REPORT

**on**

**the 57th session of the IMO Sub-Committee**

**on Safety of Navigation (NAV)**



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### **Annex 1**

Sub-Committee on Safety of Navigation (NAV) – 58th session - Agenda proposed to the Maritime Safety Committee.

**Annex 2**

# e-Navigation: proposed joint plan of work for the period 2012 – 2014.

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# 1. Introduction

The 57th session of the IMO Sub-Committee on Safety of Navigation was held at the IMO headquarters in London during the period 6 to 10 June, 2011. It was attended by representatives from 68 Member States and 28 Observer Organizations. The Secretary General, Omar Frits Eriksson, Nick Ward and Jean-Charles Leclair were representing the Association.

The most important item discussed during the week was again e-Navigation, including the adoption of the overarching system architecture and the proposed establishment of an IMO/IHO Harmonization Group on Data modeling (HGDM). At the end of the session, it was decided to re-establish the e-Navigation Correspondence Group to continue to progress the work intersessionally. Beyond its active participation to the Correspondence Group, mainly through its Members, IALA submitted three different documents to the Sub-Committee on different matters: on e-Navigation regarding Position, Navigation and Timing (PNT), on AIS as an AtoN and on AIS messages regarding navigation status.

During this session, the Sub-Committee also discussed several items regarding AIS, including the symbology for AIS aids to navigation for which it was decided to create a new correspondence Group in charge of the use of AIS AtoN. It adopted 11 different new or amended routeing measures and mandatory ship reporting systems as well as a recommendation to take a pilot when crossing the Strait of Bonifacio, as proposed by France and Italy, the bordering countries.

**2 Development of e-Navigation**

At its 86th session (May 2009), the Maritime Safety Committee approved a joint plan of work for NAV 55 (July 2009), together with COMSAR and STW, to set in motion the development of an e-Navigation strategy implementation plan, with a target completion date of 2012. NAV 55 decided to establish a Correspondence Group under the chairmanship of John Erik Hagen (Norway).

NAV 56 (July 2010) had finalized the user needs and the initial system architecture, and completed an initial gap analysis. It had also re-established the Correspondence Group.

STW 42 (January 2011) discussing the main role of the navigator – monitoring or navigating – had underlined that the navigator's own skills would remain essential for the safe navigation of the ship. It had noted that it would not be advisable to be totally reliant on systems where the navigator only monitored the system displays.

COMSAR 15 (March 2011) had agreed that IHO's S-100 data model should be used as a baseline for creating a framework for data access and information services under the scope of SOLAS; and also that IMO, in consultation with other organizations, should consider the establishment of a Harmonization Group on creating a framework for data access and information services under the scope of SOLAS, based on the example of the IMO/IHO Harmonization Group on ECDIS. COMSAR 15 had considered a template modified by the Republic of Korea, for identifying practical e-Navigation solutions based on operational, technical, regulatory and training aspects on a developed example of a gap analysis. It had been agreed that the e-Navigation Correspondence Group should develop practical e-Navigation solutions for other identified gaps, taking into account the human element. COMSAR 15 had further noted and endorsed that there was a need for resilience in the overall system. Navigation and communications equipment should be able to reliably indicate that they were functioning correctly. If redundancy was used to provide resilience, the system should be able to transfer automatically to an alternative source, with appropriate indication being given to the user. In addition, information concerning the authenticity of the data was needed including its source.

At this session, the NAV Sub-Committee considered the report of the Correspondence Group on e-Navigation. The report contained the developed complete and overarching architecture on e-Navigation, an enabling maritime data framework, the progress of the gap analysis, as well as a draft outline for the final Strategy Implementation Plan on e-Navigation. It also considered several documents, mainly on the need for resilient position, navigation and timing (PNT) within e-Navigation. Two documents (IALA and Korea) aimed at demonstrate the need, whilst two other submissions gave examples, UK on eLoran, and Australia supporting the combining of different PNT solutions, including through existing shipboard systems, and the setting of some standards to facilitate a standard multi-system PNT receiver. The Australian position received a large support from delegations.

After a general discussion in plenary, the Working Group on e-Navigation started its discussions based on the report of the Correspondence Group and on the documents submitted to this session. He succeeded to conclude on different items and to progress several others. The Sub-Committee endorsed its proposals as follows.

**- Overarching e-Navigation architecture**

The overarching e-Navigation architecture (see figure below) adopted by the Sub-Committee included, in the horizontal direction, the shipboard and the shore-based parts connected through different links put into a hierarchical perspective (operational services and functional and physical links used by technical services), stressing the harmonization requirement which was the essence of the e-Navigation definition and highlighting the information/data flow in the e-Navigation architecture. In the vertical direction, a distinction between the information and data domains were represented, including the human/machine Interfaces that interconnect the two domains and provide information and data items to the human users in the required format.

The architecture also identified the concept of Maritime Service Portfolio (MSP) which 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. This concept would be further developed in the future.



**Overarching e-Navigation architecture**

The figure explains the relationship of shore-to-shore data exchange and two additional important features were defined:

.1 the Common Maritime Data Structure (CMDS) that spans the whole of the horizontal axis (indicated by the shaded oval in the background), which serves an important function as it is a key to harmonization between the technical systems of stakeholders both shipboard and shore-based; and

.2 the World Wide Radio Navigation System (WWRNS), which delivers in particular the position and time data to virtually all technical systems in e-Navigation. The degree of this dependency might differ for several shore-based systems (indicated by different arrow shading).

The Sub-Committee, whilst considering e-Navigation as an ongoing and dynamic process, recalled that the overarching e-Navigation architecture should be kept under review.

**- Development of a Common Maritime Data Structure (CMDS)**

The Sub-Committee agreed on the principles proposed by the Correspondence Group on the way forward for developing the CMDS:

.1 should be based on user requirements;

.2 could represent any maritime entity and should be extended by the addition of new entities;

.3 should be accessible to any stakeholder or implementer;

.4 should be an abstract representation of parts of the maritime domain;

.5 should not contain details on the physical representation of its entities;

.6 should be flexible and extendable for meeting future requirements.

**- Using IHO's S-100 standard as the baseline for creating a framework for data access**

**and services under the scope of SOLAS**

The Sub-Committee agreed on the use of the IHO's S-100 standard as the baseline for creating a framework for data access and services under the scope of SOLAS and invited the Committee to approve its use, at its next session.

It was also noted with appreciation that IHO and IALA were exploring the possibilities of using the IHO’s S-100 Registry, operated by IHO, for storing defined data object. The Sub-Committee invited IHO and IALA to continue reporting on progress made on the matter.

**- Establishment of an IMO/IHO Harmonization Group on Data modeling**

The Sub-Committee invited the Committee to authorize, in consultation with other organizations, the establishment of an IMO/IHO Harmonization Group on Data modeling (HGDM) and agreed its Terms of Reference, in particular the following paragraphs:

*“…*

*3 The HGDM should be constituted of representatives of IMO and IHO Member States and Secretariats, and organizations with an official IMO/IHO observer status.*

*4 The HGDM should be chaired by an IMO Member State and supported by the Secretariat of the IMO.*

*5 The HGDM reports to the IMO Sub-Committee on Safety of Navigation (NAV), and to the IHO through the IHB Directing Committee, as appropriate.*

*6 The HGDM should:*

*.1 as requested by the IMO or the IHO, consider matters related to the framework for data access and information services under the scope of SOLAS, using as a baseline IHO's S-100 standard, with a view to harmonize and standardize:*

*.1 formats for the collection, exchange and distribution of data;*

*.2 processes and procedures for the collection; and*

*.3 development of open standard interfaces; and*

*.2 review the results of studies by the IMO, the IHO and other related organizations which address aspects of access to information services under the scope of SOLAS, and advise the IMO and the IHO as to whether they are compatible with the e-Navigation concept taking into account the identified user needs as they exist at the time.”*

**- Development of Maritime Service Portfolios (MSPs)**

The Sub-Committee agreed with the further development of MSPs with the support of shore-side organizations, such as IALA and IHO. An 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" might also be construed as a set of "products" provided by a stakeholder in a given sea area, waterway, or port, as appropriate.

The user needs with regard to the e-Navigation concept had already identified and adopted different MSPs corresponding to needs for services and communication in different areas and for different operations. Examples of such possible services might be local warnings, ice conditions, ENC updates, real-time tidal information, etc.

**- Gap analysis**

First, the Sub-Committee noted with appreciation the significant progress made by the Republic of Korea on filling and completing the gap analysis and invited them to submit this information to the correspondence group for further consideration.

Then the Sub-Committee concluded the discussion on the need to have a non-space based back-up system noting that several options or alternatives to facilitate resilience and backup

were promoted, including, but not limited to, the use of AtoNs, radar, pilot service, VTS, eLoran and inertial navigation system.

The Sub-Committee also endorsed the following view of the Working Group regarding timing component of the PNT functions: “*the requirements for timing should be carefully considered. In fact, maintaining a high precision of timing might not be necessary for e-Navigation into the foreseeable future. This might considerably simplify the backup arrangements needed for periods when GNSS performance was degraded. It was noted that the only foreseeable e-Navigation need for ultra-accurate timing could be for the transmission and reception of AIS messages. However, it was further noted that AIS already had a mode of operation that did not need accurate timing on board. If the performance degradation of AIS that results from using this mode was to be acceptable during periods of GNSS unavailability, there appeared to be no other onboard requirements for precision time in excess of that which could be given by existing cost effective technology.”*

**- Strategy implementation plan**

The Sub-Committee reviewed the joint plan of work for the COMSAR, NAV and STW Sub-Committees and requested the Committee to extend the target completion date for the work programme item “Development of an e-Navigation strategy implementation plan” to 2014. The joint plan is attached as annex 2.

Furthermore, the Sub-Committee decided to re-establish the Correspondence Group, under the coordination of Mr. John Erik Hagen (Norway), with the following new terms of reference:

*.1 using the overarching e-Navigation architecture as a framework, further develop the detailed architecture of both the ship and shore sides, as appropriate, taking into account the outcomes of the gap analysis;*

*.2 consider the development of Maritime Service Portfolios to achieve harmonization, modernization, integration and simplification on board and ashore, taking into account the use of the IHO's S-100 standard, and recommend the approach to be taken;*

*.3 further develop and complete the gap analysis with a view to finalization at NAV 58, taking into account the relevant documents submitted in this respect;*

*.4 further develop the draft Strategy Implementation Plan;*

*.5 consider the development of guidelines for usability evaluation of navigational equipment during the preparation of the Strategy Implementation Plan, taking into account the information provided in documents NAV 57/6/5, NAV 57/INF.7 and NAV 57/INF.8 (Japan) and NAV 57/WP.6, and recommend the approach to be taken;*

*.6 further progress the preparation of cost benefit and risk analysis processes;*

*.7 submit reports to COMSAR 16 and STW 43 raising specific questions, if required, that should be addressed by the STW and COMSAR Sub-Committees; and*

*.8 submit a consolidated progress report to NAV 58.*

# 3. Ships’ routeing and related matters

## 3.1 Traffic Separation Schemes (TSS) and other routeing measures

The Sub-Committee approved and invited the Maritime Safety Committee to adopt:

* A new Traffic Separation Schemes "Norra Kvarken" (Finland – Sweden)
* Amendments to the existing Traffic Separation Scheme "Sunk TSS East" (UK)
* Amendments to the existing Traffic Separation Scheme "At West Hinder" (Belgium)
* A new Area To Be Avoided “At West Hinder”
* Two new two-way routes at “Norra Kvarken”
* A new Deep-water route in the approaches of the River Scheldt (Belgium)
* A new Precautionary Area in the Vicinity of the Thorton and Bligh Banks (Belgium)
* A new two-way routes in the Gulf of Campeche and the ports of Cayo Arcas, Ta’kuntah and Yuum K’ak Naab (Mexico)
* Five Areas to Be Avoided and six Precautionary Areas in the Gulf of Campeche and the ports of Cayo Arcas, Ta’kuntah and Yuum K’ak Naab
* Amendments to the existing Area To Be Avoided “Off the Washington coast”
* Amendments to the existing Deep-water route off the coast of Langeland (Denmark).

**3.2 Mandatory ship reporting system**

The Sub-Committee approved and invited the Committee to adopt:

* Amendments to the existing mandatory ship reporting system “BELTEP” (Denmark).

**3.3 Recommendatory pilotage for ships passing through the Strait of Bonifacio**

The Sub-Committee approved a Recommendation on Navigation through the Strait of Bonifacio (France – Italy) which includes the following provision: *“Masters of vessels passing through the Strait are recommended to avail themselves of the services of a qualified pilot.”* It is part of the associated protective measures adopted with the creation of a Particular Sensitive Sea Area which should be finalized by the Maritime Environment Protection Committee at its next session (July 2011)

**4. Automatic Identification System matters**

**4.1 Development of Policy and New symbols for AIS Aids to Navigation**

MSC 88 (May 2011) had considered a proposal from Japan and United States to expand the scope of the planned output on "New symbols for AIS aids to navigation" to also include the development of policy, guidance and performance standards for AIS aids to navigation. The proposal was agreed and the planned output was renamed "Development of policy and new symbols for AIS aids to navigation".

Following the MSC decision Japan providing its views on how to progress the work and suggesting the establishment of a Correspondence Group. With three sessions of the Sub-Committee being allocated to the work starting at NAV 57, the target completion date was 2013, Japan therefore suggested that NAV 57 and NAV 58 be allocated to the development of policy and NAV 58 and NAV 59 to the discussion of the development of symbols. However, since the scope of work on the development of the policy was deemed to be rather wider than the development of the symbols, this plan might be adjusted, as necessary.

To complete the Japanese proposal, IALA submitted information with respect to its work providing guidance to AtoN authorities on the correct planning, installation, configuration, operation, and monitoring of AIS AtoNs.

There was a general support to develop the subject through a Correspondence Group under the coordination of Japan (Cdr Hideki Noguchi). The Correspondence Group was instructed by the Sub-Committee *“to consider documents NAV 56/11, NAV 57/8 (Japan) and NAV 57/8/2 (IALA), including comments made in Plenary and any other relevant information, develop a first draft of a policy for AIS Aids to Navigation and submit a report for consideration and review by NAV 58”.*

**4.2 Clarification on AIS Navigation Status**

The Sub-Committee had considered a proposed change by IALA in the use of some values of the Navigational Status parameter in AIS messages. Considering that some of these NavStatus descriptions vary slightly from what was found in the COLREG, and to mitigate possible confusion or ambiguity amongst users, IALA had proposed several clarifications. It had also proposed to define NavStatus 11-13, which was currently reserved for future use, and to amend NavStatus 9 and 10 to be "reserved for future use" but not solely reserved for WIG or IMDG carrying vessels, as presently mentioned.

After detailed consideration of the proposal, the Sub-Committee adopted the following comments on the IALA proposal:

*“.1 although the proposed changes to the definitions of parameters 0, 3, 5 and 8 were of an editorial nature, these were changes to well established definitions which would be likely to cause confusion to the mariners;*

*.2 the proposed changes to the definitions of parameters 11 and 12 to "power-driven vessel towing astern" and "power-driven vessel pushing ahead or towing alongside", were considered to be not an international requirement but a possible national or regional requirement. Consideration might be given to the use of these parameters for regional applications; and*

*.3 the proposed changes to the definition of parameter 13 to "requiring assistance" were not supported because its use would probably not lead to the provision of the required assistance as there would be limited monitoring for the parameter. It should be noted that the GMDSS provided facilities to indicate the need for assistance.”*

**5 ITU Matters - Utilization of the 495-505 kHz band by the maritime mobile service for the digital broadcasting of safety and security related information from shore-to-ships**

ITU-R Study Group 5, at its November 2010 meeting, had approved report ITU-R M.2201 (11/2010) – Utilization of the 495-505 kHz band by the maritime mobile service for the digital broadcasting of safety and security related information from shore-to-ships. This report described a technical approach allowing the reuse of the 500 kHz band for digital broadcasting of maritime safety and security related information for the benefit of ships at sea. Systems based on this technical approach can coexist with the worldwide NAVTEX system that operates on 490 kHz, 518 kHz, and in some cases 424 kHz.

The Sub-Committee considered that the frequency band of 495-505 kHz was ideally suited to broadcast from shore to ship. The surface wave propagation of a coast station using this band could provide a coverage area from the coast of 400 nautical miles off shore (same as the NAVTEX system). Therefore, acknowledging the current difficulties for frequency allocation and taking into account the further expected needs of additional frequency spectrum, the Sub-Committee was of the opinion that frequency band of 495-505 kHz should be claimed for future uses of e-Navigation.

**6 Other Items**

**6.1 Integration of pilots into bridge team**

Bahamas submitted a document outlining its increasing concerns following a spate of accidents and near misses involving vessels whilst under pilotage, and expressing the view that an appropriate SN circular should be developed. Another document provided by the FSI Sub-Committee also highlighted different similar cases where causes and situations recur, such as:

* lack of communication between the Pilot and the bridge team;
* language barriers;
* technical deficiencies with regards to maneuverability or navigational equipment;
* external conditions, e.g., weather, current and hydrodynamic interactions;
* pilots with insufficient training and experience;
* the Master or OOW become passive and leave the responsibility and various tasks to the Pilot; and
* the Pilot commences the pilotage even though the ship's condition or the bridge manning is not in accordance with regulations.

IMPA submitted a response to the Bahamas conclusions to the Sub-Committee and gave also oral arguments to explain their disagreement with the submission and its recommendation. Several delegations were, as IMPA, of the opinion that the existing instruments, in particular the Resolution A.960 and the Manila STCW amendments, already responded to the content of the draft circular proposed by Bahamas. During the discussion, Norway, recalling the ongoing work in the IALA Pilotage Authority Forum on harmonizing pilotage authority guidelines internationally, suggested to bring the above-mentioned FSI conclusions to the attention of both pilotage authorities and shipping companies, in addition to Administrations responsible for conducting investigations.

Finally, the Sub-Committee agreed that there was no need for a circular or other document at this juncture. However, the issues raised were important ones and might need to be reviewed in light of relevant accident investigations and experience gained at an appropriate time in the future.

**6.2 Polar vessel traffic monitoring and information system from the safety perspective**

The Sub-Committee on Design and Equipment (DE) in charge of developing a mandatory Polar Code requested the opinion of NAV on the implementation of a polar vessel traffic monitoring and information system from the safety perspective. After discussion and in the absence of any actual compelling need, the Sub-Committee concluded that the implementation of a VTMIS at present would be premature.

It also rejected the proposed inclusion of provisions in the mandatory Polar Code concerning vessel voyage planning and operations in order to avoid interactions, especially collisions, with cetaceans and other marine mammals. It was considered that the current guidance, and in particular MEPC.1/Circ 674, was sufficient in this respect.

## 7. Recommended actions for IALA

## It is recommended that:

## 7.1. the Council

* note the development of e-Navigation (item 2), in particular:

. the adoption of a figure representing the overarching e-Navigation architecture

. the use of the IHO’s S-100 standard as the baseline for creating a framework for data access and services under the scope of SOLAS

. the establishment of an IMO/IHO Harmonization Group on Data Modeling (should be approved by MSC 89 – May 2012)

. the discussion on the relative importance of the Timing in the PNT functions

. the new terms of reference for the e-Navigation Correspondence Group

* note the adoption of a recommendation containing a provision on recommended pilotage in an international strait (item 3.3)
* note the creation of a correspondence group for the development of policy and new symbols for AIS AtoN of particular interest for IALA (item 4.1)
* note the observations made by the Sub-Committee on an IALA proposal to provide clarification in the use of some values of the Navigational Status parameter in AIS message (item 4.2)
* note the IMO position to keep the 495-505 kHz band for future use in e-Navigation (item 5)
* note the discussion on integration of pilots into bridge team (item 6.1)
* note the decision not to introduce any VTMIS in the Polar Code developed by IMO (item 6.2)

**7.2. the e-Navigation Committee**

* note the development of e-Navigation (item 2), in particular:

. the adoption of a figure representing the overarching e-Navigation architecture

. the use of the IHO’s S-100 standard as the baseline for creating a framework for data access and services under the scope of SOLAS

. the establishment of an IMO/IHO Harmonization Group on Data Modeling (should be approved by MSC 89 – May 2012)

. the discussion on the relative importance of the Timing in the PNT functions

. the new terms of reference for the e-Navigation Correspondence Group

* note the creation of a correspondence group for the development of policy and new symbols for AIS AtoN of particular interest for IALA (item 4.1)
* note the observations made by the Sub-Committee on an IALA proposal to provide clarification in the use of some values of the Navigational Status parameter in AIS message (item 4.2)
* note the IMO position to keep the 495-505 kHz band for future use in e-Navigation (item 5)

**7.3. the VTS Committee**

* note the development of e-Navigation (item 2), in particular:

. the adoption of a figure representing the overarching e-Navigation architecture

. the use of the IHO’s S-100 standard as the baseline for creating a framework for data access and services under the scope of SOLAS

. the establishment of an IMO/IHO Harmonization Group on Data Modeling (should be approved by MSC 89 – May 2012)

. the discussion on the relative importance of the Timing in the PNT functions

. the new terms of reference for the e-Navigation Correspondence Group

* note the adoption of a recommendation containing a provision on recommended pilotage in an international strait monitored by VTS (item 3.3)
* note the decision not to introduce any VTMIS in the Polar Code developed by IMO (item 6.2)

**7.4. the Aids to Navigation Management Committee**

* note the development of e-Navigation (item 2)
* note the creation of a correspondence group for the development of policy and new symbols for AIS AtoN of particular interest for IALA, and the ANM Committee in particular (item 4.1)
* note the decision not to introduce any VTMIS in the Polar Code developed by IMO (item 6.2)

**7.5 the Engineering, Environment and Preservation Committee**

* note the development of e-Navigation (item 2)
* note the creation of a correspondence group for the development of policy and new symbols for AIS AtoN of particular interest for IALA (item 4.1)

**7.6 the Pilot Authority Forum**

* note the adoption of a recommendation containing a provision on recommended pilotage in an international strait (item 3.3)
* note the discussion on integration of pilots into bridge team (item 6.1)

# 8. Date of the next session.

The 58th session of the NAV Sub-Committee is tentatively scheduled to be held from 2 to 6 July 2012 in London.

The proposed agenda for the session is attached as annex.

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J.Ch. Leclair

Accredited Representative of IALA to IMO,

16 June 2011.

### **ANNEX** 1

**Sub-Committee on Safety of Navigation (NAV) – 58th session - Agenda proposed to the Maritime Safety Committee**

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Routeing of ships, ship reporting and related matters

4 Amendments to the General Provisions on Ships’ Routeing (resolution A.572(14), as amended

5 ITU matters, including Radiocommunication ITU-R Study Group matters

6 Development of an e-Navigation strategy implementation plan

7 Development of policy and new symbols for AIS aids to navigation

8 Casualty analysis

9 Consideration of IACS unified interpretation

10 Development of performance standards for inclinometers

11 Biennial agenda and provisional agenda for NAV 58

12 Election of Chairman and Vice-Chairman for 2010

13 Any other business

14 Report to the Maritime Safety Committee

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