

연안해역의 안전항해를 위한 사용자 요구사항의 분석

Analysis of User Needs Supporting Navigational Safety in Coastal Area

† 정중식 · 정재용* · 김선영** · 김혜진***

† , * 목포해양대학교 국제해사수송과학부

, * 한국해양연구원 해양안전·방제연구소

요약 : E-Navigation 아키텍처 상세화 과정에서 이용자 요구사항은 안전항해 기능정의 레벨과 사용자 요구서비스 상세화 레벨로 나누어 입력된다. 본 연구는 연안해역에서 선박안전 항해를 지원하기 위하여 필요한 기본정보 및 서비스 레벨에서 정보를 도출하는데 목적이 있다. 도선사, 선장 및 VTS 운영자, 해양경찰청에 근무하는 항해경험이 풍부한 전문가를 대상으로 설문을 행하고 그 결과는 해양기상 및 해상상태 정보, 상황인식 및 충돌방지를 위한 정보로 나누어 정리하였다.

핵심용어 : 전자항해, E-Navigation, 이용자 요구사항, 안전항해, 항해안전정보

1 Research Background & Purpose

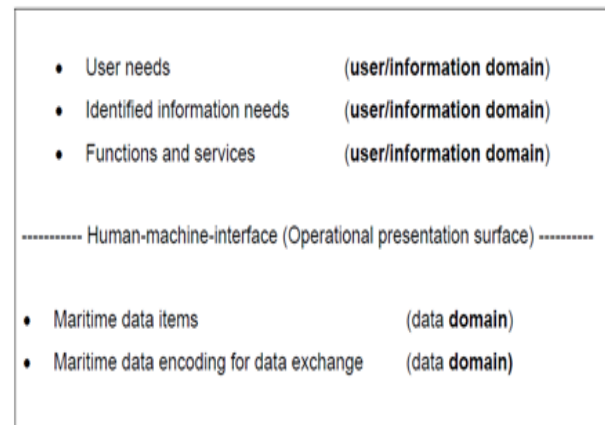
□ Motivation

- More than 80% of total maritime accidents occurs in Coastal Area
- Development of the Advanced Safe Navigation System for Inbound and outbound vessels to Major Ports in Korea
- Update of User Needs during the Implementation Process of e-Navigation Strategy

□ Research Purpose

- Survey of User Requirements
 - Navigation System in Bridge : Information with high priority
- 1st Stage : Survey to Mariners, Pilots
- 2nd Stage : Survey to System Developers - N/A on this presentation

2 User Requirements for e-Navigation

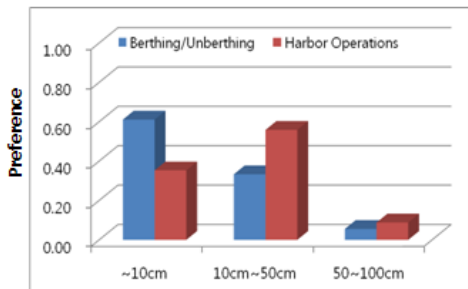


† 교신저자 종신회원 jsjeong@mmu.ac.kr

* 종신회원 jjjong@mmu.ac.kr; ** 종신회원 sykim@moeri.re.kr; *** 정회원 hjk@moeri.re.kr

3 Survey of User Requirements and Its Results

● Requirements of Accuracy for DUKC Information from shore

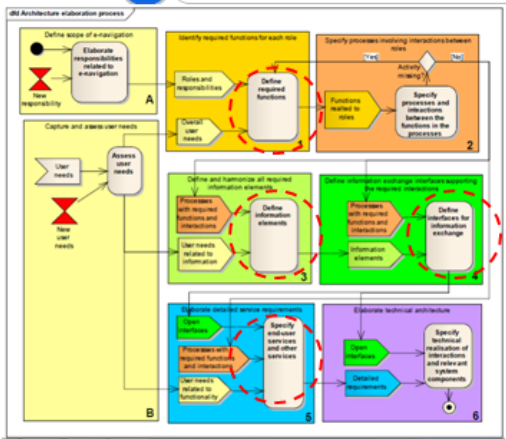


3 Survey of User Requirements and Its Results

□ Questionnaire - 2011. 9.1 ~ 2011. 11. 30

- 45 experts
 - Captains & Pilots : engaged in ship operations more than 15 years
 - VTS Operators & Korean Coast Guard with experiences more than 10 years as mariners
- Questions
 - Weather Conditions/Sea State
 - Situation Awareness and Anti-Collision

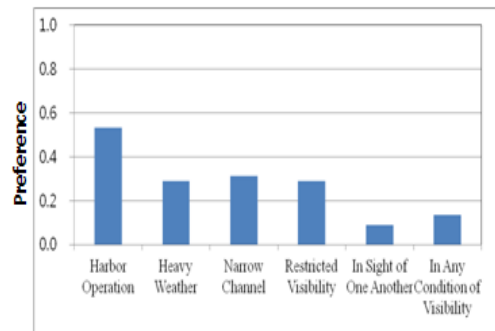
2 User Requirements for e-Navigation



● User Needs related to
-Info. elements
-Functions
-Info. to be exchanged

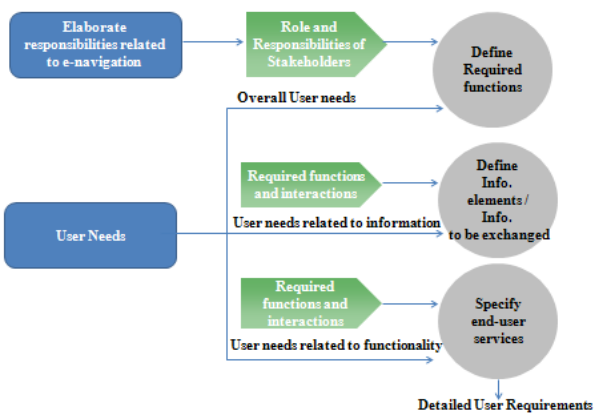
3 Survey of User Requirements and Its Results

● Needs of further detailed information of 'Wind Direction/Wind Force' from shore



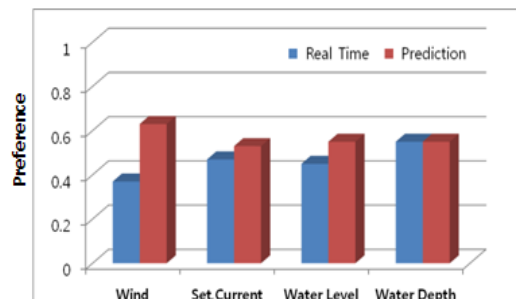
The number of respondents who checked (Harbor Operation, Heavy Weather) / Total number of the respondents who checked all items

2 User Requirements for e-Navigation



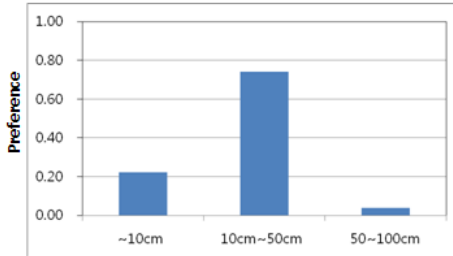
3 Survey of User Requirements and Its Results

● Preference for Needs of further detailed 'forecasted Information' from shore → in favor of 1~2 hours prediction



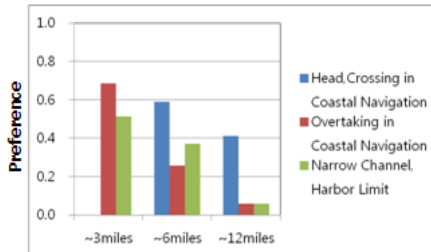
3 Survey of User Requirements and Its Results

● Requirements of Accuracy for Air Draft from shore



3 Survey of User Requirements and Its Results

● Range to be intensively monitored for Anti-Collision Actions



3 Survey of User Requirements and Its Results

● Services with High Priority

Information	
Elements	Services
Distance to Objects ...	Prediction and Broadcast of Visible Range on Intended Route
Distance to target ship, Location of Dangerous Obs., Geographic environments, Traffic etc.	Guide on an avoidable area/route
Target ship course/speed/size/draft/cargo loading condition	Display of Collision Risk, Broadcasting/Warning Message to Surrounding Vessels
Waypoints of Target Ship and Own Ship, Co., Speed, Ship Type, CPA/TCPA	Intended Route of Target Ship to be encountered, Exchange of Voyage Planning
Target Ship Position/ Course/Speed	Transmission of Target ship's Trail and Speed history
Encountering Type, Ship Size/Length, Relative Bearing/Speed, CPA/TCPA, Local Reg.	Display of Collision Risk, Guide on Applicable Navigation Rules

3 Survey of User Requirements and Its Results

● Services with High Priority

Information	
Elements	Services
Manoeuvring Characteristics, Draft, Weather Information, Sea State, Current/Set	Prediction of Maneuvering Characteristics
Traffic Information, CPA/TCPA, AIS Static Info.	Traffic Image Transmission to the Related Vessel, Prediction of vessels/location to be encountered
Overtaking vessel's speed/intended course	Transmission of Navigational Assistance Message to Own Ship
Risk alarm, Target ship information	Display of Collision/Grounding Risk
Berth no. of inbound Vessel/ETA	Transmission of Image of Berth to be moored, Current Harbor Plan
Position/Route of non-AIS Vessel	Position Display of Non-AIS Vessels in the vicinity of Own Ship
Fishing net, Fishing type, Depth of Fishing Net under Waterlevel	Location/Picture/Description of Fishing Net, Fishing Method

4 Concluding Remarks

□ Further Information with high priority was surveyed and suggested:

- Some respondents negative to get additional information from shore - Data Reliability, Timeliness to provide information

□ Future Survey

- Specify Info. Hierarchy and dependency between info. in terms of Data Mining
- Next step is going to collect the requirements of system developers, ergonomic designers
- **Bridge Checklist** - Preparation for Arrival in Port, Pilotage, Passage Plan Appraisal, Navigation in Coastal Waters, Navigation in Restricted Visibility, Navigation in Heavy Weather

참고문헌

- [1] IMO NAV 56/WP.5/Rev.1, Development of E-Navigation Strategy Implementation Plan - Report of the Working Group, pp.7-9, July 28, 2010.
- [2] ICS, *Bridge Procedures Guide*, Marisec Pub., London, 2007.
- [3] Y.W. Jeon et.al, The International Convention on Standards of Training Certification and Watchkeeping for Seafarers, 1978, as amended, IMO, Haein Pub., 2011.