

IMO/IHO HARMONIZATION GROUP ON  
DATA MODELLING  
Agenda item 4

HGDM 2/4  
20 September 2018  
ENGLISH ONLY

**DRAFT GUIDANCE ON THE DEFINITION AND HARMONIZATION OF THE  
FORMAT AND STRUCTURE OF MARITIME SERVICES WITHIN A MARITIME SERVICE  
PORTFOLIO, INCLUDING ASSOCIATED TEMPLATES**

**Draft templates proposed for maritime services that do not have  
a domain coordinating body identified by NCSR 5**

**Submitted by Norway**

**SUMMARY**

<b>Executive summary:</b>	This document proposes an initial input for maritime services that have not been assigned to a domain coordinating body, as identified by NCSR 5. This proposal and the templates therein are submitted to facilitate the development and consideration of Maritime Services by the HGDM
<b>Action to be taken:</b>	Paragraph 7
<b>Related documents:</b>	MSC.1/Circ.1595; Circular Letter No. 3859; NCSR 5/WP.4, annex 2, annex, appendix 1; and NCSR 5/23, section 8

**Introduction**

1 Noting the progress made by HGDM 1 and the terms of reference for HGDM 2, Norway, with the support from other Member States, has developed initial template documents for maritime services that do not have an assigned domain coordinating body.

**Discussion**

2 NCSR 5 updated the Strategic Implementation Plan (SIP) for e-navigation (MSC.1/Circ.1595) and renamed, for clarification, Maritime Services Portfolios (MSPs) as maritime services being part of a Maritime Service Portfolio (MSP). Furthermore, NCSR 5 noted that the following international organizations would act as domain coordinating body for specific maritime services:

- IALA: MS 1, 2, 3;
- IHMA: MS 4;
- IHO: MS 5, 11, 12, 15;
- IMPA: MS 6; and
- WMO: MS 13, 14.

3 In accordance with Circular Letter No. 3859, international organizations acting as domain coordinating bodies were invited to submit a description of their respective maritime services, using the template set out in document NCSR 5/WP.4, annex 2, annex, appendix 1.

4 However, so far, no international organizations have indicated their intent to act as domain coordinating bodies for the following maritime services:

- MS 7 (Tug service);
- MS 8 (Vessel Shore Reporting);
- MS 9 (Telemedical Assistance Service); and
- MS 16 (Search and Rescue Service).

5 As the terms of reference for HGDM 2 include templates for all maritime services defined in the SIP, a description of the maritime services listed in paragraph 4 above should also be included to ensure simultaneous progress of HGDM deliverables.

6 To that end, draft descriptions for maritime services 7, 8, 9 and 16 have been developed and the proposed templates are contained in the annex. It is recommended that these templates are included as inputs to the drafting of the Guidance on the definition and harmonization of the format and structure of maritime services within the Maritime Service Portfolio (MSP).

#### **Action requested of the HGDM**

7 The HGDM is invited to consider the templates contained in the annex and incorporate them within the draft guidance, as deemed appropriate.

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**ANNEX**  
**TEMPLATES**

**MS 7 Tug service**

**Submitting Organization**

**Description of the Maritime Service**

Tug services range from small vessels with limited capacity and service in ports and rivers to oceangoing vessels built for complex operations and salvage. This service contributes to the safety of navigation, protection of the marine environment, and efficiency of marine transportation by conducting different types of operations, such as:

- transportation (personnel and staff from port to anchorage);
- ship assistance (e.g. mooring);
- salvage (grounded ships or structures);
- shore;
- towage (harbour/ocean);
- escort; and
- oil spill response.

The need of tug services differ from port to port, type of vessel and cargo. In some cases, information about a tug service capacity and/or availability may be difficult to obtain due to communication deficiencies. This maritime service is dedicated to improve information availability of tug services.

Tug services would encompass all kinds of tugs, such as:

- conventional;
- azimuth stern drive;
- tractor; and
- rotor.

<b>Information related to:</b>	<b>Examples of information shared in a tug service</b>
Deep sea information	<ul style="list-style-type: none"> <li>• Contact information for tug vessel / operator</li> <li>• Safety procedures and regulations</li> <li>• Available resources</li> <li>• Working hours</li> </ul>
Local port or river information	<ul style="list-style-type: none"> <li>• Contact information for tug vessel / operator</li> <li>• Mooring and berthing information</li> <li>• Available resources</li> <li>• Working hours</li> </ul>

Tug information	<ul style="list-style-type: none"><li>• Type of tug</li><li>• Capacity</li><li>• Size</li><li>• Assistance services</li><li>• Response time</li><li>• Contact information</li><li>• Working hours</li></ul>
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**Table [...]: Examples of information that can be shared in a tug service**

### **Purpose**

Tug services aim to facilitate access to all necessary information required by ships heading to port, in order to optimize transit times and promote efficient movement of goods and persons by using modern technology and common standards.

Effective communications and exchange of information between relevant stakeholders would contribute to efficient tug services. Electronic exchange of information would significantly contribute to the improvement of this service. For example, notifying a ship officer in advance about tug availability in port could lead the ship to adapt its speed accordingly. In some cases this may prevent a requirement to anchor the ship. The types of information which can be exchanged include:

- ETA (request);
- confirmation requests;
- updates on transit status and tug availability;
- updates among stakeholders; and
- standardized messages to overcome language barriers.

### **Operational approach**

Tug service is a key element of the marine transportation chain and well-coordinated procedures and communication means should be in place to ensure fluid movement of ships. Like the Local Port Service, utilization of a common platform to exchange information electronically and keep users updated on a regular basis about the status of operations would significantly improve this service, for both the ships' operator and the tug owners. The tug service aims mainly to improve the communications involved in a ship request, rather than altering current operational procedures. Some of these communications may include:

- ship's size;
- number of tugs required;
- time the service is required;
- time the tug may be on site;
- estimated duration of operations; and
- end of operations.

Access to this information electronically would enhance the awareness of a ship's time-stamp.

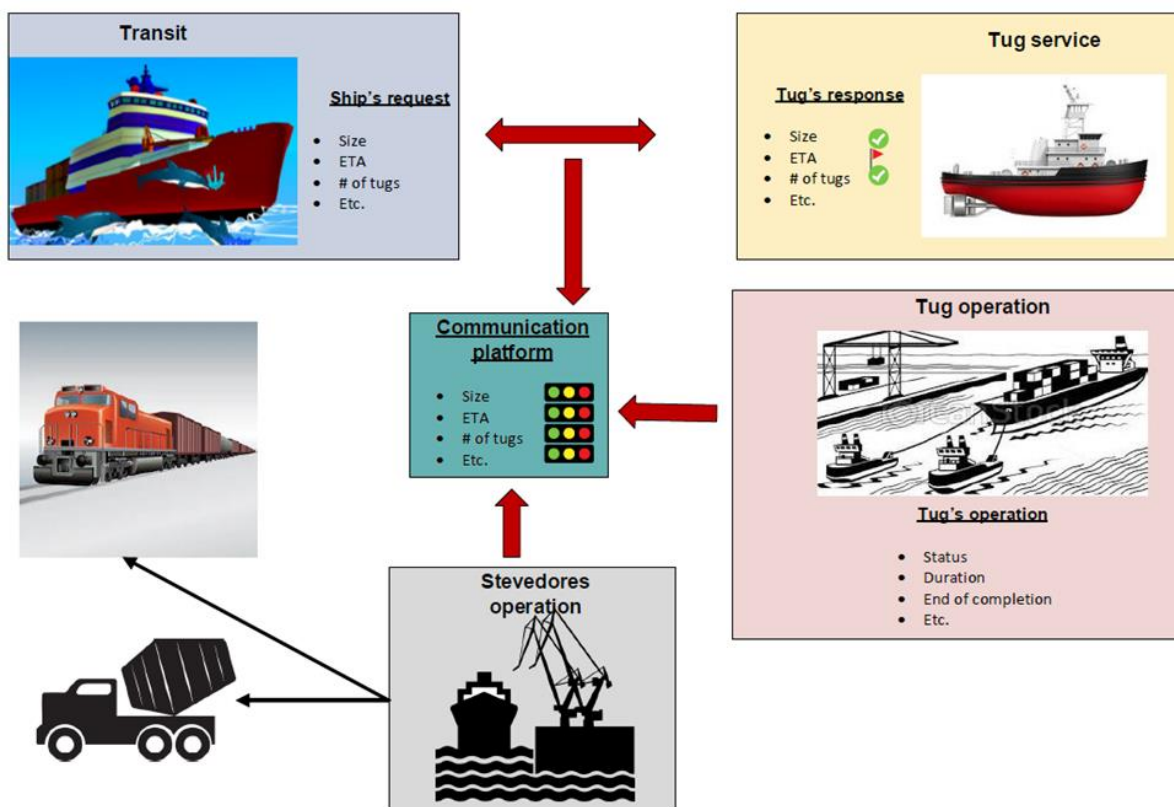


Figure [...]: Example of an electronic communication platform for all actors involved in the tug service.

Increased connectivity, through sharing of harmonized digital information regarding tug services in ports, rivers or deep-sea, will enhance efficiency through just-in-time services. It will also reduce human factor errors, such as language barriers or outdated information in publications, enhancing efficiency and access to information in a fast and easy-to-use-manner.

### User needs

Easy and timely access to tug service information is critical to ensure fluidity in the transportation chain. The information required from this service is mainly related to:

- capacity;
- availability;
- time of response;
- status of operations; and
- duration of operations.

In return, tug services should be regularly updated on the ship's ETA/ATA to plan its operations accordingly. In the event of an unanticipated change, the tug service and ship officers should be able to communicate easily with each other to keep both parties informed about the evolving situation and allow for proper decision-making. An easy communication link should be part of the user needs and this communication link would also benefit all other actors.

### Information to be provided

See Annex 7, MS 7 Tug Service

### Associated technical services

Name	ID (MRN)	Description	Architect(s)	Standardization body
S-211 Port Collaborative Decision Making (PortCDM)		Standard for information exchange between actors in ports, including tugs.		IALA

### Relation with other Maritime Services

Description	Examples of data that could be used in MS 7
MS 1 VTS IS	VTS area, types of VTS services, VTS contact information, places of refuge, local regulations, limitation, visibility, information regarding traffic in the area
MS 2 VTS NAS	Not relevant
MS 3 VTS TOS	Traffic clearance, time slots
MS 4 Local Port Service	Berthing information, time slots, security, local regulations, supply, assistance, port contact information
MS 5 Maritime Safety Information	Navigational warnings, meteorological information and other urgent safety-related information.
MS 6 Pilotage Service	Pilot regulations, contact information, request procedures
MS 8 Vessel Shore reporting	Vessel information, cargo information, crew information
MS 9 Telemedical	Not relevant
MS 10 Maritime Assistance Service	Contact information, places of refuge
MS 11 Nautical Chart Service	Charting information, chart updates
MS 12 Nautical Publications Service	Digital information from nautical publications that is relevant for the operations at hand
MS 13 Ice Navigation Service	Ice chart, ice conditions, information regarding icebreaker service / assistance, ice routes
MS 14 Meteorological Service	Information regarding weather in the area
MS 15 Real Time Hydro and Information Service	Information from real time sensors
MS 16 Search and Rescue Service	Salvage information, drifting parts, SAR areas, and rescue capabilities in the area

## MS 8 Vessel shore reporting

### Submitting Organization

### Description of Maritime Service

This service provides information from shore to ship about two different reporting regimes. The first regime is Vessel Shore Reporting (VSR), implemented for pre-arrival reporting. This service can cover information and guidelines related to reporting formalities and instructions (when, what and how) for reporting to a specific port. In addition, this service can be extended to the full exchange of information required in a Single Window ship reporting system. The Vessel Shore Reporting (VSR) regime may contain the following elements:

- Marine security regulations;
- Vessel Traffic Services zones regulations;
- Customs and immigration regulations;
- Port state regulations;
- Health and veterinary regulations; and
- Environmental regulations.

Many of these elements will be addressed by the IMO Facilitation Committee, which is developing the specifications for the Single Window Reporting System. This is linked to e-navigation Strategy Implementation Plan Solution 2 - Means for standardized and automated reporting.

IMO e-navigation solution 2, regarding automated ship reporting, is one of the most important solutions to reduce the mariners' workload (amount of time spent on preparing and submitting reports to shore-based authorities). To achieve this, reports should be automatically generated as much as possible from on-board systems.

The second regime is linked to a transit in an area where a Ship Reporting System (SRS) is established.

In SRS 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.

In a ship reporting system (SRS), resolution MSC.43(64) recalls that communication between a shore-based authority and a participating ship should be limited to information essential to achieve the objectives of the ship reporting system (SRS). The initial report required from a ship entering the system should generally be limited to:

- ship's name;
- call sign;
- IMO identification number if applicable; and
- position.

The existing resolution is based on SOLAS regulation V/11, as follows:

*"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.*

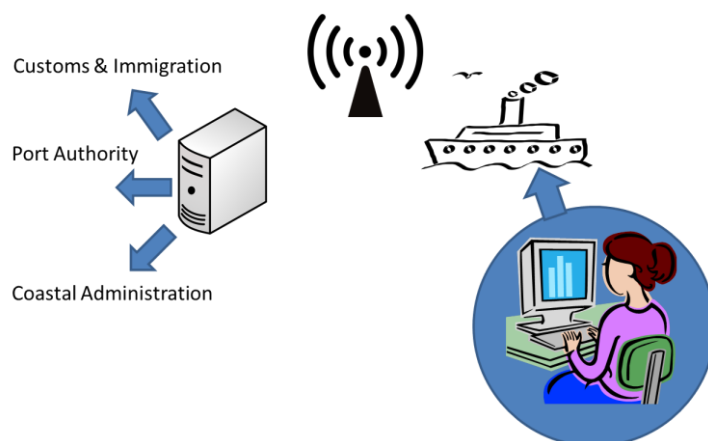
*The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ship reporting systems. Contracting Governments shall refer proposals for the adoption of ship reporting systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ship reporting system."*

Although the regulation refers to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment, resolution MSC.43(64) states that other supplementary information may also be requested in the initial report, if justified to ensure the effective operation of the ship (resolution MSC.43(64), annex, paragraph 2.2.1.4).

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 (resolution MSC.43(64), annex, paragraph 2.2.1.4).

A Vessel Shore Reporting (VSR) system normally includes a web solution and an onshore representative, or agency, for the vessel operator or owner. The agency acts on behalf of the master or owner and provides information to relevant authorities.

The VSR as envisaged by e-navigation solution 2 aims to reduce time-consuming paperwork onboard.



Information required to be transmitted as part of a mandatory SRS is generally transmitted to the VTS centre, or the relevant authority, via VHF voice communication. Some SRSs also accept reports transmitted through AIS, internet-based reporting systems, e-mail, fax, SATcom, mobile phone, or a combination of these communication means.



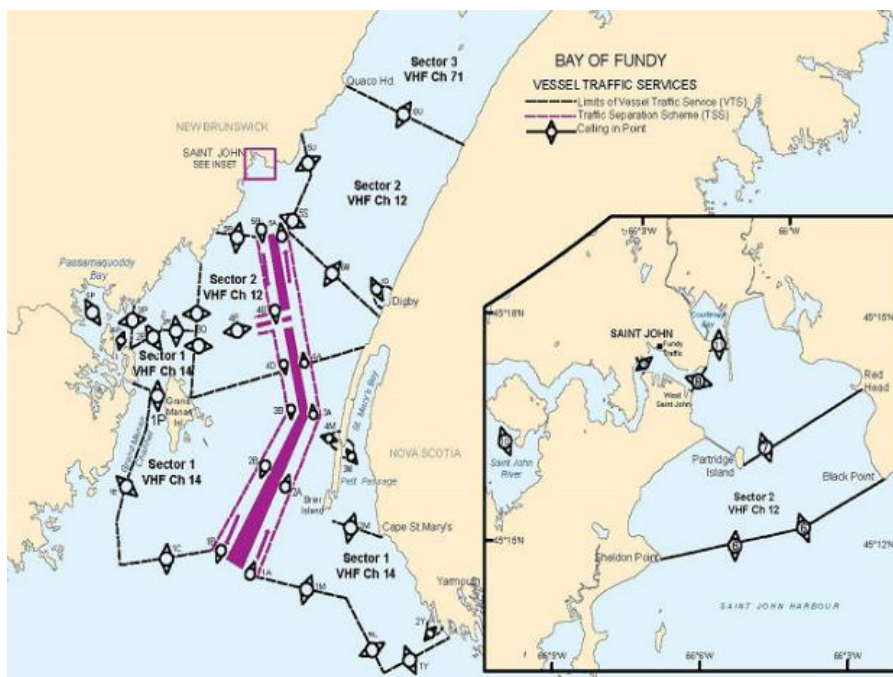


Figure [...]: Examples of reporting points from Bay of Fundy

## Purpose

The purpose of the vessel shore reporting service is to:

- secure submission and distribution of reports required by shore-based authorities in the harmonized standard and in the required timeframe;
- 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 real-time access to information to relevant stakeholders in a secure manner.

Resolution MSC.43(64) states that the objectives of SRS should be based upon:

*"the improvement of the safety of life at sea, the safety and efficiency of navigation and/or to increase the protection of the marine environment. They may or may not be operated as part of a vessel traffic service."*

As such, the VSR service contributes to the traffic situational awareness of a coastal administration either by being informed of vessels heading into its waters or the ones already in transit. Based on the information collected, a coastal administration can initiate an intervention plan, if required.

## Operational Approach

Electronic systems for ship reporting should use the same protocols and product specifications, in a Single Window solution, to send digital pre-arrival information such as the FAL forms and other regional/national requirements, as defined in SOLAS regulation V/11/2 for ship reporting systems. This will ensure a common harmonized platform for all ship reporting systems.

National competent authorities should provide information about reporting formalities and ensure that all information regarding reporting is easy to understand, accessible and even automated for the master or operator.

This service should provide ICT tools for shipboard and shore-based personnel to streamline the processes and procedures associated with the generation and distribution of required reports, including retrieval of information from other ship systems (Ballast Management, Waste Management System, Emission Control System, Navigation System, etc.) and from shore-based sources (cargo and passenger booking offices, crewing agents, stevedores, etc.).

Examples of information to provide can be:

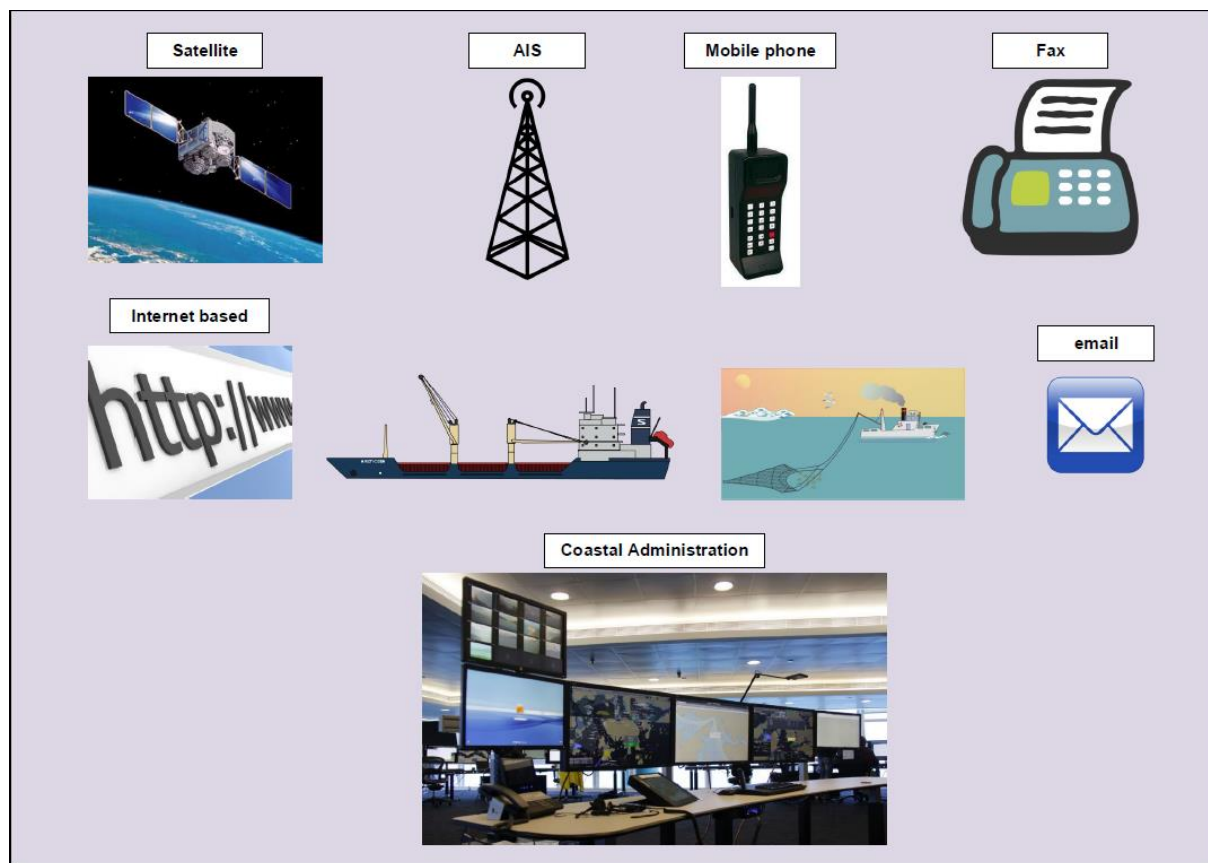
Information related to:	Examples
Reporting regulations	<ul style="list-style-type: none"><li>• What to report. The pre-arrival information may consist of ship particulars, arrival notice, crew and passenger lists, crew and passenger effects declarations, stores list, IMDG information, waste declaration, ship's certificates, ports of call list, dangerous cargo declaration and manifests, vaccination list, narcotic list, ship's money declaration, etc.</li><li>• When / What to report (e.g. 24h, 48h, 72h, 96h before arrival)</li><li>• To whom (e.g. immigrations, police, port master, etc.)</li></ul>
Reporting tools	<ul style="list-style-type: none"><li>• Web, App, etc.</li><li>• Communication</li><li>• Guidelines</li></ul>
Shore receivers And support	<ul style="list-style-type: none"><li>• Contact information</li><li>• Support information</li><li>• Information about local reporting aid / support such as coastal radio stations and agencies</li></ul>

The type of information required and reporting periods may differ from country to country and create some confusion on the ships' side, if the information requested is not clearly stated. Also, the reporting periods in some situations start as far in advance as 96h before a ship enters a coastal administration's waters. This may pose challenges with respect to the communication means available to provide the required information all along the transit.

Currently, the following communication systems are normally used to report information:

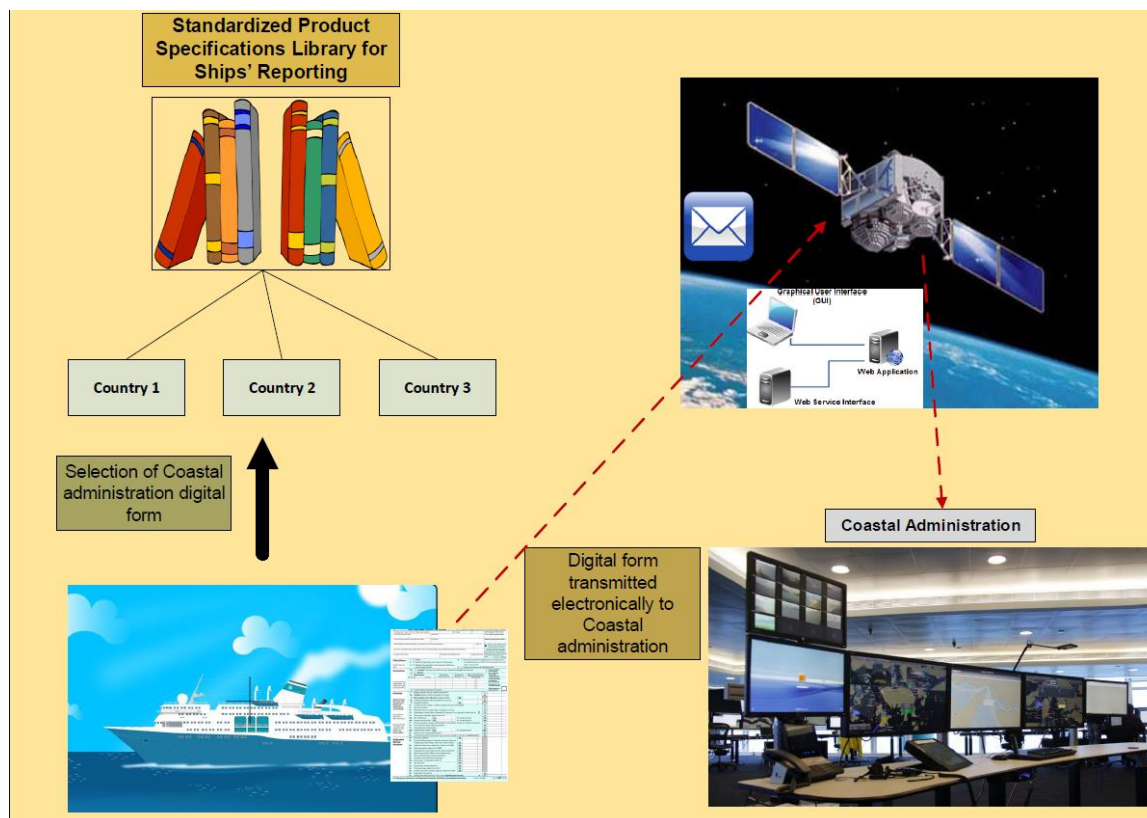
- AIS;
- internet-based reporting systems;
- e-mail;
- fax;
- SATCOM;
- mobile phone; or
- a combination of these systems.

As the scope, transmission capacity, and data format of each of these systems differ, the possibility of developing standardized protocols with their product specifications to automate the collection of data on-board and communicate it to shore-based authorities might constitute a real issue. There is a possibility of packaging the reporting information with a route exchange format (e.g. S-412), but the security of the means of communication would need to be carefully evaluated.



**Figure [...]: Example of current communication systems used to report information**

Some of these reporting systems are not using a digital format, which prevents provision of an automated service. The first step in an operational approach would be the use of a communication system capable of transmitting digital data. Secondly, and given reporting requirements differ among coastal States, a library containing information required by each administration should be developed which complies with the standardized product specifications principle. Specific requirements requested by an administration would be part of the form pertaining to this country.



**Figure [...]: Example of electronic communication systems using a standardized product specifications library**

Basic information such as the ship name, call sign, IMO number and MMSI, etc., can be automatically collected from the ship's AIS system and transmitted through terrestrial or satellite AIS.

### User needs

Ships' masters are facing considerable administrative burdens to comply with different mandatory Vessel Shore Reporting requirements and transmission of information. Different procedures, data formats, documentary requirements and formalities are applied depending on the country, ship reporting system or port of destination. One of the main challenges is that the ship has to communicate in different manners through different systems.

This, in turn, requires building and maintaining a library of required reports that are uniquely identified and characterized by their requirements for format, deadline, content, etc. The vessel reporting system also requires developing and maintaining an S-100 Product Specification for CMDs that can be used to generate all required reports in the library. Lastly, it requires that ships' systems that generate reporting information be certified to be compliant with an international machine-to-machine interface standard or ship network standards such as IEC 61162 series.

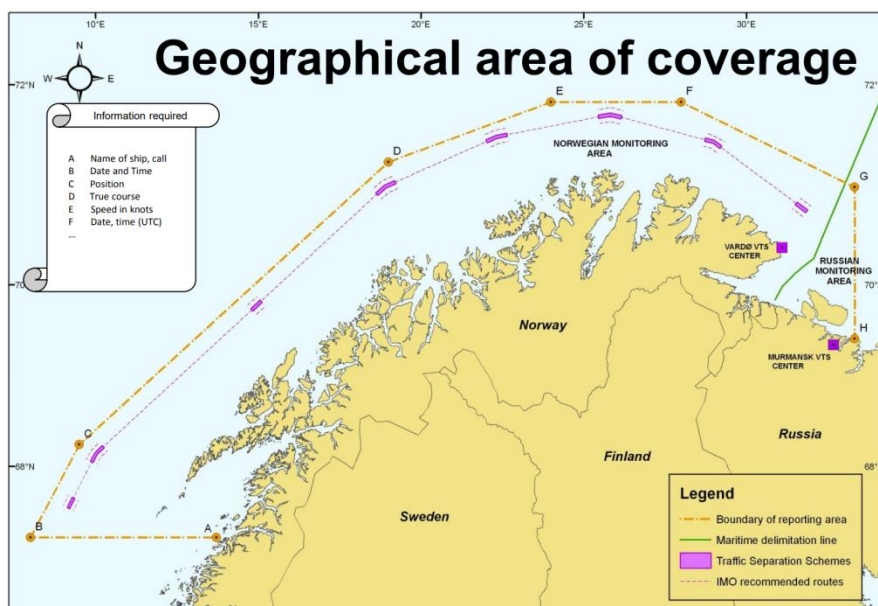


Figure XX: BAREP SRS between the Russian federation and Norway

### Information to be provided

See Annex 8, MS 8 Vessel Shore Reporting

### Associated technical services

To be capable of generating this information automatically and transmitting it automatically, a realistic operational implementation of the VSR service would require the involvement of both coastal administrations and shipowners. Coastal administrations would need to develop an international library of ship reports that are uniquely identified and characterized by their requirements for format, deadline, content, etc. This library would be part of the S 10x register and standardized product specifications (e.g. S-127 and S-421) would be developed and maintained in order to generate the required reports.

Name	ID (MRN)	Description	Architect(s)	Standardization Body
S-127 Maritime Traffic Management		Marine Traffic Management (MTM) datasets describe the availability and reliability of vessel traffic services, pilotage, routing measures, and ship reporting systems. This includes their service areas, services offered and instructions for contacting or utilizing these services.		IHO

S-421 Route Plan based on S-100		S-421 specifies the content, structure, and metadata needed for creating a fully S-100 compliant Route Plan Information and its portrayal within an S-100-based Application.		IEC
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### Relation with other Maritime Services

Digital information from the ship reporting system using common standards is beneficial for several stakeholders and actors involved.

In addition to authorities (e.g. border police, immigration, defence, coast guard, customs, etc.) claiming the information, the list below gives example of services that can benefit from access to ship reporting information.

Description	Examples of data that could be used from MS 10
MS 1 VTS IS	Type of vessel, nationality, MMSI, IMO no, contact information
MS2 VTS NAS	Draft, cargo
MS3 VTS TOS	ETA / ATA, ISPS information, purpose for arrival
MS4 Local Port Service	The majority of the information in a ship reporting system is useful and can be re-used an effective and transparent port operation
MS 5 Maritime Safety Information	Inform about changes to reporting requirements
MS 6 Pilotage Service	Ship reporting systems can exchange information with the pilot system. Easy access to information can be important for the pilot. A digital pilot requesting / booking system connected to the ship reporting system will increase efficiency.
MS 10 Maritime Assistance Service	Information about cargo, dangerous goods and persons onboard can reduce time before assistance and contribute to the allocation of the appropriate resources for the actual situation.
MS 11 Nautical Chart Service	Contain charted information about areas where reporting is required
MS 12 Nautical Publications Service	Contain detail information about reporting requirements, such as who must report, when reports are due, and to whom the reports must be submitted.
MS 13 Ice Navigation Service	Information from the ship reporting system can contribute to a more tailor-made and effective icebreaker service.
MS 16 Search and Rescue Service	Salvage information, drifting patterns, SAR areas, rescue capabilities in the area.



## MS 9 Telemedical Assistance Service (TMAS)

### Submitting Organization

### Description of the Maritime Service

According to [IMO/ILO resolution 164], the TMAS centre should be able to provide medical advice for seafarers 24h/day, 365 days/year. TMAS should be permanently staffed by physicians qualified in conducting remote consultations and who are well-versed in the particular nature of treatment on board ship.

Within maritime medicine, the prevailing view has been, for a long time, that a standardization of the TMAS services is both necessary and wanted. This would enhance the quality of the medical practice. A standardization of reporting and registering of medical events will also make a much better basis for advancement (MSC.1/Circ.1218 and MSC/Circ.960).

### Purpose

TMAS can be delivered in all sea areas, but differences in bandwidth, depending on available types of transmission techniques, will result in different levels of service.

Seafarers have some basic and limited training and skills in medical treatment. Sharing of digital information for diagnosis will increase the rate of appropriate treatment.

It is essential to provide seafarers with easy and fast access to a single point of contact with the TMAS centre, as well as to share the information between the TMAS centre and medically responsible personal onboard during treatment.

The purpose of TMAS is to give decision support and advice to the seafarer on board responsible for medical care whenever the provision of treatment cannot wait. This is today mostly done by voice communication using VHF, MF or short wave radio, or e-mail. In a future e-navigation scenario, the quality of remote diagnostics and even treatment can be expected to improve.

In addition to prevailing TMAS provisions, real time monitoring of the patient's current health status will be important. The parameters monitored may differ in different systems, but may include heart rate, blood oxygen saturation and pressure. As an example, see the telemetric medical information screen below.



Figure [...] An example of a typical telemetry screen: top (green) curve is heart rate (Beats Per Minute from two redundant connectors), below (in red) is Ambulatory Blood

Pressure (ABP) in mmHg, the third curve is Peripheral Capillary Oxygen Saturation (SPO<sub>2</sub>), then oxygen saturation of the blood (normal is 95-100 %), at the bottom of the screen are Noninvasive Blood Pressure (NBP) and the patient's temperature in degrees Celsius.

Further needs might involve real-time video chat between the remote specialist doctor and the patient, as well as examinations with remotely controlled cameras. In addition, extensive, detailed, cardiovascular (heart) data for a period of time should be able to be collected and sent as compressed files for further monitoring by the specialist doctor.

### **Operational approach**

It could be envisioned that, in the not too distant future, what today is very expensive medical equipment could be installed on some type of ships, e.g. large cruise vessels. Examples of such equipment could be ultrasonography, computer tomography (CT) and surgical operation robots. Such equipment will then be remotely operated from land given reliable radio connections.

Diagnostic ultrasonography is used to see internal body structures such as tendons, muscles, joints, vessels and internal organs. Its aim is often to find a source of a disease or to exclude any pathology. The practice of examining pregnant women using ultrasound is called obstetric ultrasound, and is widely used.

The European Space Agency has already tested a long-distance robotic ultrasound system for remote operation by distant specialists. An assistant on board simply holds the device against the patient and the ultrasound expert can move the probe as if present in the examination room, rather than thousands of kilometres away. They control the device in real time using a joystick, based on ultrasound imagery relayed back.

Computed tomography, more commonly known as a CT or CAT scan, is a diagnostic medical test that, like traditional x-rays, produces multiple images or pictures of the inside of the body.

Remote surgery (also known as tele-surgery) allows the surgeon to remotely perform surgery either using direct tele-manipulator or through computer control. The surgeon does not have to be present, but can be anywhere in the world, leading to the possibility for remote surgery.

### **User needs**

Today

A digital health emergency monitoring system allowing logged text interchange between a ship and medical specialist at a shore hospital including:

- voice communication not only with the medical officer onboard, but also with the patient in the medical bay;
- real-time video for visual examination by the remote specialists using video;
- real-time transmission at length of medical telemetry;
- transmission of compressed data packages of e.g. EEG data; and
- up-to-date digital georeferenced lists of available telemedical assistance services that can be offered by a coastal state. Comparison of TMAS with ship capabilities would facilitate the request of the most adapted service to respond to the situation on board.

In the future (examples)



- transmission of data and remote control of ultrasonography;
- transmission of data and remote control of computer tomography and the like imaging techniques; and
- transmission of data and remote control of robotic surgery.

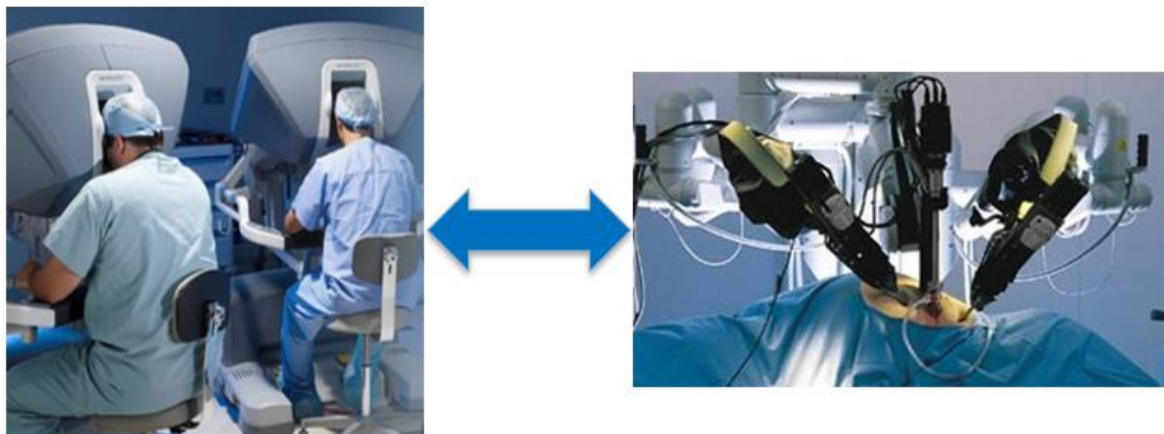


Figure [...]: Remote control of robotic surgery exist onshore already

### Information to be provided

See Annex 9, MS 9 Telemedical Assistance Service

### Associated technical services

Name	ID (MRN)	Description	Architect(s)	Standardisation Body

### Relation with other digital maritime services

Description	Examples of data that could be used from MS 9
MS 1 VTS IS	Communication with ship
MS 12 Nautical Publications Service	Provide up to date information on radio station and earth stations offering TMAS.
MS 16 Search and Rescue Service	Medical information and constraints for SAR procedures.

## **MS 10 Maritime Assistance Service (MAS)**

### **Submitting Organization**

### **Description of the Maritime Service**

IMO resolution A.950(23) on Maritime Assistance Services (MAS) specifies that the circumstances of a ship's operation that involve a MAS are not those requiring rescue of persons. Three situations can arise:

- the ship is involved in an incident (e.g., loss of cargo, accidental discharge of oil, etc.) that does not impair its seakeeping ability but nevertheless has to be reported;
- the ship, according to its master's assessment, is in need of assistance but not in a distress situation (about to sink, fire developing, etc.) that requires the rescue of those on board; and
- the ship is found to be in a distress situation and those on board have already been rescued, with the possible exception of those who have remained aboard or have been placed on board to attempt to deal with the ship's situation.

However, if in an evolving situation, the persons on board find themselves in distress, the involvement of the MRCC and not the MAS will have priority. As such, the MAS is responsible only for receiving and transmitting communications and monitoring the situation.

The establishment of a MAS should not necessarily entail the setting up of a new organization. The functions of the MAS could, at the discretion of the Administration, be discharged by an existing organization, preferably an MRCC, or alternatively a harbour master's office, a coast guard operations centre (if one exists) or another body.

Coastal States are requested to notify IMO of the existence and details (call numbers, call signs, etc.) of their MAS, in accordance with the predetermined format (Resolution A.950(23), annex 2, appendix). Information on MAS is periodically updated in the Global Integrated Shipping Information System (GISIS), maintained by IMO. National organizations that disseminate nautical information are invited to publish such particulars.

### **Purpose**

The primary mission of the MAS is to manage communications between the coastal State, ship's officers requiring assistance, and other responsible maritime organizations: fleet owners, salvage companies, port authorities, brokers, etc. As an intermediary, the main purposes of the MAS are:

- receiving the reports, consultations and notifications required by the IMO instruments referred to in resolution A.950(23), annex;
- monitoring the ship situation if a report, as referred above, discloses an incident that may cause the ship to be in need of assistance;
- serving as the point of contact between the master and the coastal State concerned, if the ship's situation requires exchanges of information between the ship and the coastal state but is not a distress situation that could lead to a search and rescue operation; and
- serving as the point of contact between those involved in a marine salvage operation undertaken by private facilities at the request of parties having a

legitimate interest in the ship and the coastal state, if the coastal state concerned decides that it should monitor all phases of the operation.

### **Operational Approach**

Resolution A.950(23) indicates that a MAS should be operational on a 24-hour basis and that it should be possible for the English language to be used in exchanges between a ship in need of assistance and a MAS. Also, MASs should be authorized by their respective governments to exchange information concerning reports received and situations involving ships which may be in need of assistance with each other.

According to [resolution A.949(23)], the most common events requiring MAS are:

- fire;
- explosion;
- damage to the ship, including mechanical and/or structural failure;
- collision;
- pollution;
- impaired vessel stability; and
- grounding.

Development of scenarios including their potential consequences with regard to safety of persons and pollution, fire, toxic and explosion risks.

The development of a database containing the key services contact information and availability of their respective resources would help move towards the digitalization of the MAS. Also, the use of templates listing the types of incidents that commonly occurring and their level of severity could facilitate ship – shore based communication. The exchange of information on key services, their contact details, capabilities and geographic service areas could be developed as an S-100-based product specification. On the ship side, digital nautical publications in the S-12x-series of product specifications, such as S-123 (Marine Radio Service), could contain MAS information.

Figure [...] illustrates briefly the different functions of a MAS.

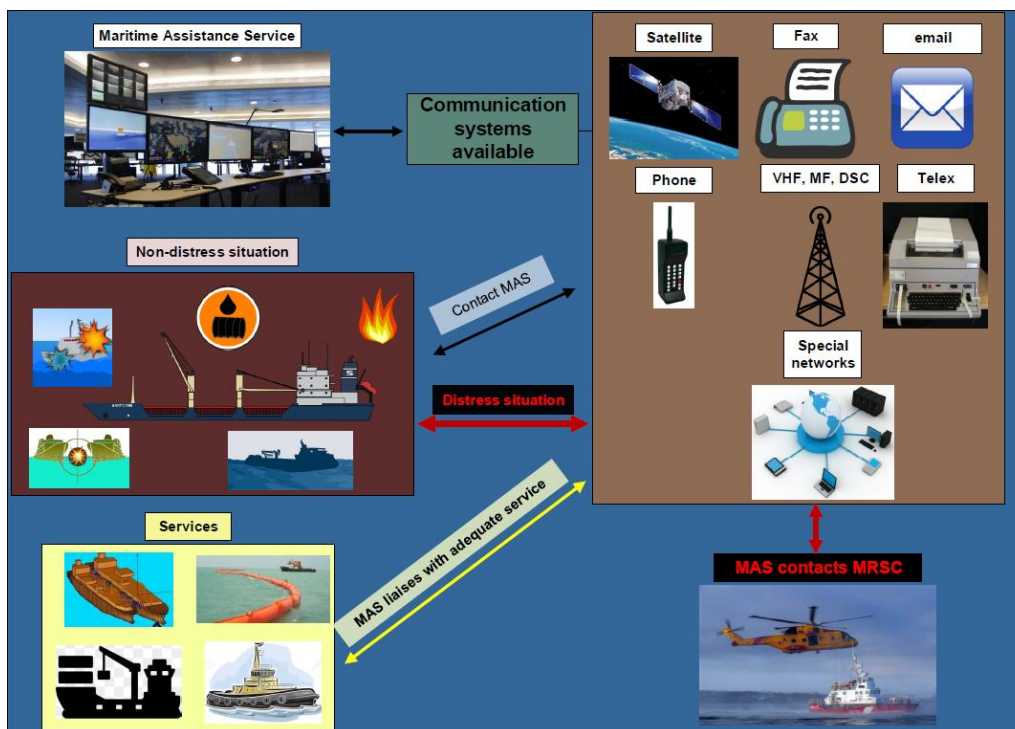


Figure [...]: Illustration of some functions provided by a MAS

### User needs

Information related to:	Examples
General information	<ul style="list-style-type: none"> <li>• competent MAS</li> <li>• roles and responsibilities of authorities and responders (fire fighting capability)</li> <li>• Responsible SAR coordination centre</li> <li>• Contact information to MRCC / operator</li> <li>• Ongoing operations in an area</li> </ul>
MAS information	<ul style="list-style-type: none"> <li>• MAS geographical coordinates, contact information, capacity, etc.</li> <li>• Information about available resources for lightering</li> <li>• Information about available resources for pollution combating and recovery</li> <li>• Information about available resources for towage</li> <li>• Information about available resources for stowage</li> <li>• Information about available resources for salvage</li> <li>• Information about available resources for storage.</li> <li>• Contingency planning</li> <li>• Evacuation facilities</li> <li>• Type of operation</li> <li>• What and when</li> <li>• Vessels involved</li> <li>• Communication</li> </ul>

Table [...]: Examples of types of information provision that MAS can cover

In some of these situations, the ship's assistance may require the designation of a place of refuge in order to limit the navigational impacts, protect the environment or facilitate repairing the ship. In that case, an assessment of risks related to the identified event should be done taking into account:

- .1 environmental and social factors, such as:
  - .1 safety of those on board;
  - .2 threat to public safety;
  - .3 pollution caused by the ship;
  - .4 sensitive habitats and species; and
  - .5 facilities available; and
  
- .2 natural conditions, such as:
  - .1 prevailing winds and sea conditions;
  - .2 tides and tidal currents; and
  - .3 bathymetry.

**Information to be provided**

See Annex 10, MS 10 Maritime Assistance Service

**Associated technical services**

Regarding communication facilities, resolution A.950(23) recommends the use of COMSAR/Circ.18, Guidance on minimum communication needs of maritime rescue co-ordination centres (MRCCs), as a basis. This circular identifies the following communication systems, such as:

- telephone links;
- fax links;
- telex link;
- VHF and MF with DSC;
- ordinary VHF;
- special networks - examine the possibility of linking with existing networks (Administration, armed forces telephone networks), in particular the aeronautical fixed telecommunication network (AFTN), which provides a link with the aeronautical rescue organization; and
- Inmarsat-C ship earth station or other satellite service providers.

S-123 (Marine Radio Service) data products contain contact details for MRCCs.

Name	ID (MRN)	Description	Architect(s)	Standardisation Body

**Relation with other the Maritime Services**

Description	Examples of data that could be used in MS 10
MS 1 VTS IS	Local sensor information such as CCTV, Radar, AIS. Regulations. Other traffic.
MS 2 VTS NAS	Exchange of routes, directions, navigation advices and assistance
MS3 VTS TOS	Information regarding regulations and other traffic
MS 4 Local Port Service	Port availability and anchorage are in the port, services related to the MAS situation
MS 5 Maritime Safety Information	All information depending on the structure of MSI
MS 6 Pilotage Service	Contact information for pilotage, pilot assistance, pilot request
MS 7 Tug Service	Tug capacity, contact information, tug order and updates
MS 8 Vessel Shore reporting	Information about the reporting formalities, local regulations, contact information, notification about dangerous cargo, number of persons onboard, arrival and departure information etc.
MS 9 Telemedical	Contact Information
MS 11 Nautical Chart Service	Local area updates, chart updates, Notice to Mariners
MS 12. Nautical Publications Service	Tidal tables, Notice to Mariners, List of Lights, information updates to publications
MS 13 Ice Navigation Service	Ice routes, ice conditions, ice breaking assistance
MS 14 Meteorological Service	Weather information, visibility, wave information
MS 15 Real Time Hydro and Information Service	Horizontal and vertical tidal information in an area, real time current, real time wave form sensors in an area
MS 16 Search and Rescue Service	Search and Rescue contact information, SAR capacity. SAR areas of operations.

## **MS 16 Search and Rescue (SAR) Service**

### **Submitting Organization**

### **Description of the Maritime Service**

The International Convention on Maritime Search and Rescue, 1979 (SAR Convention) was aimed at developing an international SAR plan to ensure that everywhere in the world, the rescue of persons in distress at sea would be co-ordinated by a responsible SAR organization or by co-operation between neighbouring SAR organizations.

Following the adoption of the 1979 SAR Convention, IMO's Maritime Safety Committee divided the world's oceans into thirteen search and rescue areas, with provisional SAR plans in place for each of these areas. In each area, the countries concerned have search and rescue regions for which they are responsible.

Parties to the Convention must ensure that arrangements are made for the provision of adequate SAR services in their coastal waters. Parties are encouraged to enter into SAR agreements with neighbouring states involving the establishment of SAR regions, the pooling of facilities, establishment of common procedures, training and liaison visits. The Convention also states that Parties should take measures to expedite entry into its territorial waters of rescue units from other Parties.

The Convention then goes on to establish preparatory measures which should be taken, including the establishment of Rescue Co-ordination Centres (RCCs) and Sub-Centres. It establishes a common glossary to be used by all Parties and outlines operating procedures to be followed in the event of emergencies/alerts and during SAR operations. This includes the designation of an on-scene commander and their duties.

The IMO and International Civil Aviation Organization (ICAO) jointly publish the three-volume IAMSAR Manual. This manual provides international guidelines for a common aviation and maritime approach to organizing and providing SAR services. The three volumes are divided as follows:

- Volume 1, *Organization and Management*;
- Volume 2, *Mission Co-ordination*; and
- Volume 3, *Mobile Facilities*.

### **Purpose**

The RCC responsible for the Search and Rescue Region (SRR) is the primary contact in a SAR incident and ultimately responsible for incident management and decision-making.

In maintaining a state of full readiness, the service is responsible for a number of search and rescue functions, including:

- detection and coordination of maritime incidents; and
- control and conduct of maritime search and rescue operations.

These functions may include activities such as:

- assisting the crew and passengers of vessels in distress;
- assisting victims of maritime and aircraft accidents or incidents;

- coordinating the medical evaluation of seriously injured or ill persons from a vessel at sea, and their subsequent evacuation, if deemed necessary, to a suitable medical facility;
- monitoring towing operations;
- monitoring and evaluating levels of risk from Maritime Safety Information (MSI) broadcasts to ensure an immediate response to potential life threatening situations;
- monitoring vessels not under command;
- monitoring pollution reports and vessels aground;
- assisting other emergency response organizations when they require additional resources to prevent loss of life; and
- liaising with other organizations assisting with search and rescue operations information collection, distribution, and coordination.

### **Operational approach**

Time, resources and effective communication will always be challenges when it comes to search and rescue cases involving human lives. Effective use of time and allocation of rescue resources to the person(s) in distress are of primary importance.

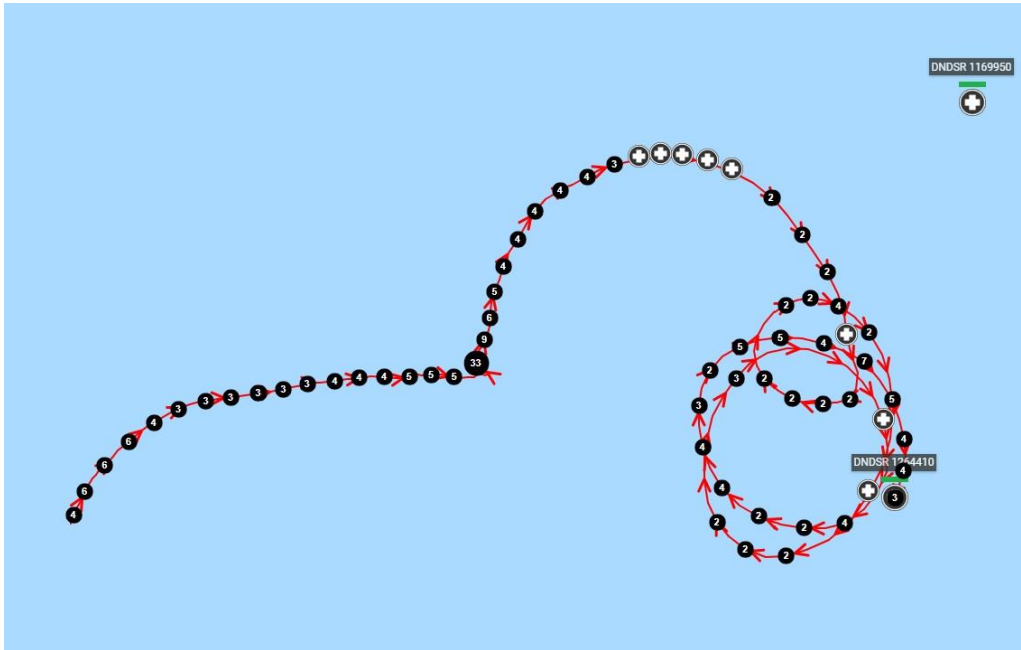
Several actors are normally involved in a SAR operation. Manual exchange of information can be easily misunderstood in the form of wrong positions, SAR areas and other significant search information, and even a short delay can be the difference between life and death. Lack of language skills has been identified as a major challenge in SAR communications.

Digital exchange and sharing of information could significantly reduce the human errors in SAR case prosecution and also result in huge time savings by allowing RCCs more timely access to accurate and relevant information.

Examples of information for SAR coordination communications that could be shared electronically to mitigate these challenges include:

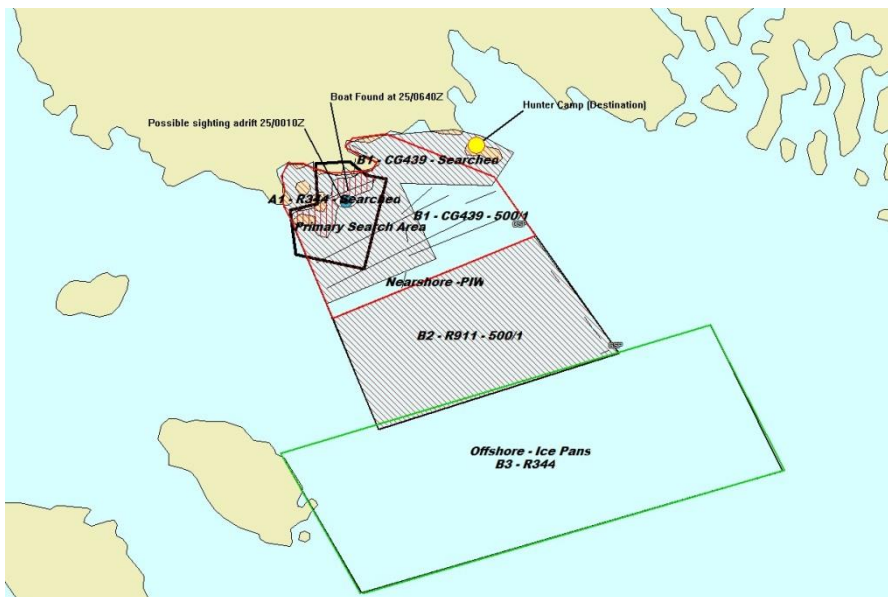
- last known position (LKP);
- search areas;
- search patterns;
- search resources;
- drift predictions;
- last known position (LKP);
- datum;
- radio frequencies;
- NOTSHIPs;
- known routing and planning information for search object (in the case of overdue aircraft or vessels);
- EPIRB hex codes and associated information;
- SLDMB information;
- satellite imaging;
- live stream and images from search resources;
- images of search objects;
- images of search area; and
- SAR Briefing Report (with information for vessels engaged in search).





Credit photo: JRCC Halifax

Figure [...]: Simulation of drift prediction



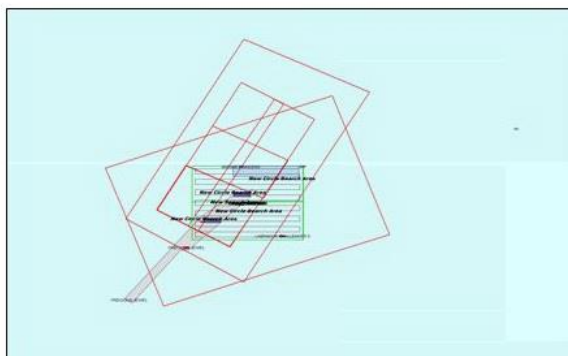
Credit photo: JRCC Halifax

Figure [...]: Illustration of search areas and additional information that may be used during a SAR operation

## SAR BRIEFING REPORT

### Vessel Name

General	
SAR	Man overboard
SITUATION	Man Overboard
DATE	01 Sep 2015
TIME	07:56
INCIDENT#	C2018-00302
LOCATION	118' ExN of Cape Bauld
N	52°17.30'N
W	052°29.5'W
CALL SIGN	n/a
POB	0



**Nature of distress** ManOverboard

**Tasking** SRU Name: Vessel Name, Sortie #: 425891,

**Description** Person in the water, crew member from the FV Precious Jewel

**Other Info** 32 YOM, no floatation

**Medical Info**

**On Scene Comd** Alfred Needler

**POBs** John Doe ( Age: 33, Gender: Male )

Proceed search area made up of points 52 17.8N 052 32.4W, 52 29.8N 052 20.7W, 52 30.3N 052 21.9W, 52 18.3N 052 33.6W. CSP will be 52 17.8N 052 32.4W head NW @ 030T for 14nm then reverse track with 1/4nm track spacing

Credit photo: JRCC Halifax

### Figure [...]: Illustration of a SAR Briefing Report

The RCC could then deliver this important information about the SAR situation to a graphical display shared with the on-scene commander, search resources and all partners involved, improving communications and increasing situational awareness for everyone. This would make it easier for all units to get current information on the search operation underway.

Information from several services assist the SAR Coordinators in making timely decisions and appropriate use of resources. Some examples would include:

- vessel information such as position, course and speed;
- medical and firefighting capabilities of nearby resources;
- other emergency organizations in the area and their rescue capabilities;
- meteorological information (including tides and currents, ice information);
- Maritime Safety Information; and
- ship reporting information such as persons on board, capacity, cargo information.

## User needs

Coordination, communication and effective exchange of information are important elements of the SAR service. The coordinating RCC must be able to share and receive information quickly and easily with a number of different resources:

- other RCCs;
- vessels assisting in search and transiting search area;
- VTS services;
- ground search and rescue;
- search target;
- other emergency organizations (for example, police, fire, ambulance); and
- port authorities.

Information related to:	Examples
General information	<ul style="list-style-type: none"> <li>• Responsible RCC</li> <li>• Other emergency organizations assisting</li> </ul>
SAR information	<ul style="list-style-type: none"> <li>• Type of operation</li> <li>• What and when</li> <li>• Last Known Position</li> <li>• Drift plot</li> <li>• Number persons missing/in distress</li> <li>• Dangers such as dangerous substances</li> <li>• In raft, lifeboat, persons in water etc.</li> <li>• Datum</li> <li>• SAR area</li> <li>• SAR resources in area</li> <li>• Vessels of opportunity within and near search area</li> <li>• Vessels and aircraft involved in search</li> <li>• Search areas assigned and completed</li> <li>• on-scene commander</li> <li>• Communication</li> <li>• Meteorological information</li> </ul>
Assistance	<ul style="list-style-type: none"> <li>• Position of vessels or stations assisting</li> <li>• Towing vessels available and positions</li> <li>• Capacity, Bollard pull (BP),</li> <li>• Other salvage and oil recovery capacities</li> <li>• Response time</li> <li>• Connection information</li> <li>• Intended route / towing plan</li> <li>• speed limits</li> <li>• maneuvering limits</li> <li>• Communication</li> </ul>

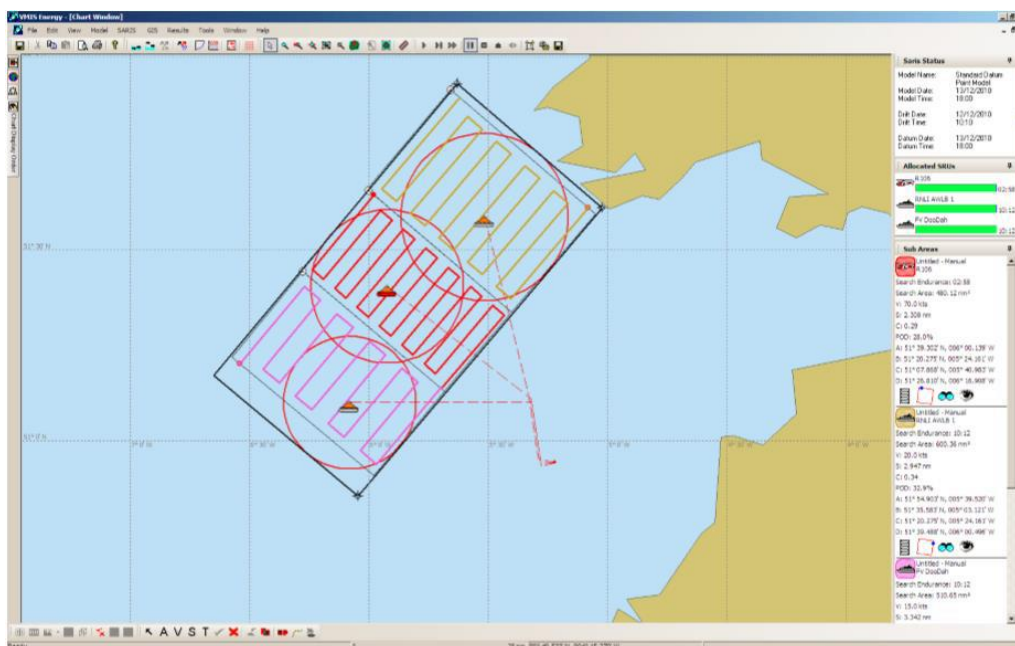


Figure [...]: Example of common sharing of digital search and rescue information

### Information to be provided

See Annex 16, MS 16 Search and Rescue Service.

### Associated technical services

Name	ID (MRN)	Description	Architect(s)	Standardisation Body

### Relation with other digital maritime services

Description	Examples of data that could be used in MS 16
MS 1 VTS IS	Information on VTS areas, places of refuge, vessel traffic in the area, vessel identification information (type of vessel, nationality, MMSI, IMO number, contact information), information from sensors (meteorological, hydrographical, visibility, etc.), radar, AIS, CCTV, communication with ship
MS2 VTS NAS	Information about vessels undertaking NAS, exchange of routes, navigation advice and assistance
MS3 VTS TOS	Traffic clearance information, time slots, ETAs, route advisories
MS4 Local Port Service	Port availability and anchorage areas, berthing information, cargo operations, security, supply, available assistance, port contact information
MS 5 Maritime Safety Information	Warnings, no-go areas, diving operations, exercises

MS 6 Pilotage Service	Pilot boarding stations, Pilot vessel positions and orders, contact information, request procedures
MS 7 Tug service	Tug operations, available tug capacity
MS 8 Vessel Shore reporting	ETAs, Notification of arrival, vessel information, cargo information, number of persons on board
MS 9 Telemedical	Local address of medical centres and communication and capacity, medical advice
MS 10 Maritime Assistance Service	Contact information, places of refuge, routing, information about vessels requesting relevant MAS, incidents , notifications
MS 11 Nautical Chart Service	Local area updates, chart updates, notice to mariners
MS 12 Nautical Publications Service	Local descriptions and publications, digital information from nautical publications relevant for the operation
MS 13 Ice Navigation Service	Ice forecast, ice chart, ice conditions, information regarding icebreaker service / assistance, ice routes
MS 14 Meteorological Service	Weather in SAR area
MS 15 Real Time Hydro and Information Service	Tidal and current information in SAR area, all information from real time sensors

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