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| e-NAV9 | Information Paper |
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**2011 Regional e-navigation Conference:
Asian Input to IMO e-navigation
16-18 February 2011, Busan, Korea**

Summary Report

During 16-18 February 2011, a Regional e-navigation Conference was held in Busan, Korea.

Attended by over 230 persons, the conference was organized by:

- Marine Electronics Industry Promotion Association (MEIPA)
- Electronics and Telecommunications Research Institute (ETRI)
- Korea Marine Equipment Research Institute (KOMERI)
- Korea Ocean Research and Development Institute (KORDI)
- Convergence of IT Devices Institute Busan (CiDI), Dong-Eui University (DEU)
- Advanced IT and Ship Convergence Center (AITSASC), Korea Maritime University (KMU)

It was hosted by:

- Ministry of Land, Transport and Maritime Affairs (MLTM)
- Ministry of Knowledge Economy (MKE)
- (of the Republic of Korea)

Mr. Woo-Seong SHIM (Korean Register of Shipping) served as Moderator for the Conference. In the opening address, Professor Yung-Ho YU (Korea Maritime University) explained how e-navigation is a paradigm shift in maritime navigation. He stated that the aim of the Conference was to explore the role and contribution of the East Asia region in regard to the scope, development, and implementation of e-navigation. In addition, Mr. Chang Sup CHOI (Korea Hydrographic and Oceanographic Administration) expressed the hope that this Conference will provide important groundwork for e-navigation development, both in the Asia region and well as world-wide.

Presentations

During the conference, thirteen (13) presentations were given covering a range of topics related to the development and implementation of e-navigation.

1. The IMO Plan for Implementing e-navigation – John Erik HAGAN, Norwegian Coastal Administration

As the Chair of the IMO e-navigation Correspondence Group, Mr. HAGAN described the scope of the activities of IMO e-navigation Correspondence Group. This included a confirmation of IMO's definition of e-navigation to required steps to implementation. Mention was made about the Correspondence Group's proposal to COMSAR 15 in regard to IHO S-100 being considered a baseline data standard, and the establishment of a Harmonization Group to create a framework for data access in information services under SOLAS. He also explained the four key elements of the Gap Analysis process (technical, operational, regulatory, & training).

Specific mention was made about using a modified version the Korean Gap Analysis template that was proposed at NAV56, and noted that Korea has promoted the “Single-window” concept whereby a ship reports just once to a shore authority. He also noted Japan’s contribution to the discussion on AIS AtoN and “virtual” AtoN.

2. e-navigation Activities in Japan – Dr. Junji FUKUTO, Japan Maritime Research Institute.

Dr. FUKUTO provided an overview of some new innovations in marine navigation that are intended to prevent collisions or “near misses.” They include:

Navigational Intentions Support System (NIESS) provides added functionality to radar when used for collision avoidance. Using a combination of radar, ARPA, AIS targets, and AIS Application-Specific Messages (ASMs), two ships exchange AIS ASMs (Msg 6 or Msg 8) so as to indicate/confirm their intentions. In addition to establishing a passing pattern between own and target ship, it can reduce voice communication barriers and aid in decision-making for collision avoidance.

Visual Lookout Support System (VLSS) helps to reduce workload and provide more meaningful watch-keeping information. Using a semi-transparent heads-up display with AIS/ARPA targets and radar contacts overlay, it provides synchronization of AIS and NIESS. This enables the watchstander to perform simultaneous confirmation of visual and electronic display (radar) targets.

Dr. FUKUTO also described the preparation of draft “Guidelines for Usability Evaluation of Navigational Equipment.” Specifically, the intent is to establish seven steps whereby usability criteria are defined based on effectiveness, efficiency, user-satisfaction, and novice-to-expert ratio.

3. Canadian CG’s Vision and Plans for Implementing e-navigation – Dr. Lee ALEXANDER, University of New Hampshire.

Dr. ALEXANDER provided an overview of Canadian Coast Guard’s vision and plan for national implementation of e-navigation. He pointed out that while Canada was not a part of East Asia region, it recognizes the importance of leading maritime nations such as Korea, Japan, and China. Since over 90% of all SOLAS vessels sailing in North American waters are built in Korea and Japan, it is crucial that whatever e-navigation becomes, that the necessary services are provided to all vessels, worldwide. In Canada, the national implementation of e-navigation has already started. It is a bottom-up approach whereby e-navigation stakeholders (both providers and users) decide what e-navigation should become and what services will be required. Canada believes that other nations might wish adopt a similar approach to implementing e-navigation.

4. Trends of IT Convergence for Shipbuilding in Korea – Dr. Man-Cherol HAN, KEIT

In an interesting and thought-provoking presentation, Dr. HAN explained how “Information Technology” is influencing the types and capabilities of shipboard equipment. Specifically, he described the three main types of IT convergence (digital, technological, and mega), as well as the major global trends that are influencing a paradigm shift (information age → nano-bio age → fusion tech age). He then provided some examples of meta-convergence that is occurring in various maritime industries (e.g., *digital Smart Ship* and *digital Shipyard*).

5. The Implementation of e-navigation – Mr. Joung-Soo ROH, GMT Cybernetics Co., Ltd.

He presented instead of Capt. BAG.

Mr. ROH described a national marine crisis management system used in Korea called: “General Information Center on Marine Safety and Security” (GICOMS). The main components are vessel monitoring, integration of systems, and information exchange. Major functions include vessel movements, cargo transport, port facilities, security, traffic control/monitoring, and people. While it may not be a total model of e-navigation, it has some of the key components.

6. Role and Involvement of IALA in Implementing e-Navigation – Dr. Lee ALEXANDER, University of New Hampshire

Dr. Alexander provided an overview of IALA’s vision, role and involvement in e-Navigation. He explained the tasks of the six (6) working groups that make up the IALA e-Navigation Committee. As Chair of the IALA eNAV Information Portrayal Working Group, he provided some specific examples on the challenges and opportunities associated with trying to achieve a “harmonized” display of shipborne and shore-based e-Navigation-related information.

7. Information Infrastructure for e-navigation – Dr. Sang-Hyun SUH, KORDI/MOERI

Dr. SUH provided a comprehensive overview of various projects and initiatives that will likely impact the development and implementation of e-navigation. In particular, he focused on the roles of different organizations in terms of establishing the necessary standards and infrastructure for e-navigation. Three key issues were specifically mentioned:

- 1) ENC coverage for all navigational areas
- 2) robust electronic positioning system (with redundancy)
- 3) an agreed infrastructure of communications to link ship to shore

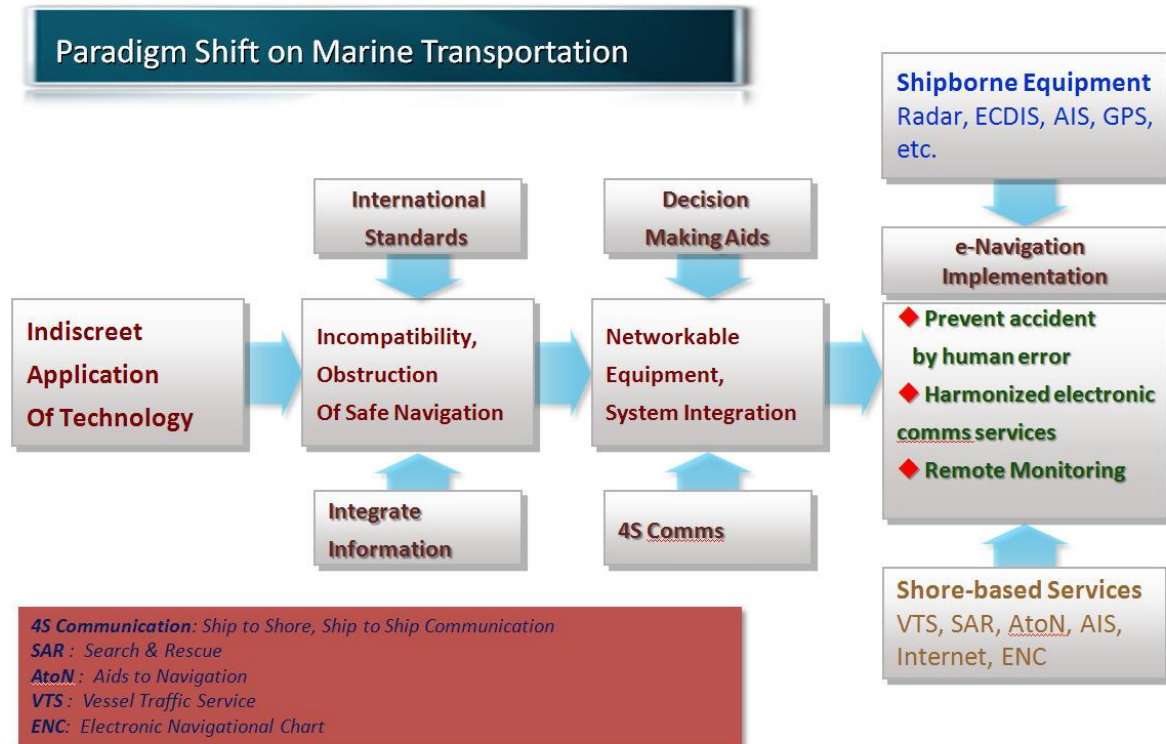
8. An Introduction to Marine Electronic Highway Project (MEH) Demonstration Project and It’s Perspective – Dr. Hee Yong LEE, GMT Cybernetics Co., Ltd.

Dr. LEE provided an overview the MEH Project being conducted in the Straits of Malacca/Singapore. Key project objectives include: 1) to demonstrate technical functionalities on navigation safety and marine environmental protection, and 2) to facilitate the integration of marine environment systems, data flow, and information exchange. In his view, this project is can be considered an example of e-navigation functional development.

9. Ship Network and 4S Integrated System for Integration Ship Information – Prof. Yung Ho YU, Korea Maritime University

Professor YU described the development of core technologies for the shipborne and shore-based networks that are necessary achieve e-navigation. Of significant value to Conference attendees was a conceptual diagram that he showed of the basic steps/components that are influencing the paradigm shift on Marine transportation.

e-Navigation Paradigm



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Instead of indiscreet application of technology leading to incompatibility and obstruction of safe navigation, e-navigation should evolve into “networkable” equipment/systems/services that include 4S communications (ship to ship, ship to shore). Dr. YU provided specific examples of various international standards and system architecture for 4S Communications systems that will need to be considered/modified in order for e-navigation to occur. In the opinion of many who attend the conference, his presentation provided a useful framework for further questions/comments during the Panel Discussion.

10. Development of Marine Digital VHF system based on ITU-R M.1842-1 – Dr. Dae-Ho KIM, ETRI

Dr. KIM gave a detailed technical overview of the top-level design and performance analysis criteria used for a Digital VHF communications system conforming to ITU standards.

11. Development of Advanced VTS Technology for e-navigation – Bunggil Lee LEE, ETRI

Mr. LEE discussed the transition from traditional to advanced VTS, and what shore-side architecture and advanced VTS technologies would be required for implementing e-navigation.

12. Concept to Reality for e-navigation - Steve GUEST, Konsburg – Norcontrol

Mr. GUEST provided an overview of what types of projects and technology initiatives that a leading marine equipment manufacturer has been involved in related to e-navigation

development. The primary focus was on shore-based systems/services, particularly those associated with VTS. This includes mention of satellite AIS, decision-support, web-map services, 3D perspective/views, and “smart phones.”

13. New Paradigm for Ocean Meteorological Service due to Changes in Korean Port Services – Yong-Su GANG, SHINDONG Digitech Co., Ltd.

Mr. GANG described a number of potential e-navigation-related activities occurring in Korea. This included availability of current meteorological services, “Blue Highway” concept, AtoN AIS, and e-navigation data sharing between various government agencies.

Panel Discussion

During the final session of the Conference, a panel discussion was conducted. Ten (10) persons participated, representing a range of e-navigation “stakeholders”. This included: maritime safety administration, maritime pilot association, shipping company, academic/research institute, and commercial equipment manufacturer. The Panel Session was skillfully moderated by Professor Yung Ho YU (Korea Maritime University).

The Panel was asked to provide their perspective and opinions on several e-navigation related questions.

1. Why is e-navigation important or needed?

Maritime Pilot – Due to increases in maritime transport, information overload is becoming more common and leads to decision-making errors. Most often this occurs when ships are entering ports. More relevant information is needed. Lack of adequately trained onboard personnel is a contributing factor in the 80-90% human error rate. Increasingly, Mariners have to learn many more things. He expressed concern about how future shore-based services (e.g. VTS) will actually support the e-navigation concept-of-operation.

VTS Operator – Based on over 20 years experience (Port of Busan), believes that the “single-window concept.” (i.e., one report, many recipients) will become the standard model. However, this will require reliable, up-to-date communications. He had concerns that at present, various ships are using different displays. For e-navigation to occur, it will be important that each ship has the same situational awareness. Human element is also important. Without humans, electronic communication is not useful. We also need to make use of language.

Maritime Safety Administration – Agreed that e-navigation is about humans, and that information overload can become a problem. IMO’s main concern is about shipborne information. Reducing accidents by humans is a major goal. New shipboard technologies must be incorporated in a holistic manner. He mentioned some other issues that were not discussed at this conference, including: 1) Differences between R&D projects and what the users actually want, and 2) IMO will perform a Gap analysis that is intended to compare what is required to what is not currently available. Also, that IMO plans to perform a cost-benefit and risk analysis as well.

Equipment manufacturer - A common VTS traffic image will be an important starting point. The training element is important as well.

Research/Academic – e-navigation will mean different things to different people. Successful implementation will depend on who is using it (mariners) and what it is being used for (more

efficient navigation with no loss in safety). Similar to what occurred with the Internet, e-navigation should enable both shipborne and shore-based personnel to have access to the same information in which to make informed decisions. However, the must be based on the current situation and task-at-hand (i.e., what you need, when you need it).

Shipping Company – The analysis and presentation of data must be simple and easy to understand. Data from shore-based providers and from other ships will require an improved infrastructure by information providers and improved shipboard displays. Research and development should be focused on what users actually need, not what is technically possible.

2. What are the User's needs?

Maritime Safety Administration - In Norway, an e-navigation User Needs Study was conducted. The results were similar to that of the International study conducted by Germany, and a national study by Canada. Language problems (ship-ship and ship-shore) are a key finding.

3. Korea proposed to IMO a Gap Analysis process. What type of technologies will be needed to accomplish e-navigation in different countries?

Maritime Safety Administration - In Norway, improved techniques for handling communications and information flow (e.g., single window concept) were cited as important needs.

Research/Academic - In Japan, AIS and ARPA are currently used only for detection and tracking. Japan is currently looking at more data fusion at a VTS centre, and improved display of other types of information (e.g., collision avoidance aids, AIS Application-Specific Messages, etc.).

4. Are there different perspectives in regard to what is the overall benefit of e-navigation (e.g., Asia vs. Europe/North America, or Users vs. Industry)?

Norwegian Coastal Administration – It must be safety first.

Shipping Company – I agree, but perhaps increased efficiency with no loss in safety (e.g., the EU *EfficienSea Project*).

Academic/Research – Regardless of the region they come from, mariners are more similar than they are different. Also, maritime navigation is conducted throughout the world.

5. What should Korea do to actively influence e-navigation development?

Maritime Safety Administration – Korea (and other nations in the Asian region) has already made significant contributions, and should continue to do so. This includes participation in IMO, IALA, and IHO. e-navigation is global initiative and needs participation by all maritime nations. The success of the effort depends on input by all.

Academic/Research – Agreed. However, pointed out that in some forums and international committee meetings that are held in Europe and North America, those that speak English as a second language are often reluctant to fully express their views. This is why this type of Conference (in the Asia region) is so important to the international development and implementation of e-navigation.

Equipment Manufacturer – The VTS centres in Korea are outstanding, and an example of what others should do.

6. Not everything that was discussed today seems to be e-navigation. What is or is not e-navigation? [a question from the audience]

Academic/Research – Not everything that has been proposed or discussed at this conference should be considered e-navigation. Just because it is technically feasible, does not mean that it is something that should be done. Many things may be possible. The real challenge will be to determine what is really needed – and then figure out how it should be provided.

In his closing comments, the Panel Moderator felt that these issues and concerns need to be brought to the attention of both IALA and IMO.

Action Requested by the Committee

Consider the role and contribution of the East Asian region with regard to the scope, development, and implementation of e-navigation. In particular, important insight can be gained from this e-navigation Regional Conference Summary Report about what should constitute the focus, concept-of-operation, as well as concerns about e-navigation by reviewing the PP Presentations and the Summary of the Panel Discussion Session. Further, it is important to consider the perspective of those from the East Asia region that may not be directly involved in the work of the IALA e-NAV Committee.

[INFORMATION]

The rest of this paper is the conference report for distributing the information produced in this conference. You can find the overview, summary report with speaker's picture, whole conference sketch and informative links to e-navigation players of Republic of Korea.

You may need to download for Korean language font when you open this pdf report because the report includes some Korean characters.



2011 Regional e-navigation Conference

Asian Input to IMO e-navigation

컨퍼런스 보고서
Conference Report

2011년 2월
FEB 2011

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ACKNOWLEDGEMENT



2011 Regional e-navigation Conference 참가자 분들께

안녕하십니까?

2011년 2월 16일부터 18일까지 부산 BEXCO에서 열린 2011 Regional e-navigation Conference에 참가해 주신 여러분들께 감사의 말씀을 드립니다.

이번 Conference에는 IMO NAV e-navigation 작업반 의장인 노르웨이 NCA의 Mr. John Erik Hagen 일행과 IALA e-Nav위원회 WG6 의장으로 활동 중인 Dr. Lee Alexander 교수 등 국외 전문가와 국내의 산업계, 학계, 연구소, 국가기관 등 e-navigation 관련 전문가 230여명이 참가하였습니다. Conference에서 13분이 e-navigation의 정책과 기술에 대해 발표를 하였고, e-navigation의 실질적인 적용 방안 마련을 위해 선박 운항의 현장 경험을 가지고 있는 패널을 포함하여 10분이 패널토론을 진행하였으며, 국외초청 인사들과 부산북항 VTS센터를 방문하였습니다.

이번 Conference는 IMO의 e-navigation 정책수립에 기여하고, 국내에서는 e-navigation에 대한 관심을 확산시킬 수 있는 좋은 기회의 장이었다고 생각합니다. 저희는 이번 Conference를 계기로 e-navigation에 대한 정책적 토론과 기술적 정보 교환을 계속해 나갈 것입니다.

성공적으로 Conference를 마무리할 수 있도록 도와주신 여러분들께 다시 한번 감사드리며, 2011 Regional e-navigation Conference에 참가해 주신 모든 분들께 깊은 감사의 말씀을 드립니다.

2011년 2월 23일

2011 Regional e-navigation Conference 조직위원회 배상

Conference의 현장 사진은 아래 홈페이지에서 확인하실 수 있습니다.

1. (사)한국선박전자산업진흥협회 홈페이지 : www.meipa.or.kr
2. e-navigation 대응전략 홈페이지 : www.e-navi.or.kr

CONFERENCE OVERVIEW



2011 Regional e-navigation Conference

- Asian Input to IMO e-navigation

From 16th to 18th FEB 2011,

Busan BEXCO Convention Center 2nd floor APEC Hall, Republic of Korea

More than 230 participants

IMO의 e-navigation 개발에 보다 적극 참여하기 위해 대한민국은 IMO NAV, COMSAR회의 등에 각종 의제를 제출하고 회기간 통신작업반 활동에 적극 참여하였으며 그 결과에 대한 IMO 회원국의 호평이 있었고 이를 계기로 우리나라 및 동아시아 국가의 보다 많은 국제사회로의 기여를 이끌어내면서 또한 관련 산학연정 관계자의 공통된 인식제고와 정보 공유의 장을 마련하고자 본 컨퍼런스를 개최하게 되었습니다.



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16~18일 'e내비게이션 국제 콘퍼런스'

지면일자 2011.02.11 임동식기자 dslim@etnews.co.kr

오는 2012년부터 단계적으로 도입될 예정인 국제해사기구(IMO)의 e내비게이션(선박항법체계)에 대응하기 위한 국제 콘퍼런스가 부산에서 열린다.

국토해양부와 지식경제부는 오는 16일부터 18일까지 사흘간 '아시아 지역 e내비게이션 콘퍼런스(2011 Regional e-navigation Conference)'를 부산 파라다이스 호텔에서 개최한다. 행사 주관은 한국선박전자산업진흥협회와 한국전자통신연구원 등 6개 기관이 공동으로 맡았다.

이번 콘퍼런스는 IMO의 e내비게이션 핵심전략 수립에 이은 분야별 세부 실행계획이 마련되고 있는 현 상황에서 국내 e내비게이션 전문가들이 한자리에 모여, 이에 대한 종합적이고 효율적인 대응 방안을 모색하기 위한 자리다.

특히 그간 유럽이 주도해 온 e내비게이션 전략 및 실행에 필요한 표준안 마련 등을 이제는 조선 강국인 우리나라와 일본을 중심으로 아시아 지역이 앞장서 공동 대응체계 마련과 동시에 실행 계획도 주도해 나가자는 계산을 깔고 있다.

공동 주관기관인 한국해양대 차세대IT선박융합기술센터의 유영호 교수는 "e내비게이션 구현에 관한 모든 기관과 전문가들의 공통적인 상황 인식과 정보교류가 필요하다"는 점에서 준비했다"고 말했다.

콘퍼런스에는 국제해사기구(IMO)의 e내비게이션 통신택업반 의장인 존 메릭 하겐(노르웨이)이 초청돼 단순 선박통신 수단이 아닌 해사 전반에 연계된 e내비게이션 도입 개념에 대해 설명하고, IMO의 e내비게이션 활동과 유럽의 e내비게이션 대응 전략을 소개한다.

또 IALA e내비게이션 WG6 의장으로 활동 중인 리 알렉산더 뉴햄프셔대 교수와 후쿠토 준지 일본해양연구소 박사는 북미와 일본의 e내비게이션 구축에 관해 설명하고, 콘퍼런스 참가자들과 정책적, 실무적 관점의 정보와 전문가적 의견을 공유할 예정이다.

한편, e내비게이션은 IMO가 해상의 안전과 보안, 해양환경 보호를 목적으로 도입·추진하고 있는 새로운 항해 표준이다. 전자적 방법에 의해 선박과 육상의 해상정보를 일관성 있게 수집·교환·표현·분석하고 기존 항해 장비와 새로 개발되는 항해장비 및 전자장치를 시스템적으로 이용하려는 선박운항 체계의 세계적 흐름이다.

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CONFERENCE PROGRAM

| First Day 16 th Feb 2011 | | |
|-------------------------------------|--|--|
| Time | Program | Speaker |
| 13:00~13:30 | Registration | |
| 13:30~14:00 | Opening and Welcome speech | |
| 14:00~14:50 | The IMO plan for implementing e-navigation - status of the project - the implementation plan - the relation to EU e-Maritime - the role of Norway in the project | Mr. John Erik Hagen (IMO NAV e-navigation CG chairman, NCA) |
| 14:50~15:10 | Coffee Break | |
| 15:10~15:40 | e-navigation activities in Japan | Dr. Junji Fukuto (NMRI) |
| 15:40~16:10 | Canadian Coast Guard's Vision and Plans for Implementing e-navigation | Dr. Lee Alexander (University of New Hampshire) |
| 16:10~16:30 | Coffee Break | |
| 16:30~17:00 | Trends of IT Convergence for Shipbuilding in Korea | Mr. Han, Man-Cheol (KEIT, Program Director) |
| 17:00~17:30 | The implementation of e-navigation - GICOMS | Capt. BAG, Jang-Ho (Ministry of Land, Transport and Maritime Affairs) |
| 17:30~18:00 | Break & Preparation | |
| 18:00~20:00 | Banquet | |

CONFERENCE PROGRAM

| Second Day 17 th Feb 2011 | | |
|--------------------------------------|--|--|
| Time | Program | Speaker |
| 10:00~10:40 | Role and Involvement of IALA in Implementing e-Navigation | Dr. Lee Alexander (IALA e-Nav committee WG6 Chairman) |
| 10:40~11:10 | National / Regional information infra for e-navigation | Dr. Suh, Sang-Hyun (KORDI/MOERI) |
| 11:10~11:30 | Coffee Break | |
| 11:30~12:00 | An Introduction to MEH Demonstration project and it's Perspective | Dr. Lee, Hee-Yong (GMT Cybernetics) |
| 12:00~12:30 | Ship network and 4S integrated system for ship information integration | Prof. Yu, Yong-Ho (Korea Maritime University) |
| 12:30~14:00 | Lunch | |
| 14:00~14:30 | Development of Marine Digital VHF system based on ITU-R M.1842-1 | Dr. Kim, Dae-Ho (ETRI) |
| 14:30~15:00 | Development of advanced VTS technology for e-navigation | Dr. Lee, Byung-Gil (ETRI) |
| 15:00~15:20 | Coffee Break | |
| 15:20~15:50 | Concept to reality for e-navigation | Mr. Steve Guest (Kongsberg UK) |
| 15:50~16:20 | New paradigm for ocean meteorological service due to changes in Korean port services | Mr. Gang, Yong-Su (Shin-Dong Digitech) |
| 16:20~16:40 | Coffee break | |
| 16:40~18:00 | Panel Discussion | Panel : Expert group for e-navigation implementation |

OPENING AND WELCOME SESSION



During 16-18 February 2011, a Regional e-navigation Conference was held in Busan, Korea. Attended by over 230 persons, the conference was organized by:

Marine Electronics Industry Promotion Association (MEIPA)
Electronics and Telecommunications Research Institute (ETRI)
Korea Marine Equipment Research Institute (KOMERI)
Korea Ocean Research and Development Institute (KORDI)
Convergence of IT Devices Institute Busan (CiDI), Dong-Eui University (DEU)
Advanced IT and Ship Convergence Center (AITSASC), Korea Maritime University (KMU)

It was hosted by:

Ministry of Land, Transport and Maritime Affairs (MLTM)
Ministry of Knowledge Economy (MKE)

Mr. Woo-Seong SHIM (Korean Register of Shipping) served as Moderator and Dr. Lee Alexander served as a rapporteur for the whole conference.

WELCOME SPEECH (Mr. Ki-Taek LIM, Organizing Chair of the conference)

spoke by Mr. Yeon-Cheol SHIN instead of Mr. LIM

Honorable chairman John Erik Hagen of the IMO working groups and correspondence group on e-navigation. Honorable chairman Lee Alexander of the information WG of the IALA e-Navigation committee, Distinguished presenters and guests from home and abroad,

I would like to express my sincere appreciation to you for taking time out of your busy schedule to come to this conference.

Today, we have gathered here to share a wide range of information from policy and working-level perspectives and expert opinions on the establishment of e-navigation system. As defined by IMO, e-navigation is "the harmonized collection, integration, exchange, presentation and analysis of maritime information onboard and ashore by electronic means to enhance berth to berth navigation." e-navigation presents us with a new opportunity as well as a challenge at a time when we need changes in the shipbuilding and maritime industries.

As you know, IMO started and completed establishing a comprehensive concept and strategies of e-navigation from 2005 to 2008 and has now reached the stage of developing implementation plans.

IMO and IALA are actively working on developing implementation plans of e-navigation strategies and countries around the world are preparing for e-navigation as a new navigation paradigm. At this juncture, I hope this conference will lay the groundwork for e-navigation implementation plans that we all aim for by bringing together many e-navigation experts from home and abroad and allowing them to share their experiences and wisdom.

Lastly, I would like to thank chairman John Erik Hagen and distinguished guests once again and hope you have a memorable time appreciating our beautiful nature and diverse culture during your stay in this country.

I wish all of you good healthy and happiness,

Thank you.





1. The IMO Plan for Implementing e-navigation

presented by John Erik HAGAN, Norwegian Coastal Administration

As the Chair of the IMO e-navigation Correspondence Group, Mr. HAGAN described the scope of the activities of IMO e-navigation Correspondence Group. This included a confirmation of IMO's definition of e-navigation to required steps to implementation. Mention was made about the Correspondence Group's proposal to COMSAR 15 in regard to IHO S-100 being considered a baseline data standard, and the establishment of a Harmonization Group to create a framework for data access in information services under SOLAS. He also explained the four key elements of the Gap Analysis process (technical, operational, regulatory, & training). Specific mention was made about using a modified version the Korean Gap Analysis template that was proposed at NAV56, and noted that Korea has promoted the "Single-window" concept whereby a ship reports just once to a shore authority. He also noted Japan's contribution to the discussion on AIS AtoN and "virtual" AtoN.

Raised issues from audience

Excessive monitoring will make mariners be too passive to do decision making actively

User needs have to be revised by the future consideration while e-navigation implementation process



2. e-navigation Activities in Japan

presented by Dr. Junji FUKUTO, Japan Maritime Research Institute

Dr. FUKUTO provided an overview of some new innovations in marine navigation that are intended to prevent collisions or "near misses." They include:

Navigational Intentions Support System (NIESS) provides added functionality to radar when used for collision avoidance. Using a combination of radar, ARPA, AIS targets, and AIS Application-Specific Messages (ASMs), two ships exchange AIS ASMs (Msg 6 or Msg 8) so as to indicate/confirm their intentions. In addition to establishing a passing pattern between own and target ship, it can reduce voice communication barriers and aid in decision- making for collision avoidance.

Visual Lookout Support System (VLSS) helps to reduce workload and provide more meaningful watch-keeping information. Using a semi-transparent heads-up display with AIS/ARPA targets and radar contacts overlay, it provides synchronization of AIS and NIESS. This enables the watchstander to perform simultaneous confirmation of visual and electronic display (radar) targets.

Dr. FUKUTO also described the preparation of draft "Guidelines for Usability Evaluation of Navigational Equipment." Specifically, the intent is to establish seven steps whereby usability criteria are defined based on effectiveness, efficiently, user-satisfaction, and novice-to-expert ratio.

PRESENTATIONS OF 1st DAY



3. Canadian CG's Vision and Plans for Implementing e-navigation

presented by Dr. Lee ALEXANDER, University of New Hampshire.

Dr. ALEXANDER provided an overview of Canadian Coast Guard's vision and plan for national implementation of e-navigation. He pointed out that while Canada was not a part of East Asia region, it recognizes the importance of leading maritime nations such as Korea, Japan, and China. Since over 90% of all SOLAS vessels sailing in North American waters are built in Korea and Japan, it is crucial that whatever e-navigation becomes, that the necessary services are provided to all vessels, worldwide. In Canada, the national implementation of e-navigation has already started. It is a bottom-up approach whereby e-navigation stakeholders (both providers and users) decide what e-navigation should become and what services will be required. Canada believes that other nations might wish adopt a similar approach to implementing e-navigation.



4. Trends of IT Convergence for Shipbuilding in Korea

presented by Dr. Man-Cheol HAN, Korea Evaluation Institute of Industrial Technology

In an interesting and thought-provoking presentation, Dr. HAN explained how "Information Technology" is influencing the types and capabilities of shipboard equipment. Specifically, he described the three main types of IT convergence (digital, technological, and mega), as well as the major global trends that are influencing a paradigm shift (information age → nano-bio age → fusion tech age). He then provided some examples of meta-convergence that is occurring in various maritime industries (e.g., *digital Smart Ship* and *digital Shipyard*).



5. The Implementation of e-navigation

presented by Mr. Joung-Soo ROH, GMT Cybernetics Co., Ltd.

Mr. ROH described a national marine crisis management system used in Korea called: "General Information Center on Marine Safety and Security" (GICOMS). The main components are vessel monitoring, integration of systems, and information exchange. Major functions include vessel movements, cargo transport, port facilities, security, traffic control/monitoring, and people. While it may not be a total model of e-navigation, it has some of the key components.

PRESENTATIONS OF 2nd DAY



6. Role and Involvement of IALA in Implementing e-Navigation

presented by Dr. Lee ALEXANDER, University of New Hampshire

Dr. Alexander provided an overview of IALA's vision, role and involvement in e-Navigation. He explained the tasks of the six (6) working groups that make up the IALA e-Navigation Committee. As Chair of the IALA e-NAV Information Portrayal Working Group, he provided some specific examples on the challenges and opportunities associated with trying to achieve a "harmonized" display of shipborne and shore-based e-Navigation-related information.



7. Information Infrastructure for e-navigation

presented by Dr. Sang-Hyun SUH, Korea Ocean Research & Development Institute/Maritime & Ocean Engineering Research Institute

Dr. SUH provided a comprehensive overview of various projects and initiatives that will likely impact the development and implementation of e-navigation. In particular, he focused on the roles of different organizations in terms of establishing the necessary standards and infrastructure for e-navigation. Three key issues were specifically mentioned:

- 1) ENC coverage for all navigational areas
- 2) robust electronic positioning system (with redundancy)
- 3) an agreed infrastructure of communications to link ship to shore



8. An Introduction to Marine Electronic Highway Project (MEH) Demonstration Project and It's Perspective

presented by Dr. Hee Yong LEE, GMT Cybernetics Co., Ltd.

Dr. LEE provided an overview the MEH Project being conducted in the Straits of Malacca/Singapore. Key project objectives include: 1) to demonstrate technical functionalities on navigation safety and marine environmental protection, and 2) to facilitate the integration of marine environment systems, data flow, and information exchange. In his view, this project is can be considered an example of e-navigation functional development.



9. Ship Network and 4S Integrated System for Integration Ship Information

presented by Prof. Yung Ho YU, Korea Maritime University

Professor YU described the development of core technologies for the shipborne and shore-based networks that are necessary achieve e-navigation. Of significant value was a conceptual diagram that he showed of the basic steps/components that are influencing the paradigm shift on Marine transportation. Instead of indiscreet application of technology leading to incompatibility and obstruction of safe navigation, e-navigation should evolve into "networkable" equipment/systems/services that includes 4S communications (ship to ship, ship to shore). Dr. YU provided specific examples of various international standards and system architecture for 4S Communications systems that will need to be considered/modified in order for e-navigation to occur. In the opinion of many who attend the conference, his presentation provided a useful framework for further questions/comments during the Panel Discussion.

PRESENTATIONS OF 2nd DAY



10. Development of Marine Digital VHF system based on ITU-R M.1842-1
presented by Dr. Dae-Ho KIM, Electronics and Telecommunications Research Institute

Dr. KIM gave a detailed technical overview of the top-level design and performance analysis criteria used for a Digital VHF communications system conforming to ITU standards.



11. Development of Advanced VTS Technology for e-navigation
presented by Dr. Byung-Gil LEE, Electronics and Telecommunications Research Institute

Dr. LEE discussed the transition from traditional to advanced VTS, and what shore-side architecture and advanced VTS technologies would be required for implementing e-navigation.



12. Concept to Reality for e-navigation
presented by Mr. Steve GUEST, Kongsberg - Norcontrol

Mr. GUEST provided an overview of what types of projects and technology initiatives that a leading marine equipment manufacturer has been involved in related to e-navigation development. The primary focus was on shore-based systems/services, particularly those associated with VTS. This includes mention of satellite AIS, decision-support, web-map services, 3D perspective/views, and "smart phones."



13. New Paradigm for Ocean Meteorological Service due to Changes in Korean Port Services

presented by Mr. Yong-Su GANG, SHINDONG Digitech Co., Ltd.

Mr. GANG described a number of potential e-navigation-related activities occurring in Korea. This included availability of current meteorological services, "Blue Highway" concept, AtoN AIS, and e-navigation data sharing between various government agencies.

PANEL DISCUSSION OF 2nd DAY



During the final session of the Conference, a panel discussion was conducted. Ten (10) persons participated, representing a range of e-navigation “stakeholders”. This included: maritime safety administration, maritime pilot association, shipping company, academic/research institute, and commercial equipment manufacturer. The Panel Session was skillfully moderated by Professor Yung Ho YU (Korea Maritime University).

The Panel was asked to provide their perspective and opinions on several e-navigation related questions.

1. *Why is e-navigation important or needed?*

Maritime Pilot – Due to increases in maritime transport, information overload is becoming more common and leads to decision-making errors. Most often this occurs when ships are entering ports. More relevant information is needed. Lack of adequately trained onboard personnel is a contributing factor in the 80-90% human error rate. Increasingly, Mariners have to learn many more things. He expressed concern about how future shore-based services (e.g. VTS) will actually support the e-navigation concept-of-operation.

VTS Operator – Based on over 20 years experience (Port of Busan), believes that the “single -window concept.” (i.e., one report, many recipients) will become the standard model. However, this will require reliable, up-to-date communications. He had concerns that at present, various ships are using different displays. For e-navigation to occur, it will be important that each ship has the same situational awareness. Human element is also important. Without humans, electronic communication is not useful. We also need to make use of language.

Maritime Safety Administration – Agreed that e-navigation is about humans, and that information overload can become a problem. IMO’s main concern is about shipborne information. Reducing accidents by humans is a major goal. New shipboard technologies must be incorporated in a holistic manner. He mentioned some other issues that were not discussed at this conference, including: 1) Differences between R&D projects and what the users actually want, and 2) IMO will perform a Gap analysis that is intended to compare what is required to what is not currently available. Also, that IMO plans to perform a cost-benefit and risk analysis as well.



PANEL DISCUSSION OF 2nd DAY



Equipment manufacturer - A common VTS traffic image will be an important starting point. The training element is important as well.

Research/Academic – e-navigation will mean different things to different people. Successful implementation will depend on who is using it (mariners) and what it is being used for (more efficient navigation with no loss in safety). Similar to what occurred with the Internet, e-navigation should enable both shipborne and shore-based personnel to have access to the same information in which to make informed decisions. However, the must be based on the current situation and task-at-hand (i.e., what you need, when you need it).

Shipping Company – The analysis and presentation of data must be simple and easy to understand. Data from shore-based providers and from other ships will require an improved infrastructure by information providers and improved shipboard displays. Research and development should be focused on what users actually need, not what is technically possible.



2. *What are the User's needs?*

Maritime Safety Administration - In Norway, an e-navigation User Needs Study was conducted. The results were similar to that of the International study conducted by Germany, and a national study by Canada. Language problems (ship-ship and ship-shore) are a key finding.

3. *Korea proposed to IMO a Gap Analysis process. What type of technologies will be needed to accomplish e-navigation in different countries?*

Maritime Safety Administration - In Norway, improved techniques for handling communications and information flow (e.g., single window concept) were cited as important needs.

Research/Academic - In Japan, AIS and ARPA are currently used only for detection and tracking. Japan is currently looking at more data fusion at a VTS centre, and improved display of other types of information (e.g., collision avoidance aids, AIS Application-Specific Messages, etc.).

4. *Are there different perspectives in regard to what is the overall benefit of e-navigation (e.g., Asia vs. Europe/North America, or Users vs. Industry)?*

Norwegian Coastal Administration – It must be safety first.

Shipping Company – I agree, but perhaps increased efficiency with no loss in safety (e.g., the EU *EfficienSea Project*).

Academic/Research – Regardless of the region they come from, mariners are more similar than they are different. Also, maritime navigation is conducted throughout the world.



PANEL DISCUSSION OF 2nd DAY



5. *What should Korea do to actively influence e-navigation development?*

Maritime Safety Administration – Korea (and other nations in the Asian region) has already made significant contributions, and should continue to do so. This includes participation in IMO, IALA, and IHO. e-navigation is global initiative and needs participation by all maritime nations. The success of the effort depends on input by all.

Academic/Research – Agreed. However, pointed out that in some forums and international committee meetings that are held in Europe and North America, those that speak English as a second language are often reluctant to fully express their views. This is why this type of Conference (in the Asia region) is so important to the international development and implementation of e-navigation.

Equipment Manufacturer – The VTS centres in Korea are outstanding, and an example of what others should do.

6. *Not everything that was discussed today seems to be e-navigation. What is or is not e-navigation?* [a question from the audience]

Academic/Research – Not everything that has been proposed or discussed at this conference should be considered e-navigation. Just because it is technically feasible, does not mean that it is something that should be done. Many things may be possible. The real challenge will be to determine what is really needed – and then figure out how it should be provided.

In his closing comments, the Panel Moderator felt that these issues and concerns need to be brought to the attention of both IALA and IMO.



CONFERENCE SKETCH



[포리너포커스] 존 에릭 IMO e내비게이션통합작업반장 "e내비게이션은 진행형"

지면일자 2011.02.18 임동식기자 dslim@etnews.co.kr ▶ 기자의 다른 기사 보기

"e내비게이션은 새로운 기술개발과 더불어 계속 발전해가고 있는 진행형 개념이다."

존 에릭 하겐 국제해사기구(IMO) e내비게이션 통신작업반 의장은 지난 16일 부산 벡스코에서 열린 'e내비게이션 아시아 콘퍼런스' 기조 강연에서 이 같이 밝히고 "e내비게이션 도입의 핵심에는 필요 기술과 이를 적용해나가는 절차, 그리고 수요자인 인간의 니즈가 있다"며 "선박 운항 등 해양환경에서 이 세가지 요소를 조화롭게 추구해 더 나은 해양환경을 만들어 나가는 것이 e내비게이션의 개념이자 목적"이라 말했다.



이날 IMO의 e내비게이션 도입 활동과 현재까지의 과정, 그리고 e내비게이션의 핵심 개념까지 폭넓게 소개한 하겐 의장은 "도입 기술과 절차도 중요하지만 무엇보다 인간(수요자 니즈)을 배제해서는 안된다는 판단 아래 e내비게이션 관련 기술 교육, 사용자 습득 과정 등 기술 숙련도 문제까지 세세하게 통합적으로 고려해 논의하고 있다"고 강조했다.

그에 따르면 현재 IMO e내비게이션 관련 3개 소위원회는 e내비게이션 운영과 기술, 표준, 교육 등에 관한 '현장과의 갭 분석 작업'을 진행 중이다. 이를 통해 언어표준과 디스플레이 표시 표준 등 e내비게이션 도입 표준안 마련과 적용에 있어 완성도를 높여가고 있다.

또 하겐 의장은 IT기술 도입에 있어 산업계의 역할에 대한 중요성도 언급했다.

그는 "e내비게이션은 IT산업 발전이 가져다 준 기회를 포착해 이를 해양분야에서 활용한다는 측면에서 산업계의 기술적 솔루션의 협력 없이는 어렵다"며 조선, IT 등 관련 산업계의 적극적인 동참을 피력했다.

부산=임동식기자 dslim@etnews.co.kr

Strategic matters for maritime safety and technology

- 국토해양부(Ministry of Land, Transportation and Maritime Affairs)
<http://www.mltm.go.kr>
- 지식경제부(Ministry of Knowledge Economy)
<http://www.mke.go.kr>

Research Institute

- 한국전자통신연구원(Electronics and Telecommunication Research Institute)
<http://www.etri.re.kr>
- 한국조선기자재연구원(Korea Marine Equipment Research Institute)
<http://www.komeri.re.kr>
- 한국해양연구원 해양시스템안전연구소(Maritime & Ocean Engineering Research Institute) <http://www.moeri.re.kr>
- 동의대학교 부산IT융합부품연구소(Convergence of IT Devices Institute Busan)
<http://www.cidi.re.kr>
- 한국해양대학교 차세대IT선박융합기술센터(Advanced IT and Ship Convergence Center) <http://itship.hhu.ac.kr>

Industrial Association

- 한국선박전자산업진흥협회(Marine Electronics Industry Promotion Association)
<http://www.meipa.or.kr>

Leading Industry Parties

- (주)신동디지텍(SHINDONG Digitech Co., Ltd.)
<http://www.shindong.com>
- (주)장산아이티(CHANGSANIT Co., Ltd.)
<http://www.changsanit.com>
- (주)지엠티사이버네틱스(GMT Cybernetic Co., Ltd.)
<http://www.gmtc.kr>
- 대양전기공업주식회사(DAEYANG Co., Ltd.)
<http://www.daeyang.co.kr>
- (주)환경과학기술(Korea Environmental Science & Technology Institute, Inc.)
<http://www.kesti.co.kr>

Other references

- e-Navigation 대응전략포럼 (한국정보통신기술협회/TTA 지원)
<http://www.e-navi.or.kr> (korean language only)
- KENTIC(Korea E-Navigation Technical Information Committee)
<http://cafe.daum.net/e-navigation> (korean language only)