Update on the e-Navigation Cooperation MOU between Sweden, Denmark, and Korea

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- Three countries signed on the MoU in Opening Session, e-Navigation Underway 2014
  - sharing a Common Interest in the establishment of global e-Navigation Test bed
  - wishing to use the e-Navigation test bed for the purposes related to the testing and demonstration of e-Navigation related services and infrastructure
MoU Ceremony to build up Global e-Navigation Test Bed between Sweden, Denmark, and Korea

Memorandum of Understanding
between
the Ministry of Oceans and Fisheries of the Republic of Korea,
the Danish Maritime Authority of the Kingdom of Denmark, and
the Swedish Maritime Administration of the Kingdom of Sweden,
Regarding the Establishment and Use of a Global e-navigation Test Bed

The Ministry of Ocean and Fisheries of the Republic of Korea (MOF), the Danish Maritime Authority of the Kingdom of Denmark (DMA), and the Swedish Maritime Administration of the Kingdom of Sweden (SMA) (hereinafter referred to as “the Participants”),

Sharing a common interest in the establishment of a global e-navigation test bed and wishing to use this e-navigation test bed for purposes related to the testing and demonstration of e-navigation related services and infrastructure;
MoU Ceremony to build up Global e-Navigation Test Bed between Sweden, Denmark, and Korea

- **Purposes**
  - to demonstrate the value of suggested services in different areas of the world
  - to test and demonstrate e-Navigation Services and Infrastructure

- It provides an opportunity to validate stability and effectiveness of e-Navigation services.
MoU Ceremony to build up Global e-Navigation Test Bed between Sweden, Denmark, and Korea

- The scope of cooperation includes
  - cooperation on establishment, implementation and use of a global e-Navigation testbed
  - information sharing and cooperation in response to the reinforcement and expansion of international e-Navigation regulations
  - knowledge sharing and cooperation on the research and development of e-Navigation solutions, services and infrastructure
  - any other areas of cooperation as may be mutually decided upon, in writing, by the Participants
A short story

IALA e-Nav.

T. Porathe

SIMF 2013

T. Porathe

2013

2014

1st test item meeting (Korea)

2nd test item meeting (Korea)

ACCSEAS Workshop

Proposal by Denmark & Sweden

Proposal by Denmark & Sweden

(excerpt, J.H.Park, Concret plans for joint trials of ... , IWGeNT 2014)
The First Step Toward Building Up Global e-Navigation Test Bed

- Conduct a feasibility study on the possibility of using a common e-Navigation prototype platform for a global test bed
- Look into the possibility of an e-Navigation conference in Asia Pacific region
- Organize a test bed workshop, before the next e-Navigation Underway conference, 27 Jan 2014
- Establish an e-Navigation test bed network
- Submit the output of the workshop to CG of e-Navigation and IALA e-Navigation Committee for information
2nd IWGeNT, Jan. 27, 2014, KRISO

- To prepare to “e-Navigation” in Foreign Waters
- Hosted by KRISO, organized by DMA
- 89 experts from 23 countries
- Past, Present, Future of e-Navigation Test Bed
- Technical issues to establish test bed
- Joint Experiment between SWA, DMA, MOF

Digital Ship in Korea 2014

1st IWGeNT, Jan. 27, 2014, KRISO

e-Navigation test bed: Concrete plan for joint trials

Test Bed: EfficienSea and MONALISA

Implementing ACCSEAS test bed

Test bed for validation of S-100 based solutions

VDES updates and test bed opportunities

Potential and limitations: Common e-Nav. prototype S/W suite

- **Background**
  - To develop e-Navigation solutions, their concept need to be validated by using testbeds.
  - A global testbed needs to support the full implementation process of the e-Navigation solutions.

- **Purpose**
  - Facilitated by the establishment of the global e-Navigation testbed, the combination of resources allowed testing of potential e-Navigation solutions on a trans-regional basis.
  - To provide a good basis for an extended cooperation on the development of e-Navigation solutions, aiming at accelerating the development of e-Navigation

(excerpt, submitted to 1st session of NCSR as agenda item 9, NCSR1/INF.16)

- Resources of the trial
- e-Navigation in Korea
  - Integrated Navigation Assistance Service
  - Real time port information service – high resolution meteorological and oceanographic information
- MONALISA: EPD, Maritime Cloud
  - Maritime Messaging Service of the Maritime Cloud as an information carrier service
  - e-Navigation Prototype Display System as a common platform
## Test Environments: Training Ships

<table>
<thead>
<tr>
<th>Ship name/image</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hanbada (T/S)</strong></td>
<td><strong>L(m) × B(m) × D(m)</strong>: 117.2 × 17.8 × 8.15</td>
</tr>
<tr>
<td></td>
<td><strong>GT (ton)</strong>: 6,686</td>
</tr>
<tr>
<td></td>
<td><strong>Max. Speed (knot)</strong>: 17.5</td>
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<tr>
<td></td>
<td><strong>Max. accommodation (persons)</strong>: 246</td>
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<tr>
<td></td>
<td><strong>Bridges</strong>: Navigation/Training/Simulation</td>
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<tr>
<td></td>
<td><strong>Construction date (yyyy.mm.dd)</strong>: 2005.12.08</td>
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<tr>
<td><strong>Sae Nu Ri (T/S)</strong></td>
<td><strong>L(m) × B(m) × D(m)</strong>: 103.0 × 15.6 × 9.9</td>
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<tr>
<td></td>
<td><strong>GT (ton)</strong>: 4,701</td>
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<tr>
<td></td>
<td><strong>Max. Speed (knot)</strong>: 16.8</td>
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<tr>
<td></td>
<td><strong>Max. accommodation (persons)</strong>: 208</td>
</tr>
<tr>
<td></td>
<td><strong>Bridges</strong>: Navigation/Training</td>
</tr>
<tr>
<td></td>
<td><strong>Construction date (yyyy.mm.dd)</strong>: 2003.03.24</td>
</tr>
</tbody>
</table>

(excerpt, J.H.Park, Concrete plans for joint trials of ... , IWGeNT 2014)
Test Environments: Training Ships

Digital Ship in Korea 2014
Test Areas

(excerpt, J.H. Park, Concret plans for joint trials of ..., IWGeNT 2014)
Route Plan: Mokpo – Yeosu, T/S SAE NURI

Digital Ship in Korea 2014
Route Plan: Busan – Yeosu, T/S Hanbada
Route Suggestion to STCC
Green Route confirmed from STCC
Situation: Ship-to-Ship
Intended Route TCPA Warning

TCPA Warning, proximity less than 1.0 nautical miles at 2014-04-15T18:15:47.667+09:00
At 15 April, 18:15
The routes come within 0.49 NM nautical miles of each other
Exchange of intended route:
from T/S Hanbada to T/S Sae Nuri
Exchange of intended route:
received at T/S Sae Nuri
The findings from the test of the "Real time port information service" indicated that a service with good quality was available within the coverage of the 3G network. Users evaluated the availability of this service as appropriate for making a route plan, if the ship gets the meteorological and oceanographic information and traffic information near the port, before the ship enters into the port area. But the overabundance of information could be another burden to users in the point of distracting mariners' concentration and increase burden. According to this, the service should be developed to the direction that relevant and timely information is provided for mariners.

The finding from the test on "Integrated navigation aids service", based on a questionnaire on the usefulness and reality of intended route exchange using AIS-ASM, found that the representation of intended route as used by the prototype system could be a valuable addition to current navigational information. The validity of the service when two vessels encountered was acknowledged by captain and cadets of the ship. The intention of each ship was clearly understood by users with displaying the collision avoidance-route information graphically, and the communication with other ship was much simpler than conventional VHF radio communication in voice.

The use of the EPD as a common test platform, being based on open source, freely available, and open for collaboration for all interested parties, was found to be a valuable tool for testing and evaluating e-navigation solutions.

It was indicated that the use of the Maritime Messaging Service of the Maritime Cloud as an information carrier is a viable solution for the exchange of maritime information in a volatile environment.
Recalling IALA Guideline No.1107
On The Reporting of Results of e-Navigation Testbeds, ed.1, Dec. 2013

- e-Navigation testbed is a platform for trialling development projects.
- The testbed allows for early detection of new system functionality, operational usability, areas of enhancements and identification of weaknesses.
- Ideally, testbeds should be linked to human-centered design processes, to ensure any operational usability issues, are detected early.
- It is important that the results of testbeds are shared and its reporting should be harmonised.
  - Objective, reproducible, statistically sound, acceptable scientific format
Potential Components of an e-Navigation Implementation Process, Nav.54/25 Annex 12
The Way Forward

Excerpt: Michelle Grech et.al, Testbeds for Ensuring Usability and Safety in e-navigation Systems, 1st IWGeNT, 2013
The Way Forward

- Develop concept in terms of e-Navigation services and infrastructure
- Identify user requirements
- Produce design solutions to meet user requirements
- Evaluate designs against requirements: Integration and testing
- Introduce and operate the systems
- Conduct early human element analysis
Thank YOU!

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