To: All CIRM Members

From: Richard Doherty, Chief Technical Officer

Report of e-Navigation Underway 2015
Copenhagen/Oslo
27-29 January 2015

E-Navigation Underway 2015 took place from 27-29 January on the Pearl Seaways (from Copenhagen to Oslo, and back to Copenhagen). This was the fifth such conference and, although slightly less well-attended than last year, it still had an impressive number of attendees.

The theme of the conference was "The Implementation Phase?" This tagline deliberately included a question mark to indicate that there is still a lack of clarity across the industry as to when e-navigation will be implemented.

This report does not include a summary of all presentations. Instead it outlines key findings and important information contained in some of the presentations. A few conclusions are included at the end of the document.

Omar Frits Eriksson (Director, Maritime Technology & Business Development at **DMA**) opened the conference with a recap on the progress of e-navigation between 2005, when the concept was first proposed, and 2015. There is now an approved Strategy Implementation Plan (SIP) in place, some Administrations are ready for e-nav, industry is showing increased interest, and shipowners are still looking for cost reduction. The conference was tasked with exploring the implementation phase of e-navigation.

Simon Pelletier (President of the **International Marine Pilots Association**) gave the keynote speech. Broadly supportive of the conference and the aims of e-navigation, Mr Pelletier nonetheless urged the need for caution. E-nav should not be seen as a new paradigm, and caution was expressed about introducing technology for technology's sake, noting that much existing equipment is still not integrated, and expressing concern at over-reliance on ECDIS and AIS. It was suggested that progress is most effective when it is focused, and that e-nav would be welcomed by pilots if it is realistic and if it adds value. Mr Pelletier ended with an example of something useful – a PPU with tidal and shoal sounding overlays.

John Erik Hagen (Director of the **Norwegian Coastal Administration**) summarised the progress of the e-navigation SIP and outlined what is coming next. MSC 94 approved the SIP and invited Member Governments to prepare a comprehensive prioritised plan of work for submission to MSC 95, review each of the SIP tasks with a view to reducing the number of outputs, and prepare a full justification of each reviewed output. Mr Hagen outlined the work being undertaken by the Norway-led e-nav interest group. They are preparing a

revised work programme, using the SIP as the basis. Working from the original 18 tasks, the group has identified a much smaller number of outputs for e-nav (*for the opportunity to provide input to this work please join the CIRM e-navigation Working Group*). Each identified output will have to be proposed by a Member State and supported by interested parties.

Robert Ward (President of **IHO**) explained IHO's underpinning role in e-navigation, focusing on the Common Maritime Data Structure (CMDS). Mr Ward suggested that "Maritime intranet" is a better term for what is currently meant by "e-navigation". The CMDS is required to facilitate e-nav interoperability and the IHO's S-100 standard has been adopted as the baseline data exchange standard for e-nav. Edition 2.0.0 of S-100 for publication in 2015/2016 has a wider scope than e-navigation – it is an ISO-based geospatial data standard supporting a wide variety of product specifications. It is is extensible with an inherent flexibility – small changes in the standard will not require changes in products. Mr Ward noted that the IMO/IHO harmonisation group on data modelling could be reactivated

Omar Frits Eriksson (Chairman of the **IALA e-Navigation Committee**) gave a short presentation on the new structure of the Committee, which now consists of the following 5 working groups:

> WG 1 - Harmonization (led by Edward Hosken of UKHO)
> WG 2 - Implementation (led by Mahesh Alimchandani of AMSA)
> WG 3 – Telecommunications (led by Peggy Browning of ExactEarth)
> WG 4 – E-nav services (led by Jon Leon Ervik of Norway)
> WG 5 – PNT Position, Navigation and Timing (led by Alan Grant of UK GLA)

The work to be undertaken by these Working Groups in the next 4 years includes development of Common Shore-based System Architecture; e-Navigation infrastructure and governance; Maritime Service Portfolios; S-100 Product Specifications; Communication channels (e.g. VDES); Testbeds and implementation activities; PNT solutions (including eLoran).

Michael Bergmann (President of **CIRM**) presented on the e-navigation Ship Side Coordination Task Group (ESSTG) which is a group set up to address the ship-side aspects of e-navigation implementation. This group came about with the recognition that while IALA is the central coordinating body of the shore-side implementation of e-navigation, the ship-side does not have a similar recognised body. The ESSTG consists of CIRM, BIMCO, ICS, IHO, IMPA, INTERTANKO, and the Nautical Institute, with IALA serving a coordination function. The group will progress work via correspondence and will meet when practical (i.e. during other meetings).

Alan Blume (Deputy Commissioner of Maritime Affairs, **Marshall Islands**) gave a Flag state's perspective on e-navigation, emphasising that in moving forwards, the intended outputs of e-nav must meet the needs of users on both ship and shore. Mr Blume warned against overloading ECDIS and talked about the need to ensure data security and integrity. There is some scepticism among Flags that identified solutions will result in new equipment without first considering how existing equipment might be better utilised.

Filipe Modesto da Rocha (**PETROBRAS** Brazil) gave an interesting presentation on what e-navigation means to the oil majors. Of note, PETROBRAS is utilising AIS ASMs (Application Specific Messages) containing physical data related to their offshore drilling

operations for portrayal on electronic charts across their fleet of 400 vessels, as well as developing S-57 compliant offshore subsea asset overlays. This presentation included an invitation to the (many) ECDIS manufacturers present to discuss commercial opportunities.

There were a number of presentations relating to **e-navigation infrastructure**, including development of the Maritime Cloud and progress in e-navigation testbeds. It was noted that the Route Exchange functionality developed by MONALISA and included in edition 4 of ECDIS standard IEC 61174 is an example of how the testbeds can have a positive effect on standards.

The **ACCSEAS project** is developing and implementing an e-Navigation Test-bed to prototype concept solutions to advance shipping accessibility in the North Sea Region, and has apparently delivered a resilient PNT solution combining GNSS with eLoran. It is also developing a GPS jamming simulator and is working with absolute radar positioning for resilient PNT. A feasibility study into DGNSS R-mode has been published and is available online (http://www.accseas.eu/content/downloadstream/4675/40172/file/R-Mode_Study_MF-Beacon_final_20140311.pdf)

Representatives from the **MONALISA** and **STM** (Sea Traffic Management) projects gave updates on technological developments, including the European Maritime Simulation Network, developed with TRANSAS and Kongsberg, which allows simulators of different manufacturers to be remotely connected for the purposes of more advanced simulation scenarios, allowing the assessment of the safety and efficiency impacts of new traffic management procedures on a large scale. SeaSWIM (System Wide Information Management) is a concept for a common information environment for the shipping industry, based on a distributed service architecture supporting service distribution and discovery, which would support interoperability among stakeholders while preserving each stakeholder's access to data.

TRANSAS focused on the future of ECDIS, outlining how ECDIS has evolved since 1990 and the direction we are now headed (e.g. edition 4 of IEC 61174, use of ECDIS as a shipboard e-navigation platform). Achievements made include manufacturer innovation and creativity, and the fact that there is now a class of pro-ECDIS users who buy into the technology. Drawbacks include a perception that ECDIS has become overly complicated and non-user friendly, and that training issues remain.

ERNC Ltd presented on the practical aspects of the transition from paper-based navigation to paperless, focusing on the human factor. This presentation proposed an ECDIS Annual Performance Test (APT), something CIRM has been exploring in the last couple of years.

Jean-Charles Cornillou of the **French Maritime Administration** spoke about the Modernisation of the GMDSS and what it could bring to e-navigation, expressing the concern France retains about the addition of new satellite services into the GMDSS and how this will affect users – although additional service will expand capacity, they will not be interoperable, which is a key aim of e-navigation. Captain Cornillou also commented on the improving technology behind HF comms but cited a lack of shore-based facilities as another concern. He noted that only 11 coastal radio stations actually provide HF NBDP MSI services but that 84 are declared in the GMDSS Master Plan.

Jan Reche of **Germany** presented on the development of PNT guidelines for e-navigation, the purpose of which are to facilitate reliable PNT data provision and continuative integrity

monitoring as well as detections and compensation of errors; to specify and harmonise data processing techniques as prerequisite of standardised data products; and to efficiently facilitate evolving user needs and technical progress. The work must focus on establishing a modular system concept, promoting the combined use of PNT-relevant data sources, and supporting system awareness. Germany has provided a draft guideline to NCSR 2, with a view to providing the final text to NCSR 3.

Kwang-il Lee (Electronics and Telecommunications Research Institute of **Korea**) spoke on cyber-security for e-navigation. Heavily involved in IEC TC 80 Working Group 6 and the key author of IEC 61162-460, Mr Lee spoke about the -460 Ethernet security standard currently in development. He stated his view that "cyber security" in the e-nav context consists of three concepts – Maritime Cloud Security (IALA), Communications Security (ITU/IALA), and Shipborne Security (IEC). Shipborne security threats included virus/worm infection through external devices and hacking from on- or off-ship systems, which may be addressed through use of gateways and network monitoring. Comms security threats revolved around the vulnerability of AIS. Maritime Cloud security referred to the lack of authentication and secure session management evident in the testbeds.

Nick Lemon of **AMSA** presented on the harmonisation of e-navigation guidelines (Human Centred Design, Software Quality Assurance and Usability Testing) recently completed by the correspondence group. The harmonised guidelines brings these three subject areas together into one harmonised guideline, in order to provide an overarching document to ensure that e-navigation quality design attributes are included in the development of e-navigation systems. The guidelines are goal-based, mainly based on ISO standards, and not intended to specify or discourage the use of any particular design solution or SQA or UT method.

Conclusions...

- The conference continues to be well attended and there were a range of different types of organisation present from around the world. Manufacturers and service providers were there in force.
- A number of speakers pointed out that "e-navigation" is a misnomer and it should have been called something else, because the scope of the SIP goes beyond navigation. This is something I have heard from the IMO Secretariat also.
- In terms of how e-nav has progressed between the 2014 conference and the 2015, there is definite progress on the regulatory stage (with approval of the SIP, drafting of a prioritised work programme, harmonisation of guidelines) and definite progress within the e-navigation testbeds, which are delivering some interesting prototypes and further defining concepts. However there has been very little progress in terms of the "buy-in" to the e-navigation concept by the sceptics. It is clear that e-nav as a concept is progressing in the minds and work of those directly involved in it, but remains a hard sell (and something of a mystery?) to those outside of it.
- There is therefore a corresponding difference in the level of enthusiasm between those involved in the e-navigation projects and testbeds (IALA, DMA, NCA, SMA, etc.) and those representing the end users of some of the proposed e-nav solutions (ICS, Pilots, other Flag States). Those present who represented mariners continually expressed a more conservative point of view, stressing the need to not develop

technology for the sake of it – "mariners don't want extra equipment, they want more time to navigate."

- Of all solutions discussed, by far and away the one that provoked unanimously favourable reaction from mariners is automated reporting (i.e. the automatic collection of data, the automatic population of FAL forms, and the automatic submission of these to port).

Richard Doherty   9th February 2015