HGDM2 report and related tasks

Submitted by:	NIPWG Chair
Related Documents:	??????????????
Related Projects:	IMO E-navigation,

Introduction/Background

The second meeting of the IMO/IHO Harmonization Group on Data Modelling (the Group) was held at IMO Headquarters in London, from 29 October to 2 November 2018, chaired by Mr. Sunbae Hong (Republic of Korea).

The Group was attended by delegations from 14 Member States and from 9 intergovernmental and non-governmental organisations.

Based on the E-navigation strategy implementation plan (SIP), IMO defined a set of 16 different Maritime Services. Stakeholders were invited to provide descriptions of Maritime Services under their remit. Each description should be based on a template which was developed during the first HGDM meeting. Maritime Services relevant for IHO are:

MS 5 (Maritime Safety Information Service (MSI)),
MS 11 (Nautical Chart Service),
MS 12 (Nautical Publications Service),
MS 15 (Real-time hydrographic and environmental information Service).

The description of each maritime service was the focus of this meeting.

Analysis / Discussion

The group reviewed the submitted document for relevance.

The Group considered an IHMA document providing comments on the high-level terminology currently used in the draft guidance on the definition and harmonization of the format and structure of maritime services within a Maritime Service Portfolio (the draft Guidance), in particular regarding the use of the terms “Maritime Services” and “Local Port Services”.

During the consideration, while expressing some sympathy to the proposals, the view was expressed that it would be difficult to change the terms proposed as these had already been agreed as part of the E-navigation strategy implementation plan – update 1 (MSC.1/Circ.1595) and thus, changing the title of “Local Port Services” would also require updating the e-navigation strategy implementation plan (SIP). On the other hand, it was recognized that certain flexibility should be given to the domain coordinating bodies to address these kind of issues and that the issues raised by IHMA could be further elaborated or explained under the description of the corresponding maritime service.

It was decided not to further consider the IHMA proposal and to refer the issue to NCSR6 for consideration. In addition, IHMA was invited to provide a description of maritime service “Local Port Services” to NCSR 6, together with any concerns regarding the use of these terms.

Later during the meeting, the Group noted that IHMA would be submitting a description on MS 4 (Local Port Service (LPS)) to NCSR 6, including a proposal and justification to rename this MS. In this context, the observer from IALA supported the change of the name of MS 4 as the term “LPS” was in use already for other applications and could create confusion. IALA recommended using instead “Local Port Logistics”.

The group considered the best structure of MSC documents and decided to propose following structure:

1. a draft MSC resolution containing the draft Guidance, including the template for the submission of maritime services (see Annex A) and a description for the harmonized specification of technical services (see Annex B), and inviting Member States and international organizations acting as domain coordinating bodies to submit descriptions of maritime services to the Organization; and

2. a draft MSC circular consolidating the descriptions of maritime services, which could be re-issued, as revised versions, when maritime services were added or updated.

The Group agreed to rename the title of the draft Guidance to "guidance on the definition and harmonization of the format and structure of maritime services", excluding the reference to "maritime service portfolio".

The Group discussed whether the HGDM should be maintained as a permanent group for the consideration of maritime services descriptions and if a continuous output would be required. It was agreed to recommend that descriptions of maritime services could be submitted to the NCSR Sub-Committee for consideration under either a revised output referring to the "Consideration of descriptions of maritime services" or under "Any other business". Based on the required to be conducted, NCSR could then decide how to address the required work (e.g. by the Sub-Committee itself or one of the Working Groups, or by reactivating the HGDM).

The group considered the submitted Maritime Services descriptions. It was expressed during the reviewing process that

1. the draft descriptions of maritime services submitted to this Group were not final descriptions and would require further development.
2. the Group should not modify the descriptions submitted by domain coordinating bodies, but rather raise any concerns regarding harmonization and provide recommendations and advice for further developments.
3. it was necessary to undertake a high-level editorial review to ensure consistency with IMO style and use of correct terminology;
4. additional guidance on how to complete the template was required;
5. descriptions of maritime services should be finalized before publishing a MSC circular; and
6. available descriptions of maritime services should be consolidated and published under a MSC circular, which could be subsequently revised, as and when necessary.

After the initial general consideration, the Group agreed to proceed with the high-level review of maritime descriptions with the view of preparing a draft MSC circular containing the descriptions of maritime services.
The Group also agreed that the cover of the MSC circular should clearly indicate that these descriptions of maritime services were preliminary drafts which would be periodically updated taking into account developments and related work on harmonization.

Based on the information provided, the Group reviewed the descriptions of all submitted maritime services. Relevant for IHO were:

MS 5 (Maritime Safety Information Service (MSI)),
MS 11 (Nautical Chart Service),
MS 12 (Nautical Publications Service),
MS 15 (Real-time hydrographic and environmental information Service).

The Group noted that MS 15 (Real-time hydrographic and environmental information Service) was divided into two sub-services. It was noted that this was necessary in order to make a clear distinction between "Water level information for navigation" and "Surface water currents for navigation".

As part of the general comments regarding the descriptions, the Group invited domain coordinating bodies and Member States involved in the preparation of maritime service descriptions:

1. when defining the associated technical services, to ensure that only MRNs that had been accepted as a global harmonized solution were included;
2. to complete as much as possible all sections of the template;

3. to take into account that the section “information to be provided” was not about “how” the information should be provided, but rather to describe “what” information should be provided; and
4. to take into account the comments of the Group for future works on the maritime services descriptions.

Given the need for a continuous review process of maritime service descriptions and the harmonization of related services, the Group invited NCSR to consider the following options for the consideration of descriptions of maritime services in the future:

1. rename the existing output for the development of Guidance to “Consideration of descriptions of maritime services”; or
2. consider the descriptions of maritime services, and relevant updates, submitted by domain coordinating bodies and Member States

Justification and Impacts

The description of Maritime Services is part of the IMO E-navigation strategy implementation plan (SIP). Some Maritime Services under IHO remit. Apart from the necessary work to provide sufficient Maritime Services descriptions, the future provision of IHO services should consider whether an update of a Maritime Service description is necessary.

Conclusions and Recommended Actions

The descriptions of Maritime Services under IHO remit have been reviewed by the HGDM2 meeting. It was detected that some descriptions need further work.

This work should be completed by the responsible IHO WGs to be able to submit revised descriptions to NCSR7 for consideration. Red line versions presenting the outcome of HGDM2 review have been annexed for convenience.

Maritime Service	**Responsible IHO WG/WGs**	**Annex**
MS 5 (Maritime Safety Information Service (MSI))	WWNWS-SC	C
MS 11 (Nautical Chart Service)	NCWG, ENCWG	D
MS 12 (Nautical Publications Service)	NIPWG	E
MS 15 (Real-time hydrographic and environmental information Service)	TWCWG	F

Action Required of HSSC

HSSC11 is invited to:

1. take note of the paper,
2. assign the maintenance of the Maritime Service (MS) description to the responsible HSSC WGs and the WWNWS-SC,
3. set the deadline for providing MS description to August 2019
4. assign the coordination of the IHO submissions to NCSR to NIPWG, and
5. introduce a permanent agenda item on Maritime Services to each HSSC meeting.

Template for descriptions of Maritime Services

This template should be used to describe the maritime services. Descriptions of maritime services provided to IMO using this template will enable IMO to exercise leadership and overarching oversight and to provide a globally harmonized list of maritime services.
To ensure a standardized approach in the development and implementation of maritime services, the content should include a general description of the operational services, and a reference to associated technical services that will enable the exchange of information in digital format.

1. Title of the maritime service (Maritime Service number)

2. Submitting Organization

3. Coordinating Body

4. Description of the maritime service

Stating the exact nature and scope of the maritime service in accordance, if applicable, with existing IMO instruments. Additional details might be added for clarity as required.

5. Purpose

What is the purpose of the maritime service?
What value does it bring to its intended stakeholders?
Is the maritime service compliant with regulatory requirements, if applicable?
In the case that the maritime service covers existing services, a description of the steps required to transition from analogue to digital information promulgation must be included.

6. Operational approach

How is the purpose of the maritime service achieved, taking into account existing guidance of the Organization and other international bodies?

7. User needs

Describe the user needs the maritime service addresses. In so doing make reference to any relevant IMO instruments and, where applicable, include one or more use cases.

8. Information to be provided

List the information elements the maritime service provides. The information elements will be the starting point for data modelling, as part of the technical services to access, promulgate or exchange the information.

9. Associated technical services

Using the table below list existing or potential technical services associated with this maritime service.

Name	**ID (MRN) ***	**Description** ***(incl. measure for quality assurance‡)***	**Standardization body**

10. Relation to other maritime services

Describe any relationships between this and other maritime services such as interdependencies or areas of overlap. This section should clarify the nature of interdependencies, overlaps and provide recommendations for their resolution.

* Maritime Resource Name (MRN); see http://mrnregistry.org

‡ MSC.1/Circ.1512 on Guideline on Software Quality Assurance and Human-Centred Design for e-navigation

Description for the harmonized specification of technical services in the context of e-navigation

1 Maritime Services are implemented by a set of Technical Services. For harmonization, the Maritime Services are described by using a common template, as set out in appendix 1. This template includes references to technical services

2 The specifications are split into three parts:

- a service specification;
- a service design description; and
- a service instance description.

3 The technical service specification covers the technical/digital service on a general level to implement the maritime services. The service specification is still technology-agnostic. The service specification should include the following information:

- MRN ID for the service specification;
- reference to the Maritime Services which make usage of the Technical Services;
- the operational context of the service in (e.g. requirements, use cases);
- the service interface descriptions (operations, parameters);
- the information provided and used by the service (the service data model);
- the dynamic behaviour of the service (sequence of operations, behaviour description); and
- author of the service specification (organization, contact person).

4 A technical service specification will have one or several associated (technical) service design descriptions. Each technical design describes how the service is implemented using specific technologies. Service design descriptions should include the following information:

- MRN ID for the service design description;
- reference to the service specification;
- description of the chosen technologies (data processing, communication technologies, infrastructure, networks, etc.);
- detailed description of the used data structures and types (service physical data model, encoding);
- mapping of the used data structures to the service specification's service data model; and
- author of the technical design (organization, contact person).

5 A technical service design will have one or several associated technical service instance descriptions. Each instance description is a reference (endpoint) to a specific service provider for this specific service following the specific design description. The instance description also contains additional information such as coverage area for the service providers' instance of the service. A service instance includes the following information:

- MRN ID for the service instance description;
- reference to the service technical design (and thus, implicitly, to the service specification);
- information about service provider;
- access/information (e.g. URL, frequencies etc.); and
- geographical coverage information.

6 The relationship between the different levels of service descriptions are shown in this example for a VTS service:

Maritime Service	**Technical Service specification**	**Technical service design description**	**Technical service instance description**
VTS service	Inter VTS information exchange	Web service using REST	Provided by Sound VTS
			Provided by Helsinki VTS
		Web service using SOAP	Provided by Zandvliet VTS
		Other technical design for VTS information exchange	Another instance of that design provided by someone somewhere
	Route exchange ship to shore	Some technical design	Some instance
		Another design	Another instance
	Another technical VTS service	…	…
Another Maritime Service	…	…	…
…	…	…	...

7. In order to achieve a harmonized use of technical services, it is recommended to use guidelines developed by the domain coordinating bodies[1], if available.

[1] E.g. IALA Guideline G1128.

Annex C

MS 5 - Maritime Safety Information (MSI) Service ~~(MSP/DMS 5)~~

5.1 Submitting Organization

IHO and WMO. ~~World-Wide Navigational Warning Service Sub Committee & WMO World-Wide Met-Ocean Information and Warning Service Committee~~

5.2 Coodinating Body

IHO and WMO

5.3 Description of the Maritime Service

The MSI Service describes the provision of navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships. The MSI Service is the internationally and nationally coordinated network of broadcasts containing urgent information which is necessary for safe navigation, received in ships by equipment which automatically monitors the appropriate transmissions, displays information which is relevant to the ship and provides a print capability.

5.4 Purpose

The purpose of the MSI Service is to provide the mariner with information related to navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages.

The provision of MSI makes available to mariners, prior to and during voyages, information that improves their situational awareness and assists with safety of navigation.

The promulgation of MSI is defined in resolution A.705(17) and it is further defined by chapter IV to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), as amended, as part of the "The Global Maritime Distress and Safety System (GMDSS)".

SOLAS regulations V/4 through V/7 governs the contracting government's responsibilities with regards to providing MSI.

The Revised Joint IMO/IHO/WMO Manual on MSI, Publication S-53 (the Joint Manual on MSI) describes the provision of the service and the receiving methods in more detail.

The delivery methods have been described by the International SafetyNET Manual MSC.1/Circ. 1364.

The roles and responsibilities of a METAREA Coordinator are defined in resolution A.1051(27), and the provision of marine meteorological services is

guided by WMO No.558 (Manual on Marine Meteorological Services) and WMO No.471 (Guide to Marine Meteorological Services).

Services that constitute the ~~digital~~ Maritime Services ~~(MSPs)~~ are currently provided in a fully electronic format and as such there is no requirement to transition from analogue to digital information provision. Additional analogue (voice) services do exist but there is no intent to transition these to digital services.

5.5 Operational approach

The MSI Service, as defined in resolution A.705(17), is "the internationally and nationally coordinated network of broadcasts containing information which is necessary for safe navigation, received in ships by equipment which automatically monitors the appropriate transmissions, displays information which is relevant to the ship and provides a print capability. This concept is illustrated in figure below.

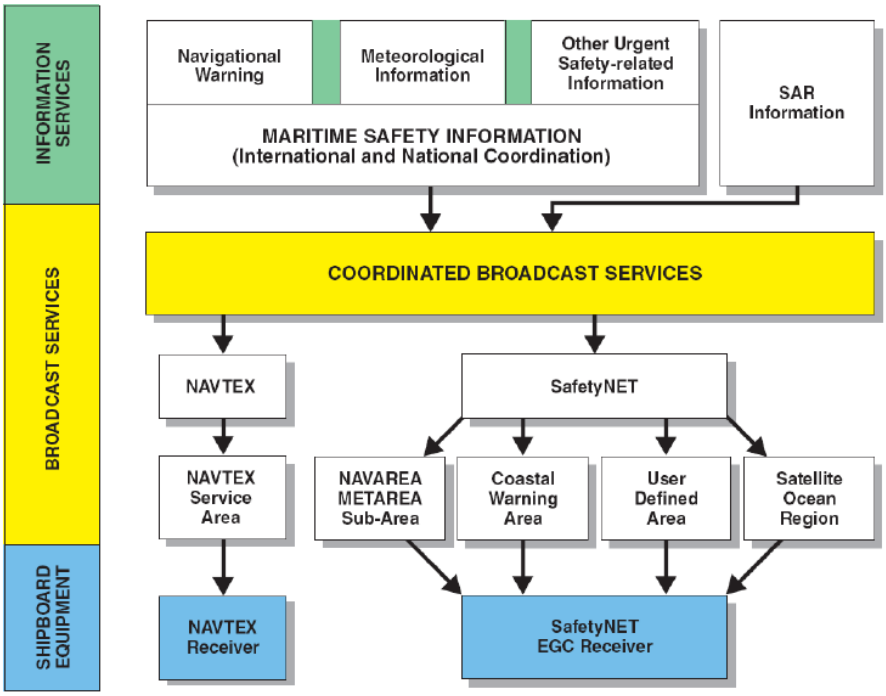

Figure 5-1 The maritime safety information service of the Global Maritime Distress and Safety System (Source: S-53)

Within GMDSS, Maritime Safety Information is promulgated to defined areas that are managed by area coordinators as illustrated in the figures below;

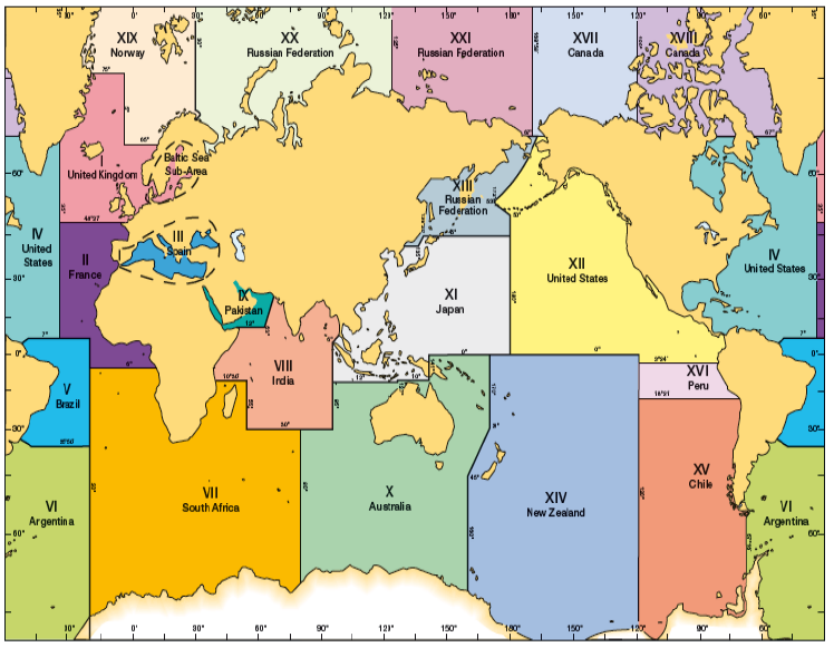

Figure 5-2 NAVAREAs for coordinating and promulgating navigational warnings under the World-Wide Navigational Warning Service (Source: S-53)

Figure 5-3 METAREAs for coordinating and promulgating meteorological warnings and forecasts under the World-Wide Met-Ocean Information and Warnings Service
(Source: S-53)

5.6 User needs

To meet the needs of GMDSS users, NAVAREA, METAREA and National MSI Coordinators promulgate MSI to their respective areas of responsibility via approved GMDSS methods as follows:

Typical MSI services and delivery:

Information	Area	Service Delivery
Navigation Warning	NAVAREA	EGC/HF NBDP
Navigation Warning	Coastal Warning Area	NAVTEX/EGC
Meteorological Warnings and Forecasts	METAREA	EGC/HF NBDP
Meteorological Warnings and Forecasts	Coastal Warning Area	NAVTEX/EGC

To meet the needs of non-GMDSS users, NAVAREA, METAREA and National MSI Coordinators may promulgate MSI to their respective areas of responsibility via other methods as follows:

Information	Area	Service Delivery
Navigation Warning	NAVAREA	HF Voice
Navigation Warning	Coastal Warning Area	VHF/ MF Voice
Meteorological Warnings and Forecasts	METAREA	HF Voice
Meteorological Warnings and Forecasts	Coastal Warning Area	VHF/ MF / HF Voice
Navigational Warning	NAVAREA and Coastal Warning Area	Web service
Meteorological Information	METAREA and Coastal Area	Web service

Potential Future Services/Delivery methods:

Navigation Warning	NAVAREA	VDES-SAT
Navigation Warning	Coastal	VDES-TER AIS-SRM
Meteorological Warnings and Forecasts	NAVAREA	VDES-SAT
Meteorological Warnings and Forecasts	Coastal	VDES-TER AIS-SRM (warnings) AIS-ASM (forecasts)?

5.7 Information to be provided

MSI Services, as listed in resolution A.706(17),as amended, for hazards to navigation, the Manual on Marine Meteorological Services, and in the Joint Manual on MSI for marine weather warnings and forecasts are listed below.

Information related to:	**Examples[2]:**
Hazards to Navigation	1. Casualties to lights, fog signals, buoys and other aids to navigation affecting main shipping lanes; 2. The presence of dangerous wrecks in or near main shipping lanes and, if relevant, their marking; 3. Establishment of major new aids to navigation or significant changes to existing ones, when such establishment or change might be misleading to shipping; 4. The presence of large unwieldy tows in congested waters; 5. Drifting hazards (including derelict ships, ice, mines, containers, other large items over 6 metres in length, etc.); 6. Areas where search and rescue (SAR) and anti-pollution operations are being carried out (for avoidance of such areas); 7. The presence of newly discovered rocks, shoals, reefs and wrecks likely to constitute a danger to shipping, and, if relevant, their marking; 8. Unexpected alteration or suspension of established routes; 9 Cable or pipe-laying activities, the towing of large submerged objects for research or exploration purposes, the employment of manned or unmanned submersibles, or other underwater operations constituting potential dangers in or near shipping lanes; 10. The establishment of research or scientific instruments in or near shipping lanes; 11. The establishment of offshore structures in or near shipping lanes; 12. Significant malfunctioning of radio navigation services and shore-based maritime safety information radio or satellite services; 13. information concerning events which might affect the safety of shipping, sometimes over wide areas, e.g. Naval exercises, missile firings, space missions, nuclear tests, ordnance dumping zones, etc. It is important that where the degree of hazard is known, this information is included in the relevant warning.

[2] Examples from resolution A.706(17) as revised Document Review Working Group 2018, and the Manual on Marine Meteorological Services.

Information related to:	**Examples[2]:**
	Whenever possible such warnings should be originated not less than five days in advance of the scheduled event and reference may be made to relevant national publications in the warning; 14. Acts of piracy and armed robbery against ships; 15. Tsunamis and other natural phenomena, such as abnormal changes to sea level; 16. World Health Organization (WHO) health advisory information; and 17. Security-related requirements
Marine weather warnings and forecasts	**For high seas areas:** Forecasts shall include wind parameters, sea state and visibility, Warnings shall be provided for the following phenomena: • Wind warnings of gale force (Beaufort force 8) and above; • Ice accretion. **For coastal areas:** Forecasts shall include wind parameters, waves (sea and swell), and ice accrection where applicable. Warnings shall be given for the following phenomena: a) Winds of gale force (Beaufort force 8) and above; b) Potentially hazardous ice accretion; c) Unusual and hazardous sea-ice conditions. Warnings should be given for the following phenomena: a) Near gales (Beaufort force 7); b) Severe thunderstorms/squall lines; c) Restricted visibility (one nautical mile or less); d) Storm-induced water-level changes; e) Tsunami

5.8 Associated technical services

Two principal methods are used for broadcasting MSI in accordance with the provisions of the SOLAS Convention, as amended, in the areas covered by these methods, as follows:

- NAVTEX: broadcasts to coastal waters, or EGC where no NAVTEX services exist; and
- Enhanced Group Call Services (EGC) (e.g. SafetyNET): broadcasts which cover all the waters of the globe except for Sea Area A4, as defined by resolution A.801(19), annex 3, as amended.

Additionally, HF NBDP may be used to promulgate MSI to Sea Area A4 (SOLAS regulation IV/7.1.5).

Ships are required to be capable of receiving MSI broadcasts for the area in which they operate in accordance with the provisions of the SOLAS Convention, as amended.

Method	ID (MRN)	Description	Standardization body
EGC Services		Delivery of MSI via IMO Recognized Satellite Service	Resolution A1001.(25)
NAVTEX		Delivery of MSI via NAVTEX	ITU-R M.540
HF NBDP		Delivery of MSI via HF NBDP	ITU-R M.688 Resolution A.700(17),
Web platforms		Display of MSI and access to MSI data files ~~[to be described once developed]~~	
~~NAVDAT~~		~~Delivery of MSI via NAVDAT~~	~~ITU-R M.2010~~
~~AIS-T – ASM~~ ~~AIS-S – ASM~~ ~~AIS – VDES~~		~~Delivery of MSI via AIS:~~ ~~• Message 14~~ ~~• Message 8~~ ~~• Message 21~~ ~~• Data via VDES~~	~~ITU 1371-5~~ ~~SN. 1/Circ.289~~ ~~IALA 124~~
~~Maritime Connectivity Platform~~	~~urn:mrn:mcl~~	~~Provision of MSI [to be described once developed] [more to come]~~	~~IALA~~

S-100 format messaging will be used to pass MSI for display in ECDIS (Specifically S-124, S-411 & S-412 standards).

5.9 Relation to other Maritime Services

~~D~~MS5 has relationships with other services for the delivery of safety information:
Examples may be different depending on the coastal ~~s~~State arrangements.

MS No	Identified Services	Identified Responsible Service Provider
1	VTS Information Service (INS)	VTS Authority
4	Local port Service (LPS)	Local Port/Harbour Authority
11	Nautical Chart Service	National Hydrographic Authority / Organization
13	Ice Service	National Competent Authority Organization
14	Meteorological information service	National Meteorological Authority Public Institutions
15	Real-time hydrographic and environmental information service	National Hydrographic and Meteorological Authorities
16	Search and Rescue Service	SAR Authorities
~~20~~	~~Anti-Piracy Information~~	~~TBC~~

Annex D

Nautical Chart Service

11.1 Submitting Organization

~~International Hydrographic Organization~~ IHO

11.2 Coordinating body

IHO

11.3 Description of the Maritime Service

~~The purpose of Nautical Chart Services are to provide~~ This Maritime Service provides geospatial information (in digital and / or printed format) to support safe maritime navigation. The types of information depicted in nautical charts include the configuration of the shoreline and seafloor, water depths, locations of dangers to navigation, locations and characteristics of aids to navigation, anchorages, and other features relevant to maritime navigation. (SOLAS regulation V/2.2 *Nautical chart* or *nautical publication is a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation*).

A Nautical Chart Service must include update functions to ensure that all navigational products and service are kept current. Update information must be delivered in a standardised format. Distribution networks should conform to standardised data authentication and distribution standards to ensure their safe and secure transmission and delivery.

11.4 Purpose

The primary purpose of the Nautical Chart Service is to provide information to be used for safe navigation. The information provided as part of a Nautical Chart Service must complement information provided as part of other services such as Nautical Publication Services and Real Time Hydrographic and Environmental Information Services. Nautical Chart Service should support functions such as; voyage planning, pilotage, collision avoidance, vessel traffic managements etc …

A Nautical Chart Service should include discovery metadata information that will enable users to determine what product and services are available within a given area of interest (both geographic and contextual).

11.5 Operational approach

The data model is based on the IHO S-100 Hydrographic Data Model and derived Product Specifications. It enables the information provision in a harmoni~~s~~zed way. The products should take into account a harmoni~~s~~zed

display of navigational information. The portrayal of digital Nautical Chart Services should conform to IMO / IHO standards.

The provision of Nautical Chart Service should use distribution strategies, methods, and technologies which can adapt to serve vessels in locations or conditions that may be challenging for data transfer.

Digital chart distribution services should conform the S-100 authentication and encryption data standard. Mechanisms should also be included to accommodate new editions of the Chart Product Specification; including the issuing of new datasets, and associated feature and portrayal catalogues.

11.6 User needs

The primary users are mariners responsible for maritime navigation. Access to the information is required both onshore and at sea.

SOLAS regulation V/19, paragraph 2.1.4 describes the requirement for ships to carry '*nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage.'* Timely and simple access to uniform up-to-date nautical information for a particular sea area is essential for the conduct of safe voyages.

The Nautical Chart Service provides navigational information for safe navigation on open sea, for making landfall, and for navigation in confined waters.

11.7 Information to be provided

The appropriate resolutions and recommendations adopted by the ~~International Hydrographic Organization~~ IHO provide the recommended set of information to be covered by the Nautical ~~C~~chart ~~S~~service.

Information related to:	**Examples:**
Geographical features	• Coastline • Inland topography • Bathymetry • Rivers
Transits and routeing	• Routes in constricted shipping lanes • Associated Vessel Traffic Service • Associated Ship Reporting System
Ports approaches and entry	• Hazards, directions, limiting conditions • Pilot service, outer anchorages • Navigational aids
Protected area information	• Locations of marine protected areas • Restrictions and regulations applicable within specific areas
Regulatory information	• Laws and regulations applicable in specific locations. • Laws and regulations applying to vessels of specific dimensions or carrying specified cargo • Local rules regarding use of specific pilot boarding

	places by vessels exceeding specified dimensions or carrying hazardous cargo
Navigation aids	• ~~d~~Descriptions of Lights • ~~d~~Descriptions of buoys
Planning	• Mariners' Routeing Guides
Controlled areas	• Vessel Traffic Service contact information • Ship Reporting System contact information • Exercise Area contact information
Metadata	• Update information • Projection / spheroid • Data bounding polygon

11.7 Associated technical services

Name	ID (MRN)	Description	Standardization body
~~Nautical Publication Services~~	~~urn:mrn:iho~~		~~IHO (NIPWG)~~
~~Real-time hydrographic and environmental information services~~	~~urn:mrn:iho~~	~~Water level and surface current information~~	~~IHO (TWLWG)~~

IHO does not provide any technical services to deliver charts and nautical publications to the end user. This will be done by the technology which is developed by the value added resellers.

By having established sophisticated secure quality proof transmissions, IHO only insures that the data will not be corrupted during the transport from the producing HO to the end user.

The Service should include hard media and online delivery mechanisms. The delivery mechanism must make provision for data authentication and data encryption.

11.9 Relation to other Maritime Services

Nautical chart service provides overviews of other Maritime Services. It summarizes content information which is covered by other Maritime Services in more detail. Other Maritime Services may reuse information which is provided by Nautical Chart Service.

Description	Examples of data that could be used by MS 11
MS 1 VTS IS	Area of the service, functions, contact information, communication, Local sensor information such as CCTV, Radar, AIS. Regulations. Other traffic. Information regarding regulations and special traffic

MS 2 VTS NAS	Recommended routes, directions, navigation advices
MS 4 Maritime Safety Information	Area of the service, contact information, communication, navigational warnings issued by the MSI service
MS 5 Pilotage	Pilot boarding areas

Annex E

Nautical Publications Service

12.1 Submitting Organization

~~International Hydrographic Organization~~ IHO

12.1 Coordinating body

IHO

12.3 Description of the Maritime Service

~~Nautical Publications Services deliver~~ This Maritime Service delivers a set of nautical information available for a particular marine area. The aim of the Nautical publications service is to provide information as a support to the navigation process. This comprises information to complement nautical charts, such as information on ports and sea areas ~~as defined in paragraph 23 of MSC.1/Circ. 1595[3]~~, as well as the contact information of authorities and services for a sea area or port. It further describes regulations, restrictions, recommendations and other nautical information applicable in these areas.

Nautical Publications Services include:

.1 the information traditionally provided within updated nautical publications such as sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage (SOLAS regulation V/27). The majority of the information can be delivered from shore to ship in a digital format. This will enhance the usability, increase the quality and update rate and give the navigator an opportunity to tailor made the information needed.

.2 a discovery service to allow users to determine what is available in their area of interest (geographic and context);

.3 an ordering service to allow users to order the information required from the service providers identified;

.4 a delivery service to allow the user to receive the information required.

12.4 Purpose

The purpose of the ~~Nautical Publications Services deliver~~ Maritime Service is to electronically provide the mariner with information to complement ENCs/nautical charts for advance planning and to navigate a ship safely during the intended voyage.

The Nautical publications service provides information which is continuously updated and which is required for voyage planning and execution. It improves the situational awareness during the voyage.

SOLAS regulation V/2 defines ~~allows~~ the provision of nautical publication information in digital format as database and SOLAS regulation V/27 requires the carriage of nautical publications suitable for the intended voyage. The combination of both is a digital provision of nautical information requested for navigation according to SOLAS chapter V.

The information covered in nautical publications is either provided as printed paper publications (NP1) or as digital publications based upon existing paper publications (NP2). The next evolutionary step is the provision of information in digital datasets based on internationally harmonised and appropriate data models (NP3). The datasets will be distributed by appropriate methods to electronic onboard equipment.

The anticipated steps in the transition to full digital delivery can be described only in general terms at this time:

.1 development of product specifications (including data models) for digital data products.

.2 conversion of appropriate parts of the content of existing NP1 and NP2 nautical publications to NP3 data products.

.4 integration of appropriate new sources of nautical publications information into the supply and production chain for NP3 data products.

.5 delivery infrastructure and methods – either the design and construction of new delivery infrastructure/methods, or the integration into existing or under-development delivery infrastructure/methods.

.6 application upgrades or new application development to make best use of the digital products.

.7 test beds for the data products, delivery methods, and applications.

12.5 Operational approach

The data model is based on the IHO S-100 Hydrographic Data Model and derived Product Specifications. It enables the information provision in a harmonized way. The products are designed for a display based on Interim guidelines for the harmonized display of navigation information received via communication equipment (MSC.1/Circ.1593) and the data provision should take into account a harmonized display of navigational information. The used product specifications comprise rules for interoperation and harmonized

graphical presentations of datasets that will be interacting one each other and with the ENC information when used by a navigation system such as~~n~~ ECDIS.

The provision of Nautical publications service should use distribution strategies, methods, and technologies which can adapt to serve vessels in locations or conditions that are highly challenging for information transfer.

The data provision follows the S-100 based data protection schema.

12.6 User needs

The primary users are mariners responsible for maritime navigation. Access to the information is required both onshore and at sea.

SOLAS regulation V/19, paragraph 2.1.4 describes the requirement for ships to carry '*nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage.'* Timely and simple access to uniform up-to-date nautical information for a particular sea area is essential for the conduct of safe voyages.
The nautical publications service provides navigational information for safe navigation on open sea, for making landfall, and for navigation in confined waters.

The nautical publications service provides information on Maritime Services available and provides details to get access to responsible authorities and services provided by those authorities.

Secondary users such as pilot services, defence, VTS Authorities or any individuals or organizations, onshore and at sea, require access to the information for reference.

12.6 Information to be provided

The appropriate resolutions and recommendations adopted by the International Hydrographic Organization provide the recommended set of information to be covered by the Nautical Publication Service.

Information related to:	**Examples:**
Transits and routeing	• Routes in constricted shipping lanes • Routeing measures, traffic separation schemes, and shipping lanes • Associated Vessel Traffic Service • The mandatory reporting of vessel traffic movements • Associated Ship Reporting System
Ports approaches and entry	• Hazards, directions, limiting conditions • Pilot service, outer anchorages • Traffic regulation, arrival procedure
Summary information about port facilities	• Function, port authority • Basins and berths • Depth alongside berths, and quay lengths • Cargo handling facilities at specified terminals and

	berths • Specific vessel parameters, such as length, draft, beam
Marine radio services	• Geographic availability of services • Frequencies and channels used and broadcast schedules • Purposes supported – Weather forecasts, MSI, telemedical assistance etc.
Protected area information	• Locations of marine protected areas • Restrictions and regulations applicable within specific areas
Prevailing natural conditions	• Seasonal hazardous conditions • Periodic (e.g. tide-related) or irregular hazardous conditions
Regulatory information	• Laws and regulations applicable in specific locations. • Laws and regulations applying to vessels of specific dimensions or carrying specified cargo • Local rules regarding use of specific pilot boarding places by vessels exceeding specified dimensions or carrying hazardous cargo
Port Services	• Waste disposal, collection of ship pollutants such as oily wastes • Repair, bunkering, • Availability of potable water • Issuing of Ship Sanitation Certificates • Pilot services contact information and notice times
Navigation aids	• descriptions of lights • descriptions of buoys
Climatic Information, predictions	• Tide surge prediction tables and tidal stream atlases • Weather routeing, solar radiation and precipitation • Cold/hot durations and warnings • Air temperature, wind speed and direction • Cloudiness and barometric pressure • Ephemerides and nautical almanacs for celestial navigation
Planning	• Mariners' routeing guides
Controlled areas	• Vessel Traffic Service contact information • Ship Reporting System contact information • Exercise Area contact information
Chart catalogue	• Graphically display a chart catalogue4

The Nautical publications service provides up-to-date information pertaining to the area along the planned route.

Users should be enabled to report discrepancies between the real world and the information provided by the Nautical publications service with no or minimal human interference.

[4] To fulfil IEC61174 "in order to identify the date and origin of the ENC in use, the ECDIS shall include a graphical index of ENC data available, presented upon the mariner's request and providing access to the edition and date of each cell.",

Corrections to Nautical publications service information should be provided as updates (either as updates of the whole dataset or as incremental updates) in a format which supports the automatic correction and the traceability of the corrections of the on-board datasets.

12.7 Associated technical services

Name	ID (MRN)	Description	Standardization body
~~Nautical Chart Services~~	~~urn:mrn:iho~~		~~IHO (ENCWG)~~

IHO does not provide any technical services to deliver charts and nautical publications to the end user. This will be done by the technology which is developed by the value added resellers.

By having established sophisticated secure quality proof transmissions, IHO only insures that the data will not be corrupted during the transport from the producing HO to the end user.

The Service should be capable to work within multiple levels of bandwidth limitations. The Service should provide the data in various data packages according to the bandwidth capability.

12.9 Relation to other Maritime Services

Nautical Publications Service provides overviews of other Maritime Services. It summarises content information which is covered by other Maritime Services in more detail. Other Maritime Services may reuse information which is provided by Nautical Publications Service.

~~**Maritime Service No.**~~	~~**Nautical Publications Services**~~			
	~~**provides overview**~~	~~**summarizes information**~~	~~**supplements information**~~	~~**reuse of information**~~
~~1 VTS Information Service (INS))~~	~~• Area of responsibility~~	~~• Contact information~~	~~•~~	~~•~~
~~2 Navigational Assistance Service (NAS)~~	~~• Area of responsibility~~	~~• Contact information~~	~~•~~	~~•~~
~~3 Traffic Organization Service (TOS)~~	~~• Area of responsibility~~	~~• Contact information~~	~~•~~	~~•~~
~~4 Local Port Service (LPS)~~	~~• Area of responsibility~~	~~• Contact information~~	~~•~~	~~•~~

5 Maritime Safety Information Service (MSI)	• Area of responsibility	• Contact information	•	•
6 Pilotage service	• Area of responsibility	• Contact information	•	•
7 Tug service	• availability	• Contact information	•	•
8 Vessel Shore Reporting	• Area of responsibility	• Contact information	•	•
9 Telemedical Assistance Service (TMAS)	•	• Contact information	•	•
10 Maritime Assistance Service (MAS)	•	• Contact information	•	•
11 Nautical Chart Service	•	•	• charted information	•
13 Ice Navigation Service	•	• Climatic information	•	• radio services information
14 Meteorological Information Service	•	•	• Climatic information	•
15 Real-time hydrographic and environmental information Service	•	•	•	• radio services information
16 Search and Rescue Service	• Area of responsibility • Conduction of service	• Contact information	•	• Tide information and forecasts (for SAR planners)

Another way of providing the information above

Description	Examples of data that could be used by MS 12
MS 1 VTS IS	Area of the service, functions, contact information, communication, Local sensor information such as CCTV, Radar, AIS. Regulations. Other traffic. Information regarding regulations and special traffic
MS 2 VTS NAS	Recommended routes, directions, navigation advices

MS3 VTS TOS	Not relevant
MS 4 Local Port Service	Port security, facilitation and anchorage area, services related to the vessel, arrival procedure, contact information, communication
MS 5 Maritime Safety Information	Area of the service, contact information, communication, navigational warnings issued by the MSI service
MS 6 Pilotage Service	Applicability, Contact information for pilotage, Pilot assistance, Pilot request
MS 7 Tug Service	Availability, contact information, regulations
MS 8 Vessel Shore reporting	Applicability, information about the reporting formalities, local regulations, contact information
MS 9 Telemedical Assistance Service	Contact information
MS 10 MAS	Contact information
MS 11 Nautical Chart Service	Charted information, Notice to Mariners
MS 13 Ice Navigation Service	Ice routes, ice breaking assistance
MS 14 Meteorological Service	Local weather phenomena, climatic information, wave information
MS 15 Real Time Hydrographic and Environmental Information Service	Information about sensors in an area, radio services information
MS 16 Search and Rescue Service	Search and Rescue contact information, communication, SAR capacity, SAR areas of responsibility

Annex F

MS 15 - Real-time hydrographic and environmental information services

15.1 Water Level information for navigation ~~(S-104)~~

15.1.1 Submitting Organization

~~International Hydrographic Organization.~~ IHO

15.1.2 Coordinating body

IHO

15.1.3 Description of the Maritime Service

Oceanic and Inland water level information is essential for determination of under keel clearance required for safe navigation. Real-time water level information is important for applications such as route planning port entry and the determination of tidal prediction. Water level information consists of:

.1 observed and/or forecasted time series at one or more fixed stations;

.2 forecasted gridded forecasts of water level for one or more regions and/or

.3 a gridded hydroid surface.

15.1.4 Purpose

The development of electronic navigation systems that use high resolution bathymetric data, are demanding the provision of real-time water level data. The IHO water level specification provides a standardi~~s~~zed mechanism to digiti~~s~~ze and transfer water level data.

15.1.5 Operational approach

Water level data are usually provided by ~~H~~hydrographic ~~O~~organizations, or on their behalf by an approved authority. Datasets are based on an internationally harmoni~~s~~zed model and data encoding specification. Water level datasets will be provided via online internet services or distributed by appropriate distribution networks used for other navigational products and services.

15.1.6 User needs

Tidal and/or tidal water information is intended for activities such as situational awareness, hazard avoidance, works on offshore renewable ~~marine~~ energy installations and route planning. A knowledge of water levels and under keel clearance water along a planned route, and for some time in the future, can help planners select the most efficient time and safest route for transit.

15.1.7 Information to be provided

Digital water level metadata and catalogue information is encoded using the eXtensible Markup Language (XML). The Hierarchical Data Format (HDF5) format is used for water level surface coverage data. (More to come). [[Describe here what will be delivered and not how it will be delivered]]

15.1.8 Associated technical services

~~The following technical services are associated with this Maritime Service.~~

~~Name~~	~~ID (MRN)~~	~~Description~~	~~Standardization body~~
~~Nautical Publication Services~~	~~urn:mrn:iho~~	~~Maritime descriptive information~~	~~IHO (NIPWG)~~
~~Nautical Chart Service~~	~~urn:mrn:iho~~	~~Maritime geospatial data~~	~~IHO (S-100WG)~~

15.1.9 Relation to other Maritime Services

This product may conflict with simplified information on water levels that are included with many nautical charts. The data from this product should have "display priority" over older simplified water level information.

~~This template should have a relationship with the Nautical Publication Services (Maritime Service No. 12), with under keel clearance water (NIPWG) and S-100 working on a harmonised hydrographic data model.~~

Description	Examples of data that could be used by MS 15
MS 11 Nautical Chart Service	Underlying chart layout, simplified water level information
MS 12 Nautical Publication Service	Description of long term tidal observations.
MS 14 Meteorological Service	Information on storm surges
MS 16 Search and Rescue Service	Tidal influences on rescue operations.

~~Name~~	~~ID (MRN)~~	~~Description~~	~~Architect(s)~~	~~Standardization body~~
~~under keel clearance water~~	~~urn:mrn:iho~~	~~Nautical Information Provision~~		~~IHO, NIPWG~~
~~Nautical Publication Services~~	~~urn:mrn:iho~~	~~Maritime Service Number 12~~		~~HSSC~~
~~Data Quality~~	~~urn:mrn:iho~~			~~IHO,DQWG~~
~~ENC Standards~~	~~urn:mrn:iho~~			~~IHO, ENCWG~~

~~Interoperability Specification for Navigation Systems~~	~~urn:mrn:iho:s99~~	~~Maintain, develop and extend Operational Procedures for the Organization and Management of the S-100 Geospatial Information~~	~~S-99~~	~~IHO, HSSC, S-IHO, S-100WG~~
~~Geospatial Information Registry~~	~~urn:mrn:iho~~	~~Supervise the management and development of the S-100 Geospatial Information Registry~~		~~IHO, S-100WG~~
~~S-100 Universal hydrographic Data model~~	~~urn:mrn:iho~~	~~Monitor the development of other relevant international standards~~		~~IHO, S-100WG~~
~~Maintenance of S-100-based product specifications~~	~~urn:mrn:iho~~	~~Advise and support the development and maintenance of S-100-based product specifications in liaison with the relevant IHO bodies and non-IHO entities~~		~~IHO, S-100WG~~
~~Bathymetry information~~	~~urn:mrn:iho~~			~~IHO~~

15.2 Surface water currents for navigation

15.2.1 Submitting Organization

~~International Hydrographic Organization~~ IHO

15.2.2 Coordinating body

IHO

15.2.3 Description of the Maritime Service

This product provides digital information on surface current speed and direction to land-based and ship-board ECDIS. The information consists of:

.1 time series at one or more fixed stations;

.2 gridded forecasts of surface currents for one or more regions; and/or

.3 time series at a moving (i.e., drifting) station.

Surface current information is portrayed as colour-codes vector lines, with additional information available via mouse pick command.

15.2.4 Purpose

This Marine service includes:

- surface current vector and tidal information, intended for situational awareness;
- hazard avoidance;
- works on offshore renewable ~~marine~~ energy installations; and
- route planning.

The implementation of this service should result in improved safety and cost reductions due to time and fuel efficiencies. The associated product specification implemented update mechanism to ensure that the latest data is available to the mariner and other users.

~~Additional education and/or information will be necessary to distinguish the digital product, which will often include the influence of winds, from existing paper/image currents products that represent only the tidal currents~~

This marine service includes:

- ~~The~~ information traditionally provided within nautical publications such as tide and surface current information necessary for the route planning (link with SOLAS).
- ~~S~~surface current vector and tidal information, intended for situational awareness, hazard avoidance, works on renewable marine energy and route planning. Information derived from observations and/or from numerical model.
- a service to allow users to determine what is available in their area of interest (geographic and context);
- ~~A~~an ordering service to allow users to order the information required from the service providers identified; and
- ~~A~~a delivery service to allow the user to receive the information required

The service provides information on current and tide in complement to ENCs/nautical charts.

15.2.5 Operational approach

Data are created by ~~H~~hydrographic ~~O~~organizations and are disseminated via internet or other available channels.

One evolution of the marine service is the provision of datasets information based on an internationally harmoni~~sz~~ed and appropriate model. The datasets will be distributed by appropriate methods for use by on-board navigation equipment.

15.2.6 User needs

Surface current vector information and water level are intended for situational awareness, hazard avoidance (storm surge forecast, analysis, marine submersion), and route planning. Upon entering a harbour or other confined body of water, knowledge of currents is essential to pilots to avoid hazards. Knowledge of currents and under keel clearance water along a planned route, and for some time in the future, can help planners to select the most efficient time and route for transit.

15.2.6 Information to be provided

Data is contained in XML files that consist of metadata and HDF5 data files containing arrays of speed and direction information, tidal amplitude, tidal water level and water level. This Information and all other necessary information are provided in various IHO Standards (ex: S-111, S-104 IHO recommendations).

~~MS 1 VTS IS~~	
~~MS 2 VTS NAS~~	
~~MS3 VTS TOS~~	
~~MS 4 Local Port Service~~	
~~MS 5 Maritime Safety Information~~	
~~MS 6 Pilotage Service~~	
~~MS 7 Tug Service~~	
~~MS 8 Vessel Shore reporting~~	
~~MS 9 Telemedical Assistance Service~~	
~~MS 10 MAS~~	
~~MS 11 Nautical Chart Service~~	
~~MS 12 Nautical Publication Service~~	
~~MS 13 Ice Navigation Service~~	
~~MS 14 Meteorological Service~~	
~~MS 16 Search and Rescue Service~~	

15.2.8 Associated technical services

(More to come).

~~Name~~	~~ID (MRN)~~	~~Description~~	~~Standardization body~~
~~Nautical Chart Services~~	~~urn:mrn:iho~~		~~IHO (ENCWG)~~
~~Nautical Publication Services~~	~~urn:mrn:iho~~		~~IHO (ENCWG)~~
~~Real-time hydrographic and environmental information services~~	~~urn:mrn:iho~~	~~(Water Level information for navigation)~~	~~IHO (TWCWG)~~

Name	ID (MRN)	Description	Standardization body

15.2.9 Relation to other Maritime Services

This product may conflict with simplified information on tidal currents, chart datum, tidal water level, that are included in nautical charts. The data from the new product must have display priority over the older simplified information.

Description	Examples of data that could be used by MS 15
MS 11 Nautical Chart Service	Underlying chart layout, simplified water ~~level~~ movement information
MS 12 Nautical Publication Service	Description of long-term current ~~tidal~~ observations.
MS 14 Meteorological Service	Information on storm surges
MS 16 Search and Rescue Service	Current influences on rescue operations.

~~Maritime Service No.~~	~~Real-time hydrographic and environmental information Service~~			
	~~provides overview~~	~~summarizes information~~	~~supplements information~~	~~reuse of information~~
~~1 VTS Information Service (INS))~~	~~•~~	~~•~~	~~•~~	~~•~~
~~2 Navigational Assistance Service (NAS)~~	~~•~~	~~•~~	~~•~~	~~•~~
~~3 Traffic Organization Service (TOS)~~	~~•~~	~~•~~	~~•~~	~~•~~
~~4 Local Port Service (LPS)~~	~~•~~	~~•~~	~~• Tidal information~~ ~~• Under Keel Clearance information~~	~~•~~
~~5 Maritime Safety Information Service (MSI)~~	~~•~~	~~•~~	~~• Tidal information~~ ~~• Under Keel Clearance information~~	~~•~~
~~6 Pilotage service~~	~~•~~	~~•~~	~~•~~	~~•~~
~~7 Tug service~~	~~•~~	~~•~~	~~•~~	~~•~~
~~8 Vessel Shore Reporting~~	~~•~~	~~•~~	~~•~~	~~•~~

9 Telemedical Assistance Service (TMAS)	-	-	-	-
10 Maritime Assistance Service (MAS)	-	-	- Tidal information - Under Keel Clearance information	-
11 Nautical Chart Service	-	-	- Charted tidal information	-
12 Nautical Publication Service	-	-	- Tidal information - Under Keel Clearance information	-
13 Ice Navigation Service	-	-	-	-
14 Meteorological Information Service	-	-	- Tidal information	-
16 Search and Rescue Service	-	-	-	-