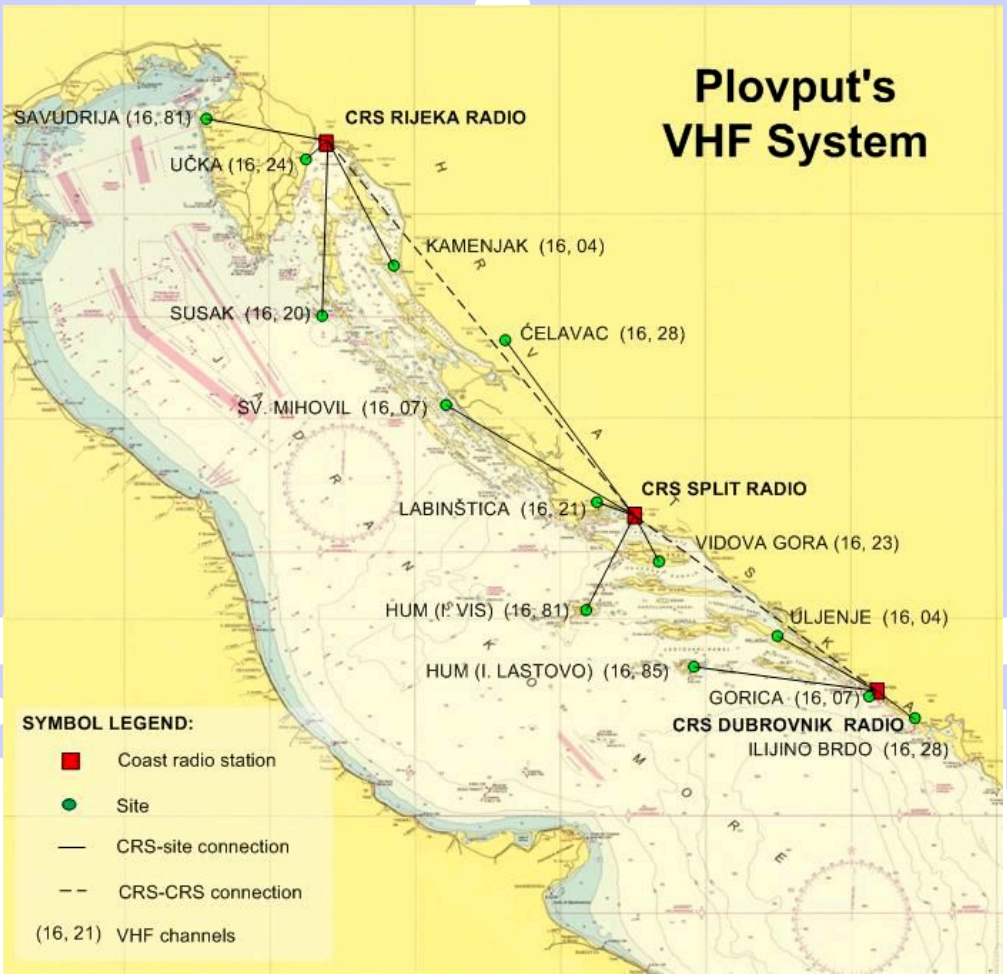
PLOVPUT'S VHF SYSTEM

IN GENERAL ABOUT VHF SYSTEM

VHF System is a part of Global Maritime Distress and Safety System (GMDSS) within which communications are made on frequencies prescribed by Radio regulation which regulate the scope and order of use of radio channels for radio telephony on VHF frequency band (from 156 MHz to 174 MHz). VHF maritime radio service uses 56 VHF channels (simplex and duplex channels), among which channel 16 (156.800 MHz) serves for calls and communications in distress cases and for calls of other communications, VHF channel 70 (156.525 MHz) for DSC calls, without regards to the type of call, while other VHF channels serve for all other types of communications.

PLOVPUT'S VHF SYSTEM

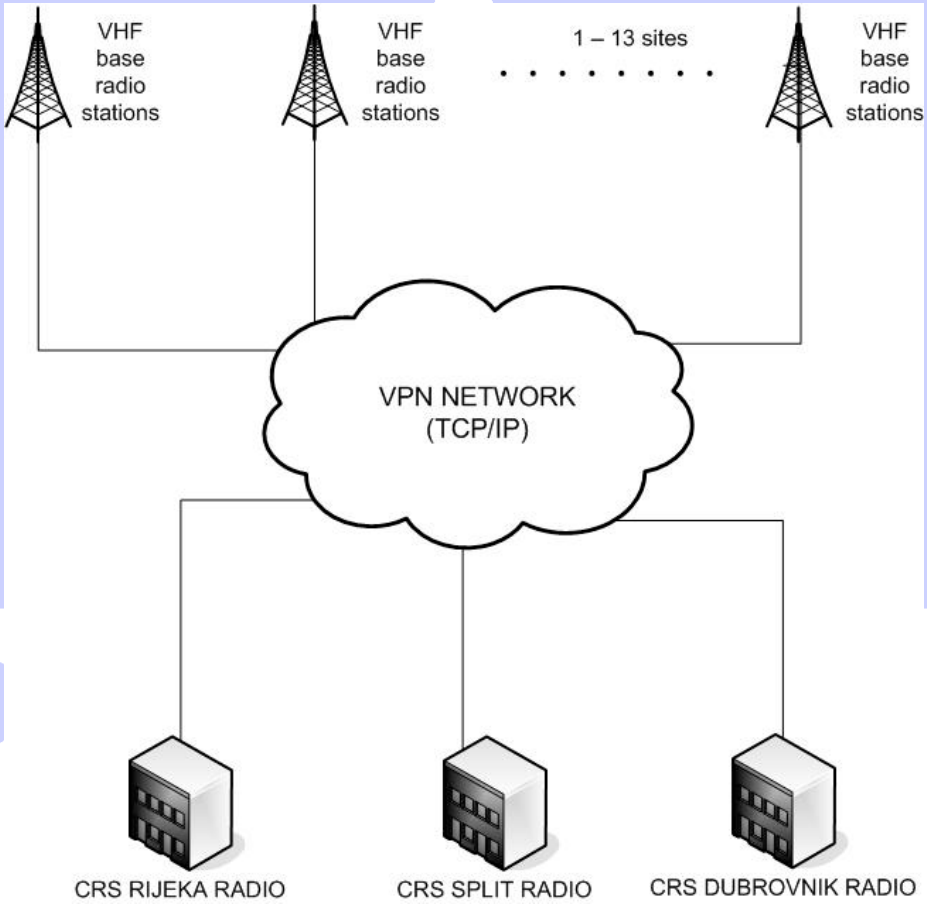
VHF System of Plovput includes the equipment located in three Coast Radio Stations and on 13 sites (two radio stations on each site: VHF channel 16 and VHF duplex channel). Coast Radio Stations are mutually connected and also connected with VHF base radio stations by means of VPN network based on TCP/IP technology.



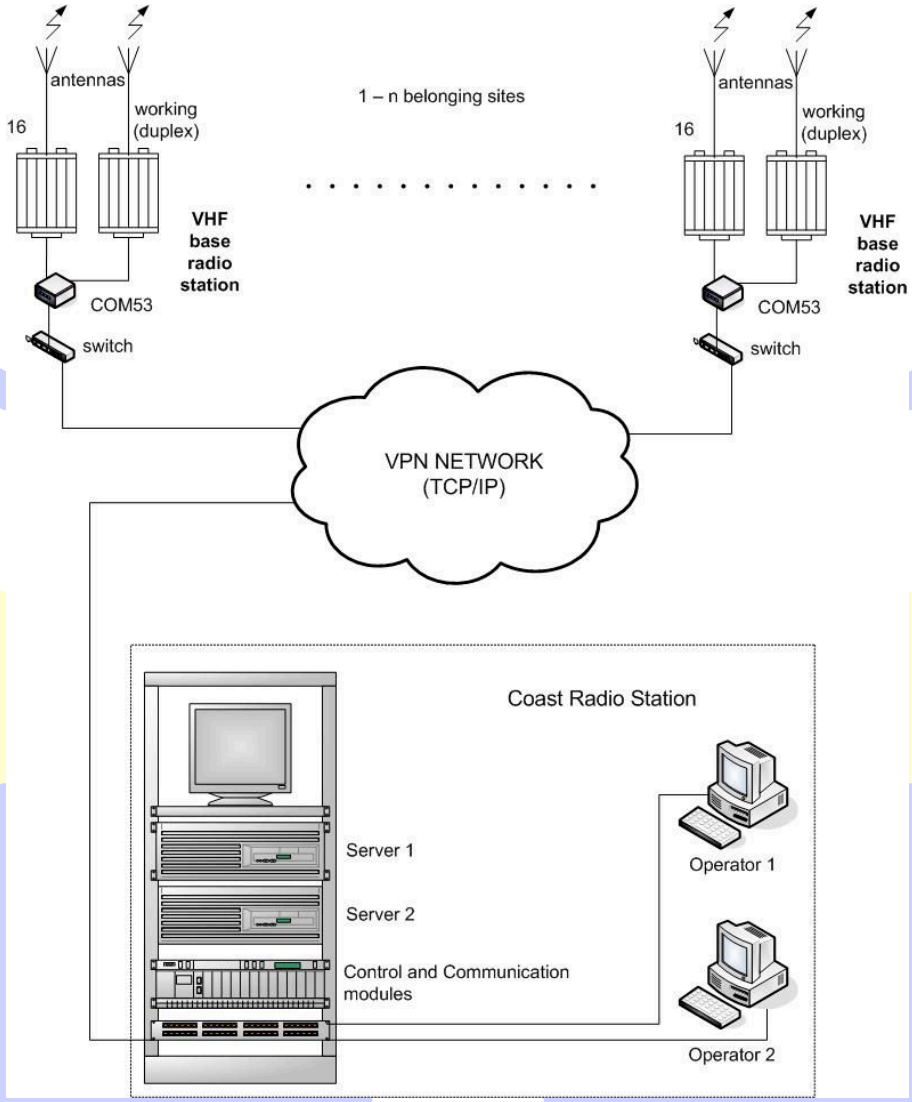
Picture No 1: *Plovput's VHF System*
(Coast Radio Stations, belonging sites and VHF channels)

Coast Radio Stations	Sites	VHF channels
CRS RIJEKA RADIO	Lighthouse Savudrija	16, 81
	R.R.S. Učka	16, 24
	Lighthouse Susak	16, 20
	R.R.S. Kamenjak	16, 04
CRS SPLIT RADIO	R.R.S. Sv. Mihovil	16, 07
	R.R.S. Ćelavac	16, 28
	R.R.S. Labinštica	16, 21
	M.B. Hum (isl. Vis)	16, 81
	R.R.S. Vidova Gora	16, 23
CRS DUBROVNIK RADIO	R.R.S. Uljenje	16, 04
	R.R.S. Hum (isl. Lastovo)	16, 85
	C.R.S. Gorica Sv. Vlaha	16, 07
	R.R.S. Ilijino brdo	16, 28

Table No. 1: *Plovput's VHF System*
(list of Coast Radio Stations, belonging sites and VHF channels)



Picture No 2: *Plovput's VHF System*
(mutually connection of Coast Radio Stations and sites)



Picture No. 3: *VHF System belonging to one Coast Radio Station (equipment on Coast Radio Station, sites and type of connection)*

VHF SYSTEM IN COAST RADIO STATIONS

The equipment of VHF System in Coast Radio Stations includes:

- control and communication rack which contains: two servers (main and reserve), monitor and keyboard for servers, interfaces towards VHF radio stations located on sites, telephone network and operators' places, communication, control and network modules and cards, power supply, system for recording and storing of communications on VHF channels, telephone lines connected with the System and telephone lines which serve for safety of navigation;
- two operators' places equipped with: computer, monitor, keyboard and mouse, operators' console with microphone, earphone, foot communication switch (key) and common loudspeakers.

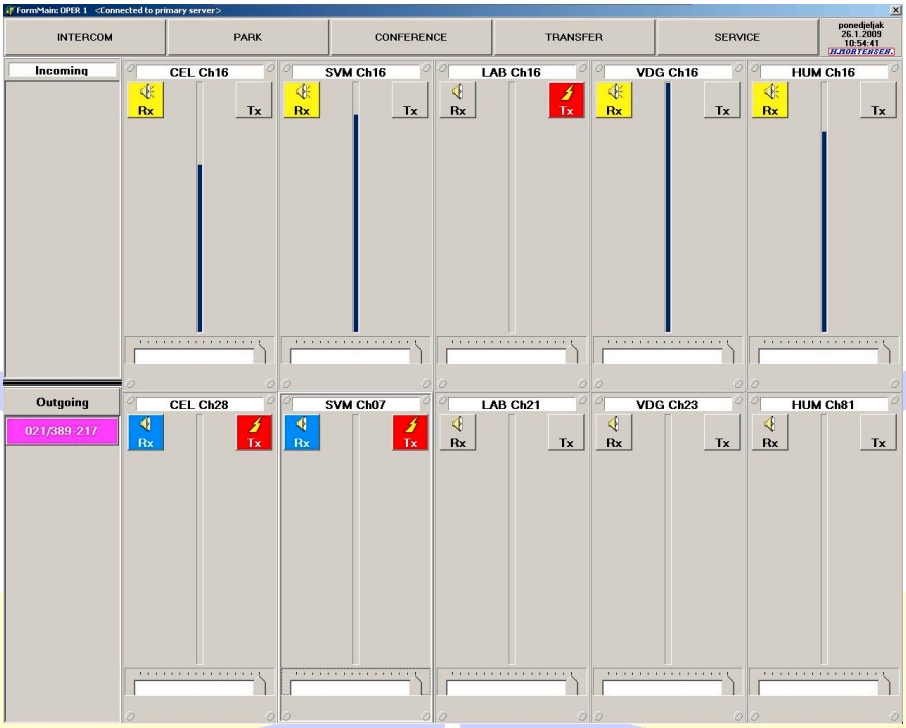
Basic functions of VHF System in Coast Radio Stations connected with VHF radio stations on sites are:

- permanent watch on VHF distress channel 16;
- mediation of communications in case of distress, emergency and safety;

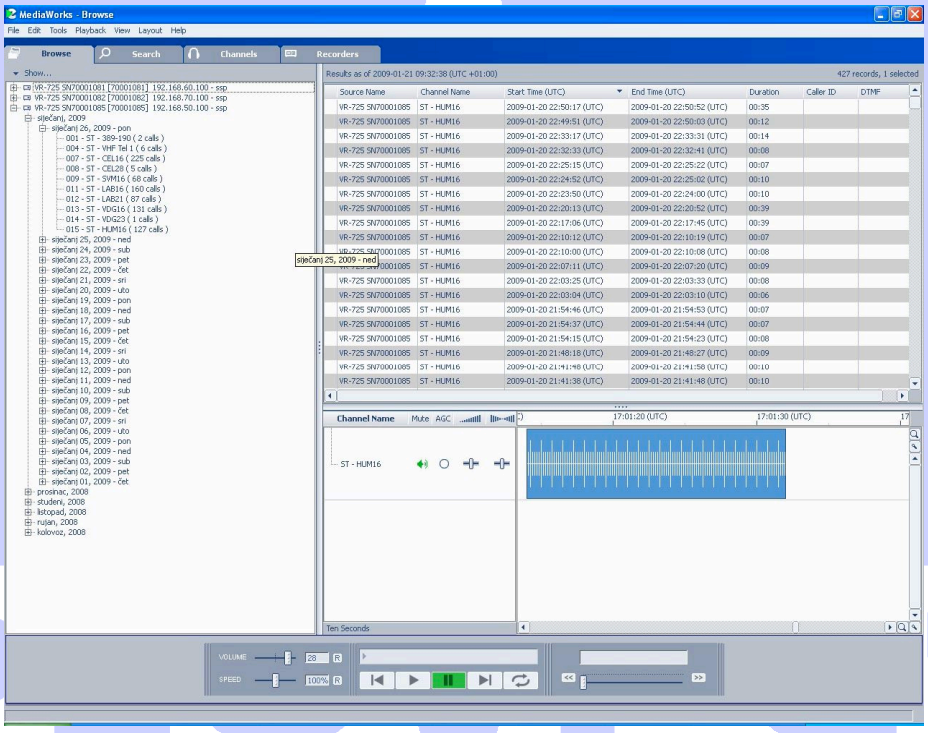
- ship to shore, shore to ship and ship to ship communication on VHF channels;
- simultaneous transmission of MSI - Maritime Safety Information (search and rescue information, regular and special navigational and meteorological warnings…) on several different VHF channels;
- System's redundancy, namely independent work of servers where in case of a failure on one server, the entire System is automatically switched to another server, as well as the independence of functioning of each operators' computer;
- guarantee of access to all VHF channels and telephone lines from both operators' places, without regard to overloading of the System;
- continuous control of functioning of all parts of the System, including checking of communications to VHF radio stations on sites and automatic reporting of a System's failure;
- simple maintenance of single devices with continuous work of the System;
- possibility of remote access to the System in order to maintain the software of the entire System;
- possibility of simple enlargement of the System by adding some new operators' places and radio and telephone interfaces;
- recording and storing of communications on VHF channels, telephone lines linked to the System and telephone lines which serve for safety of navigation and the possibility of listening of recorded communications from any computer linked to the System;
- synchronization of times of all parts of VHF System, including the recorder, with the help of NTP server.

On operators' computer there is a continuous presentation of:
- state of communication with VHF radio stations on sites (reception, transmission, level of signal strength for reception and transmission);
- state of telephone lines (occupied or free);
- state of communications between users on shore (telephone lines), one or both operators and ships by using one, more or all VHF channels.

Computer program on operators' computers has the following possibilities:
- communication with ships on VHF channels;
- communication with users on shore by means of telephone lines;
- communication between operators;
- conference link;
- transmission of MSI information;
- function of holding of telephone line;
- automatic reporting of a failure in the functioning of the System;
- diary of events;
- telephone book;
- adjustment of System's watch;
- exit from the program by means of password.



Picture No 4: *VHF System – main screen of a VHF computer program*



Picture No 5: *VHF System – main screen of a voice recorder program*

All VHF equipment is connected to unterupted power supply (UPS). In case of a longer interruption of electric energy the supply is switched to a diesel generator.

Apart from being connected to VHF base radio stations on sites, the Coast Radio Stations are also mutually linked in the way that Coast Radio Station Split Radio has the possibility to take

over VHF radio channels of other Coast Radio Stations, thereby the possibility to carry out the tasks of Coast Radio Stations Rijeka Radio and Dubrovnik Radio.

VHF SYSTEM ON SITES

The equipment of VHF System on sites includes:
- base radio station for VHF channel 16;
- base radio station for VHF duplex channel;
- antenna systems;
- control devices;
- communication devices;
- unterupted power supply (UPS).

COMMUNICATION BETWEEN VHF SYSTEM IN COAST RADIO STATIONS AND ON SITES

VHF systems in Coast Radio Stations are mutually linked and also linked with VHF base radio stations by means of VPN network based on TCP/IP technology, making possible remote access to each site within the VHF system.

Sites	Connection speed
C.R.S. Rijeka Radio	1 Mbit/s
C.R.S. Split Radio	2 Mbit/s
C.R.S. Dubrovnik Radio	1 Mbit/s
Lighthouse Savudrija	256 kbit/s
R.R.S. Učka	256 kbit/s
Lighthouse Susak	256 kbit/s
R.R.S. Kamenjak	256 kbit/s
R.R.S. Sv. Mihovil	256 kbit/s
R.R.S. Ćelavac	256 kbit/s
R.R.S. Labinštica	256 kbit/s
M.B. Hum (isl. Vis)	256 kbit/s
R.R.S. Vidova Gora	256 kbit/s
R.R.S. Uljenje	256 kbit/s
R.R.S. Hum (isl. Lastovo)	256 kbit/s
C.R.S. Gorica Sv. Vlaha	256 kbit/s
R.R.S. Ilijino brdo	256 kbit/s

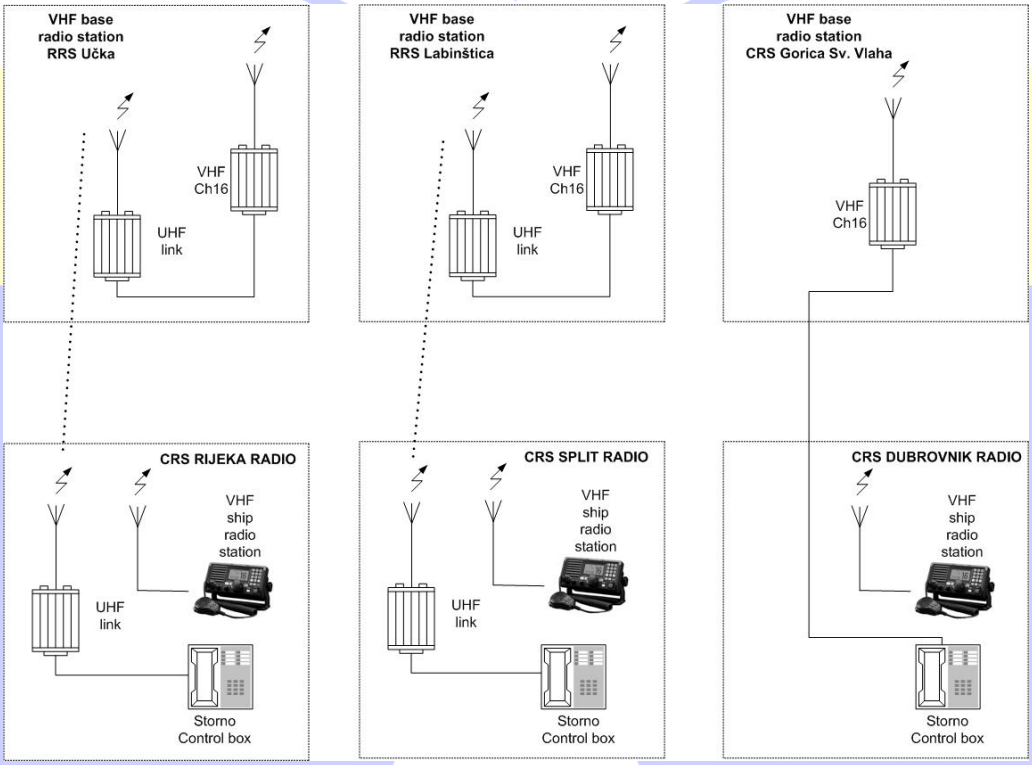
Table No 2: *Connection speed of Plovput's VHF System*

BACKUP OF PLOVPUT'S VHF SYSTEM

Backup of Plovput's VHF System includes the communications on VHF channel 16 in case of impossibility to use the primary VHF System. This includes the use of control boxes in Coast Radio Stations which are linked with VHF base radio stations on sites by wire or UHF radio stations and the use of VHF ship radio stations located in Coast Radio Stations.

Coast Radio Stations	Sites	VHF channels
CRS RIJEKA RADIO	R.R.S. Učka	16
	C.R.S Mlaka	App. 18
CRS SPLIT RADIO	R.R.S. Labinštica	16
	C.R.S Zenta	App. 18
CRS DUBROVNIK RADIO	C.R.S. Gorica Sv. Vlaha	16
	C.R.S. Gorica Sv. Vlaha	App. 18

Table No. 3: *Backup of Plovput's VHF System*
(list of Coast Radio Stations, belonging sites and VHF channels)



Picture No. 6: *Backup of Plovput's VHF System*
(Coast Radio Stations, belonging sites and VHF channels)