STERNULA AIS 2.0 PILOT PROJECT

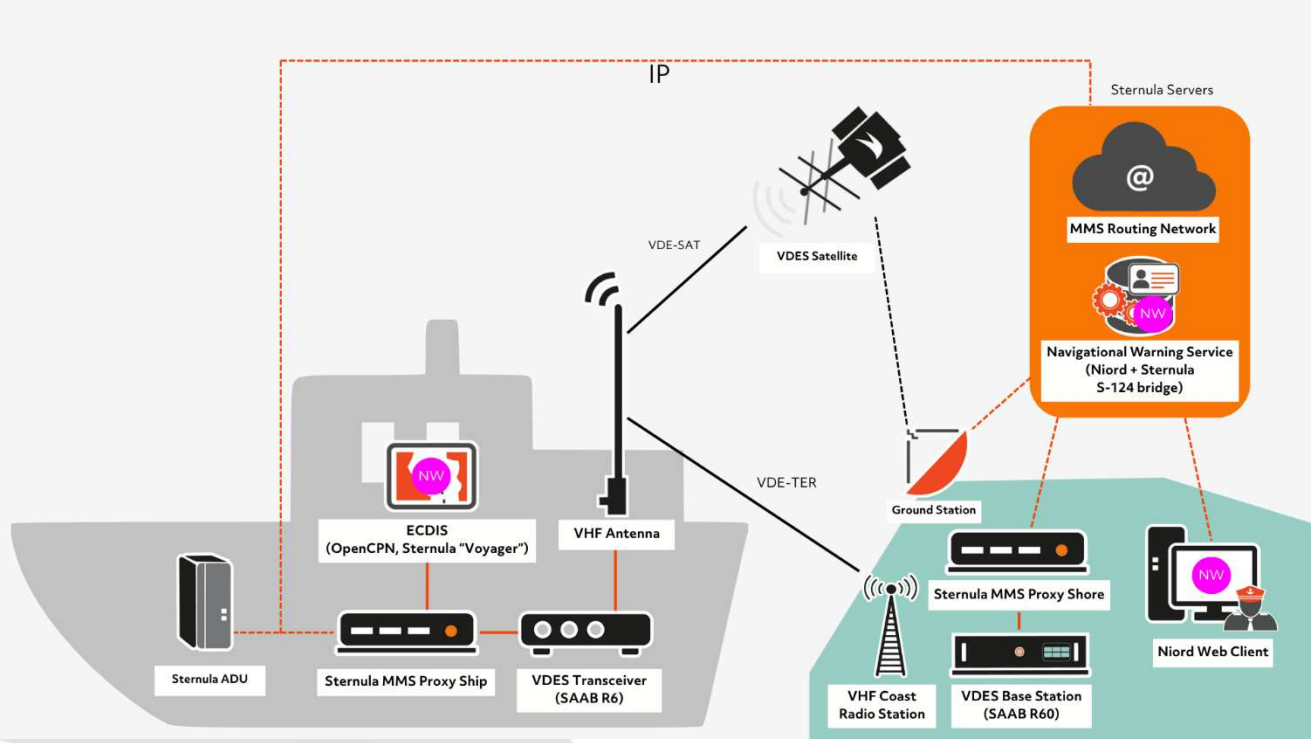
Experience seamless end-to-end AIS 2.0 connectivity with Sternula

The Sternula AIS 2.0 Pilot Project offers a complete setup that combines Sternula's advanced hardware with satellite and coast station connectivity. Built on VDES (VHF Data Exchange System) technology, AIS 2.0 enables the digitalization of vessels and coastal infrastructure.

With AIS 2.0, maritime safety and efficiency are significantly enhanced. Navigational warnings (S-124) are updated and displayed in real time on an ECDIS, ensuring that ship operators always have access to the most current information.

Through the Maritime Connectivity Platform (MCP), Sternula's MMS routers ensure fast, secure, and reliable data exchange from ship to shore, shore to ship, and ship to ship. This connectivity enables seamless communication and supports the growing demand for digital maritime services.

For maritime authorities, AIS 2.0 simplifies the digital transformation process. By relying on Sternula's infrastructure, authorities can focus solely on providing S-100 services, while Sternula delivers the foundation that makes these services possible.



Pilot Project Architecture

What is it?

AIS 2.0 consists of two elements. Firstly, VDES, the key radio access technology, enables significantly higher data rates than traditional AIS. Secondly, MMS ensures secure transmission for all data using digital signatures. This assists maritime authorities in ensuring S-100 data is being delivered securely to seafarers. Our AIS 2.0 solution includes the possibility to transmit data via VDE-SAT, VDE-TER, or an IP-connection, and our MMS-based routing automatically selects the best connection at the time of transmission.

A key strength of Sternula's technological approach is that the new components are fully compatible with existing AIS standards. Moreover, the system is fully functional even without satellite connectivity, allowing authorities to deploy and operate it in coastal areas or under budget constraints without compromising core functionality. This means the solution can be introduced and scaled gradually, providing a seamless upgrade path to the new world of a Secure Digital Maritime Domain. It ensures continuity and resilience by enabling a smooth migration from legacy AIS systems toward next-generation secure digital communication, all while maintaining operational stability and minimizing financial risk.

Sternula's AIS 2.0 Pilot Project ensures compliance with the carriage requirement of VDES, starting January 1st, 2028, on board all IMO vessels.

A test of the AIS 2.0 setup will lead to:

- An improvement in maritime safety and the potential for faster emergency response times.
- Enhanced control over unauthorized maritime activities within the region.
- Strengthening national sovereignty and situational awareness, promoting a more proactive and digitalized approach to maritime governance.

How does it work?

AIS 2.0 consists of two elements. Firstly, VDES, the key radio access technology, enables significantly higher data rates than traditional AIS. Secondly, MMS ensures secure transmission for all data using digital signatures. This assists maritime authorities in ensuring S-100 data is being delivered securely to seafarers. Our AIS 2.0 pilot project includes the possibility to transmit data via VDE-SAT, VDE-TER, or an IP-connection, and our MMS-based routing automatically selects the best connection at the time of transmission.

The components of Sternula's AIS 2.0 Pilot Project have been developed to meet all specifications, requirements, and guidelines in the maritime and radiocommunication industries. This includes:

- ITU-R M. 2092
- IALA guideline G1117
- RTCM MMS specification 13900.0
- Maritime Connectivity Platform (MCP) compatibility.

Product Specifications

Shore Components

1. VDES Base Station

The VDES transceiver used for the project should be a FLIR TransponderTech R60 VDES Base Station[1]. A complete FLIR TransponderTech R60 Full version Base Station set with AIS and VDES functionality and recommended Antenna kit, as well as incremental upgrades from FLIR TransponderTech. FLIR TransponderTech R60 is tested against Sternula's products.

2. Sternula MMS Proxy Shore

The Sternula MMS Proxy Shore[2] enables the transfer of digital messages containing digital data, using VDES terrestrial base stations. The Sternula MMS Proxy Shore makes it possible for the Sternula MMS Router to use the connected VDES base station for MMS communication with VDES-equipped ships in the terrestrial coverage area of that base station. Such MMS services can be selected to be accessible by ships with VDES equipment in the coverage area of that base station. The Sternula MMS Routing Shore manages access to services and the mobility of ships in a VDES shore network. It provides traffic statistics and accounting functions for management.

3. Sternula Above Deck Unit

The above deck unit is a 4G modem inside a water-resistant casing, which may be used as an alternative to VDES as the connectivity option for service demonstrations. Moreover, the 4G connection is useful for remote updates to the onboard setup.

4. Sternula MMS Routing Shore

The MMS Routing Shore is a service to connect VDES Base Stations via the Sternula MMS Proxy Shore to an MMS Router. It directs maritime communications to exchange data and messages between authenticated maritime users such as maritime administrations, port authorities, and services, ship crew, captains, pilots, and personal equipment, in an efficient, policy-governed, and seamless manner. Together with one Sternula MMS Proxy Shore per VDES base station, the Sternula MMS Routing Shore service enables your terrestrial VDES base stations to become part of the Sternula MMS Routing solution to route your and/or other secure maritime services over your VDE-TER network to ships and other mobile VDES equipment.

5. Niord Navigational Warning Service

An open-source editor and publication system for Navigational Warnings and Notices to Mariners, originally developed for the Danish Maritime Authority. The Niord platform enables maritime authorities to efficiently create, manage, and distribute navigational warnings in standardized S-100 formats, ensuring reliable and timely maritime safety information dissemination.

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[1] *FLIR TransponderTech R60 VDES Base Station*
[2] *Sternula MMS Proxy Shore*

Ship Components

1. VDES Transceiver

The VDES transceiver used for the project should be a FLIR TransponderTech R6 Supreme[3] with AIS and VDES functionality. With its state-of-the-art Software Defined Radio, it provides an AIS sensitivity of - 118 dBm. FLIR TransponderTech R6 Supreme is tested against Sternula's products.

2. Sternula MMS Proxy Ship

The Sternula MMS Proxy Ship[4] enables the transfer of digital "messages", i.e., arbitrary digital data, organized in a predefined, known way to be used by digital applications. It provides a non-synchronous data exchange that can be realized over varying, intermittent, and diverse digital connectivity. The Sternula MMS Proxy Ship supports both secure IP-based transport through internet connectivity and through VDE-TER and VDE-SAT connections. As a result, it addresses the need for secure transportation of trusted services and private communication among maritime stakeholders who have AIS 2.0 (VDES) or IP connectivity. Sternula MMS Proxy Ship software is compatible with 4G, AIS, AIS 2.0 (VDES), and VSAT technology, ensuring the exchange of secure maritime communication.

3. Sternula Above Deck Unit

The Above Deck Unit is a 4G modem inside a water-resistant casing, which may be used for IP-based communication with the ship. This can be used as an alternative to VDES as the connectivity option for service demonstrations in the PoC. Moreover, the mobile network connection is useful for remote updates to the onboard PoC installation.

4. Sternula MMS Routing Ship

The MMS Routing Ship is a service to connect a VDES Ship Transponder via the Sternula MMS Proxy Ship to an MMS Router. It directs maritime communications to exchange data and messages between authenticated maritime users such as maritime administrations, port authorities, and services, ship crew, captains, pilots, and personal equipment, in an efficient, policy-governed, and seamless manner. Together with one Sternula MMS Proxy Ship per VDES Ship Transponder, the Sternula MMS Routing Ship service enables your ship units to become part of the Sternula MMS routing solution to route your and/or other secure maritime services over your VDE-TER network to ships and other mobile VDES equipment.

5. Display Unit

The Display unit for ships, which is not offered under this project, must be a modern ECDIS supporting S-100 and MMS (future SOLAS requirements). In case such ECDIS is not available within the timeframe of the project, in particular during the PoC, a temporary solution is provided based on the open-source OpenCPN platform. Sternula has developed a plug-in for this platform with the necessary features.

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[3] *FLIR TransponderTech R6 Supreme*
[4] *Sternula MMS Proxy Ship*