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Agenda item 11

Task Number 2.1.1

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**e-Navigation Communication Study**

**SUMMARY**

This input paper summarises the results of a study on e-Navigation communications carried out for the General Lighthouse Authorities of the UK & Ireland.

**Action requested of the Committee**

The Committee is invited to note the results of the study.

**E-NAVIGATION COMMUNICATION STUDY**

**INTRODUCTION**

This paper summarises the results of a study carried out by Helios for the General Lighthouse Authorities of the UK & Ireland (GLA). The study defined key high level requirements for the communication systems that would be necessary to support e-Navigation applications, with an initial assessment of candidate technologies against these requirements. The report is intended as a guide to the future development and implementation of e-Navigation applications by the GLA and to provide input to the international implementation process.

**SCOPE**

The scope of the study was the implementation and use of the e-Navigation communication infrastructure in the 2020 to 2030 timeframe. The applications assessed were those that best reflected the current and likely future status of e-Navigation within the defined timeframe, considering the IMO Strategy Implementation Plan (SIP). The study considered e-Navigation communications systems already under development, as well as those that could be available and deployed in the 2020-2030 timeframe.

**METHOD**

The candidate communication systems were assessed against their ability to support the user and performance requirements of each e-Navigation application in defined future usage scenarios. The high level requirements that were used to assess the communication systems included: capacity, coverage, availability and confidentiality. Future traffic scenarios for the Dover Strait and North of Scotland were developed to assess the number of vessels using each application, and hence the data demand on the communication systems. It was found that the Dover Strait would result in the greatest application data loads and therefore would be the main driver for developing the communication system requirements.

The key indicators used to assess each communication system were: the ratio of the average data load for an application against the maximum theoretical capacity of the system; and the time taken (or delay) for each system to serve peak application data loads. It was found that the most data intense applications were the No Go Area and Telemedicine; requiring large amounts of bathymetric data to be sent and two-way video calls respectively. The least data intense applications were the Route Exchange and Vessel Operational Coordination Tool, which mainly involved transfer of position coordinates.

**RESULTS**

The analysis indicated that when the VHF Data Exchange System (VDES) reaches maturity it should provide significant advantages for several of the applications. Combining channels can be used to cope with data rates required by the most demanding applications and coverage can be provided in regions unreachable by other technologies. It was also noted that future developments in mobile telecommunications will provide faster data rates, capable of supporting greater data demand from vessel crews and passengers. However, the ground infrastructure for these technologies will be the limiting factor in providing coverage away from shore.

Based on the analysis, communication system(s) were selected that were considered to be the most suitable for supporting each e-Navigation application. The results can be seen in Table 1.

| Application | Recommended Communication System |
| --- | --- |
| No-Go | VDES |
| Route Exchange | VDES |
| MSI | NAVDAT (just MSI response)  VDES (both request, and MSI response) |
| Weather Data | VDES |
| Telemedicine | 4G and 5G (close to shore)  Inmarsat GX (away from shore) |
| Maritime Single Window | VDES (away from port)  4G/5G (in port/near the coast) |
| VOCT | VDES/NAVDAT |
| Passenger Internet Access | 4G/5G (close to coast)  Wi-Fi (in port)  Inmarsat GX (away from coast) |

**Table 1: Summary of applications matched to communication systems**

Note: The full report can be obtained on application to nick.ward@gla-rrnav.org.