



Finnish e-Navigation



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Juho Pitkänen

Head of Digital Development



Background

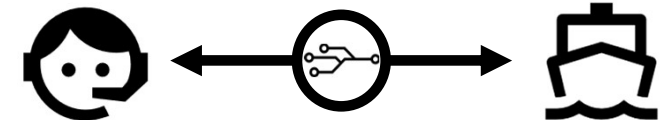


e-Navigation in Finland

What is e-Navigation?

"The harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment."

- IMO's definition of e-Navigation (2009), underlining added



Finnish e-Nav:

Offering core digital maritime navigation information for vessels

Feedback from the Finnish e-Navigation workshop organized by Fintraffic VTS in January, 2024

- "It is important to take into account the national coordination of the adoption of S-100 standards led by Traficom".
- "There could have been more from the user perspective"
- "It would be nice to hear the opinions of the device manufacturers"



Fintraffic VTS in a Nutshell

“The world’s safest, smoothest and most environmentally friendly traffic through intelligent services”

We provide and develop traffic control and management services in all traffic forms as well as ensure safe and smooth traffic in a responsible manner.

Our special assignment safeguards society’s key functions

We are a special assignment group operating under the ownership steering of the Ministry of Transport and Communications.

The special assignment set for us safeguards the essential traffic control services required by society, the authorities and commerce. The special assignment also ensures reliability of operations in case of disturbances under normal conditions and in exceptional circumstances.



Fintraffic VTS' Role in e-Navigation

Fintraffic VTS' role in Finnish national e-Navigation is to develop and operate technical solutions for secure and real time e-Navigation services.

Different stakeholders are forming the future of Finnish e-Navigation ecosystem together.



Stakeholders and their roles in Finnish e-Navigation

The stakeholders are forming the future of Finnish e-Navigation ecosystem together.



Traficom coordinates the introduction of S-100 products nationally and is responsible for navigational chart, hydrographic data as well as navigational warnings.



The Transport Infrastructure Agency is responsible for the infrastructure of sea fairways, including maritime safety devices.



Fintraffic is responsible for vessel traffic services, monitoring international areas. Fintraffic is the developer of the e-Navigation service platform in cooperation with FTIA



Finnpilot is responsible for pilotage and pilotage services. Finnpiilot is developing and testing a remote piloting concept.



The Finnish Meteorological Institute is responsible for marine weather data and weather and conditions data.



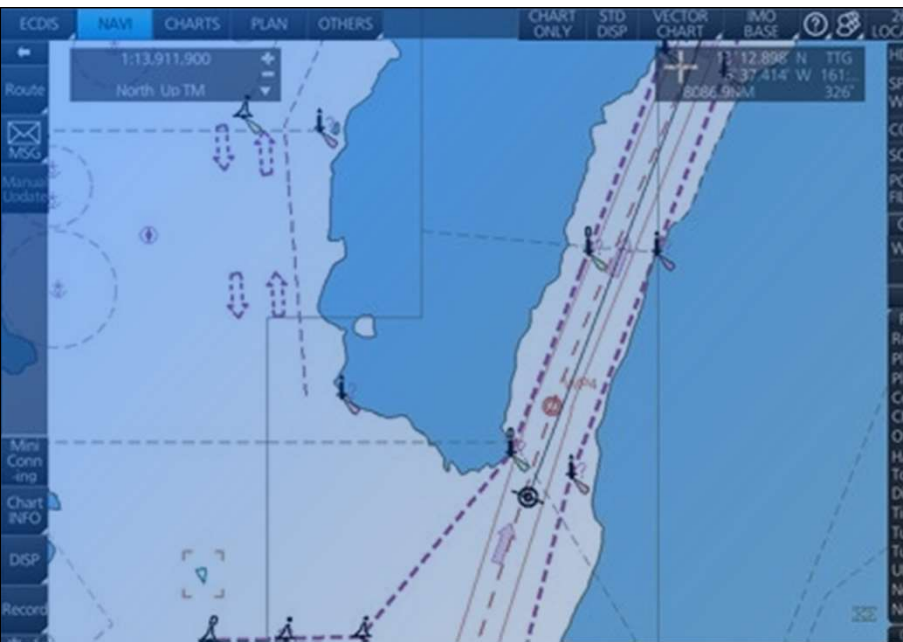
FINNISH METEOROLOGICAL INSTITUTE





(e-)Navigation Information Today

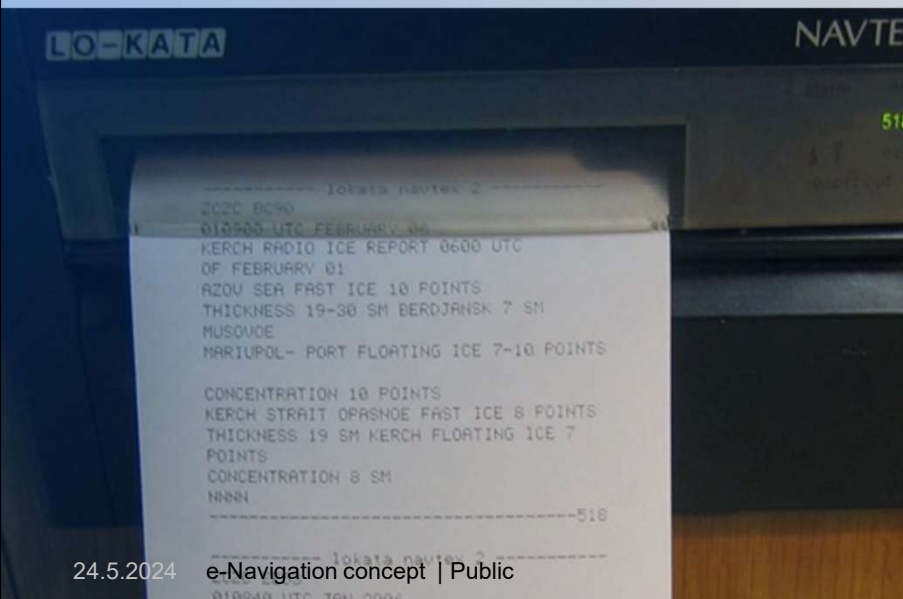




Current Navigational Information Delivery

Navigation is based on an offline ECDIS chart.

NAVTEX (Navigational Telex) provides navigational and meteorological warnings, forecasts and other urgent maritime safety information to the vessels.





Current Navigational Information Delivery

The national coastal radio station, Turku Radio, broadcasts navigational warnings, maritime weather forecasts and ice reports

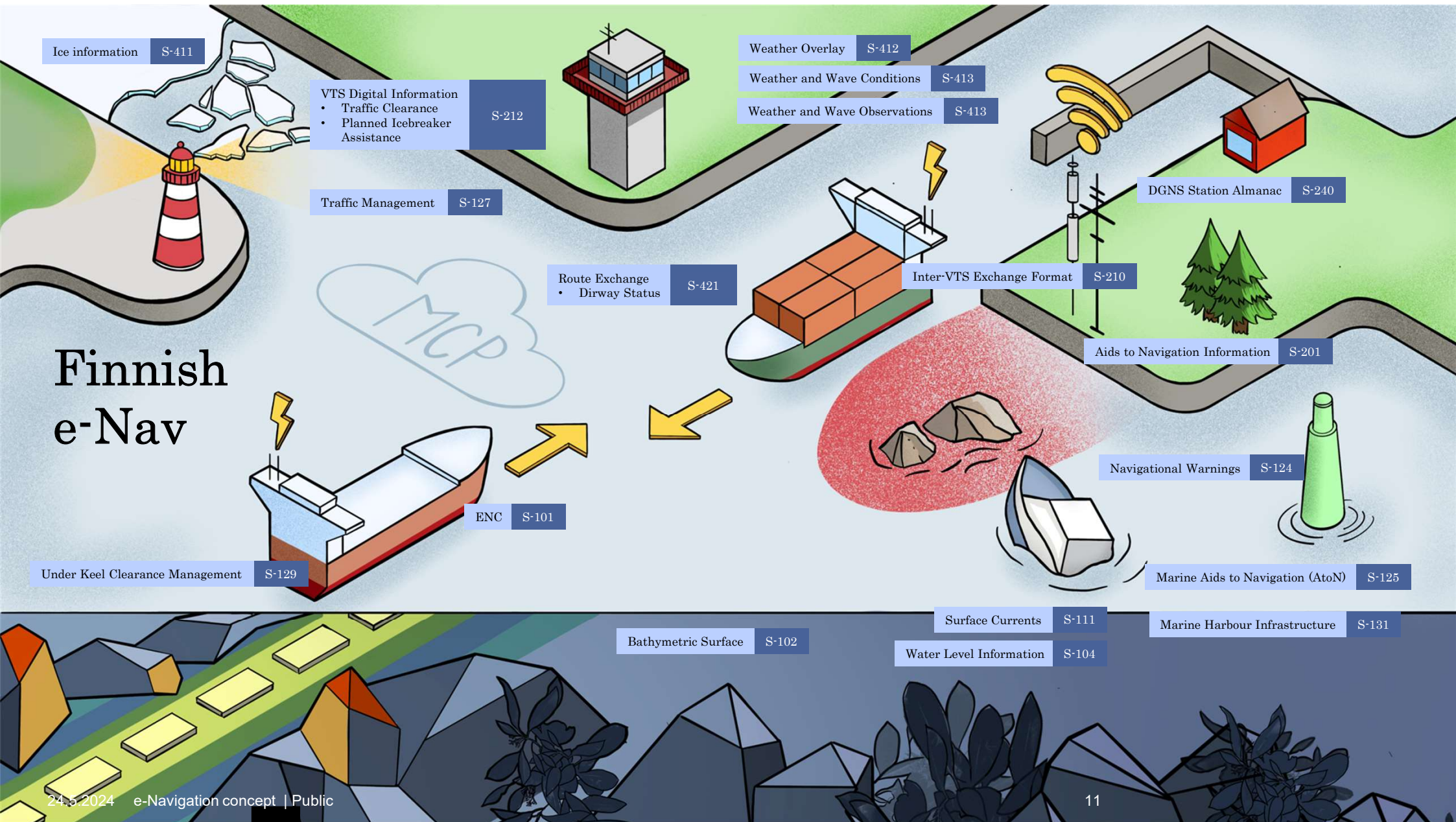
VTs uses VHF radio for voice-based communication with vessels

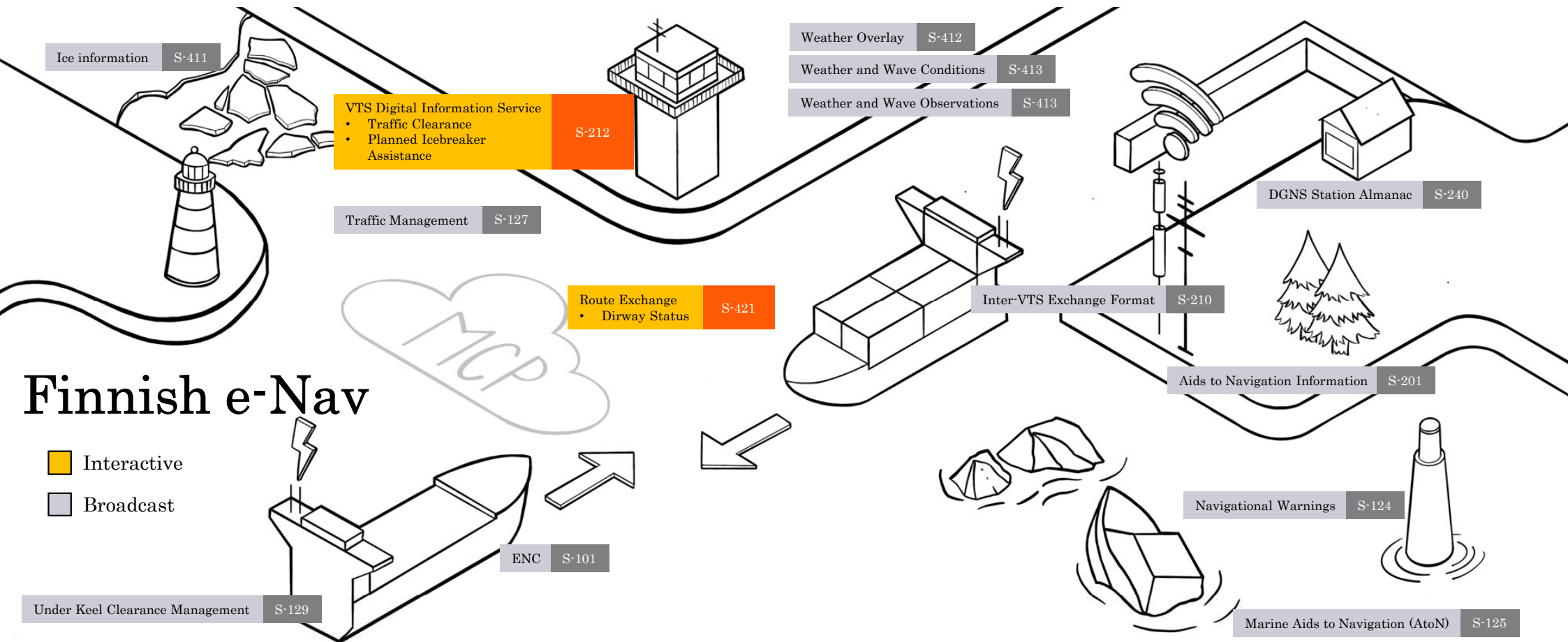


e-Navigation Tomorrow?



Finnish e-Nav





Finnish e-Nav

- Interactive
- Broadcast

Key Benefits of New e-Nav Capabilities

- **Enhance safety:** The integration of Electronic Navigational Charts (ENC) S-101 and Bathymetric Surface S-102 with MSI information (for example S-124) will improve maritime safety by reducing the risk of accidents and protecting the marine environment from potential spillages and damage
- **Operational efficiency:** The implementation of Water Level Information S-104 standard enables precise load optimization and efficient route planning, leading to fuel savings and a decrease in emissions
- **Streamline routes and fleet management:** With tools like Route Exchange S-421, we can optimize voyages, resulting in less unnecessary travel, reduced fuel consumption, and fewer greenhouse gas emissions





Finnish e-Nav 2024-2030

Creating New Digital Navigation Services for Vessels



The New S-100 ECDIS in 2026

The new S-100 ECDIS provides high resolution bathymetry and water level information for improved safety, efficiency and capacity optimization

Related S-100 products:

S-101 Electronic Navigational Chart (ENC)

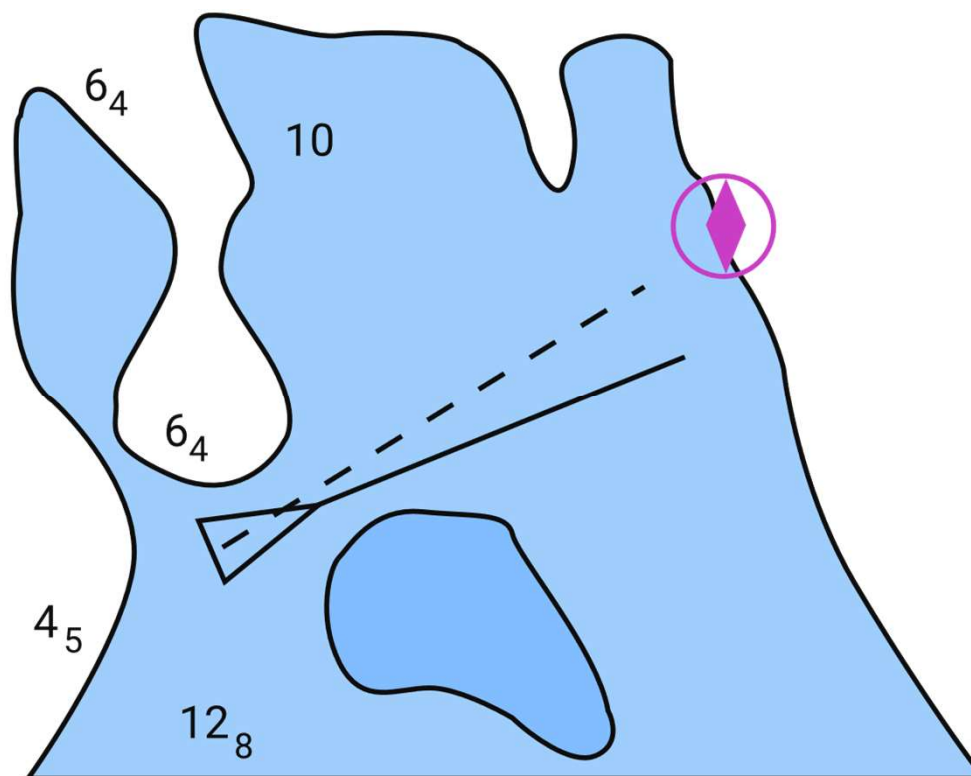
S-102 Bathymetric Surface

S-104 Water Level Information for Surface Navigation

S-101

S-102

S-104



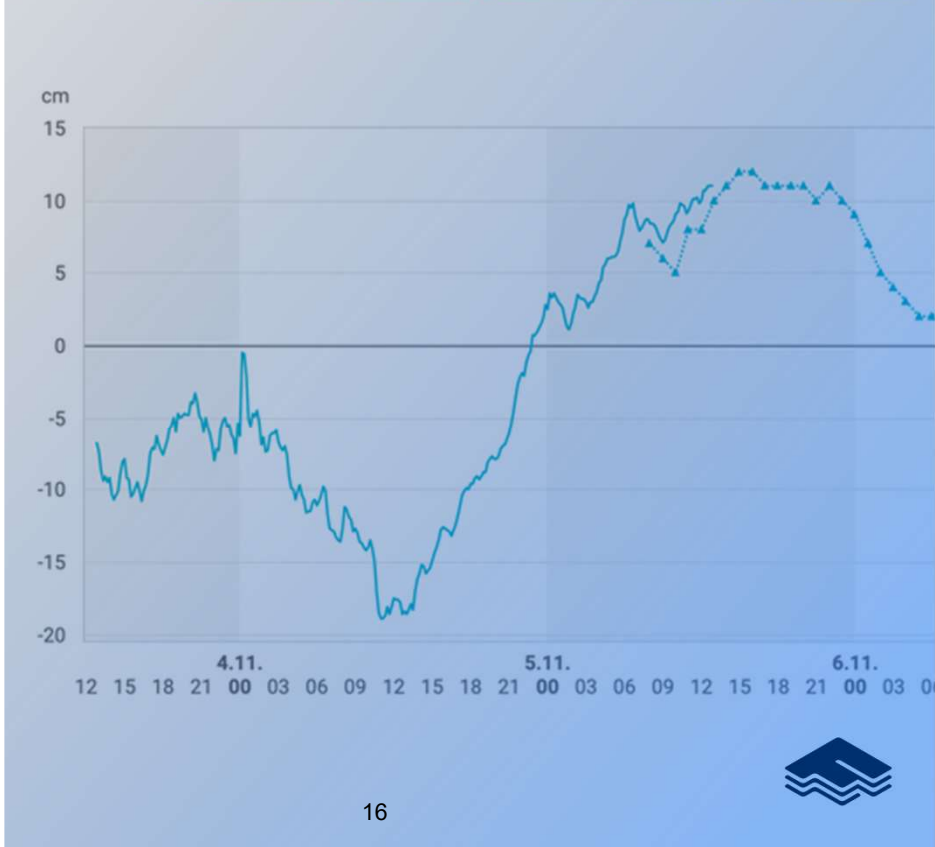
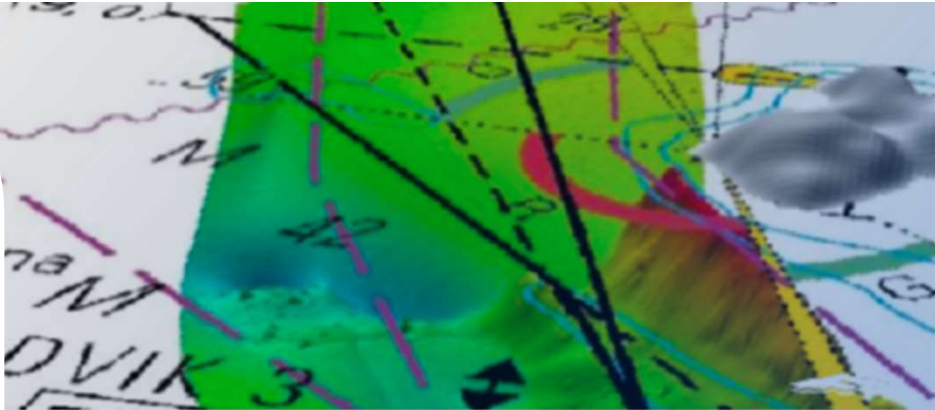
Load Optimization With Bathymetry Model and Water Level Information

S-102

S-104



Additional cargo
deepens the
vessel's draft



Navigational Warnings, Marine Aids to Navigation (AtoN)

Real-time shore to ship communication enables efficient delivery of navigational warnings (S-124) and faults in AtoN (S-125)

S-124

S-125

Kirjattu	Turvalaite & tyyppi	Vika & tila	Väylä
2023-11-13 18:59:58	22697: Björnö 1 buoy	Light out of order	Kristiinankaupunki Karhusaari fairway (Kristiinankaupunki lighthouse SW side)

Navigational warning

Nr 285 LOCAL WARNING
Kristiinankaupunki karhusaari fairway

Leading light Båtskär front NR 7283 in position 62-14.70N 021-18.43 Light out of order

Updated today at 03:35



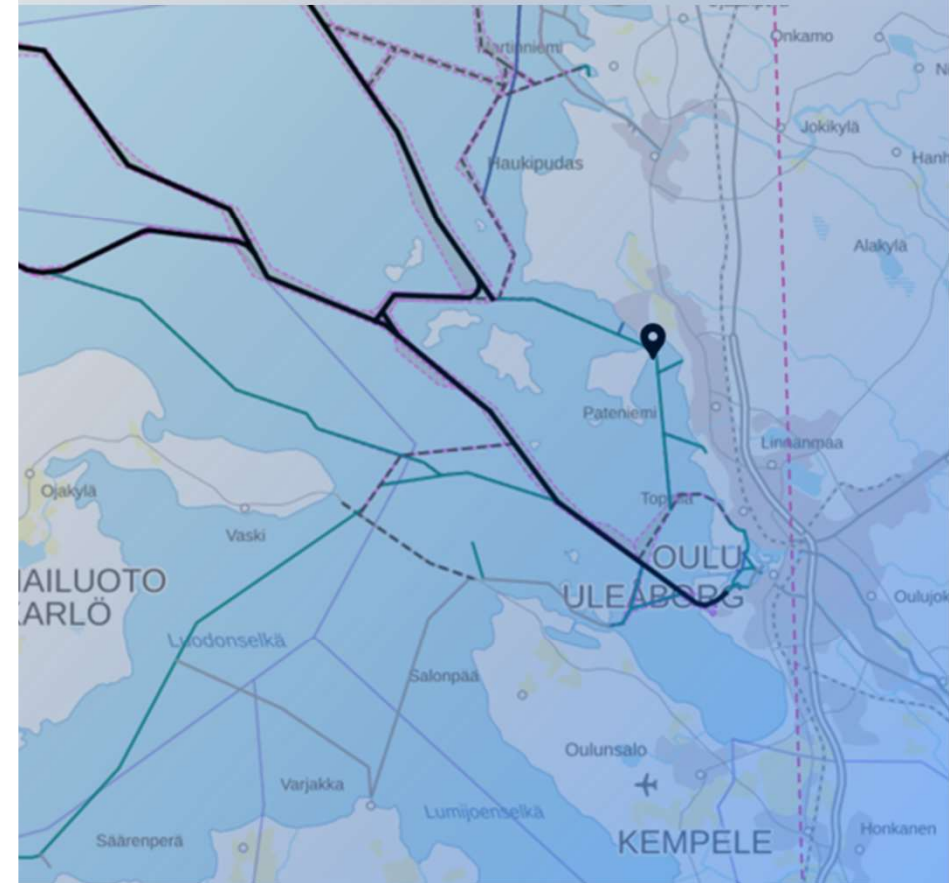
Vessel Traffic Management

S-212

S-421

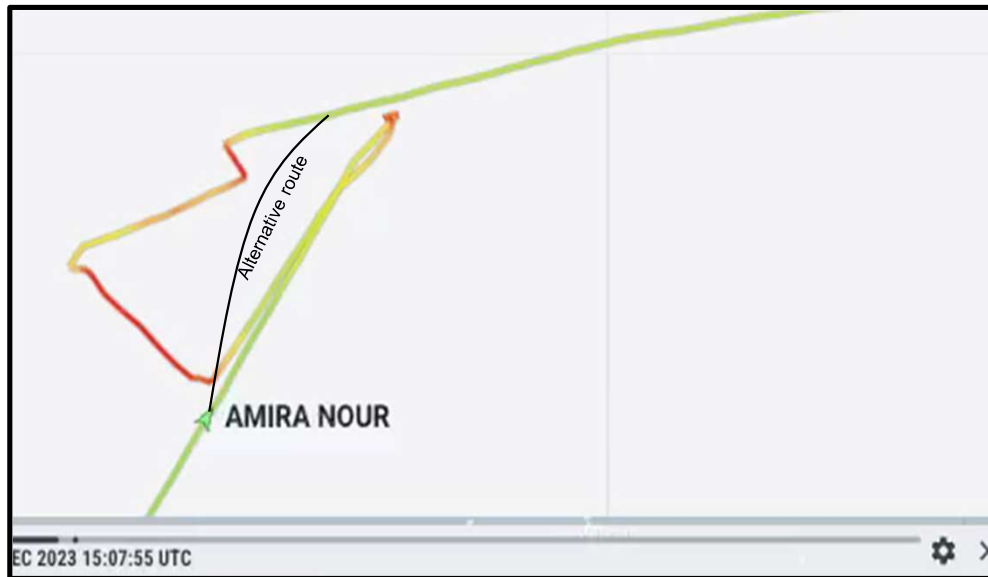
The S-212 VTS Digital Services enhance marine navigation and safety. In this scenario, a ship planning to leave the Port of Oulu shares S-421 route to VTS and uses S-212 to request departure permission from Vessel Traffic Services (VTS).

The service streamlines communication, ensuring adherence to the meeting and overtaking prohibition near the port. Once clearance is granted, the vessel has a 20-minute window to commence its journey. Digital VTS Services have an important role in coordinating and optimizing maritime traffic in restricted or regulated areas.

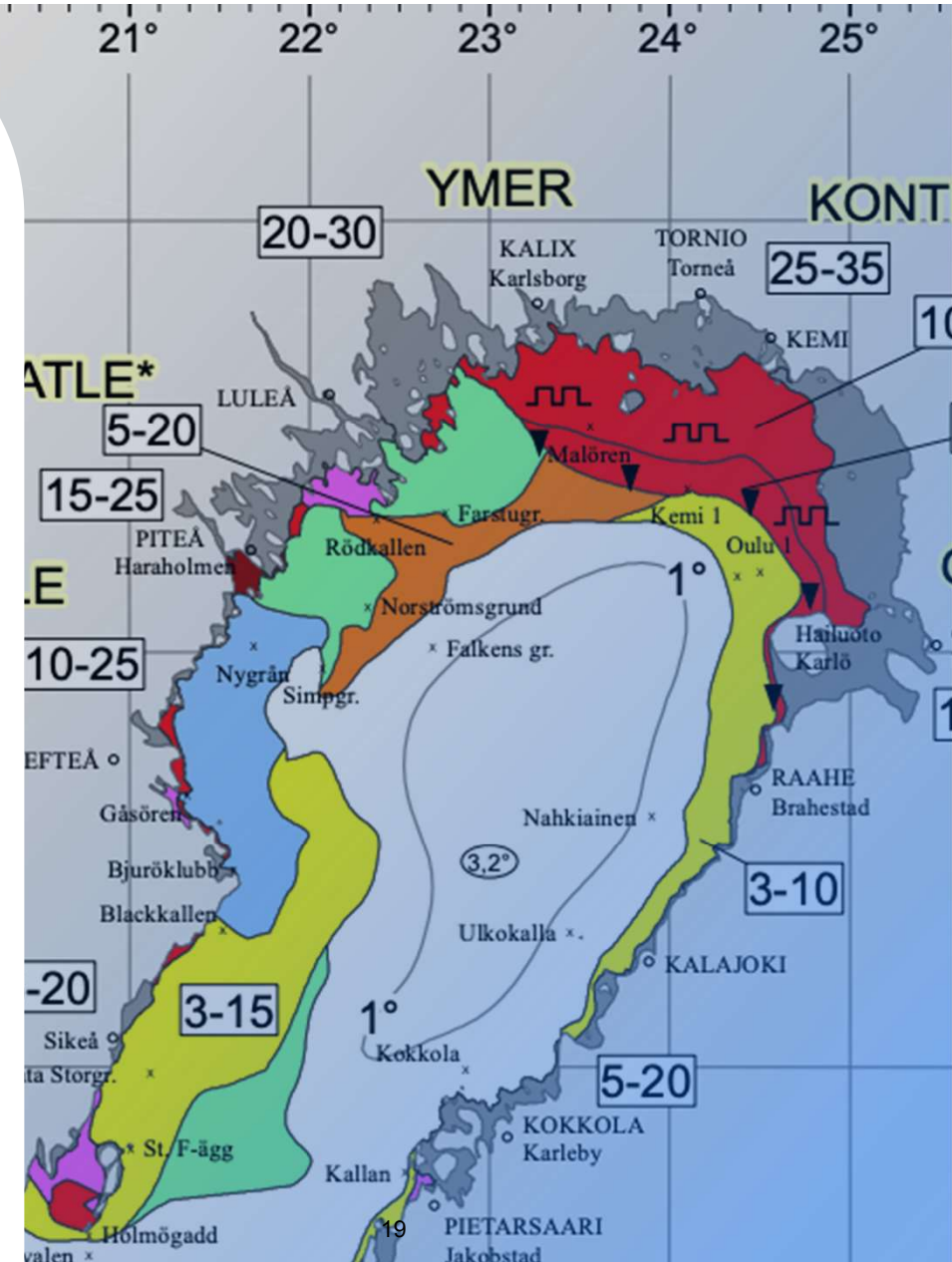


Ice Information

S-411



In this sample scenario, a vessel is advancing at the Baltic Sea towards the port. Suddenly, it encounters ice, causing it to halt unexpectedly. Attempting to navigate out of this situation, the vessel tries to find an alternative route, in the process consuming a significant amount of fuel. This increased fuel consumption has a negative impact on the environment, highlighting the challenges and ecological consequences of winter navigation. Access to better ice information could greatly assist in planning alternative routes in advance.

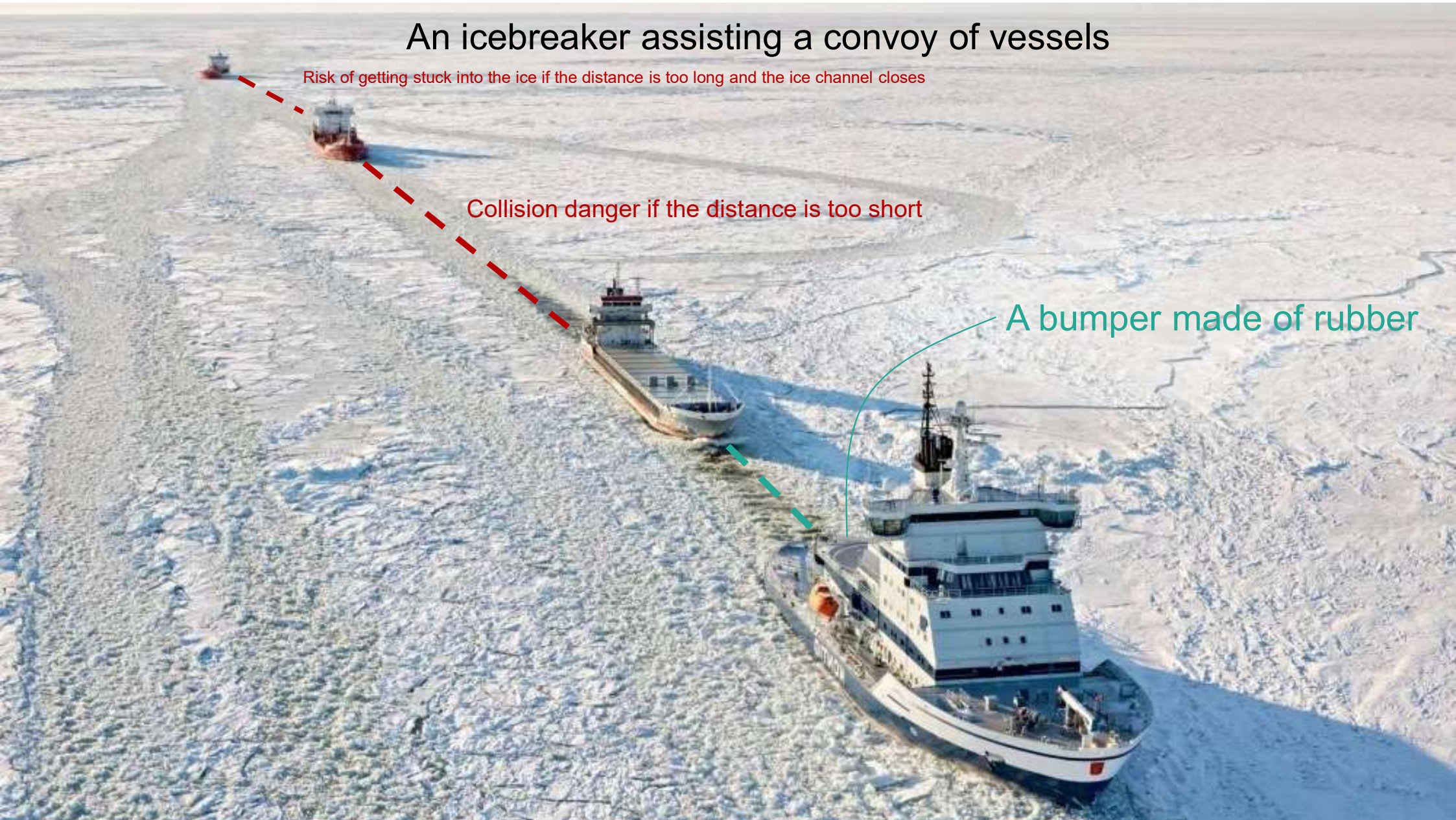


An icebreaker assisting a convoy of vessels

Risk of getting stuck into the ice if the distance is too long and the ice channel closes

Collision danger if the distance is too short

A bumper made of rubber

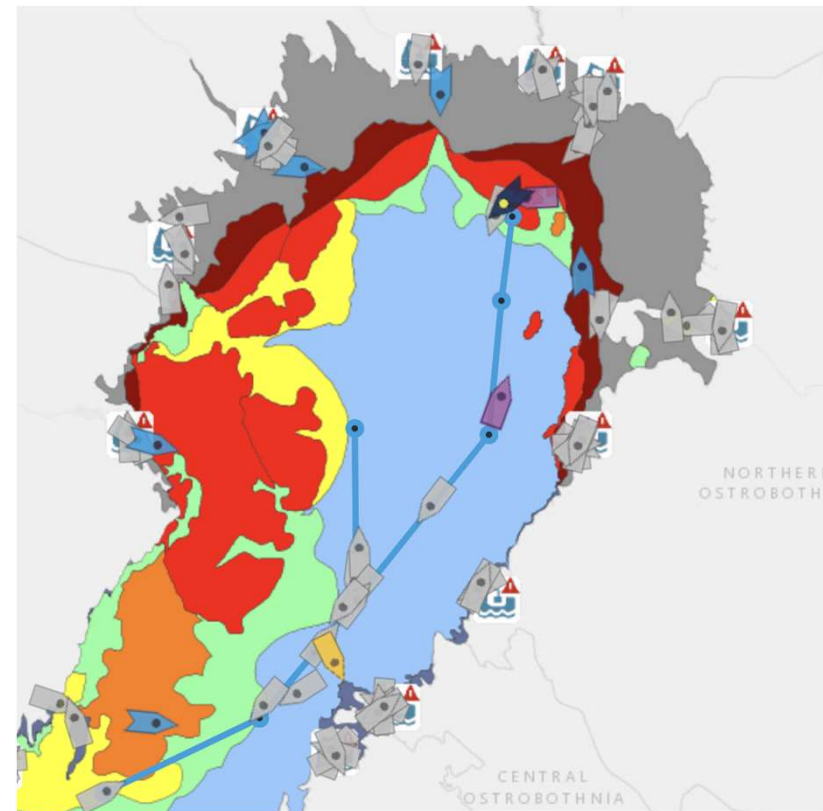


Ice Navigation Information

S-411

S-421

- Real-time ice information makes it possible to navigate more safely and efficiently in winter conditions
- In the sample scenario, the vessels are able to receive real time information to optimize route and avoid collisions in convoy



<https://vimeo.com/945635865>



About Fintraffic's e-Nav Platform

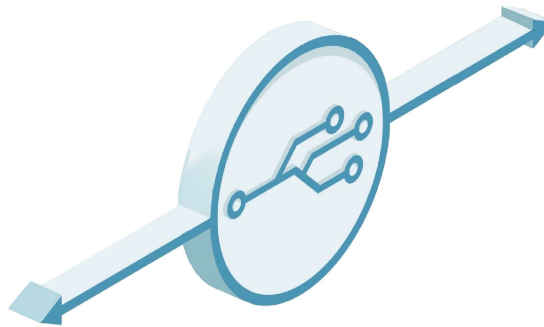


Fintraffic VTS offers a joint solution to data service providers 1/3

The role of Fintraffic VTS in the Finnish e-Navigation is to develop and operate a **decentralized Maritime Connectivity Platform (MCP)** that **facilitates secure and reliable information exchange** between vessels and data service providers.

When the national e-Navigation platform will become operative in 2026, it opens a new digital communication channel between all identified ships, authorities and registered services, as well as other stakeholders in the shore.

Shore



Ship



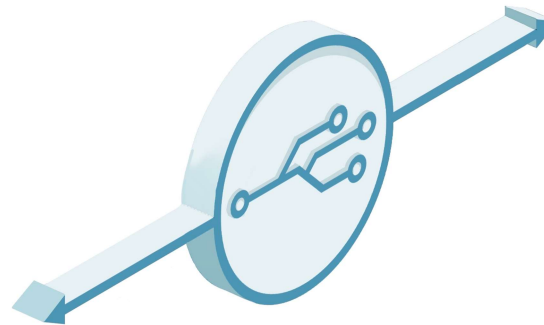
Fintraffic VTS offers a joint solution to data service providers 2/3

In the heart of the solution are an MCP **identity registry (MIR)** and a **maritime service registry (MSR)**.

The **identity registry** ensures all stakeholders are identified and who they claim to be. The **service registry** lists available data services and ensures they follow needed standards.

Fintraffic also develops data delivery mechanisms that support messaging between ships and shore.

Shore



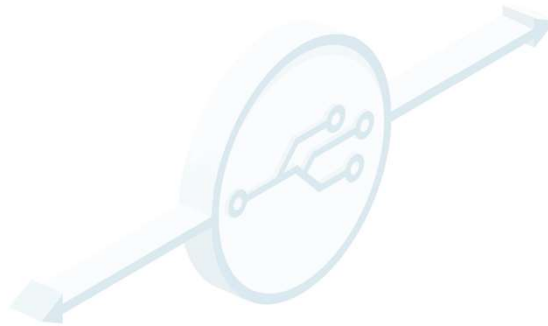
Ship



Fintraffic VTS offers a joint solution to data service providers 3/3

The e-Navigation related data services, offered by various service providers, are decentralized. They all follow required rules and standards to make sure data sharing is safe and harmonized.

Shore



Ship



Benefits of the Finnish e-Nav solution

The joint solution enhances maritime operations by improving data flow and accessibility, contributing to safety, efficiency, environmental protection, and overall operational effectiveness.



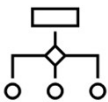
1. Operational efficiency

Real-time data provision can be used to optimize loading, routing and speed, reducing fuel consumption and voyage time. The solution's ability to disseminate this data to both shipboard and shore-based systems allows for enhanced coordination and planning.



2. Environmental impact

Efficient routing and better operational decisions not only reduce fuel consumption and costs but also decrease the environmental footprint of maritime operations.



3. Decision-making support

The availability of accurate, up-to-date maritime data enhances decision-making capabilities. This can lead to more informed and effective decision-making processes in terms of navigation, emergency response, and operational logistics.



4. Improved safety and compliance

By integrating various data sources, the solution helps ensure that vessels operate safely and comply with international regulations.



5. ICT cost optimization

By providing a decentralized platform that distributes critical data to both ships and shore facilities, the solution can help reduce the costs associated with individual vessels and operators maintaining their own separate systems and data sources.



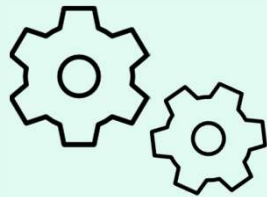
6. Data security and scalability

The data communication services ensure that data exchange is secure, which is critical for maintaining the integrity of navigational and operational data. The scalable solution architecture enables adapting to future needs, integration of new technologies and adding new data sources.

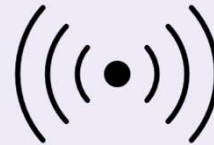
High-level development roadmap for joint Finnish e-Navigation solution & data services



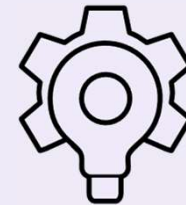
1.
Finnish e-Nav solution
concept creation and
Proof of Concept
initiatives



2.
First pilot services and
platform capabilities
building



3.
E-Nav platform
solution and chosen
data services live and
continuous
development ongoing.
New services
onboarding

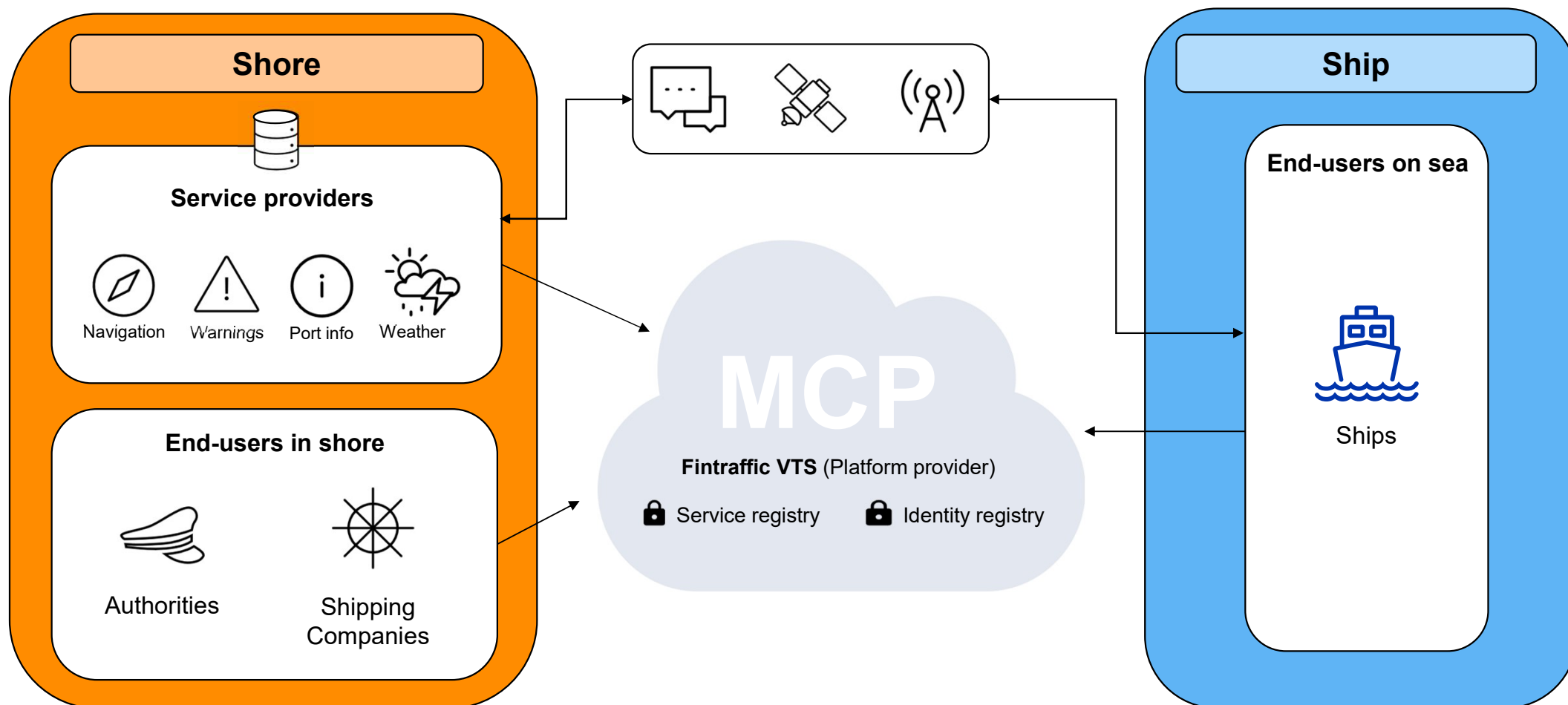


4.
Development towards
common data
ecosystem, i.e.
"Finnish e-Navigation
Data space"

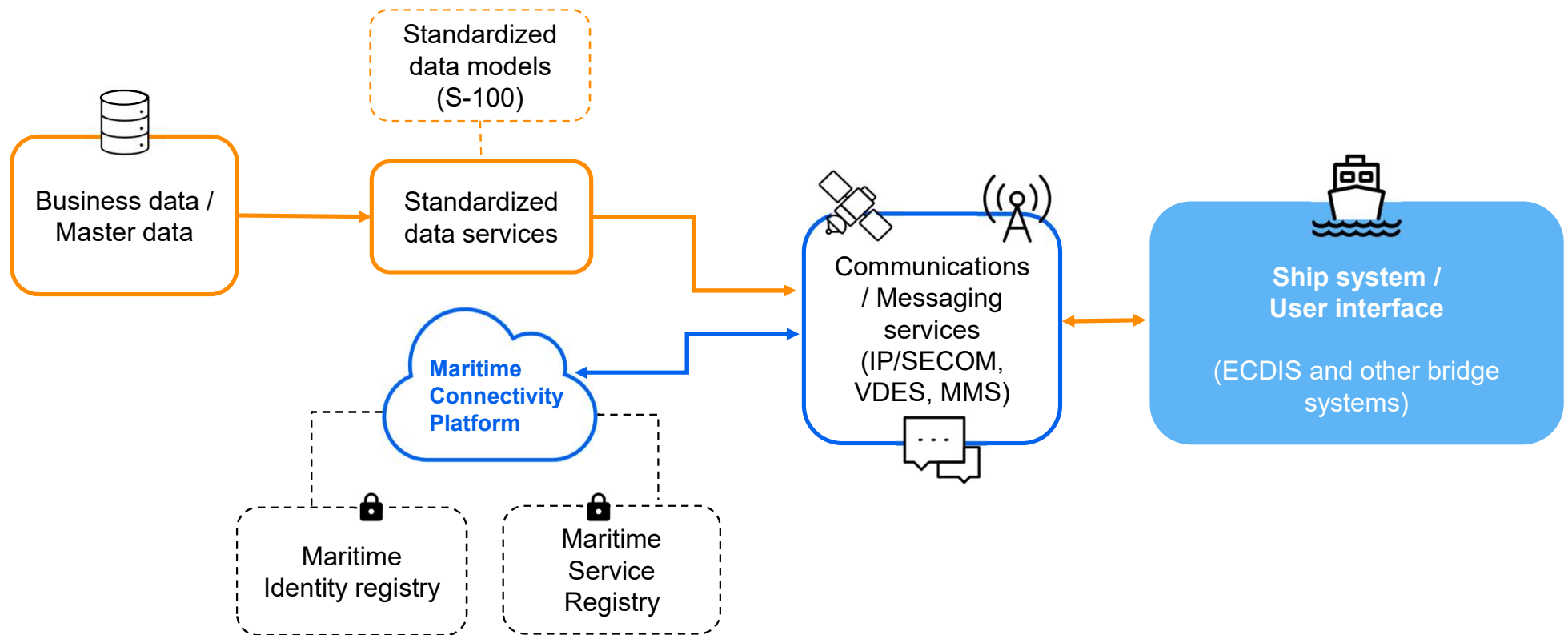
First Finnish e-Nav services operational in 2026



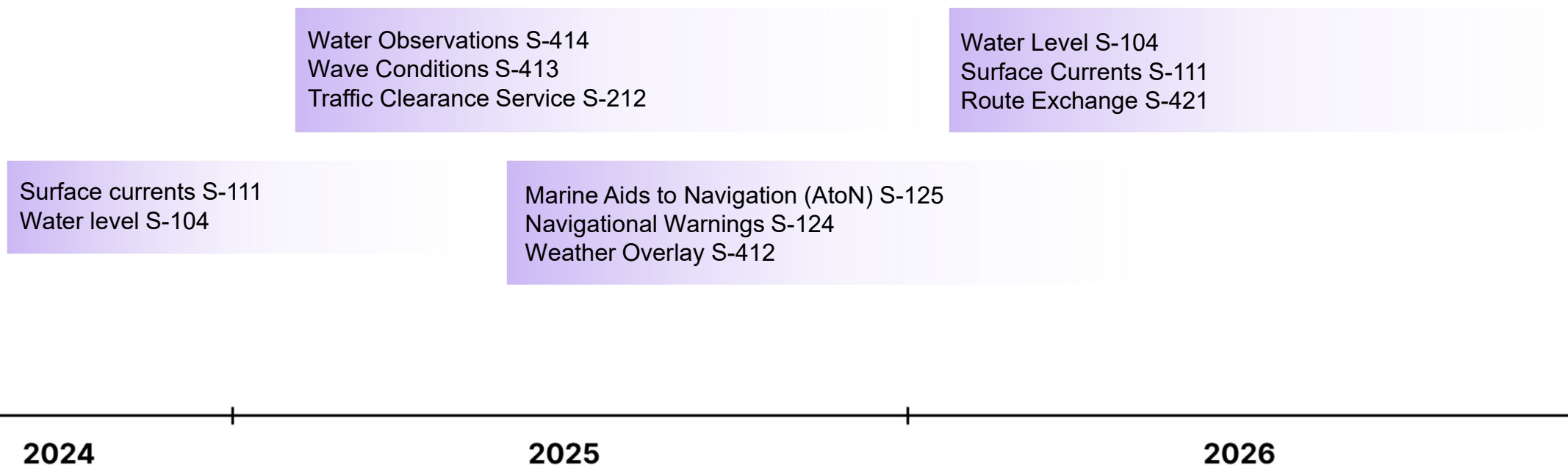
Fintraffic's e-Nav solution setup in a nutshell



National MCP instance supporting fast and secure navigational information delivery



Roadmap of Finnish digital activities on a timeline



Thank you!

Juho Pitkänen
Head of Digital Development
Fintraffic Vessel Traffic Services Ltd.

juho.pitkanen@fintraffic.fi

24.5.2024

