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NORWEGIAN COASTAL ADMINISTRATION

Digitalisation of sea routes and safe exchange of information ship – shore

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Department for Navigation Technology and Pilotage
Management

– Clean, safe and efficient seaways

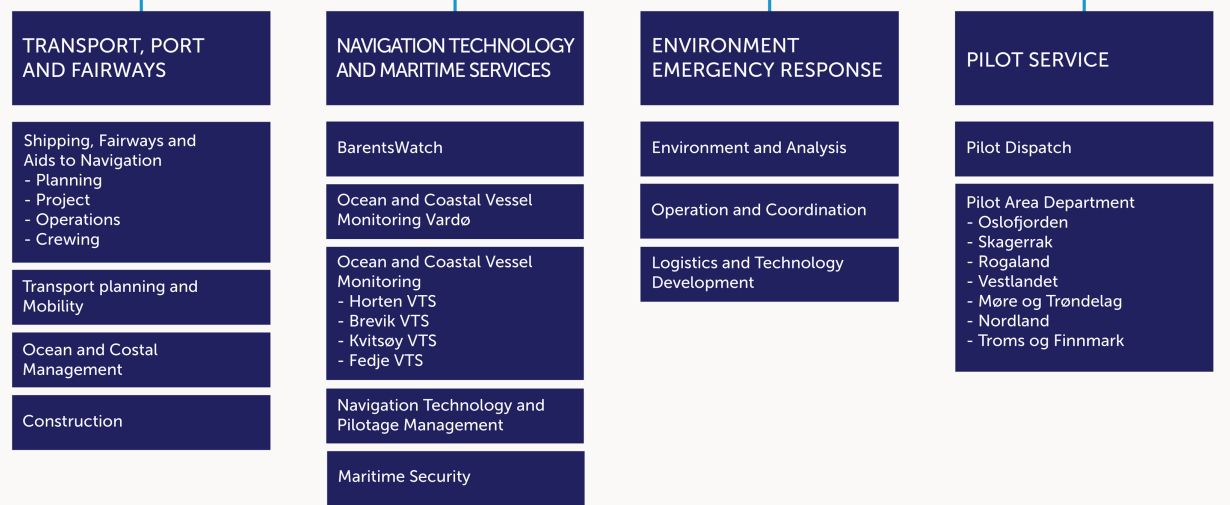
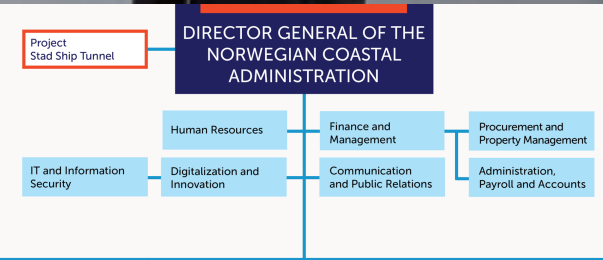




Kystverket



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Guarding the fairways

- Pilotage and PEC
- Navigation services
- Oil spill protection
- Navigational Warnings
- Ship Reporting





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Safe and efficient port operation

National Port Authority

Maritime Safety and Security

Coastal Zone Management



What was the problem?

Navigation is based on old traditional knowhow. How can we utilize new technology?

(and it must work in an ecosystem of maritime technology)



.. and for the maritime user



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Video



Download digital reference routes (RTZ) directly to your **ECDIS/ navigation display on board**

routeinfo.no

Digital Sailing Routes for **mariners**

The NCA Digital Route Service offers over 600 sailing routes for the entire Norwegian coast. Get important voyage-related information at routeinfo.no.



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A Quality-Assured Service

- More than 600 reference routes for navigation
- For easier and improved route planning
- Quality-assured by NCA services:
 - Pilot Service
 - Vessel Traffic Service
 - Aids to Navigation Service
 - Pilot Exemption Certificate Unit
- Depth data reviewed by the Norwegian Hydrographic Service.
- Routes are quality assured for vessels up to **150 meters length** and **9 meters draught**, with some exceptions.
- Four voyage categories: Inbound, outbound, between ports and coastal.





Background

- In the 2014 Maritime Safety Analysis, the sharing of sailing routes and route information is highlighted as an important measure to:
 - reduce the complexity of work tasks for bridge crews,
 - contribute to a more predictable and readily available overview of the traffic situation,
 - reduce the risk of mishandling or misjudgment.
- Integration of digital sailing routes and electronic sea charts is in line with maritime ITS and e-navigation - global frameworks for digitization and automated exchange of information between ships and authorities.

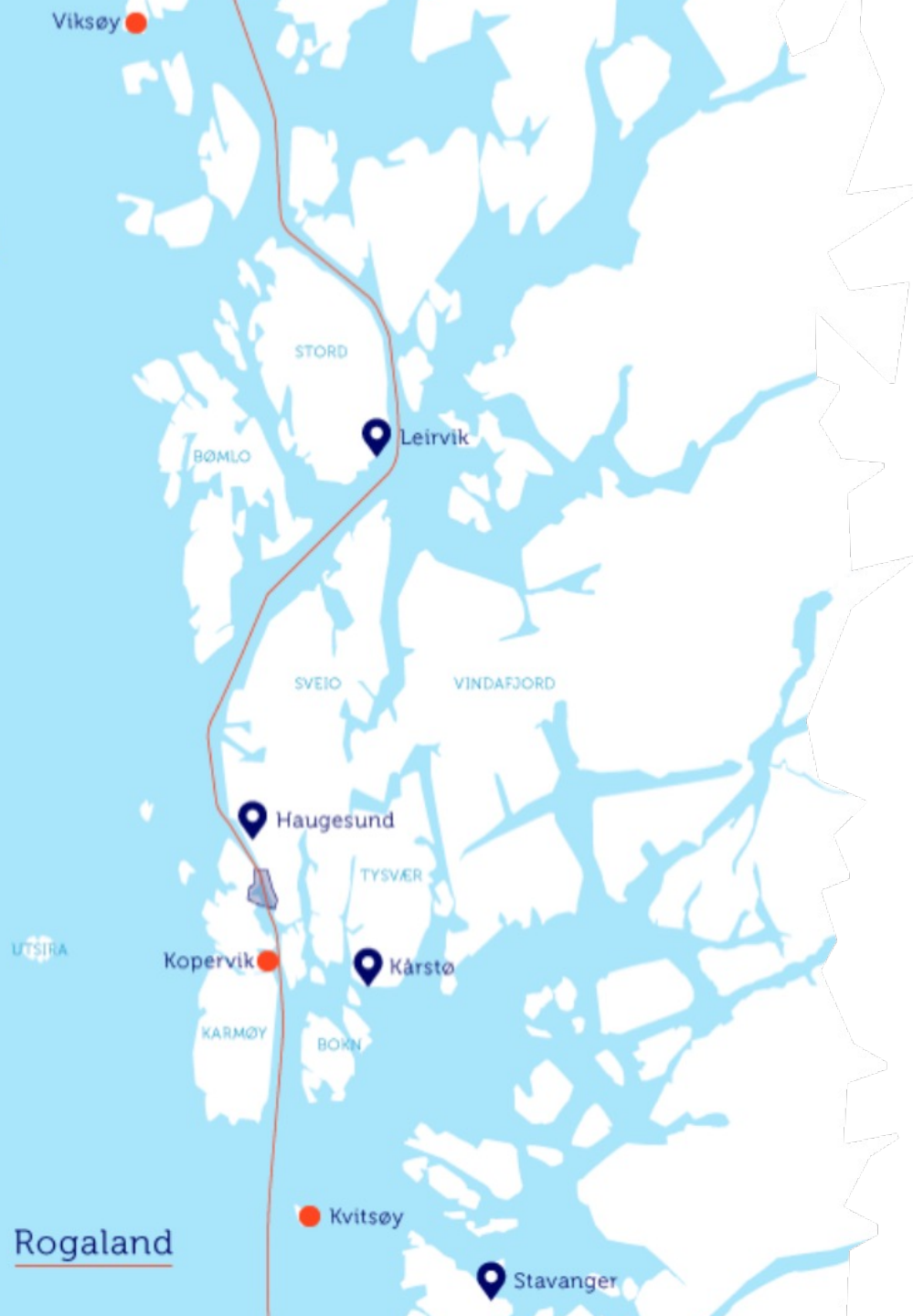


Timeline

- 2018: The first digital routes were tested and implemented in the Oslofjord.
- Since then, the NCA has gradually expanded the service northwards along the coast.
- 2022: The service offers quality-assured reference routes for navigation to all major ports between Halden and Kirkenes.
- 2023+: Further development together with Kartverket / The Hydrographic Service and other service providers



Vestland



Rogaland

Goals

- Safer and easier voyage to port
 - Reduce the number of ship accidents
 - Fewer groundings and collisions
 - Lower risk of unwanted traffic situations at sea
- More efficient route planning
 - Just-in-time arrival
 - Environmental benefit
 - Reduced fuel consumption
- Easy access to the right information
 - Sailing regulations
 - Navigational warning?
- Better interaction between ships and the Norwegian Coastal Administration's pilot service and Vessel Traffic Service



Operational Use of Route Service

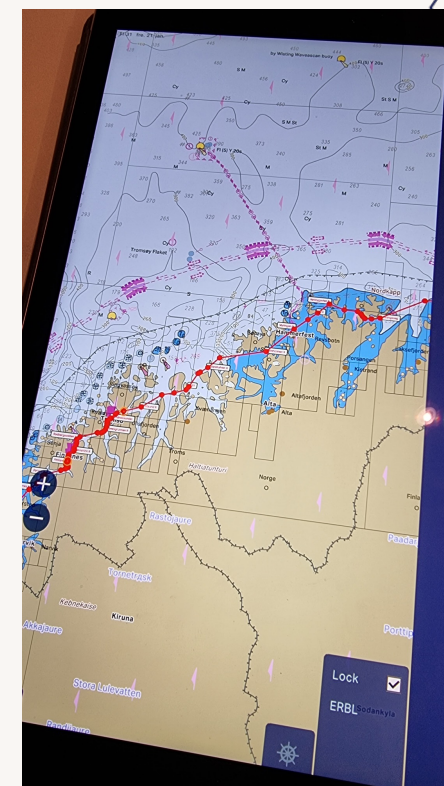
- **Navigator:** reference routes and route information are downloaded directly into the navigation display on board all utility vessels – to support route planning.
- **Pilot:** when the pilot comes on board or the mission is planned, the reference routes/route information can improve cooperation between the pilot and bridge crew.
- **VTS operator:** more predictable and clearer voyage plan.

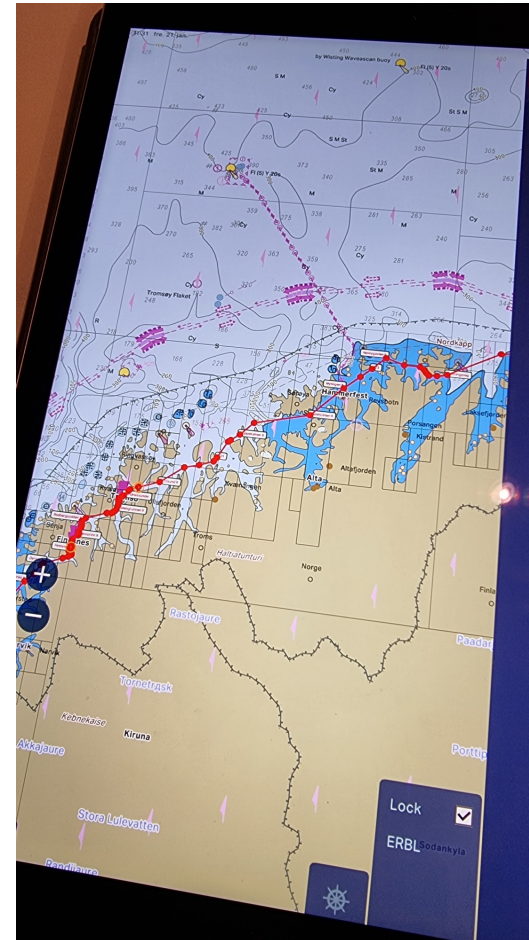
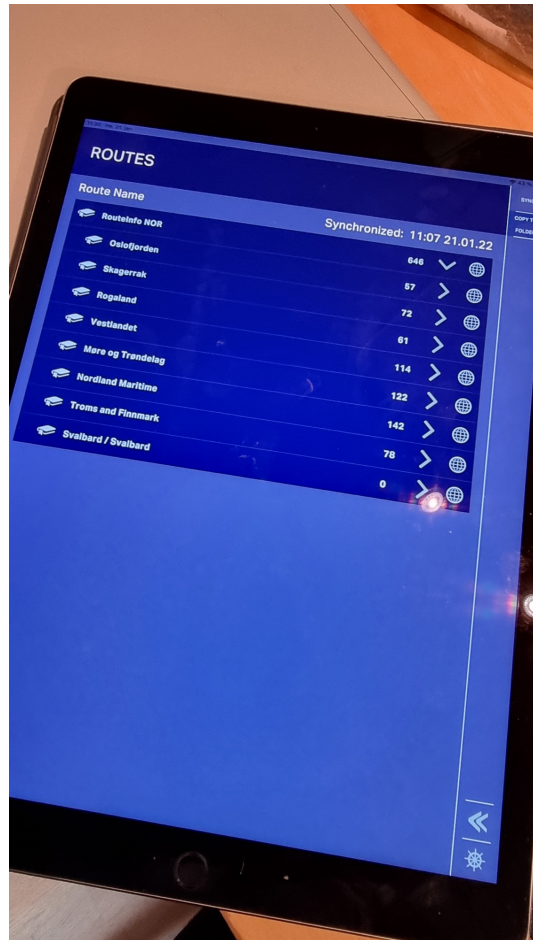


Reference route in the C-Scope VTS tool



Good cooperation and communication





A part of the
pilots portable
unit (PPU)
(2021/2022)



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Route Information in one digital service

- Offers information that is currently scattered in various maps and publications:
 - Local regulations, for example meeting bans in narrow fairways.
 - Visibility and size restrictions for vessels.
 - Quay and port locations, sailing distances.
 - VHF channels for communication in risk areas where VTS centres monitor and organize ship traffic.
 - Information about the VTS service.
- Cooperation with Kartverket to include further navigational information, especially on port information



Expected gains for shipping

- Reduced risk of groundings and collisions.
- Less time spent on route planning and more time for quality-assurance of the route and voyage plan.
- Time-saving: The service is set to assist more efficient route planning which for a voyage often take more than 3 hours.
- Better interaction between vessels and authorities (pilot and VTS services).



Integrated with other supporting services

- Today, the quality-assured digital sailing routes are available in the pilots' support system (Njord Pilot).
- The digital route service is used by vessels to send voyage-related information to the Norwegian authorities in the SafeSeaNet ship reporting system.
- The routes are available through PRIMAR, the Norwegian Mapping Authority's subscription service for electronic sea charts.
- Will eventually be available in commercial navigation solutions. Based on Open Data License (NLOD).





Key priorities

- Facilitate important and useful information for navigators and voyage planning for free.
- Good dialogue with users / user-friendly service.
- Interdisciplinary quality-assurance and updating.

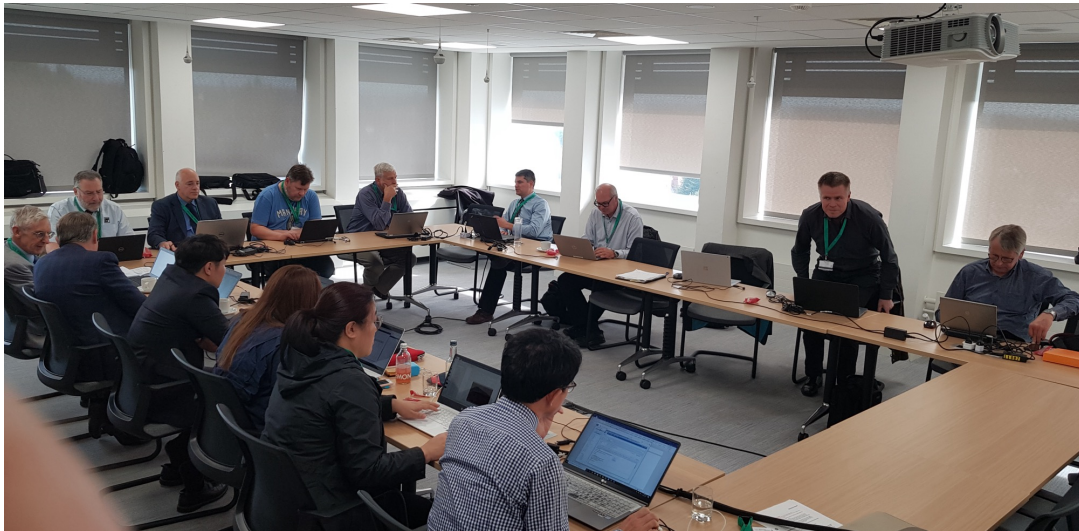


Digitalisation Order in The House!

Some times it feels like
the «order» in the
British House of
Common (John Bercow)



Utilizing international standardisation and AI!?



IEC T80 WG 17, 2019-2021

Digital Route Service based on IEC 61174:2015 (RTZ v. 1.0)

Recommended routes
+ Route information

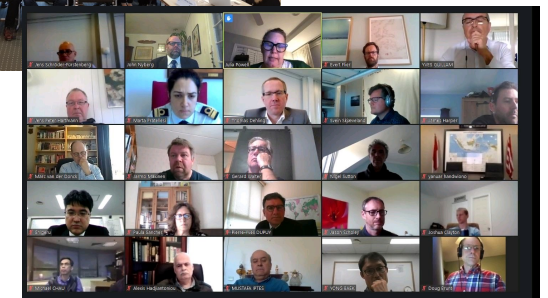
- Locations:
- Ports (SafeSeaNet Norway including places at sea and Anchorages)
 - Port facilities (NCA's register of ISPS port facilities)
 - Quay's: registered in SafeSeaNet Norway by the ports)

- Regulations not available in nav.charts/ENC:
- PEC (Pilot Exemption Certificate)
 - VTS (within service areas for Vessel Traffic Centers)

VTS Factsheet
Sailing distance

On Routeinfo you can also access route information:
Example: Route Oslo West Inbound:
VTS info, sailing distance, locations (ports, port facilities and quays).
Local regulations for Pilot Exemption Certificate (PEC)
Local VTS regulations

The screenshot displays a digital interface for route information. It includes a map of the Oslo West Inbound route with various points of interest marked. Text boxes provide details on VTS (Vessel Traffic Service) information, sailing distances, and local regulations for Pilot Exemption Certificates (PEC). The interface is designed to be user-friendly and accessible on various devices.



IHO NIPWG6 (2019)

Maritime ITS / e-Navigation

IMO Maritime Services

- MS1 – Vessel Traffic Service (VTS)
- MS2 – Aids to Navigation Service (AtoN)
- MS8 – Vessel Shore Reporting (FAL committee)
- MS

ECDIS performance standards updated

The Sub-Committee approved, for adoption by MSC, a revision of resolution MSC.530(106) on Performance standards for electronic chart display and information systems (ECDIS) introducing new ECDIS functionalities for a standardized digital exchange of ships' route plans between ships and shore-based authorities. The implementation of the new functionalities will be aligned with the implementation dates set out in the ECDIS Performance Standards which introduced, in particular, the application of new IHO Data Standards and product specifications (S-98, S-100 and S-101) with regard to ECDIS equipment installed on or after 1 January 2029 and, optionally, for equipment installed after 1 January 2026 and before 1 January 2029.

IHO (International Hydrographic Organisation)

- S-101 Digital chart
- S-102 Bathymetry
- S-111 Surface Currents
- S-123 Marine Radio Services
- S-125 Marine Aids to Navigation
- S-124 Navigational Warnings
- S-131 Marine Harbour Infrastructure

IALA (Int. Assoc. of Marine Aids to Navigation and Lighthouse Authorities)

- S-201 Aids to Navigation Information
- S-212 VTS Digital Information Services

IEC (International Electrotechnical Committee)

- S-421 Route plan + SECOM for secure communication (this is a further development of the RTZ-format)



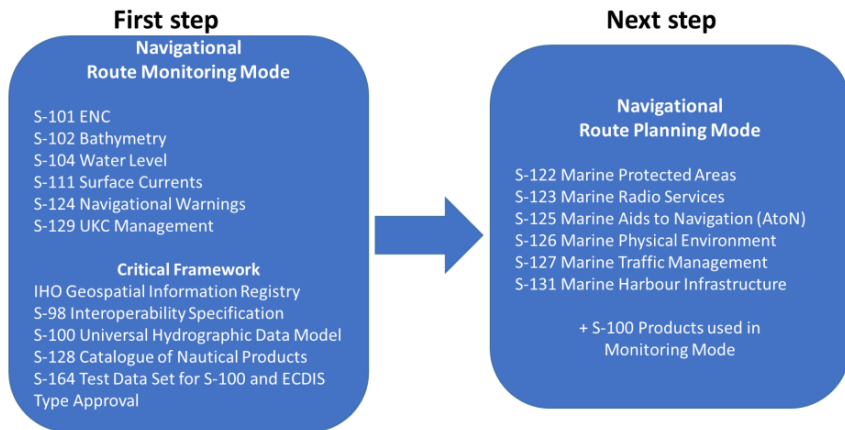


Figure 2 The IHO Navigational Package to be handled by the Interoperability Specification S-98. Additional layers may be added in the future.

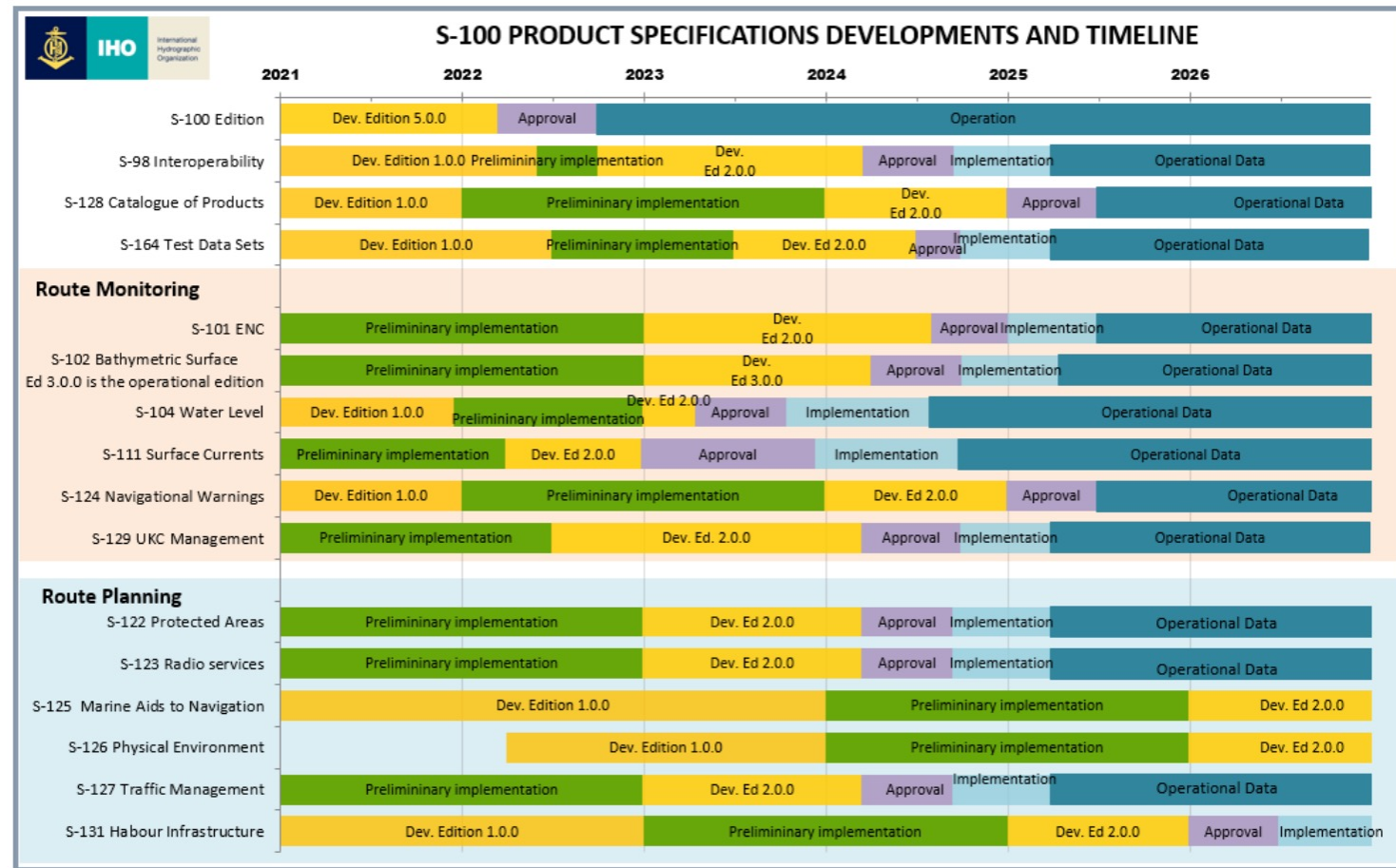


Figure 3 This S-100 timeline is updated: 12 July, 2022.

Figure: https://iho.int/uploads/user/Services%20and%20Standards/DQWG/DQWG18/DQWG18_2023_02.3A_S-100_Roadmap_Annex_2_v2.0_July2022.pdf

Product specifications: <https://iho.int/en/s-100-based-product-specifications>

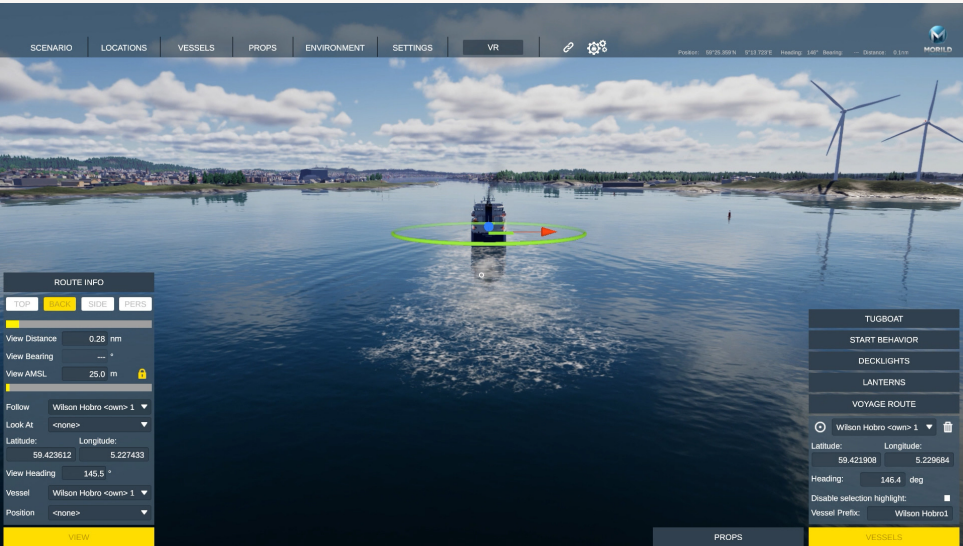


*International standards to support
all Ships!*

VR-simulator / Digital twin



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Thank you for the attention

Find out more: <https://kystverket.no/en/routeinfo>

contact: jmk@kystverket.no / +47 911 32 002



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– Vi tar ansvar for sjøvegen



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IMO-initiative on digitalisation

The IMO e-Navigation strategy is dependent on S-100 and as such S-100 is a fundamental element of digitalisation of the shipping industry. S-100 is a complex ecosystem where IHO is the focal point.

IALA, WMO, IEC and others are contributing.

(HSSC): S-100 ECDIS will be legal to use after 1 January 2026 and from 1 January 2029 new systems must comply with the new IMO Resolution on ECDIS Performance Standards

IALA - <https://www.iala-aism.org/technical/data-modelling/>