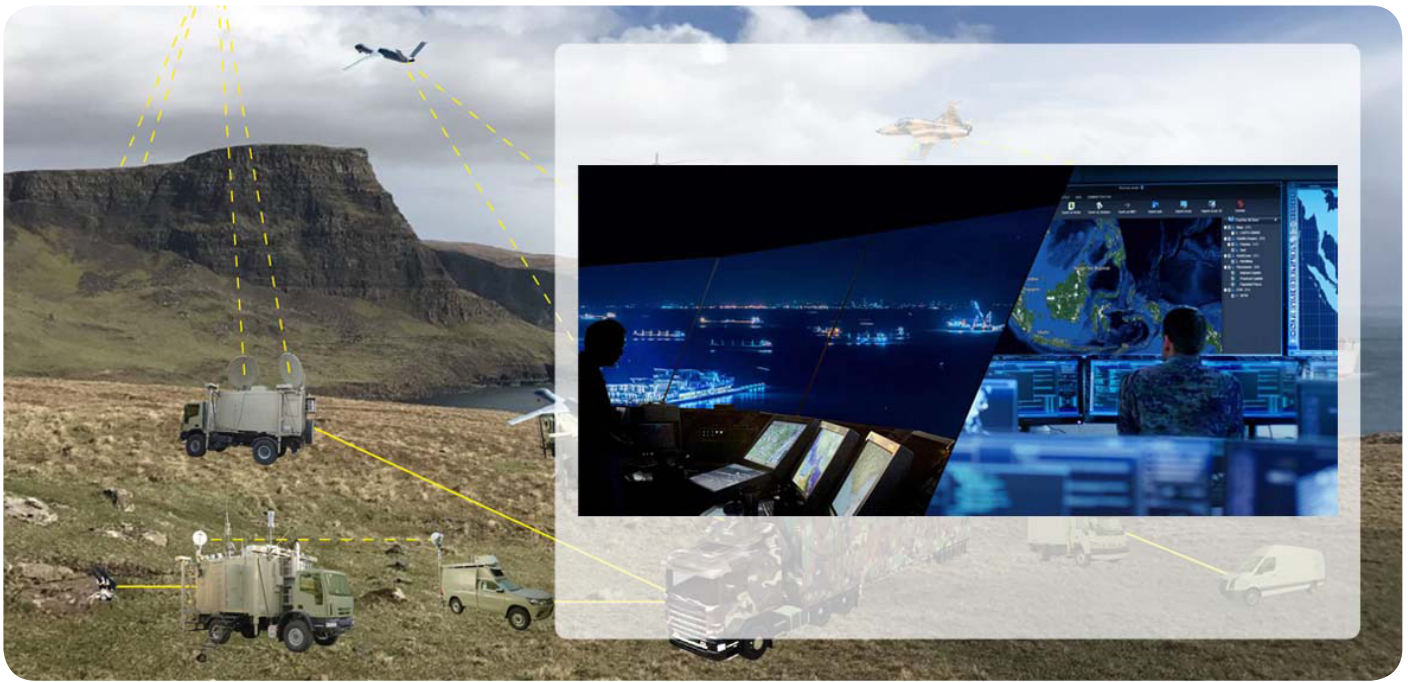




Marine Internal and External Communication Systems

In order to establish radio communication between the vessels, vessel and coast station, helicopter, and fighter a set of radio solutions are needed to cover the desired communication layers. Considering mission of the surface vessels, different communication layers are used for establishing communication so that each one is called a communication layer. It can be categorized into one of the A1 to A4 classes according to marine rules and distance of the vessel from coast.

Effect of electromagnetic interference and the considerations related to propagation in the sea as the EVAPORATION DUCT, marine standards, GMDSS, and SOLAS along with the last changes in marine conventions are considered in designing radios of each communication layer. For easy operation, all communication layers are accessible via the ICS (Integrated Communication System).

Communication layers for military vessels are as follows:

Tactical communication layers

- First communication layer in the range of 2-30 MHz and tactical HF band equipped with modem for data transmission
- Second communication layer in the range of 30-80 MHz and tactical VHF-LB equipped with modem for data transmission, encryption system for security, and frequency hopping capability for establishing reliable communication in jamming condition
- Third communication layer in the range of 108-138MHz and airborne VHF band
- Fourth communication layer in the range of 225-400 MHz and tactical UHF band

Communication layers based on the GMDSS regulations and A1 to A4 marine classes

- First communication layer in the range of 147-174 MHz and marine VHF band
- Second communication layer in the range of 2-30 MHz and marine HF band
- Third communication layer in the range of the Inmarsat C satellite
- Fourth communication layer including the NAVTEX, SART, and EPIRB marine transponders
- Integrated communication console based on the marine regulations

ICI plays role of equipping this class of destroyer mainly from external communication and intercommunication.

External communication

In order to establish radio communication between the vessels, vessel and coast station, helicopter, and fighter a set of radio solutions are needed to cover the related frequency bands. Considering mission of the surface vessels, different frequency bands are used for establishing different types of communication so that each one is called a communication layer.

Effect of electromagnetic interference and the considerations related to propagation in the sea as the EVAPORATION DUCT, marine standards, GMDSS, and SOLAS along with the last changes in marine conventions are considered in designing radios of each communication layer.

For easy operation, all communication layers are accessible via the ICS (Integrated Communication System).

Frequency bands used for each communication layer are as follows:

- Range of 2-30 MHz of tactical HF band equipped with modem for data transmission
- Range of 30-80 MHz of tactical VHF-LB equipped with modem for data transmission, encryption system for providing security, and frequency hopping capability for establishing reliable communication in jamming condition
- Range of 108-138 MHz of airborne VHF band
- Range of 225-400 MHz of marine tactical UHF band

Intercommunication

Considering complication of cabling and difficulties of analogue systems in intercommunication of wave one vessel, in this vessel, IPBASE digital systems are used to operate all computer networks, CCTV, and intercommunication of the vessel through this infrastructure simultaneously without interference as well as establishing a low size cable network.

Intercommunication of this vessel includes interphone system, intercommunication system, public announcement, interphone, and emergency telephone. A set of warning alarms including life buoy and check fire are considered too in this solution for safety in the sea. Except emergency alarms and emergency telephone, they function according to IPBASE system and under the LAN. In addition, some facilities such as television, radio, and music player are considered in this infrastructure.

Used equipment in this vessel is as follows:

- 1- MRC-150 150W marine HF radio and KUM-803 antenna
- 2- MRC-400 400W marine HF radio and KUM-803 antenna
- 3- VRC-2500 VHF-LB radio and AT30~90 antenna
- 4- SRC-120 marine VHF radio and AT136~174 antenna
- 5- IM-805 VHF radio along with the related modem and AT136~174 marine antenna
- 6- IP-795 VHF-LB handheld radio
- 7- PRC-58 VHF-LB manpack radio
- 8- GBR-1000 UHF stationary radio with the R&S antenna
- 9- GBR-160 VHF-HB radio with the R&S antenna
- 10- PRC-110 HF manpack radio
- 11- ICS central switch
- 12- Voice terminal, ICS operating console, and PANEL PC for the ICS remote control
- 13- SAILOR 6000 GMDSS console
- 14- R&S EK896 VHF-HF receiver
- 15- Intercommunication equipment including intercommunication system, interphone, public announcement system, entertainment facility, CCTVs, emergency voice telephone, life buoy alarm system, and check fire