



e-Navigation
underway 2016

Technical Program

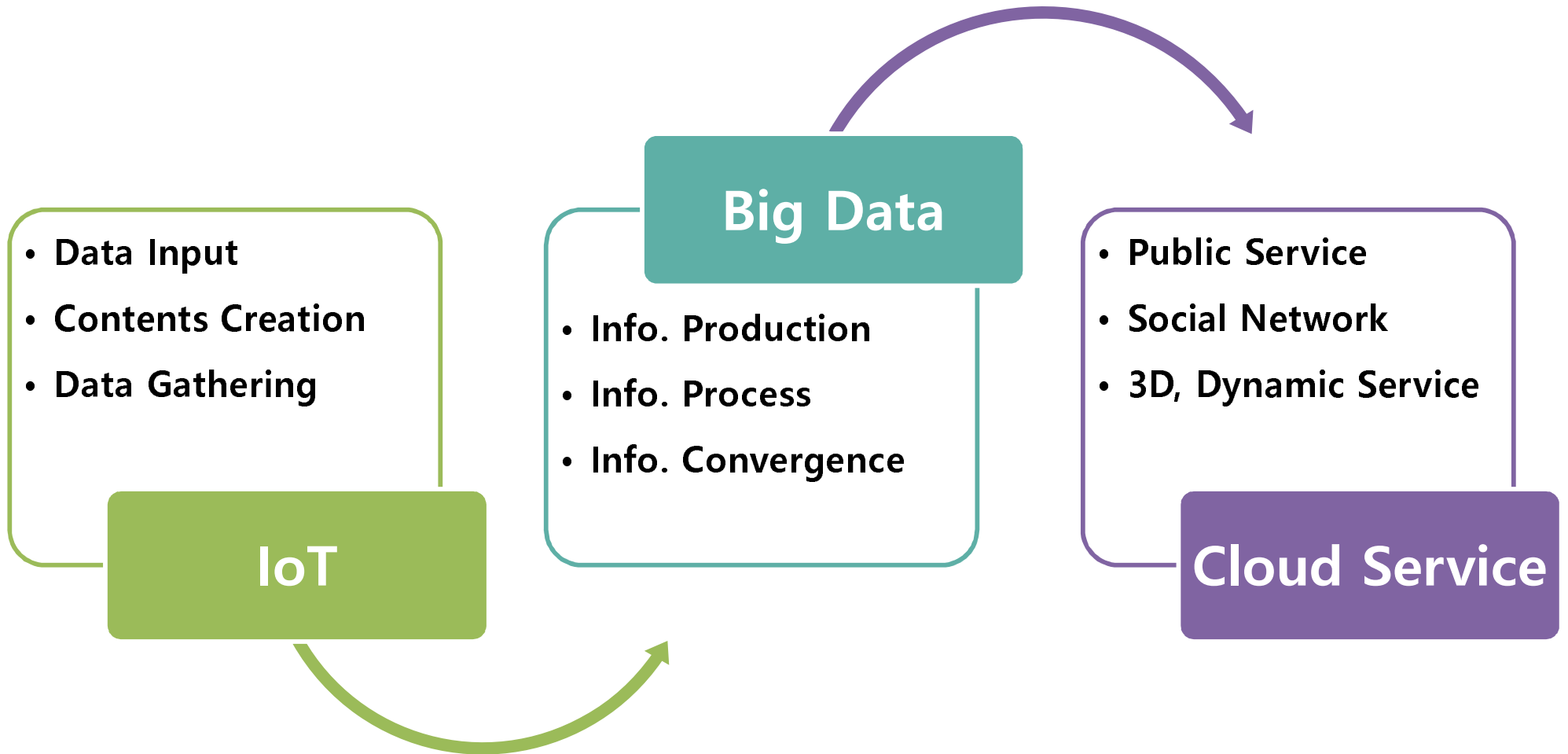
S-100 Based e-Navigation Application Prototype Development

2016. 2. 2~4

Dr. JJ Unggyu Kim



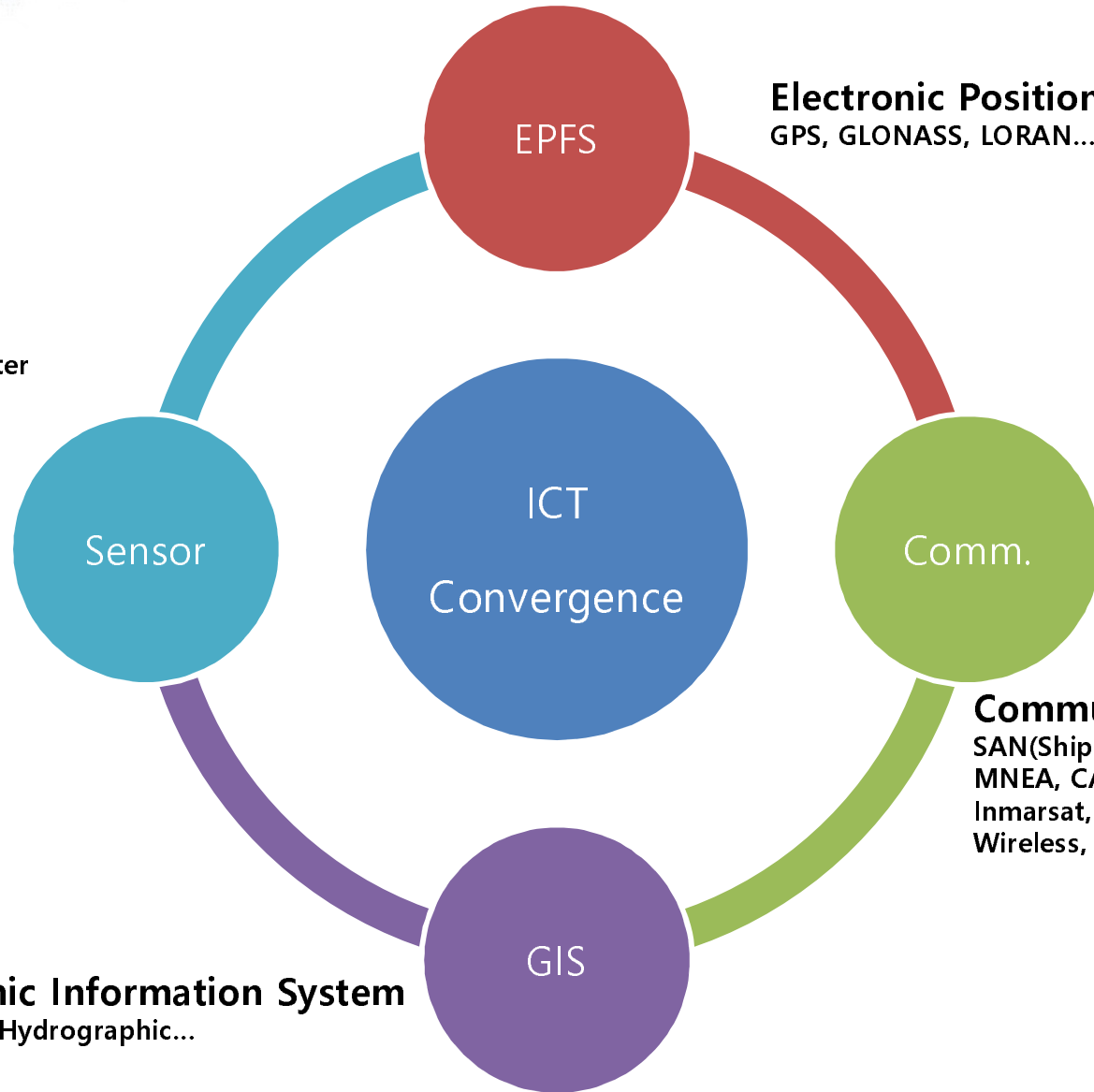
ICT Approach to e-Navigation





ICT Convergence Technology Map

Navigational Sensors
RADAR, Speed Log, Thermometer
ROT, Motion Sensor, TRIM
Engine Monitor, Alarm Monitor
Weather ...



Electronic Position Fixing System
GPS, GLONASS, LORAN...

Communication Network
SAN(Ship Area Network), Ethernet, TCP/IP
MNEA, CAN-BUS
Inmarsat, VSAT
Wireless, AP

Geographic Information System
Geo-Spatial, Hydrographic...

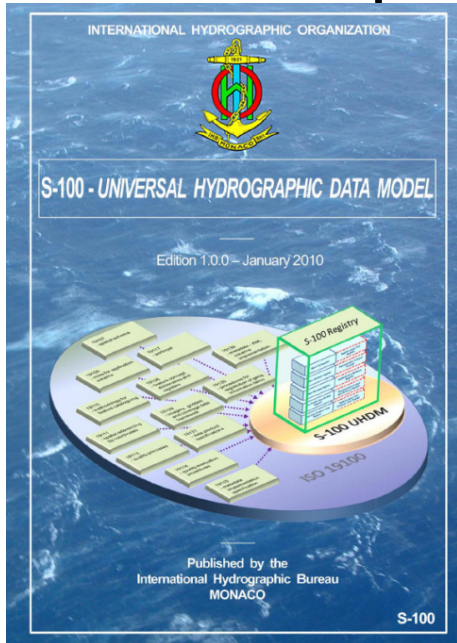


S-100 Based e-Navigation Application Development Project

- ❖ Funded By Ministry of Industry, Trade and Resources
- ❖ 4 Years (2012.6~2016.5)
- ❖ Led by e-Marine Co., Ltd

❖ Team :





S-100 version 1.0.0

January 2010

Foreword

Development of S-100 – the *IHO Universal Hydrographic Data Model* was included in the IHO Work Programme in 2001. S-100 has been developed by the IHO Transfer Standards Maintenance and Applications Development (TSMAD) Working Group with active participation from hydrographic offices, industry and academia.

S-100 provides a contemporary hydrographic geospatial data standard that can support a wide variety of hydrographic-related digital data sources, and is fully aligned with international geospatial standards, in particular the ISO 19100 series standards, thereby enabling the easier integration of hydrographic data and geospatial solutions.

The primary goal for S-100 is to support a greater variety of hydrographic sources, products, and customers. This includes the use of imagery and enhanced metadata specifications, unlimited encoding formats and maintenance regime. This enables the development of new applications the scope of traditional hydrography - for example, high-density bathymetry, marine GIS, et cetera. S-100 is designed to be extensible to support requirements such as 3-D, time-varying data (x, y, z, and time) and Web-based services. S-100 is designed to support requirements for acquiring, processing, analysing, accessing, and presenting hydrographic data that are added when required.

The S-100 development and maintenance process is specifically aimed at encouraging input from non-IHO stakeholders, thereby increasing the likelihood that the standard will maximise their use of hydrographic data for their particular purposes.

S-100 will eventually replace S-57 – the established *IHO Transfer Standard for Hydrographic Data*. Although S-57 has many good aspects, it has some limitations:

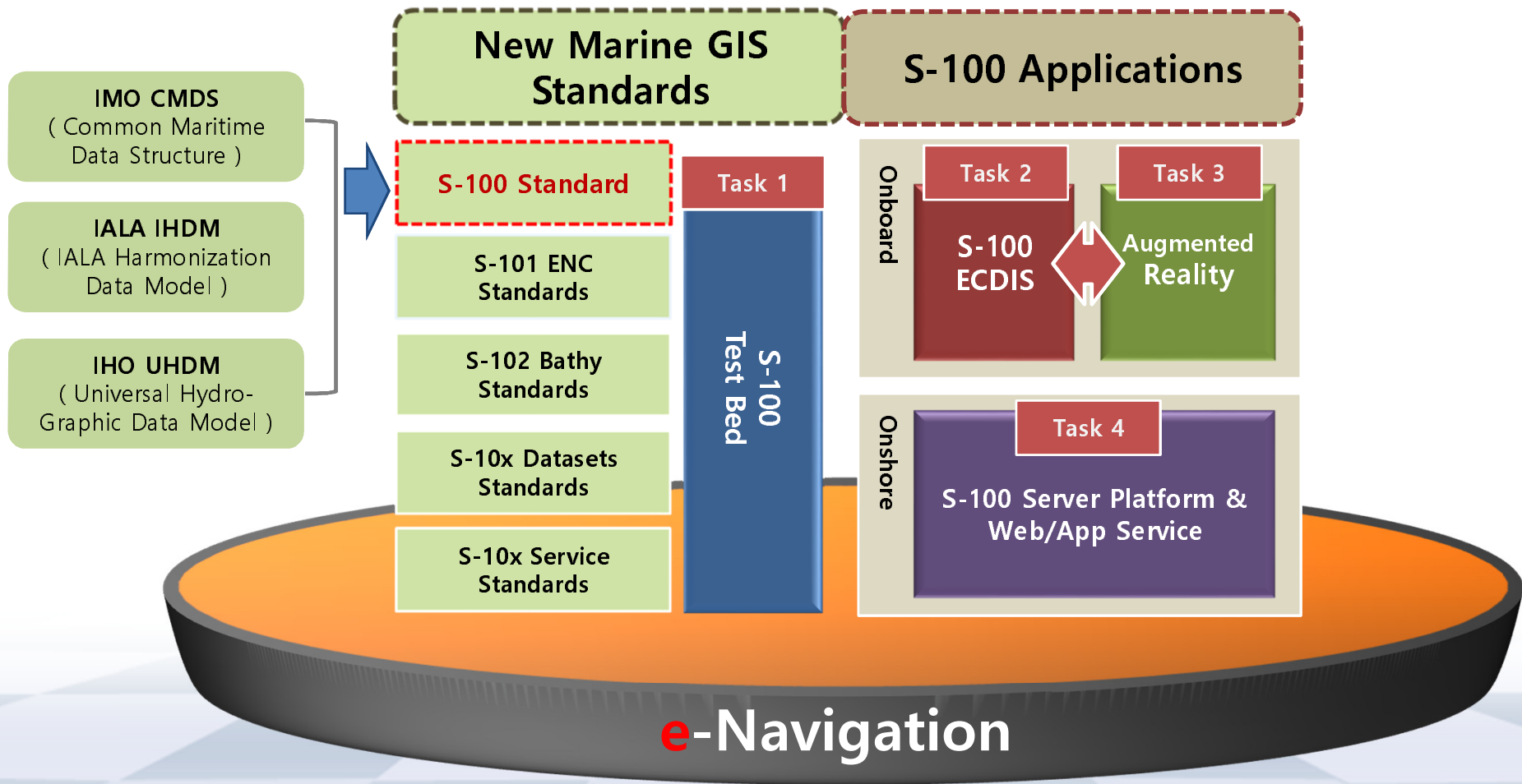
- S-57 has been used almost exclusively for encoding Electronic Navigational Charts (ENCs) for use in Electronic Chart Display and Information Systems (ECDIS).
- S-57 is not a contemporary standard that is widely accepted in the geospatial community.
- It has an inflexible maintenance regime. Freezing standards for hydrography is counter-productive.
- As presently structured, it cannot support future requirements for high-density bathymetry, or time-varying information).
- Embedding the data model within the encapsulation (i.e., file format) reduces the flexibility and capability of using a wider range of transfer mechanisms.
- It is regarded by some as a limited standard focused exclusively for the production and exchange of ENC data.

The transition from S-57 to S-100 will be carefully monitored by the IHO to ensure that existing S-57 users, particularly ENC stakeholders are not adversely affected. S-57 will continue to exist as the designated format for ENC data for the foreseeable future.

In the meantime, all existing and potential users of hydrographic information and data are encouraged to use S-100 as the basis for new applications, seeking input to the further development of the standard if their particular requirements are not yet catered for.

International Hydrographic Bureau
MONACO

... This enables the development of new applications that go beyond the scope of traditional hydrography – for example, high-density bathymetry, sea floor classification, marine GIS, etc. S-100 is designed to be extensible and future requirements such as **3D, time-varying data and web-based services** can be easily added when required.

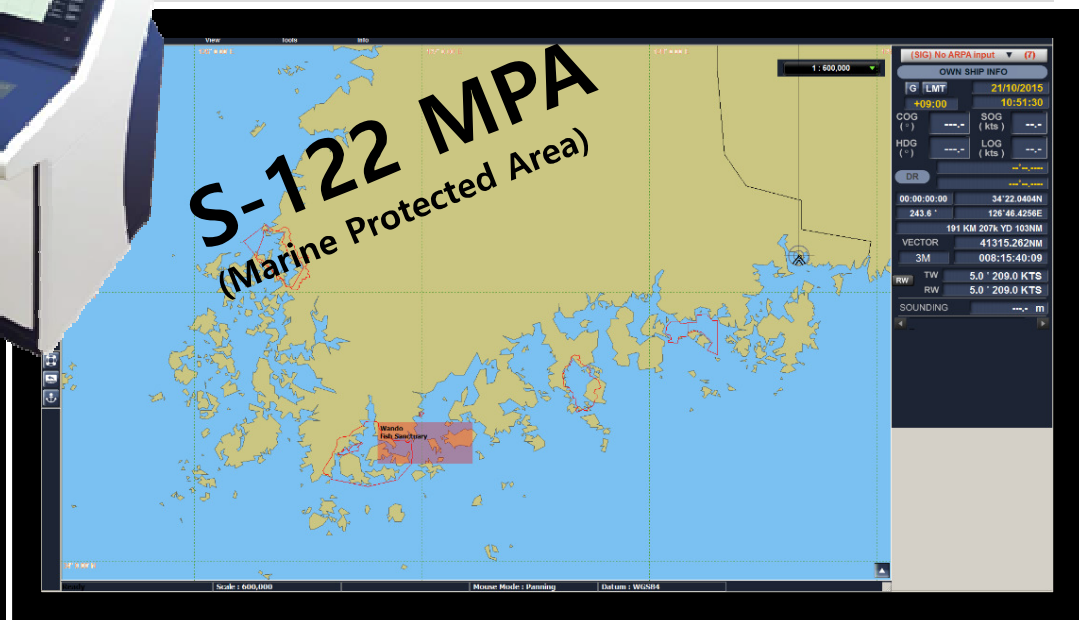
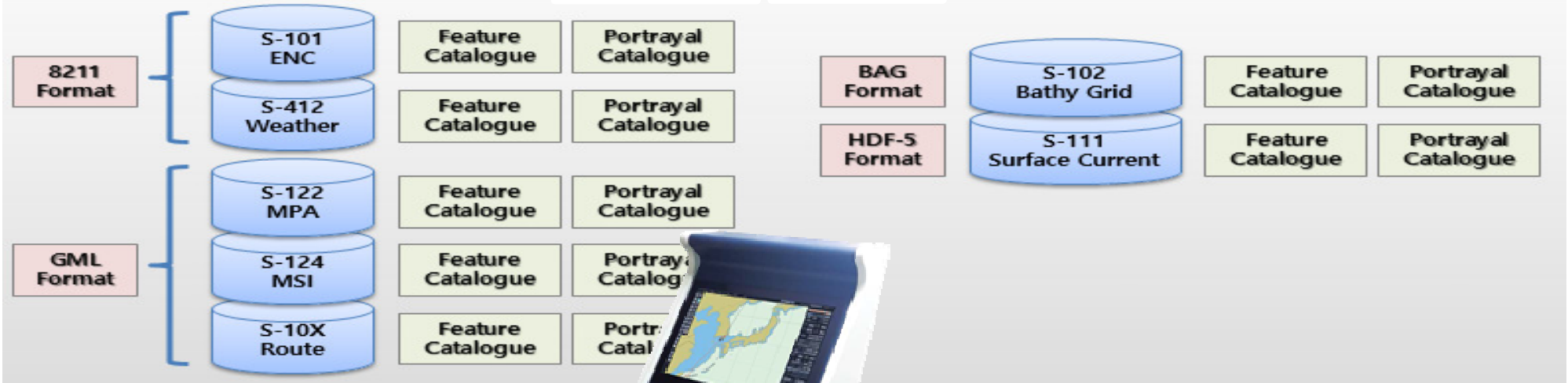


S-10x Multi-Products ECDIS



Vector Data

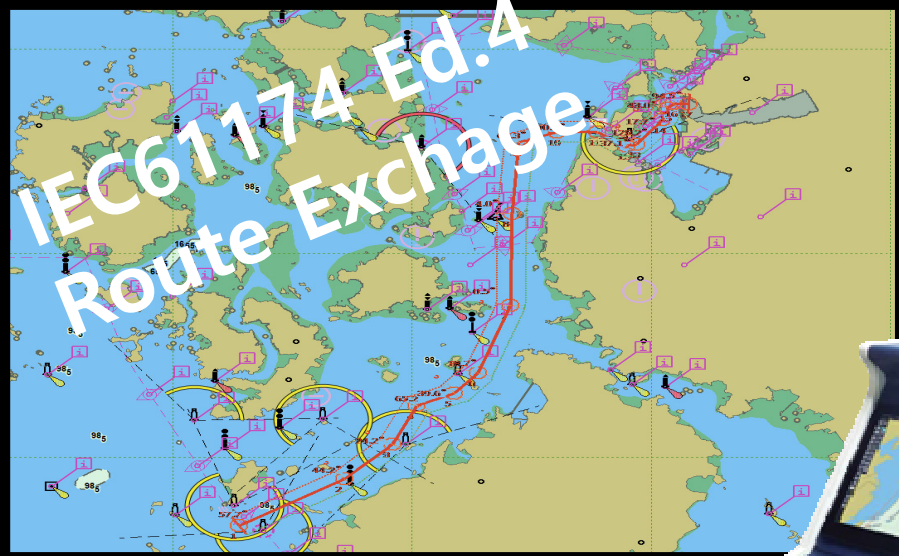
Grid Data



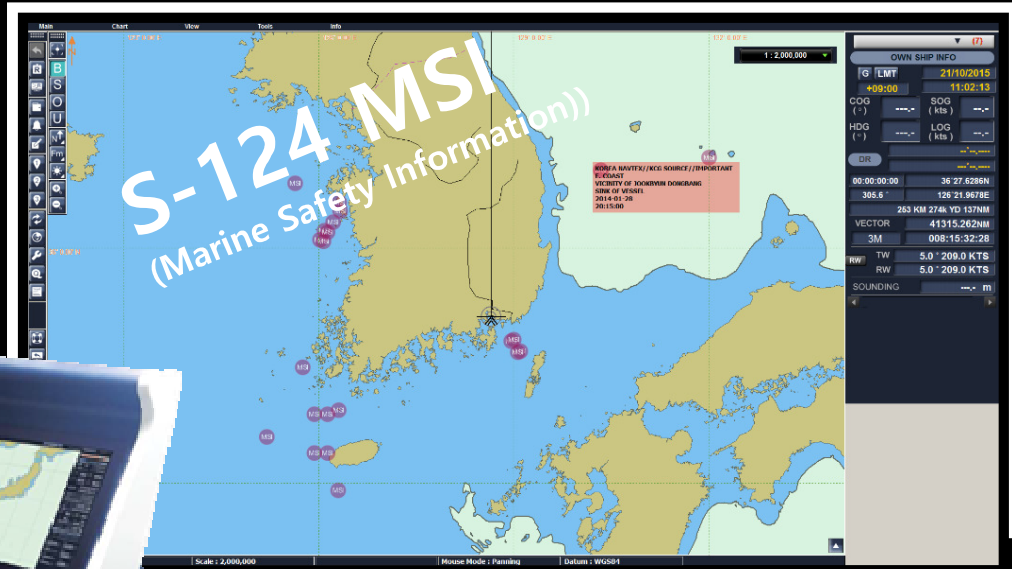
S-10x Multi-Products ECDIS



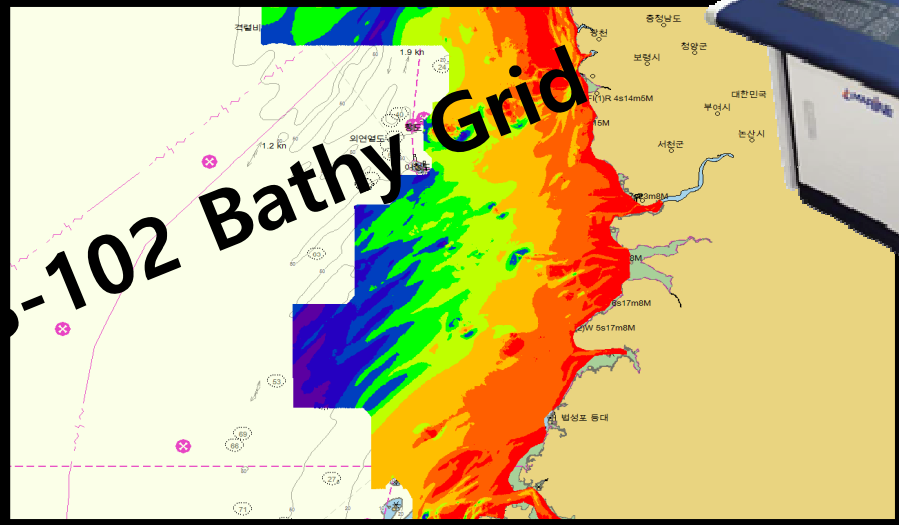
IEC61174 Ed.4
Route Exchange



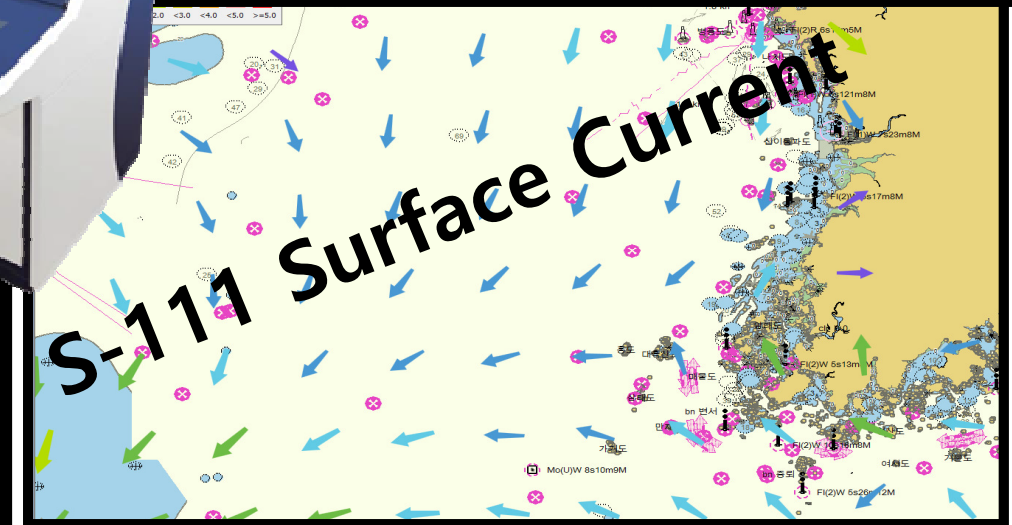
S-124 MSI
(Marine Safety Information)



S-102 Bathy Grid

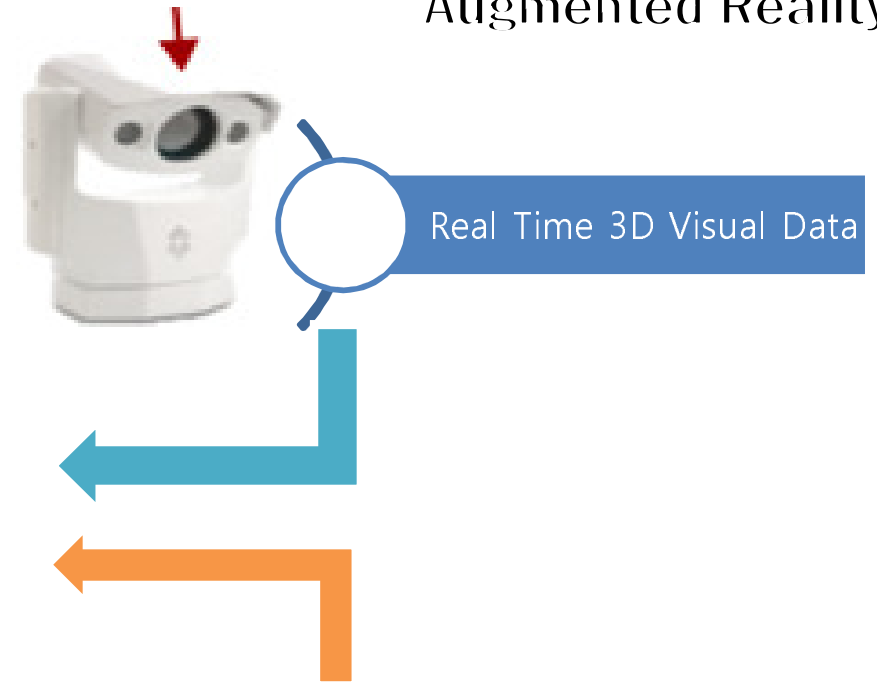
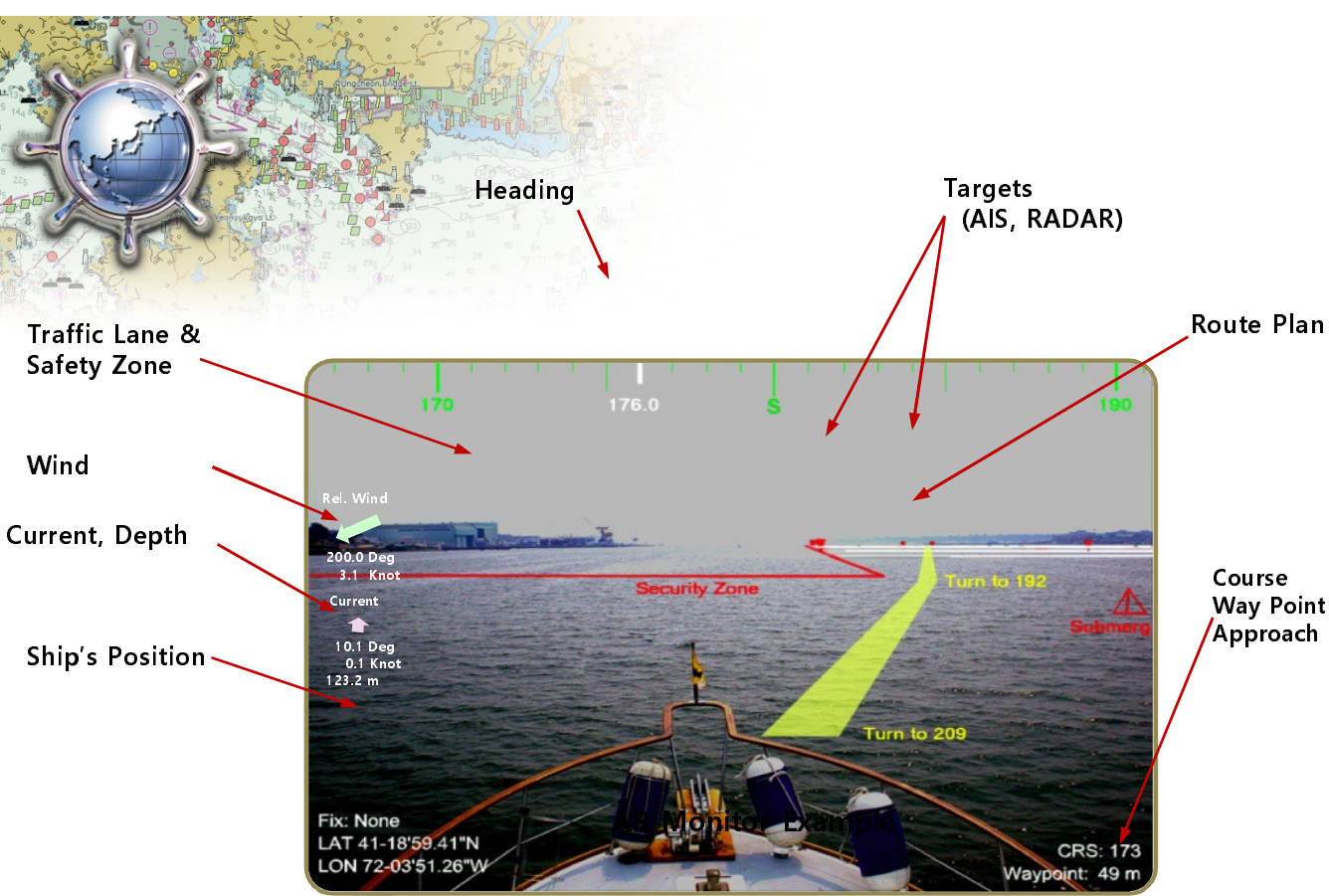


S-111 Surface Current



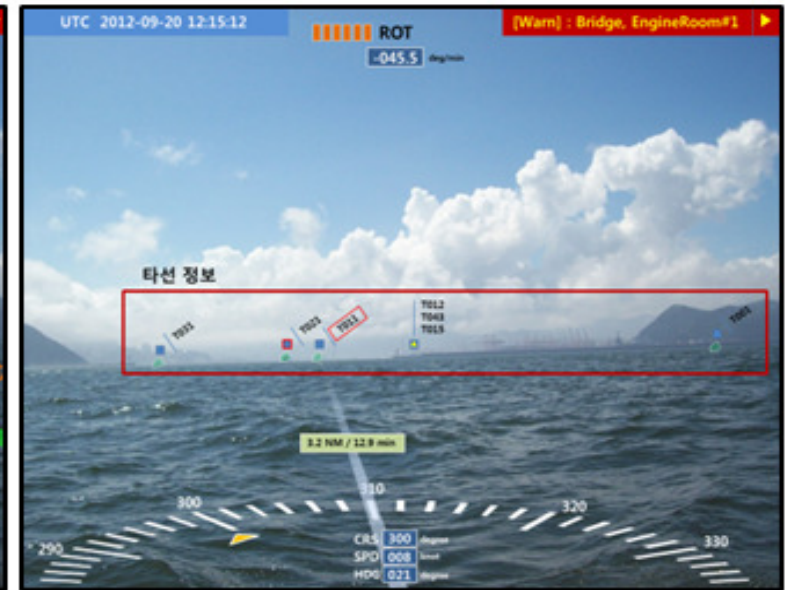
AR navigation

Augmented Reality

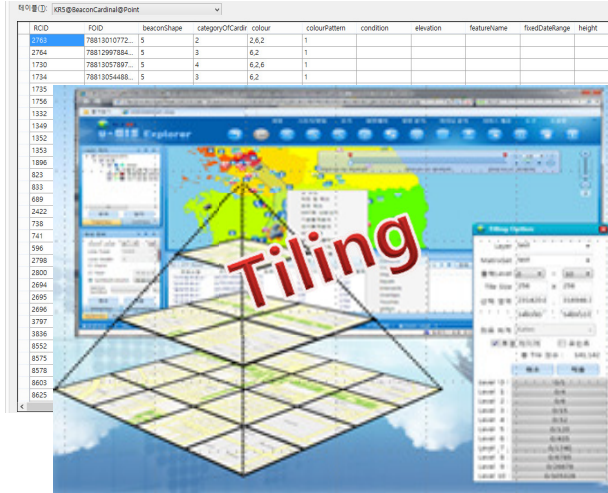
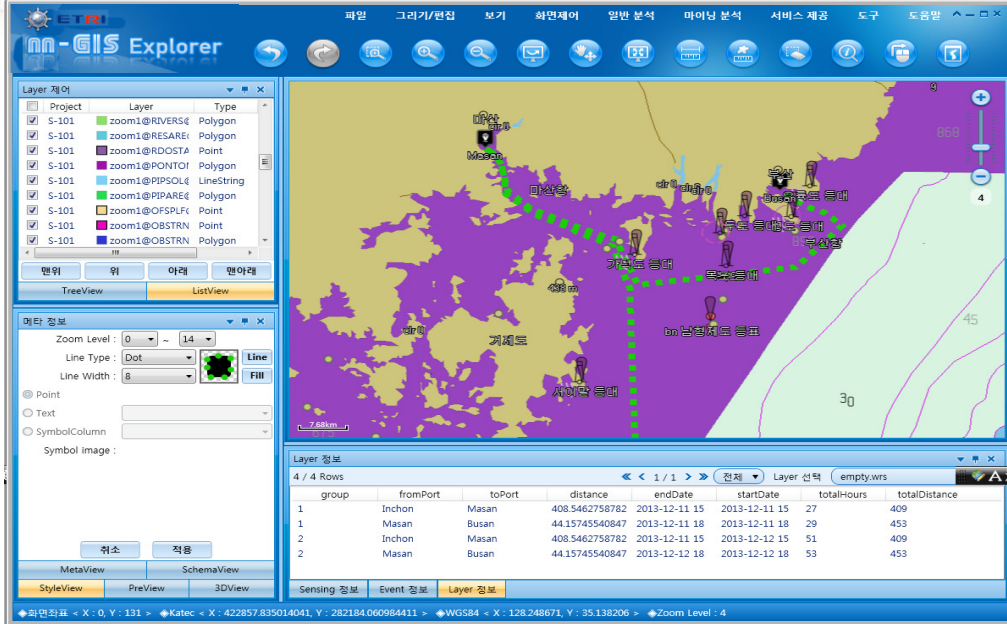
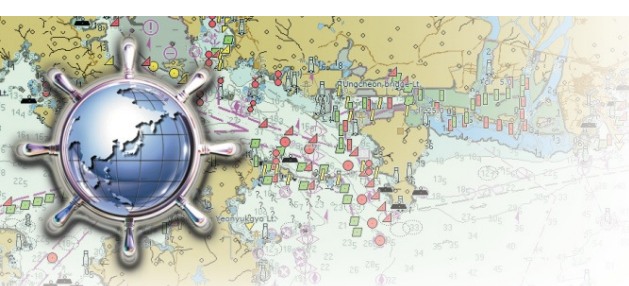


AR navigation

Augmented Reality



OnShore S-100 Server Platform



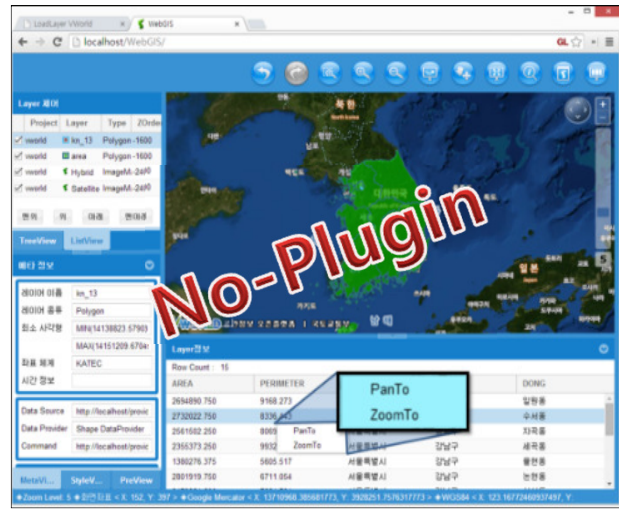
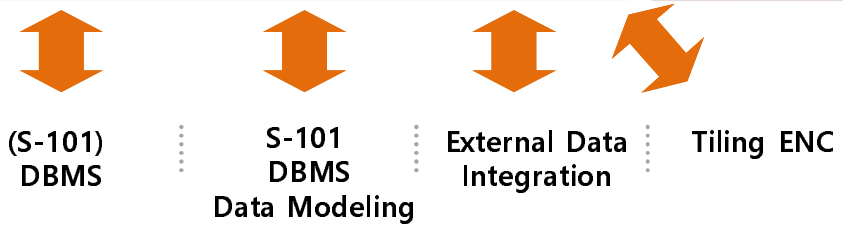
WebApp

Any Browsers



Android
iOS

S-100 Data Synchro. Component Catal. Sync Component



Marine Cloud

On-shore Marine Data Service

- Crowd Sourcing
- Cloud Service
- ENC Streaming

HTML5 기반
차세대 웹 앱

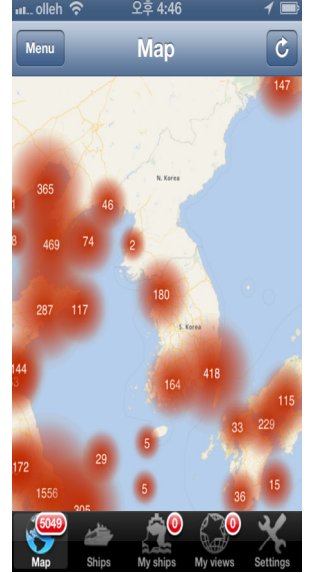
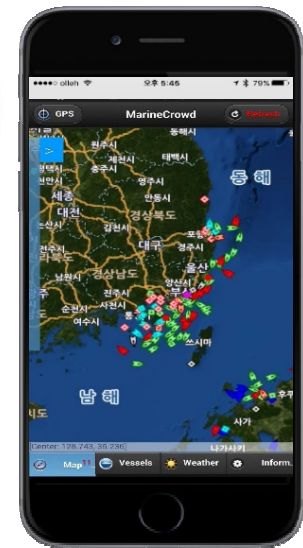
항행정보지원
모바일 웹 앱

항행정보지원
모바일 웹 앱

항행정보지원플랫폼

VTS

- S-10X
- AIS
- 항행정보
- 기상정보
- 해양콘텐츠





- ❖ **e-Navigation is convergence of maritime industry and ICT.**
- ❖ **IHO S-100 standard is designed to be extensible and future requirements, such as 3D, Time varying data and web-based services can be easily added when required.**
- ❖ **S-100 based e-Navigation Applications are under development to meet the future requirements.**
- ❖ **Outcome of S-100 Project, at its initial stage, includes prototype of S-10x Multi-products ECDIS, AR Navigation System and On-Shore S-100 Server Platform & WebApp Service.**
- ❖ **The development shall contribute to implementation of e-Navigation into international maritime industry, in terms of technological advance and operational practice.**



e-Navigation is underway



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