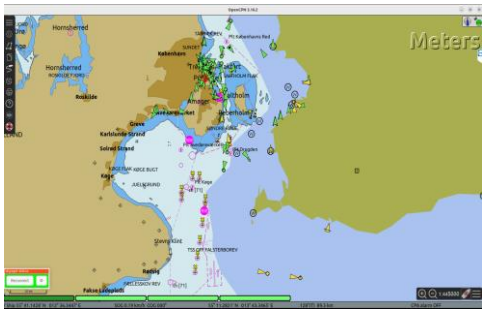
Navigational Warnings (S-124)

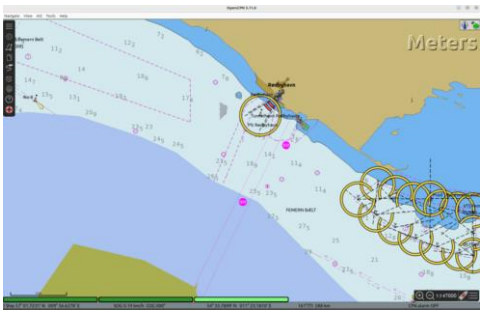
End-to-end solution

AIS-based navigational warnings (NW) are foundational to maritime safety. However, the current AIS ecosystem lacks sender authentication, opening the door to spoofed messages where virtual marks or warnings can be falsified. This compromises navigational safety, confuses Electronic Chart Display and Information Systems (ECDIS), and exposes vessels to unintended hazards. In an evolving digital maritime environment, this trust gap in AIS must be closed.



What is it?

The next generation of trusted navigational warnings is built on the S-100 framework, a universal standard for maritime geospatial data developed by the International Hydrographic Organization (IHO). This framework enables harmonized and interoperable data exchange between systems, making it a cornerstone of future maritime navigation.



S-100-based ECDIS will be approved for operational use, with mandatory compliance for all new systems, in accordance with updated IMO Performance Standards (MSC.530(106)). This ensures that all navigational systems align with a standardized, digital-first infrastructure.

The new generation of navigational warnings leverages:

- S-100 (universal maritime data framework)
- S-124 (navigational warnings product specification)
- VDES (high-bandwidth, two-way communication layer)
- Maritime Connectivity Platform (MCP) - enabling strong identity verification via digital signatures and PKI (Public Key Infrastructure)
- Maritime Messaging Service (MMS) - for secure data delivery

How does it work?

The system creates an end-to-end trust chain for navigational warnings through a combination of standardized data formats, secure messaging, and authenticated communication channels.

Message Creation & Authentication: Shore authorities create S-124 compliant navigational warnings using standardized data structures. Each message is digitally signed using PKI certificates managed through the MCP, ensuring sender authenticity and message integrity.

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Secure Transmission: Messages are transmitted using the MMS standard as specified by RTCM and aligned with IALA guidelines. The Sternula MMS Proxy Ship (the world's first MMS Edge Router) and Sternula MMS Proxy Shore (the world's first MMS Edge Router for VDE-TER) handle message routing and delivery. Both components were designed following IALA G-1117 and RTCM standard 13900.0.

Flexible Communication Channels: Messages can be transmitted either over IP-based networks or via VDES, enabling flexible deployment depending on available infrastructure. This dual-path approach ensures reliable delivery even in areas with limited connectivity.

Onboard Integration: Ships receive authenticated warnings through their VDES-enabled systems. The Sternula MMS Proxy Ship processes incoming messages, verifies digital signatures, and integrates the warnings with onboard ECDIS systems. This creates a seamless flow from shore to ship, maintaining trust throughout the entire chain.

Open Standards & Interoperability: The system is built with interoperability and transparency in mind, supported by NIORD and OpenCPN, open-source platforms for managing navigational warnings and notices to mariners. These enable structured dissemination and integration with both shore-based and onboard systems.

By combining S-100/S-124 data standards, secure digital messaging, and open-source infrastructure, our solution ensures that essential navigational information is delivered quickly, clearly, and reliably, supporting safer navigation and full compliance with international maritime regulations.

Navigational Warnings integration package

SHIP Setup

- VDES Transceiver
- Sternula MMS Proxy Ship
- Display Unit

SHORE Setup

- VDES Coast Station
- Sternula MMS Proxy Shore
- Display Unit