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DEVELOPMENT OF AN E-NAVIGATION STRATEGY IMPLEMENTATION PLAN

Developing a Common Data Infrastructure for e-navigation

Submitted by the Nautical Institute

SUMMARY

Executive summary: To facilitate the harmonization of data exchange and information services provision within the concept of e-navigation, a Common Data Structure or Data Enabling Framework is needed. This is important for e-navigation to interface with emerging digital information standards and web services. Although such a common structure or framework does not exist for the general maritime industry, there are a variety of data structures for niche segments of the shipping industry as well as for the hydrographic, oceanographic, meteorological and terrestrial domains. Emergence in recent years of Spatial Data Infrastructure (SDI), and the realization of national SDI strategies across the globe emphasizes the importance of ensuring that e-navigation is positioned to adopt such developments

Strategic direction: 5.2

High-level action: 5.2.6

Planned output: 5.2.6.1

Action to be taken: Paragraph 10

Related document: MSC 85/26, annex 20

Introduction

1 For integration of maritime information the IMO strategy for the development and implementation of e-navigation states that:

"Mariners require information pertaining to the planning and execution of voyages, the assessment of navigation risk and compliance with regulations. 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." (MSC 85/26, annex 20, section 8.2.1).

2 The IMO Implementation strategy also indicates that e-navigation should, as far as practicable, be interoperable and make best use of open architecture. (MSC 85/26, annex 20, section 8.2.8). Whereas onboard information is still framed by the priority of navigation and safety and potentially well catered for in next generation S100 driven ECDIS the scope of shore-based information demands has escalated dramatically in recent years across diverse domains such as: piracy, cargo tracking, traffic management, ship routing, port security, EEZ policing, oil spill response, search and rescue, environmental monitoring and integrity. For example, the regulatory adoption of AIS and LRIT has created security demand for intelligent interpretive systems that require ingest of data from other networks. Additionally, the realization of inland waterway transportation adds another dimension of data needs and information sharing and opens the door for its own as yet unregulated ENC/ECDIS domain. It is necessary to take an overarching view of these information service requirements and to place them into proper context with regard to e-navigation and assess how the data and information components relate.

3 Recognizing that the creation of data structures and communication protocols has been an intensive work programme in certain maritime sectors such as the IHO, and the EMSA European Safe Sea Net project, and in the meteorological and oceanographic community organizations World Meteorological Organization (WMO), Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) and Intergovernmental Oceanographic Commission of UNESCO (IOC), as well as the international logistics industry, major Geographic Information Systems (GIS) providers such as ESRI (originally known as Environment Systems Research Institute Inc.) and the international standards organizations ISO and OGC; The Nautical Institute suggests that the work from these communities be taken into account during the Gap Analysis phase of the e-navigation implementation plan development.

Background

4 In recent months, two major international conferences, FIG (Federation Internationale des Geometres (International Federation of Surveyors)) Congress 2010 and IMDIS (International Conference on Marine Data and Information Systems) 2010, have taken place which highlight development of SDI at global scale and discuss development of national marine cadastres and the Pan-European marine data infrastructure SeaDataNet. SeaDataNet has been developed under auspices of the UNESCO IOC representing the global ocean science community. The Joint Research Centre (JRC) of the EC through its special SDI Unit is actively advancing the EC INSPIRE Directive implementation in context of environmental data structures, e.g., COM(2008)46 Towards a Shared Environmental Information System (SEIS). This complements the specific EC focus on marine environment addressed by COM(2009)6 Roadmap for marine spatial Planning: Achieving common principles in the EU.

5 Next generation ECDIS is important in view that a new ENC kernel code S100 is not only backwards compatible with S57 but is "open standards compliant" which enables the handling and visualizing of many other data types in support of dynamic ECDIS, marine GIS and web-based services. This provides a gateway for remote data access and puts into perspective the potential of marine data gateways such as the EMSA, SafeSeaNet and CleanSeaNet and the IOC community SeaDataNet. S100 which is highly SDI oriented lends itself as a template for a broad based navigation specific data structure allowing adoption of latest web service and interfacing with other data types and variables.

6 The World Meteorological Organization (WMO) is becoming an important player in structuring a new global architecture WIS (WMO Information System) for access to meteorological data and related marine information services. WHO collaborates closely with IOC through JCOMM in promoting and steering development of the next generation of ocean monitoring and forecasting systems; which will be fundamental to future marine navigation.

7 Whereas "marine data structures" such as S100, SeaDataNet and WIS articulate the vision and requirements of large consolidated global communities represented by IHO, WMO and UNESCO-IOC, using data models such as Marine XML and CSML, are strongly supported by international standards organizations ISO and OGC, the same is not true for the many other marine data structures and data models that exist such as SafeSeaNet, CleanSeaNet, SeaZone Hydrospace and ESRI ArcMarine which are essentially proprietary data model platforms requiring open standards data compliance converters. The adoption of such variant data systems by some national and regional authorities should be recognized and allowed for in any e-navigation strategy.

8 In 2009 the EC adopted e-Maritime as a new framework initiative for development of innovative marine information services to support development of European maritime transport under the TEN-T programme and beyond. From a data structure point of view, the e-Maritime embraces the concept of e-navigation and extends beyond it by including EC research developments such as e-Freight, e-Customs and My-Ocean. The EC e-Maritime initiative provides an enormous pool of potential knowledge skills and research expertise that will be available to the e-navigation community.

The basic principles underlying any such review have to accord with:

- .1 clarification of information needs specific to e-navigation;
- .2 recognition of the embracing e-Maritime framework;
- .3 cross-community engagement for knowledge exchange and advancement;
and
- .4 monitoring and scrutiny of solutions for e-navigation adoption.

Subsequently a mechanism to be established that allows monitoring the implementation of any such review and a parallel mechanism established that allows ongoing monitoring of relevant technological advances (e.g., EC e-Maritime) and ensure their notification and potential adoption for e-navigation.

Conclusion

9 The creation of a common data infrastructure or framework for e-navigation should be a collaborative effort across the various relevant international organizations involved to ensure the e-navigation demand for data access and information services are harmonized and interoperable. A priority workshop is suggested for initiating the process.

Action requested of the Sub-Committee

10 The Sub-Committee is invited to note the information provided.