

Agenda item 9 – IALA TECHNICAL ACTIVITIES

9.4 e-NAV

9.4.1 Documents for approval

***9.4.1-4 Frequently Asked Questions (FAQ)
addressing Common Shore-Based
System Architecture (CSSA)***

Information paper by the e-NAV Committee

1 INTRODUCTION

The e-NAV Committee, noting that topical FAQ are commonly used on many websites, has identified a need for Frequently Asked Questions (FAQ), addressing Common Shore-Based System Architecture (CSSA) in the context of the overarching e-Navigation architecture, as defined by IMO.

The proposed publication media are:

- 1 IALA Membership part of IALA Web Site.
- 2 IALA Bulletin.

It is intended that the Architecture FAQ be separate but complementary to the existing e-Navigation FAQ.

The proposed Architecture e-Navigation FAQ are at Annex A.

2 ACTION REQUESTED

The Council is requested to consider, with a view to approval for publication, the following Frequently Asked Questions (FAQ), addressing Common Shore-Based System Architecture (CSSA) in the context of the overarching e-Navigation architecture, as defined by IMO.

ANNEX A e-NAVIGATION ARCHITECTURE AND SHORE-BASED INFRASTRUCTURE FOR E-NAVIGATION FAQ

Note: *These FAQs are maintained up-to-date by the IALA e-Navigation Committee at its biannual meetings usually held during March and September. e-Navigation is a rapidly evolving IMO concept and IALA takes all reasonable efforts to reflect the most current IMO decisions in these FAQs.*

1 WHAT DOES THE e-NAVIGATION ARCHITECTURE DO?

The architecture forms a framework and will assist in the development of e-Navigation applications, while promoting international harmonisation and standardisation.

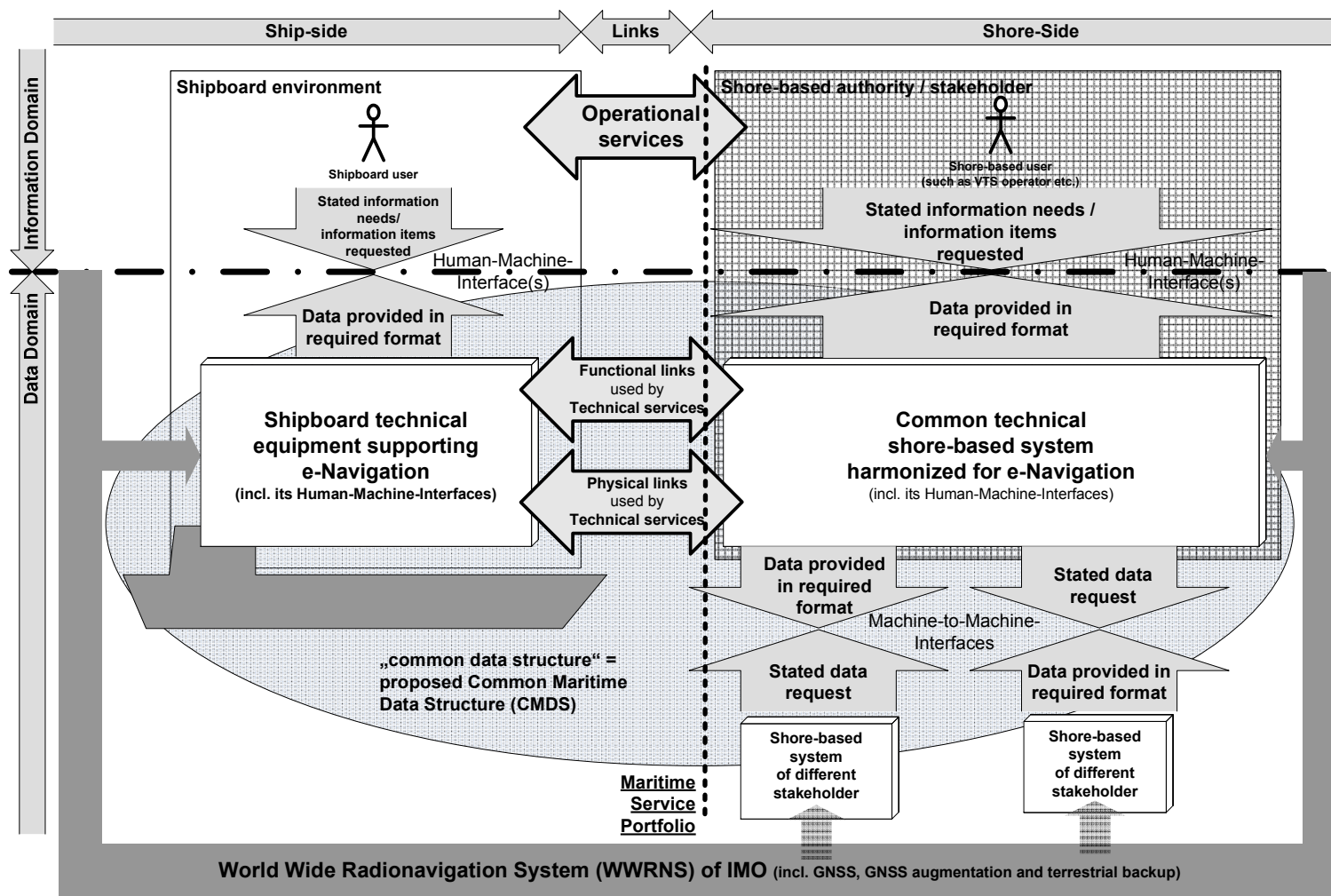
Supporting quotes from IMO MSC 85 Report, Annex 21:

No-5: 'The architecture should include the hardware, data, information, communications technology and software needed to meet the user needs. The system architecture should be based on a modular and scalable concept. The system hardware and software should be based on open architectures to allow scalability of functions according to the needs of different users and to cater to continued development and enhancement.'

2 WHAT ELEMENTS ARE INCLUDED IN e-NAVIGATION ARCHITECTURE?

The architecture includes models for the hardware, data, information, and communications technology and software needed to meet the user needs.

IMO has defined an overarching architecture for e-Navigation as given in the following Figure. IALA focuses its attention on the shore side of the overarching e-Navigation architecture, including the Maritime Service Portfolios (MSPs), in accordance with the mandate of IALA. This is illustrated by the highlighted area on the shore side in the Figure on the following page (source: IMO NAV57/15, paragraphs 6.31ff, explicitly referencing NAV57-WP.6, paragraphs on the overarching e-Navigation architecture and in particular the Figure 1; highlight added).



Note: There are operational and technical interactions between different shipboard environments. These are not shown for simplicity's sake in this figure.

Figure 1 The IMO defined overarching e-Navigation architecture with the Common Shore-based System (CSS) highlighted

3 IS THERE A SIMPLIFIED REPRESENTATION OF THE OVERARCHING e-NAVIGATION ARCHITECTURE?

Yes, the relevant elements of the IMO defined e-Navigation architecture can be re-arranged in the image of the '7 pillars of e-Navigation' (or 'e-Navigation Platform suite'). This is shown in Figure 2.

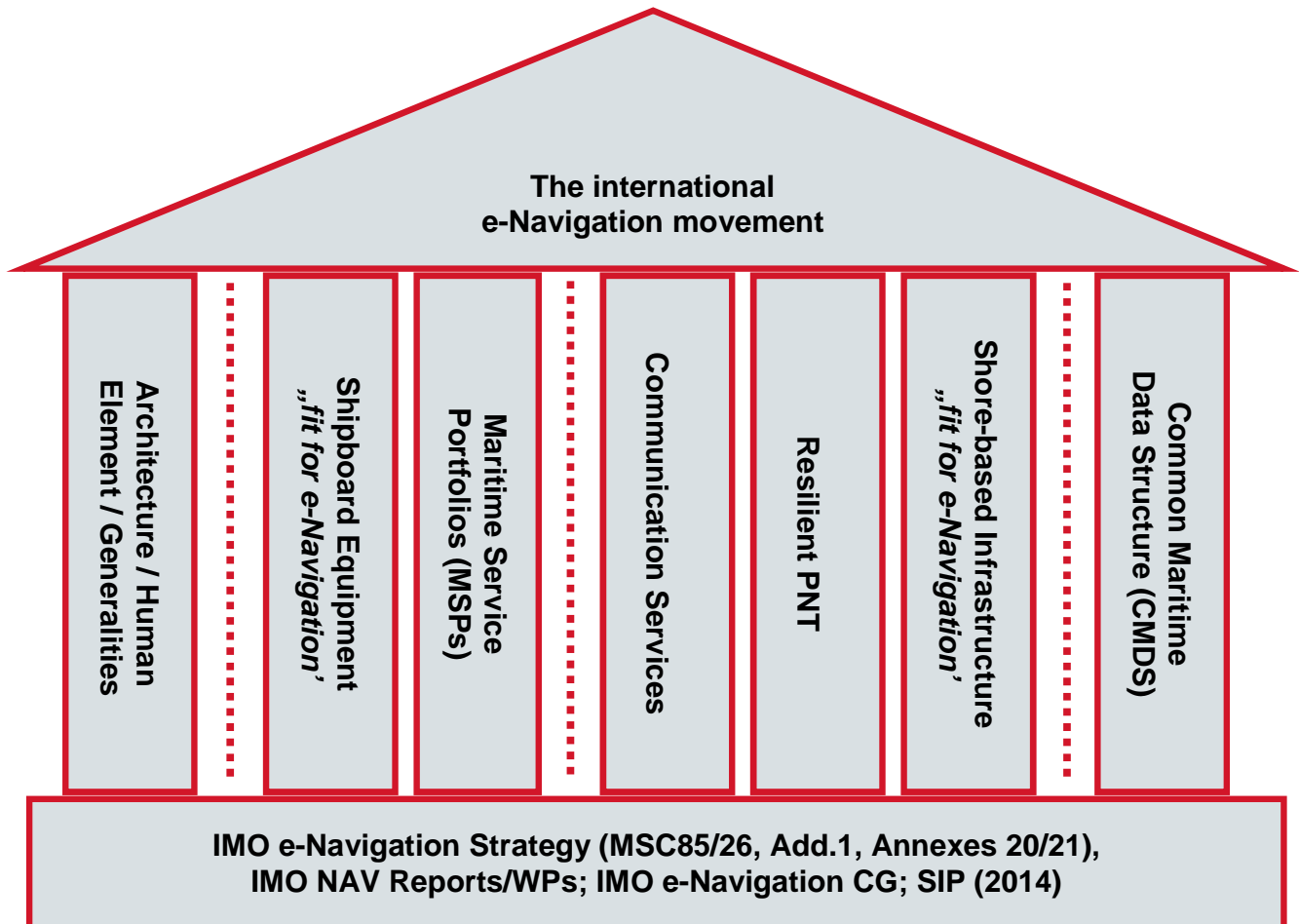


Figure 2 The IMO defined overarching e-Navigation architecture as represented in a simplified depiction ('seven pillars')

These 'seven pillars' can also be construed as seven working fields within the international e-Navigation movement. These working fields are:

- H&A: Human element, architecture, and generalities,
- SE: Shipboard equipment 'fit for e-Navigation',
- MSPs: Maritime Service Portfolios,
- COM: Communication technologies, systems and services 'fit for e-Navigation';
- PNT: Resilient PNT (Position, Navigation, and Timing) 'fit for e-Navigation';
- SI: Shore-based infrastructure 'fit for e-Navigation';
- DM: Data Modelling, including the Common Maritime Data Structure (CMDS).

4 TO WHAT EXTENT DOES THE IALA ARCHITECTURE WORK CONTRIBUTE TO THE IMO e-NAVIGATION STRATEGY IMPLEMENTATION PLAN?

IALA is leading the architecture work for e-Navigation for shore systems and ship-shore/shore-ship services by publishing Manuals, Guidelines and Recommendations. That is part of the existing mandate of IALA. The IALA Recommendations provide the necessary framework for e-Navigation from the shore side.

Additionally, at the request of IMO, IALA is supporting IMO in the development and implementation of e-Navigation by offering architecture proposals for coordinated review by IMO.

IALA is also contributing to the Common Maritime Data Structure (CMDS), as based on the IHO S-100 standard that has been designed to model data object related aspects of e-Navigation.

Supporting quotes from IMO MSC 85 Report, Annex 21:

5: 'The architecture should include the hardware, data, information, communications technology and software needed to meet the user needs. The system architecture should be based on a modular and scalable concept. The system hardware and software should be based on open architectures to allow scalability of functions according to the needs of different users and to cater to continued development and enhancement'.

Compare also Annex 20: 8.2.1, 9.1.1, 9.1.5, and 9.7.2.1.

5 CAN THE COMMON MARITIME DATA STRUCTURE (CMDS) CONCEPT BE APPLIED TO SHIP, SHORE AND THE COMMUNICATION LINKS IN BETWEEN?

Yes, that's its purpose. IMO has stated that e-Navigation will be a single integrated concept with an internationally agreed common data structure. The CMDS does not impose restrictions on encoding or implementation. Rather, the data model is an abstract framework that defines the semantics of the data. Different encoding and implementation techniques in different technical and operational contexts are possible with no changes to the data model. IMO has established a dedicated group, the IMO/IHO Harmonization Group on Data Modelling (HGDM) that is expected, once inaugurated, to co-ordinate international work on the CMDS.

Supporting quotes from IMO MSC 85 Report, Annex 20:

8.2.1: 'Mariners require information pertaining to the planning and execution of voyages, the assessment of navigation risk and compliance with regulation. This information should be accessible from a single integrated system. Shore users require information pertaining to their maritime domain, including static and dynamic information on vessels and their voyages. This information should be provided in an internationally agreed common data structure. Such a data structure is essential for the sharing of information amongst shore authorities on a regional and international basis'.

6 WHERE CAN I BUY AN 'e-NAVIGATION SYSTEM'?

There is **no** such thing as an 'e-Navigation system'. The e-Navigation **concept** is broad in scope and will have many users both ship-board and ashore and many components. No users will use all possible components defined by the complete e-Navigation concept. Individual users will use components appropriate to their activities.

7 WHAT MAKES A SYSTEM 'e-NAVIGATION COMPLIANT'?

While there is presently no direct definition of 'e-Navigation compliancy' or of an 'e-Navigation compliant' operational or technical service or device provided by IMO, the working and therefore tentative definition can be inferred from the IMO e-Navigation strategy. 'e-Navigation compliant' would mean that an operational or technical service or device has been proven, tested, or checked by a competent body to be in conformity with relevant IMO performance standards, which were explicitly created or revised as part of the implementation of IMO's e-Navigation strategy.

8 WHERE CAN I BUY CERTIFIED 'e-NAVIGATION SYSTEM COMPONENTS'?

You cannot buy certified components until IMO has adapted their existing performance standards to the e-Navigation paradigm and has written performance standards for new services or components. Likewise, other recognized international bodies need to adapt their existing recommendations and standards to the e-Navigation paradigm and write new recommendations and standards as appropriate for new services or components.

Supporting quotes from IMO MSC 85 Report, Annex 20:

9.1.3: 'The provision and development of e-navigation should consider relevant international conventions, regulations and guidelines, national legislation and standards. The development and implementation of e-navigation should build upon the work of IMO.'

9.1.7 'This part of the work will follow the development of performance standards and will involve users and manufacturers'.

9.9.3 'Implementation itself, in phases, perhaps based on a voluntary equipage of (integrated) existing systems to begin with, but with mandatory equipage and use of a full e-navigation solution in the longer term.'

Annex 1.5 'taking the lead in **setting the performance standards appropriate for e-Navigation** covering all the dimensions of the system: shipborne, **ashore** and communications. These standards should be based on user needs and should encourage technology neutrality and interoperability of system components'.

9 WILL THE CURRENT TECHNICAL ENVIRONMENT (INFRASTRUCTURE, SYSTEMS, DATA BASES, INTERFACES, PROTOCOLS, ETC.) OF AN IALA MEMBER BECOME OBSOLETE WITH THE INTRODUCTION OF THE COMMON SHORE-BASED SYSTEM ARCHITECTURE (CSSA)?

No, the current technical environment will still be relevant as IALA members move towards a Common Shore-based System Architecture (CSSA). **However**, in the usual course of upgrading, recapitalization, changing user requirements and new regulations, the IALA member will eventually be 'e-Navigation compliant'. IMO has stated that e-Navigation implementation will take place in phases. The first phase will be most likely to integrate existing technology and systems. It is possible that in this phase some new services, systems, and/or technologies will also be introduced. It should be noted that IMO has also stated that 'e-Navigation compliance' is eventually expected.

Supporting quotes from IMO MSC 85 Report, Annex 20:

9.9.1 'transition planning, taking into account the phasing needed to deliver early benefits and to make the optimum use of existing systems and services in the short term. The implementation plan should be phased such that the first phase can be achieved by fully integrating and standardizing existing technology and systems (the reduced architecture identified during the gap analysis) and using a reduced concept of operations. Subsequent phases should develop and implement any new technology that is required to deliver the preferred architecture and implement the overall concept of operations.'

9.1.5 'Communications technology and information systems will have to be identified to meet user needs. This work may involve the enhancement of existing systems or the development of new systems. Any impacts affecting existing systems will need to be identified and addressed, based on technical standards and protocols for data structure, technology, and bandwidth and frequency allocations.'

9.9.3 'implementation itself, in phases, perhaps based on a voluntary equipage of (integrated) existing systems to begin with, but with mandatory equipage and use of a full e-navigation solution in the longer term.'

10 WILL THE TECHNICAL ENVIRONMENT OF AN IALA MEMBER NEED TO MIGRATE TO THE COMMON SHORE-BASED SYSTEM ARCHITECTURE?

There may be incentives in the future for shore authorities to migrate towards the Common Shore-based System Architecture, in order to support the IMO intended 'mandatory equipage' and 'defined service levels' (compare Annex 20, 5.1.6 and 9.9.3). Although the full impact is not known yet, the IMO Member State Audit Scheme, which is mandatory by the 1st January 2015, may have an impact on the migration towards an 'e-Navigation compliant' shore-based infrastructure.

11 WILL AN IALA MEMBER WHO AT PRESENT DOES NOT HAVE AN ADEQUATE TECHNICAL ENVIRONMENT NEED TO SETUP THE COMMON SHORE-BASED SYSTEM ARCHITECTURE?

Should an IALA member intend to set up a shore-based system this IALA member may consider a system adhering to the Common Shore-based System Architecture.

12 HOW DOES AN IALA MEMBER PREPARE FOR E-NAVIGATION?

Participate in the e-Navigation work being done at IALA and elsewhere. IMO's e-Navigation Strategy Implementation Plan (SIP) is presently being developed and is expected to be ready in 2014. Based on that plan it is most likely that several concurrent initiatives regarding the above architectural elements will be launched, thus affecting IALA, amongst other bodies.

13 DOES AN IALA MEMBER NEED TO DO ANYTHING TODAY?

Yes, there are several things that an IALA member may wish to start doing today:

- become familiar with the existing and emerging documentation and literature regarding e-Navigation;
- prepare a national e-Navigation plan based on the international descriptions and the internationally defined framework for e-Navigation;
- participate in the e-Navigation work being done at IALA and elsewhere.

14 WHO WILL DO THE LIFE-CYCLE MANAGEMENT OF THE COMMON SHORE-BASED SYSTEM ARCHITECTURE AFTER IT IS DEVELOPED?

IALA will maintain what it has developed; hence IALA will maintain and further develop its own documentation regarding the Common Shore-based System Architecture.