# TUWRS **GENEVA2024**

2-6 December 2024 Geneva, Switzerland





## **ITU World Radiocommunication Seminar**

Maritime Communications

2-6 December 2024, Geneva, Switzerland



## Over 80% of global trade is transported by ship

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

- Global Maritime Distress and Safety System (GMDSS)
- Vessel identification, tracking, and security altering
- 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 over 25 years ago 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)







### **GMDSS** Overview





## **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 ships and from vessels to shore
- 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

![](_page_11_Picture_1.jpeg)

### **AIS Search and Rescue Locating**

![](_page_11_Picture_3.jpeg)

![](_page_12_Picture_1.jpeg)

## Long-Range Identification and Tracking System (LRIT)

![](_page_12_Figure_3.jpeg)

LRIT provides global identification and tracking of ships Unlike AIS, LRIT is not transmitted ship-to-ship

![](_page_12_Picture_5.jpeg)

LRIT information is transmitted to shore facilities via Inmarsat or Iridium

![](_page_12_Picture_7.jpeg)

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

![](_page_13_Picture_1.jpeg)

## Ship Security Alert System (SSAS)

![](_page_13_Picture_3.jpeg)

Raises an alarm ashore in reaction to security threats or incidents

![](_page_13_Picture_5.jpeg)

SSAS information is transmitted to shore facilities via satellite Notifies the flag State of the ship and designated shore contacts

![](_page_13_Picture_7.jpeg)

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

![](_page_13_Picture_9.jpeg)

The SSAS does not alert other ships or coast stations

![](_page_14_Picture_1.jpeg)

## 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 mobilesatellite 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

![](_page_14_Picture_9.jpeg)

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### **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 and 16 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

![](_page_16_Picture_1.jpeg)

## **Future Maritime Communications Demand**

- Innovations have already led to the commercial use of smaller autonomous and remotely controlled vessels
- Work is underway within IMO on the maritime regulatory framework for Maritime Autonomous Surface Ships (MASS)
- NAVDAT and VHF data exchange system (VDES) are systems provided for in the RR and ITU Recommendations which may support future maritime communications

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## IMO Maritime Autonomous Surface Ships (MASS) timeline\*

Development of MASS may drive demand for advanced maritime communication systems

![](_page_17_Figure_4.jpeg)

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### Maritime communications supported by **ITU** publications and resources

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![](_page_18_Picture_6.jpeg)

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## Maritime communications supported by ITU publications and resources

![](_page_19_Picture_3.jpeg)

![](_page_19_Picture_4.jpeg)

Technical characteristics for a VHF data exchange system in the VHF

M Series

Mobile, radiodetermination, amateur and related satellite services

maritime mobile band

ITU

110

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## Maritime communications supported by ITU publications and resources

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## Maritime communications supported by ITU publications and resources

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## Maritime communications supported by ITU publications and resources

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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)

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## ITU – Radiocommunication Bureau Questions to: <u>brmail@itu.int</u>