

Paper for Consideration by the NIPWG

Tentative overview of issues related to the development of Maritime Service Portfolios

Submitted by:	IHO Secretariat
Executive Summary:	This paper offers for the consideration of the NIPWG a tentative overview of the issues that need to be considered in relation with the definition and harmonization of the format and structure of Maritime Service Portfolios (MSPs) under the scope of the IHO in support of the implementation of e-navigation.
Related Documents:	HSSC8-07.2A
Related Projects:	- Development of S-100 - IHO contribution to the implementation of e-navigation

Introduction / Background

1. The term “Maritime Service Portfolio” (MSP) was introduced in the report of the IMO Correspondence Group (CG) on e-navigation to the 56th session of the then Sub-Committee on Safety of Navigation (NAV) in 2010 (see NAV 56/8 - paragraphs 39 to 42). The term was defined as follows in the report of the CG to the 57th session of the NAV Sub-Committee (see NAV 57/6 - paragraph 23):

“A ‘Maritime Service Portfolio (MSP)’ defines and describes the set of operational and technical services and their level of service provided by a stakeholder in a given sea area, waterway, or port, as appropriate. Hence, a ‘Maritime Service Portfolio’ may also be construed as a set of ‘products’ provided by a stakeholder in a given sea area, waterway, or port, as appropriate.”

2. The concept of MSP was included in the e-navigation architecture endorsed by the 90th session of the IMO Maritime Safety Committee (MSC) in 2012 (see MSC 90/28 - paragraph 10.10, MSC 90/10 - paragraph 2.3, NAV 57/15 - paragraph 6.32.1, and NAV 57/WP.6 - paragraphs 3.4 to 3.8 and figure 1).

3. The e-navigation Strategy Implementation Plan (SIP) developed by the IMO Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) and adopted by the MSC in 2014 (see MSC 94/21 - paragraph 9.15 and NCSR 1/28 - annex 7) identified MSPs as the means of providing electronic information in a harmonized way and proposed a provisional list of MSPs. The further development of the MSPs is one of the eighteen tasks of the SIP.

4. In 2016, the IHO Secretariat co-sponsored on behalf of the IHO a submission to MSC 96 coordinated by Norway (MSC 96/23/7) proposing, in accordance with the SIP, a new output on e-navigation to define and harmonize the format and structure of MSPs and to provide guidance on the appropriate communication channels used for the electronic exchange of information between shore and ship, including any necessary coordination mechanisms and transitional arrangements that may be required. The MSC agreed to include in the post-biennial agenda of the Committee (2018-2019) an output on “*Develop guidance on definition and harmonization of the format and structure of Maritime Service Portfolios (MSPs)*”, with two sessions needed to complete the item, assigning the NCSR Sub-Committee as the coordinating organ (see MSC 96/25 - paragraph 23.14).

5. The scope of the hydrographic services under the remit of the IHO is defined by SOLAS Regulation V/9:

1. *Contracting Governments undertake to arrange for the collection and compilation of hydrographic data and the publication, dissemination and keeping up to date of all nautical information necessary for safe navigation.*
2. *In particular, Contracting Governments undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services, in the manner most suitable for the purpose of aiding navigation:*

- 2.1 to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;
- 2.2 to prepare and issue nautical charts, sailing directions, lists of lights, tide tables and other nautical publications, where applicable, satisfying the needs of safe navigation;
- 2.3 to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and
- 2.4 to provide data management arrangements to support these services.

6. The definition of nautical charts and publications is provided in article 2 of 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.*

**Refer to appropriate resolutions and recommendations of the International Hydrographic Organization concerning the authority and responsibilities of coastal States in the provision of charting in accordance with regulation 9.*

7. In addition, the provision of navigational warnings is governed by SOLAS Regulation V/4:

*Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments.**

**Refer to the Guidance on the IMO/IHO World-Wide Navigational Warning Service adopted by the Organization by resolution A.706(17), as amended.*

8. Within the framework defined by IMO resolution A.705(17) as amended - *Promulgation of maritime safety information*, navigation warnings are identified as part of maritime safety information (MSI), which, in accordance with the definition provided by SOLAS Regulation IV/9 includes:

- navigational warnings,
- meteorological information, and
- other urgent safety-related information.

9. The subjects suitable for navigational warnings are identified in the revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) (see IHO Publication S-53, Edition January 2016, paragraphs 4.2.3.1 to 4.2.3.18). They include position-based subjects that may be relevant to nautical charts or publications (for example: "the presence of newly discovered rocks, shoals, reefs and wrecks likely to constitute a danger to shipping, and, if relevant, their marking"), transient position-based subjects that may be displayed on a GIS-based system (for example:) and transient general subjects that may affect the destination of the ship (for example: "World Health Organization (WHO) health advisory information").

10. The E-Navigation Committee of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) has been active in developing guidance documents related to the provision of e-navigation services, not limited to aids-to-navigation and other services under the scope of IALA. The relevant documents include in particular:

- draft IALA Guideline on Maritime Service Portfolios: digitizing maritime services (current version: document C63-11.4.6.2; see also document NIPWG3-45.2A);
- draft IALA Guideline on e-navigation technical services documentation guideline (see documents ENAV20-9-23 and related templates ENAV20-9-24 to 26).

11. The IHO has been invited to provide comments on the draft IALA Guideline on MSPs (see IHO Liaison Note dated 23 February 2017). The Secretariat is not aware of any formal consultation on the draft IALA Guideline on e-navigation technical services documentation guideline.

Overview of the issues to be considered

General

12. The general structure of the MSPs that are required to support e-navigation will have to be developed and agreed with all interested parties. In order to prepare the IHO contribution to the development of the general structure, it is suggested that the following aspects be considered by the NIPWG:

- Possible need to refine the definition of MSPs recalled in paragraph 1 above.
- Principles of the governance and architecture of the MSPs: it is suggested to consider a four-level structure:
 - o Level 1: MSP governing body: refers to the authority/organization which defines and maintains the overall architecture of the MSPs, endorses the definition and scope of individual MSPs, ensures interoperability and consistency, etc. The IMO/IHO Harmonization Group on Data Modelling could be the initial forum for defining further that structure.
 - o Level 2: Service definition owner: refers to the authority/organization which proposes the definition of a specific MSP to the MSP governing body and then implements the agreed definition through technical specifications.
 - o Level 3: Service provider: refers to the authority/organization responsible for delivering a specific operational MSP in a given area according to the relevant specifications. In some cases (i.e. MSI service), there may be a need to distinguish between the provider of the information content (i.e. a NAVAREA coordinator) and the provider of the communication infrastructure/service (i.e. SafetyNET);
 - o Level 4:
 - End-user: refers to the organization/individual which makes use of the information provided by a specific MSP; and
 - Stakeholder: refers to the organization/individual other than an end-user that contributes to the implementation and provision of a specific MSP. The stakeholders include the originators of the data/information relevant to the specific MSP, the providers of the end-user equipment, etc.

13. The set of characteristics that are required to describe and implement the MSP should be agreed by the MSP governing body. The following characteristics are proposed as a starting point:

- Designation;
- Objective;
- Definition/Description/Scope;
- Service definition owner;
- Service provider(s);
- End-users;
- Stakeholders;
- Area(s) of operation;
- Maintenance;
- Interaction(s) with other MSPs if any;
- Regulations and Standards applicable;
- Status; and
- Intended evolution.

Issues related to the provision of hydrographic services

14. It is proposed that the MSP/MSPs addressing the provision of hydrographic services include all services required for the implementation of SOLAS Regulation V/9 and navigational warnings.

15. The provisions of SOLAS Regulation V/9 reflect the paper product era: two sets of documents were developed to support safe navigation: the nautical chart which is a simplified portrayal of the real world adapted to the needs of the mariner and nautical publications which contain all additional information which are deemed useful but less essential and would clutter the paper chart. Charts and publications are kept up-to-date through Notices to Mariners (NtMs) which are generally issued weekly and were originally distributed by post. With the advent of radio-communications, NtMs were supplemented by radio navigational warnings in order to promulgate without delay urgent safety related information.

16. With the development of ECDIS, we are today in an intermediate situation. Charts are available in digital form (Electronic Navigational Charts - ENC) with digital updates (ER-profiles) but their content is very similar to the content of the paper charts (both continue to be produced and used concurrently¹). More and more nautical

¹ IMO Circular MSC.1/Circ.1496 dated 21 November 2014 on the unified interpretation on the appendix to the SOLAS Convention regarding the records of equipment concerning nautical charts and ECDIS indicates that:

publications are turned into e-books ('NP2' according to the classification defined in IHO Resolution 5/2002). Notices to Mariners are more and more made available on the web but navigational warnings continue to be pushed to the mariner through Navtex and SafetyNET services. The IMO is developing provisions to address the 'harmonized' display of MSI on Integrated Navigation Systems (INS) but NP2 publications are not meant to be 'integrated' with ENC's.

17. The development of the S-100 framework provides the foundation for the next phase. The current architecture combines a 'base product' (S-101 ENC's) and 'add-ons' that could provide either more detailed information on a specific ENC theme (for example: detailed bathymetry - S-102), or additional layers that are meant to be used in conjunction with the ENC (for example: weather overlay - S-412). A number of S-100 based product specifications are being developed to address themes related to nautical publications (for example: radio services - S-123). An S-100-based product specification is being developed for navigational warnings (S-124). It is likely that the S-100 environment will be implemented progressively and that S-52/S-57-based ECDIS and paper products will continue to be used in parallel for some time.

18. A number of recent or on-going projects related to the development and implementation of e-navigation are already testing options relevant to the next phase. These projects, undertaken in particular by the European Union and the Republic of Korea², need to be identified and their objectives and results should be monitored in order to anticipate / assess the impact on the provision of hydrographic services.

19. Beyond the on-going development of an S-100 interoperability specification to support the harmonized display and interaction of the information related to more than one navigational data product, a number of issues related to the management of chart and nautical information will need to be considered in relation with the implementation of MSP's. Examples of potential issues are:

- Role of 'composite' products (such as the ENC) versus separate individual 'layers' for the different themes (for example: bathymetry, topography, aids to navigation, marine protected areas, routing measures, port infrastructures, etc.);
- Management of data/information shown on different generation of products that may be used in parallel by different users (for example paper charts, S-57 ENC's and S-100-based products);
- Management of data/information affecting more than one MSP to ensure consistency (for example information on aids to navigation [AtoN] if a MSP on AtoN is established);
- Provisions related to categorizing, filtering, routing, displaying of received data according to the urgency and the area (including standard versus user settings, preventing risk of information overload, impact on display equipment, impact on the bridge alert management system, etc.);
- Use of the pull mode (for example via the "maritime cloud") versus the push mode (for example via SafetyNET) for the provision of updates to the end-user and impact on maintaining or not an MSP on the current perimeter of MSI;
- Combination of static and dynamic information (for example tidal height and depths referred to chart datum)
- Organizational and liability aspects noting that arrangements may vary from country to country: in one country, the same organization may be responsible for hydrographic services, aids to navigation and maritime safety information while in another three different organizations may be involved;

1 *The ship's management is responsible to determine what form of charts is to be used onboard as the primary means of navigation. Where paper charts are used as the primary means of navigation then they may also be regarded as the ECDIS back-up arrangements.*

2 *Paper charts or ECDIS provided as the "back-up arrangement" may be used alternatively with the primary ECDIS, and not be limited to use only when the primary ECDIS is inoperable.*

This reflects the view that SOLAS regulation VI/19 only defines the carriage requirement for ECDIS, but does not specify that the mariner should use it.

² An inventory of e-navigation testbeds is available at: <http://www.iala-aism.org/products-projects/e-navigation/testbedsprojects/>.

Action required of the NIPWG

20. The NIPWG is invited to:
 - a. consider this paper when addressing its task on the development of high level specifications for a combined Marine Service Portfolio (MSP) covering the provision of hydrographic services to mariners in accordance with the IMO e-navigation strategy implementation plan;
 - b. consider the impact of the developments undertaken by other organizations such as IALA and e-navigation testbeds;
 - c. take any other actions considered necessary.