



Interoperability Pilot Project

Final technical report

Agreement number SI2.786422

Promotion of interoperability between industry and competent authorities in the European Maritime Single Window (EMSW) environment under the CISE Process

Public Version 1.0

Date: 29 July 2022



Funded by the European Union –
European Maritime and Fisheries
Fund



Table of Contents

1. Executive summary	5
2. Objectives of the grant	6
2.1 Objectives pursued	6
2.2 Specific objectives	6
2.3 Expected results	6
3. Activities performed	7
3.1 Activity A.1 - Assessment of EMSWe data exchange via SSN	7
3.2 Activity A.2 - Evaluation of security and interoperability solutions for SSN	8
3.3 Activity A.3 - Use of SSN for statistics and vessel movement patterns services	12
3.4 Activity B.1 - Facilitate MRS and VTS reporting	14
3.5 Activity B.2 - Use of reference databases to support the MS authorities and EU agencies	16
3.6 Activity B.3 - Use of common databases for the EMSWe	19
3.7 Activity C.1 - EMSWe dataset	20
3.8 Activity C.2 - EMSWe message formats	22
3.9 Activity C.3 - EMSWe processes	24
3.10 Activity D.1 - VDE Capability project	25
4. Conclusion and follow-up	26

List of Figures

Figure 1: SSN system context in the case of MNSW data exchange	8
Figure 2: System context of the target SSN architecture relying on blockchain technology	9
Figure 3 – SSN system context for the centralised cloud architecture scenario	11
Figure 4: System context for the event-driven decoupling architecture scenario.....	11
Figure 5: System context for the decentralised architecture scenario.....	12
Figure 6: Example of a traffic density map visualised in SEG	13
Figure 7: Example of MRS reporting along a route from Alexandria (Egypt) to Gdansk (Poland)	15
Figure 8: System context of the Integrated Report Distribution service (IRD)	16
Figure 9: Flow of information involving the IRD in the ship-shore reporting of MRS and VTS reports	16
Figure 10: The Central Ship Database and its data sources.....	18
Figure 11: User interface of the Central Geographical Database	19
Figure 12 – System context of the Hazmat Data Validation service	20
Figure 13: User interface of the Hazmat Data Validation service.....	20
Figure 14: Overview of the initial EMSWe data model	21
Figure 15: Comparison of the EMSWe dataset with other reference datasets considered by the study	22
Figure 16: Abstract of the EMSWe dataset specifications	22
Figure 17: Estimated coverage of message standards as regards the EMSWe dataset.....	23
Figure 18: Abstract example of a EMSWe message structure.....	24
Figure 19: Concept of the VDE-SAT capability	25
Figure 20: Concept of the VDE-SAT on-board application.....	25

List of Abbreviations

Abbreviation	Description
AIS	Automatic Identification System
CEF	Connecting Europe Facility
CGD	Central Geographical Database
CHD	Central Hazmat Database
CISE	Common Information Sharing Environment
CLD	Central Location Database
CSD	Central Ship Database
EIF	European Interoperability Framework
EIS	European Index Server
EMFF	European Maritime and Fisheries Fund
EMSA	European Maritime Safety Agency
EMSWe	European Maritime Single Window environment
ESA	European Space Agency
EU	European Union
EUCDM	European Union Customs Data Model
HLSG	High-Level Steering Group for Governance of the Digital Maritime System and Services
ICT	Information and Communication Technology
IMO	International Maritime Organisation
IRD	Integrated Reports Distribution system
LRIT	Long-Range Identification and Tracking
MCP	Maritime Connectivity Platform
MMT RD	Multi-Modal Transport Reference Data Model
MNSW	Maritime National Single Window
MRS	Mandatory Reporting System
MS	Member State
SEG	SafeSeaNet Ecosystem Graphical user interface
SRS	Ship Reporting Systems
SSN	SafeSeaNet
STM	Sea Traffic Management
TDM	Traffic Density Map
TDMS	Traffic Density Mapping System
VDES	VHF Data Exchange System
VDE-SAT	Satellite component of the VHF Data Exchange System
VTS	Vessel Traffic Service

1. Executive summary

On 18 September 2018, the Commission (DG MARE) and EMSA have signed a grant agreement for the execution of action 1.2.1.4 of the EMFF work programme 2018 for the “promotion of interoperability between industry and competent authorities in the European Maritime Single Window environment (EMSWe) under the CISE Process”. For the purpose of facilitating the communication with stakeholders and teams involved, the action was identified under the name “Interoperability project”. The project ran until May 2022 and was overseen by a Steering Committee composed of the relevant Commission DGs (MOVE, MARE, DIGIT and TAXUD) and EMSA.

The first objective of the project was to assist Member States (MS) in improving their National Maritime Single Window (NMSW) solutions and the interfaces with SafeSeaNet (SSN) in order to achieve better data consistency, improve re-use of data and harmonise exchanges between MS and EMSA systems. The second objective was to contribute to the development of an EMSW environment through the elaboration of interoperability solutions and specifications. The action contributed, on the one hand, to further developing the EMSW environment and, on the other hand, to creating more robust information exchange channels between administrations in the maritime domain, which is one of the objectives of CISE.

The project was structured in several activities aiming at enabling a more efficient data exchange and sharing of port documentation using SSN, enhancing connectivity between relevant authorities and end-users, developing specific interoperability solution contributing to the development of an EMSW environment, and improving ship-to-shore information exchanges using VDE-SAT communications.

In terms of the contribution to the EMSWe environment, the project successfully managed to elaborate business processes descriptions, a reference dataset including taxonomies, controlled vocabularies and code lists, and reusable data structures/models covering all known reporting obligations applied in all ports of the EU. The results therefore addressed the organisational and semantic layers of the European Interoperability Framework¹. By providing a connection with existing reference datasets and message standards from the IMO, the WCO, UNECE and ISO, the project gave solid grounds for the MS to set up MNSWs solutions which are interoperable with the ICT solutions of the Shipping Industry and of the diverse authorities involved with the ports, such as port authorities and customs.

Taking into account to central role of SSN in the exchange of maritime information between authorities of the MS, the project drew possible paths for further developing it to serve as an exchange platform for MNSWs and ship operators. Several technological options were assessed including the Blockchain, cloud services, CEF building blocks and decentralised peer-to-peer data exchanges using CISE nodes. It as well defined technical measures for securing the information exchanges between MS.

In collaboration with 14 volunteering MS, the project developed a solution that proved how MS authorities can automatically receive and integrate SSN information within their own systems in order to improve situation awareness at sea and reduce ship-to-shore reporting. The project demonstrated as well that MRS and VTS ship-to-shore reporting could be achieved through electronic means, therefore reducing voice communication, and materializing the e-navigation concept. By contributing to a VDE-SAT demonstration project with Norway and ESA, the project further developed the concept and demonstrated how such ship-to-shore reports can be communicated using satellite connections.

The project developed master database services on ship identification information and particulars as well as on geographical areas and dangerous and polluting goods characteristics. Such services are meant to deliver reference information that can be integrated with EMSA maritime applications and MS systems to reduce administrative burden and guarantee the quality of the reported information.

The Interoperability project produced concrete results that will contribute to the setting up of truly harmonised and interoperable EMSWe and to the further development of SSN services to the MS such as more secured and efficient port documentation exchanges, central databases, data processing services and digitalisation of ship-to-shore reporting.

¹ https://ec.europa.eu/isa2/eif_en/

2. Objectives of the grant

On 18 September 2018, the Commission (DG MARE) and EMSA have signed a grant agreement for the execution of action 1.2.1.4 of the EMFF work programme 2018 for the “promotion of interoperability between industry and competent authorities in the European Maritime Single Window environment (EMSWe) under the CISE Process” (Ref. Ares(2018)4632337, agreement number SI2.786422). The initial duration of the action was set to 36 months. For the purpose of facilitating the communication with stakeholders and teams involved, the action was identified under the name “Interoperability project”.

2.1 Objectives pursued

Information exchange between maritime surveillance authorities at EU and national level needs to be enhanced, in order to improve their overall maritime awareness, to increase co-operation between coastguard authorities and to ensure efficiency and cost-effectiveness of individual and/or joint operations in the maritime domain. This objective has been pursued by the Common Information Sharing Environment for the maritime domain (CISE) initiative, through a voluntary collaborative process directly supported by Member States².

The project aimed at engaging EMSA in further developing interoperability solutions allowing for seamless information exchange between the EU and national authorities' systems, cross-sector and cross-border.

2.2 Specific objectives

The first objective of the project was to assist Member States (MS) in improving their National Maritime Single Window (NMSW) solutions and the interfaces with SafeSeaNet (SSN) in accordance with the requirements of Directives 2010/65/EU and 2002/59/EC, in order to achieve better data consistency, improve re-use of data and harmonise exchanges between Member States and EMSA systems.

The second objective of the project was initially to enhance the functionalities of the European Maritime Single Window (EMSW) demonstrator, developed under a previous 2012 project funded by the Integrated Maritime Policy transitional financial instrument, in order to enable interoperability with other EU systems (e.g. Mandatory Reporting Systems, VHF Data Exchange System (VDES) for the transmission of digital data between ship and shore, eCustoms, Eurostat). That second objective was revised through a grant amendment to perform specific interoperability activities contributing to the development of an EMSW environment.

The action contributed, on the one hand, to further developing the EMSW environment and, on the other hand, to creating more robust information exchange channels between administrations in the maritime domain, which is one of the objectives of CISE.

2.3 Expected results

The action sought to produce concrete results that allowed for seamless information exchange between EU and national authorities. More specifically, it allowed Member States' authorities to test how to automatically receive and integrate information services provided by EMSA within their own systems and fuse this data with additional information only available at national level, in order to improve situation awareness at sea and reduce ship reporting formalities.

To achieve these the main tasks of the project implied:

- a. Enabling a more efficient data exchange and sharing regarding port documentation between the different authorities of Member States using SSN, including exchange of cargo information;
- b. Enhancing connectivity between all relevant authorities and end-users in the different Member States;
- c. Performing specific interoperability activities contributing to the development of an EMSW environment, and

² <https://emsa.europa.eu/we-do/surveillance/cise.html>

- d. Improving information exchange ship-to-shore using VHF Data Exchange-satellite (VDE-SAT) communications, by setting up a data processing capability.

The four tasks above were translated into a series of activities:

- Activity A.1 - Assessment of EMSWe data exchange via SSN,
- Activity A.2 - Evaluation of security and interoperability solutions for SSN,
- Activity A.3 - Use of SSN for statistics and vessel movement patterns services,
- Activity B.1 - Facilitate MRS and VTS reporting,
- Activity B.2 - Use of reference databases to support the MS authorities and EU agencies,
- Activity B.3 - Use of common databases for the EMSWe,
- Activity C.1 - EMSWe dataset,
- Activity C.2 - EMSWe message formats,
- Activity C.3 - EMSWe processes,
- Activity D.1 - VDE Capability project.

3. Activities performed

This section presents an overview of the activities performed under the project and of their results.

3.1 Activity A.1 - Assessment of EMSWe data exchange via SSN

For voyages between EU ports, the information reported at the departure port is in many cases the same information that a ship has to report to the arrival port (e.g. voyage details, security, dangerous and polluting goods, cargo, crew and passenger data). In order to facilitate the reporting of information in port and apply the reporting-once principle by which information would only need to be reported once, data exchange mechanisms between MNSWs could be envisaged to transfer information already reported at the previous port to the next port. A study was contracted to assess how SSN could support such data exchange.

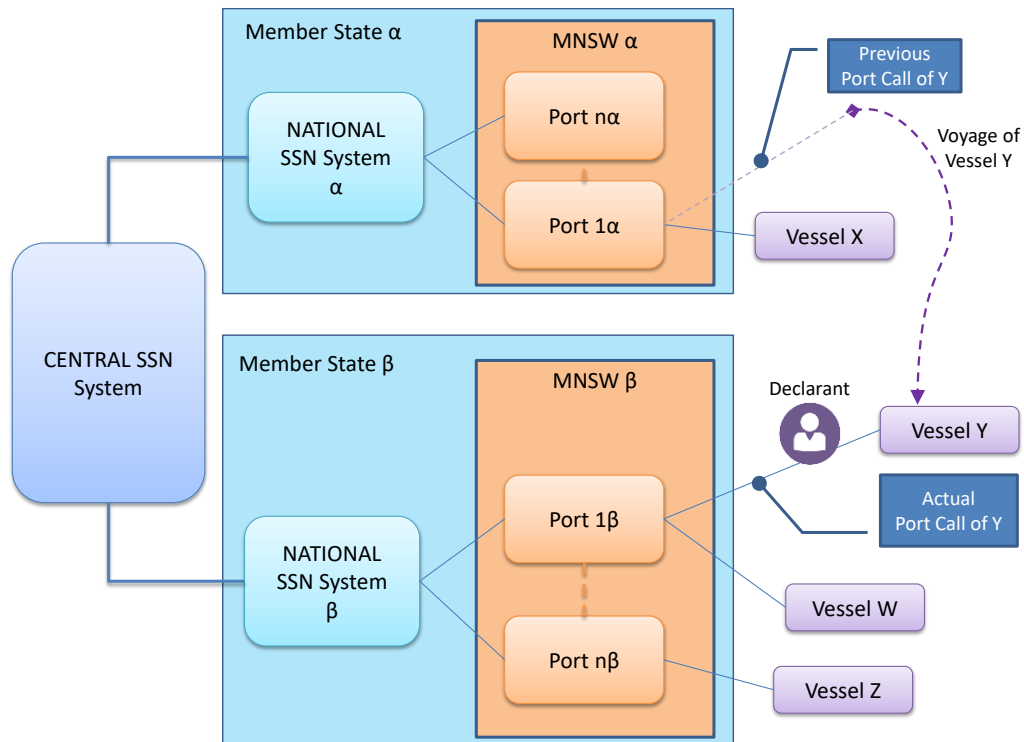


Figure 1: SSN system context in the case of MNSW data exchange

Using the description of the EMSWe dataset elaborated under Activity C.1, the study identified the individual data elements that would be exchanged through SSN in order to allow reusing information between ports. The study then performed a projection estimate of the data flows based on existing figures from SSN and from statistics on the maritime transport sector. The result of this work was delivered on in May 2020.

The study showed that compared with the data currently exchanged via SSN, the most significant additional information would relate to persons on board and cargo. It estimated that, in a situation where all data that can be reused between ports would be actually exchanged via SSN, the system would have to handle yearly more than 2,000,000 data requests. In some cases, information packages may have a significant size (up to 10 MB for cargo data in the case of large container ships and 18 MB for passenger data in case of large cruise ships, compared with a maximum of 2 MB currently treated by SSN).

3.2 Activity A.2 - Evaluation of security and interoperability solutions for SSN

3.2.1 Security and Interoperability Study for SSN

Activity A.1 had shown that personal data and commercially sensitive data may be exchanged via SSN in the context of the EMSWe. The current architecture of SSN, which has been designed for the purpose of close-to-public data exchange between authorities, poses problems as it may not sufficiently ensure the security of data exchanges. Additional specific security measures and technical solutions would be necessary to guarantee that personal data and commercially sensitive data are securely exchanged and processed. A Security and Interoperability Study was contracted to define more secure technologies and interoperability measures that would need to be applied in SSN.

The study ran from July 2019 until April 2020 and involved experts from EMSA, DG MOVE, DIGIT, ENISA and CERT-EU. It considered as input the Cyber Security guidelines developed by the EU and the International Maritime Organisation (IMO), Regulation (EU) 2018/1725, and the General Data Protection Regulation (EU) 2016/679 as well as Decision 2015/444, Decision 2017/46, and ISO 27001. In terms of the technical solutions, the study assessed the Connecting Europe Facility (CEF) Building Blocks such as eID, eSignature, eDelivery, and eArchiving. The study provided as final output a series of recommendations in terms of security measures, technical specifications for implementation, and revised security guidelines for SSN.

3.2.2 Study on distributed non-repudiation solutions based on blockchain for SSN

To complement the above study and assess additional technical options, a study on distributed non-repudiation solutions based on Blockchain for SSN was launched in June 2020. The study aimed at elaborating a technical architecture proposal for a new SSN system that would be based on a distributed system concept and ensure the non-repudiation, integrity and traceability of data using Blockchain technologies.

The study evaluated two nominal use cases of data exchanges involving declarants using MNSWs connected to SSN and maritime authorities dealing with situations at sea and requesting ship data to SSN. The study focused on an approach where the functionalities of the interface with national SSN systems would be maintained to lower the impacts on the MS. The central SSN system operated by EMSA would be reengineered to rely on SSN nodes integrated with each national SSN system or MNSW.

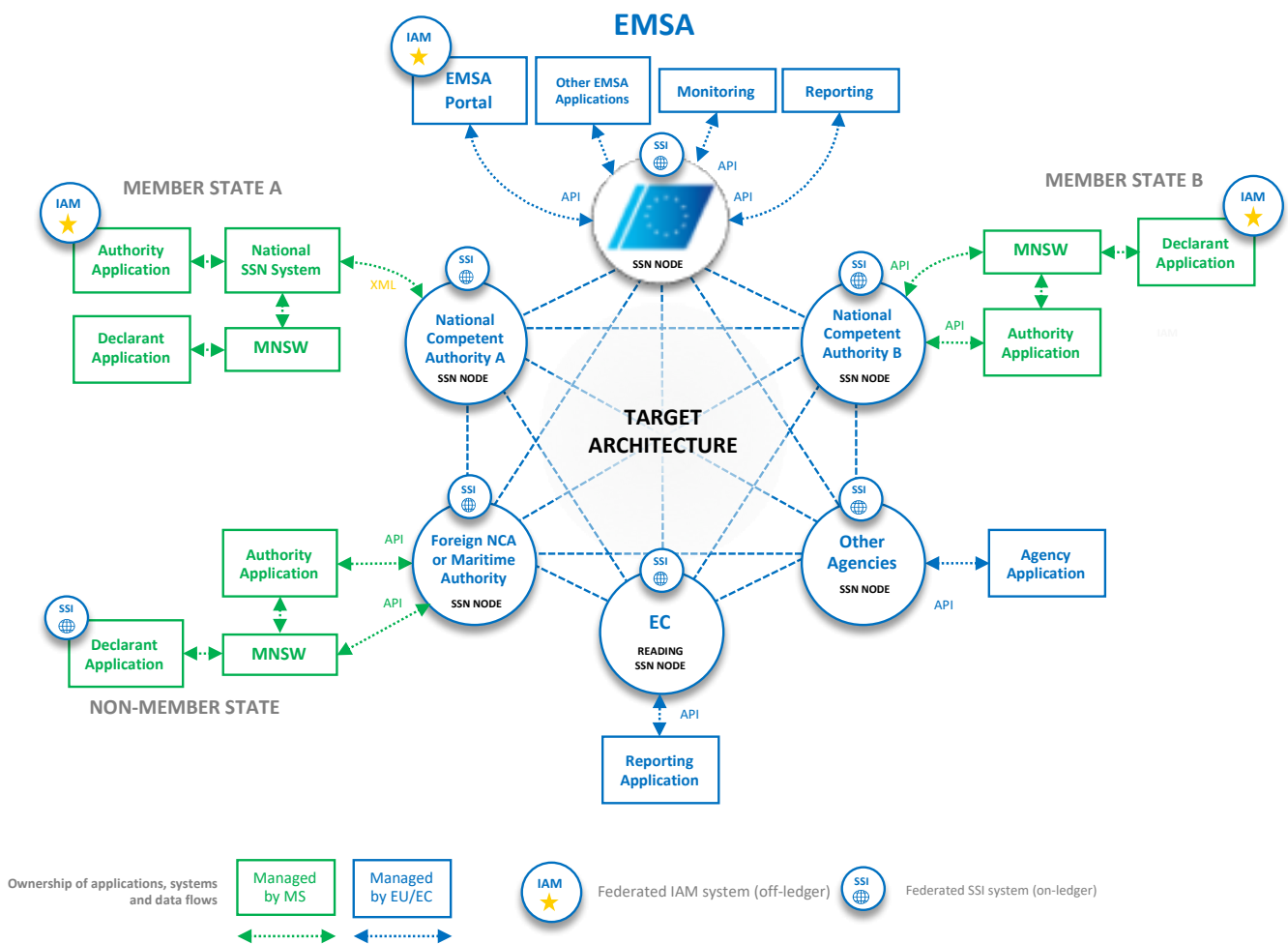


Figure 2: System context of the target SSN architecture relying on blockchain technology

The study has shown that a decentralised architecture was possible and that the Blockchain may play a role in increasing the level of trust in the data exchanged. It also found that while Blockchain is efficient in ensuring the integrity and non-repudiation of information, it may not be the best solution for sharing non-public information and for performing exchanges of large quantities of information, such as cargo and passenger lists.

3.2.3 Study on a distributed architecture for SSN

With the possible significant increase of data exchanges in the context of the EMSWe, it was considered that the current architecture of SSN, which relies on a central node, may cause issues as it would represent a single point of failure for the exchange network. A study on a distributed architecture for SSN was contracted to assess different technological options for addressing the sharing and exchange of information between parties of the SSN

network in a hybrid manner (partially in centralised and partially in decentralised mode) and compare it with the solution presented in the Blockchain study.

The study assessed the technical solutions proposed by other data sharing projects, namely CISE, the STM³ project and the Commission's CEF Building Block eDelivery⁴. The study also assessed how the blockchain may be used for guaranteeing the integrity of data exchanged through SSN (e.g. data Integrity auditing by relying on a Blockchain solution to record data transactions) and how the Commission's CEF European Blockchain Services Infrastructure (CEF EBSI⁵) could support the implementation of the solution.

The assessment showed that several features of the STM project as well as of the MCP architecture used by the project, might be reusable for the future SSN architecture. However, the MCP platform was not well suited for reuse in SSN since its use cases were very different from the SSN ones.

Both CISE and eDelivery offered features that could be leveraged in SSN. This assessment has uncovered potentially reusable technology features of these solutions, the main finding being that both CISE and eDelivery offered a secure and reliable communication channel that could be used as a communication enabler between parties. However, the key takeaway of the assessment was that none of the investigated solutions offered full compliance with SSN requirements and additional developments would always be needed on top.

The study also concluded that ESBI being an infrastructure, it addressed specific use cases that did not cover SSN's needs for data exchanges.

The study assessed the role that cloud have in the future SSN network. It had become evident that public cloud technologies offered various benefits for deploying and developing applications and for offering scalable and highly available services.

The requirements specifications and the existing solutions' analysis devised the below three architecture scenarios that supported the use cases in scope:

³ Sea Traffic Management (STM) is a methodology developed by a project coordinated by the Swedish Maritime Administration and endorsed by the European Commission with the objective to define a set of systems and procedures to guide and monitor sea traffic. STM applies the MCP architecture which consists of distributed actors supporting third-party services to be provided to relevant maritime actors through a standardized network.

⁴ eDelivery is a building block that provides technical specifications and standards, installable software and ancillary services to allow projects to create a network of nodes for secure digital data exchange. By building with eDelivery, public and private organisations from different sectors can easily create a safe and interoperable channel to transfer documents and data among each other over a public or private network. <https://ec.europa.eu/digital-building-blocks/wikis/display/DIGITAL/eDelivery>

⁵ EBSI is a network of distributed blockchain nodes across Europe, supporting applications focused on selected use-cases. EBSI is the first EU-wide blockchain infrastructure, driven by the public sector, in full respect of European values and regulations. <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Home>

- A **centralised cloud architecture**, in which the high-level architecture of SSN is maintained - including the functionality of the European Index Server (EIS), which is the core of the Central SSN System – and an in-depth cloud migration strategy is considered for solving the pain points of the current architecture;

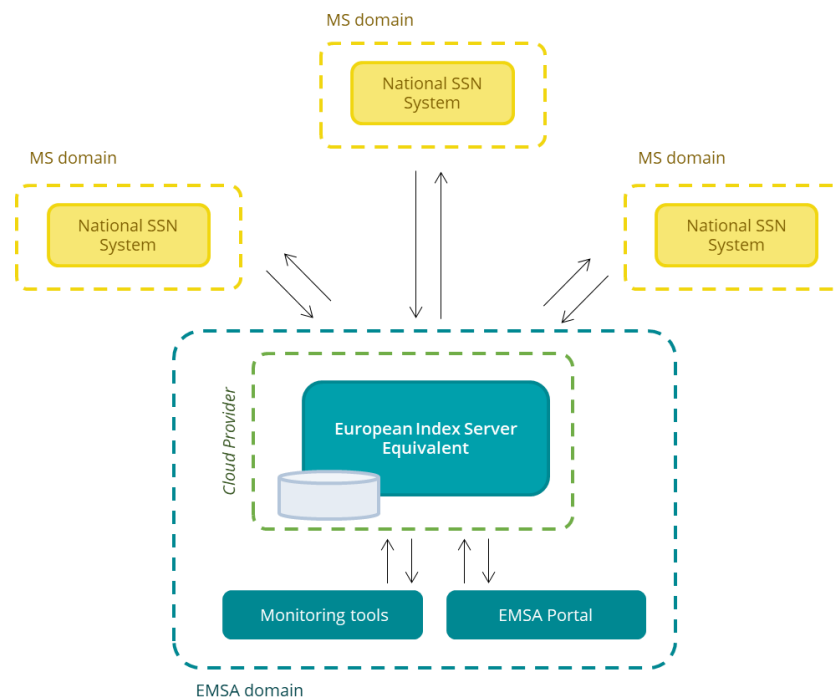


Figure 3 – SSN system context for the centralised cloud architecture scenario

- An **event-driven decoupling architecture**, in which load is removed from the Central SSN System by handling requests between the nodes without EIS intervening in the transactions and by delivering messages through an asynchronous, central message broker, which is built using a product from the market (commercially available off-the-shelf - COTS);

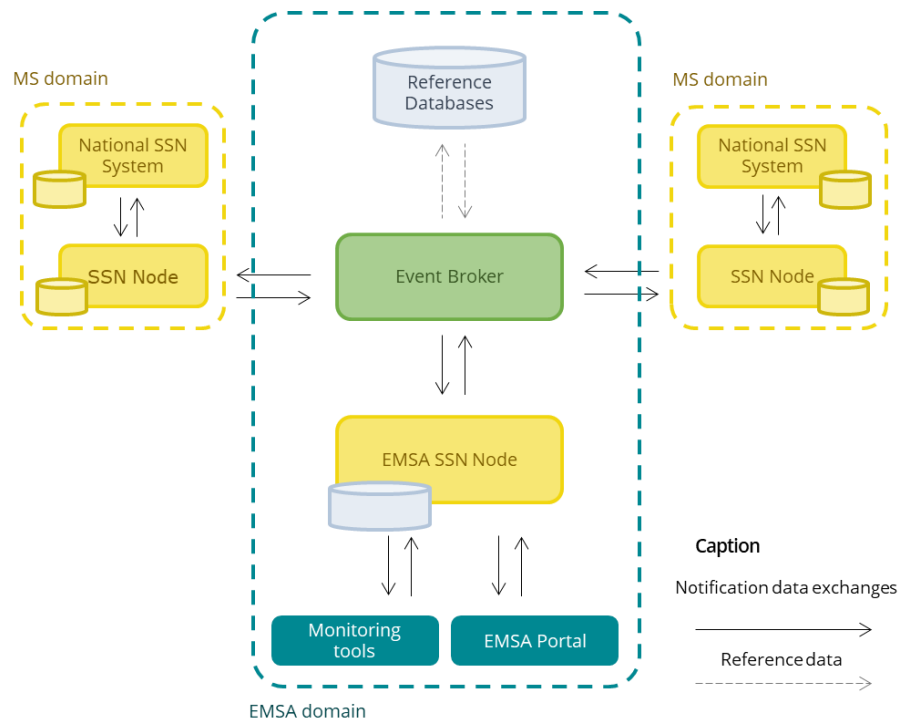


Figure 4: System context for the event-driven decoupling architecture scenario

- A **decentralised architecture**, in which nodes are responsible for sharing the data to whom it may concern and for consolidating the received data without the involvement of a central system.

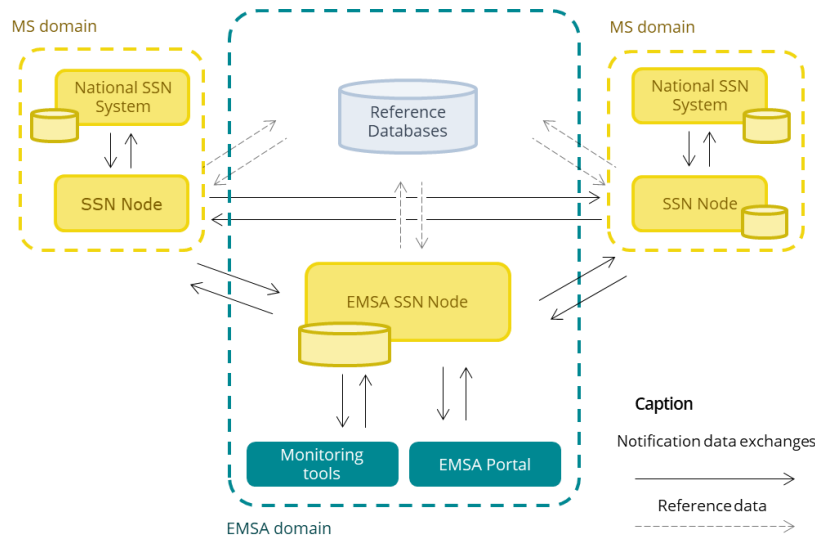


Figure 5: System context for the decentralised architecture scenario

The study revealed that the assessed existing solutions CISE and eDelivery could potentially be reused in the decentralised architecture scenario.

To support the future decision-making process, the study also performed a high-level cost analysis for the architecture scenarios. The centralised cloud scenario was the less expensive architecture. It was also the only scenario that did not imply additional costs for the MS. The event-driven decoupling scenario was the most expensive architecture for EMSA. This scenario also came with considerable costs for the MS, especially when it comes to the initial investment. The decentralised scenario, although not the most expensive architecture for EMSA, was the most expensive for the MS due to the complexity of the MS nodes and their interfacing with the National SSN systems. The study noted that the costs found by the Blockchain study were of a similar level of magnitude as the costs of the centralised cloud scenario, while the Blockchain-based scenario offered fully decentralised data exchanges.

3.3 Activity A.3 - Use of SSN for statistics and vessel movement patterns services

The project assessed the use of the SSN Ecosystem platform to offer data computation services to the users for purposes such as statistics and vessel movement patterns. This activity included the development of visual representations of vessel movement pattern (traffic density maps), statistics on the impact of the COVID-19 crisis and tracing of calls of ships in ports. Interoperability solutions with Eurostat were as well assessed.

3.3.1 Traffic density maps

To address needs of the MS maritime authorities for statistics on vessels movement patterns, a traffic density mapping service was developed. The service computes ship position data and calculates the density of traffic per geographical cells and per time periods (e.g. month, season, year) in the overall EU maritime areas and in specific areas. The resulting traffic density maps are made available to the maritime authorities through the SSN Ecosystem Graphical Interface (SEG), and to the public through the EMODnet Human Activities portal⁶. Several types of maps are computed:

- Standard maps (with 1 x 1 km cells),
- Detailed maps (for specific areas, with 200x200 m cells),
- Vector maps (for specific areas, displaying individual ship tracks),
- Comparative maps (showing traffic value differences between two maps selected by the user),
- Customised maps (for user-defined time periods from 2 to 36 months),
- Ship particulars maps (per value ranges of gross tonnage, keel laying date, fuel type and engine rotation speed, based on ship characteristics data from the Central Ship Database).

⁶ <https://www.emodnet-humanactivities.eu/view-data.php>

The service computes ship position data from several sources including Terrestrial and Satellite AIS. By consolidating information from multiple AIS sensors from MS and data providers, the service offers a broader view on shipping traffic than available by the MS own AIS networks.

The development contract was kicked-off in April 2020 and the service was developed progressively, adding new types or maps, until May 2022. The service calculates more than 600 maps per year.

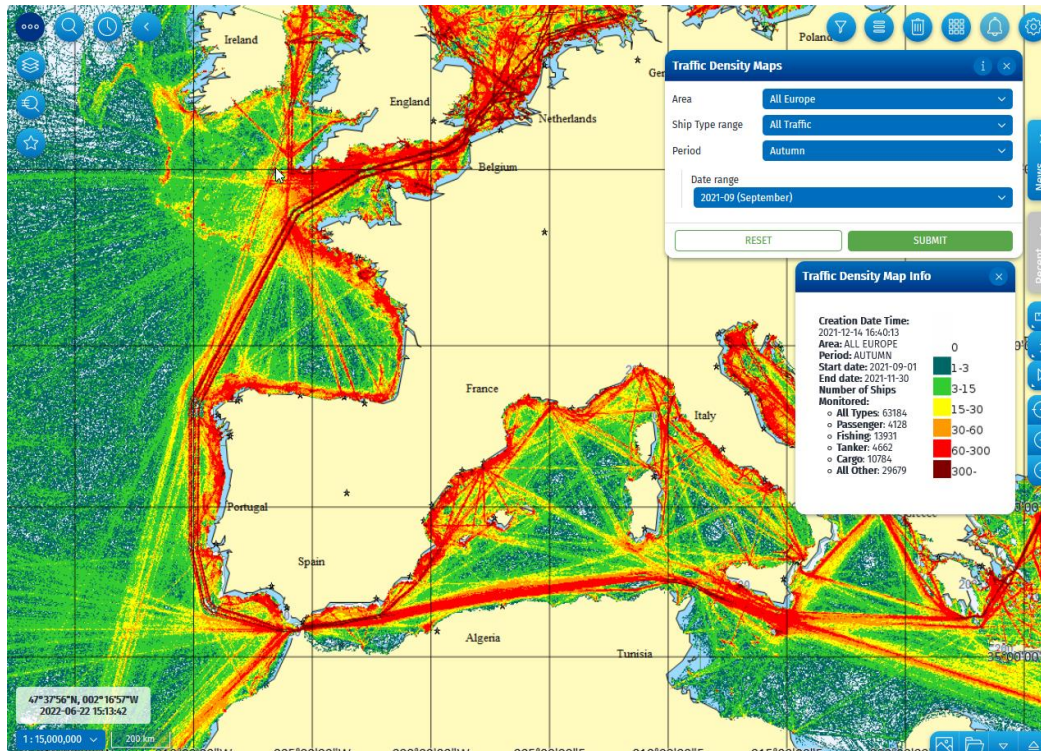


Figure 6: Example of a traffic density map visualised in SEG

3.3.2 Statistics on the impact of the COVID-19 crisis

The COVID-19 outbreak affected the lives and work of people in the EU and across the globe. Since the start of the COVID-19 crisis, the Commission, the MS and the shipping industry have been taking measures to ensure the continuity of operations and thus the security of supply. The effects of the crisis could be long-term, and during the peak of the pandemic situation what shipping would look like post COVID-19 was unclear.

EMSA had most of the necessary data and tools to analyse the impact of the pandemic on certain shipping activities by analysing vessel traffic, and data from inhouse databases including ship inspections, accidents and emission reporting thus providing reliable figures to assist policy makers in the definition of measures for recovery policies. In this regard EMSA had produced regular reports with figures on the impact of COVID-19 on shipping traffic. However, these reports did not fully serve the purpose of measuring the economic impact of COVID-19, mainly because trade volumes, cargo freights and other economic indexes were not available in the EMSA tools and applications. Therefore, a new study appeared necessary to provide missing elements and complement the full picture of the COVID-19 impact to maritime transport.

This study was contracted in December 2020 and executed between January and April 2021. The objective of the study was to provide figures and insight on the impact that COVID-19 had on trade volume and type, economic and financial affairs, new trading routes/patterns, cargo freights, chartering, and other financial indexes and indicators related to ship owners/ship operators and ports, and consequently monetary impact on the EU maritime transport sector as a whole. The study took into consideration the major trends in maritime flows with a keen eye on the EU, its ports and its fleet (owned and flagged).

The report is available on EMSA's website: <http://www.emsa.europa.eu/publications/download/6635/4436/23.html>

3.3.3 Tracing of calls of ships in ports

One of the main issues for maintaining an acceptable level of interoperability in SSN, which interconnects 27 national systems, is to control that the information exchanged is correct and complete. This is generally done through manual checks. While the interoperability generally refers to automatization of data exchange, it should also consider all activities which contribute to the automatization of data exchanges such as data quality checks. Automatizing such checks would significantly contribute to the overall interoperability with MS systems considering that 5% of port calls are not reported to SSN. The project assessed whether using SSN's ship position tracking services could be used to detect port calls and compare the detected port call information with the data notified by the MS.

The activity delivered a Cloud ICT service which detects port calls from ships position tracks. For that purpose, an Automated ship Behaviour Monitoring algorithm has been developed to use ships positions obtained from Terrestrial and Satellite AIS positions and compare them with geographical port areas to capture port arrival and departure times. The service was deployed in February 2021 and is capable of detecting port calls worldwide. The service is a near real time and is also able to detect port calls retroactively.

Lists of detected port calls can already be extracted from the system and used to compare results reported by the MS national systems. This represents an additional mean of data quality checks, in addition to e.g. commercial data providers. Before this is put in operational practice within EMSA's data quality procedures, validation checks will need to be done on the detected port call data to have an accurate measure of its accuracy. EMSA is as well assessing the resulting information to see how it may be used in EMSA's maritime applications.

3.3.4 Interoperability with Eurostat

EMSA liaised with Eurostat to assess whether information already reported by ports to SSN could be re-used and transmitted to Eurostat. The aim of the discussion was to see how such SSN information could facilitate the collection of maritime statistics which are currently reported manually and in an unharmonized manner by the port authorities through the national statistical agencies. Ultimately such development would improve the interoperability of port systems with EU systems and automatize data exchanges. Meetings were held on 21 February 2020 and 28 April 2020. The relevant information from SSN was identified and it was found that although not completed enough to replace the reporting by national statistical agencies, it could be used by Eurostat to perform data quality and consistency checks. Eurostat is considering launching a study to define ways to interpret SSN data and build correlation factors to build early statistical indicators based on SSN data.

3.4 Activity B.1 - Facilitate MRS and VTS reporting

There are 16 IMO-adopted Mandatory Ship Reporting Systems (MRS) in European waters which require ships to report data to shore-based authorities when entering specific areas. Similarly to MRS, there are over 100 VTS centres in the EU which also require certain data to be reported. Ships which cross several MRS and VTS areas along their route are often required to report similar information in each area.

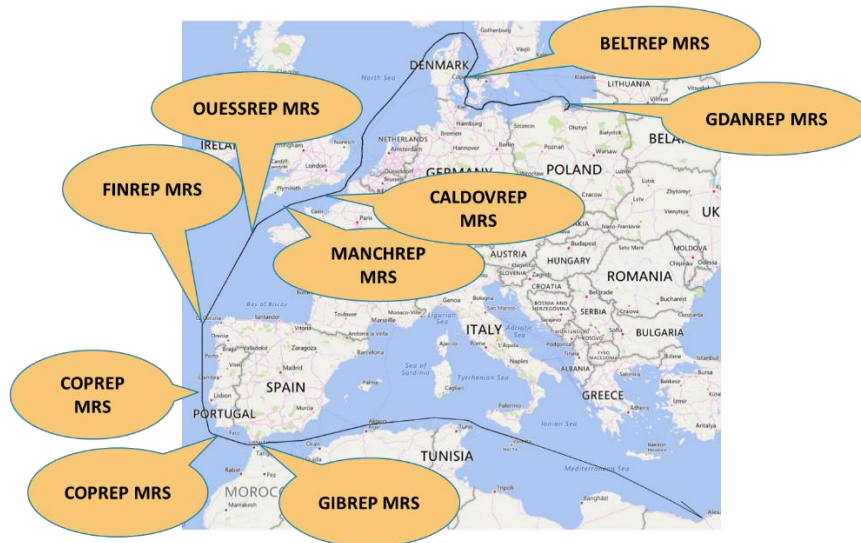


Figure 7: Example of MRS reporting along a route from Alexandria (Egypt) to Gdansk (Poland)

The last years have seen notable developments in technology within navigation and communication systems and advanced technologies are developing rapidly. Automation of ship reporting has taken a big step forward with IMO decisions aiming at simplifying the communication of navigational safety information between ship and shore and at harmonising display on ships' bridge equipment. This trend is also reflected in the recently adopted Resolution A.1158(32) on guidelines for Vessel Traffic Services which aims at providing a framework for implementation of VTS globally in a harmonized manner and foreseeing accommodation of new trends, such as e-navigation and others aiming at more safe, secure and efficient maritime traffic and trade.

A pilot project on the facilitation of ship-to-shore reporting was launched in November 2018 to explore technical and operational solutions to minimise the reporting burden for ship crew and of coastal station operators in MRS and VTS areas and to investigate how SSN could play a facilitator role. 14 MS volunteered to participate in the project: BE, DE, DK, EE, FI, FR, HR, IT, LV, NL, NO, PL, RO and SE.

The pilot project aimed at developing a solution that would demonstrate how:

- a. The different data sets which are available in the SSN Ecosystem can be integrated and made available to coastal stations operators;
- b. The coastal stations operators can use that integrated data to minimise the reporting burden for ships, improve the efficiency of their services and develop a better awareness of their areas of control;
- c. The ships can electronically submit MRS and VTS reports and re-use information available in SSN;
- d. New technologies such as VDE-SAT can be used for communicating MRS and VTS reports between ship and shore.

The following tasks were executed:

- i. Define the content of and Integrated Ship Report (ISR) - EMSA worked with the participating MSs to define the ISR's content (data elements and their sources) to cover the needs of different coastal stations in a harmonized way.
- ii. Develop the technical solution to build the ISR – A new Integrated Reports Distribution (IRD) service was developed to continuously collect data from the SSN Ecosystem and integrate it into ISRs. The service ran along with the EMSA maritime applications and ensured that the ISR was in place and could be distributed whenever needed.
- iii. Develop the technical solution to distribute the ISR to MSs authorities – The IRD solutions was further developed to deliver the ISRs to MSs authorities through a web user interface, a system-to-system interface and e-mail notifications. The distribution service could be configured for each coastal station in terms of the ISR data content and triggers for sending the ISR (e.g. ship entering or leaving an area

- detected by EMSA’s Automatic Behaviour Monitoring system - ABM, time period, notification of ship arriving or leaving a port received by SSN, manual request)
- iv. Design and develop a graphical user interface for ships reporting – A web application was developed to allow ships crew to deliver MRS and VTS reports by electronic means to the relevant coastal stations. The solutions offered to re-use information from ISRs to facilitate the preparation of the reports.
- v. Test the developed technical solutions with authorities and the shipping industry – The project included operational tests with coastal stations and ships to prove that the technical solution provided the expected benefits and that it could be inserted in the existing administrative processes.

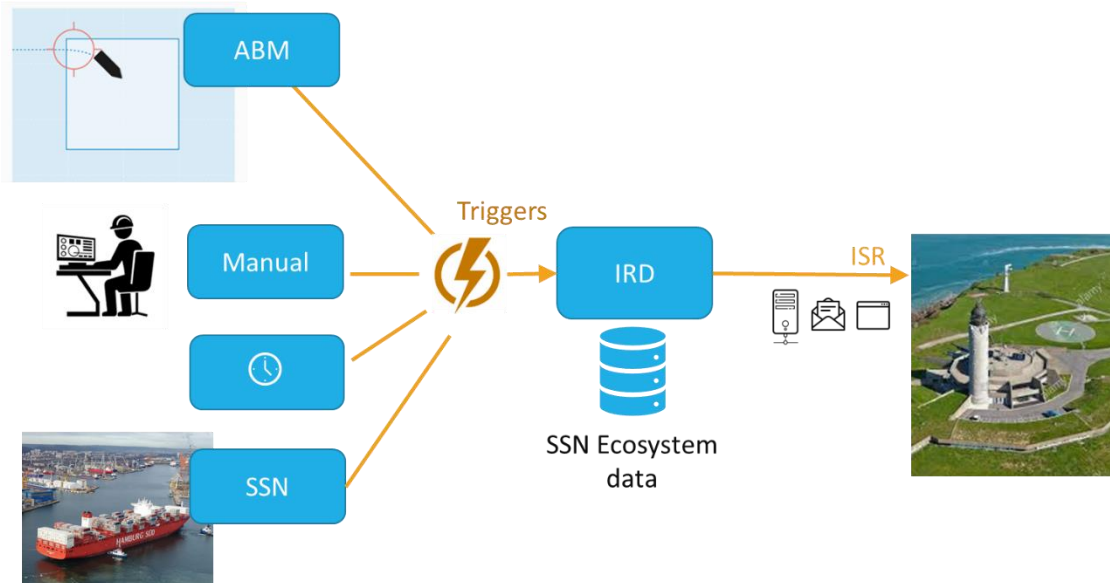


Figure 8: System context of the Integrated Report Distribution service (IRD)

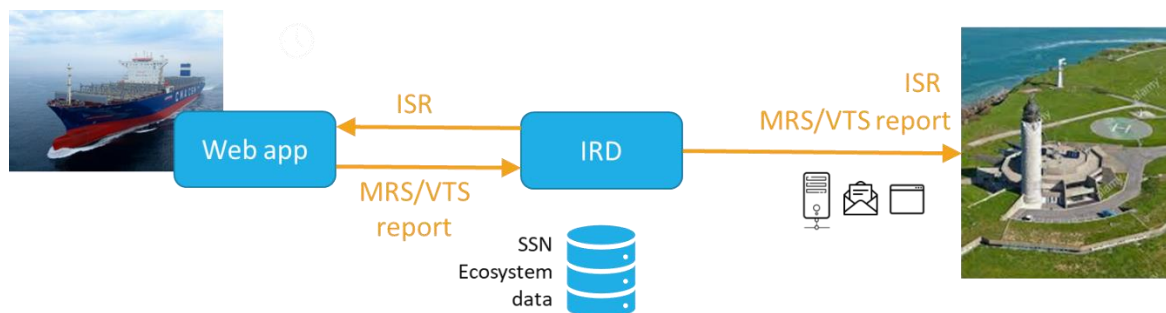


Figure 9: Flow of information involving the IRD in the ship-shore reporting of MRS and VTS reports

The project was run until May 2022. MS participants were involved through 9 project meetings and three operational test phases. The detailed report of this activity can be consulted on EMSA’s website.

3.5 Activity B.2 - Use of reference databases to support the MS authorities and EU agencies

3.5.1 Background

Through the last 15 years, EMSA has developed multiple maritime information systems. All these maritime information systems rely for their operation on reference data such as ships identification information and particulars, location codes, country codes, public organisation details and codes lists. To avoid that such information is duplicated in each information system in an inconsistent manner, EMSA has developed a number of central databases which hold reference information. Such databases include the Central Country Database, the

Central Location Database, the Central Organisation Database, the Central Ship Database and the Central Geographical Database.

3.5.2 Central Ship Database

In June 2019, EMSA launched a pilot project for the development of enhanced ship database services. The project aimed at developing a Central Ship Database (CSD) version 2 which would offer reference information on ships identification information and characteristics to the EMSA maritime services and to national maritime systems of the Member States. 11 Member States volunteered to participate in the project: DE, EE, FI, FR, IT, LV, NL, NO, RO, SE and HR.

The concept of CSD v2 was developed in collaboration with the participating MS. It foresaw that the CSD would aim at supporting MS authorities and EU agencies in the execution of their tasks (e.g. PSC inspections, vessel traffic monitoring, fisheries control, border control, law enforcement, customs). As the information from the CSD was intended to serve as a reference for MS authorities and EU agencies, it was crucial that it gathered information from reliable and trusted sources, and that the source of information is traced. In a first stage, the CSD would hold information on commercial ships and fishing vessels. Extension to other type of ships, such as leisure crafts, would be investigated in the future.

Considering the extent of systems to be connected, a flexible architecture needed to be applied to dynamically adapt to the varying interfaces and data sets. To address that issue, the CSD was build using the Master Data Management platform Tibco EBX⁷. A first delivery of the CSD was released in November 2021 for testing purposes. An operational version of the system (v2.0) was deployed in January 2022 and integrated with the following data sources:

- SSN (ship data from Port call notifications, Incident Reports, Ship Mandatory Reporting Systems and exemptions),
- EU LRIT CDC (ship data from the EU LRIT ship database),
- THETIS (ship data from Port State Control inspections),
- Fishing vessels record (information on EU fishing vessels), and
- The commercial data provider IHS Markit⁸ (information on commercial ships of 100 GT and above).

⁷ <https://www.tibco.com/products/tibco-ebx-software>

⁸ <https://ihsmarkit.com/products/sea-web-maritime-reference.html>

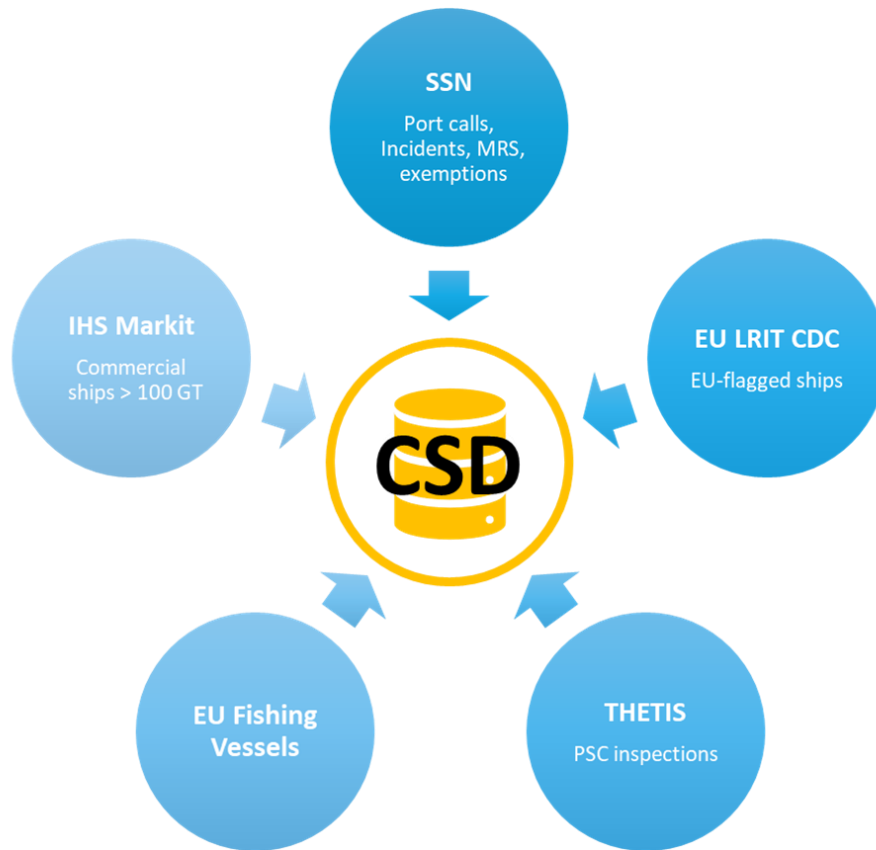


Figure 10: The Central Ship Database and its data sources

The CSD handles the following set of ship information:

- Ship identification (e.g. IMO number, name, MMSI number, fisheries IR number),
- Inmarsat Call number,
- Ship type (different code lists: IHS, UN, PSC),
- Construction details (dates of ship construction),
- Status (from IHS and THETIS),
- Dimensions (e.g. gross tonnage, length overall, length between perpendiculars),
- Dimensions for fishing vessels (classes),
- Company information (ISM company and owner),
- Technical details (e.g. hull, engines),
- Technical details for fishing vessels (e.g. fishing gears, segment),
- Port State Control information (bans),
- Fisheries control information (equipment and license indicators),
- Reference List for fishing vessels (RFMO and SANCO lists).

The CSD holds information on more than 300,000 ships including more than 120,000 active ships. The remaining ones being either under construction or dead ships. Since its launch, data quality had been monitored and the data consolidation logic of the CSD was progressively fine-tuned. A further improvement of the system was delivered in May 2022 (release v2.1) to improve the data control mechanisms to offer a better reliability on ships identifiers.

SSN was adapted to interface with the CSD to use it as reference for identifying the ships in the notifications received from the MS national systems. SSN became the first of the EMSA maritime applications to be integrated with the CSD.

3.5.3 Central Geographical Database

In November 2020, EMSA launched the development of a new version of its Central Geographical Database (CGD) which aimed at replacing the original database which did not offer sufficient interoperability services. The

CGD aims at managing, storing and exposing to the MS and to EMSA Maritime applications reference geographical features. These geographical features include geographical areas of common interest, such as EEZ, fisheries areas, traffic separation schemes, territorial waters, etc.

The CGD offers a graphical user interface for entitled users and webservice to external systems. It includes access control mechanisms to restrict access to non-public geographical areas. The service was delivered in October 2021.

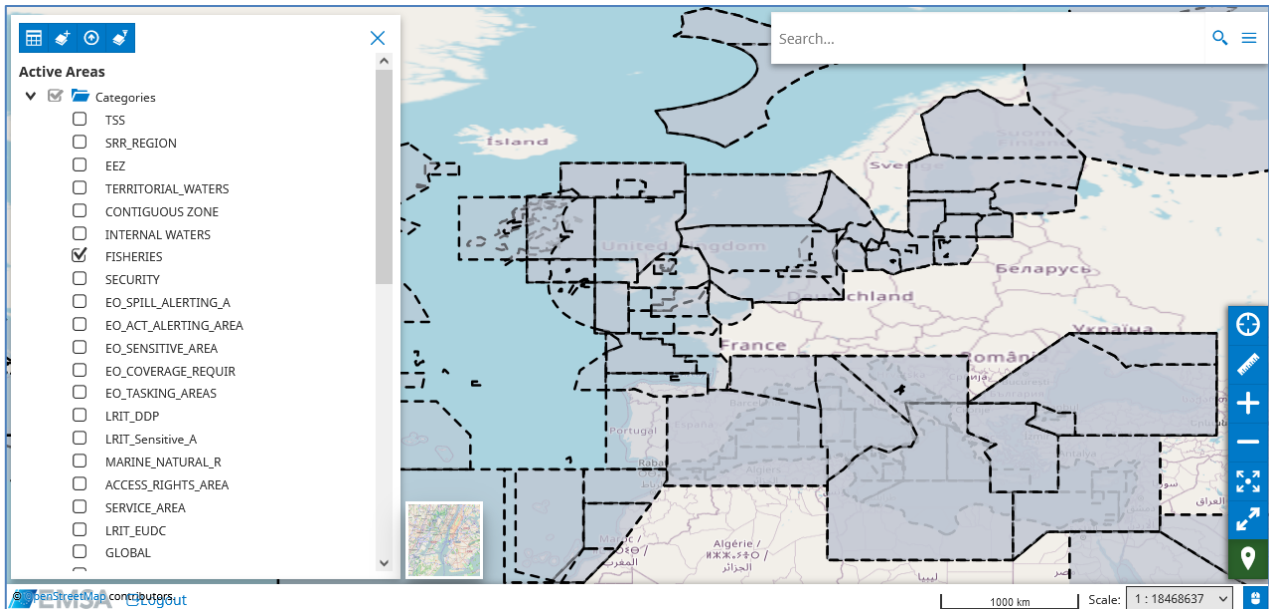


Figure 11: User interface of the Central Geographical Database

3.6 Activity B.3 - Use of common databases for the EMSWe

This activity aimed at assessing and developing solutions to provide Member States' MNSW systems with reference database services. Considering that the EMSWe Regulation requires the development of such databases, development of equivalent services under the Interoperability project could not be envisaged because it would have overlapped with the implementation tasks led by the Commission. Rather than developing central databases for the EMSWe, the project assessed how added value services could be developed over the central reference databases.

In that perspective, the project designed and developed a new Hazmat Data Validation service. The purpose of the service was to offer the SSN Community a way to control that the dangerous and polluting goods declarations reported to SSN and to MNSWs are valid according to IMO Codes and Conventions thus contributing to improve the quality of the reported information and to the safer carriage of dangerous and polluting goods by sea.

The service was deployed in February 2022. It checks the content of declarations provided in spreadsheet and XML files and returns a report containing the results of a series of data quality checks in a way that can be integrated in SSN and MNSW validation processes. The Hazmat Data Validation service interfaces with EMSA's Central Hazmat Database (CHD) to retrieve the latest details of polluting and dangerous goods according to IMO Codes and Conventions. It is provided as a Cloud service that can ultimately be integrated with national SSN and MNSW systems.

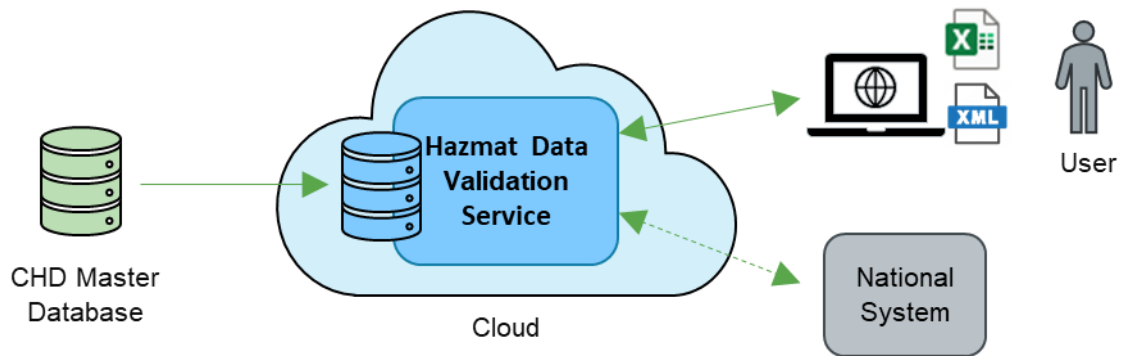


Figure 12 – System context of the Hazmat Data Validation service

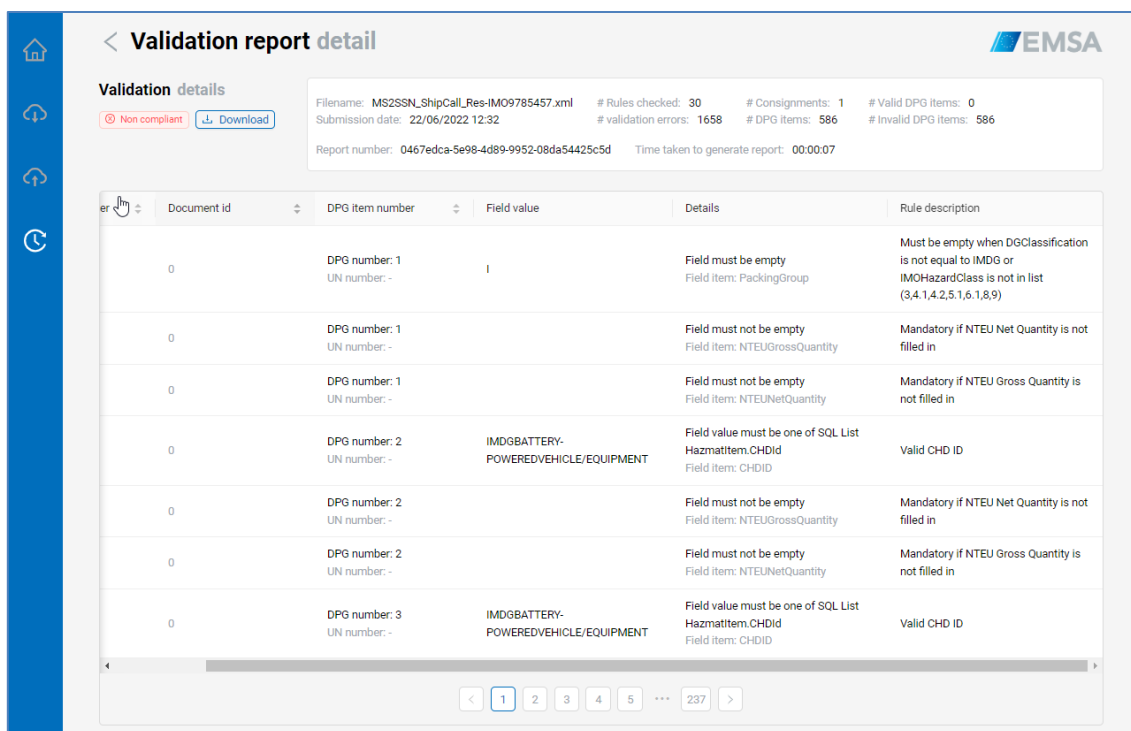


Figure 13: User interface of the Hazmat Data Validation service

3.7 Activity C.1 - EMSWe dataset

The activity consisted in defining an EMSW reference data set representing the compilation of individual data elements required to fulfilling reporting obligations applied to ships arriving to, staying in and leaving all ports of the EU. The study aimed at contributing to the interoperability of MS and Port systems by establishing a fully harmonised cross-sector data model applicable in all ports of the EU. The results of the activity were delivered in May 2020 and were communicated to the Commission as a preliminary input for the implementation of the EMSWe Regulation (EU) 2019/1239.

The work covered the reporting obligations stemming from legal acts of the Union (e.g. port arrival notifications, notifications on waste and residues, lists of persons on board for border control, notification of dangerous and polluting good, security information, customs notifications and declarations) and reporting obligations stemming from international instruments (e.g. forms defined by the FAL IMO Convention and maritime declaration of health). Reporting obligations stemming from national legislation and requirements were kept out of scope of the work.

The task involved experts from EMSA and from the relevant Commission’s DG such as TAXUD and MOVE. MS were not involved considering that they were to be consulted via the relevant forums established by the Commission for the implementation of the EMSWe Regulation.

The NSW Data Mapping Report (used for the implementation of the former reporting formalities Directive 2010/65/EU), the results of the eManifest pilot project (run by EMSA and the Commission from January 2016 to July 2018), the IMO FAL Compendium on Facilitation and Electronic Business⁹ and the EU Customs Data Model¹⁰ (EUCDM) were used as input.

The study resulted in the definition of an overall dataset including semantic definition of the information. All pieces of information that were common to several reporting formalities were mapped together in order to apply the reporting-once principles by which all information necessary for the fulfilment of reporting obligations shall be provided once in the MNSW and shared with all relevant authorities. The study resulted in the definition of 478 individual data elements that were structured in 46 data groups.

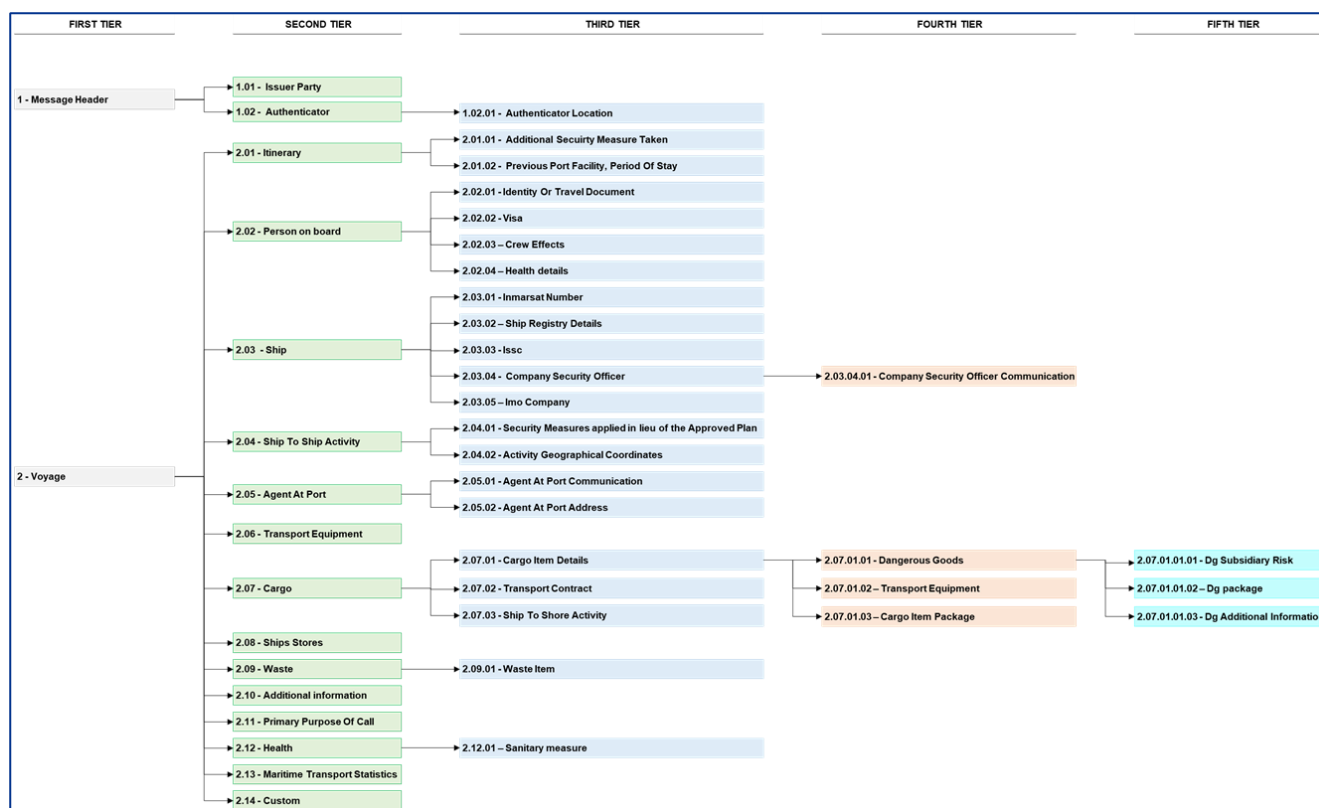


Figure 14: Overview of the initial EMSWe data model

The dataset definition was completed with additional reference information (data element IDs, codes list, business rules) and registered in the data modelling tool GEFEG.FX until end September 2020.

In the meantime, discussions with Commission, MS and Industry experts continued to expand the EMSWe dataset to incorporate information required to fulfil reporting obligations defined from MS national and local requirements. The information was reflected in additional data subsets covering aspects such as e.g. port services, navigation services, loading and unloading of cargo, operational port call management, additional details on crew and passengers, sanitary controls.

While the initial EMSWe dataset included 478 individual data elements, the extended dataset, delivered in July 2021, included in total 1115 data elements described in 91 data groups. A mapping with the corresponding data elements of the IMO Compendium and of the EUCDM was provided to facilitate the interconnexion between

⁹ <https://www.imo.org/en/OurWork/Facilitation/Pages/IMOCompendium.aspx>

¹⁰ Defined by Annex B of the UCC Commission Delegated Regulation No. 2015/2446 and of UCC Commission Implementing Regulation No. 2015/2447. See https://ec.europa.eu/taxation_customs/customs-4/union-customs-code/eu-customs-data-model-eucdm_en

Maritime Single Windows and with EU customs systems. The extended EMSWe dataset provided a harmonised semantic definition of the information covering all reporting obligations applied to ships in all ports in the EU. Thanks to the data modelling tool, the EMSWe dataset specifications could be produced in different forms including Excel files, Word documents and a website.

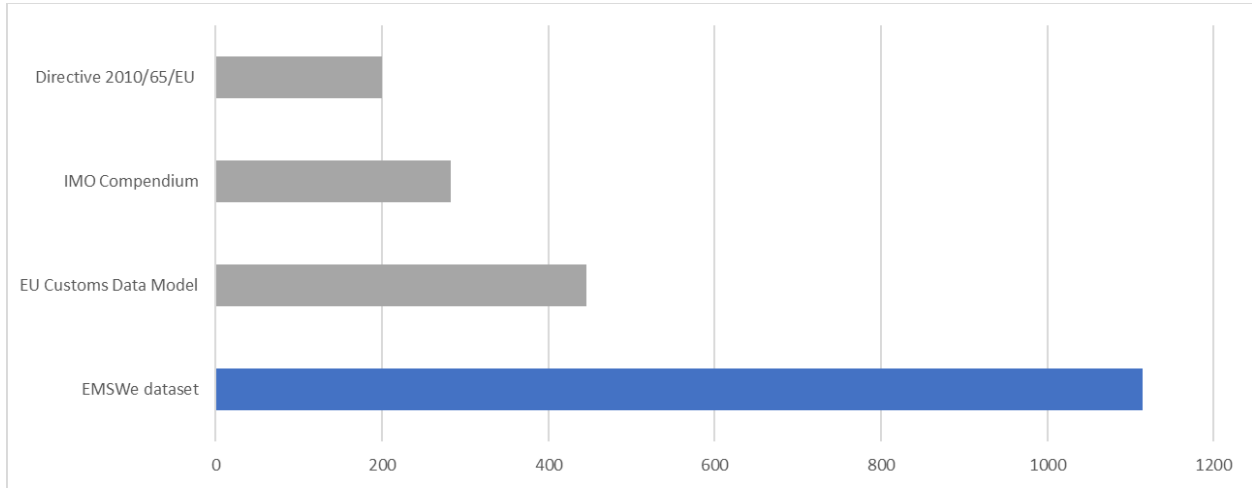


Figure 15: Comparison of the EMSWe dataset with other reference datasets considered by the study

Data group / element ID	Name	Description	Format	IMO Compendium	UCC Annex B	Code list	Business rules
DG-001 General							
DE-001-01	Measurement unit, coded	A code representing the units of measured for a referenced quantity on board, such as crew's effects, ship's stores, and cargo.	an..3			UN/ECE Recommendation 20 (EDIFACT codes 6411)	
DE-001-02	Sequence number	A sequence number given to an element in a list	n..5				
DG-002 Message header							
DE-002-01	Message date time	The date and time the message is sent	an..35	IMO0078			BR-001
DE-002-02	Authentication date time	Date and time when the information contained in the formality has been certified by the declarant.	an..35	IMO0014	1506000000		BR-001
DE-002-03	Message type, coded	Code specifying the name of a message type: either a formality type, or a response type	an..3	IMO0192		Refer to code list Formalities and response types	
DE-002-04	Customs declaration type	Enter the relevant Union code	an..5		1101000000	Refer to UCC code lists	BR-047
DE-002-05	Message sender identifier	The identifier of the party transmitting the message. Identification of the physical sender of the message (the system).	an..17	IMO0082			
DE-002-06	Message receiver identifier	The identifier of the party receiving the message (the system). Identification of specific receiver the message is intended for.	an..17	IMO0275			
DE-002-07	Message identifier	Unique identifier of a message. Used for asynchronous error messages or acknowledgements related to this message.	an..70	IMO0277			
DE-002-08	Message function code	Code providing the function of a message.	an..3	IMO0305		UN/EDIFACT codes 1225	BR-054
DE-002-09	LRN	The local reference number (LRN) shall be used. It is nationally defined and allocated by the declarant in agreement with the competent authorities to identify each single declaration.	an..22		1209000000		
DG-003 Additional information							
DE-003-01	Remarks	Statement of any other information relevant to ship arrival, stay or departure.	an..512	IMO0196			

Figure 16: Abstract of the EMSWe dataset specifications

3.8 Activity C.2 - EMSWe message formats

The definition of the EMSWe dataset from activity C.1 above addressed a first part of the semantic definition of the information, such as reference data in the form of taxonomies, controlled vocabularies and code lists. To address a full semantic interoperability of MNSWs, defining data structures and models for data exchanges was needed. For this further step, a study was contracted in November 2021 to elaborate message structures corresponding to reporting processes between declarants' systems (e.g. ship operator, shipping agent), data service providers and MNSWs.

The study considered the message standards mostly used by the shipping industry in the domain of ship reporting:

- The World Customs Organisation's (WCO) Data Model¹¹,
- ISO standard 28005 on electronic port clearance¹², and
- UNECE Multi-Modal Transport Reference Data Model (MMT RDM)¹³.

The study assessed the scope of each standard and concluded that the MMT RDM had the best coverage of the EMSWe dataset.

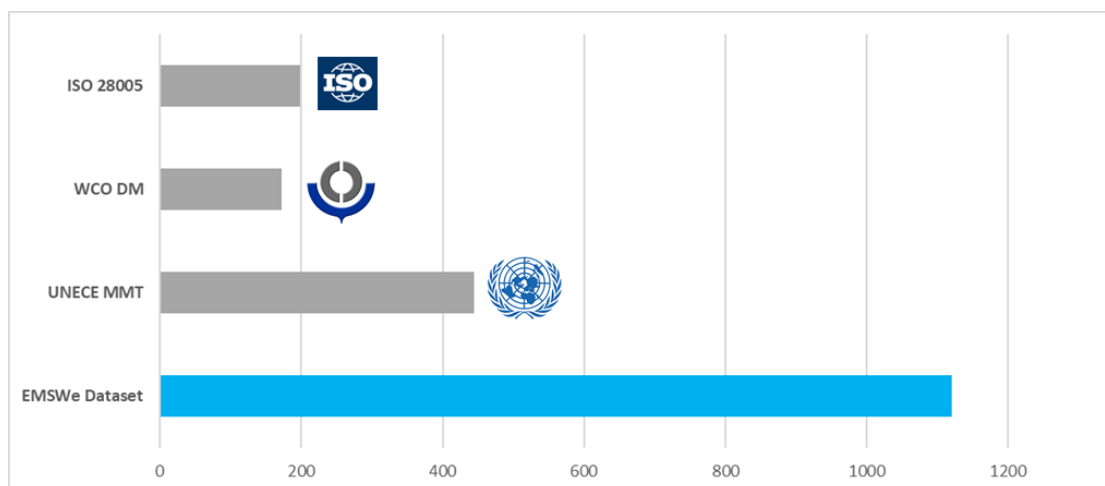


Figure 17: Estimated coverage of message standards as regards the EMSWe dataset

The study elaborated message structures for each of the 48 formalities applicable to the EMSWe using as reference the MMT RDM. Extensions to the MMT RDM were included to cover data elements not covered by the standard. The results, which were delivered on 31 March 2022, were communicated to the Commission as preliminary input by the Commission for the implementation of the EMSWe Regulation.

¹¹ <http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/tools/data-model.aspx>

¹² <https://www.iso.org/standard/54105.html?browse=tc> and <https://www.iso.org/standard/74059.html?browse=tc>

¹³ <https://unece.org/trade/uncefact/rdm>

Formality structure – NOA - Notice of pre arrival

Structure	EMSWe id	Format	St.	Occ.	Used by	MMT name
Message header						Exchanged Document
Remarks	DE-003-01	an..512	O	0..1		Remark
Additional information				0..n		Attached File
Attachment description	DE-003-03	an..256	O	0..1		Description
Attachment type	DE-003-02	an..17	O	0..1		Type Code
Voyage						Logistics Transport Movement
Mode of transport at the border	DE-014-03	n1	O	0..1		Mode Code
Number of passengers	DE-034-02	n..4	O	0..1		Passenger Quantity
Number of crew	DE-034-03	n..4	O	0..1		Crew Quantity
Cargo brief description	DE-014-16	an..256	O	0..1		Cargo Description
Dangerous goods carrier indicator	DE-014-11	n1	O	0..1		Dangerous Goods Indicator
Primary Purpose of Call, coded	DE-014-10	an..3	O	0..n		Call Purpose Code
Regular service indicator	DE-014-20	n1	O	0..1	BE EE ES FI FR SE	Regular Service Indicator
Liner service indicator	DE-014-25	n1	O	0..1	DE	Liner Service Indicator
Regular service identifier	DE-014-21	an..17	O	0..1	ES	Regular Service Code
Liner service name	DE-014-26	an..70	O	0..1	DE	Liner Service Code
Number of persons on board	DE-034-01	n..4	O	0..1		Total Onboard Quantity
Number of drivers	DE-034-06	n..4	O	0..1	LT	Driver Quantity
Cabotage indicator	DE-014-23	n1	O	0..1	ES	Cabotage Indicator
Governmental ship indicator	DE-014-28	n1	O	0..1	LT	Government Ship Indicator
Animals on board indicator	DE-014-29	n1	O	0..1	HR	Onboard Animals Indicator
Transmitting on 6Ghz frequency indicator	DE-014-30	n1	O	0..1	IE	Six Ghz Transmitting Frequency Indicator
Shipping area, coded	DE-014-27	an..17	O	0..1	DE	Shipping Area Code
Type of voyage, coded	DE-014-22	an..17	O	0..1	BG ES FR IT	Voyage Type Service Code
Ship contact						Master
Ship master name	DE-012-01	an..70	O	0..1		Name
Ship master embarkation date	DE-012-03	an..35	O	0..1	CY	Embarkation Date
Ship master nationality, coded	DE-012-02	a2	O	0..1	NO	Nationality Country Code
Ship contact person name	DE-012-04	an..70	O	0..1	LV	Person Name
Ship contact person phone number	DE-012-05	an..35	O	0..1	LV	Telephone Complete Number
Ship contact person email address	DE-012-06	an..256	O	0..1	BE HR LV	Email Address URI
Ship contact person address	DE-012-07	an..256	O	0..1	NO	Postal Address Free Form Text
						Arrival Event

Figure 18: Abstract example of a EMSWe message structure

3.9 Activity C.3 - EMSWe processes

The EMSWe dataset helped in defining grounds to addressing the semantic interoperability of MNSWs. A second phase of the study focussed on the issue of organisational interoperability by building up a common description of the business processes involved in the fulfilment of reporting obligations. For this task, the study relied on inputs from experts from the relevant DGs of the Commission (DG MOVE, DG TAXDU, ESTAT) as well as experts from Shipping Industry associations such as the European Community Association of Ship Brokers and Agents (ECASBA), the European Community Shipowners' Associations (ECSA), the European Sea Ports Organisation (ESPO), the Federation of European Private Port Companies and Terminals (FEPOR), the International Port Community Systems Association (IPCSA) and the World Shipping Council (WSC). Workshop meetings with the experts helped in clarifying how obligations are applied in operation in ports.

The study produced for each of the identified reporting obligation BPMN (Business Process Model and Notation) diagrams identifying the actors (declarants and authorities), systems (MNSWs, data providers and authorities' systems) and information flows involved in the reporting processes. The study report, which was delivered in May 2020, was communicated to the Commission as input for the implementation of the EMSWe Regulation.

3.10 Activity D.1 - VDE Capability project

One of the main difficulties encountered by the shipping industry is the difficulty for ships to send large electronic files from ship to shore, in particular, when such files are sent through existing global satellite communication services and where the communication expenses are based on the amount of data delivered. EMSA participated with Norway and the European Space Agency (ESA) in a “VASP” demonstration project aiming at testing the new VHF Satellited Data Exchange System (VDE-SAT) to relay digital information between ships and MS coastal stations using Norway’s NorSat-2 satellite and specific ship on-board equipment.

The aim of the project was to test VDE-SAT communications by setting up a data processing capability. During a meeting of the facilitation of ship to shore reporting pilot project (activity B.1 above), MS proposed to apply VDE-SAT communication to MRS and VTS reporting. Some synergies were found between the two projects and EMSA presented the concept of a ship-to-shore MRS/VTS reporting by electronic means which, in addition to using existing communication links (3G, 4G), would test the VDE-SAT connection to address cases of ships sailing on the high seas.

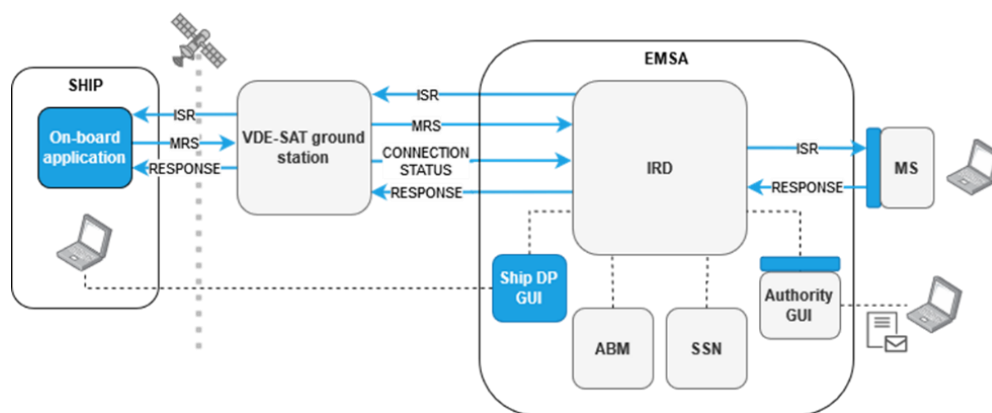


Figure 19: Concept of the VDE-SAT capability

In order to test the VDE-SAT connection for reporting MRS/VTS data to coastal stations, a specific “on-board application” was developed for creating MRS/VTS reports and displaying returned responses from authorities. The application offered two main functionalities:

- Graphical user interface for ship crew, to consult, create, update and submit VTS/MRS reports to the maritime authorities and consult authorities’ responses,
- Backend services to orchestrate message exchanges with the VDE-SAT equipment installed on-board the ship.

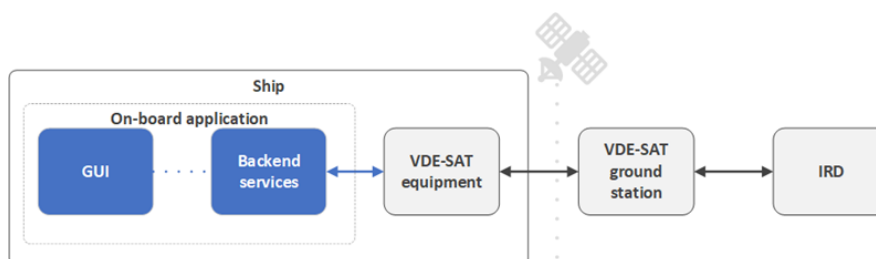


Figure 20: Concept of the VDE-SAT on-board application.

The contract for the development of the on-board application was signed in May 2021. The development took place during the summer and was completed in October 2021. The VDE-SAT equipment and the on-board application were installed on board a test vessel (Ocean Space Lab) situated in Trondheim. Site acceptance testing between EMSA and the test vessel was carried out in two phases: in November 2021 via regular Internet connection, and in April 2022 via satellite. The test demonstrated successful exchanges of ISR requests, submission of MRS/VTS

reports, and authority responses between EMSA and the test ship via VDE-SAT during the single pass of a satellite.

During the 2nd half of 2021 and early 2022, the project faced some technical complications with the satellite and the VDE-SAT ship terminal data uplink. While the issues were addressed by Space Norway, they resulted in delays of the demonstration phase. Operational demonstration is foreseen to be carried out in Norwegian waters in 2022 with 3 vessels flying the Norwegian flag, under the ongoing VASP project. The vessels will also be involved in other testing activities under the VASP demonstration project (e.g. SAR coordination and ice chart distribution services).

4. Conclusion and follow-up

The Interoperability project had been given the objectives to enable a more efficient data exchange and sharing of port documentation using SSN, enhance connectivity between relevant authorities and end-users, develop specific interoperability solution contributing to the development of an EMSW environment, and improve ship-to-shore information exchanges using VDE-SAT communications.

In terms of the contribution to the EMSWe environment, the project successfully managed to elaborate business processes descriptions and semantic definitions of information required to fulfil all known reporting obligations applied in all ports of the EU, therefore addressing the organisational and semantic layers of interoperability as defined in the European Interoperability Framework. The work resulted in the definition of an EMSWe reference dataset and sets of message structures that can be applied in the MNSWs of the MS. By providing a connection with existing reference datasets and message standards of the domain from the IMO, the WCO, UNECE and ISO, the project gives solid grounds for the MS to set up MNSWs solutions which are interoperable with the ICT solutions of the Shipping Industry and of the diverse authorities involved with the ports, such as port authorities and customs. In view of the implementation of the solutions by the MS, the project results were communicated to the Commission DG MOVE, which is in charge of coordinating the implementation of the EMSWe according to Regulation (EU) 2019/1239. The project results should serve a reference input for setting up the mandatory common specifications of the EMSWe and therefore contribute to setting up a truly harmonised and interoperable environment of MNSWs.

While the project favoured technical specifications for EMSWe data exchanges based on the Multi-Modal Transport Reference Data Mode defined by the UNECE, other message standards such as the WCO Data Model, which is currently considered by DG TAXUD for EU customs systems and the EU CDM, could be considered as well. The discussion on the application of certain message standards for the implementation of the MNSWs under the EMSWe Regulation will have to be coordinated by the Commission taking as input the outcome of the project.

In terms of the exchange and sharing of port documentation, the project took into account central role of SSN in the exchange of maritime information between authorities of the MS and drew possible paths for further developing it to serve as an exchange platform for MNSWs and ship operators. Such development would require extending the scope of SSN to new user communities and to cover all relevant information of the EMSWe dataset, including commercially sensitive data (cargo) and personal data (passengers and crew). Several technological options were assessed including the blockchain, cloud services, CEF building blocks and decentralised peer-to-peer data exchanges using CISE nodes.

A first set of the security measures defined by the project were applied in SSN for the purpose of securing the exchange of information on persons on board, as required by Directive (EU) 2017/2109 on the registration of persons sailing on board passenger ships. A second set of measures and architecture scenarios may be considered depending on the outcome of discussions regarding the implementation on the reporting-once principles required by Regulation (EU) 2019/1239 establishing the EMSWe. While the Regulation requires that MS ensure that the data elements of the EMSWe data set provided at departure from a port in the Union are made available to the declarant for the purpose of fulfilling the reporting obligations at arrival to the next port, and while it requires that any relevant data elements of the EMSWe data set shall be made available to other MNSWs via SSN, it foresees that the list of the data elements to be exchanged via SSN would be laid down in implementing acts to be adopted by the Commission. The level of impact on SSN and the architecture that would be applied to SSN will

therefore depend on the content of such implementing acts, which would not be expected before 2023 according to the multi-annual implementation plan for the EMSWe¹⁴.

In terms of the connectivity between all relevant authorities and end-users, the project proved how MS authorities could automatically receive and integrate SSN information provided by EMSA within their own systems in order to improve situation awareness at sea and reduce ship-to-shore reporting. The project demonstrated as well that MRS and VTS reporting could be achieved through electronic means, therefore reducing voice communications and materializing the e-navigation concept.

To ensure continuation of the work started in the project, EMSA proposed at the 9th meeting of the HLSC in December 2021 to establish a working group on facilitation of ship to shore reporting. The proposal was approved, and the working group composed of MS experts will be a future forum to discuss on a harmonised approach to ship reporting in the EU and further use of novel technologies for better re-use of data and reduction of administrative burden, therefore consolidating the results of the pilot project.

As foreseen by the European Interoperability Framework (EIF), base registries (also known as “master data”) are the cornerstone of European public service delivery. With the purpose of providing master data related to ships identity and particulars for maritime authorities, the project developed a Central Ship Database (CSD) which consolidates ship details from several sources, including EU databases, MS national systems and commercial data providers. The CSD is meant to be used as reference for all maritime applications of EMSA and of the Member States. A Central Geographical Database (CGD) was as well developed to provide reference definitions of geographical areas such as fisheries areas, EEZ, territorial waters, etc. Building upon EMSA’s Central Hazmat Database, the project developed a Hazmat Data Validation service meant to control that the dangerous and polluting goods declarations reported to SSN and to MNSWs are valid according to IMO Codes and Conventions.

While the project focussed on setting up the databases and connecting them to their various data sources, follow-up activities are planned to test the database services in real operation with testers from the MS, integrated them with EMSA’s maritime applications, set up connections with MS systems and set up support and helpdesk services within EMSA.

As regards data exchange ship-to-shore using VDE-SAT communications, the project demonstrated that MRS and VTS information can be exchanged between a vessel and a coastal station by using satellite communication. The communication times were limited because only one satellite was available at that time, but the situation is expected to improve when more satellites will be launched. By elaborating a technical solution and defining communication standards (e.g. harmonised XML messages), the project built grounds for a future EU-wide solution for ship-to-shore reporting through satellite communication.

The results of the Interoperability project were presented to the MSs on several occasions gaining the general praise for the work and for turning relatively small budget into purposeful and needed outputs, in some case far beyond expectations. Certain activities of the pilot project, will continue and become operational activities reflected into the EMSA Single programming Document as well to other relevant documents (e.g. the positive developments in the project regarding the facilitation of ship to shore reporting, should be included in the revision of the IFCD).

¹⁴ Communication from the Commission (2021/C 299/03) regarding the multi-annual implementation plan for the European Maritime Single Window environment

European Maritime Safety Agency

Praça Europa 4
1249-206 Lisbon, Portugal
Tel +351 21 1209 200
Fax +351 21 1209 210
emsa.europa.eu

