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Table of Contents

1 Reporting Ship-Shore .............................................................................................................. 5
  1.1 Introduction ...................................................................................................................... 5
    1.1.1 Pre-Arrival or Departure reporting .............................................................................. 5
    1.1.2 Mandatory Ship Reporting System (MRS) or SRS Reporting ................................. 5
    1.1.3 e-Navigation and Ship Reporting ............................................................................... 6
2 Architecture objective ............................................................................................................ 7
  2.1 USER STORY - now ........................................................................................................... 7
    2.1.1 Automatic Ship Reporting System ............................................................................. 8
  2.2 USER STORY – future ...................................................................................................... 8
3 Concept Automatic Ship Reporting ..................................................................................... 10
  3.1 Mandatory Ship Reporting System (MRS) ................................................................. 10
  3.2 Vessel Shore Reporting and Maritime Single Window (MSW) .................................... 11
  3.3 Request and Respond Services (RRS) .......................................................................... 12
  3.4 Transmit and Receive Services (TRS) ............................................................................ 13
4 Message Exchange ................................................................................................................. 14
5 Process view .......................................................................................................................... 16
6 Onboard view ....................................................................................................................... 17
7 Use case descriptions ............................................................................................................. 19
  7.1 UC 1: Determine Reporting Obligations ......................................................................... 19
    7.1.1 Actors: ....................................................................................................................... 19
    7.1.2 Triggers: .................................................................................................................... 19
    7.1.3 Preconditions: .......................................................................................................... 19
    7.1.4 Post-conditions: ...................................................................................................... 19
    7.1.5 Normal Flow: ........................................................................................................... 20
    7.1.6 Alternate Flows: ...................................................................................................... 20
    7.1.7 Summary .................................................................................................................. 20
  7.2 UC 2 Collecting Data ....................................................................................................... 21
    7.2.1 Actors: ....................................................................................................................... 21
    7.2.2 Triggers: .................................................................................................................... 21
    7.2.3 Preconditions: .......................................................................................................... 21
    7.2.4 Post-conditions: ...................................................................................................... 21
    7.2.5 Normal Flow: ........................................................................................................... 21
    7.2.6 Alternate Flows: ...................................................................................................... 22
    7.2.7 Summary .................................................................................................................. 22
7.3 UC 3 Data Reporting........................................................................................................22
7.3.1 Actors: ........................................................................................................................22
7.3.2 Triggers: ......................................................................................................................22
7.3.3 Preconditions: ............................................................................................................22
7.3.4 Post-conditions: ..........................................................................................................22
7.3.5 Normal Flow: ............................................................................................................22
7.3.6 Alternate Flows: .........................................................................................................23
7.3.7 Summary ....................................................................................................................23
8 DRAFT Glossary and Definitions .......................................................................................24
1 Reporting Ship-Shore

1.1 Introduction

The term *Ship Reporting* in this document refers to the reporting obligations that the ship's master needs to report to the shore authorities under certain conditions. The reporting obligations in certain countries or areas are normally regulated domestically, regionally or internationally. Ship reporting requires a great deal of attention from the ship's master with multiple forms to submit by using a confusing mix of procedures, technologies and formats.

General Ship Reporting is still a somewhat manual process, and the use case described in this document seek to address the automatization of the reporting Ship to Shore.

The reporting obligations can in principal be divided into two variants:

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

A detailed overview of international ship reporting activities, data elements and its formats used in ship reporting today are further elaborated and detailed in the *OUTPUT 5.1 Use case, processes and data formats for automated ship reporting* document.

1.1.1 Pre-Arrival or Departure reporting

This type of reporting is related to obligatory reporting formalities and instructions procedures (when, what and how) for the submission of the information required by public authorities and ports in connection with the arrival, stay and departure of to a specific port in a country. These reporting formalities can be extended to the full exchange of information required by a Maritime Single window.

Many of these reporting formalities are addressed by the IMO Facilitation Committee, which is developing the specifications guidelines for setting up a Maritime Single Window for the single window reporting system. The IMO FAL Committee are also working on the harmonization of data definitions, and maps the relationships among data elements in the ongoing review and revision of the IMO Compendium on Facilitation and Electronic Business. This work is linked to e-navigation Strategy Implementation Plan Solution 2 – Means for standardized and automated reporting (see MSC.1/Circ.1595).

A Pre-Arrival or Departure reporting system normally includes a reporting interface where the information are registered, stored and forwarded to the relevant authority or operator in charge of handling the information provided by the ship.

1.1.2 Mandatory Ship Reporting System (MRS) or SRS Reporting

The practice of following predetermined routes for shipping are adopted for reasons of safety. Related provisions were subsequently incorporated into the original SOLAS Convention. Traffic separation schemes and other ship routing systems have now been established in most of the major congested, shipping areas of the world. IMO's responsibility for ships' routing is enshrined in SOLAS Chapter V, which recognizes the Organization as the only international body for establishing such systems.
Ships' routing systems, including traffic separation schemes, that have been adopted by IMO, are tightly linked to Ship Reporting Systems. Regulation 11 of chapter V of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, provides the authority for the adoption of ship reporting systems by IMO. Ship reporting systems so adopted will be mandatory for use by all ships, certain categories of ships, or ships carrying certain cargoes.

Although the regulation refers to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment, resolution MSC.433(98) states that other supplementary information may also be requested in the initial report, if justified to ensure the effective operation of the ship.

This information may include the intended movement of the ship through the area covered by the reporting system and any operational defects or difficulties affecting the ship, as well as the general categories of any hazardous cargoes on board.

Information required to be transmitted as part of an MRS/SRS report is generally transmitted to a shore centre (ie. VTS), or the relevant authority via VHF voice communication at defined reporting points. Some MRS/SRS also accept reports transmitted through AIS, Internet-based reporting systems, email, fax, SATcom, mobile phone, or a combination of these communication means.

1.1.3 e-Navigation and Ship Reporting

General Ship Reporting is still a somewhat manual process and requires a great deal of attention from the ship master, with multiple forms to submit by using a confusing mix of procedures, standards and technologies.

The e-navigation ¹Strategy Implementation Plan (SIP), which was approved by MSC 94 in November 2014, contains a list of tasks required to be conducted in order to address 5 prioritized e-navigation solutions.

The E-navigation Solution 2 (Means for standardized and automated reporting) and Solution 9 (improved communication of VTS service portfolio) described in the SIP is considered as important solutions to reduce the mariners' workload (amount of time spent on preparing and submitting reports to shore-based authorities). To achieve these benefits E-navigation solution 2 and 9 envisage an automatic system where ship reports should be automatically generated- and transmitted as much as possible from on-board systems to shore systems.

In line with E-navigation and the objectives of the BALT SAFE project the use cases described in this document seek to address the automatization of the reporting Ship to Shore.

2 Architecture objective

To best introduce the objective of Automatic Ship Reporting let's set the stage by introducing a real world example through a user story.

2.1 USER STORY - now

The following simplified user story can be imagined:

- A ship is leaving the port of Murmansk and the destination are set for the port of Helsinki. The ship departs and heads west transiting the Norwegian coast. In the northern areas of Norway, the ship is obligated to report to NOR VTS when entering the BAREP area. The report is submitted via voice and or in a mail communication with the VTS.

- After sailing south, the ship enters the waters between Sweden and Denmark, also here there are obligation to report information. The SOUNDREP2 reporting regime requires the ship to report various information such as Ship Name, callsign, MMSI Number, IMO Number, Present Maximum Draught, Air Draught, Total No. of persons onboard and ETA SOUNDREP.

- During the ship voyage, and at least 24 hours before arrival to the port of Helsinki the ship has to report the planned arrival to the Finish authorities. The ship master (or an agent acting on his behalf) will have to register the necessary and required information into the Finish system (MSW?).

- Eventually the ships enter the Gulf of Finland, also here there are obligations to report. The GOFREP3 reporting regime requires the ship to report ship and voyage related information4. Finally, the ship concludes it voyage by docking in the Port of Helsinki.

To add to the story; Let's imagine the voyage is done by a rookie master and crew, or new to the region. The master is not aware of the reporting requirements, areas or obligations along the planned route. Nor does he or she know the details of the data (reporting formalities) that has to be submitted in the various cases. The master must therefore seek this information before, or at least at very early stage in the voyage.

The above imaginary voyage (hopefully) visualizes the reporting burdens, time and costs related to ship reporting for the responsible master on board the ship. The story will also (hopefully) open for understanding of the processes and use cases which are essential to message conveyed later in this document.

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3 MSC.139(76)
2.1.1 Automatic Ship Reporting System

The E-navigation solution 2 envisage various technical services to support a future automatic system for reporting. These services, both on the ship (on-board) and on-shore, will expose methods for obtaining and submitting information between the two involved parties.

2.2 USER STORY – future

Let’s imagine a future (still simplified) user story using the objectives of E-navigation solution 2.

The ship is leaving the port of Murmansk and the destination are set for the port of Helsinki.

- Before the departure, the master of the ship submits a voyage plan (route, destination and waypoints) from the on-board system to a designated shore-based service dedicated to support voyage management.

- While the master is relaxing or concentration on his/her other duties, the shore-based service are eagerly working on gathering the information about the reporting obligations, procedures, timing and other relevant information along the route of the ship.

- After a short period of time the on-board system/service receives a structured response from the shore-based service that provide all the necessary information that are relevant for the for reporting along the route.

- Based upon the information received, the on-board system/service starts preparing the various reports that need to be submitted during the voyage. The information collected, such as the ship name, call sign, IMO number, country codes, certificates, contact information are obtained from local databases onboard, dynamic information such as the ship position, heading, speed etc are collected from the ship's positioning- and/or AIS systems. Cargo, crew/passengers and similar information will if possible be collected from other management systems onboard or ashore.

- After relaxing, the Master is presented by the onboard system the reporting obligations and the pre-populated fields reports, indication missing information that need to be manually filled in.

- The Master will finalize the report(s) by populate the missing fields and approve the information to be automatically submitted at appropriate times and according to the relevant procedures set be the reporting system onshore.

- During the ship voyage the onboard system will update the dynamic information in the reports such as the ship position, heading and speed. The onboard system will also keep track of time and position and timely and automatically report the relevant information to the appropriate reporting system on-shore.

- The shore-system/service will acknowledge the reports submitted by the ship enabling the master to keep track of the status and progress of the automatic reporting.

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Based upon the introduction and the two stories it is safe to conclude that the architecture objective is to design and implement system(s) and services for Automated Ship Reporting that will satisfy the following goals:

- automating manual reporting routines will likely increase report quality and timeliness
- make use of existing modern technology to enhance collaboration between ship and onshore support organizations (agents, owner et.al)
- make use of existing modern technology to reduce the administrative burdens on board the ship and ashore.
- enhance safety and security in reporting areas and regimes by utilizing the potential related to existing modern technology and digital information
- enhance shore capacity for efficient, optimized and environmentally friendly traffic organization;
- secure submission and distribution of reports required by shore-based authorities in the harmonized standard and in the required timeframe;
- enhance the capacity to reduce the information in all relevant processes in the transport chain;
- reduce the administrative burden on board the ship and ashore;
- reduce the number of human errors and missing information by automating the reporting processes as much as possible; and
- provide near real-time access to information to relevant stakeholders in a secure manner.
3 Concept Automatic Ship Reporting

Obviously, there are a user and operational aspect to the concept of automatic ship reporting, however this document addresses the technical aspects, thus other concerns are therefore not discussed. Based upon the introduction and the imaginary user stories it is very clear that to be capable of generating information and transmitting it automatically, a realistic implementation of these services would require the involvement of both Competent Authorities and shipowners.

The concept of an automatic reporting schema comprises in principal two technical systems or services:

- on-board system (SHIP side), and
- on-shore system(s) (SHORE side)

The principal figure below visualizes the scope that of the reporting, and shows how the two systems or services interacts at various stages of a ship voyage.

The reporting obligations usually lies with the Master on the ship, but the actual reporting might be done by a third party such as a ship agent. For simplicity the third party is left out of the figure. Using existing data communication systems, ship information will be transmitted to the authorities, ports, VTS’es and shore centers during the ship voyage or ship arrival to port.

The DATA CONSUMERS (SHORE) e.g. VTS, Authorities or private stakeholders’ side, illustrated in the figure on the right, is included to visualize the holistic picture of ship reporting. The stakeholders will receive relevant information from the reporting ship, using the existing connections and exchange mechanisms implemented in the relevant system, i.e NSW(s).

The main area of interest is depicted in the grey area of the figure. This represent the area where the automatic ship reporting typically operates, and where the systems interact and communicate with or affect each other. The endpoints typically expose one or more services that enable submission, retrieval and exchange of information.

The endpoints indicated in the figure comprise at least two principal set of services that are common in both VSR and MRS reporting; one that enable the ship and shore to request and receive information, and another service that enable the transmission and receiving of the reporting information.

3.1 Mandatory Ship Reporting System (MRS)

The currently 23 IMO adopted Mandatory Ship Reporting Systems follow the structure based on IMO Resolution A.851 (20).
Parts of the required information, such as ID, course, speed, position etc., is normally captured by sensors such as AIS and LRIT. Remaining information is often already available from a shore system. The sharing of information between systems will have several benefits.

In MRS areas, shore authorities can provide more automated and efficient reporting systems by using technology such as AIS and VDES, in combination with common data structures and product specifications.

Figure 1 The GOFREP operational area

3.2 Vessel Shore Reporting and Maritime Single Window (MSW)

Vessel Shore Reporting is a generic term and a supporting reporting system to receive information from the ships could in principle be any system suitable for the purpose, however some kind of Single Window system are often the case.

The term “Maritime Single Window” can be defined as a one-stop service environment that covers maritime and port administrative procedures, such as port entry/departure declaration, notice of security reports, and other related information between private sectors and public authorities nationwide. In other words, an MSW is a single window in the scope of maritime and port fields.
The system depicted on the right represents a conceptual architectural model that defines the structure and behavior of the MSW. This model assumes that a single authority (CIM, Centralized information model) has the responsibility to operate the system that receives information electronically via the Single Window and thereby disseminates this information to all relevant stakeholders.

The conceptual model illustrates that the MSW consists of an environment whereby ship data providers can submit information electronically either through a user interface or a system-to-system interface. The information is digitized, and the individual data elements will be submitted once only.

### 3.3 Request and Respond Services (RRS)

Seen from the ship perspective the VSR and MRS system provides an information service, and are able digitally respond to information requests from the ships. Both types of shore services should as a minimum respond by giving the requesting system the accurate current reporting obligation for that particular reporting system, being VSR or MRS.

Additional functions in the service could give responses to other requests as indicated in earlier in this document.

Today the various reporting systems has different reporting obligations and procedures. The reporting obligations (information element to be reported) should be in accordance with the IMO Resolution 851. However, not all reporting systems requires all the information that is specified in the resolution and the reporting procedures will vary based upon different parameters.

One of the central services that should be found in the RRS are the ability for the ships system to request the reporting obligations for a particular voyage geography or port call. Based on e.g the ship particulars and voyage information, such as type and size of the ship, port of departure, crew and passengers the ship system should have the opportunity to request the shore-based reporting system for the ships reporting obligation for that the ships particular voyage. The shore-based system should in return respond to the requester in a structured message the obligatory reporting information and reporting procedures that would be required for the ship and voyage.

Therefore; seen from the ship perspective the VSR and MRS system provides an information service, and are able digitally respond to information requests from the ships. Both types of shore services should as a minimum respond by giving the requesting system the accurate current reporting obligations and procedures for that particular reporting system, being VSR or MRS.
3.4 Transmit and Receive Services (TRS)

The TRS service is a more traditional service provided by the VSR and MRS systems. The service is exposed to the ships and are able to receive and acknowledge the submitted reports (new or updates) from the ships.

Further elaboration on the information flow, technical aspects and relevant use cases are addressed in the following chapters.
4 Message Exchange

In every reporting scheme, and in particular automatic reporting schema there needs to be well defined message exchange mechanisms in place. These exchange mechanisms should in principle be independent of the context in which the exchange is taking place.

The exchange is often described as message exchange sequences (patterns) and corresponding information elements that are necessary to execute the exchange. Each pattern can represent several different concrete exchanges between different parties. However, when it comes to ship reporting, the message sequences should be the same generic flow of information both for single window data exchanges or ship reporting to VTS or any other ship reporting system.

The sequence diagram(s) presented in this document consisting of vertical lines representing an abstract time axis for respectively client (ship) and server (shore), and in some cases a proxy (catalogue). Arrows between the parties represent the sequence of messages that need to be exchanged. A thick line from an arrow end to a new arrow start shows synchronous processing by the respective party.

The eNavigation services massage flow and representation are being discussed in the IMO Expert Group on Data Harmonisation (EGDH), and Figure 4 Request Reporting Obligations & Procedures is a slightly modified version of the figure found in the annex 3 of the IMO document5 EGDH 1/9. The modification to the original generic drawing is done to visualize a specific sequence diagram for the pattern which describes a Service Request in relation to the concept of automatic reporting.

In Figure 4 Request Reporting Obligations & Procedures the ship requests the RRS from the shore centre, in this case the request are for the Reporting Obligations & Procedures for clearance to go to port or entry to an MRS area. A receipt is sent to acknowledge that the request for service is received by the shore centre. The shore centre proceeds with some work to handle the request, and will respond to the requesting ship with the relevant reporting requirements and procedures for the particular ship and voyage. In the generic sequence diagram, there is also sequences for loops and options related to the message exchange. Loops and options might not be relevant in the example.

In the example above a catalogue service (proxy service) could expose the service on behalf of the shore centre.

In a sequence where the ship actually submits a report (TRS service) loops and options would be very relevant. As an example; a single window system that has received a ship report would check that the data received is correct and on the right format. The single window will then forward the relevant information to the correct authorities. Results of the work done by the shore centre is sent to the ship as

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5 ISO (2019), Input paper to IMO EGDH 1/9, Submitted by ISO: "IMO DATA SET RELATED TO ACKNOWLEDGEMENT RECEIPTS", 4 October 2019.
a service response, for instance, for a Single Window, this can be a clearance to enter the port. The ship

can both update and cancel the request in several iterations. For port clearance, this corresponds to

sending a clearance message multiple times, when the ship has available more information to submit. The

ship can also cancel the service request, for instance cancel the port clearance request.

To enable a sequence of data exchange similar to what is described in the examples above would require
definitions of additional data elements (beyond conventions and regulations). The data elements would

be within the computer and communication domain and will not require additional human interactions

or administrative burdens.

The pattern can also be used to describe a use case where the client subscribes to updates from server

until some time-out or until cancellation.

Note that for simplicity and consistency, the sequence diagram is foreseen to be an information exchange

between the ship and shore. However, from a practically and real-world point of view, systems and

services “onboard” might be implemented elsewhere i.e. on shore or in some kind of cloud

implementation. This sequence diagrams should be interpreted with these facts in mind.
5 Process view

The generic concept of automatic reporting can be understood by the figure below. In principal there are three components involved.

1. The Ship, or the ship's onshore representation, obligated to do the reporting to either the MRS/SRS or MSW.
2. Shore, represents the receiving side. Eventually the information submitted by the ship ends up in the designated system (instance).
3. Service discovery. From a generic point of view, the ship initially has to find the reporting instance.

Furthermore, the process and flow of information in the architecture of automatic reporting can be seen from two perspectives;

1. From the ship side, where the ship is initiating the process and control the process of reporting.
2. From the shore side, where shore service initiate the process by requesting the ship to report on demand.

The services and behavior (methods) will in essence be the same in both cases (1 and 2). A combination of the two alternatives is an also a likely scenario. Alternative 2 is however out of the scope in this work package.

Besides to two main actors (Ship & Reporting Service) in the scenarios described there are an obvious need for a service to lookup ship reporting instances (URL’s to reporting system instances). The Maritime Connectivity Platform (MCP) is considered to be the system that expose this service.

Also, a service that are capable of receiving a ship route, and identify the reporting obligations along the route and if relevant at the destination is assumed. The Route Management Service are foreseen to be developed to support this functionality.
6 Onboard view

A conceptual ship system (includes both ship and shore) to support the architecture of automatic Reporting described in this document is depicted below. For simplicity and consistency, the conceptual ship system is foreseen to be installed and operated onboard the ship. However, from a practically and a real-world point of view, modules, services and databases might be implemented elsewhere i.g. on shore or in some kind of cloud implementation. The requirements should be interpreted with these facts in mind.

The onboard system is foreseen to comprise three modules. Some user interaction is required in the management modules, whilst other module(s) should provide services to both the management modules and the shore services. The conceptual ship system should maintain the fixed and dynamic data related to reporting on board, but could also connect to external databases or registries outside the ship domain.

To enable dynamic updates and timely scheduling for submission of reports, the system should interact with the navigation system onboard.

- **Route Management**
  - This module basically contains functionalities that are already implemented on the STM compliant ships.

- **Reports Management**.
  - The module requires user interactions.
  - The user should register/update data that are otherwise not automatically collected from the onboard databases, external systems and from the navigation system.
  - An important function is the ability for the master to approve the data that will be automatically submitted.
There should be an interface that provides information to the master on the reporting obligation along the route, and the statuses on the submissions. The module should comprise functionality to maintain the fixed or static data which is stored in the database(s).

**Reports Handling**
- This module is foreseen to be a service module that will not require user interactions.
- The services should interact and support functionality in the Reports Management module.
- Three basic services handle the interaction with the shore services.
  - The *Receive RO&P* service consume the shore service that exposes the Reporting requirements and procedures for the relevant MRS, SRS or shore reporting.
  - The *Report Submissions* consumes the shore service for reporting.
  - *Acknowledge handling* interact with the shore service for reporting and handles responses. These functions also provide data to the *Create/update* (error handling, retransmit), and the *Status* function.
- Using data from the NAV system and Reporting obligations the *Create/update* service compile the report accordingly. The service exposes the missing information to the *Report Maintenance UI*.
7 Use case descriptions

7.1 UC 1: Determine Reporting Obligations

7.1.1 Actors:

- Ship (the reporting party)
  NOTE; the SHIP/vessel as an actor can be realized by a representation on-shore representing or assisting the ship to fulfil the reporting obligations.
- MRS/MSW (the party that sets the reporting requirements and which exposes the reporting interfaces)
  NOTE; the MRS/MSW actor represents in this UC generic and harmonized interface/exposure of the reporting obligations and procedures (RO&P).
- Service for reporting discovery (TBD (MCP service?))
- MCP System (xx)
- VTS/GOFREP (SRS)

7.1.2 Triggers:

- The ship finalizes the planned voyage by submitting the route.
- The ship changes the planned voyage by submitting the route update
- By request from the ship

7.1.3 Preconditions:

- Connectivity to the on-shore representation of the ship i.e VIS or equivalent.

7.1.4 Post-conditions:

- The system and user onboard will know the reporting requirements and procedures along the route until final destination.
- Reporting endpoints is known.
- The system onboard will be ready to collect relevant data needed for the reports.
- The system onboard will be able to schedule where and when to submit the relevant data to the reporting endpoints.
7.1.5 Normal Flow:
- The ship plans the voyage and reporting is included as part of the planning
- The ship submits a voyage plan (route, destination and waypoints) from the on-board system
- The MCP service or similar services on shore will evaluate the route and identify the different reporting systems along the route, including at the destination. This is evaluated by the MCP service registry in filtering out services according to coverage areas crossing the route and of service type= reporting
- The MCP service registry returns URL’s for the filtered list of reporting services.

At this point in the normal flow the ship has two optional flows to choose from

- **STM flow:**
  - The STM system or similar services on shore will request the endpoint URL’s for the reporting obligations and procedures (RO&P) for the particular reporting system.
  - The ship receives the reporting obligations, procedures and URL’s for the report submissions from the STM system.

- **SHIP flow:**
  - The ship onboard services will request directly the endpoint URL’s for the reporting obligations and procedures for the particular reporting system.
  - The ship receives the reporting obligations, procedures and URL’s for the report submissions from the STM system.

- The ship repeats the flow of requesting the RO&P for the subsequent reporting system if relevant.
- After repeating the steps of requesting the RO&P for the relevant reporting systems the ship now have enough information to start preparing the ship report(s)
- The use case ends.

7.1.6 Alternate Flows:
Alternative flows are dealing with cases where the various reporting points, procedures and obligations are already known to the ship. In these cases, the preliminary steps to identify the relevant reporting systems can be omitted.

7.1.7 Summary
Summary needed?
7.2 UC 2 Collecting Data

7.2.1 Actors:
- Ship (or the shore representative)
- .
- Company (the owner, freighter, charterer, etc)
- Nav system (onboard)
  NOTE; Might be GPS and/or AIS any system that can give updated relevant data, such as position, speed and time.
- Local and external databases (databases with relevant data onboard or at company)

7.2.2 Triggers:
- The ship knows, or has Determined the Reporting Obligations and procedures.
- By request from the ship, assuming the Reporting Obligations and procedures are known

7.2.3 Preconditions:
- The ship knows the route and the RO&P for the relevant reporting systems during the voyage

7.2.4 Post-conditions:
- The ship reports are ready for transmission at the scheduled geographical point, time or a combination
- The ship can under any circumstances un-approve the report
- The ship can under any circumstances cancel the report

7.2.5 Normal Flow:
- Knowing the RO&P the ship starts automatically to collect the relevant data for the draft report(s) to be submitted at a later stage.
- Fixed data, such as ship name, IMO#, destination etc are collected from onboard database(s)
- Data are collected from the Company databases (if possible and relevant)
- Dynamic data is constantly updating the draft report(s)
- A draft report is presented to the ship.
- The draft report is a unique instance, and changes are logged, if needed.
- Missing fields in the draft report (data not available or missing) are highlighted to the ship
- The ship completes the report by filling in the missing fields, and/or updates incorrect information
- Storing and logging
- The ship approves the report(s) for submission
- The report will be locked for updates, except for defined dynamic updates (pre-approved).
7.2.6 Alternate Flows:
- If the voyage is cancelled or changed and the draft/approved reports created earlier is no longer relevant or valid, the ship should be able to delete the report.
- The reported is deleted and logs updated.
- The new or changed voyage should follow the normal flow

The use case ends.

7.2.7 Summary
Summary needed?

7.3 UC 3 Data Reporting

7.3.1 Actors:
- Ship (the reporting party)
  NOTE; the ship might comprise a full- or partly shore system representing or assisting the ship to fulfil the reporting obligations.
- Nav system (onboard)
  NOTE; Might be GPS and/or AIS any system that can give updated relevant data, such as position, speed and time.
- Local and external databases (databases with relevant data onboard or at company)
- MRS/MSW (the party that except the report electronically)
  NOTE; the MRS/MSW actor represents in this UC generic and harmonized interface/exposure of the reporting submission.

7.3.2 Triggers:
- The scheduler initiates an approved report to be submitted, based upon geographical point, time or a combination

7.3.3 Preconditions:
- Approved report is available for submission

7.3.4 Post-conditions:
- Report is acknowledged and approved by the MRS/MSW

7.3.5 Normal Flow:
- The scheduling services are monitoring data from the dynamic system and the pending approved reports to be submitted.
- When a report is due, the scheduler initializes the report submission to the relevant reporting system.
- The ship can in any circumstances override the scheduler
- The ship is informed if there is no approved report to be submitted.
- The MRS/MSW acknowledge the report
• The MRS/MSW approves the report or request updates or indicate errors
• The ship behaves accordingly to the response from MRS/MSW
• The ship is presented the status of the report.

7.3.6 Alternate Flows:
None?

The use case ends.

7.3.7 Summary
Summary needed?
8 DRAFT Glossary and Definitions

ABBREVIATIONS

AIS - Automatic Identification System
ASM – Application Specific Messages
CDM - Collaborative Decision Making
CSE - Cognitive Systems Engineering
CoCoM - Contextual Control Model
DSS - Decision Support System
DWT - Deadweight tonnage
ECDIS - Electronic Chart Display and Information System
FOC – Fleet Operation Center
FSA - Formal Safety Assessment
GOFREP - Gulf Of Finland REPorting scheme (supported by the VTS’s in the Gulf of Finland)
IBNET – Icebreaker information system, distributed information system used on board the icebreakers in the Baltic Sea was originally developed in 1990’s
IALA - International Association of Lighthouse Authorities and Aids to Navigation
IMO - International Maritime Organization
INS - Information Service
NAS - Navigational Assistance Service
PortCDM - Port Collaborative Decision Making
RE - Resilience Engineering
RTZ - Route exchange format
SC - Shore Centre
SeaSWIM – Sea System Wide Information Management
SIP - Strategy Implementation Plan
SIRE - Ship Inspection Report Programme
SMCP - Standard Maritime Communication Phrases
SOLAS - Safety of Life at Sea
SOP - Standard Operating Procedures
DEFINITIONS
The definitions made here, aim to describe wordings and expressions as used in the project.

Administrative burdens are defined as "administrative work which in the opinion of the stakeholder is not adding value proportionate to the resources the stakeholder will have put into the work to comply with specific rules and requirements".

Adopted ship reporting system means a ship reporting system, (hereinafter referred to as a "system") that has been established by a Government or Governments after it has been accepted by the Organization as complying with all requirements of SOLAS regulation V/11. (MSC 98/23/Add.1 Annex 17)

Anomaly Detection is the identification of rare items, events or observations which raise suspicions by differing significantly from the majority of the data. Anomaly detection can be used for enhanced monitoring.

Automatic Identification System – radio modem that automatically exchanges static (identity) and dynamic (navigation) data between ships and may transport ASM data structures.

BIMCO – BIMCO is the largest of the international shipping associations representing shipowners. The association’s main objective is to protect its global membership through the provision of information and advice, and while promoting fair business practices, facilitate harmonisation and standardization of commercial shipping practices and contract which was founded under the title of "The Baltic and
White Sea Conference” in Copenhagen in 1905 was the first organisation to see the benefit in joining forces with other countries to secure better deals and standard agreements in shipping. As the organisation grew and became more international it was renamed -The Baltic and International Maritime Council – and at present day – simply BIMCO.

Decision Support System, referring to the technical support system at hand in an operational environment in the Vessel Traffic Service or at bridge.

Deviating from planned route -

Enhanced Monitoring: Enhanced monitoring will be an anomaly detection to detect if planned schedule is not kept or if ship deviates from planned route that is transferred to operators in a shore centres. Thus, shore centres can monitor that ships are following their planned route and also foresee possible dangerous situations and suggest route modifications (geographic and/or speed) due to traffic or other impeding conditions.

Flow Line - A passage line used to mark the timing of ships passages in Flow Management

Flow Management: Flow Management is the design, auditing and implementation of traffic coordination plans for shipping traffic. It describes a process through which the speed / timing of ships passage of a traffic areas, e.g. narrow strait, is adjusted to achieve a safe and efficient traffic flow.

Flow Management Services will support both onshore organisations and ships in optimising overall traffic flow through areas of dense traffic and areas with particular navigational challenges.

FSA - Formal Safety Assessment, the method recommended by the IMO to determine changes in risk when certain new measures/ methods/ designs/ layouts, etc. are applied in the maritime sector

Ice Waypoints - Route points that an icebreaker issues for ships to follow when navigating at sea (also called Dirways)

Interaction between a shore-based authority and a participating ship means interchange of data between ships participating in a system and a shore-based authority, aimed at enhancing maritime safety or the protection of the marine environment. (MSC 98/23/Add.1 Annex 17)
MCP Maritime Connectivity Platform - is a communication framework enabling efficient, secure, reliable and seamless electronic information exchange between all authorized maritime stakeholders across available communication systems.

Route - A representation of the planned way to get from point A to point B, consisting of a list of waypoints (geometry) and information associated with the legs between waypoints. A way or course taken in getting from a starting point to a destination. Shipping routes are the paths taken by ships across the world’s seas. They are channels down to a hundred meters wide up to unrestricted, defined by compulsory points of passage (capes, straits, channels), physical constraints (current speed, depth, presence of reefs) and geopolitical contexts.

Route exchange – The exchange of routes or voyages in RTZ format between STM compatible actors through the SeaSWIM environment.

Route Planning - can be defined as a method of deriving or computing the safest/ most cost/ time/ environmental effective route involving several waypoints/ nodes/stopovers by minimizing the distance traveled or time taken.

Ship-to-Ship Route Exchange - S2SREX – A function available to STM compatible ships where they can choose to broadcast their routes (up to 7 waypoints) via AIS or VDES to nearby STM compatible ships.

Sea Traffic Management: The aggregation of the seaborne and shore-based functions (sea traffic services, maritime space management and sea traffic flow management) required to ensure the safe and efficient movement of vessels during all phases of operation.

SeaSWIM connector – A software that enables a device to connect with the Maritime Connectivity Platform and other STM compatible devices.

SeaSWIM environment – A digital environment formed by maritime actors (e.g. ships, ports, VTS, service provider) registered in the Maritime Connectivity Platform and possessing a device with a SeaSWIM connector installed.
Schedule - The estimated timing of a voyage, i.e. ETA/ETD of waypoints, speed on legs, etc.

Ship Reporting System – Ship reporting systems contribute to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment. A ship reporting system, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization** pursuant to this regulation, shall be used by all ships, or certain categories of ships or ships carrying certain cargoes in accordance with the provisions of each system so adopted. (SOLAS reg 11). Ships to which a mandatory ship reporting system applies should report to the shore-based authority without delay when entering and, if necessary, when leaving the area covered by the system. A ship may be required to provide additional reports or information to update or modify an earlier report. SRS aims to keep a vigilant eye on the sea traffic. In cases of rendering help, the systems enable to give pieces of information about e.g. navigational hazards, etc. SRS can be mandatory or voluntary.

Shore-based authority means the authority or authorities designated by a Contracting Government or Governments with the responsibility for the management and coordination of a system, the interaction with participating ships, and the safe and effective operation of a system. Such an authority may or may not be an authority in charge of a vessel traffic service. (MSC 98/23/Add.1 Annex 17)

Shore center – Shore center act as a communication hub between a stakeholder on land and ships. In a shore centre the monitoring of several vessels or a dedicated area is performed by educated operators. Shore centers can be VTS, FOC och centers connected to port traffic

STM compatible – as of being registered in the Maritime Connectivity Platform and possessing a device with a SeaSWIM connector.

STM compliance implies that ships are equipped with STM compatible bridge systems or VTS with STM compatible VTS systems

STM service – An information service accessible through the maritime digital infrastructure SeaSWIM and registered at the Maritime Connectivity Platform.

STM shore center –
Strategic Voyageplan - Longterm planning that consists of

- A Route with
- A Voyage number (and other Route information)
- A list of waypoints (geometry)
- A Schedule (Time axis - ETA, ETD, Speed on legs, etc.)
- Charter parties, legal conditions, economic condition

When a Strategic voyage plan is given to the ship/captain as a voyage order it changes to Dynamic Voyage plan

Tactical Voyage plan - Tactical voyage plan is: A Dynamic Voyage plan in conning mode (tactical execution) The vessel is under Captains command and decisions are based on navigational and safety knowledge taken on legal basis (colreg). The tactical voyage plan can be transmitted between ships to increase situational awareness and enhance the planning of alternative legs to avoid close encounter

VHF radio Very High Frequency radio, the primary means of communication for VTS and vessels

VTS area - Area in territorial waters in which VTS is provided to the merchant fleet

Vessel traffic services - VTS - are shore-side systems which range from the provision of simple information messages to ships, such as position of other traffic or meterological hazard warnings, to extensive management of traffic within a port or waterway.

Vessel Traffic Management - Vessel Traffic Management provides Vessel Traffic Service (VTS) to merchant shipping and other marine traffic and maintains safety radio operations. Vessel Traffic Services, a shore-based support service, are provided by the VTS Centres. The Centres’ surveillance areas are typically provided in constrained/ confined/ congested waters and in those with high shipping traffic intensity.
Voyage plan – when adding a schedule added to a route, it becomes a voyage plan.

Voyage Information Service – VIS – A standard for the communication of routes and voyages in RTZ format, as well as text and area messages, in the SeaSWIM environment.

Voyage Management Services will provide support to individual ships in both the planning process and during a voyage, including route planning, route exchange, and route optimisation services.

Waypoint A position marking the intersection between two legs in a Voyage Plan.

STM SERVICES

By using standards and creating interoperability Sea Traffic Management is opening up for an endless number of services. Below you find descriptions about the STM services that are being validated in the STM Validation project.
Using STM to increase BALTic Sea SAFety

Making the Baltic Sea even safer by improving the situational awareness on ships and shore, building tools that automate work and provide decision support to prevent risk situations and accidents.

Making STM happen!

SAFETY - ENVIRONMENT - EFFICIENCY

Swedish Maritime Administration ◦ VTS Finland ◦ Estonian Maritime Administration ◦ Norwegian Coastal Administration ◦ RISE Research Institutes of Sweden ◦ DNV GL

www.stmbaltsafe.eu
www.stmvalidation.eu/projects/stmbaltsafe