SMART-Navigation: an e-Navigation project focusing on non-SOLAS ships as well as SOLAS ships

01 February, 2017

SMART-Navigation Project Office
Han Jin Lee
Introduction of SMART-Navigation Project

2020
Completion of the SMART-Navigation Project

2016
JUN Start of the SMART-Navigation Project

2015
MAR Selection of SMART-Navigation Project Office
DEC Selected as a world-class technical support targets
(Steering committee of National Science and Technology Council)

2014
JUL Korean e-Navigation strategic implementation plan confirmation
FEB Korea e-Navigation forum foundation

2013
AUG Planning research for Korean e-Navigation strategy

2015
Korean e-Navigation strategic implementation plan confirmation

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AUG Planning research for Korean e-Navigation strategy
Introduction of SMART-Navigation Project

By contribution to the introduction of IMO e-Navigation
Securing Maritime Safety and Leading Related Technologies

Final Goal of Project

Background

- Total marine accidents caused by fishing boats and small ships: 72%
- Accidents due to human factors: 82%

Solution

Navigational Safety
SMART-Navigation Services
ICT
Introduction of SMART-Navigation Project

IMO e-Navigation, and
LTE-Maritime * Non-SOLAS vessels

Departure

Electronic Navigational Chart Streaming
Maritime Safety Information

Monitoring Assistance

SOS

Pilot/Tug Assistance Service

Arrival

Remote Monitoring / Optimal route planning

Sea traffic coordination & optimization
Maritime domain awareness
Active & proactive maritime safety management
Remote Assistance

Republic of Korea

Ministry of Oceans and Fisheries
Introduction of SMART-Navigation Project

**SMART-Navigation Project**

**About USD 110M**

**March 2016 ~ December 2020**

- e-Navigation Forum
- Ministry of Oceans and Fisheries
- Steering committee
- Korea Institute of Marine Science & Technology promotion
- SMART-Navigation Project Office
- Project Advisory Committee

**KRISO (Korea Research Institute of Ships & Ocean Engineering)**
- Activity 1: Development of Core Technology

**KR (Korean Register)**
- Activity 2: SMART-Navigation Operating System & Digital maritime infrastructure
- Activity 3: International standardization
Introduction of SMART-Navigation Project

Activity I

1. Comprehensive situational awareness & responding service
   - WP1: Monitoring Assistance for high risk ships
2. e-Nav service covering Korea maritime traffic
   - WP2: Onboard system remotemonitoring
   - WP3: Optimal safe route planning
   - WP4: ENC service for small ships
3. e-Nav service required by IMO
   - WP5: Pilot/Tugs assistance
   - WP6: Maritime safety information service

Activity II

WP7: Integrated e-Nav system
WP8: LTE-Maritime
WP9: Digital communication (VHF/NAV/AF)

Activity III

WP10: Maritime data exchange standards (S-10X)
WP11: Maritime Cloud
WP12: Technologies for digital communication
WP13: S-mode

* e-Nav: e-Navigation
S-10X: Standards based on IHO Special publication 100 (S-100)
IMO (International Maritime Organization)
IHO (International Hydrographic Organization)
Construction of LTE-Maritime

16.02.14

16.02.18
• Pilot construction of LTE-Maritime
  • Verifying radio wave characteristics and its coverage on each sea areas
  • Verifying the influence of tidal level
  • Test to reduce radio shadow areas by islands and other factors
  • Test to remove the interference with other networks
  • Test to reduce spill over into neighboring countries
02 Construction of LTE-Maritime

Wahyun, Geoje city

Mt. Bulmo, Gimhae city

Mt. Daedun, Mokpo city

Construction

LTE antenna installation

e-Navigation Underway Int. 2017
# SMART-Navigation Services

<table>
<thead>
<tr>
<th>ID</th>
<th>Service</th>
<th>Dedicated user/ship</th>
<th>Physical Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Svc.1</td>
<td>Monitoring assistance for high risk ships</td>
<td>• High risk ships</td>
<td>LTE-M VDES</td>
</tr>
<tr>
<td>Svc.2</td>
<td>Remote monitoring on system onboard for high risk ships</td>
<td>• Passenger ships with Korean Flag (International/Domestic)</td>
<td>LTE-M VDES, etc</td>
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<td></td>
<td></td>
<td>• Ships requiring the service</td>
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<tr>
<td>Svc.3</td>
<td>Optimal routes planning for high risk ships</td>
<td>• Passenger ships with Korean Flag (International/Domestic)</td>
<td>LTE-M VDES, etc</td>
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<tr>
<td></td>
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<td>• Ships requiring the service</td>
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<tr>
<td>Svc.4</td>
<td>Electronic Navigation Chart streaming for small vessels</td>
<td>• Non-SOLAS Ships</td>
<td>LTE-M</td>
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<tr>
<td>Svc.5-1</td>
<td>Pilots/tugs assistance service</td>
<td>• Pilot</td>
<td>LTE-M</td>
</tr>
<tr>
<td>Svc.5-2</td>
<td>Maritime safety information service (information on maritime safety, weather, route)</td>
<td>• Ships requiring the service</td>
<td>LTE-M VDES, etc</td>
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<tr>
<td>No</td>
<td>Identified Services</td>
<td>SMART</td>
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<tr>
<td>MSP 1</td>
<td>VTS Information Service (IS)</td>
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<td>MSP 2</td>
<td>Navigational Assistance Service (NAS)</td>
<td>Svc.1/Svc.2</td>
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<tr>
<td>MSP 3</td>
<td>Traffic Organization Service (TOS)</td>
<td>Svc.3</td>
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<td>MSP 4</td>
<td>Local Port Service (LPS)</td>
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<td>MSP 5</td>
<td>Maritime Safety Information Service (MSI)</td>
<td>Svc.5-2</td>
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<td>MSP 6</td>
<td>Pilotage Service</td>
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<td>MSP 7</td>
<td>Tugs Service</td>
<td>Svc.5-1</td>
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<td>MSP 8</td>
<td>Vessel Shore Reporting</td>
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<td>Telemedical Assistance Service (TMAS)</td>
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<td>MSP 10</td>
<td>Maritime Assistance Service (MAS)</td>
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<td>Nautical Chart Service</td>
<td>Svc.4</td>
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<td>MSP 12</td>
<td>Nautical Publications Service</td>
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<td>Ice Navigation Service</td>
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<td>MSP 14</td>
<td>Meteorological Information Service</td>
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<td>MSP 15</td>
<td>Real-time Hydrographic and Environmental Information Service</td>
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<td>MSP 16</td>
<td>Search and Rescue Service</td>
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04 International Standards of e-Navigation

Ref.: IMO NCSR 1/28 Annex 7
Results

Ensuring maritime traffic safety management system
- Marine accident reduction
- Real-time support of safe navigation

Ensuring access to information at Sea
- Maritime information sharing/communication
- Digital collaboration for port operations

Ensuring international standards
- Strategic response to international standards
- Strengthening international cooperation

Creating additional services
- Creating new markets in maritime safety
- ICT convergence in maritime domain

Strengthening international cooperation
- Strategic response to international standards
- ICT convergence in maritime domain

Maritime accident reduction
- Real-time support of safe navigation

ICT convergence in maritime domain
THANK YOU

SMART
WIDER CONNECTION SAFER NAVIGATION

Ministry of Oceans and Fisheries