

GENERAL DOCUMENTATION

REMOTE CONTROL SYSTEM TC 950

The logo consists of a yellow inverted triangle pointing downwards, with the word "telerad" written in a stylized, lowercase font across its center. The letters are white with a yellow outline.

telerad



telerad telerad telerad telerad telerad telerad telerad telerad telerad telerad telerad telerad telerad

*Edition
January 13th 2000*



TC 950

REMOTE CONTROL SYSTEM TC 950



f

DESIGNED FOR REMOTE TRANSMISSION-RECEPTION EQUIPMENT USED IN
EXTENDED RANGE STATIONS

REMOTE CONTROL SYSTEM

The remote control system TC 950 has been designed to remote control transmission-reception equipment through a long range link (specific lines 4 QN, satellite link ...).

This system uses the digital technology (**DSP**) associated with an analog transmission which permits its use on any transmission unit.

It includes :

- **a support frame BS 117 which can accomodate :**
 - * 1 or 2 power supply P.C.B.'s ...ALIM 14240,
 - * 1 to 8 remote control P.C.B.'s ...TELC 14241,
 - * 1 to 8 interface P.C.B.'s ...INTE 14242.
- **optional P.C.B.'s :**
 - * telemonitoring extension P.C.B. + 18 I/O + interface P.C.B.
 - * telex P.C.B. + interface P.C.B.

Remote control P.C.B.'s are identical on each side.



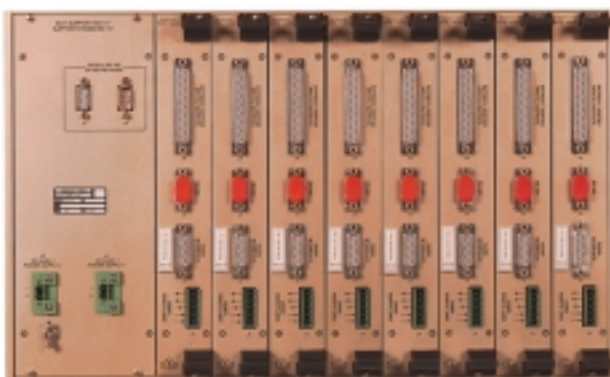
FRONT VIEW

The remote control system ensures the transmission or the reception of the following signals :

- AF modulation designed to the transmitter,
- transmission control (P.T.T.),
- control signals towards remote equipment (Main/ Standby, reduced power, ON/OFF ...),
- modulation from the receiver,
- aircraft presence information,
- state information of the remote station,
- state information of the remote equipment TC 950,
- use of the link as a service channel with radio traffic priority.

In order to ensure these functions, the audiofrequency bandpass is divided in two frequencies bands :

- the 300-2500 Hz band is designed to the transmission of the reception or of the transmission modulation,
- the 2700-3000 Hz band is designed to the data transmission.



REAR VIEW

The necessary filters are realized by means of a **DSP** circuit (**D**igital **S**ignal **P**rocessor) which permits to get utmost performances. The digital/analog converters digitalize the signal on 16 bits. An HC11 microcontroller ensures the practical application of the data, the control of the data received and controls the operation of the P.C.B. The generation of the modulation FSK frequencies and the demodulation of the signal received are ensured by a programmable analog network (FPGA). The FSK modulation frequencies are generated from a quartz (24.756 MHz) which gives a perfect temperature stability.

GENERAL CHARACTERISTICS

Modulation line input :

- 600 ohms symmetric transformer
- Available phantom
- Overvoltage protection
- Limiter threshold +3/0/-3/-6/-9/-12/-15/-18 dBm

Modulation line output :

- 600 ohms symmetric transformer
- Available phantom
- Overvoltage protection
- Level : 0 dB gain between transmission line input and modulation input, once the line losses are compensated
- Level adjustment +3/0/-3/-6/-9/-12/-15/-18 dBm

Transmission line output :

- 600 ohms symmetric transformer
- Overvoltage and lightning protection
- Selectable A.F. level :
+3/0/-3/-6/-9/-12/-15/-18 dBm
- FSK level selectable :
* -25 dB under the audiofrequency level
* -20 dB under the audiofrequency level
* -15 dB under the audiofrequency level

Transmission line input :

- 600 ohms symmetric transformer
- Overvoltage and lightning protection
- Adjustment of line losses :
+3/0/-3/-6/-9/-12/-15/-18 dBm
- FSK demodulator dynamic FSK = 25 dB

Logical inputs (16) :

- Polarized comparator . . . : +12 V
- High level = $V > 12 V$
- Low level = $V < 11.5 V$
- V_{max} = 68 V
- Transmission speed : 400 ms
(without extension)

Logical outputs (16) :

- FET open drain transistor
- V_{max} = 68 V
- I_{max} = 100 mA
- Transmission speed : 400 ms
(without extension)

P.T.T./call inputs :

- Polarized comparator : +12V
- High level = $V > 12 V$
- Low level = $V < 11.5 V$
- V_{max} = 68 V
- Transmission speed : $\leq 30 ms$

P.T.T./call outputs :

- FET open drain transistor
- V_{max} = 68 V
- I_{max} = 100 mA
- Transmission speed : $\leq 30 ms$

POWER SUPPLY BS 117 SUPPORT FRAME :

D.c. voltage :

21-31 V (negative to the ground)

Consumption of each P.C.B. :

< 250 mA, i.e. max < 3 A

Dimensions :

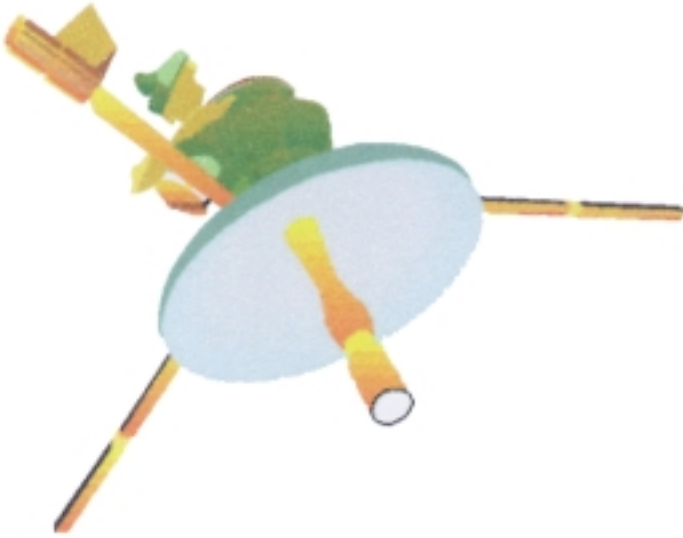
483 mm x 266 mm x 430 mm (without mobile plugs)
19" rack, 6 U scale zero

OPTIONS

- Remote control unit test bench BTTC 950,
- Remote control unit frame UTC 950-2
(24V version for one remote control channel or TGTS),
- Remote control unit frame UTC 950-2A
(220V a.c. for one remote control channel or TGTS).



REMOTE CONTROL UNIT FRAME UTC 950-2



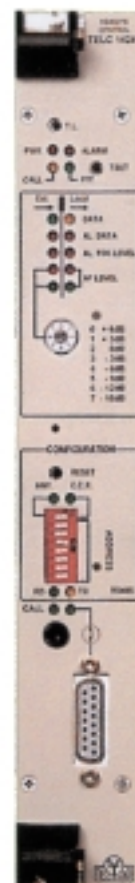
USABLE SUPPORTS OF TRANSMISSION

- f** 4 WIRES DEDICATED LINES (TYPE 4QN), band pass 300-3000Hz,
- f** 2 WIRES DEDICATED LINES (with differential transformer in option),
- f** MICROWAVE LINK,
- f** SATELLITE LINK (on 16kbits channel).



MODULAR SYSTEM

- f REMOTE CONTROL BOARDTELC 14241,
- f INTERFACE BOARDINTE 14242,
- f SERVICE CHANNEL BOARDVDS 950,
- f POWER SUPPLY BOARDALIM 14240,
- f SERVICE CHANNEL PHONE SETCOMB 950,
- f BS 117 SUPPORT FRAME FOR 8 REMOTE CONTROL BOARD (24V power supply),
- f SUPPORT FRAME FOR 1 REMOTE CONTROL BOARD UTC 950-2,
- f A.C. POWER SUPPLY OPTION,
- f SET OF EXTENDER BOARD,
- f TEST BENCH BTTC 950.

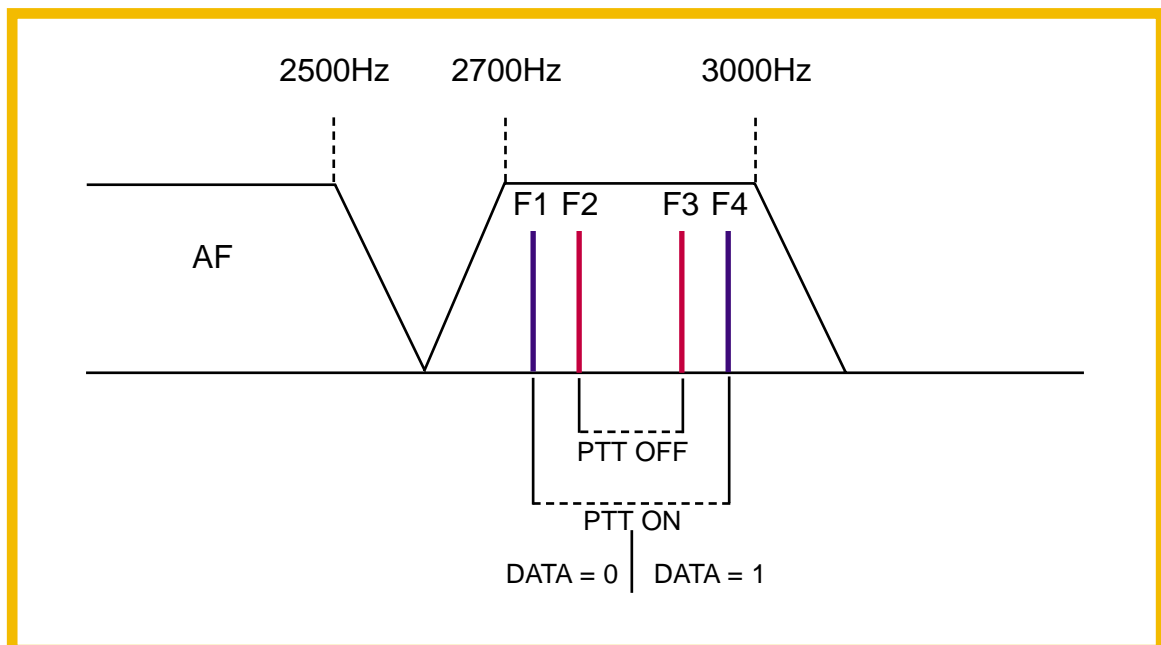


EXTENSION BOARD

- f EXTENSION BOARDTGTS 14251
 - 18 binary inputs / outputs,
 - 5 analogic inputs 0-10V or 0-40V,
 - RF power measures / % modulation / SWR on radio equipment
- f INPUTS/OUTPUTS INTERFACE BOARDINTE 14256

TECHNOLOGY

- f** ANALOG :
- HIGH DYNAMIC AGC CIRCUIT
 - FSK MODULATION FOR DATA TRANSMISSION
- f** DIGITAL :
- DSP FILTERS,
 - FSK DEMODULATION BY MEANS OF FPGA CIRCUIT



SPECIFICITIES

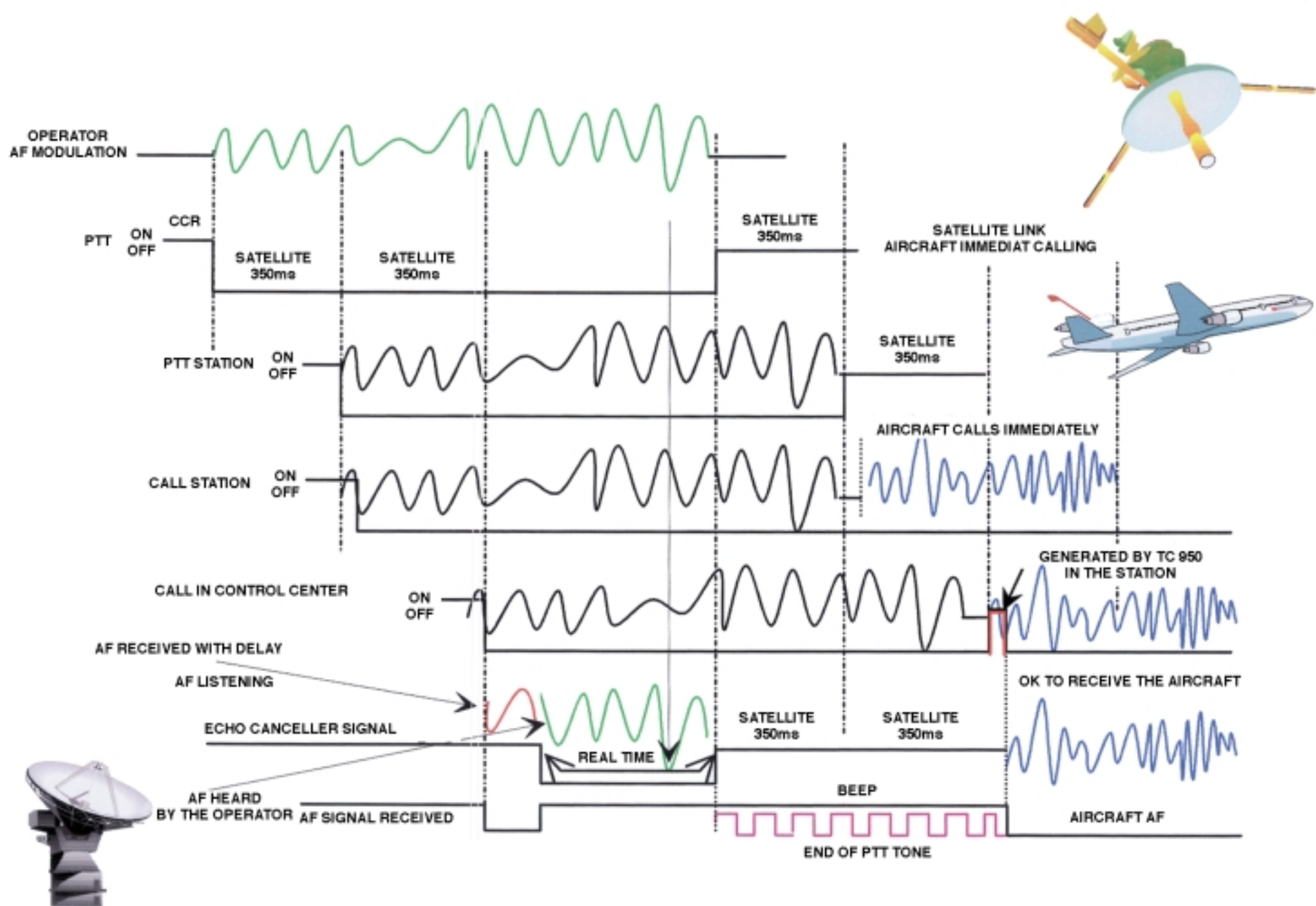
- f** USABLE ON VERY NOISY CIRCUIT (S/N min = 10dB),
- f** ACCEPTS HIGH LEVEL VARIATION ON THE LINE (25dB) AND LOW SIGNAL/ NOISE RATIO (10 dB),
- f** DATA TRANSMISSION WITH HIGH PROTECTION AGAINST MISMATCH,
- f** EASY INSTALLATION AND ADJUSTMENT,
- f** ECHO CANCELLER SYSTEM INCLUDED,
- f** SPECIAL SATELLITE FEATURES INCLUDED

FACILITIES

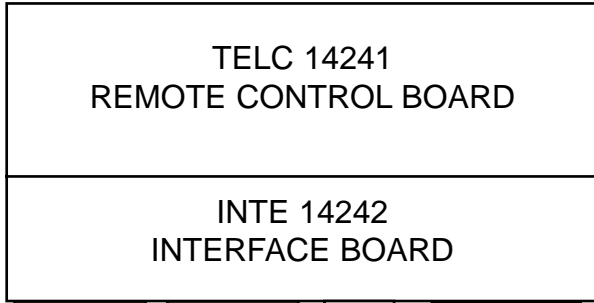
- f** AF MODULATION TRANSMISSION (band pass 300-3000Hz),
- f** PTT (OR CALL) IN UPPER BAND 2700-3000Hz (transmission delay < 80ms),
- f** 16 INPUTS AND 16 OUTPUTS (expandable by extension board to 18 inputs/outputs and 5 analog inputs frequency control for multichannel Tx and Rx),
- f** SERVICE CHANNEL WITH TRAFFIC PRIORITY,
- f** RS485 SERIAL LINK CONNECTION FOR RCMS (TELESIGNALLING / TELEMONITORING) BY COMPUTER.

SECURIZED TRANSMISSION

- f** DATA FRAME ADDRESS,
- f** DATA ORIGIN IDENTIFICATION,
- f** INTEGRITY CONTROL BYTE (CRC16).



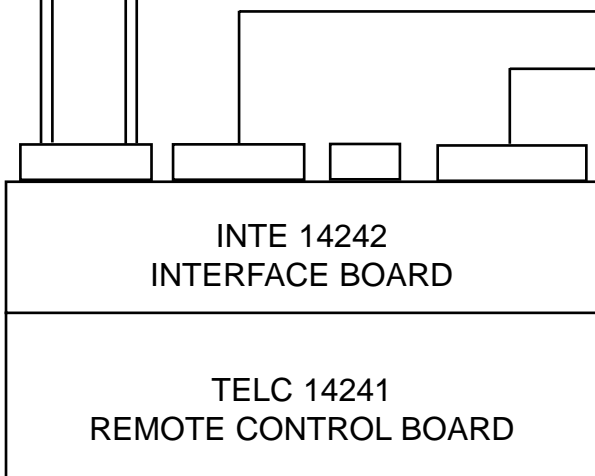
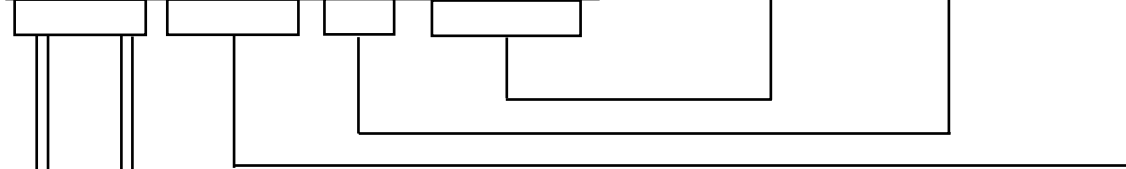
CONTROL CENTER



COMPUTER
RS485 RCMS

TELEMONITORING AND
TELESIGNALLING
16 INPUTS
16 OUTPUTS

VCSS CONNECTION
AF TX/AF RX
PTT/CALL
(SQUELCH SIGNAL)



TELEMONITORING AND
TELESIGNALLING
16 INPUTS
16 OUTPUTS

TRANSMITTER/RECEIVER
AF TX/AF RX
PTT/CALL
(SQUELCH SIGNAL)

EXTENDED RANGE STATION



REMOTE CONTROL SYSTEM TC 950

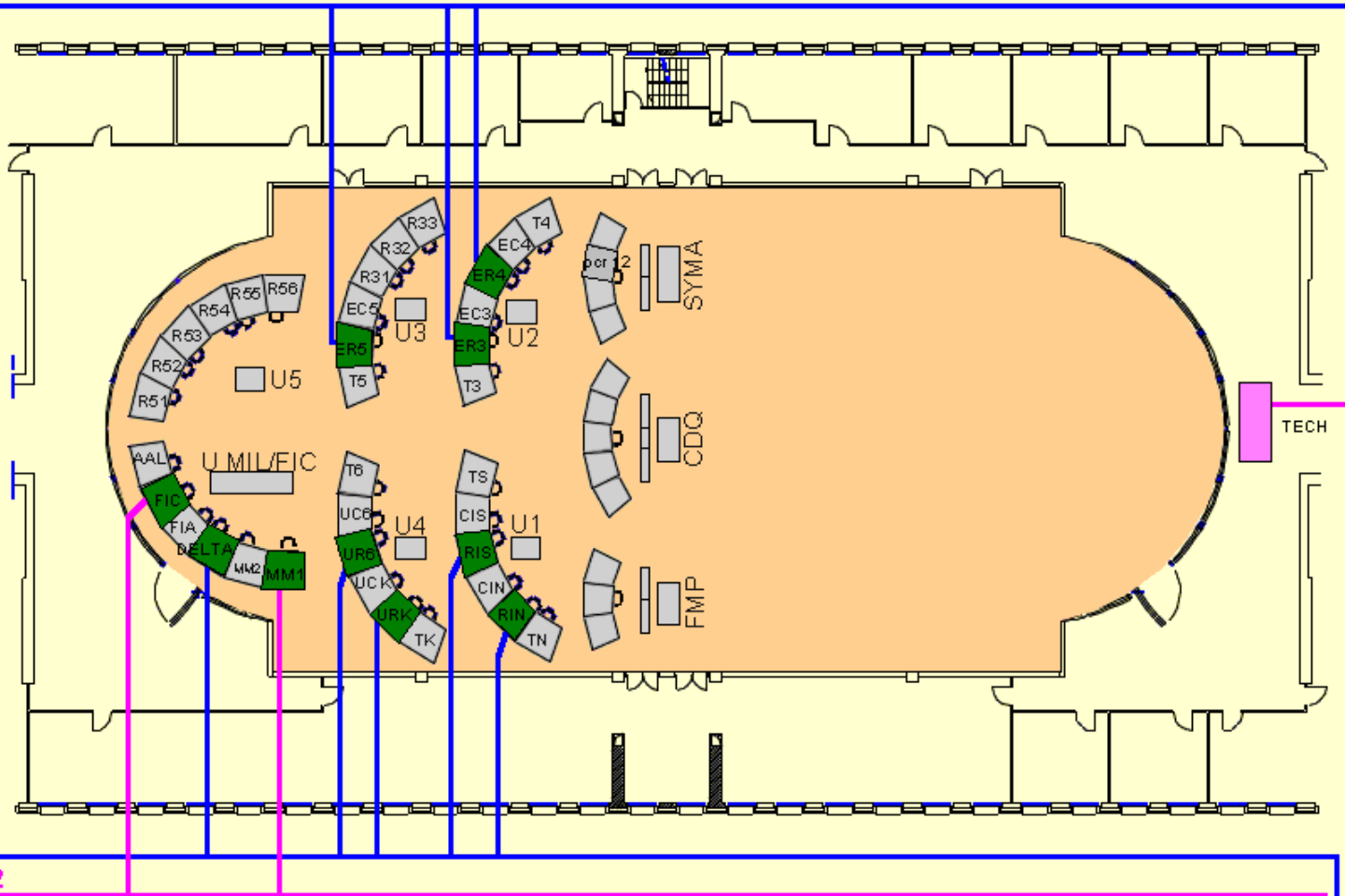


EXAMPLE OF REALIZATIONS



Serial 2

Serial 1

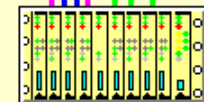


La Dôle
Le Cunay

NAG SWISSCONTROL CONTROL CENTER
GENEVA

Serial 1

Serial 2



Previous page

MAP

PCR960 general view

Scrutation

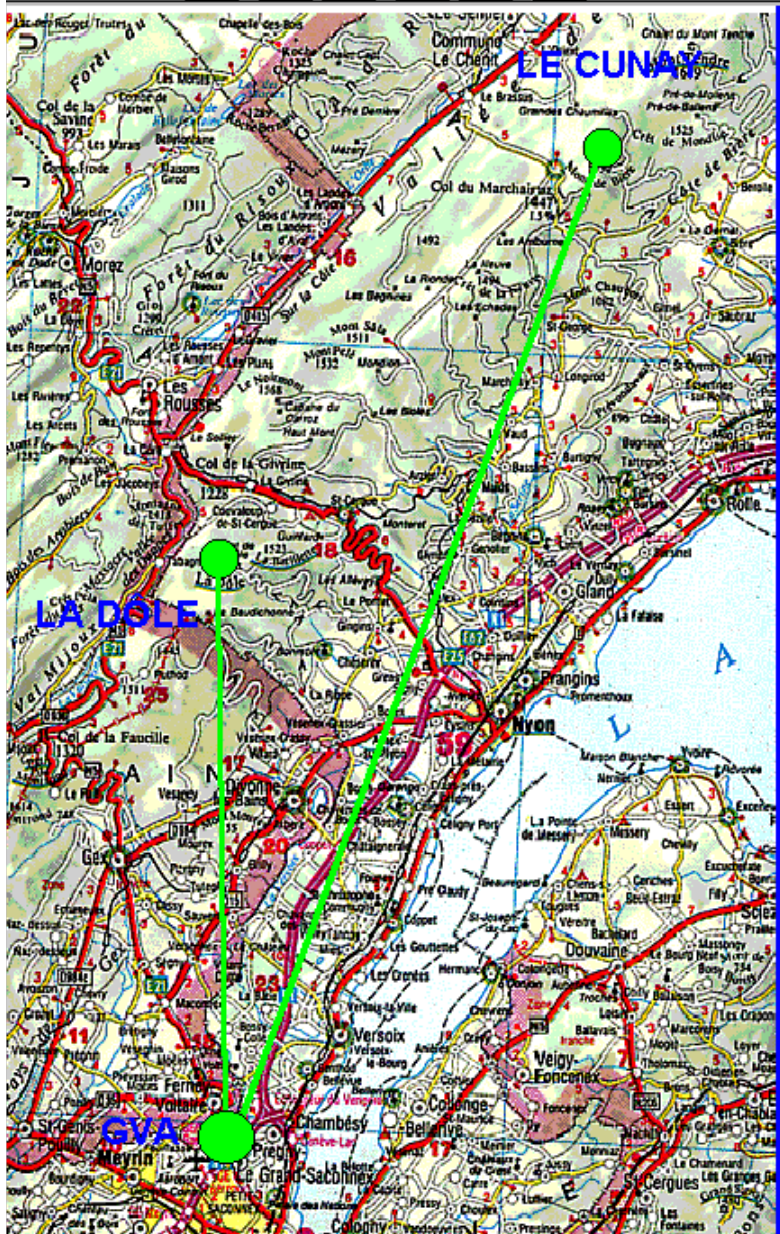
ER3

Serial 2



EMERGENCY VCSS REMOTE CONTROL UNIT
GENEVA





La Dôle

Le Cunay



GENEVE

VSS 960	ACC Room
Rx Center	Tx Center

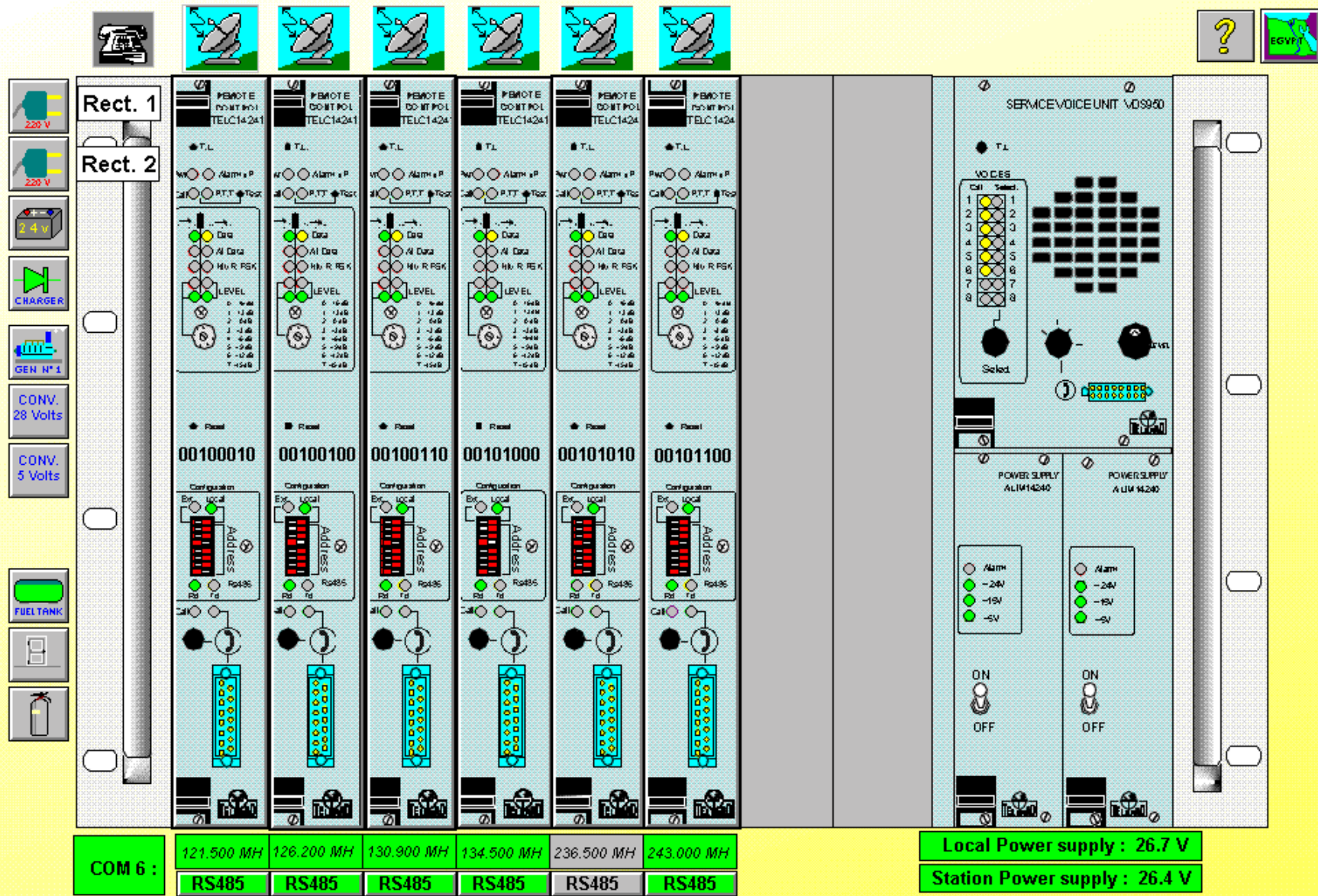
MANAGEMENT

Priority - Time out	Monofrequency
8.33kHz Band	Label description
French messages	English messages
Exploitation	
Normal operating	Network



CONTROL CENTER RADIOCOMMUNICATION MONITORING
GENEVA





REMOTE CONTROL RACK
 CAIRO

TOPKAPI Mimic Display [EGYPT]

File Controls Windows Options ?

TopKAPI 20/12/99 10:54:34 P1- General View

Session open : TELERAD

ARAB REPUBLIC OF EGYPT
EGYPTIAN CIVIL AVIATION ORGANISATION

TELERAD Sofreavia
REMOTE CONTROL MONITORING SYSTEM

CANC CENTER

CANC SHELTER Mono Frequencies	ABU RAWASH Mono Frequencies
Multi Frequencies	Multi Frequencies

Mersa Matru	Alexandria
Hurgadha	Ras El Nakab
Luxor	Asyut
Mersa Alam	Dakhla
Aswan	Abu Simbel

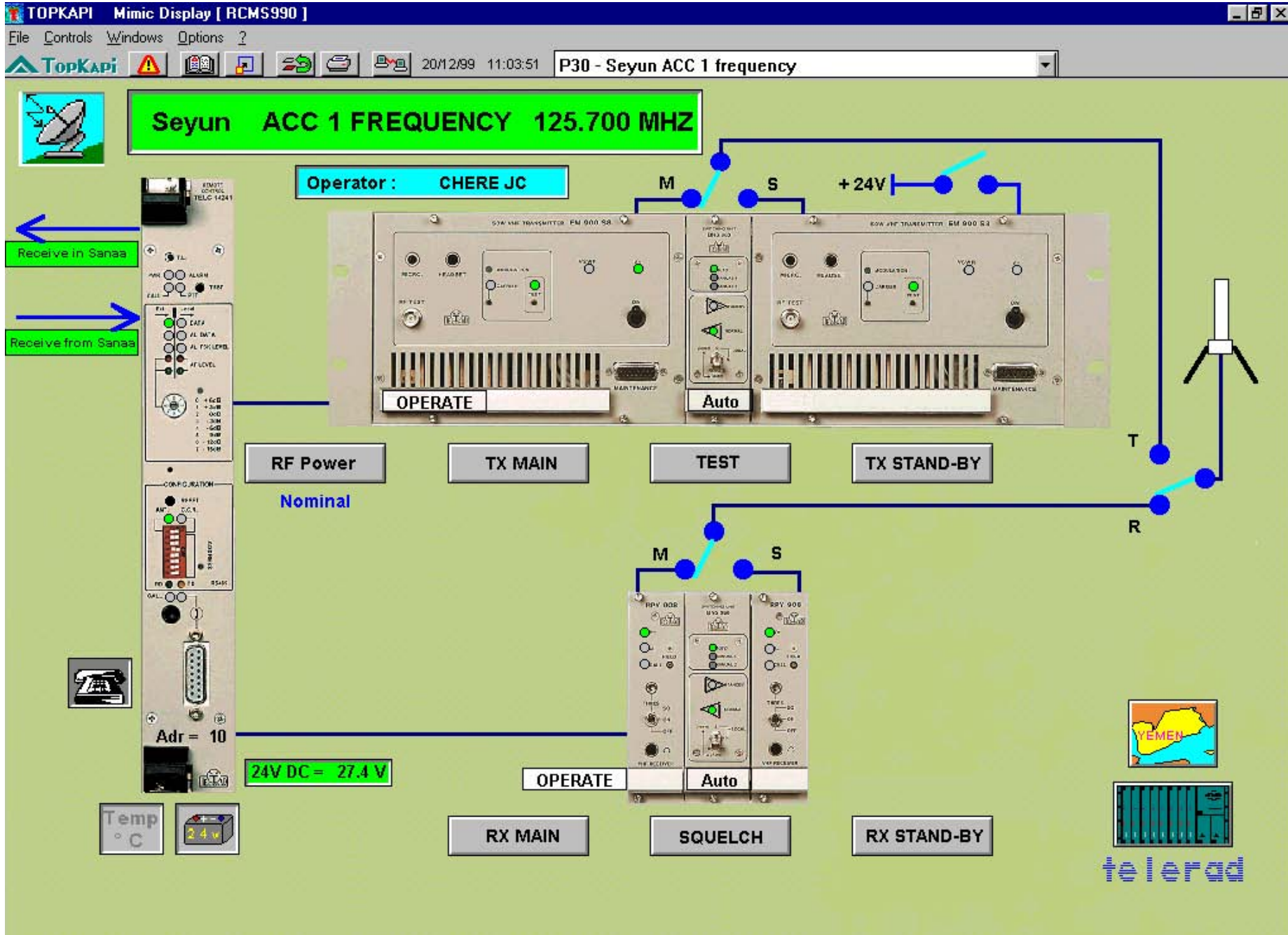
TXM POSTE ← MAIN POSTE ●

Reserved to ECAO Management

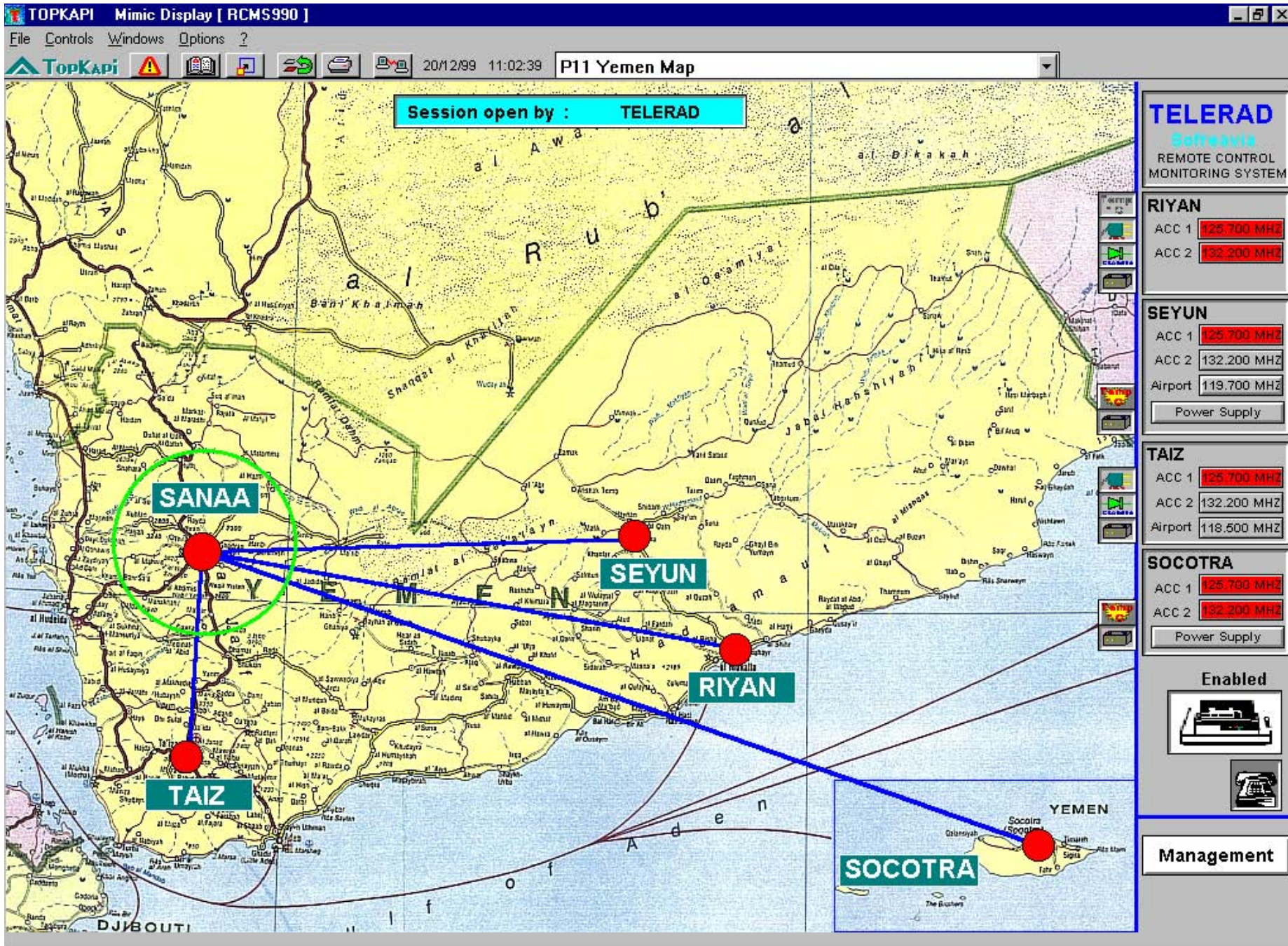
Sounds : No Configuration

File TMP Clear

CONTROL CENTER RADIOCOMMUNICATION MONITORING
CAIRO



VHF MAIN / STANDBY STATION
YEMEN



CONTROL CENTER RADIOCOMMUNICATION MONITORING SANAA

TOPKAPI Mimic Display [RCMS994]

File Controls Windows Options ?

TopKAPI P13-VHF1 - ATC

telerad Power Supply TX : 0.70 V

ATC - VHF FREQUENCY Number 1

A.T.C - B.O.C VIEW

Squelch

RF Power Nominal Test

Watts S.W.R. Peak % Mod Volts

P/Pn = 0.0 dBo Power = 0 S.W.R = 1.0 Modulation = 0 Field receiver = 0.5

Antenna Fault

SOW VHF TRANSMITTER EM 900 S SY 900 RY 900

VHF3 VHF2 VHF4

VHF1 frequency : 130.000
VHF2 frequency : 144.000
VHF3 frequency : 132.650
VHF4 frequency : 118.700

Mode Frequency Frequency

Current loop : Ok INTE : Present RS485 : OK

VHF Programming

Current loop : Fault INTE : Present RS485 : OK

Frequency display not correct. Try to change frequency or channel.

Session open by : TELERAD

VHF MULTICHANNEL STATION
QATAR