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Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien

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Basics of radio and satellite communication

IOTC ROS SFO TR6

Category: Emergency radio communication

IOTC ROS SFO TR6



CapMarine
Capitaine Marine Environnemental

This module runs in parallel with the requirements of Health & Safety and understanding bridge equipment. It aims to provide Observers with knowledge of communication equipment that can be present on a fishing vessel for general communication but more specifically the emergency frequencies and procedures used with VHF, MF and HF radios, and its usage so they can transmit and receive distress messages if required.

Trainee performance is evaluated against the following agreed IOTC ROS competency standards:

- capability of using VHF/HF radios and send distress messages.

The achieving of the standard is demonstrated by trainee capacity to:

- identify VHF/HF transmitters and respective emergency frequencies and;
- explain how to set up and adjust a VHF radio to transmit and receive an emergency message.



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Importance of Communication

- Observers must be able to communicate.
- Communication is an essential tool for Observer Programs
- Communication serve several vital functions:
 - health and safety;
 - observer well-being;
 - operational requirements; and
 - emergency situations.



Reliable communication allows the controlling agency to monitor the wellbeing of the observer and at the same time keep up to date on their work. Similarly, the observer can report back to their controlling agency if they have any personal or safety issues onboard and request guidance in achieving their tasks. Clearly the prime function of communication is to be able to send out a distress signal in the event of an emergency that threatens the vessel and lives of personal onboard.



Types of Accidents at Sea

- Capsizing
- Grounding
- Fire
- Collisions
- Foundering / Sinking
- Man Overboard (MOB)
- Personal Injury



The high risk of working at sea must be remembered at all times. The types of accidents listed in the slide are all real possibilities and observers around the world have been exposed to these.



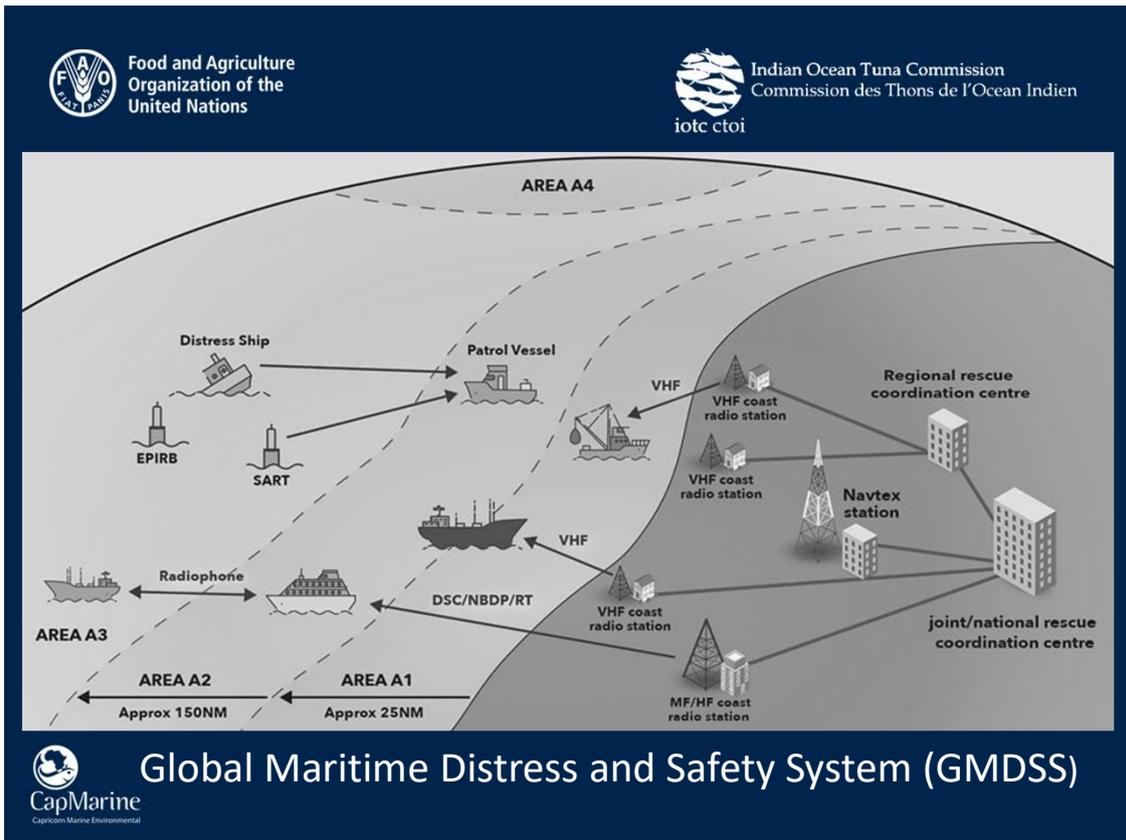
Communication Equipment and At-sea Safety

- Observers are to familiarise themselves with communication equipment and location, during:
 - Vessel safety inspection (*done by the Observer at pre embarkation*)
 - Vessel familiarisation tour (*conducted by an officer after boarding*)
 - Vessels normal fishing operational safety requirements (*transmitted by officers and crew during the trip*)

Remember that under all aspects involving safety onboard – the Observer falls under the authority of the Captain.

First off, it is important to be aware that when onboard any vessel the observer is always subject to the captain's authority. This protocol MUST be strictly and always adhered to for all the observers work and conduct onboard. However, it remains the observer's responsibility to learn and be aware of all safety requirements and equipment onboard including the communication equipment and know where they are located.

Health and safety awareness starts from the time the observer steps onboard. One of the first functions of the observer is the vessel inspection to confirm that the “minimum safety standards” are met. This inspection provides the observer with the opportunity to identify all the communication equipment onboard as well as where it is located. *Keep in mind some of the equipment may be located in the Captains cabin and not easily accessed by the observer.* A second health and safety function also includes a vessel familiarisation tour, which should be led by one of the vessels senior officers. It provides the observer further opportunity to familiarize themselves with the location of all safety equipment as well as the safety alarms and muster procedures including communication procedures. Remember, there will also be further safety requirements during the vessels normal fishing operations and the observer will be made aware of these.



The Global Maritime Distress and Safety System (GMDSS) is the technical, operational and administrative structure for maritime distress and safety communications worldwide. It ensures rapid alerting of shore-based rescue and communications authorities in the event of an emergency. The GMDSS establishes the radiocommunications equipment that all vessels from countries aligned to the United Nations and IMO are required to carry, how this equipment shall be maintained and how it is used, and provides the context within which governments should establish the appropriate shore-based facilities to support GMDSS communications. Three GMDSS sea areas have been defined to describe areas where GMDSS services are available, and to define what GMDSS ships must carry:

- **Sea Area A1:** An area within the radiotelephone coverage of at least one VHF coast station. Such an area could extend typically 30 to 50 Nautical miles from the Coast Station.
- **Sea Area A2:** An area within the radiotelephone coverage of at least one MF coast station. This area typically extends to 150 nautical miles offshore, but in practice, satisfactory coverage may be achieved out to around 400 Nautical miles offshore.
- **Sea Area A3:** An area, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available. This area lies between about latitude 76 Degree NORTH and SOUTH



GMDSS Main Components

- Emergency Position-indicating Radio Beacon (EPIRB)
- NAVTEX Instant Messaging System
- Inmarsat Satellite Systems
- High Frequency (HF) radiotelephone and radio telex
- Very High Frequency (VHF) radio
- SART (Search and Rescue Transponder)
- Digital Selective Calling (DSC)



The main components for GMDSS are:

- EPIRBs Emergency Position-Indicating Radio Beacon - 406 MHz;
- NAVTEX an international, automated system for instantly distributing maritime navigational warnings, weather forecasts and warnings, search and rescue notices and similar information to ships;
- Inmarsat Inmarsat Satellite systems operated by the Inmarsat, overseen by IMSO, International Mobile Satellite Organization are important elements of the GMDSS. The types of Inmarsat ship earth station terminals recognized by the GMDSS are: Inmarsat B, C and F77;
- HF Radio The GMDSS includes High Frequency (HF) radiotelephone and radio telex (narrow-band direct printing) equipment, with calls initiated by digital selective calling (DSC). Worldwide broadcasts of maritime safety information are also made on HF narrow-band direct printing channels;
- SART These devices may be either a radar-SART (Search and Rescue Transponder), or an AIS-SART (AIS Search and Rescue Transmitter) are used to locate survival craft or distressed vessels by creating a series of dots on a rescuing ship's 3 cm radar display; and
- DSC The IMO also introduced Digital Selective Calling (DSC) on MF, HF and VHF maritime radios as part of the GMDSS system. Each DSC-equipped ship, shore station and group is assigned a unique 9-digit Maritime Mobile Service Identity.



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High Frequency (HF) radiotelephone & Very High Frequency (VHF) radio

Radio VHF



Radio HF



1. Radio VHF (Very High Frequency) has limited range used for local communications up to approximately 25 miles; and



2. Radio MF & HF (Medium & High Frequency) for communication over longer distances over 1000 miles.



Be sure to check where the radios are situated!!

It is important to try and recognise the different GMDSS equipment. Different models and makes have their own characteristics so it is good for the observer to engage with the vessels Captain to show you and explain each piece of equipment. REMEMBER, an observer should NEVER touch or attempt to operate any of the equipment themselves. It always best to ask the Captain or one of the officers to do this, unless expressed permission is given by the Captain.

Things may be different in an emergency situation.



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Inmarsat Systems



- Inmarsat Satellite systems
- The types of Inmarsat ship earth station terminals recognized by the GMDSS are:
 - Inmarsat B, C and F77

NAVTEX



- International, automated system for instantly distributing maritime navigational warnings, weather forecasts and warnings, search and rescue notices and similar information to ships.



Check where the Inmarsat terminal is positioned!!



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Emergency Position Indicating Radio Beacons



Handheld Personal Locator Beacon (PLB): portable, with manual start



EPIRBs housed in a container with a hydrostatic switch, with manual or automatic start



Check where the EPIRBs and SARTs are located!!



Emergency Communications

Observer knowledge of English may put him in the situation where he will be the most qualified to send off a distress signal or communicate with rescue vessels.



The Observer shall not use radiotelephony or make adjustments without the permission of an officer of the ship, but the Observer should understand the practical use of the equipment, follow the communication procedures and if necessary, ensure the transmission and reception of messages relating to the safeguarding of human life at sea (in the event that no other person can do so).

Keeping this in mind it is important to know the frequencies and basic transmission procedure to send out an emergency call.



Emergency Communications

Memorise Main Emergency Frequencies

- VHF Channel 16
- SSB High Frequency 2182.0 kHz
- SSB Medium Frequency 4125.0 kHz
- Inmarsat Terminal has a “single press” distress button (Need to hold it down for 7 seconds)



VHF Channel 16, is the main calling and listening channel on the VHF making it the main distress frequency. For normal working communication on VHF an alternative channel must be selected. Also note due to the limited range of VHF an response to a distress call indicates a vessel in relatively close proximity possibly less than an hour away. It is, therefore, the best channel to first call on.

MF and HF emergency frequencies are 2182 and 4125 kHz. As these frequencies have a much longer range (over 100 nm) they are important if a vessel is fishing on the High Seas remote from land and possibly other vessels.

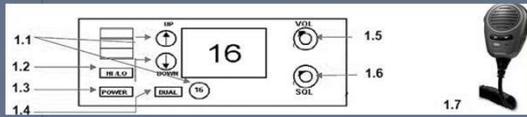
The Inmarsat and most satellite communication systems have an SOS button that automatically sends out a distress frequency. It is important to note that these generally have a “safety function” to prevent accidental activation so the button may have to be held down for a predetermined time to activate (7-seconds for Inmarsat).

The EPIRB and a PLB will automatically send out a distress signal when activated.



VHF Controls

1.1	Selection and control of channels. This can be a rotary knob, "Up" and "Down" keys or keys.	1.2	Output power control. A button, usually called "Hi / Lo" (High / Low).
1.6	A button or key with marker 16 for direct access to channel 16.  	1.3	Connection. A "ON / OFF" button (POWER) is used to activate and deactivate the device.
1.4	Dual standby devices and controls. A button called "DUAL" or "DW" (DualWatch) makes it possible to watch over the distress channel while being positioned on another chosen channel.	1.5	Volume control. A generally rotary knob adjusts the BF reception level (volume).
1.6	Squelch control. Device for adjusting the sensitivity of reception of the VHF. It forces the receiver to be silent when it receives no signal.	1.7	Alternating control. The handset connected to the fixed telephone has a PTT (Push To Talk) key that allows you to alternate send and receive. While holding down this key, the machine is in the transmit mode and it is possible to talk; By releasing this button, the unit is in the receiving mode and it is possible to listen.





VHF: How to Adjust

1. move to the channel 16
2. set the squelch to a minimum: high blast noise
3. gently resume the adjustment in reverse order until complete silence
4. turn back slightly
5. when the loudspeaker emits only a "cloc" from time to time, the setting is perfect
6. keep watch on channel 16
7. respond to communications (no distress) on other paths
8. To facilitate the reception of messages relating to the safeguarding of human life at sea (SVH), emissions on the international call and distress frequency (channel 16) shall be reduced to a minimum.





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Take note of International Telecommunications Union Phonetic Alphabet

A alpha	B bravo	C charlie	D delta	E echo	F foxtrot	G golf
H hotel	I india	J juliett	K kilo	L lima	M mike	N november
O oscar	P papa	Q quebec	R romeo	S sierra	T tango	U uniform
V victor	W whiskey	X xray	Y yankee	Z zulu		



Due to language differences, differences in pronunciation and radio signal clarity it is also important to spell out vessels names and especially the radio call sign using the phonetic alphabet.



Distress Call (remain calm speak clearly)

Check if the VHF radio is connected by checking the "ON / OFF" button (POWER), used to activate and deactivate the device

1. **MAYDAY** (x 3)
2. Vessel Name (x3)
3. Call sign
4. Position (check GPS if possible)
5. Nature of Emergency
6. Number of Crew
7. Description of the vessel
8. Transmitting frequency

Repeat as often as possible
Allowing time interval for a reply
for as long as your time allows .

**In extreme emergency
transmit only first 4 steps**

The voice MAYDAY procedure is important to remember, note the procedure in the accompanying slide.

Time and panic are always a real factor in an emergency situation. As far as possible, try to have the critical information at hand when sending out a distress call, these include:

- Vessel full name and radio call sign
- Your position from the GPS
- Nature of the emergency
- Number of crew onboard
- Description of the vessel
- Your transmitting frequency

Where possible resend the distress call at frequent intervals or on different frequencies. Allow time for someone to answer you. In an extreme emergency it may be only possible to send out the vessels name, position and nature of emergency.



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EXERCISE:

Your vessel has an emergency and you are the only English speaking person onboard. Broadcast the following information:

Emergency:	Fire in the engine room, vessel going down
Position:	02°40.27'S and 042°15.22'E
Number of crew:	26
Radio channel:	VHF 16
Vessel name:	Southern Albatross
Radio call sign:	R F T T Z
Vessel type:	Pelagic longliner



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A real example of an observer's experience



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As mentioned accidents at sea are always a real risk. In such events it is quite possible that the observers training and knowledge of English will put them in the situation where they may have to take charge of emergency communications, at the request of the Captain or as the situation demands.



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send us a message via Talents LMS

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