main areas of responsibility

- Maritime safety.
- Maritime infrastructure.
- Transport planning and coastal zone management.
- Emergency response to acute pollution.
- ISPS

International work

- Participates in a number of international forums on maritime issues.
- Contributes to the development of policies and framework for safety at sea and maritime transport.
- Promotes Norwegian competence on maritime issues.
- Main cooperating partners:
  - International Maritime Organization
  - IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities)
  - European Maritime Safety Agency
  - EU/EEA
  - BPAC (The Baltic Pilotage Authorities Commission)
  - PIANC (Permanent International Association of Navigation Congresses)
  - IAPH (International Association of Ports and Harbours)

Areas for research and development

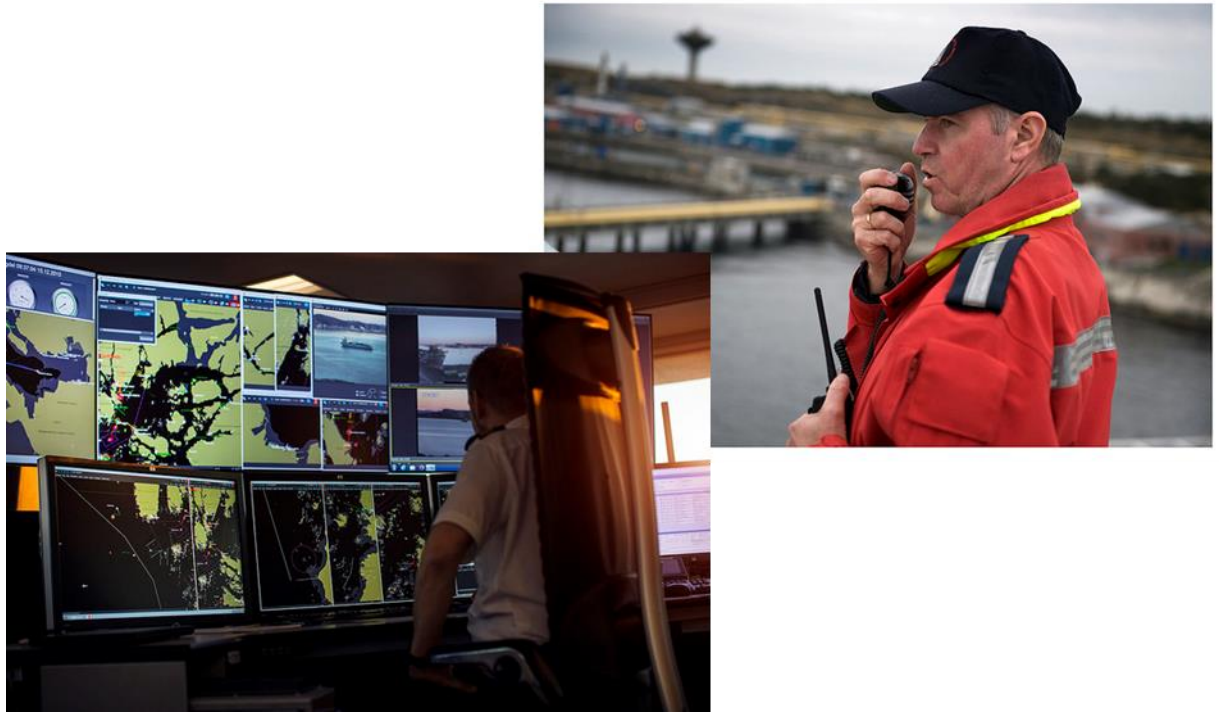
- ITS (Intelligent Transport Systems)
  - Communication between systems on board and ashore
  - Holistic, automatisation
  - ITS Norway – forum for inter-agency cooperation (rail, road, sea, air transport)
- e-navigation
  - IMO initiative, SIP coordinated by Norway
  - Provide needed information, in electronic format, to a ship's bridge team to enhance the safety and efficiency of marine navigation.
  - Simplify the exchange of information between systems on board and between ships, and on shore.

Climate and Environmental Strategy

- Ensure that we protect the environment when carrying out our tasks.
- Prioritized areas:
  - Promote the social and environmental benefits of maritime transport.
  - Work to reduce climate change and environmental impacts of shipping and ports.
  - Safeguard a dynamic emergency response to acute pollution.
  - Work systematically with environmental issues within our own organization.
  - Take responsibility for the environmental impact of our organization.

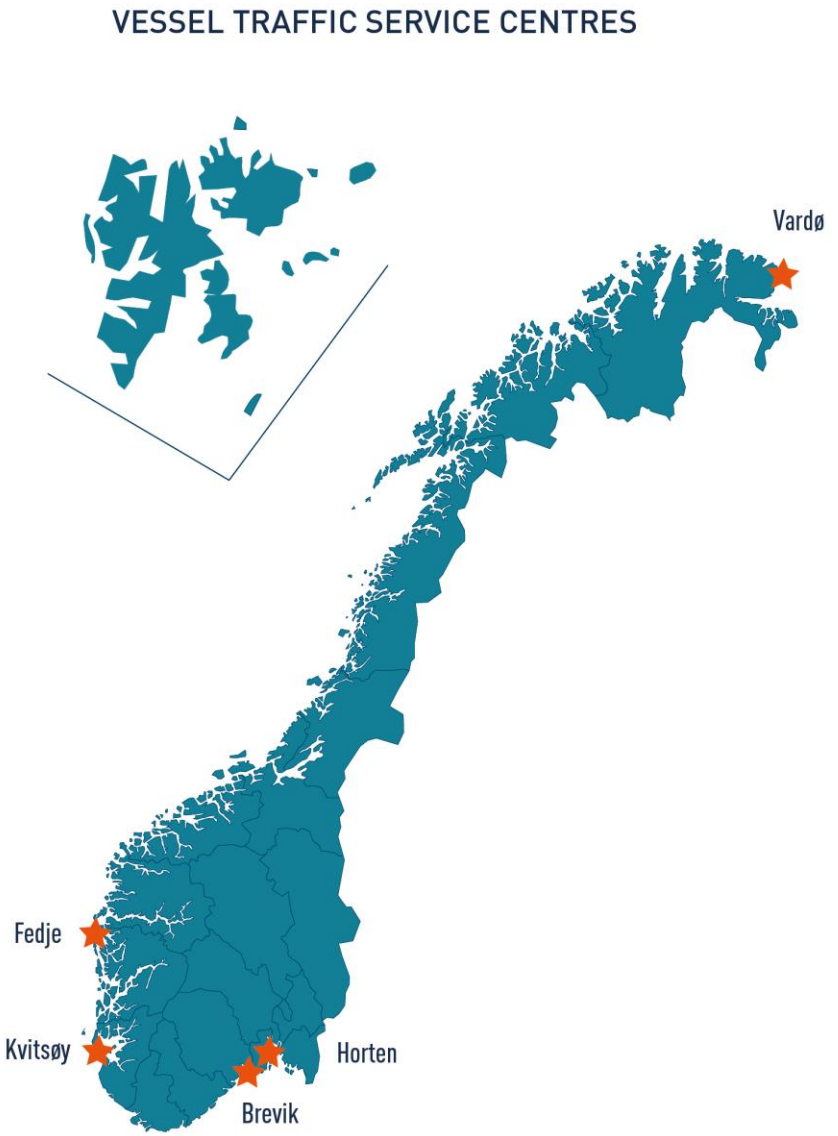
Maritime Services

- For improved and efficient safety and transport at sea:
  - Pilot service.
  - Vessel Traffic Service.
  - Messaging and Reporting services.



Vessel Traffic Services

- Prevents accidents and facilitates safe and efficient traffic in coastal areas.
- Offer services such as traffic control, information and navigation assistance to shipping.
- Monitors traffic using digital aids such as radar, camera, weather stations, VHF and AIS.
- Operational 24 hours a day - all year round.



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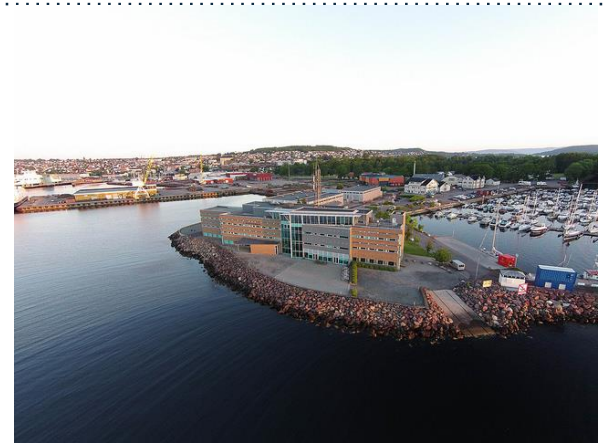
VTS



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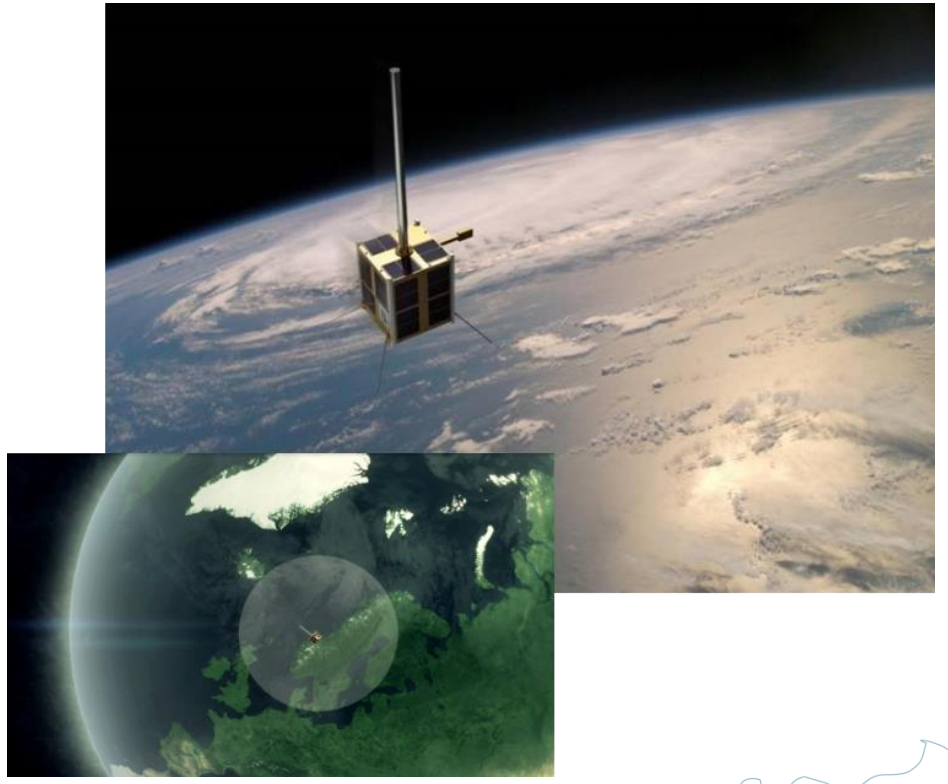
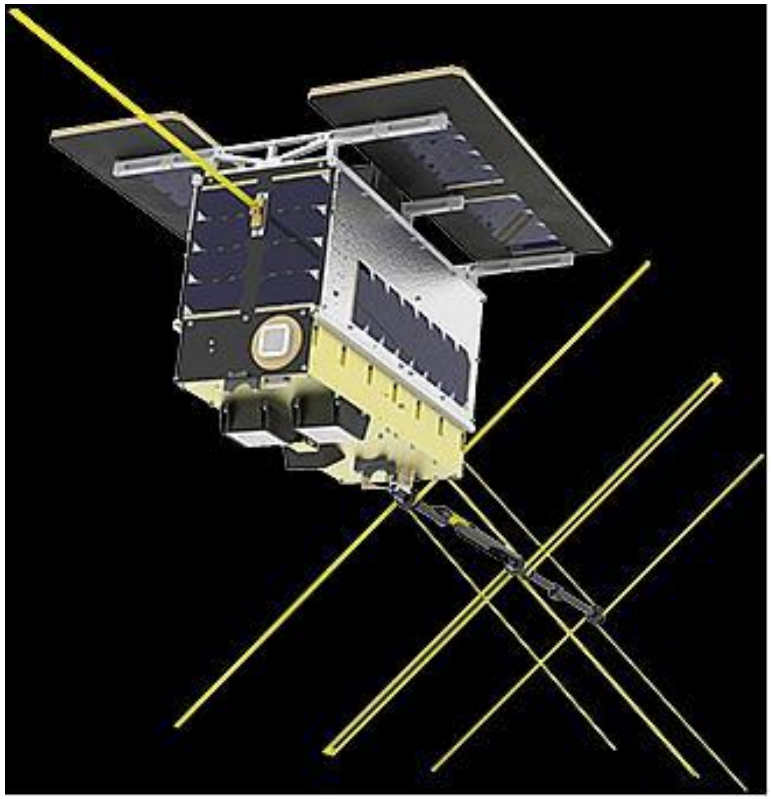
Reporting and Information Services

- Development and operation of:
  - Map service “Kystinfo”
  - Database for statistical ship traffic monitoring “Havbase”
  - NAVAREA XIX Warnings
  - National port overview
  - Navigational Coastal Warnings (NAVCO)
  - Radio Navigation (DGPS)
  - Land-based AIS
  - Satellite-based AIS
  - Long Range Identification and Tracking (LRIT)
  - SafeSeaNet Norway ship reporting system
  - Wave and Current forecasts
  - Ice Service



AIS – Automatic Identification System

- Ground- and satellite based
- 50 ground based stations covers coastal areas
- AISSat-, AISat-2, NORSAT 1 ans 2 with globale cover
- AISSat-3 to be launched in 2018
- Inter-agency cooperation – SAR, police, military, customs, fisheries

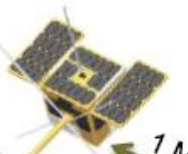


Future Arctic VHF Data Exchange Satellite System

Ship 1

VHF
2 x 100 kbps up
2 x 28 kbps down

Ship N



1 Mbps up/down
S-band

Norsat-2 (Test satellite)
- 650 km dusk to dawn polar orbit
- 98 minutes period
- 20 minute Arctic coverage
- Two way store and forward data transfer
- 10 MB upload capacity per pass
- 4 MB download capacity per pass

Statsat OPS centre

Vardø Gateway

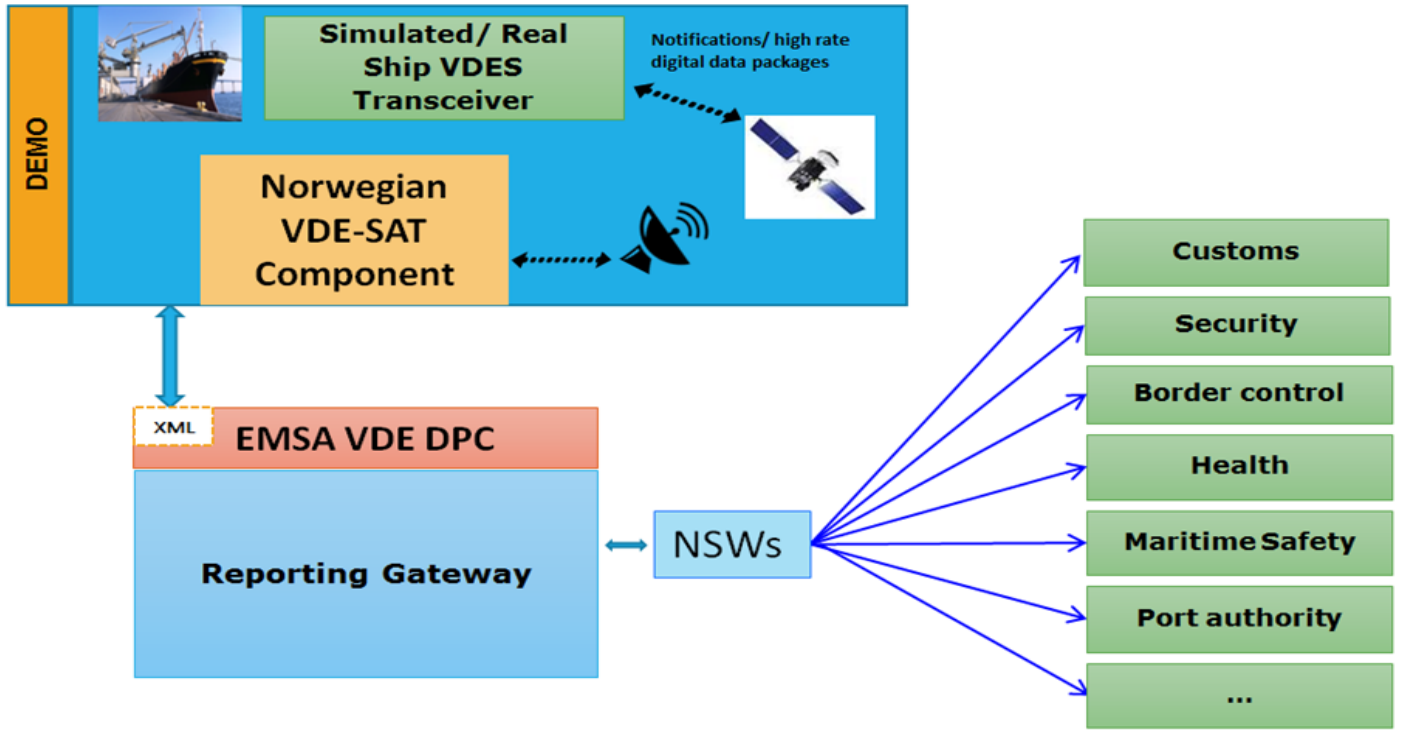
IMO eNav service portefolio
- VTS Information Service (IS)
- Navigational Assistance Service (NAS)
- Traffic Organisation Service (TOS)
- Local Port Service (LPS)
- Maritime Safety Information Service (MSI)
- Pilotage Service
- Tugs Service
- Vessel Shore Reporting
- Telemedicine Assistance Service (TMAS)

- Maritime Assistance Service (MAS)
- Nautical Chart Service
- Nautical Publications Service
- Ice Navigation Service
- Meteorological information Service
- Real time Hydrographic and Environmental info Service
- Search and Rescue Service (SAR)

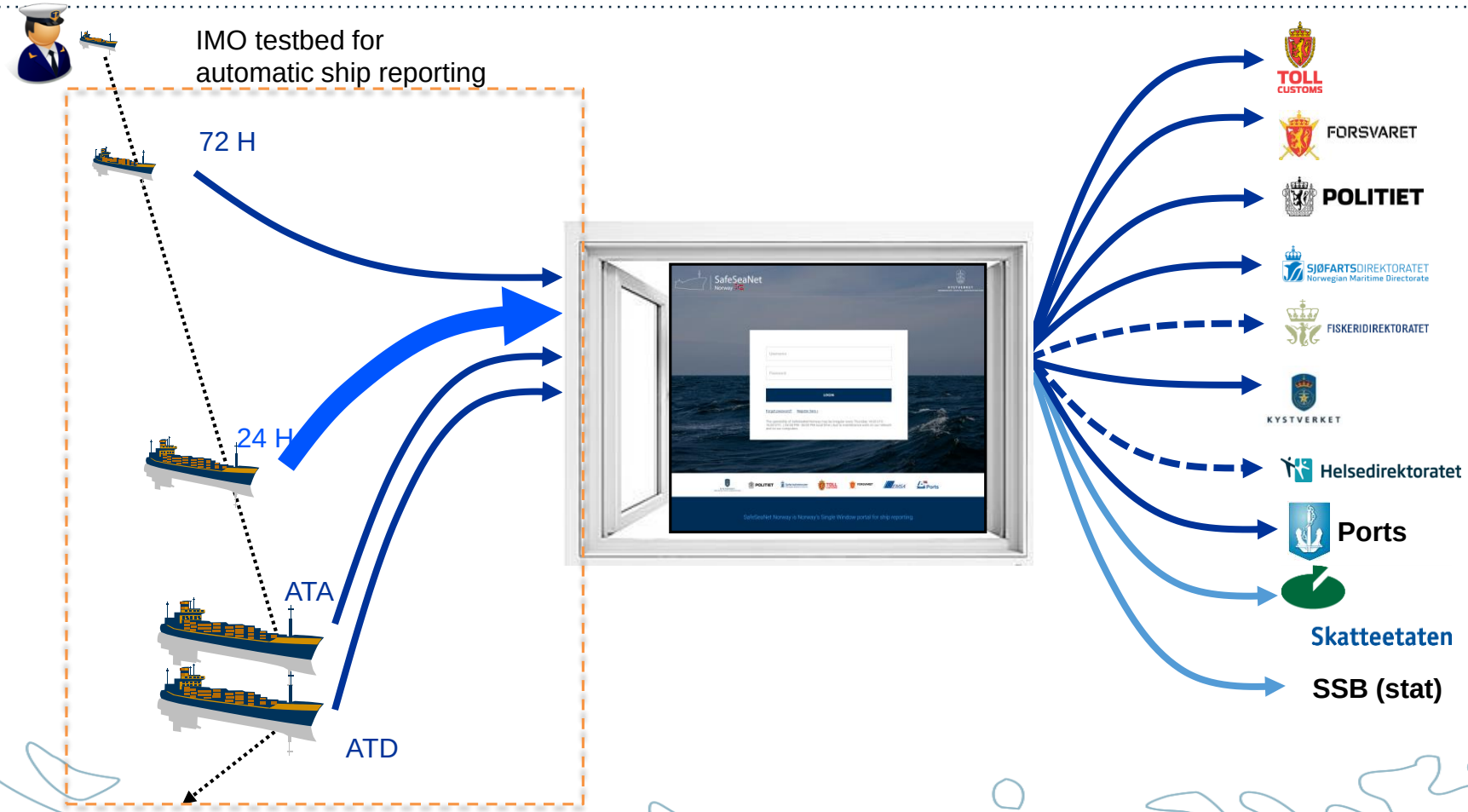
Internet

Third party applications

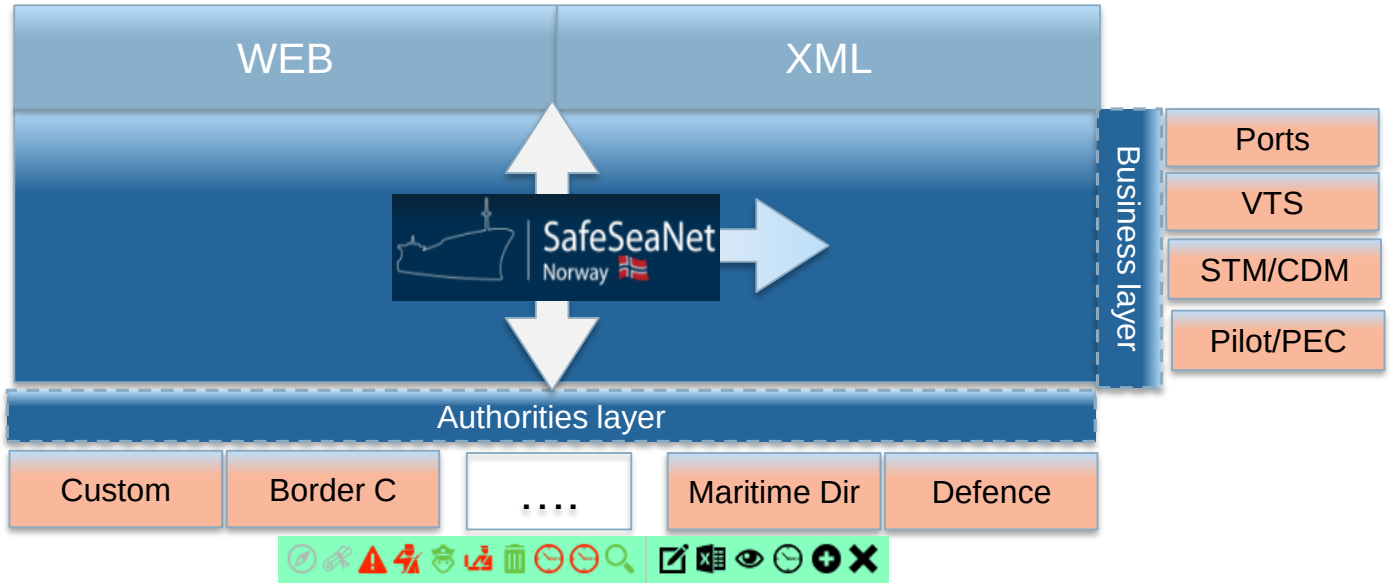
Distribution of digital data packages to NSWs via EMSA's Reporting Gateway



Maritime Single Window (SafeSeaNet Norway)



Norwegian Single Window (SSNN)



Automatic Reporting testbeds

- **Norway** - 2nd half 2016
  - 1st generation HW/SW/concept
  - VDES and mobile communication
  - Single Window integration
  - Ship²Shore & Shore²Shore

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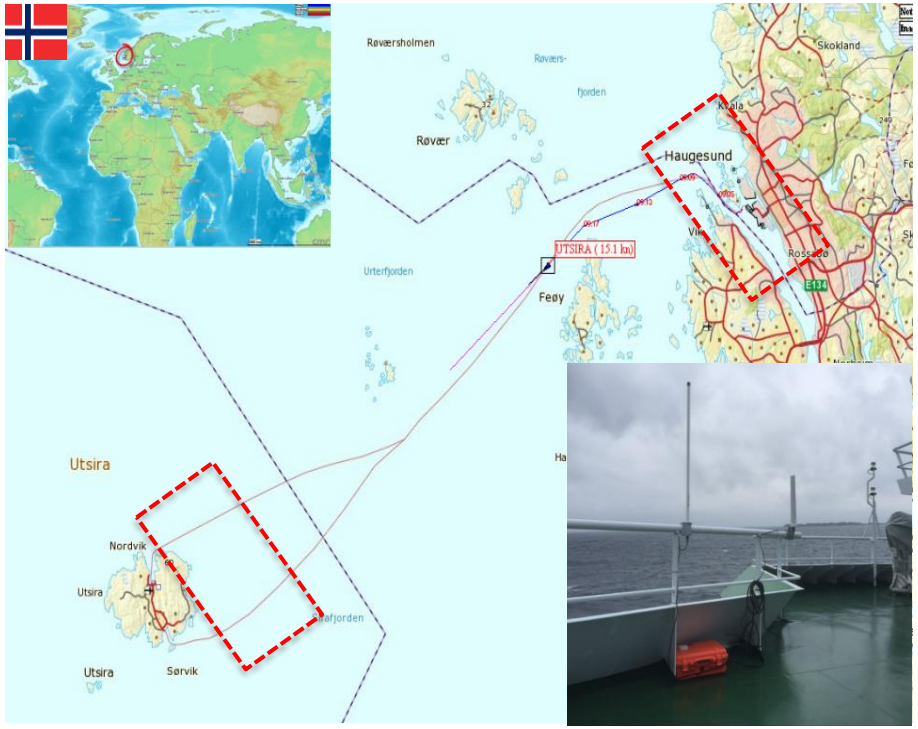
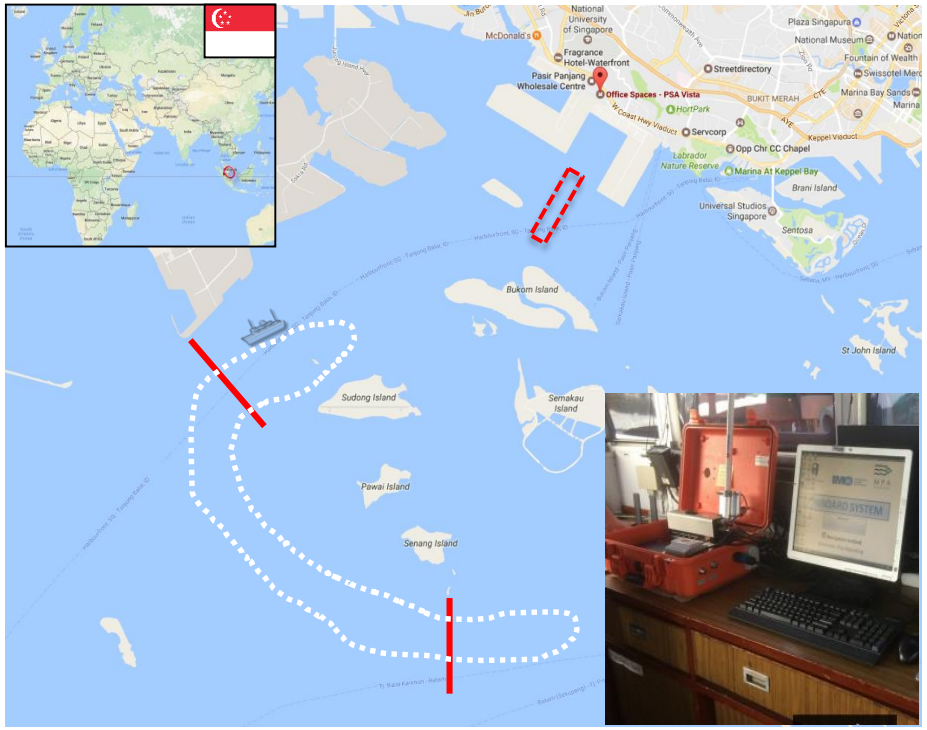
- **Singapore** - February 2017
  - 2nd generation HW/SW/concept
  - VDES and mobile communication
  - Ship²Shore

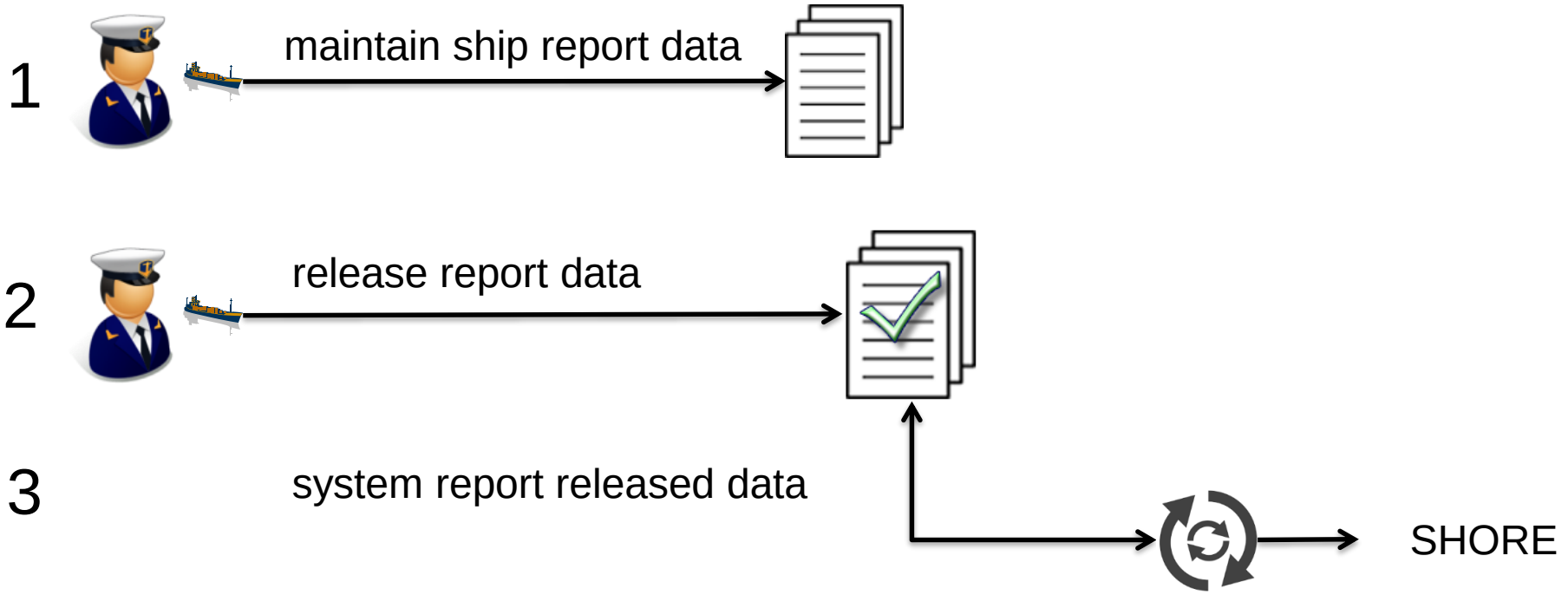
MPA
SINGAPORE

What & Where ?


Røværsholmen
Røværs-
fjorden
Skokland
Kvala
Røvær
Haugesund
UTSIRA (15.1 kn)
Vik
Rossabø
E134
Urterfjorden
Feøy
Utsira
Nordvik
Utsira
Utsira
Sørvik


National University of Singapore
McDonald's
Fragrance Hotel-Waterfront
Pasir Panjang Wholesale Centre
Office Spaces - PSA Vista
Plaza Singapura
National Museum
Fountain of Wealth
Streetdirectory
Swissotel Merc
Marina Bay Sands
BUKIT MERAH
HortPark
Servcorp
Opp Chr CC Chapel
Labrador Nature Reserve
Marina At Keppel Bay
Brani Island
Universal Studios Singapore
Sentosa
Bukom Island
St John Island
Sudong Island
Semakau Island
Pawai Island
Senang Island

Reporting principle



Automatic Ship Reporting – Testbed Generic Concept

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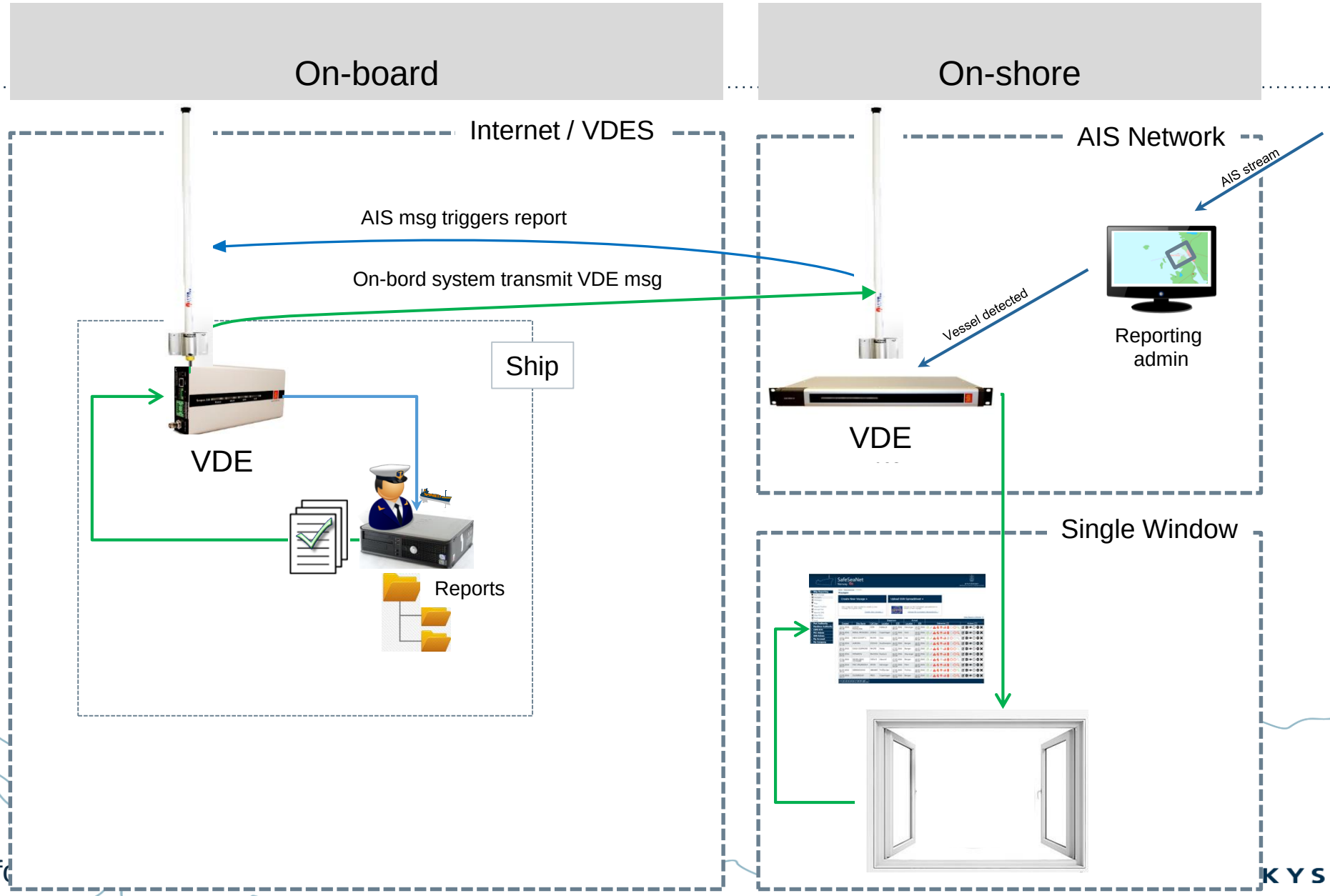

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Conclusions

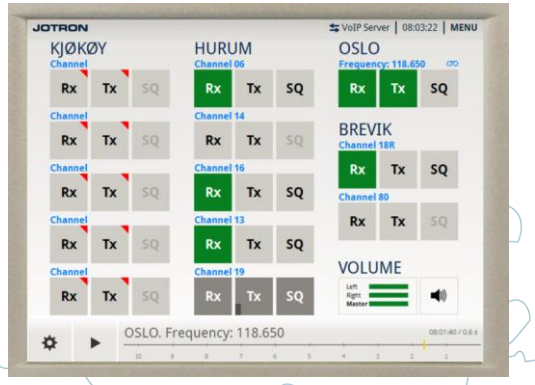
- ✓ Results from the testbeds shows that *Automatic Reporting* is a central part of the future
- ✓ VDES will play an important role in the communication for *Automatic Reporting*
- ✓ Technical and operational concepts for reporting needs to be further developed
- ✓ Focus on standards, harmonisation and security

(potential) way forward

- Digitalization, Automation and Single Window
  - ✓ Further explore concepts for ship reporting
  - ✓ Use experience to develop 3. generation
  - ✓ Harmonisation
  - ✓ Integration
- Enhanced business models
  - ✓ value adding activities and services
- Commercialize
  - ✓ Off the shelf HW (and SW)
  - ✓ Prototype 1. gen Automatic Reporting product

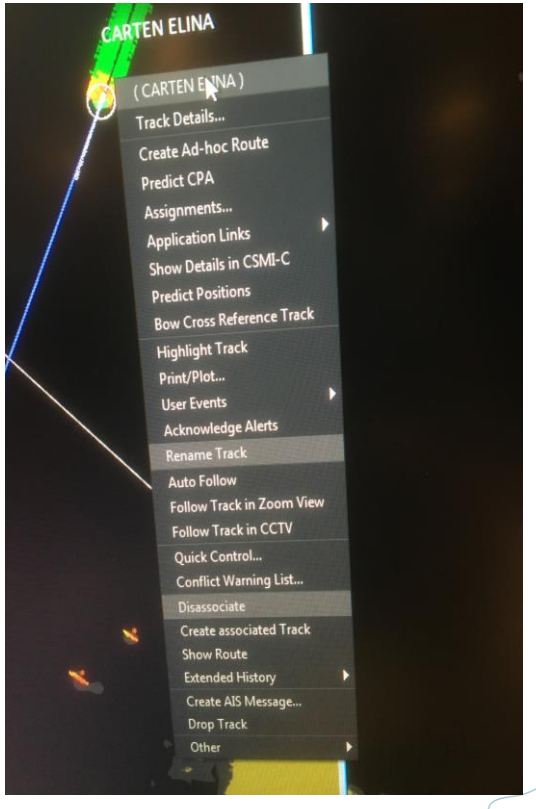
VHF

- Text to speach
  - Written text can be scheduled in intervals to do public read-outs
- Speach to text
  - Communication on VHF can be typed by system to a text file, time-syncronized with track information
- DSC
  - From VTS System, DSC messages is sent to a vessel by right click
  - Automated DSC messages is sent when crossing a line in the map
  - Investigating possibility to get information (poll) from radio and display as track in VTS System
    - MMSI
    - Position
    - Active radio channel/frequency
    - Communication on channel/frequency



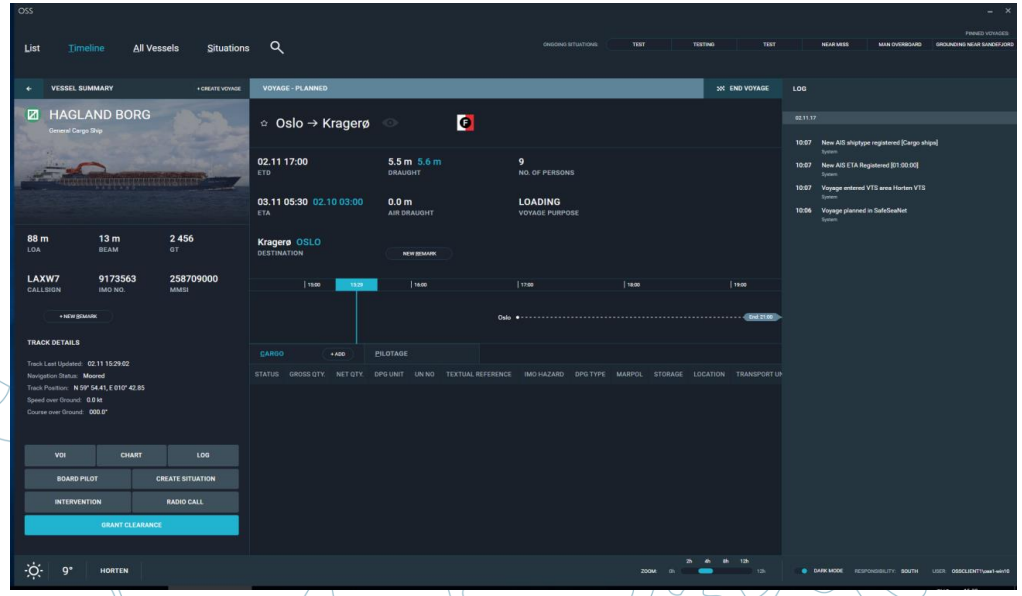
CSCOPE

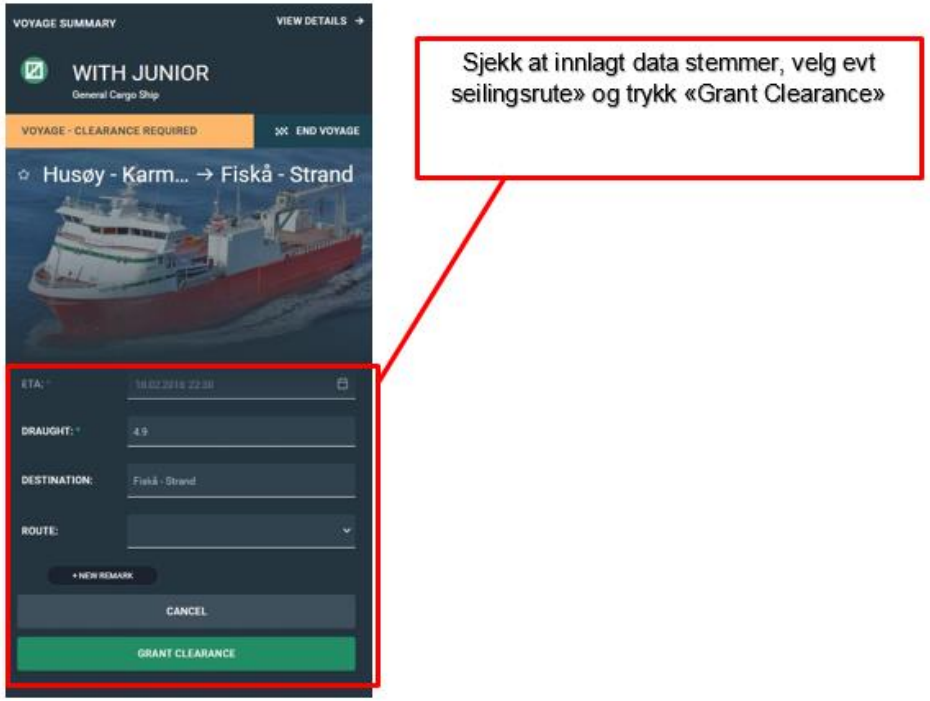
- GIS tool to ensure VTS picture
- Combines available sensor data
- Communication options
  - AIS messages
  - Virtual AToN
  - DSC



OSS

- Get information directly from Single Window
  - Clarences
  - Route information and approval
  - Situations





Sjekk at innlagt data stemmer, velg evt seilingsrute» og trykk «Grant Clearance»

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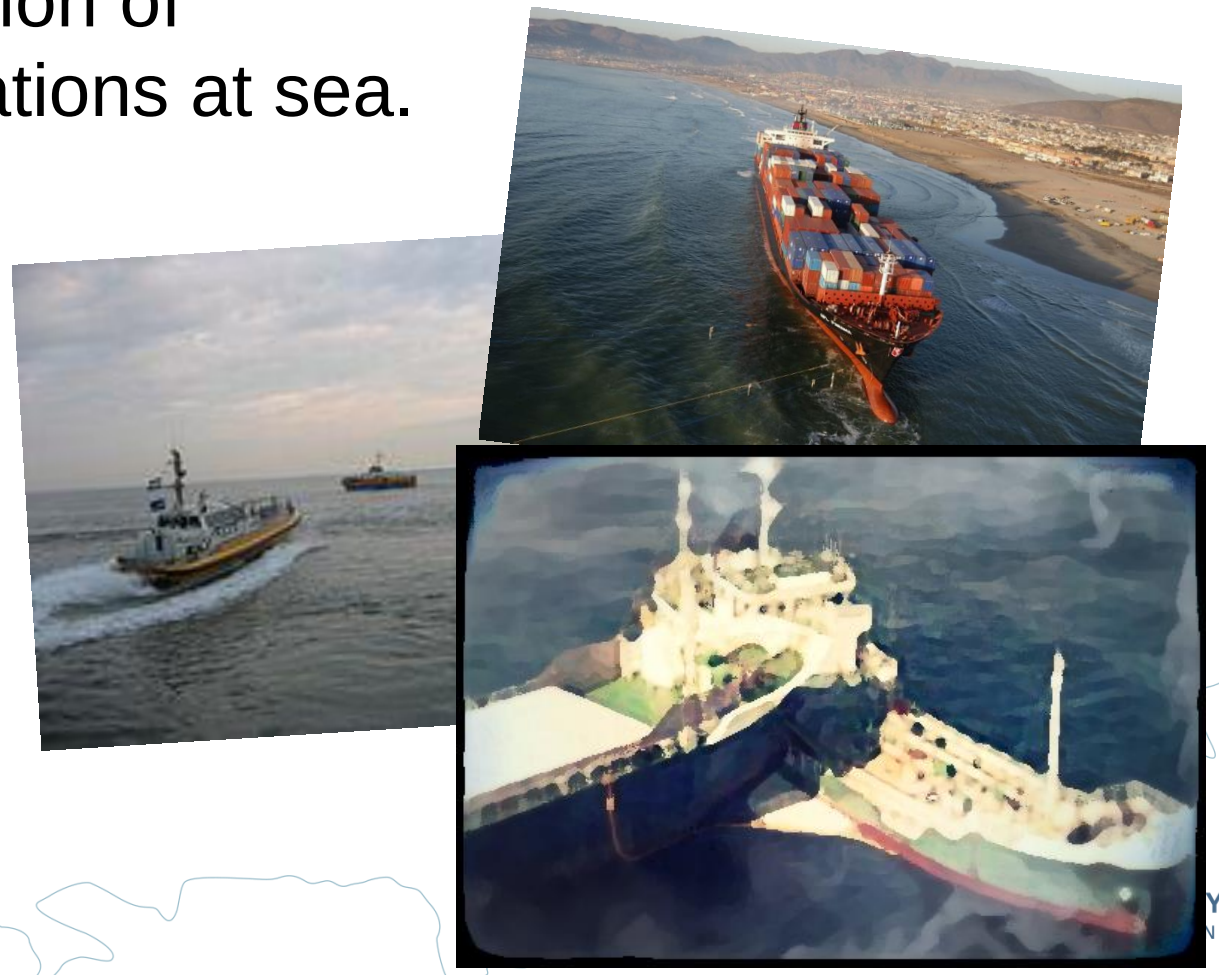
OSS Background

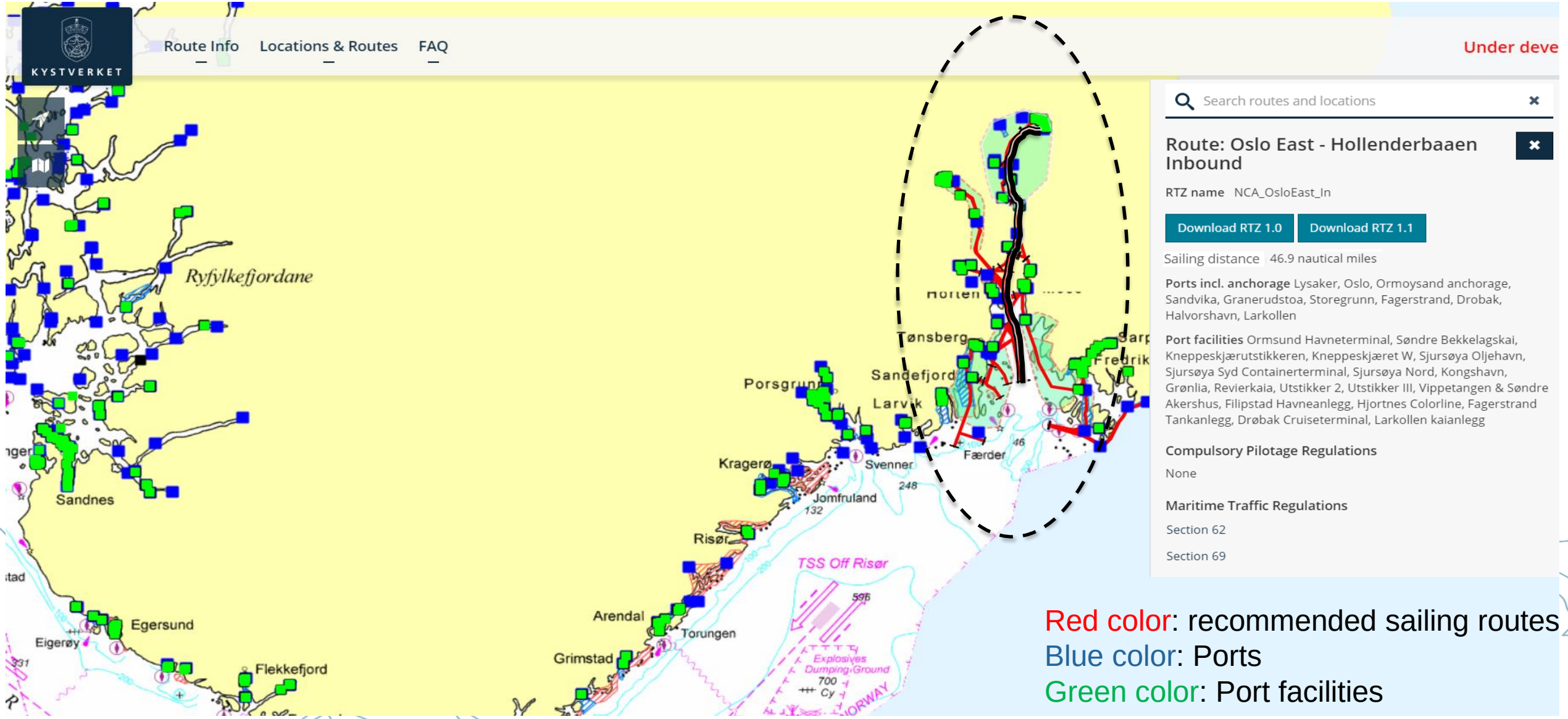
- A common decision support system for all VTS' in NCA
- Built on operational input and need

BEhavioral Analysis (BEAN)

- An automated system for timely identification of anomalous situations at sea.



Ex: Sailing route to Oslo East is selected



Red color: recommended sailing routes
Blue color: Ports
Green color: Port facilities

GIS

ECDIS

Information technology

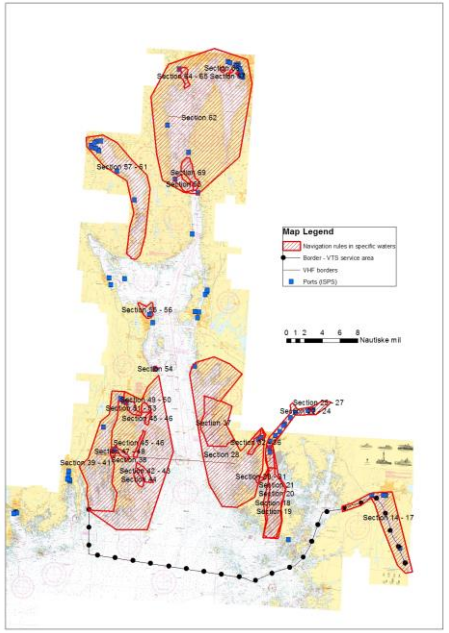
Information-management and tools in web-based Geographical Information Systems (GIS)

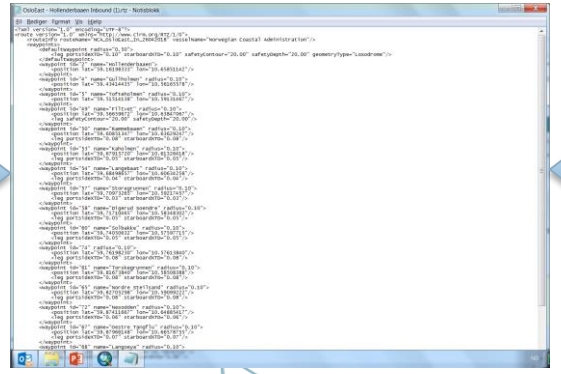
Operational technology

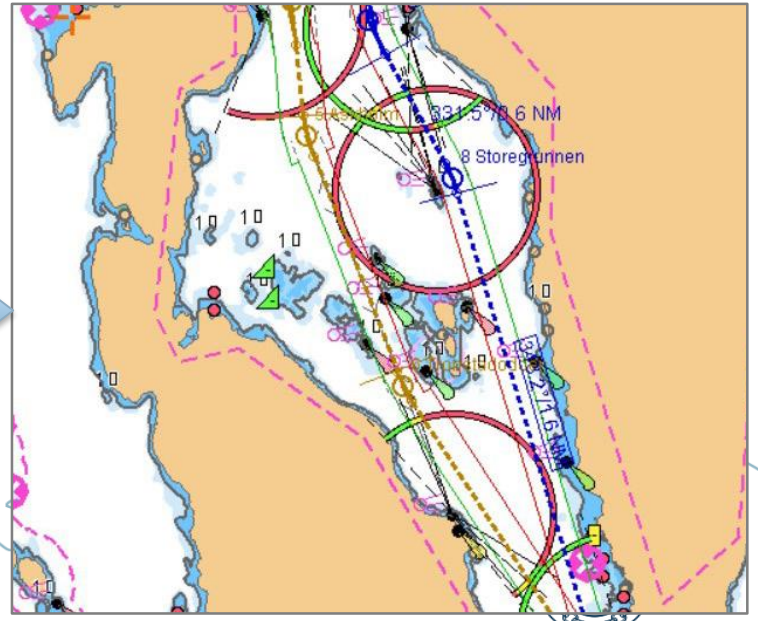
- Nautical information in Electronic Chart Display and Information System (ECDIS)

Route

(rtz and other international standards)







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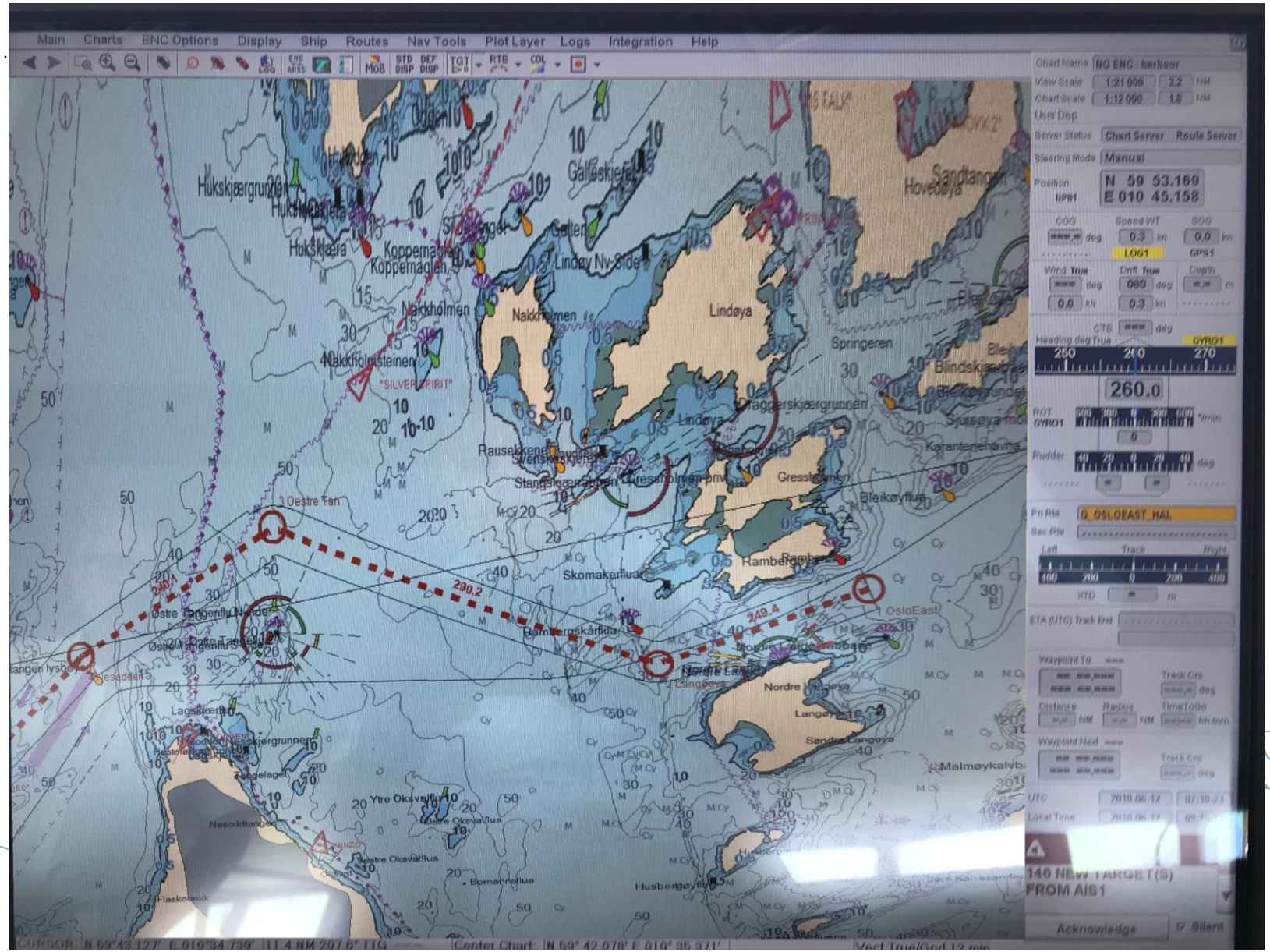
The same sailing routes are integrated in ECDIS (exchanged from GIS to ECDIS)

NCA recommended and, NCA approved



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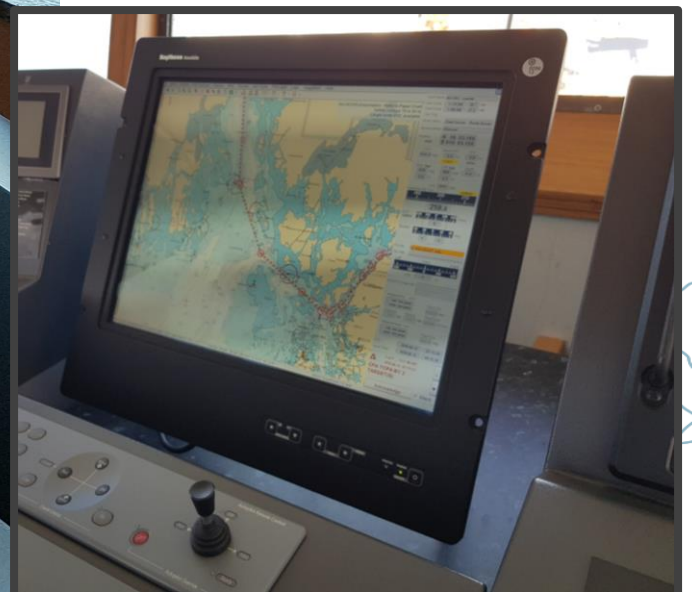
Implementation of The Digital Voyage

Quality check and assurance of usability for operationalization

The NCA-representative and the captain (to the right) on board



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CLEAN, SAFE AND EFFICIENT SEAWAYS

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