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Technical Domain / Task Number 2 …………………………………

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New Release: Automated Mandatory Ship Reporting Systems Service

# Summary

The Norwegian Coastal Administration has released the first iteration of an automated ship reporting service. The service is hosted on a test environment in SafeSeaNet Norway, the Norwegian Coastal Administration’s maritime single window (MSW) and was developed through the SESAME Solution II and STM BALTSAFE projects. While the service supports only Mandatory Ship Reporting Systems (MRS) or SRS Reporting, other types of reporting, such as pre-arrival and FAL reporting, will be added in future iterations of the service.

This paper briefly introduces MRS, describes the two services that have been developed, explains how others can explore these services, and introduces a testing and evaluation web client that is publicly available.

## Purpose of the document

We would like the ARM Committee and the Ship Reporting Correspondence Group to consider integrating and promoting the concepts described in this paper for future automated ship reporting technology solutions, such as those currently under consideration in the Ship Reporting Correspondence Group of the ARM Committee.

# Background

The two MRS services described in this paper were developed by the Norwegian Coastal Administration through the SESAME Solution II and STM BALT SAFE e-navigation testbed projects. Both projects share similar objectives related to IMO’s e-navigation Solution 2 on means for standardized and automated reporting. The projects intend to have interoperable automated reporting solutions.

# Automated reporting Ship to shore

## What is ship reporting?

The term *Ship Reporting* is a term with broad meaning, encompassing a variety of reporting obligations that the master of a ship needs to fulfil toward shore authorities under certain conditions. Reporting obligations are country and port specific, with the means of reporting likewise varying a great deal. For this reason, the ship master is required to pay a great deal of attention to reporting obligations, as well as procedures and the technology required to submit, be it by VHF, fax, email, web portal, and others.

## Standardized ship reporting

Even though *Ship Reporting* encompasses a variety of reporting obligations, most of the data that is required to report is regulated by the International Maritime Organisation (IMO). Thus, the IMO regulated reporting data forms a standardised base to what is internationally acknowledged information to be requested from the ships engaged in international voyage.

The IMO regulate these recommended reporting obligations in the Convention of Facilitation of International Maritime Traffic, the so-called FAL Convention. With this convention members aim at facilitating maritime transport by simplifying and minimizing the formalities, data requirements and procedures associated with arrival, stay and departure of ships engaged in international voyage. To this end, the Annex to the FAL Convention contains Standards and Recommended Practices on formalities, documentary requirements and procedures that should be applied to the ships, their crews, passengers, baggage and cargo upon arrival, during their stay, and on departure.

Whilst the IMO FAL Convention aims at regulating ship arrival, stay and departure, the guidelines and data definitions set out in the IMO Resolution A.851(20) recommend the general principles and standard reporting format procedures for a Mandatory Ship Reporting System (MRS).

Based upon the above convention and resolution, amongst others, the IMO maintains a compendium that consists of the IMO Data Set and IMO Reference Data Model, which is agreed-upon by the main organizations involved in the development of standards for the electronic exchange of information related to the FAL Convention: the World Customs Organization (WCO), the United Nations Economic Commission for Europe (UNECE) and International Organization for Standardization (ISO).

Since July 2019, the IMO Expert Group on Data Harmonization (EGDH) is responsible for the technical maintenance of the IMO Compendium and for further expanding its data set and data model to areas beyond the FAL Convention, including exchange of logistics and operational port and shipping data.

Derived from above, the standardised reporting obligations (and procedures) can therefore in principal be divided into two types:

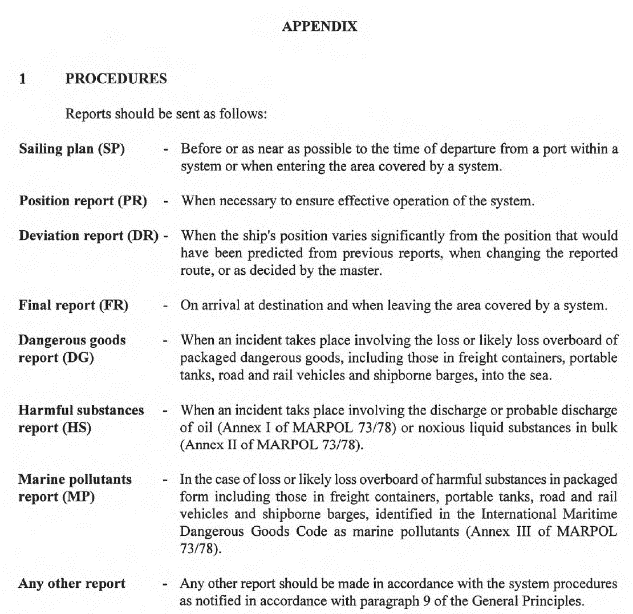
* Pre-Arrival, stay or Departure reporting and
* Mandatory Ship Reporting System (MRS) or SRS Reporting

This input paper describes only an (initial) automatic reporting services for a Mandatory Ship Reporting System (MRS) or SRS Reporting.

## Mandatory Ship Reporting System (MRS) or SRS Reporting

When the Original SOLAS Convention developed ships’ routing systems, including traffic separation schemes, MRS/SRS was tightly linked to these areas. These shipping routes and schemes were adopted by the IMO for the purpose of safety of navigation, and MRS areas are likewise for reasons of safety.

Most all MRSs require information such as vessel ID, course, speed, position etc., which can be captured by AIS and LRIT, while the remaining reporting requirements may or may not be available either by sensor or in a shore-based management information system. And even if all data can be accurately captured using existing technology, the ship master, in most MRSs, is required to contact the shore authority by a specific VHF channel and speak the reporting requirements.



1. Reporting procedures in the A.851 annex

The currently 23 IMO adopted Mandatory Ship Reporting Systems follow the structure based on IMO Resolution A.851 (20). At present, shore authorities in some of these MRS areas use AIS to provide more automated and efficient reporting systems. VDES is expected to enhance and expand automated reporting capabilities.

# Required services for mrs automated reporting

## Identifying the required services

Following the path of the first SESAME e-navigation testbed project, SESAME Solution II set as its first and primary objective to develop an automated ship reporting system to the fullest extent possible. From the start, the project adopted a system design that relied on the shore system being able to provide to the ship information and services that would enable the ship to report automatically according to the requirements at the particular reporting point and according to the procedures set out in the IMO Resolution A.851.

The Norwegian Coastal Administration, which led the Automated Ship Reporting work package, identified two services:

* **Request and Respond Services (GetMrsReportingFormalities)**

This is an information service provided by the MRS that aims at responding with information regarding the reporting obligations of a requester. From a ship’s perspective, the MRS system digitally responds to queries or information requests from the ship, specifically, the service gives the requester (a ship) the accurate and current reporting obligations and procedure for specific reporting systems.

* **Transmit and Receive Services (PostMrsMessage)**

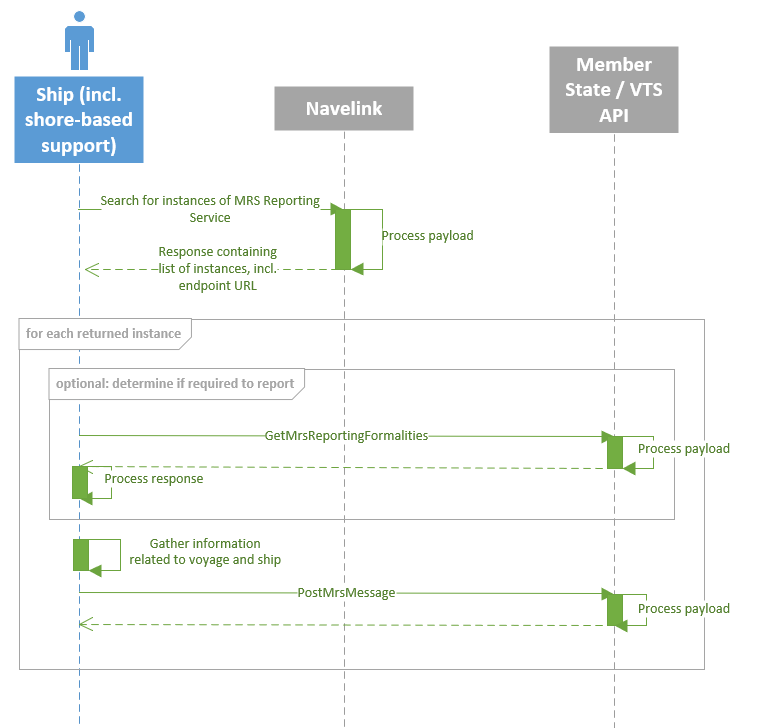
The PostMrsMessage service, also provided by the MRS, enables a system-to-system interface (ship-shore) that facilitates an efficient exchange of electronic information between ships and shore for coastal transit or port calls when the reporting obligations are known. The service will receive and acknowledge reports that are submitted by ships, both new reports and updates.

The ISO28005-2 standard is used as the primary data model in the MRS Reporting Service. The ISO28005-2 standard is based on the IMO Data Set and Reference Data Model; its intended use is electronic port clearance. The standard is maintained by SINTEF Norway and has, in collaboration with the Norwegian Coastal Administration, been extended to cover the MRS reporting formalities as defined in IMO Resolution A. 851(20).

See also Appendix X for more information on the services mentioned above.

## Service interface MRS Reporting

The automated machine-to-machine reporting sequence is initiated by the ship onboard navigational system (ECDIS). The ship begins by performing a service lookup in Navelink (a commercially run digital platform for providing maritime/e-navigation services) by providing the planned route. The lookup returns all MRS Reporting Service instances with an area intersecting with the route. The ship will iterate over each returned instance and retrieve each MRS’ reporting obligations from the configured service instance endpoint. The ship system then gathers relevant information from onboard systems and/or other (shore based) supporting services and provides an MRS report to the service instance in accordance with the reporting obligations and configured triggers.



# First (beta) release for the services

On the 3rd of June 2020, the first of these services/methods related to MRS was released. While the services are not mature (still under development) and should be evaluated in this regard, they are available for all to view and explore.

The service is currently hosted in the Norwegian Coastal Administration's Single Window test environment. It has two endpoints:

* SOAP / XML: <https://test.shiprep.no/SSNApis/VoyageNotificationService.svc>
* REST / JSON: https://test.shiprep.no/SSNApis/MrsReportingService.svc

Each endpoint exposes two methods:

* GetMrsReportingFormalities

This method is the Request and Respond Services (RRS) described above. When queried, this method returns the reporting requirements to the requester based on given criteria.

The return value from GetMrsReportingFormalities includes:

* Name of the MRS area
* Reporting obligations (required, excluded, voluntary)
* Coverage area for the MRS (GeoJSON format)
* Which designators the MRS requires, according to the A.851
* A subset of ISO28005 XML, which covers the reporting duty of MRS, based on required designators and report type. The subset XML provides an indication of which data elements are required when submitting data to the TRS service (PostMrsMessage).
* PostMrsMessage

This method corresponds with the Transmit and Receive Services (TRS) also mentioned above. PostMrsMessage is the method used for reporting MRS messages based on ISO28005.

This method requires authentication, specifically a username and password entered either in HTTP or SOAP headers with the keys "username" and "password".   
  
**NOTE:** Users wanting to access the service need a special userID issued by the Norwegian Coastal Administration for the Norwegian Single Window (SSNN) BarentsSRS web service.

## Testing and evaluating the services

The RRS service can be tested independent of any particular external system, such as a ship system, through the use of a publicly available web client, which shows how different criteria, such as ship details and route will affect a vessel’s reporting requirements.

The web client has three input sections and an output section, as shown below.

### The input sections

**MRS Report Types**

The report types listed in this section corresponds to the ones that are found in the IMO Resolution A.851 reporting procedures. Users must select at least one report type here.

**Ship Details**

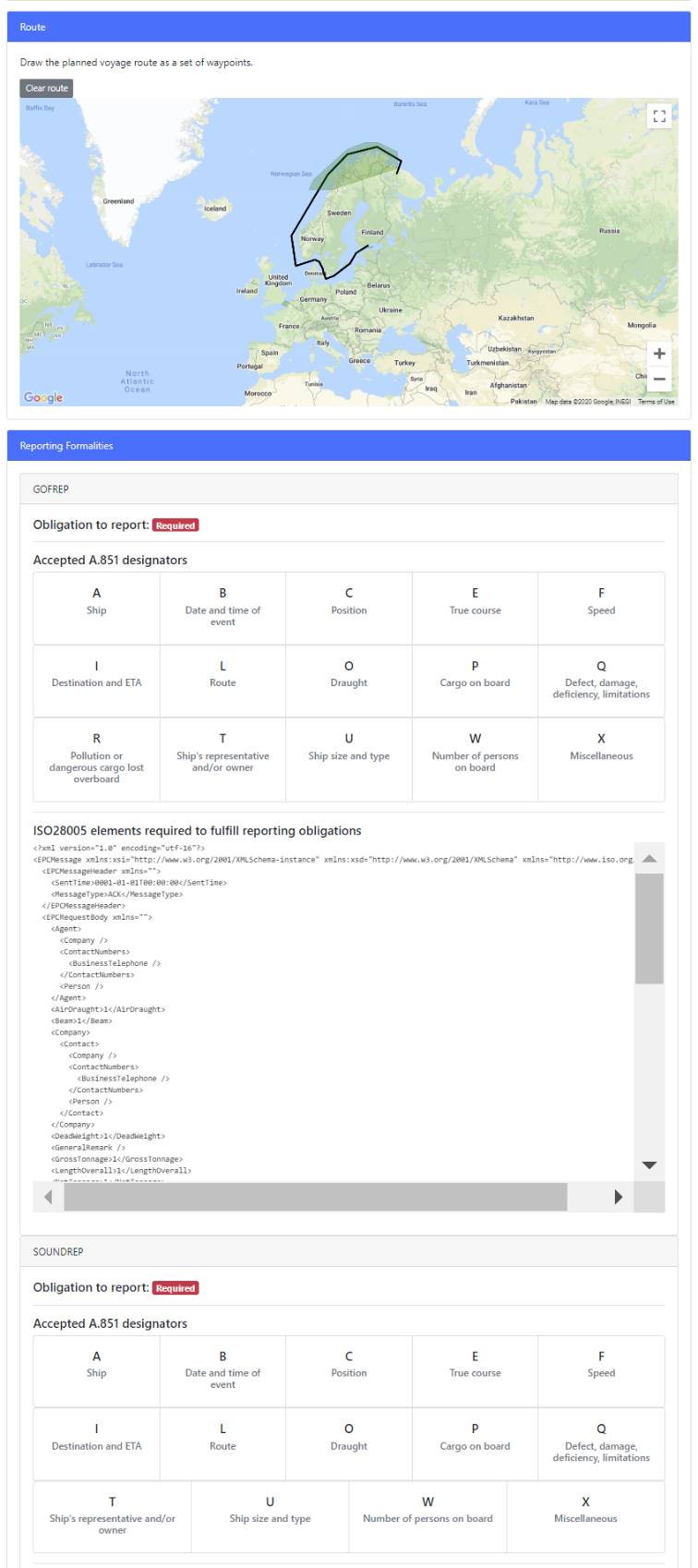
Ship identification information is entered here as well as mandatory fields, while voyage related information, which might influence reporting, is optional.

**Route**The route section allows users to draw a basic route on a chart, which allows the system to determine which MRS areas the ship will pass.

**NOTE**: Currently, the BARENTSSRS, SOUNDREP, GOFREP and CALDOVREP are the MRS areas configured in this system.

1. Web Client screenshot; RRS Input sections

### The output sections

Once all of the input sections are completed, including the route, the web client will evaluate the route and determine the reporting obligations during the voyage.

**Reporting Formalities**

The output in this section are split into the reporting requirements for each MRS found on the ship’s route.

In the example to the right, the service found the following MRS areas:

BARENTS SRS, SOUNDREP and GOFREP.

Each MRS is listed separately with:

##### Obligation to report: Required (or not)

* What are the accepted A.851 designators for that particular MRS
* The ISO28005 elements (subset) required to fulfill reporting obligations for that particular MRS

1. Web Client screenshot; RRS Output sections

The RRS web client demonstrator is publicly available and can be accessed with the following link:

https://test3.shiprep.no/SSNApisWeb/Reporting/MandatoryShipReportingSystem

# Action requested of the Committee

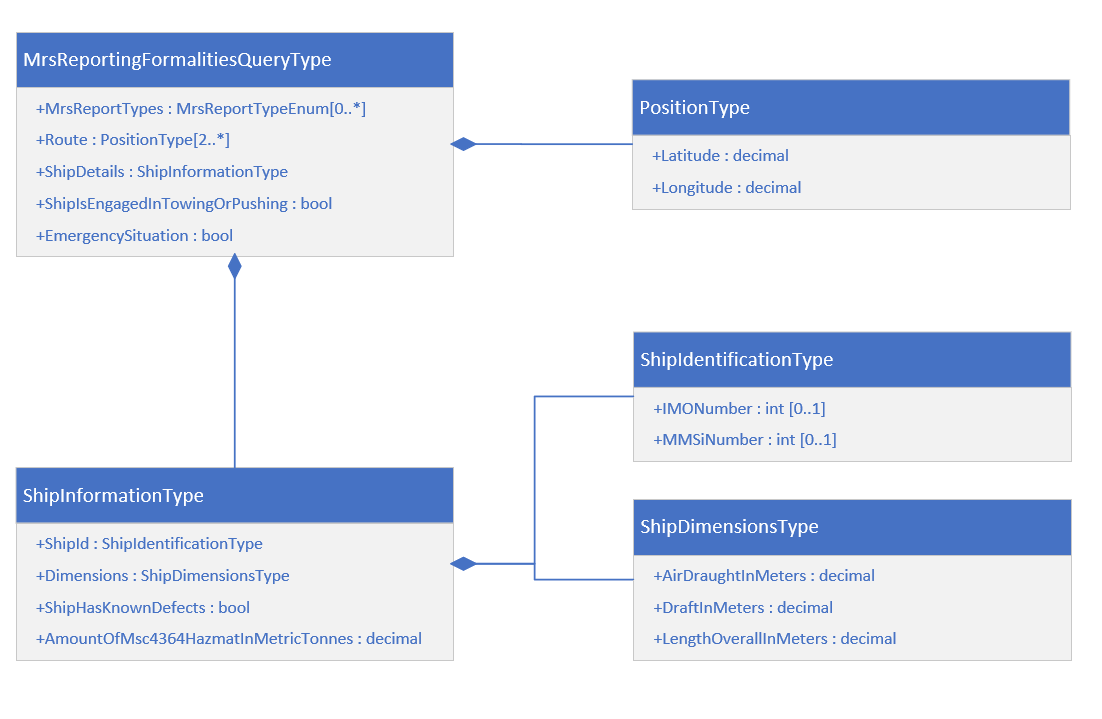
The Committee and the Ship Reporting Correspondence Group is requested to:

1. Take note of the availability of these MRS services in SafeSeaNetNorway, as a significant outcome of the SESAME Solution II and BALTSAFE projects.
2. Consider integrating and promoting the concepts described in this paper for future automated ship reporting technology solutions, such as those currently under consideration in the Ship Reporting Correspondence Group of the ARM Committee.
3. ........
4. Appendix heading 1
   1. Appendix heading 2
      1. Appendix heading 3
5. SERVICE DATA MODEL.

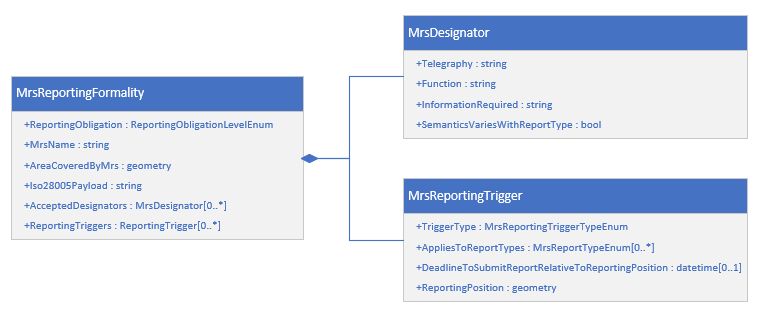
This appendix describes the information model, i.e., the logical data structures to be exchanged between information providers and consumers of the MRS service.

* 1. GetMrsReportingFormalities

The *GetMrsReportingFormalities* operation *receives* the following logical data exchange models:



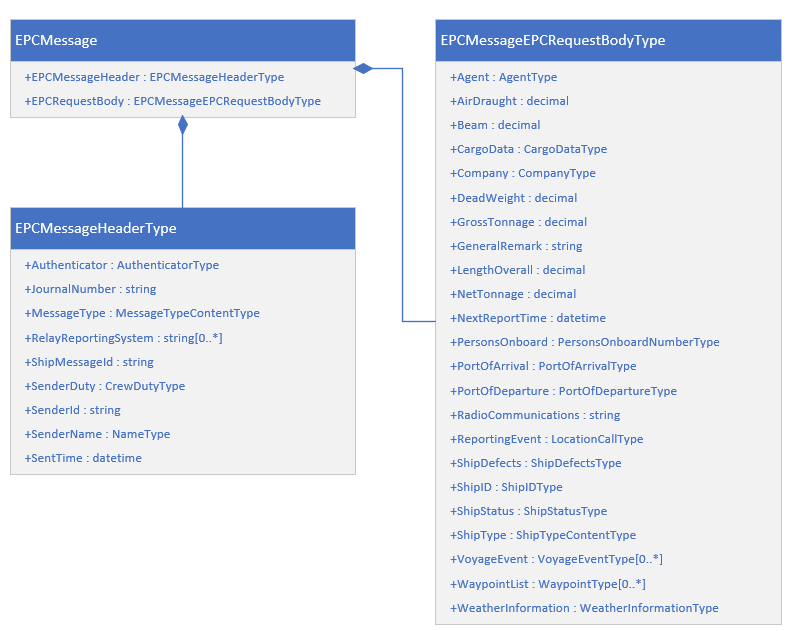
The *GetMrsReportingFormalities* operation *returns* the following logical data exchange models:



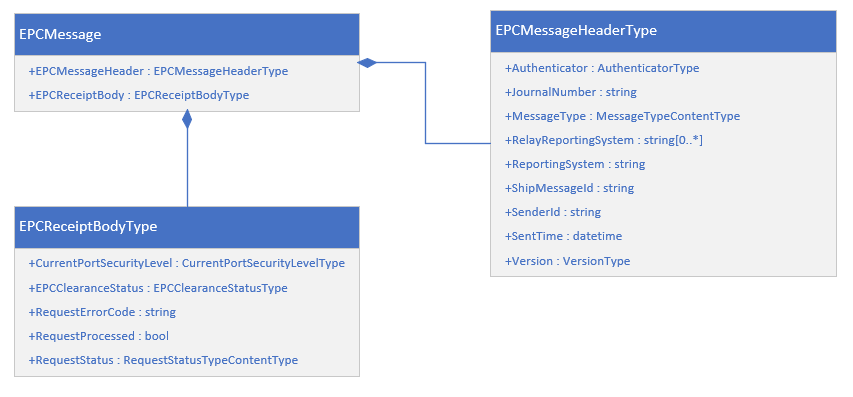
* 1. PostMrsMessage

Note: For brevity, only top-level types for the sub-set of elements in the EPCMessage model used for MRS reporting are shown in the diagrams. For further details of the semantics of elements in the EPCMessage model, refer to [10].

The *PostMrsMessage* operation *receives* the following logical message structure:



The *PostMrsMessage* operation returns the following logical message structure:



1. REFERENCES
2. IALA Guideline 1128 on Specification of e-Navigation Technical Services
3. SOLAS V/11 MRS reporting guidelines, <http://www.emsa.europa.eu/ssn-main/documents/item/2069-mrs-guidelines-final-draft.html>
4. IMO A.851(20) GENERAL PRINCIPLES FOR SHIP REPORTING SYSTEMS AND SHIP REPORTING REQUIREMENTS, INCLUDING GUIDELINES FOR REPORTING INCIDENTS INVOLVING DANGEROUS GOODS, HARMFUL SUBSTANCES AND/OR MARINE POLLUTANTS, <https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/AssemblyDocuments/A.851(20).pdf>
5. SESAME II, <http://sesamesolution2.org/>
6. STM BALT SAFE, <https://www.seatrafficmanagement.info/projects/stm-balt-safe/>
7. Maritime Connectivity Platform, <https://maritimeconnectivity.net/>
8. Navelink, <https://www.navelink.org/>
9. S-100 Universal Hydrographic Data Model, <http://www.iho.int/iho_pubs/standard/S-100/S-100_Ed_2/S_100_V2.0.0_June-2015.pdf>
10. ISO 28005-2:2011 Security management systems for the supply chain — Electronic port clearance (EPC) — Part 2: Core data elements, <https://www.iso.org/standard/42144.html>
11. IALA Dictionary, <https://www.iala-aism.org/wiki/dictionary/index.php/Main_Page>

IHS Markit, <https://ihsmarkit.com/products/imo-ship-company.html>

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-2)
2. Leave open if uncertain [↑](#footnote-ref-3)