NIPWG report and recommendations

Submitted by:	NIPWG
Related Documents:	Minutes of NIPWG10, VTC02-2023, VTC03_2023, and VTC01-2024 meetings
Related Projects:	S-100 product specifications

Chair:	Eivind Mong, CANADIAN COAST GUARD, CA
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Member States:	Argentina, Australia, Brazil, Canada, Denmark, Estonia, Finland, France, Germany, Japan, India, Italy, Republic of Korea, Netherlands, Norway, Poland, Russian Federation, South Africa, Spain, Sweden, UK, USA, (and IHB).
Expert Contributor Organisations:	Anthropocene Institute, Bergmann Marine, CARIS, CIRM, EEC, GARMIN, GEOMOD, HARTIS, IC-ENC, ICS, IHMA; IIC, Kpler, KRISO, NV Chats Germany, NOVACO, NTOU, University of New Hampshire, Portolan Sciences, PRIMAR.

Meetings Held During Reporting Period (Work Plan section K)
NIPWG VTC, multi-sessional virtual meetings in June and December 2023, and March 2024.
NIPWG10 in Monaco, IHO HQ, in September 2023.

Next Planned Meetings
NIPWG11 in Poland, September 2024
NIPWG VTC, multi-sessional virtual meetings in June and December 2024, and March 2025

Work Programme according to the HSSC Work Plan 2023-2024 for NIPWG and associated HSSC action items

Current work is being conducted in accordance with the HSSC Work Plan.

Action item HSSC15/36 (former HSSC14/44, HSSC13/35) is being worked on by IALA ARM. A draft of this system architecture is available in Annex B. A full delivery of the system architecture is expected with a liaison note once approved by IALA Council in June.

Action item HSSC15/37 (former HSSC 14/46, HSSC13/38) is ongoing and further details given later in the report.

Action item HSSC15/38, HSSC15/45 (former HSSC 14/47, HSSC13/40) NIPWG chair presented his IALA Conference paper on how S-124 and S-125 can work together to S-100WG8 (see S100WG8-8/6.9). The meeting took note of the presentation.

Action item HSSC15/39 (former HSSC14/49,HSSC13/41) is being developed as part of HSSC15/36.

Action item HSSC15/40 (former HSSC14/50) Efforts to upgrade all S-12x and S-131 to S-100 Ed.5.2 are ongoing. Funding has been provided by IC-ENC to speed up the upgrade of S-122.

Action item HSSC14/52 is complete

Action item HSSC 15/86 NIPWG has discussed a draft to NCSR 11/12 provided by the IHO Secretariate. This review generated a list of questions that NIPWG consider important for IHO to consider in light the guideline that is up for discussion at NCSR11. The list of questions were drafted by the NIPWG chair group and presented at NIPWG's March VTC meeting. The was consensus about the questions, however, UKHO desired to comment on the questions and clarify their intent, including ensuring the questions are for IHO to consider, see Annex C.

Action item HSSC15/88 NIPWG has taken note of the timeline constraints and have taken steps to progress the development of S-128, specifically month meetings were set up and attended by the chair team to help keep the development on track.

Action item HSSC15/93 NIPWG stood up a task group to refine the initial pyramid shape mapping ENDS products to IMO Maritime Services. The revised mapping is attached in Annex D.

Product Specifications development progress

S-122 (Marine Protected Area) (Work Plan section F)
During the work period the S-122 Task Group continued to meet looking at the way ahead for S-122 development. It has been noted fragmented national MPA issuing processes makes it complicated to establish a single point of contact in Member States. There is an ongoing debate about how close S-122 should be aligned with findings from recent OGC testbeds, but for now the NIPWG Chair Team has instructed the Task Group to focus on the navigational aspects of Marine Protected Areas. Funding has recently been made available by IC-ENC and a contractor has been hired to update the product specification to align with the upcoming Edition 5.2.0 of S-100.

S-123 (Radio Services) (Work Plan section F)
S-123 Task Group has submitted the list of proposed changes for the S-123 Product Specifications to NIPWG for review at the 1st NIPWG VTC of 2024 (March 5, 2024). The deadline for NIPWG members to provide feedback was April 26, 2024 (roughly 7 weeks for members to review). The proposed changes will increment the S-123 Product Specifications from Edition 1.0.0 to 1.1.0 and will align with S-100 Edition 5.2.0. The proposed changes will include an elaborated chapter on Data Quality to align with the current updated guidance as per S-97 Part C. The proposed changes will also include new feature types and information objects to capture "connectivity subscription" to support autonomous and remotely operated shipping. It should be noted that there are industry stakeholders who have volunteered to test S-123 data with connectivity information once the new version of the S-123 Product Specifications becomes available. However, due to lack of resources, work on updating the S-123 Product Specifications to a newer version may only start in 2025.

S-125 (Navigational Services) (Work Plan section F, J)
The S-125 product specification development continues with IALA support. NIPWG Letter 3/2023 was issued to request a review of the latest S-125 draft. Comments received were compiled and sent to IALA ARM Committee's 17th meeting as input paper where these were discussed. Additionally, China MSA conducted trials of S-125 and provided lessons learned and suggestions for improvements to the same IALA meeting. IALA ARM Committee plans to draft a 0.0.4 version of the product specification, but due to the link between S-125 and S-201, some improvements are needed in S-201 before S-125 0.0.4 can be completed.

The IALA DTEC committee is developing the S-125 service specification which will describe a method for machine to machine exchange of S-125 datasets using the Maritime Connectivity Platform concepts along with IEC 63173-2 SECOM principles for secure communication. Trials of such a service is already underway by General Lighthouse Authorities of the United Kingdom and Ireland Research And Development (GRAD).

NIPWG Chair and vice-chair continues to engage with IALA. Chair regularly attend the ARM committee. Vice chair attended DTEC2 and VTS55 committee meetings.

S-126 (Physical Environment) *(Work Plan section F)*
Work on the S-126 product specification is on hold as per HSSC 15/42. Resources to lead and work on the product specification are still lacking and NIPWG is therefore not seeking any change to the status of S-126 work.

S-127 (Traffic Management) *(Work Plan section F)*
Conversion of S-127 version 1.0 to S-100 edition 5.2 conformant PS is in progress with the target date of December 2024. Review of all version 1.0 related comments has been completed and the outcome needs to be integrated into the new PS version. Review of all proposal submitted to date has been completed and the outcome needs to be integrated into the new PS version. New draft Feature Catalogue has been developed and is being reviewed by the task group. Overall, the work is progressing however the progress is slow due to limited resources including their availability.

Member states have started testing S-127 product specification and are providing this input to the task group. Most recently BSH has created test data in German waters making use of the tools available. Their efforts are detailed in NIPWG_VTC03_09.4. The image below shows one step of their process.
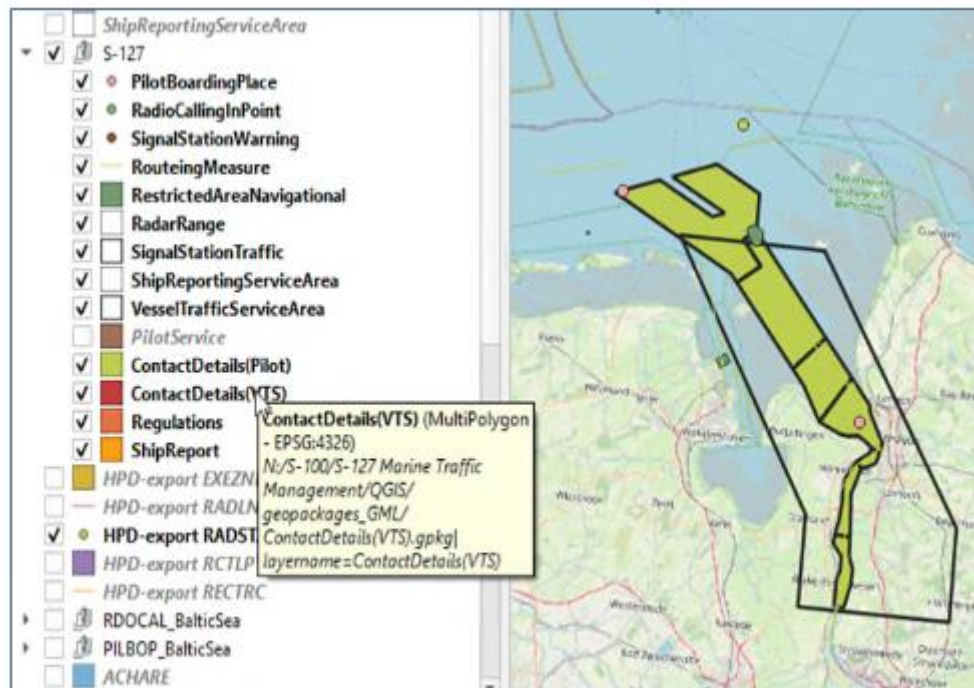

Figure 2: Display of intermediate results (QGIS)

A significant finding from the BST tests is that "To generate test datasets manual workarounds are currently still necessary. This might lead to an integration of human error". NIPWG continues to work with tools manufacturers to encourage the creation of software suits that aid in the creation of data.

S-128 (Catalogue of Nautical Products) *(Work Plan section F)*
Following NIPWG10, monthly meeting have been held to focus and push the S128 development forward to meet the deadlines of phase 1 of S-100 ECDIS implementation. Two rounds of reviews have been conducted on two versions of the product specification, each time refining the documents based on the outcomes of the reviews. Discussions have revealed that the S-128 producer and distribution diagram that was included in NIPWG report to HSSC have remained largely intact, meaning the principles proposed remain true; it is possible that every data producer can generate a S-128 catalogue of their products, each RENC and distributor can create a S-128 of their offerings of data, and the ECDIS must potentially review and generate a report on multiple S-128 catalogues. The last finishing touches are being done on the product specification which aims to support a declaration of physical and electronic products, as well as services. Additionally, optional functionality to declare relationships, equivalence and producer preference of products is being finalized, as well as the ability for producer to declare if a product meet a specific carriage requirement. Once the last parts of the data model have been finalized, submissions to GI registry will be undertaken. A draft 2.0.0 is undergoing last finalizations before going to stakeholder review. Work is on schedule to be ready for HSSC endorsements towards the late parts of summer.

An impact study for S-128 has been completed and is included as Annex E for HSSC review.

S-131 (Marine Harbour Infrastructure) *(Work Plan section F)*
The product specification testing continues by member states reviewing their data and considering S-131 implementation. Comments are being collected and evaluated for impact on the product specification documents. For example, a review gap analysis between S-131 and Norwegian port data was done by the Norwegian Hydrographic Service. Closely related is the S-131 Project at the IHO-Singapore Lab. Efforts are underway to get the database installed and operational at the Lab. The project team is also working on the criteria for port data upload. As part of the project, digitization of Singapore port guide data have been done and being used as the test data for the service.

Maintaining IHO Standards under NIPWG responsibility (Work Plan section D)

Maintain Publication S-12 "Standardization of List of Lights and Fog Signals"
No requests to amend S-12 were raised in 2023. The content provided in S-12 is considered as appropriate and fit for purpose.

Amendments to M-3
The NIPWG did start considering the impact of S-12x, Maritime Services and their interdependencies on NP3 inclusion within M3 Resolution 5/2002. A draft change is attached in Annex F and HSSC guidance is requested on the appropriateness of this change.

Any Other Items of Note

IMO related work (Work Plan section G)
The IMO Expert Group on Data Harmonization, EGDH 9, met in London 23-27.10.2023. IHO attended the hybrid meeting in person (NIPWG Vice-chair, Stefan Engstom), together with around 15 participants in person and a similar amount online during the first day. EGDH is responsible for maintenance of the IMO Compendium.

IHO presented the document EGDH 9/4 on the outcome of the IHO S- 100 and IMO Reference Model mapping exercise. The exercise indicated, that producing S-100 compliant product specification(s) based on the IMO Compendium would be technically feasible, but would also include a substantial amount of work. It was noted by IHO, that machine readable versions of the IMO Compendium and versioning would

make it easier for developers to use the Compendium and reflect changes developers' in implementations.

Guidelines for Harmonized Communication and Electronic Exchange of Nautical Data for Port Calls

In parallel to the work with EGDH, NIPWG has been working with IHMA on a Guidelines for Harmonized Communication and Electronic Exchange of Nautical Data for Port Calls (See Annex G). This guideline and related work focuses on harmonizing terms and definitions between port authorities and hydrographic authorities, aiming to reduce confusion with regards to data exchanged in relation to port calls. IHMA has requested that input on how to ensure the guideline is made operational, who the custodian of this will be and who can make it enforceable and an officially implementable procedure. Is this IHMA or IMO? Currently this is unclear. NIPWG is seeking guidance on the road ahead for the Guideline.

The work with IHMA continues the earlier efforts done jointly to improve and harmonize UKC definitions, for both dynamic and static UKC, and have since been folded in to the Guideline.

Conclusions and Recommended Actions

The NIPWG continue to focus on making progress with the S-100 compliant NPUB Product Specifications development and testing, including the related the development of test data sets for S-100 compliant NPUB Product Specifications. Among these developments, the push to elevate S-128 to operational status is primary. The IHO Standards that NIPWG is responsible for maintaining are regularly assessed for their continued appropriateness. NIPWG manages the coordination of the IHO contributions to the IMO e-nav strategy and the assessment of proportionate S-100 based products management.

Action required of HSSC

HSSC16 is invited to note this report and to endorse:
1. the activity of NIPWG;
2. the continuance of the revised 2024-25 Work Plan as annexed.
3. Give advice on amending M3 Resolution 5/2002
4. Give advice on how to move forward with the work on Guidelines for Harmonized Communication and Electronic Exchange of Nautical Data for Port Calls
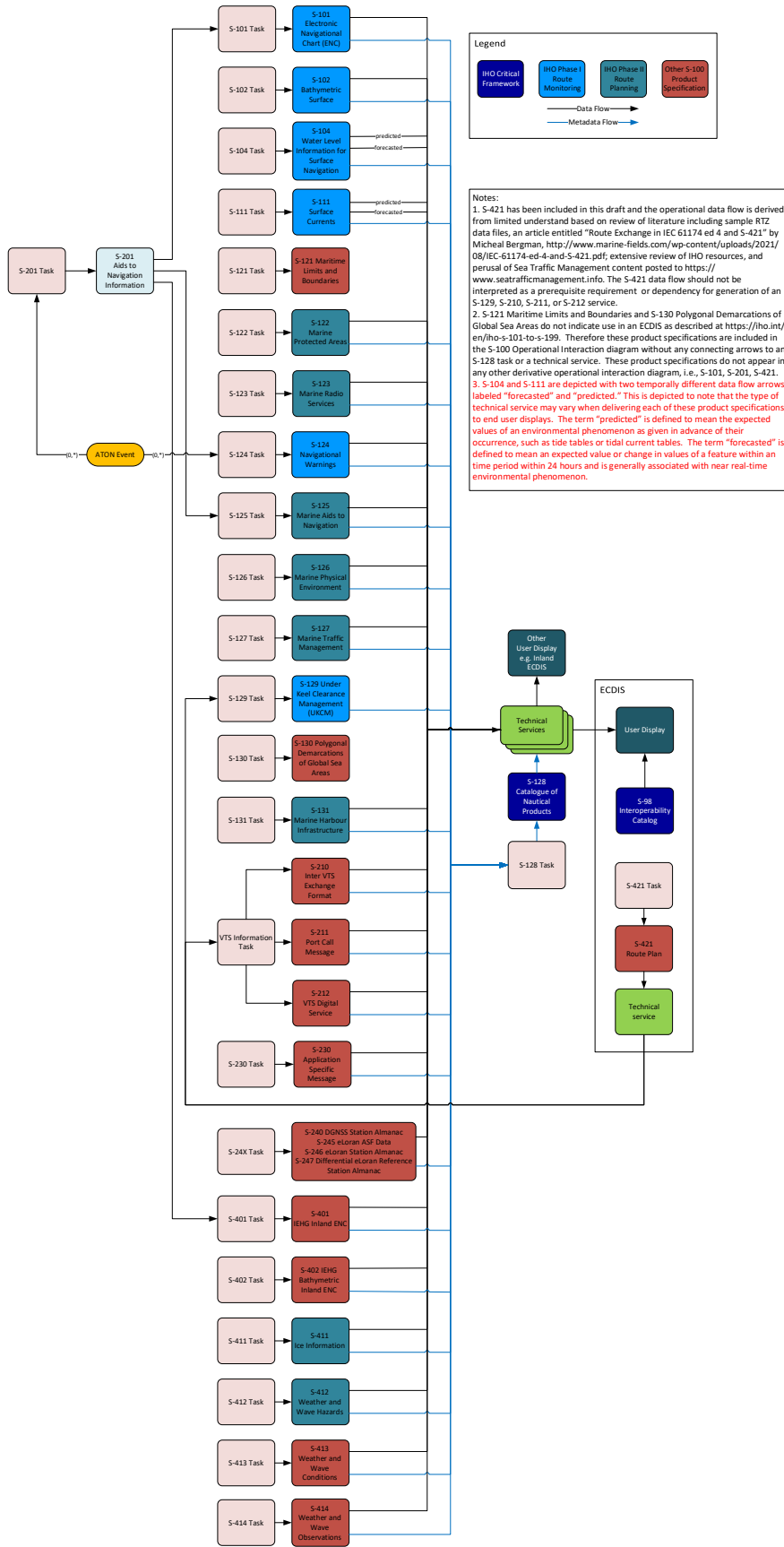
Annex A
Members List see
https://iho.int/uploads/user/Services%20and%20Standards/NIPWG/MISC/NIPWG_Members.pdf

Annex B – Draft S-100 System Architecture

S-100 Operational Interaction Diagram

Legend
- IHO Critical Framework
- IHO Phase I Route Monitoring
- IHO Phase II Route Planning
- Other S-100 Product Specification
- Data Flow →
- Metadata Flow →

Notes:
1. S-421 has been included in this draft and the operational data flow is derived from limited understand based on review of literature including sample RTZ data files, an article entitled "Route Exchange in IEC 61174 ed 4 and S-421" by Micheal Bergman, http://www.marine-fields.com/wp-content/uploads/2021/08/IEC-61174-ed-4-and-S-421.pdf; extensive review of IHO resources, and perusal of Sea Traffic Management content posted to https://www.seatrafficmanagement.info. The S-421 data flow should not be interpreted as a prerequisite requirement or dependency for generation of an S-129, S-210, S-211, or S-212 service.
2. S-121 Maritime Limits and Boundaries and S-130 Polygonal Demarcations of Global Sea Areas do not indicate use in an ECDIS as described at https://iho.int/en/iho-s-101-to-s-199. Therefore these product specifications are included in the S-100 Operational Interaction diagram without any connecting arrows to an S-128 task or a technical service. These product specifications do not appear in any other derivative operational interaction diagram, i.e., S-101, S-201, S-421.
3. S-104 and S-111 are depicted with two temporally different data flow arrows labeled "forecasted" and "predicted." This is depicted to note that the type of technical service may vary when delivering each of these product specifications to end user displays. The term "predicted" is defined to mean the expected values of an environmental phenomenon as given in advance of their occurrence, such as tide tables or tidal current tables. The term "forecasted" is defined to mean an expected value or change in values of a feature within an time period within 24 hours and is generally associated with near real-time environmental phenomenon.

Annex C – Questions for HSSC to consider regarding the ENP Guideline before NCSR11.

1) It is not clear from the draft guideline what systems are in scope, i.e. only new systems or can old systems comply. This leads to the question, what are the implications of this for a bridge computer? Can systems installed before this guideline goes into force be used to meet the requirements? Are there any grandfathering implications?

2) Think there is ambiguity in the referencing to S-100 ECDIS (MSC. 530(106)), what about the hybrid situation where some information is in S-100 ECDIS, but other information is still in NP2? Who would be responsible for ensuring clarity to the end user and PSC officers? Will IHO need to issue additional guidance?

3) What about the case of S-100 based data being used outside the S-100 ECDIS? Would such a usage be covered by this guideline?

4) The guideline lists the examples used in SOLAS V and includes a statement that ENP must be official. IHO may have to issue guidance to IHO MS on how this works, what an ENP is, and what impacts there are on NP2 Nautical Publications.

5) The guideline require adherence to issuing authority's requirements for system using their ENP. Does this necessitate some review of who can produce ENP over who's waters? For it may mean that there are different rules for different producers, and if the voyage is supported by products from two producers, two systems may have to be used. Does this result in the need for a WEND type set of rules for NP2?

6) Since the guideline require adherence to issuing authority's requirements for system using their ENP, does this require an issuing authority to issue hardware/software requirements when providing NP2 in PDF format? IHO guidance may be needed to support this.

7) The guideline gives power supply requirements, which seems to preclude the use of laptops and table computers, such as IPAD and Android. Language seems to indicate that the user system must be permanently plugged in to the ship power.

8) Lack of clear screen size recommendations in the guideline makes it challenging to test use of NP2 by issuing authority. I.e. is a cellphone screen adequate or must it be viewed on a 32" monitor? Moreover, given wording in section 2.2 of the guideline (Hardware and Software), does this mean that the issuing authority can decide screen size? If so, there is a risk that different screen size requirements by issuing authorities can necessitate different screens to be used using different parts of a voyage.

9) Guidance on cyber security is missing.

10) Guidance on training is vague, what about the hardware and/or software that portrays the ENP? What are the requirements if the ENP is a PDF from the issuing authority? May require IHO guidance to Member States.

11) The guideline should perhaps also include some wording around the ease of accessibility of ENP system record keeping for PSC officers and others that need to check ENP system and its content's fitness for purpose.

HSSC Action 15/86 – IMO Electronic Navigational Publication guideline UKHO comments

Submitted by UKHO

At HSSC15, NIPWG was assigned action 15/86 to provide HSSC16 and IHO Secretariat comments towards the IMO Navigation Communication and Search and Rescue Sub-Committee (NCSR); Noting the proposal by the ROK MOF (Ministry of Oceans and Fisheries) submitted to IMO/MSC - Guidelines for the use of Electronic Nautical Publications to be discussed at NCSR-11 (June 2024), NIPWG to prepare a comment paper for HSSC / IHO Secretariat.

NIPWG Chair team proposed a draft commenting paper to the NIPWG VTC which included analysis and discussion points of the paper. The UKHO wishes the following comments be considered prior to submission of this paper to NCSR.

1) The initial paper clearly defines that ECDIS system requirements are out of scope and that other systems for the purposes of installing and using ENP's are in scope. The UKHO agrees that further clarification should be sought on whether this applies to old systems and that there may be grandfathering implications.

2) It is our understanding the intent of this paper is to clarify the requirements of systems displaying Nautical Publications to the NP2 "Digital publications based upon existing paper publications" standards and not those products which comply to NP3 "Digital dataset(s) fully compatible with ECDIS that serve the purpose otherwise provided by NP1 or NP2." We agree that clarification on this would aid the discussion at NCSR.

3) The original paper makes no reference to who can produce ENP, other than to quote the existing SOLAS regulation V/2.2. The intent of the paper is to reach consensus on the hardware and software requirements for the use of ENP's by end users. Therefore, discussions on who can create Nautical Publication data or the introduction of WEND-type rules should not be included by the secretariat in its submission to NCSR and any discussion on this should be held internally within the IHO between member states.
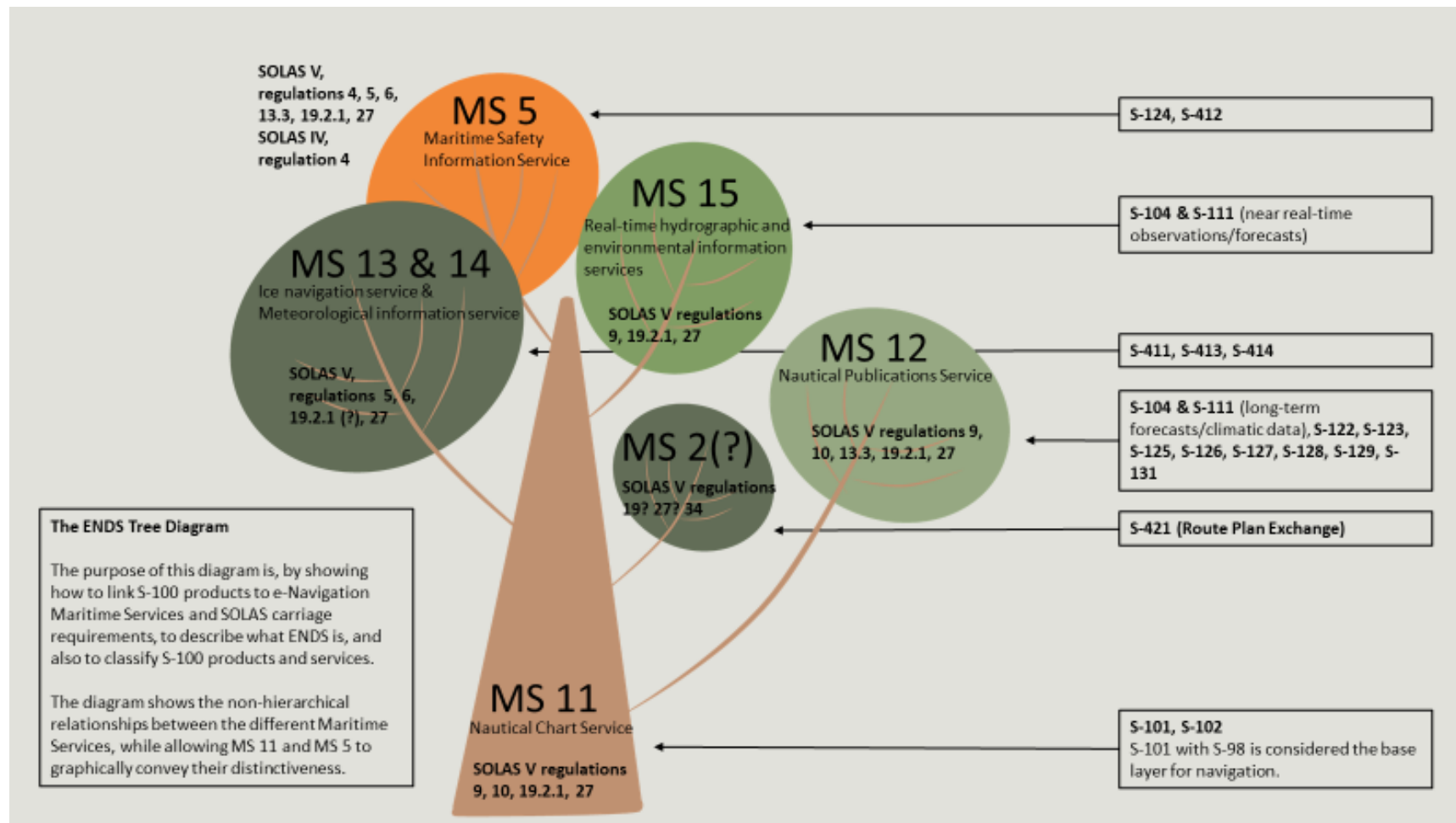
   In considering this, the IHO should consider the benefits of having a single product which has global NP coverage for end user. These benefits include familiarity with the product, a single updating regime, reduction in training requirements and more efficient PSC inspections.

4) The UKHO issues guidance on the use of its Nautical Publications products, which include minimum systems requirements. The UKHO also includes provisions within its products to allow for back-up arrangements according to SOLAS regulation V/19.2.1.5. Producers developing dedicated software for the viewing of ENP's (including those which display S-1xx data) on a back of bridge system should provide minimum system requirements to allow shipping companies to provide suitable equipment.

In some cases, nautical publications software or data may be designed to be integrated with third party systems. Therefore, minimum requirements for the viewing of NP data may be issued by the third party and not the data producer.

5) We agree that clarification should be sought for the requirement of back up power supplies for portable IT equipment.

6) A pragmatic approach to screen size should be sought. Producers of Nautical Publications should use adaptive UI design to ensure their products are useable on as wider variety of screen sizes and device types as is practicable. Shipping companies should ensure they provide appropriate hardware suitable for the task of passage planning depending on the ENP solutions they decide to use. Considerations should be made to the advantages of having smaller, portable hardware as well as the disadvantages of smaller screens. Within their designs producers should also consider the following MSC Circulars:

- MSC/Circ.891 Guidelines for the On-Board Use and Application of Computers

- MSC/Circ.982. Guidelines on Ergonomic Criteria for Bridge Equipment and Layout

- MSC/Circ.1091. Issues to be Considered when Introducing New Technology on board Ship

7) It is not practical for training to be provided on a system-by-system basis. The use of nautical publications as part of passage planning is adequately covered by STCW. Producers of Nautical Publication products should ensure their systems are intuitive for users and provide adequate guidance on how to use their systems. Again, multiple systems to view NP's produced by multiple providers is a disadvantage to the mariner.

Annex D – Revised Mapping between S-100 products and IMO Maritime Services

SOLAS V,
regulations 4, 5, 6,
13.3, 19.2.1, 27
SOLAS IV,
regulation 4

MS 5
Maritime Safety
Information Service

S-124, S-412

MS 15
Real-time hydrographic and
environmental information
services

S-104 & S-111 (near real-time
observations/forecasts)

MS 13 & 14
Ice navigation service &
Meteorological information service

SOLAS V regulations
9, 19.2.1, 27

MS 12
Nautical Publications Service

S-411, S-413, S-414

SOLAS V,
regulations 5, 6,
19.2.1 (?), 27

MS 2(?)
SOLAS V regulations
19? 27? 34

SOLAS V regulations 9,
10, 13.3, 19.2.1, 27

S-104 & S-111 (long-term
forecasts/climatic data), S-122, S-123,
S-125, S-126, S-127, S-128, S-129, S-
131

S-421 (Route Plan Exchange)

The ENDS Tree Diagram

The purpose of this diagram is, by showing
how to link S-100 products to e-Navigation
Maritime Services and SOLAS carriage
requirements, to describe what ENDS is, and
also to classify S-100 products and services.

The diagram shows the non-hierarchical
relationships between the different Maritime
Services, while allowing MS 11 and MS 5 to
graphically convey their distinctiveness.

MS 11
Nautical Chart Service

SOLAS V regulations
9, 10, 19.2.1, 27

S-101, S-102
S-101 with S-98 is considered the base
layer for navigation.

* MS 2 has been renamed to AtoN Service with recent changes to MSC Circ 1610 and should probably be changed to MS 1 - VTS services.

Annex F – Working Draft for amendments to Resolution 5/2002

IHO M3
CONTENT AND GENERAL ARRANGEMENT 5/2002 A7.1
1.
Digital Nautical Publications may be produced in two arrangements, firstly as a stand-alone product based on existing paper publications, and secondly in the form of a compiled database intended primarily to work within an ECDIS.
2.
 For the sake of clarity, Nautical Publications shall be defined by the following:
a) NP1 – Printed paper publications
b) NP2 – Digital publications based upon existing paper publications
c) NP3 – Digital dataset(s) fully compatible with ECDIS that serve the purpose otherwise provided by NP1 or NP2.

~~Note: Data Specifications for NP3 have yet to be finalised and therefore are not specifically referred to in this document.~~
3.
It is resolved that Digital Nautical Publications (NP2 and NP3) shall at least fulfil the functions of corresponding printed nautical publications (NP1).
4.
Digital Nautical Publications (NP2 and NP3) need not slavishly follow the requirements of presentation and organisation laid down for printed publications (NP1). However, the relevant resolutions and recommendations for printed publications (NP1) shall serve as guidance regarding content and purpose.

5.
Digital datasets (NP3) will inevitably cover the gap between traditional publications and real-time services, and thus also expand the concept of Nautical Publications. Information that, due to a need for frequent updates, is not usually available in traditional publications might be available in Digital datasets. Where traditional publications (NP1 and NP2) would include only availability information of such frequently updated external services, it is possible to include also the actual information produced by such service as ECDIS-compatible Digital datasets. The concept of Nautical Publications should, in these cases, include also those Digital datasets.