

## IALA's work in EfficienSea2

***Dr Nick Ward, Director of Research, General Lighthouse Authorities of the United Kingdom and Ireland, has kindly provided this update in his capacity as IALA Project Manager for EfficienSea2***

EfficienSea2 is a European Union-funded “Horizon 2020” project led by the Danish Maritime Authority, with 32 partners, including IALA. The purpose of the project is to enhance safety of navigation and increase efficiency at sea, by developing e-navigation services, the Maritime Cloud and communications, in particular the VHF Data Exchange System (VDES).

IALA leads Task 1.2 (Project/Test Bed Liaison) and Task 1.3 (Standardization) in EfficienSea2 Work Package 1 (WP 1) and also contributes to WP 2 (Communications - VDES) and WP 3 (Maritime Cloud).

### Standards and testbeds

The initial core work in Tasks 1.2 and 1.3 has been completed and reports have been accepted. There is ongoing work to maintain the spread sheets on which the testbed and standards information is recorded and which are being kept updated; the current versions are provided on the EfficienSea2 website (<http://efficiencsea2.org/>) with links from the IALA website.

### Work plan

IALA has also completed its work plan for the second year of the project, progressing work on VDES and Maritime Cloud documentation. The information generated will be provided on the website and as inputs to the IALA e-Navigation Committee (ENAV). The expected outcomes from the current work plan, for the third and final year of the project, are described below.

This work is carried out by a ‘virtual team’ of consultants from around the world, coordinated by e-mail and teleconferencing. However, the team members do attend IALA Committee and Working Group meetings, as appropriate, to present results and provide feedback.

### Communications strategy for e-navigation

The e-navigation concept is designed to increase the efficiency, safety and security of voyage planning and information in the maritime sector. e-Navigation is dependent on applications that provide mariners with the data they need in a more secure and efficient manner. These applications require communication technologies that can provide the necessary capacity for bidirectional ship-ship, ship-shore, and ship-satellite communications.

The vision for digital communications in the maritime environment is “secure, effective, seamless communications to support maritime applications”.

To achieve this vision, four core strategic challenges have been identified:

1. Providing communication options to address operational requirements.
2. Ensuring existing and developing digital maritime communications technologies that interact effectively and seamlessly.
3. Evaluating the suitability of different technologies to address the requirements.
4. Implementing infrastructure to support digital maritime communications.

It is planned to promote such a strategy through the work of the IALA ENAV Committee.

## VHF Data Exchange System

The VHF Data Exchange System (VDES) represents an effective and efficient use of maritime spectrum, building on the existing capabilities of the Automatic Identification System (AIS). The development of the VDES as a communication channel for the transfer of large volumes of data between ships and other entities is being coordinated by IALA, in close consultation with the International Telecommunication Union (ITU). It could be a key supporting element of the International Maritime Organisation's (IMO's) e-navigation initiative.

A number of trials and test beds for VDES continue to be carried out. One trial concerned a channel sounding campaign, conducted by the General Lighthouse Authorities of the United Kingdom and Ireland (GLA) and the Institute for Telecommunications Research (ITR) at the University of South Australia. This examined radio propagation conditions for all channels intended for use in ship-to-shore and shore-to-ship VDES communications. A comprehensive series of sea trials were conducted over five days, near Harwich, on the east coast of England. Five operational scenarios were examined, spanning four of the six IMO-identified categories of maritime areas where shore-based maritime services for e-navigation (the so-called Maritime Service Portfolios or MSPs) should be considered; the selected four maritime area categories concern port areas and approaches, coastal waters and confined or restricted areas, open sea areas, and areas with offshore and/or infrastructure developments. System components and deployment were consistent with real-world maritime use and indicated a potential channel model design.

The channel model is being further developed, using the results of these trials as well as data available from satellite-based AIS.

A number of potential navigation applications of VDES have been identified, which illustrate how it could be used to support the introduction of e-navigation.

## Maritime Cloud

In preparation for an IALA workshop on the Maritime Cloud (MC), planned for late 2017, some consideration has been given to the business model on which the MC could be based.

The MC is a communication framework that enables efficient, secure, reliable and seamless electronic information exchange among all authorized maritime stakeholders across available communication systems. In other words, it is not a storage system for on-line data in the traditional sense of an on-line cloud, but a communications infrastructure for e-navigation,

The core components of the MC will be open source. In fact, all MC components should be open source to ensure international compatibility.

These core components are as follows:

- **Identity Registry.** This is needed for secure and reliable identity information and provides a single login to all services, using identity information provided by trusted stakeholders.
- **Service Registry.** This is needed for registering, discovering and using all relevant e-navigation and e-maritime services, commercial and non-commercial, authorised and non-authorised, for free and against payment. This can be seen as a sophisticated "Yellow Pages" phone book or the equivalent of an App Store.
- **Maritime Messaging Service.** This is an information broker that intelligently exchanges information between communication systems connected to the MC, taking into account the current geographical position and communication links available to the recipient.

The Maritime Messaging Service is a service that could be registered as part of the Service Registry and provided by one or more third party Service Providers (see also below).

## Operational description

Both **Service Providers** and **Service Consumers** will need to register on the MC. The registration will enable them to make use of the MC. Registered Service Providers would be able to list their services on the MC, while Service Consumers would be able to browse the list of available services, select the required/desired service and then, depending on how the service is offered, use it.

The Service Provider could include any entity (international, regional and national authorities, ports and commercial organisations) that has a service to offer. The Service Consumer could include any entity (Service Provider and/or vessel) that wishes to make use of a service offered on the MC.

Registered Service Consumers will be able to use services on offer. Registered Service Providers will be able to discover Service Consumers and use the information gained in the development and provision of services.

## Conclusion

IALA is playing an active role in EfficienSea2, maintaining an overview of testbeds and standards while engaging a team of consultants working closely with the IALA ENAV Committee to develop e-navigation services, technology and documentation for the VHD Data Exchange System and to promote and develop the Maritime Cloud as the logical communications structure for e-navigation.

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