**HSSC13-05.3A rev2**

NIPWG report and recommendations

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| ***Submitted by:*** | NIPWG |
| ***Related Documents:*** | Minutes of the various VTC meetings incl. NIPWG8 |
| ***Related Projects:*** | S-100 product specifications |

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## Meetings Held During Reporting Period (Work Plan section K)

NIPWG VTC, held as multi-sessional virtual meetings in July, August and September 2020

NIPWG VTC, as multi-sessional virtual meetings in December 2020, January, February and March 2021

NIPWG8 VTC, March 2021

## Next Planned Meeting

NIPWG VTC, multi-sessional virtual meetings in July, August and September 2021

## Work Programme according to the HSSC Work Plan 2020-2021 for NIPWG and associated HSSC action items

Current work is on track against the HSSC Work Plan. Expect Action Item HSSC 12/32, which is a permanent action item; all HSSC action items assigned to NIPWG are completed. Action items assigned to multiple HSSC WGs with NIPWG involvement (HSSC 12/41) are in progress.

**Product Specifications development progress**

**S-122 (Marine Protected Area) and S-123 (Radio Services)** (Work Plan section F)

The first HO initiated and party completed the production of S-122 and S-123 data sets. They provided feedback and requested product specification improvements. The findings underline that updates of S-100 may have effects on production software. Furthermore, challenges arise when a product specification based on earlier S-100 versions and the production software is current with the latest S-100 version. It seems that there an urgent need to consider upgrading product specifications every time a new S-100 Edition is released.

In addition to data model improvements, the S-122 and S-123 products specifications need portrayal instructions. This is urgently necessary to make the S-122 and S-123 products fit for testing in real S-100 based test environment.

Both Product Specifications need revision in 2021. As stated in 2020 as endorsed by HSSC12, the work should be contracted as NIPWG has not the experience to make the improvements by their own. The calculated estimate is 8000 € from each product specification and covers portrayal and will replace the small samples in the 1.0.0 packages with more realistic test datasets.

**S-125 (Navigational Services)** (Work Plan section F, J)

The S-125 development will be based on the S-201 product specifaction and will be done by IALA on behalf of the NIPWG. The S-125 product specification will contain information information in addition to those already covered by S-101. Side effects on S-124 need considerations.

The working group assessed an IALA outlone paper desribing how S-201, S-125 and S-124 may work together. The data model aspects were no questioned. Rather, the WG discussed operational aspects. The outline paper with NIPWG responses incorporated is provided in Annex C.

The IALA paper also addresses the nececity to resume the Scale Dependant/Scale Independant (SD/SI) discussion within the IHO community, SNPWG initiated 10 years ago. NIPWG stands ready to provide a paper discussing impacts, opportunities and challenges of SD/SI data creating, maintenance, distribution and processing in ECDIS environment to HSSC14.

**S-126 (Physical Environment)** (Work Plan section F)

The S-126 product specification is progressing with low priority.

The intended work will be on the data model side and portrayal side. No additional funds for contracting out the development of the necessary product specification parts will be requested until 2024.

**S-127 (Traffic Management)** (Work Plan section F)

Version 1.0.0 of the product specification has been endorsed by HSSC and is under the new Resolution 2/2007 life circle regime.

Several tests have been conducted to assess the appropriateness of the specification against real HO data. The tests confirmed that the tested parts of the data model are fit for purpose and that semi-automatic generation of data sets is possible. Test further deliver demand for further product specification improvement. Therefore, the year 2022/2023 is the new intended release date for version 2.x.x.

Data model harmonisation between S-101 and S-127 took place.

**S-128 (Catalogue of Nautical Products)** (Work Plan section F)

The work on S-128 is making good progress. The development is led by KHOA, and the latest version considers more than 200 comments submitted by NIPWG members. In addition, the developer checked the S-128 appropriateness for use in e-navigation environment, and S-100WG Test Strategy Meeting (S-100WG TSM) discussed impacts on S128 in terms of future use in ECDIS. The work is ongoing with review and comment adjudication, with a VTC planned for later in 2021 to finalize things. Assuming all comments will be successfully implemented, it is expected that an updated version could be released later in 2021. This updated version is planned to be submitted to HSSC for approval as a version 1.0.0 of S-128 and be made available for testing in accordance with IHO Resolution 2/2007 as amended.

NIPWG8 discussed INToGIS and how S-128 relate to it. It was concluded that a scope expansion is needed to account for INToGIS and that such work should be targeted for the version after 1.0.0. These modifications can be done when incorporating S-100 Edition 5.0.0 impacts.

S-128 can be the vehicle to provide up-to-date information of products and can have similar functions as the current S-63. A relevant paper on S-128 management issues was provided to WENDWG for consideration.

**S-131 (Marine Harbour Infrastructure)** (Work Plan section F)

The Marine Harbour Infrastructure product specification development is progressing. The scope is determined in close liaison with the International Harbour Master Association and with the International PortCDM Council.

The IHO contracted out the development of the product specification. The expected delivery time is spring next year, depending on the development status of the relevant S-100 edition 5.0.0 components on which it should rely on.

The HSSC should consider the development of a digital infrastructure to enable ports to contribute their information to an single database. NIPWG stands ready to provide the necessary data element information. This information is IMO BLU CODE compliant and needed for berth-to-berth planning. That enables HOs to provide information needed to fulfil the ship’s requests of corresponding IMO Resolution A.893(21).

This digital infrastructure has several benefits:

* One access point for both the contributors and user,
* Ports can define which information they would like to share with HOs,
* HOs can harvest and process further the data,
* Appropriate API definition would be helpful to support the electronic data exchange, and
* IMO can be encouraged to put pressure on ports that are not contributing, keeping in mind the harbour’s contribution to the fulfilment of the relevant IMO resolution on berth-to berth route planning.

The single access point and respectively one database, should be an interim solution and it should stay in operational mode until Coastal States or HOs are able to host and operate their own systems, which collect marine harbour infrastructure information on national basis.

NIPWG approached potential industry partners to consider possible estimates. The response received so far estimates a cost of 10-20k € and includes:

• API

• web based GUI

• database set up according to the S-131 data model

• database hosted on the IHO Secretariat’s server

Taking into account that IHO is an intergovernmental organisation, hosting such a database, by the IHO Secretariat, could help to build up a trusted environment. Ports would know where their data are. The data entered would be S-100/S-131 compliant and ports would not need to become familiar with the S-131. HOs can use the extracted S-131 compliant data and implement them easily in their S-100 based production platforms.

An addition to the said benefits, IMO could have an overview on which ports contribute to the database and could be more specific in the submission request. IMO FAL may also benefit from the information provided.

Depending on the S-131 data element development status, the work could either be assigned to the industry partner who provided the estimate or it could be tendered. Considering the S-131 product specification contract timeline, an early 2022 start seems appropriate for such a project.

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

***Maintain Publication S-12 “Standardization of List of Lights and Fog Signals”***

No requests to amend S-12 were raised in 2020. The content provided in S-12 is considered as appropriate and as fit for purpose.

***Maintain Publication S-49 “Recommendations concerning Mariners’ Routeing Guides” (MRG)***

A revision of S-49 was done and has successfully passed the Member State Approval process. The current version is considered as appropriate and as fit for purpose.

***Amendments to M-3***

The NIPWG did not receive requests on M-3 amendments in 2020.

**Provision of S-100 Architecture**

The S-100 Architecture presents all Product Specifications under the remit of the IHO. The approach is to have all Product Specifications displayed on one ECDIS screen. Different interoperability levels apply. NIPWG updated the list of product specifications based on HSSC decision to add S-131 (Marine Harbour Infrastructure) and S-126 (Marine Physical Environment).

The latest version of the Architecture is provided under HSSC 13-05.3C.

With the aim to reflect the different interoperability aspects, NIPWG recommends to incorporate the Architectural Display of Prod Specs into the Annex of the Roadmap of the S-100 Implementation Decade together with the S-1xx development Gantt-type diagram.

## Any Other Items of Note

***Strategic Performance Indicator (SPI) prioritisation of product specification and effects on NIPWG work***

The forthcoming IHO SPI revision should consider prioritising the NIPWG Product Specifications higher. The recent downgrade to second priority may be considered an invitation to member states to reduce their investment in NIPWG related activities. Seeing this in conjunction with the output achieved in the past, taking into account the status of product specifications under the remit of NIPWG, considering the fact that products will add the requested value to S-100 based ECDIS systems, and considering the IMO request to provide berth-to-berth route planning, downgrading the importance of product specifications under the remit of NIPWG in the SPI is definitely the wrong message to member states, IMO and other Stakeholders.

The following IHO standards under the remit of NIPWG are relevant for berth-to-berth planning as requested by IMO and may have an immediate effect to improve the safety of navigation:

S-122 (Marine Protected Areas),

S-127 (Marine Traffic Management), and

S-131 (Marine Harbour Infrastructure).

Furthermore, the standard S-128 (Catalogue of Nautical Products) is relevant for checking product up-to-dateness in ECDIS and may support the data provision mechanism. Port State Control officers could use the catalogue file as reference. Detection of outdated products in on-board ECDIS improves the safety of navigation in many aspects.

Both the SPI and the S-100 Implementation Strategy should reflect the importance of the said NIPWG product specifications in their next updates.

***NtM XML Development***

The current XML structure version appears stable. NIPWG did not receive requests to enhance the structure during the reporting period. It seems the 1.5-day’s workshop is no longer necessary. NIPWG will approach HSSC for endorsement to conduct the said workshop if considered necessary. For the time being, NIPWG recommends to close this topic.

***IMO related work*** (Work Plan section G)

NIPWG continued the monitoring of the development of the IMO e-Navigation strategy. It further coordinates the IHO submission of the Maritime Services in context of e-navigation description under IHO to the IMO.

The IHO contribution to the IMO Expert Group on Data Harmonization (EGDH) needs to be harmonised. NIPWG stands ready to act as responsible IHO working group to monitor and contribute to EGDH discussions.

The enhancement of the associated technical services description as part of the Maritime Services in context of e-navigation can benefit from the work done by IALA on Guideline G1128 providing a template for these descriptions and drafts created for S-124. Furthermore, IALA has developed Guideline G1157 for web-based S-100 data exchange (references IEC 63173-2 SECOM) providing further information useful for the technical serviced description.

Considering that IMO defined S-100 as one of the key pillars in their e-navigation implementation strategy, IHO should reflect this importance in the forthcoming S-100 roadmap update. HSSC should ensure that their subsidiaries responsible for particular Maritime Service descriptions include the check of their Maritime Service description as a permanent work item.

***Test of product specifications and production of data sets***

S-122 (Marine Protected Area) data are available for US and DE waters for testing purposes. According to the software maintenance circle the product specification passed the “Evolution” phase is now in the “Report” and “Request” phase. That needs active support from all HOs that intend to provide S-122 data in the future.

S-123 (Marine Radio Services) product specification is ready to be used for test data set production.

**Development of an outline paper providing the whole picture of future S-100 compliant products use**

Considering the NIPWG responses on the IALA S-201/S-125 outline paper, and taking into account the recent WENDWG discussions which data or products are official according to SOLAS Chapter V Reg 9 and their dissemination under the WEND100 principles, NIPWG considers it necessary to develop a paper discussing operational aspects of the future S-100 environment. There is a lack of understanding or at least different expectations on how the different products under the remit of IHO should work together in a future S-100 based ECDIS machine. The requested description of IMO’s Maritime Services in context of e-navigation put an obligation on IHO to provide information on what/how/when. That should also include the interaction with stakeholders, which have direct relations to the IHO prod specs, such as IALA.

The focus of the paper is the description of how products work together in an S-100 based environment. This environment envisaged complexity, more interoperability and the use of the information for purposes beyond navigational purposes. The paper should further address the internal and external data contributions, data stream aspects and legal questions.

Therefore, NIPWG recommends HSSC to order the development of such a paper. This paper can complement the S-100 architecture. NIPWG stands ready to take this work.

## Conclusions and Recommended Actions

* The NIPWG activities are focussed
	+ on making progress with the S-100 compliant NPUB Product Specifications development,
	+ the development of test data sets for S-100 compliant NPUB Product Specifications
	+ on assessing the appropriateness of IHO Standards that NIPWG is responsible for maintaining,
	+ on the coordination of the IHO contributions to the IMO e-nav strategy,
	+ on the assessment of proportionate S-100 based products management.

## Action requested of HSSC

HSSC13 is invited to note this report and to endorse:

1. the activity of NIPWG;
2. the continuance of the revised 2021-22 Work Plan as annexed.

HSSC13 is further invited to ensure:

1. the appropriate reflection of the NIPWG product specifications S-122, S-127, S-131 and S-128 in the next version of the SPI and S-100 Implementation Strategy; noting that an update of the S-100 Gantt-type diagram for S-1xx Products is needed.
2. that the description and maintenance of Maritime Services in context of e-navigation become part of the S-100 roadmap.
3. That the Architectural Display of Prod Specs becomes an Annex of the S-100 roadmap together with the S-1xx development Gantt-type diagram.

HSSC13 is further invited to start:

1. consideration of a set up a digital infrastructure to collect S-131 compliant Harbour Information and NIPWG to provide the necessary data elements description.

HSSC13 is further invited to confirm:

1. budget to contract the S-122 and S-123 product specifications improvement (8,000.00 € each).
2. the NIPWG responsibility to maintain the Architectural Display of Product Specifications under the remit of the IHO.
3. that responsible WGs should review the initial descriptions of “Maritime Services in context of e-navigation” under their remit if appropriate and to provide them to NIPWG for further action.
4. that NIPWG should coordinate IHO input to IMO’s EGDH.
5. the intention to close the NtM XML workshop topic and to recommence the work is deemed necessary.
6. that NIPWG is responsible to develop an outline paper describing the whole S-100 picture in close cooperation with stakeholders, inside and outside the IHO community
7. that NIPWG provides a paper discussing SD/SI data handling aspects to HSSC14.
8. Confirm NIPWG plans to investigate options for develop an IHO operated database to collect harbour information and report these to HSSC14.

HSSC13 is further invited to assign:

1. the permanent work item on maintaining Maritime Service in context of e-navigation description to their responsible subsidiaries.

**Annex A**

**Members List see** [**https://iho.int/uploads/user/Services%20and%20Standards/NIPWG/MISC/NIPWG\_Members.pdf**](https://iho.int/uploads/user/Services%20and%20Standards/NIPWG/MISC/NIPWG_Members.pdf)

**Annex B**

NIPWG WORK PLAN 2021-22 (as discussed at NIPWG8 VTC 23-25 March 2021); see separate Annex B file

**Annex C**

To: IALA ARM Committee

NIPWG response on IALA liaison note to NIPWG, ref C72-13.4.1

**Vision outline on S-125 Marine Navigational Services Product Specification**

NIPWG appreciates the provided liaison note. The note shows how much potential a close cooperation between S-201 and S-125 could have.

NIPWG supports the note content in principle. Without elaborating each bullet point it in more detail, the key advantages are:

* The provision of S-125 data by AtoN Authorities can assists the data exchange between them and the responsible Hydrographic Office(s).
	+ Sharing of responsibilities
	+ Split of resources
	+ Reduce delays in information provision
	+ Shorten of HOs data bases update time
	+ Support of Autonomous Shipping
* HOs can establish scale independent features data streams utilising S-125.
	+ Replacement of P&T S-124 information by durable chart content updates
	+ Shorten the information provision time of affected features
	+ Support of Autonomous Shipping
* The introduction of IMO Maritime Services in context of e-navigation concept requests innovative solutions.
	+ Shorten the information provision time for all information
	+ Support of Autonomous Shipping
	+ Support of Route Plan Exchange
	+ Utilising of the advanced S-98 Interoperability Catalogue

NIPWG support more efficient data stream based on provision of AtoN information.. IMO, IHO, IALA and other standardisation bodies envisioned and described the future S-100/e-navigation world. The architecture is ready. The IALA S-201 outline paper provided to NIPWG’s consideration (ref C72-13.4.1) describes the final status of an S-100 based ECDIS in an e-navigation environment; taking into account the IMO e-navigation concept. Converting the currently planned short-term 3+ years (S-101) ENC production and provision mechanism to the envisioned status is a long-term 10+ years’ goal. However, it is necessary to build the foundation of this final status better earlier than later. S-201/S-125 are few of the first real bricks.

Having established the data exchange between AtoN Authorities and HOs, involved organisations can learn from the experiences made.

Specific passages need updates to reflect concerns regarding responsibilities of involved organisations and on the relation between S-124 and S-125. In addition, NIPWG members discussed operational aspects.

NIPWG recommends splitting the outline in two sections

* data models
* exchange mechanism and operational aspects.

Annex A provides comments to affected paragraphs in red font colour.

Best regards,



Jens Schröder-Fürstenberg,

Chair, NIPWG

**Annex A**

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| From: IALA | C72-13.4.1 |
| To: IHO NIPWG | 11 December 2020 |

LIAISON NOTE

S-125 Marine Navigational Services Product
Specification – Vision outline

# INTRODUCTION

IHO NIPWG welcomed the IALA offer in drafting of S-125, Navigational Services, as a dataset-based on S-201, Aids to Navigation Information, and requested that S-125 should provide navigationally significant information additional to the data currently available in S-101 (IALA Paper ARM8-10.6 refers). ARM11 drafted the S-125 vision outline and ARM12 finalized this outline.

This paper provides an update of how IALA ARM Committee proposes to develop S-125 in-line with the instructions from NIPWG.

# DETAILS

S-201 is a standard for exchanging all information related to any AtoN including metadata like maintenance schedules, equipment types (such as battery and bulb types). S-201 is intended to be the means of communicating such information within an AtoN organization or between AtoN organization and in certain circumstances with its main partners such as hydrographic offices. S-201 is not intended to be for navigation systems like ECDIS, and therefore is not constrained by ECDIS requirements. This means the S-201 can include additional cartographic information to inform about AtoN services that would not be appropriate in a navigation system, such as ….. (provide an example here)

S-125 meanwhile, would be a derivative of S-201 service as the public facing information for use in ECDIS/ECS. In other words, S-125 would be the digital equivalent of the extended list of lights in order to meet IMO SOLAS V requirements of having list of lights on board and serve as a continually updated list of AtoN, including virtual AtoNs.

S-125 should also be designed to boost S-124 NW and ENC S-101 productions, especially by reducing the effort in the transformation of data, with the harmonization of data models. This could be done by introducing efficient data exchange mechanism between authorities. In terms of S-125 is means the exchange of data on nautical aspect of AtoN.



Not all HOs have consistent AtoN authorities, which have the capabilities or responsibilities of providing this data as a separate dataset to the ENC provided by the HO. It doesn’t exist an internationally agreed understanding of the term “Local NM”.

It is also envisioned that following scenario illustrates how S-125 would work with the S-124 MSI Product Specification:

* An AtoN Outage is reported and immediately communicated by S-124. Upon confirmation of the outage, the responsible AtoN authority will move the report of outage from S-124 into the S-125, thereby relieving S-124 of old, but still active information.

What is considered “old” in S-124? If the AtoN information is still active and in-force then why is it being transferred to S-125? Is this for the clutter of point features in S-124 at the expense of removing in-force warnings?

MSI Providers are responsible with the removal of any Navigational Warnings from S-124. A Navigational Warning moved from S-124 to S-125 will remain in force and continue to be promulgated by GMDSS broadcast services, since adding the information to the S-125 database will not, on its own, be sufficient to cancel the warning from GMDSS broadcast.

With respect to the proposed interaction between S-124 and S-125, MSI Providers (National and NAVAREA Co-ordinators) are the recognised authorities for promulgating and cancelling Navigational Warnings, so consideration must be given to the implications of having another party (the AtoN authority) move Navigational Warnings from the “in force nav warning list” in S-124.

The placement of long-term S-124 temporary information through S-125 is a good plan though. It helps lower the chance the mariner overlooks older critical navigation safety information.

All in-force NAVAREA warnings should remain in S-124. The NAVAREA coordinators should be the only agency responsible for cancelling these warnings. If they are kept in S-124, and the cancellation will occur in S-124, there is no need to move them to S-125. If active in-force warnings will be taken out of S-124 then what is the point since it will be an incomplete dataset of world-wide active navigational warnings.

S-125 will include the attributes necessary to digitally populate discrepancies, proposed changes, Advance Notice of Change and Temporary Changes.

Will non-navigation or seasonal buoys, which are normally maintained by a Temporary Notice, be taken into account, such as:

1. Tsunami warning buoys off the east and west coasts of India.
2. NOAA weather buoys (ATLAS buoys, RAMA buoys, PIRATA buoys, and High Latitude Climate Station buoys) in the Atlantic, Pacific, and Indian Oceans.
3. St. Lawrence Seaway seasonal buoys.

How would the four categories mentioned above (discrepancies, proposed changes, Advanced Notice of Change, and Temporary Changes) be differentiated among themselves, as well as from Permanent ECDIS information? Also, what is the difference between a proposed change and an Advanced Notice of Change?

S-125 will support both route planning and route monitoring functions of any voyage. It is further envisioned that S-125 can contribute to the check route function of S-100 based ECDIS. This means that S-125 and S-421 can complement each other.

Will all S-125 information, even ones that are preliminary (not active yet), be included in the check route function? Is there going to be a specified buffer along the route since the S-125 dataset mostly consists of point features?

In order to support the above vision, S-125 will be developed using S-100 Edition 4 but may utilize later versions should these become available during the development phase. S-125 compliant datasets will contain the AtoN information within the dataset area of coverage and delta changes to these datasets will contain the change information.

An S-125 service will be able to issue any change information more rapidly than what is expected from an ENC service. This is required to provide the navigationally significant information additional to the data currently available in ENC. Should the ENC service subsequently include the updated information, this information status change can then be reflected in the S-125 service.

In places where the buoyage changes very frequently, we can imagine that possibly, an S-125 local layer be issued by the qualified AtoN service and transmitted to the end users systems without HO’s checks or transformation.

The suggestion is that this layer could be updated more frequently than the ENC and pre-assumes the updating periods of HOs ENCs will remain weekly/monthly and not be reduced.

Portrayal of AtoN information in an S-125 compliant dataset will be governed by a portrayal catalogue. This will be a required component of S-125 in order to meet the sufficient S-100 compatibility level that allows for use in ECDIS. The development of a portrayal catalogue also allows IALA to specify the appropriate portrayal for AtoN information. It is important to remember that since ECDIS is a target user system, all portrayal specifications must follow relevant IMO guidelines, such as SN.1/Circ.243 as amended.

S-125 product specification development will explore functionality within GML, including upcoming enhancements that better permit delta change functionality, as the means of packaging relevant data into datasets for ingestion into ECDIS/ECS.

It may be necessary to enhance the S-100 framework standard to support these envisioned goals which will necessitate writing and submitting change proposals to S-100WG. Such submissions can be done jointly between ARM Committee and NIPWG.

AtoN information must be of highest possible quality to be considered useful in ECDIS/ECS. Some AtoN information currently in ENC have been altered from the source information to better fit with related features such as coastline using cartographic principles. Providing for such alterations would be unlikely in a S-125 service, and the focus should therefore be on providing the most accurate positional and descriptive information possible. S-125 will contain sufficient instructions to highlight the need to focus on data quality.

S-125 will require an implementation guide that should act as a living document which captures lessons learned and provides best practice for implementation and operation of an S-125 service. In order to keep such a guide relevant and up to date regularly, it may be beneficial to keep such guidance outside of the S-125 document bundle and thus reduce the risk of having to update the other S-125 documents with version changes of the implementation guide. The ARM committee envision itself to be the maintainer of this guidance document as an IALA document.

Since S-125 is intended for ECDIS, it is required that S-125 consider any impact on S-98, which is the Interoperability Catalogue Specification for ECDIS. This standard will govern how the various product layers will interact within an ECDIS and it is therefore important that the intentions with S-125 be communicated to the IHO. Within the IHO, S-98 is developed and maintained by S-100WG. Such communication can be undertaken jointly between the ARM Committee and NIPWG.

It will be necessary to develop an operational service specification (according to the final version of ARM12-11.3.1.1 and ARM12-11.3.1.1.1), and service specification/ service technical design (G1128).

# RELATED PAPERS

* G1143 – Unique Identifiers for Maritime Resources.
* IHO S-100 4.0
* IALA S-201 Aton Product Specification 1.0, 2019.
* IALA ARM12-11.3.1.1 and ARM12-11.3.1.1.1 Guideline on the development of a description of a maritime service in the context of e-Navigation plus annex.

# Related Meetings

* IALA ARM12 (28 September – 22 October 2020)
* IALA ARM13 (13 – 28 April 2021)
* IHO NIPWG8 (22 - 26 March 2021)

# Action requested

The IHO NIPWG is requested to:

1. Review the S-125 vision outline and provide feedback and comments to the ARM Committee, by the input paper deadline for consideration at ARM13.