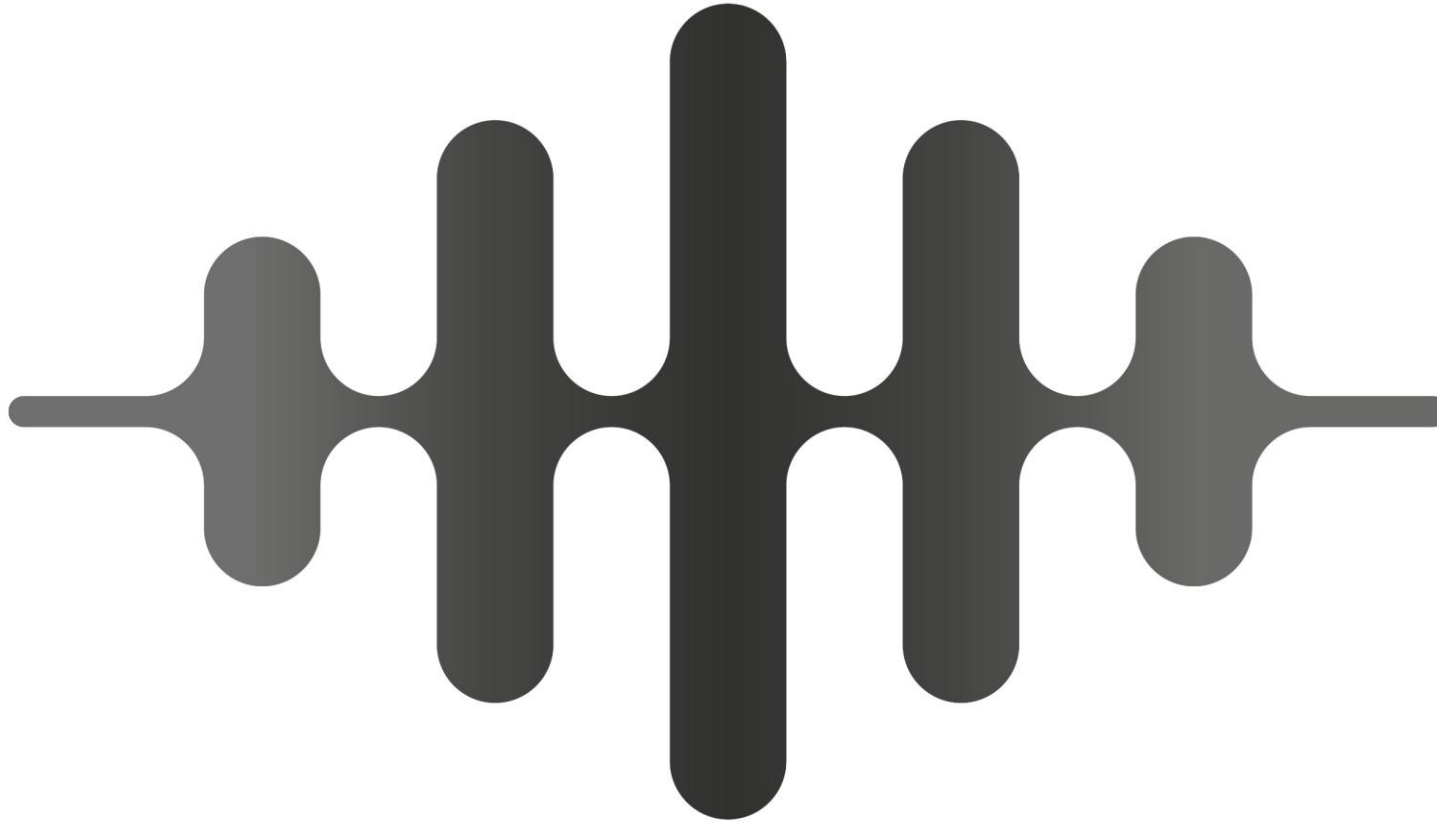
32ND ITU WORLD
RADIOCOMMUNICATION SEMINAR

ITUWRS GENEVA2026

7–11 December 2026
Geneva, Switzerland

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ITU World Radiocommunication Seminar

Maritime Communications

7-11 December 2026, Geneva, Switzerland

Over 80% of global trade is transported by ships

Shipping relies on maritime communications for a safe, secure and efficient operations



Global Maritime Distress and Safety System (GMDSS)

Vessel identification, tracking, and security alerting

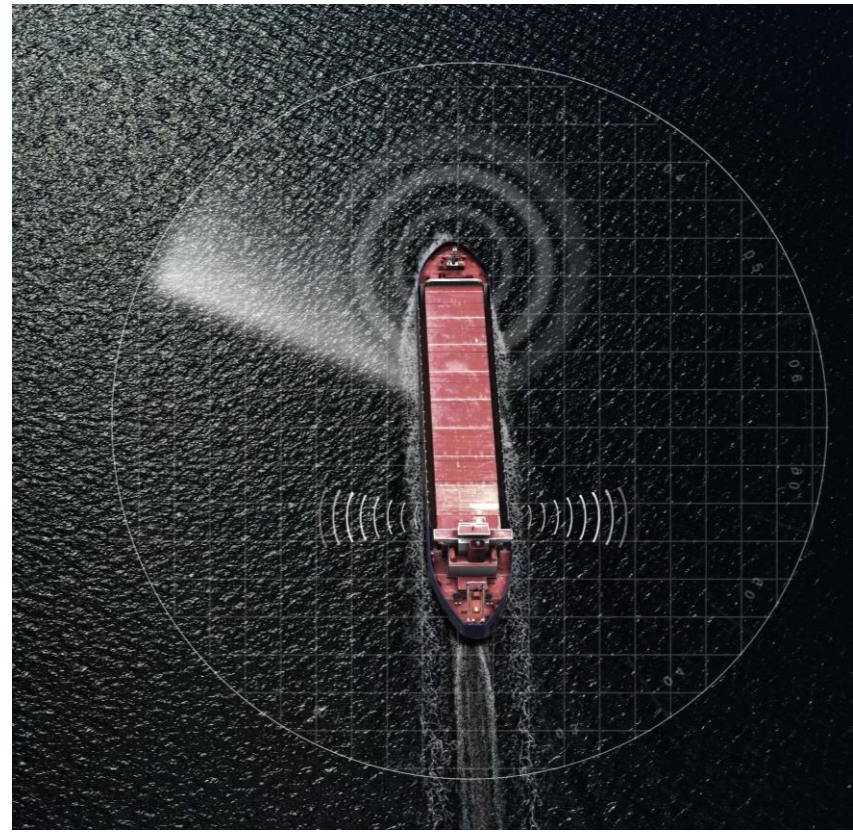
General radiocommunications

Global Maritime Distress and Safety System (GMDSS)

- The recognised safety communication system developed within the regulatory frameworks of the ITU and International Maritime Organization (IMO)

- Implemented since 1999 and relied upon worldwide for distress and safety communications by the entire maritime community, from large commercial ships to small vessels

- RR Article **31**: The frequencies for GMDSS distress and safety communications are contained in Appendix **15 (Rev.WRC-23)**



Maritime Communications



Distress communications

- RR Article **32**: Operational procedures for distress communications in the (GMDSS)
- Ship in distress sends an alert using onboard GMDSS equipment

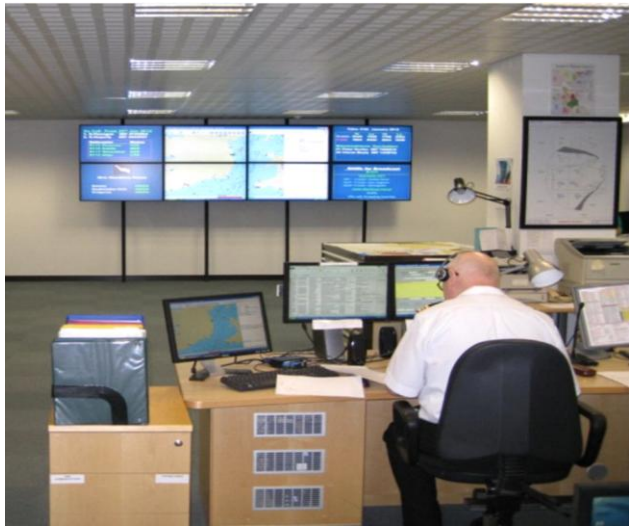




Distress communications

- RR Article **32**: Operational procedures for distress communications in the (GMDSS)
- Ship in distress sends an alert using onboard GMDSS equipment
- Distress alert is received by shoreside Search and Rescue Authorities and vessels in the vicinity
- Co-ordinated search and rescue response can be actioned with minimal delay







GMDSS shipboard equipment

- **Terrestrial distress calls and alerts**
  Radiotelephony and Digital Selective Calling (DSC) on VHF, MF and HF
- **Satellite distress calls and alerts**
  Recognized mobile satellite service providers (Inmarsat, Iridium)
- **EPIRB distress alerts**
  Emergency position-indicating radio beacon (satellite EPIRB) 406 MHz
- **Maritime safety information (MSI) broadcasts**
  Terrestrial: NAVTEX, NAVDAT, Narrow Band Direct Printing (NBDP) on MF and HF
  Satellite: Inmarsat SafetyNet and Iridium SafetyCast
- **Locating signals**
  Radar search and rescue transponder (SART) 9 GHz
  AIS search and rescue transmitter (AIS-SART) and (EPIRB-AIS) on VHF











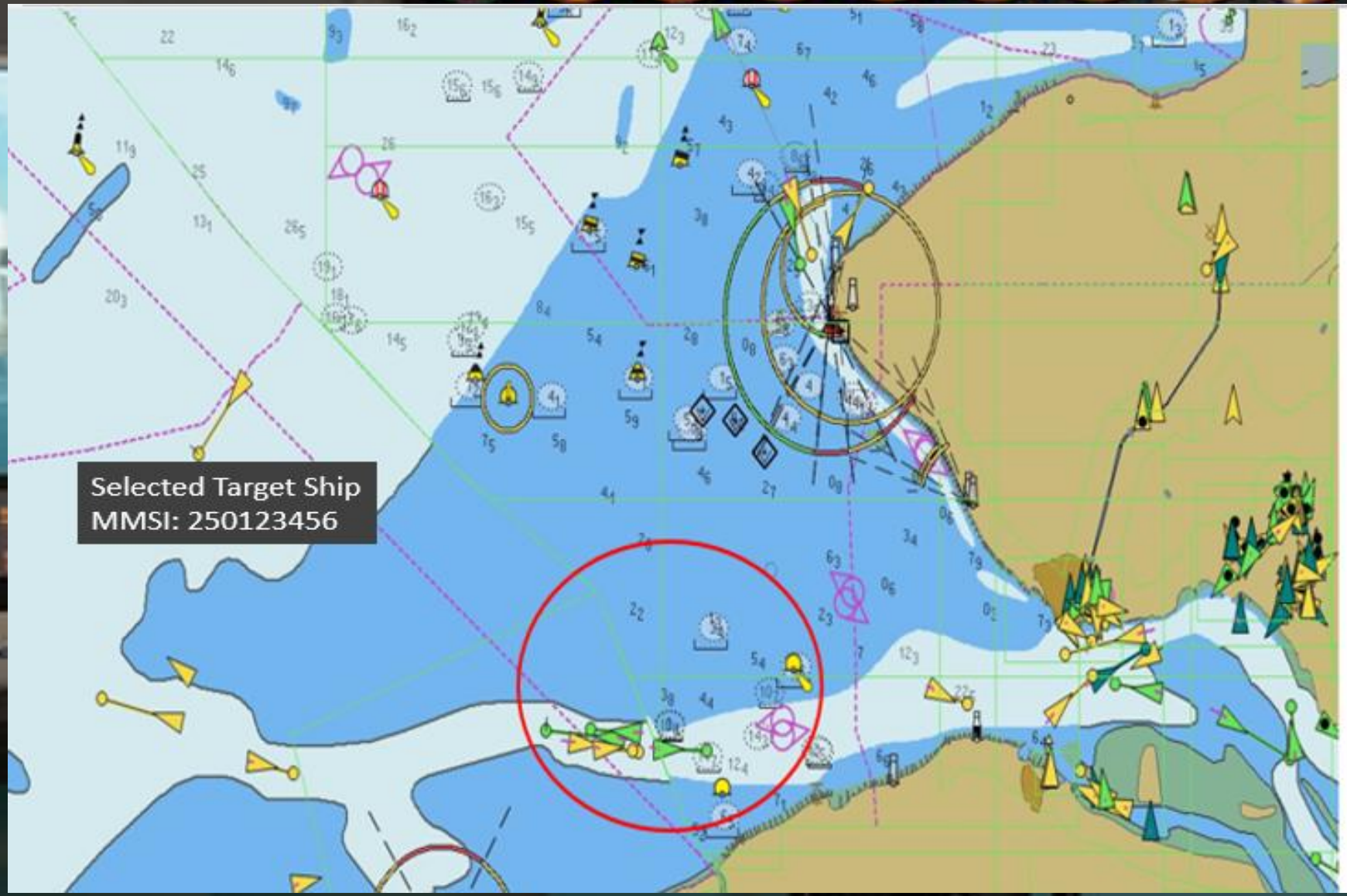
Other essential maritime communication applications

- Automatic Identification System (AIS)
- Long-Range Identification and Tracking System (LRIT)
- Ship Security Alert System (SSAS)

Automatic Identification System (AIS)

- Operates in the VHF maritime mobile band (RR Appendix **18**)
- Improves navigational safety by automatically reporting information between vessels and between vessels and shore stations
- Exchanges information such as vessel identity, position, course, speed, destination, etc.





Target Ship Information

- MMSI: 250123456
- Callsign: EI92345
- Vessel Name: MV Nonsuch
- Destination: Gibraltar
- Heading: 300°
- Position: 30°25.54'N 21°19.24'W

VHF Data Exchange System (VDES)



- **Advanced version of AIS**

  Allows exchanging large amount of data with enhanced protection

- **More secure ship tracking**

  Includes authentication to reduce the risk of spoofing

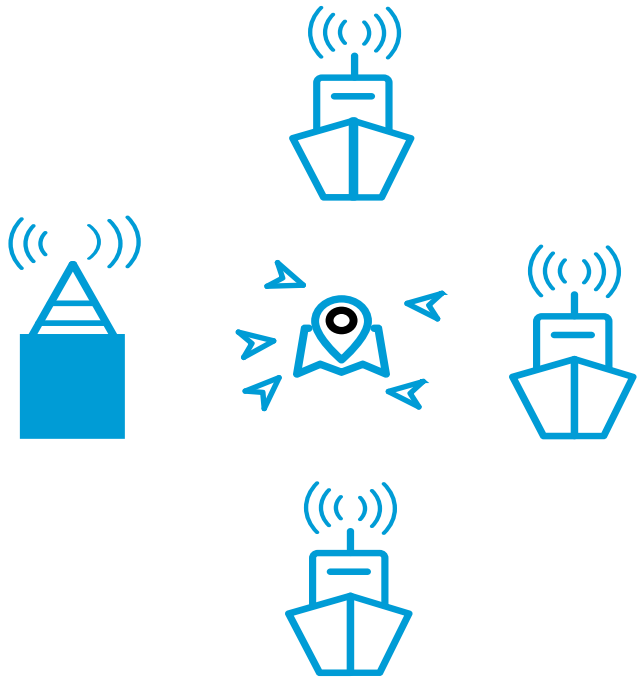
- **Recognized in IMO regulations**

  Amendments to SOLAS Chapter V was adopted

AIS Search and Rescue Locating

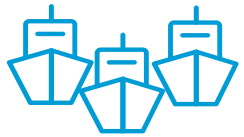








Long-Range Identification and Tracking System (LRIT)



LRIT provides global identification and tracking of ships

Unlike AIS, LRIT is not transmitted ship-to-ship



LRIT information is transmitted to shore facilities via Inmarsat or Iridium



Enhances safety and security of shipping and the protection of the marine environment

Ship Security Alert System (SSAS)



Raises an alarm ashore in reaction to security threats or incidents



SSAS information is transmitted to shore facilities via satellite

Notifies the flag State of the ship and designated shore contacts



Initiated by pressing a dedicated SSAS button and transmitting a ship-to-shore security alert



The SSAS does not alert other ships or coast stations

Maritime general radiocommunications

Use terrestrial and satellite systems

- Maritime mobile service VHF, MF and HF bands
- UHF bands 450-470 MHz for on-board communications
- Geostationary-satellite orbit (GSO) and non-GSO systems in the mobile-satellite service, L-band (1.5 GHz/1.6 GHz) and S-band (2.5 GHz), including the GMDSS recognized mobile satellite services (Inmarsat and Iridium)
- Earth stations installed onboard vessels operating under the fixed-satellite service in the C-band (4 GHz/6 GHz) and Ku-band below 15 GHz
- Maritime earth stations in motion (M-ESIMs) in the fixed-satellite service in the Ku and Ka bands above 17 GHz



Maritime developments

Outcomes of WRC-23 support modernization of the GMDSS and the implementation of new maritime communications technologies

MF/HF NAVDAT System

Included as part of the RR GMDSS provisions for the transmission of maritime safety information to ships from coast stations

Automatic Connection System (ACS)

ACS using DSC in the maritime frequency bands 2/4/6/8/12 and16 MHz included in the RR to ensure reliable access to required radio links for mariners

BeiDou Message Service System (BDMSS)

Provisionally recognized as a satellite system for use in the GMDSS, subject to the completion of frequency coordination requirements

Future Maritime Communications Demand

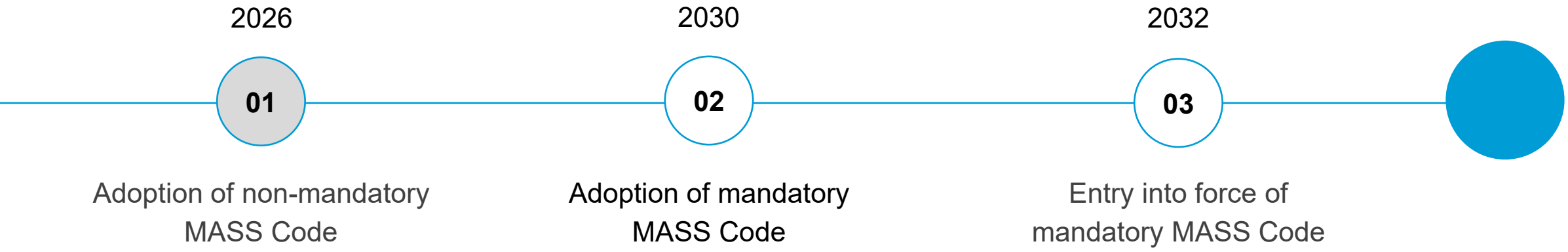
- Innovations have already led to the commercial use of smaller autonomous and remotely controlled vessels
- IMO has adopted the non-mandatory MASS Code, with work continuing towards a mandatory framework
- NAVDAT and VHF data exchange system (VDES) are systems provided for in the RR and ITU Recommendations which may support future maritime communications



Source: Report ITU-R M.2527

IMO Maritime Autonomous Surface Ships (MASS) timeline*

Development of MASS may drive demand for advanced maritime communication systems



*Timeline source: www.imo.org

Future maritime developments

Preliminary WRC-31 agenda items 2.7 and 2.8 (Resolution 814 (WRC-23))

VHF Digital Voice

Advancement of digital voice in the MMS within the VHF maritime mobile band

Resolution **363 (Rev.WRC-23)**

VDES R-Mode

Implementation of VDES R-Mode as a new maritime radionavigation service

Resolution **363 (Rev.WRC-23)**

Enhancement of MF/HF radiocommunication

Identification of additional working channels on an international basis to improve the use of maritime radiocommunication in the MF/HF bands

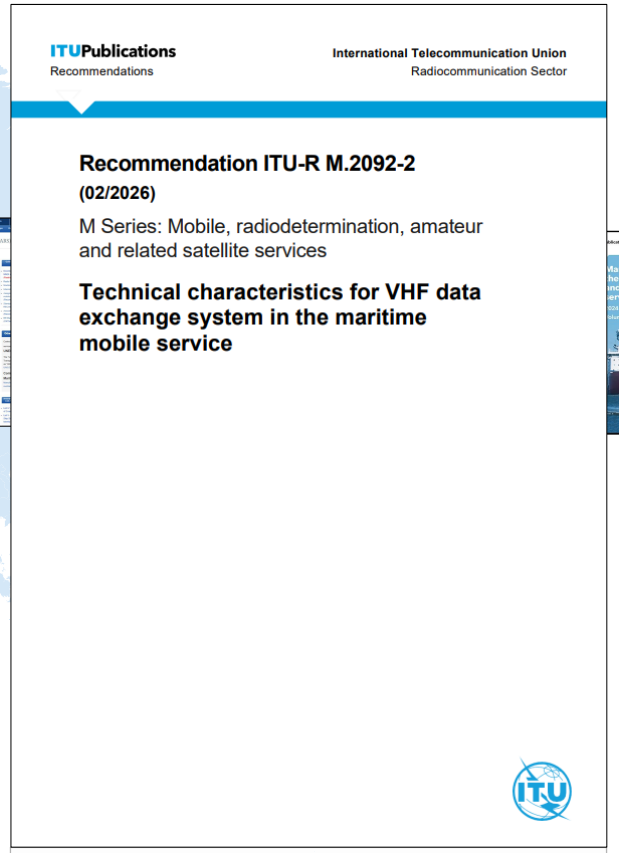
Resolution **366 (Rev.WRC-23)**

Maritime communications supported by ITU publications and resources



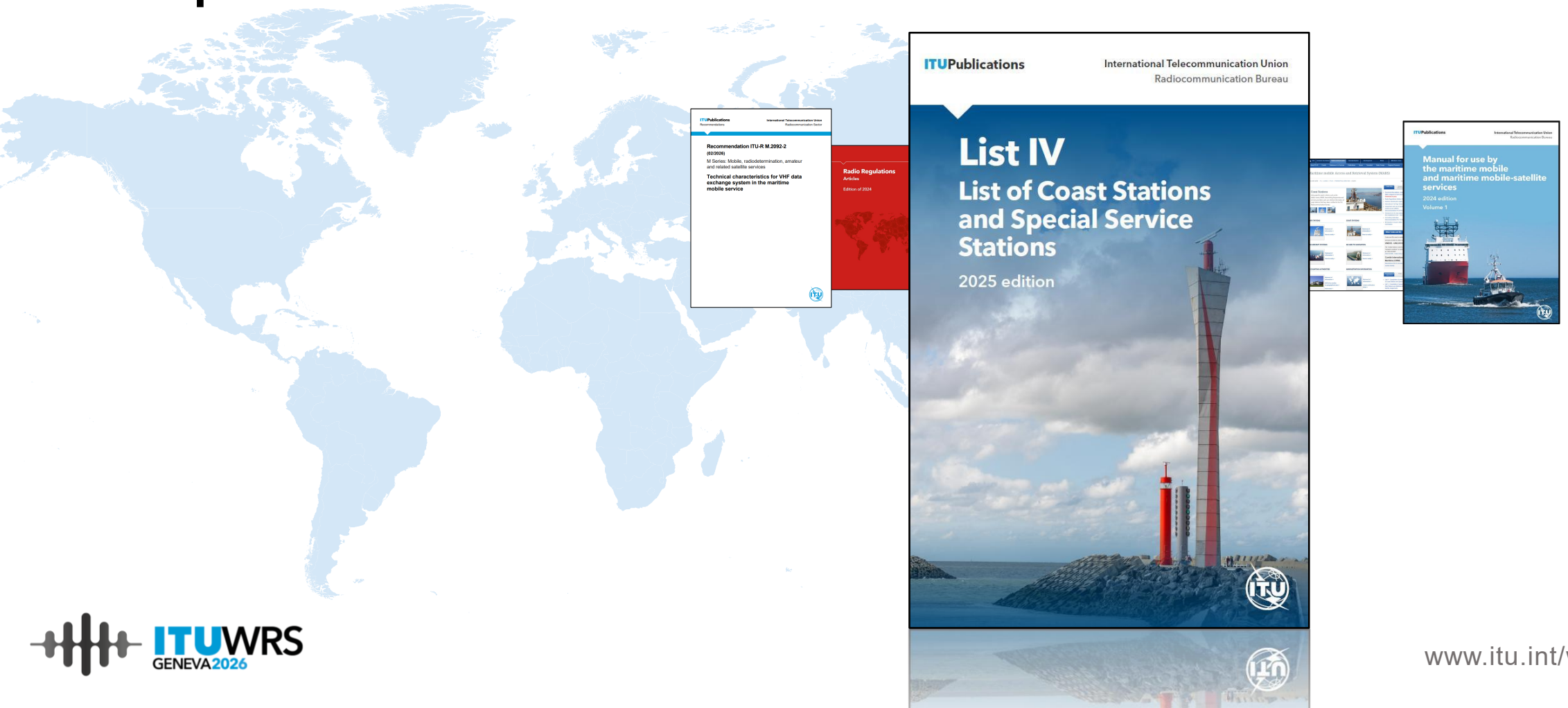
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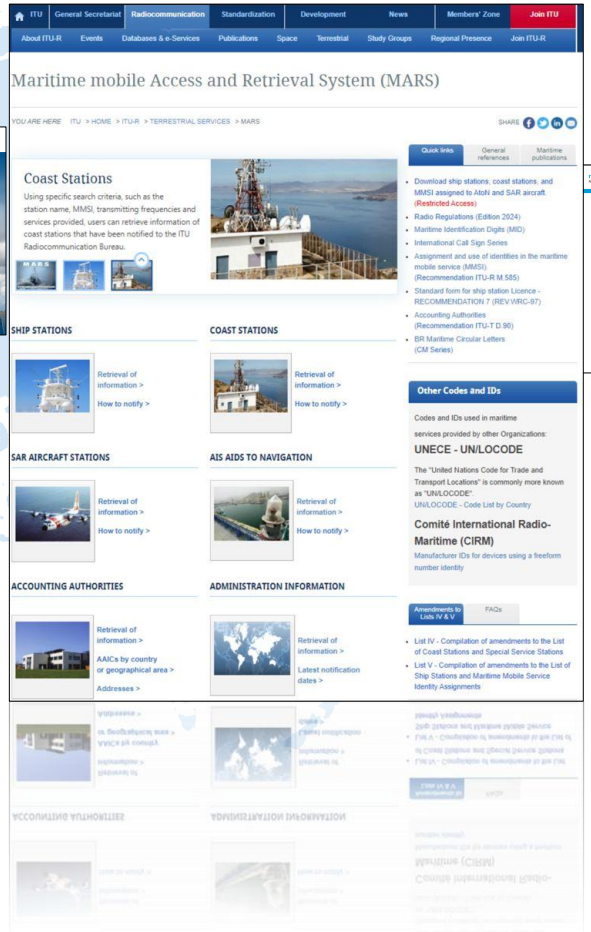


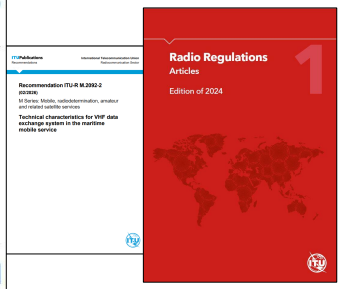
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Maritime communications supported by ITU publications and resources



- Provisions of the RR
- ITU-R Recommendations and Reports
- ITU Maritime Service Publications
- Maritime mobile Access and Retrieval System (MARS)

Thank you!

ITU – Radiocommunication Bureau

Questions to: brmail@itu.int