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**CONSIDERATION OF DESCRIPTION OF MARITIME SERVICES
IN THE CONTEXT OF E-NAVIGATION**

Proposal on update and new Maritime Services descriptions

Submitted by IALA

	SUMMARY
Executive summary:	This document contains proposals on a new Maritime Service description on Aids to Navigation and revision of the Maritime Service 1, 2 and 3 on VTS.
Strategic direction, if applicable:	2
Output:	2.11
Action to be taken:	Paragraph 10
Related documents:	Resolutions A.1158(32) and MSC.467(101); MSC.1/Circ.1595, MSC.1/Circ.1610; NCSR 6/8; HGDM 2/5/1, HGDM 2/10, and NCSR 9/7/2

Introduction

1   IALA submitted its plan for the development of descriptions of Maritime Service in the context of e-Navigation (NCSR 9/7/2), and has been reviewing the relevant descriptions as a domain coordination body. An update was prepared on the new description of Vessel Traffic Services (VTS) in accordance with the revised *Guidelines for vessel traffic services* (resolution A.1158(32)) as well as a proposal to add a new description of Aids to Navigation (AtoN) as set out in annex 1 and 2.

Background

2   At its ninety-ninth session, the Maritime Safety Committee (MSC), recognized the need to regularly update the e-navigation Strategy Implementation Plan (SIP) and approved the *E-navigation Strategy Implementation Plan – Update 1* (MSC.1/Circ.1595), prepared by NCSR 5.

3   The Maritime Safety Committee, at its 101st session (MSC101), adopted resolution MSC.467(101) *Guidance on the Definition and Harmonization of the Format and Structure of Maritime Services in the Context of e-navigation*; and invited Member States and international organizations acting as domain coordinating bodies to submit descriptions of Maritime Services to the organization, taking into account the guidance provided in the resolution.

4   In doing so, the Committee also approved MSC.1/Circ.1610 *Initial Descriptions of Maritime Services in the Context of e-navigation*, which had been prepared by NCSR 6, based on information submitted by Member States and international organizations acting as domain coordinating bodies.

5   Taking into account the guidance provided in MSC.1/Circ.1610 for the periodic updating of the initial descriptions of Maritime Services, IALA suggested making amendments to Maritime Services 1,2,3 as described in NCSR 9/7/2, in order to be aligned with the revised *Guidelines for vessel traffic services* (resolution A.1158(32)).

6   IALA also noted in NCSR 9/7/2 that the current descriptions of Maritime Services do not include all AtoN under the remit of IALA, such as physical and electronic aids to navigation and resilient Position, Navigation and Timing, which are essential services for the safety of navigation.

Discussion

7   IALA has amalgamated MS 1, MS 2 and MS 3 on VTS and developed an updated Maritime Service description on VTS (MS 1) as described in annex 1 for inclusion in MSC.1/Circ.1610 *Initial Descriptions of Maritime Services in the Context of e-navigation*.

8   It is the position of IALA that the descriptions of the Maritime Services should also provide information on the provision of AtoN deployed to enhance the safety of navigation. IALA has therefore developed a new Maritime Service description on Aids to Navigation (AtoN) as described in annex 2 for inclusion in MSC.1/Circ.1610 *Initial Descriptions of Maritime Services in the Context of e-navigation*.

9   As a consequence to this proposal and the decisions thereof, MSC.1/Circ.1595 *E-Navigation Strategy Implementation Plan - Update 1* should be amended to align with the updated Maritime Service description on VTS (MS 1) as well as including the new Maritime Service description on Aids to Navigation. In such a review, the revised resolution A.1158(32) *Guidelines for vessel traffic services* should be taken into account.

Action requested of the Sub-Committee

10   The Sub-Committee is invited to consider the proposal above on deleting MS 1, 2 and 3 and adding an updated description for VTS and a new description for AtoN as set out in the annexes and take action as appropriate.

ANNEX 1 DRAFT DESCRIPTION ON VTS

MS 1 - VESSEL TRAFFIC SERVICE (VTS)

1.1 Submitting organization

IALA

1.2 Coordinating bodies

IMO and IALA

1.3 Description of the Maritime Service

This Maritime Service in the context of e-Navigation is a digital information service for the exchange of vessel traffic services (VTS) information by electronic means between a VTS and ships in the VTS area and shore based users. The Maritime Service in the context of e-navigation means the exchange of VTS information by electronic means, not to be confused with operational services for a VTS independent of way of service provision.

1.3.1   Operational Description

VTS means a service implemented by a Government with the capability to interact with vessel traffic and respond to developing situations within a vessel traffic service area to improve the safety and efficiency of navigation, contribute to safety of life at sea and support the protection of the environment.

IMO Resolution *A.1158(32)* states that:

"The purpose of VTS is to contribute to the safety of life at sea, improve the safety and efficiency of navigation and support the protection of the environment within a VTS area by mitigating the development of unsafe situations through:

> *1. providing timely and relevant information on factors that may influence ship movements and assist onboard decision-making.*
>
> *2. monitoring and managing ship traffic to ensure the safety and efficiency of ship movements.*
>
> *3. responding to developing unsafe situations.*

IALA Guideline *G1089 Provision of a VTS* provides guidance for the provision of VTS to participating ships in a harmonized manner in accordance with internationally approved guidelines and IALA standards.

1.4 Purpose

The purpose of this digital Maritime Service is to support the provision of VTS to participating ships by providing information in a digital format.

Information could be presented in appropriate systems on board and ashore in order to create the means to reduce administrative burden and information overload, reduce miscommunication due to external interference, simplify work procedures, promote sustainable shipping and increase navigational safety.

This Maritime Service could be used for digital information exchange between a VTS and other stakeholders, such as conventional ships, maritime autonomous surface ships (MASS) and allied services.

1.5 Operational approach

The digital information provided in this digital Maritime Service could be delivered by several different means, such as Automatic Identification System (AIS) or VHF data exchange system (VDES) messages, by IP-based communication and using S-100 based Product Specifications and other international standards.

Information provided digitally could partly replace voice communications in non-time critical situations and in addition, complement voice communications in time critical situations.

The steps to achieve this transition to digital information exchange may vary in different areas and for different types of vessels. Details about digital information exchange should be published by the VTS provider.

IALA publishes standards and associated recommendations and guidelines specifically related to technical services and specifications used for the implementation of this Maritime Service.

1.6 User needs

The use cases are generic and intended for description purposes only.

1.6.1   Use Case - Providing timely and relevant information

The provision of timely and relevant information on factors that may influence the ship's movements and assist on-board decision making should be provided where:

- deemed necessary by the VTS; or
- requested by the participating ship.

Vessels could receive timely and relevant information in a digital format that can be displayed in the navigational equipment on board. This may include but is not limited to:

- Navigational situations (including traffic and route information)
- Navigational warnings
- Meteorology
- Meteorological warnings
- Hydrography
- Electronic navigational aids
- Other information

1.6.2   Use Case - Managing ship traffic

Vessels could receive information related to the management of ship traffic in a digital format that could be displayed in the navigational equipment on board. Digital information exchange may apply to elements of the management of ship traffic that is not time critical.

This information may include but is not limited to the following examples:

- Slot management: provides vessels digitally with priority of arrival and distance between two vessels.
- Traffic clearance: provides vessels digitally with permission to proceed, impose conditions or deny entry.
- Anchorage: assigning anchorage positions in digital format.
- Route information: VTS and vessels digitally exchange planned and recommended routes.

- Waterway management: VTS and vessels digitally exchange intentions and recommendations related to traffic situations, such as overtaking of another vessel.

- Information regarding restricted or no-go areas: the content (draft, closed fairway/port/quay etc.) could be provided digitally to vessels without using voice communication.

1.6.3 Use Case – Responding to unsafe situations

VTS responding to developing unsafe situations could be supported by the provision of navigational information in digital format. Information provided digitally could complement voice communications in time critical situations and in addition, partly replace voice communications in non-time critical situations.

This information may include but is not limited to the following examples:

- A vessel deviating from the route: updated route could be sent digitally to a vessel.

- The content of the voice communication could be provided digitally and be displayed as text in parallel / in addition to voice communication.

- Risk of grounding/striking/collision. In addition to voice communications, the vessel could be provided with an electronic route recommendation or waypoint.

1.7 Information to be provided

Technical services and data models used for the implementation of this Maritime Service are under development.

S-212 VTS Digital Information [under development] is a product specification for encoding VTS Information. It is based on the IHO S-100 framework specification and the ISO 19100 series of standards.

Information elements provided in the Maritime Service may include but are not limited to:

- Meteorological data, using AIS/VDES Application-Specific Messages defined in IMO SN.circ.289 or S-100 based product specifications being developed by the WMO Commission for Weather, Climate, Water and Related Environmental Services and Applications (WMO Services Commission) (S-411 to S-414).

- Navigational warning information, using *S-124 Product Specification for Navigational Warnings.*

- Information related to Aids to Navigation (AtoN), using virtual AtoN following the guidance from IALA Guideline *G1081 Provision of Virtual Aids to Navigation* or *S-125 Product Specification for Marine Navigational Services.*

- Route Information, using AIS/VDES Application-Specific Messages defined in IMO *SN.circ.289*, *IEC S-421 Product Specification on Route Plan 63173-1:2021* or *IEC specification 61174-1:2021 Route plan exchange format.*

- Restricted Area Information, using AIS/VDES Application-Specific Messages defined in IMO *SN.circ.289.*

- VTS and SRS Area and Reporting information, using *S-127 Product Specification on Marine Traffic Management.*

1.8 Associated technical services

The table below lists potential technical services associated with this Maritime Service. The list may be updated.

Name	ID (MRN)	Description	Standardisation Body
Voyage Information Service	urn:mrn:iala: techsvc**	The service supports exchange of voyage plans, text messages and area messages.	IALA
Meteorology Service	urn:mrn:wmo**	The service supports the provision of information which could include the speed and direction of the prevailing wind, direction and height of the waves, visibility, atmospheric pressure, the formation of ice, etc.	WMO
Meteorological Warnings Service	urn:mrn:wmo**	The service supports the provision of warnings concerning gale, storm, tsunami, restricted visibility, etc.	WMO
Hydrographic Service	urn:mrn:iho**	The service supports the provision of information which could include factors such as the stability of the seabed, sea depth, the accuracy of surveys, tidal ranges, tidal streams, prevailing currents and swell, etc.	IHO
AtoN Information Service to End-users	urn:mrn:iala: techsvc**	The service supports the provision of Aids to Navigation information for end-users (primarily navigators).	IHO, IALA
Service for Provision of Navigational Warnings to End-users	urn:mrn:iho**	The service supports the provision of safety related messages such as dangerous wrecks, obstacles not otherwise promulgated, diving operations, vessels not under command, etc.	IHO
Route Information Service	urn:mrn:iala: techsvc**	The service provides route recommendations and/or route validation for ships.	IALA
Slot Management Service	urn:mrn:iala: techsvc**	The service allocates ships in a time window to ensure safe voyage in the VTS area.	IALA
Traffic Clearance Service	urn:mrn:iala: techsvc**	The service provides vessels with permission to proceed, impose conditions or deny clearance.	IALA
Anchorage Assignment Service	urn:mrn:iala: techsvc**	The service assists ships into anchorage position by assigning anchorage areas/positions.	IALA

*not official designation, for example only

**should be defined in due course

1.9 Relation to other Maritime Services

This Maritime Service has a close relationship with nearly all other Maritime Services as several information elements delivered in the service could also be provided as part of other Maritime Services. Areas of overlap, such as vessel shore reporting (MS 8), meteorological information service (MS 14) or Maritime Safety Information (MSI) service (MS 5), should be taken into consideration during the implementation of this service.

ANNEX 2 DRAFT DESCRIPTION ON AIDS TO NAVIGATION SERVICES

MS 17 AIDS TO NAVIGATION SERVICES (ATON)

17.1 Submitting organization

IALA

17.2 Coordination body

IMO and IALA

17.3 Description of the Maritime Service

This Maritime Service describes the provision of Aids to Navigation (AtoN) deployed to enhance the safety of navigation[1]. IALA defines an AtoN as a device, system or service, external to vessels, designed and operated to enhance safe and efficient navigation of individual vessels and/or vessel traffic. For the purposes of this service description, Positioning Navigation and Timing (PNT) services are included. However, the description of vessel traffic services (VTS) is contained in a separate Maritime Service.

17.3.1 IALA Maritime Buoyage System (MBS)

The MBS contains descriptions of AtoN systems used worldwide for all users. The MBS is comprised of fixed and floating visual marks and devices. This is primarily a physical system; however, all of the marks may be complemented by electronic means.

Within the MBS there are six types of marks, which may be used alone or in combination. Mariners can distinguish between these marks by identifiable characteristics. As described below, lateral marks differ between Buoyage Regions A and B, whereas the other five types of marks are common to both regions.

There are four AtoN applications:

• Fixed

• Floating

• Mobile (MAtoN)

• Electronic (AIS AtoN, radar beacon (Racon) and radar target enhancer)

Determining the proper application of a navigational mark or signal involves:

• balancing the benefits derived from new and advancing technologies against safety and security concerns;

• the impact on the environment and on international trade facilitation; and

• the potential costs to the industry, and finally their impact on personnel, both on board and ashore.

17.3.2 Positioning, Navigation and Timing (PNT) services

Positioning, Navigation and Timing services are considered to be the services provided to allow the mariner, or an aid-to-navigation to calculate their position, or to receive precise time. References to PNT data is considered to be the use of such derived position and time data within the AtoN or the vessel's receiver.

It is useful to recognize that some AtoN use PNT data, while others can provide PNT Services for use by others. Examples of such can be the use of GNSS within AtoN AIS or the provision of

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1 AIS-ASM (Application Specific Messages) is not included in the MS17 description

positioning information via Racons, or augmentation data. Based on this, the maritime service only considers PNT aspects within the remit of AtoN service provider.

17.4 Purpose

To promulgate the latest information on AtoN and augment charted AtoN information on an appropriate shipborne navigation display prior to updates to the nautical chart.

17.5 Operational Approach

This document deals primarily with provision of AtoN services and related IALA S-200 series Product Specifications designed to convey updates and information to augment an ENC. A current listing and descriptions of existing (or under development) IALA S-200 series Product Specifications may be found here.

17.6 User Needs

Users will include mariners and shore side authorities. User needs may include the most up to date presentation of information on:

- New hazards (fixed or dynamic)

- Temporary channels or routes

- Temporary areas to be avoided (e.g., restricted areas (i.e., military exercises), survey, dredging, fishing, special marine events)

- Changed hydrography, such as shifting banks

- Temporary replacement of a charted aid that is off-station or removed

- Dynamic areas (e.g., reduced visibility, presence of protected species)

- Polar navigation, provided there is sufficient means of radio communication broadcast and charting

- Ice conditions and navigation

- Incident response (e.g., environmental, search and rescue)

- Port specific applications (e.g., passage planning, amended pilot boarding location, etc.)

- Measures for the protection of the marine environment

- Security

- PNT information on position in real time (Timing is a critical component in the provision of some AtoN services, and the need to synchronise and reference radio navigation signals to universal coordinated time (UTC) will increase as look to use more diverse systems and solutions.); and

- PNT Integrity (Recognizing the vulnerability of radionavigation systems to interference (e.g., GNSS jamming), the use of multiple dissimilar positioning and timing systems is required to achieve resilience in support of safe navigation and the optimal working of AtoN.).

17.7 Information to be Provided

17.7.1 General

The AtoN Information Product Specifications (S-201, S-240, S-124 and S-125) provides a common structure for the exchange of information about AtoN. The product contains the positions, properties, operational status and general comments related to an AtoN.

The Product Specification can be used to exchange AtoN information in a consistent form between Aids to Navigation Authorities, Hydrographic Offices and other organizations, including commercial and professional agencies.

17.8   Associated Technical Services

Name	ID (MRN)	Description	Standardisation Body
Provision of AtoN information service to end-users	urn:mrn:iala:techsvc: spec:atoninfo*	Using the datamodel from the S-125 product specification	IALA(IHO)
Navigational warnings service	urn:mrn:iho**	Using the datamodel from the S-124 product specification	IHO
Enhanced AtoN information for AtoN authorities	urn:mrn:iala:techsvc: spec:enhancedaton*	Using the datamodel from the S-201 product specification	IALA
PNT information	urn:mrn:iala: techsvc**	Using the datamodel from the S-240 product specification	IALA

Note: The technical service specifications listed are under development

*not official designation, for example only

**should be defined in due course

17.9   Relation to other Maritime Services

MS 17 has a relationship with other Maritime Services where it affects AtoN

Examples may be different depending on coastal states arrangement.

Description	Examples of information related to MS 17
MS 1 Vessel Traffic Service (VTS)	Navigational hazard, exchange of routes, navigational advices and assistance, waterway management
MS 2	
MS 3	
MS 4 Port Support Service (PSS)	ETA/ATA, Access to the port, availability of port services
MS 5 Maritime Safety Information (MSI) Service	MSI information
MS 6 Pilotage Service	Pilot and boarding arrangements
MS 7 Tug Service	Update on information
MS 8 Vessel Shore Reporting	Position information
MS 9 Telemedical Assistance Service (TMAS)	Vessels position, delays, weather information
MS 10 Maritime Assistance Service (MAS)	Notifications, routing, places of refuge
MS 11 Nautical Chart Service	Local area updates, chart updates
MS 12 Nautical Publication Service	Updates to publications

MS 13 Ice Navigation Service	Ice routes, ice conditions, ice breaking assistance
MS 14 Meteorological Information Service	Weather information
MS 15 Real Time Hydro and Environmental Information Service	Horizontal and vertical tidal information in VTS area, available water column
MS 16 Search and Rescue (SAR) Service	Search pattern and vessels of opportunity

Note: The table above should be updated in accordance with the suggestion of annex 1.