



# Moving Forward with e-Navigation

# Maritime Standards

- Maritime navigation and communications standards have traditionally described stand-alone shipborne navigation and communications equipment.
- More recently, there has been movement toward integrated shipborne systems.
- The concept of e-Navigation broadens integration to include shore-based services (i.e., via communications).
  - An integrated e-Navigation “architecture” involves the exchange of information not only between ships, but also between ships and shore services.

# e-Navigation

- e-Navigation is defined as:  
*“the harmonised collection, **integration**, **exchange**, presentation and analysis of maritime information **onboard and ashore** by electronic means to enhance berth to berth navigation and related services, for safety and security at sea and protection of the marine environment.”*

# US e-Navigation Strategy

The US e-Navigation strategy must provide for the inclusion of smaller vessels and recreational boats which operate in US waters, but which are not directly governed by the SOLAS Convention.

- **The vision for US e-Navigation is:**

*“To establish a framework that enables the transfer of data between and among ships and shore facilities, and that integrates and transforms that data into decision and action information.”*

- **The ultimate goal of US e-Navigation efforts is to:**

*“Use timely and reliable information to make the US Marine Transportation System operate better.”*

# US e-Navigation Focus Areas

- *“Improved connectivity”*
- *“Seamless data exchange”*
- *“System integration”*
- *“Human-machine interface”*
- *“Standards for components supporting the eNavigation framework”*
- *“Position, Navigation and Timing”*

# RTCM's Role in US e-Navigation

- RTCM sees its role in contributing to e-Navigation and supporting the U.S. e-Navigation strategy as a developer of standards for navigation and communications equipment, with a focus on the integration of navigational and communications functions that have traditionally been performed separately.
- RTCM builds on the framework of international standards developed by the IMO, IALA, ITU, IEC, ISO, and IHO and develops standards that address gaps in those international standards.

# RTCM and e-Navigation

- The RTCM e-Navigation Steering Committee coordinates work programs of the RTCM Special Committees for projects related to e-Navigation.
  - Eight Special Committees comprise the e-Navigation group of Special Committees reporting to the Steering Committee.
  - Two special Committees liaise with the Steering Committee.

# SC 109: Electronic Charting Technology

- Ver. 6 ECS Standard (10900.6) is now based on an application of IEC 61174 (ECDIS) vice an application of IEC 62376 (ECS)
  - Invokes and applies IEC 60945 and IEC 62288 standards
  - Defines four classes of ECS, ranging from ECDIS back-up arrangements to tablet-sized platforms
  - Class A invokes IEC 61174 Annex F as ECDIS back-up
    - Anticipated to be identified as back-up for carriage in US Navigation Safety Regulations
  - Class A & B invokes IEC 61196-2 for S-VDR functions
  - Anticipated to be identified in lieu of S-VDR in US Navigation Safety Regulations
  - Class A & B invokes IEC 62388 for radar / collision avoidance functions
    - Includes support for networked radar video image via IEC 61162-450 and NMEA OneNet®
  - Class A, B & C required to have AIS interface
    - Invokes IEC 61993-1 for remote MKD functions
    - Required to support ASM, both international and regional, references IALA collection...
  - Class B, C & D allowed to adjust charted depth using detailed bathymetry
  - Class A, B & C envision combined ECS & radar product(s)
- Expected to go to CDV before annual assembly



# SC 112: Ship Radar

- Ver. 2 [Non-SOLAS] Radar Standard (11201.2) is now based on an application of IEC 62388 (CAT 3)
  - Invokes IEC 60945 and IEC 62288 standards
  - For ECS:
    - Includes support for networked radar video image via IEC 61162-450 (and NMEA OneNet®)
  - For AIS:
    - Required to support ASM, both international and regional, references IALA collection...
  - Envision combined ECS/radar products
- Expected to go to CDV before annual assembly

# SC 121: AIS & Digital Messaging

- New ASM creation/qualification standard (12100.0)
  - Provides rules/guidance not found in ITU-R M.1371 or IMO SN.1/Circ.289
  - Crafted to maximize efficiency in use of binary data
  - Compliance to be documented in IALA collection of ASM
- Expected to go to CDV before annual assembly

# SC 127: eLoran

- Proposed IMO Performance Standards for eLoran receiver equipment...

# SC 129: Portrayal of Navigation Information

- New portrayal standard
  - Provides rules/guidance not found in IEC 62288, addresses gaps in various other interface and presentation documents
    - Rules/guidance focused on portrayal as graphical, textual or both
    - Crafted to ensure portrayal of all data received by a presentation system (e.g., ECS, radar), regardless of method of receipt
      - IEC 61162 / NMEA interfaces
      - AIS messages, including ASM

# SC 130: Electro-Optical Imaging Systems

- On hiatus until NMEA OneNet<sup>®</sup> messaging established...
  - Envisioned for integration with ECS, radar and AIS

# SC 131: Multi-System Receiver

- Working with IALA on proposed IMO Performance Standards for multi-system receiver equipment...
  - Requires at least two GNSS constellations
  - Provides for terrestrial radionavigation as well
  - Addresses interference and jamming

# SC 104: Differential GNSS

- Working on differential signals for Bei Dou
- Considering differential corrections for distribution via AIS ASM

# SC 123:

- Working with IALA and ITU on new VDES
  - Used to define up to six channels VHF data exchange, simultaneously
  - Possible prototype with USCG
- VDSMS standard published
  - Awaiting action by FCC for implementation in US