Liaison Note to IMO e-Navigation Correspondence Group

Inputs on infrastructure and test-beds

# Introduction

On 8 February 2013 Mr John Erik Hagen, Chairman of the IMO e-Navigation Correspondence Group (CG) wrote to the CG with regards to ‘Time schedule for e-Navigation towards NAV 59’. After outlining the 5 prioritised potential solutions, he invited Members of the CG to provide inputs on e-navigation technical infrastructure and test-beds before 29 April 2013.

# Discussion

As IALA is a member of the CG, the IALA e-NAV Committee has compiled this paper that provides input on both technical infrastructure and test-beds of particular interest to IALA

# Action requested

The IMO e-Navigation CG is requested to consider the information provided below

On 8 February 2013 Mr John Erik Hagen, Chairman of the IMO e-Navigation Correspondence Group (CG) wrote to the CG with regards to ‘Time schedule for e-Navigation towards NAV 59’. Within this message he stated that:

*The majority of the CG has prioritized the following main potential solutions:*

*S1: Improved, harmonized and user-friendly bridge design*

*S2: Means for standardized and automated reporting*

*S3: Improved reliability, resilience and integrity of bridge equipment and navigation information*

*S4: Integration and presentation of available information in graphical displays received via communication equipment*

*S9: Improved Communication of VTS Service Portfolio*

*Through prioritization, the remaining solutions might thus be assigned to a roadmap for future iterations of the e-navigation Strategy Implementation Plan.*

*Based on this prioritization, the next step might be to consider:*

*1. Technical infrastructure that will provide the backbone of the e-navigation prioritized solutions which could enable reliable and efficient sharing of maritime data ship-ship, ship-shore, shore-ship and shore-shore*

*2. Test-beds under each prioritized main potential solution that utilize/demonstrate the infrastructure, with the human element in focus*

*Members of the CG are invited to provide inputs on e-navigation technical infrastructure and test-beds before* ***29 April 2013.***

IALA understands that the intention of seeking input on the ‘technical infrastructure’ and ‘test-bed demonstration’ at this time is to help inform the ‘Cost Benefit Analysis’ process that will need to be conducted prior to NAV 59 in order to contribute to the draft Strategic Implementation Plan (SIP). Therefore we wish to offer practical advice on known or anticipated infrastructure that may support or be needed to support the 5 main potential solutions noted above.

Given that these aforementioned 5 practical solutions have been translated into 8 Risk Control Options (RCOs) identified in the “FSA Steps 1-3” (CG 13 February 2013), we have used these (outlined below) to structure the identification of the requested infrastructure and test-beds.

Since the inception of the IALA e-Navigation Committee, there has been a great amount of work done identifying such existing or potential infrastructures.

The purpose of this document is to summarise the issues related to infrastructure and to provide reference and/or links to future details, in order to aid the Cost/Benefit Analysis based upon the current RCOs.

Given IALAs specialist interest in the shoreside infrastructure, the issues raised in this paper focus specifically on RCOs 4, 5 & 6. For clarity, RCOs 1, 2, 3, 7 and 8 have been removed from this list, although it is recognised that all RCOs will need to be addressed by the IMO CG to achieve a full solution.

**RCO 4: Automated and standardised ship-shore reporting**

The system envisaged would allow bridge crew to edit all reportable information in one common interface. The system would integrate relevant on board systems enabling collection of information and data needed for reporting. The system should facilitate information to be entered only once.

The system should allow for automated digital distribution of required reportable information (single window solution), including both static, dynamic, voyage related and SAR information to authorised authorities, with the least possible intervention required by the ship during and/or before navigation.

Secure ship-shore data communication would be a prerequisite for an automated reporting solution. In order to reduce the amount of ship-shore data communication, a system for shore distribution to stakeholders is envisaged.

RCO 4 is to cover subjects proposed in solution 2.1, 2.2, 2.3 and 2.4 as per [8].

**Issues Identified by the IALA e-Navigation Committee:**

|  |  |
| --- | --- |
| Shipboard Infrastructure Issues to take into account: | Shorebased Infrastructure issues to take into account: |
| * National, regional and international mandatory ship reporting requirements * Existing communication systems (including GMDSS and its current review process) * Other communication developments (i.e. VDE, Internet) * FAL Forms * Infrastructure for onboard data and information management * Usability of Human Machine Interface for effective use. * Need/ability to record all reported information. * Level of resilience for reporting functions * Interoperability between systems both onboard and between ship and shore | * Existing communication systems (including GMDSS and its current review process) * FAL Forms * National Single Windows * LRIT infrastructure * The IALA Radio Communications Plan * Inter VTS Exchange Format exchange (IALA work for data exchange) * VTS Guidance (i.e. IALA Recommendation V-128 Operational & Technical Performance requirement for VTS equipment) * How to receive danger messages SOLAS Reg V/31 * Usability of Human Machine Interface for effective use. * Need/ability to record all reported information. * Level of resilience for reporting functions * Interoperability between systems both onboard and between ship and shore |
| Test Beds or examples of relevance   * MEH S-100 * IMO Adopted Mandatory Ship Reporting systems (i.e. ReefRep, Malaca, Dover, etc..) | |

**RCO 5: Improved reliability and resilience of PNT systems**

In order to improve reliability and resilience of position, navigation, and timing data (PNT) an integration of PNT related systems and services is envisioned. PNT data encompasses position, velocity, and time data (PVT) and ship's parameters describing ship's current movement and attitude (e.g. heading, rate of turn). Resilience is the ability of the PNT system to detect and compensate external and internal sources of disturbances, malfunction and breakdowns in parts of the system.

The Integrated PNT Concept as described in [11] ‘Modular and open concept of Integrated PNT System’ is suggested as basis for the RCO.

RCO 5 is to cover the subject proposed in e-navigation solution 3.4 as per [8].

**Issues Identified by the IALA e-Navigation Committee:**

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| --- | --- |
| Shipboard Infrastructure Issues to take into account:   * The ability to integrate data and information provided by various PNT systems (PNT Model – eNAV11/8/5) * Note IMO Development of performance standard for multi-system shipborne navigation receivers. * The accuracy of PNT in relation to accuracy of Hydrographic data. * GNSS Vulnerability IALA Recommendation R-129 | Shorebased Infrastructure Issues to take into account:   * IALA World Wide Radio Navigation Plan * Need to define levels of service – Internationally, Regionally, Nationally and locally. * Note IMO resolutions on radio navigation services A.915(22) & A.1046(27) * GNSS Vulnerability IALA Recommendation R-129 |
| Test Beds and examples of relevance   * ACCSEAS Project * GLA GPS Jamming Trials | |

**RCO 6: Improved shore-based services**

VTSs and other shore-based stakeholders gather and hold a lot of information regarding navigational warnings, incidents, operations, tide, AIS, traffic regulations, chart corrections, meteorological conditions, ice conditions, etc. As per today this information is mostly communicated via voice VHF and paper documents. Information transfer via voice communication can be time-consuming and distractive as navigators may need to make notes of information received and possibly consult various written documentation on the bridge. The voice communication procedure also holds a potential for incorrect transfer and misinterpretation of information. It is clear that there is a significant potential for improving the way such information is administered and communicated to the fleet.

Implementation of system for automatic and digital distribution of shore support services would make information more available, updated and applicable for navigators.

RCO 6 is to cover subjects proposed in e-navigation solution 4.1.3, 4.1.5, 4.1.7, 4.1.8, 4.1.9 and 9 as per [8].

**Issues Identified by the IALA e-Navigation Committee:**

|  |  |
| --- | --- |
| Shipboard Infrastructure Issues to take into account:   * Ability of shore provided data and information, from various sources, to be integrated onboard in a usable method. * Development of systems or applications to effectively reduce the workload onboard. * Ability to effectively portray MSI to assist decision making. | Shorebased Infrastructure Issues to take into account:   * Note variety of communication options (note: IALA Maritime Radio Communications Plan) * Note service level requirements * Need to provide effective MSI, in digital format, Note IMO work to present MSI on INS (MSC 92/23/5). * Standards for data quality. * Standards for shore system quality (including hardware and software) * The need for systems to be maintained and upgraded. * Both push and pull systems and services. * Note Maritime Service Portfolios (MSPs) * Need to ensure seamless interoperability between ships and shore for data transfer on an international basis. * Ability to reduce the workload of information management shoreside. |
| Test Beds and examples of relevance   * ACCSEAS Project – Note ‘mariners notification service’ * EfficenSea * MarInfo (Canada) (Actual working example) * BLAST project (mariners routing guide) * C-Sharper (Singapore) * MEH (Singapore) * UKCM (Under Keel Clearance Management – Australia) (Actual working example) * NavDat Recommendation ITU-RM.2010 * SafePort (EU Project) * MonaLisa * MarNIS | |