E-Navigation & Digital@Sea
related developments
in Taiwan

Taiwan ENC Center (TECNCC), Ministry of the Interior (MOI)
Maritime and Port Bureau (MPB) and Central Weather Bureau (CWB),
Ministry of Transportation and Communications (MOTC)
presented by
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Administrations and Related Maritime Services

- Ministry of the Interior (MOI)
  - Department of Land Administration
    - Taiwan ENC Center (TENCC)

- Ministry of Transportation and Communications (MOTC)
  - Maritime and Port Bureau (MPB)
    - Maritime Safety Division
  - Central Weather Bureau (CWB)
    - Marine Meteorology Center

Electronic Navigational Charts (ENC) and Nautical Publications Services
- Coastal Vessel Traffic Service (VTS), Vessel shore reporting
- Maritime safety information (MSI) service
- Meteorological information service / Real-time hydrographic and environmental information services
- Maritime assistance service (MAS), Search and rescue (SAR) service

ENC (Research) Center, Department of Communications, Navigation and Control Engineering
National Taiwan Ocean University (NTOU)
Coastal AIS Network (MPB)

• 33+ shore stations (14 BS, 19 AtoN) + receivers + Sat-AIS + ENC WMS
  • Vessel monitoring
  • Safety messages
  • V-AIS AtoNs
  • Risk assessment
  • Accident investigation

• data sharing with
  • Fisheries Agency
  • Coast Guard Administration
  • Environmental Protection Administration
  • Taiwan International Ports
  • Chunghwa Telecom (cable protection)
  • MOI (chart adequacy assessment)
  • CWB (ship weather observation reports)
Weather Application-Specific AIS network (CWB)

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<th>FI</th>
<th>Message Name</th>
<th>Data Source</th>
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<td>31</td>
<td>Meteorological and hydrographic data</td>
<td>Buoys(wind, wave and current..)</td>
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<td>Environmental</td>
<td>Tidal(observation and prediction)</td>
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<td>21</td>
<td>Weather observation report from ship</td>
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- Shore to ship
  - Data source → central control → a network of 8 shore stations
  - International ASM: sensor data (data buoys & tidal stations) & forecast

- Ship to shore (back to CWB)
  - Shipboard weather observation reports
    - automatic & manual
  - AIS shore network assisted sharing

- AIS weather APP
  - receive via shipboard AIS or internet

- Regional ASM (CWB/NTOU)
  - Regional wind field forecast
  - Typhoon warnings
(AIS) Shipboard weather observation reports

- CWB Project starting 2022: participation by 100 more vessels

Location, Air Pressure & Temperature, Wind; every 10 min. (remote-controllable also via AIS ASM)
MOI’s S-100 Digitalization Plan (2021-2026)

- S-101 ENC
- S-102 Bathymetric Surface
- S-111 Surface Current (CWB & MOI)
- S-127 Marine Traffic Management
- S-124 (Navigational Warnings)
- S-125 (Marine Navigation Service)
  - IALA S-201 (Aids to Navigation Info.)
- S-131 (Marine Harbour Infrastructure)
  - TPNet
  - ....

Build up the cooperation & infrastructure ready for the products/services

100 ENC Cells in UB3-6 Published & maintained
AtoN database management and publication

• Web-assisted cooperation between authorities in AtoN management
  • add MRN & generate digital List of Lights (2021, MOI)

S-57 ENCs

AtoN Database (S-201 schema)

Automatically generated Digital List of Lights (in PDF & GML)

Pictorial representation
Inspection frequency
Inspection requirement
Aton maintenance record : URI
Installation date

TENCC, MOI

MPB, MOTC
Enhance MSI service provision while testing S-124

1. Parse daily NAVTEX to extract time & geometry
   Publish on the web for query & management
2. Assist editing MSI (text) in the digital way

- Digitalization of NAVTEX broadcast by Keelung Radio
  - MSI(NAVTEX) → S-124 (data structures), generate MSI(NAVTEX) from S-124 based editing
- Digitalization of MPB’s Notice to Mariners published on the web
  - Re-design the SOPs and publication system (automated by parsing functions)
Challenges: offshore wind farms, weather...

- 8 hours Pre-Arrival Notification required
- Near Ports of Taichung and Mailiao at both ends
- OWFs under construction on both sides
  - Laying cables across the channel
- Navigation difficulty (NE monsoon, Typhoon)
- Fishing boats & fishing gear/nets (AIS Net Marks)

Violations of regulation or entry into OWF areas are mostly due to lack of “information” (not using Taiwan ENCs or not updating charts)
Further developments

• The Intelligent Navigation Safety Service Development Plan (MPB)
  • 1.0 (2020-2023)
    • Integrate 19 systems /information sources
    • Establish Changhua VTS and the Maritime Center
    • ....
  
  • 2.0 (2024-2027)
    • Under planning

- Phase 3 Offshore Wind Farm Development (2026-2035)
  More OWFs to be developed offshore Changhua and northward
We believe there are very good opportunities where e-Navigation & Digital@Sea can really help to tackle the challenges. We look forward to international cooperation.

Thanks for your attention.