Radiomonitoring System RAMON

Customized radiomonitoring from VLF through SHF

Radiomonitoring System RAMON from Rohde & Schwarz detects and monitors emissions in the frequency range 10 kHz to 18 GHz. Made up of tried and tested standard components, it allows comprehensive radiomonitoring systems to be set up to customer requirements. A graphics user interface ensures easy-to-learn and convenient operation.

FIG 1   Radiomonitoring System RAMON-search with application-specific add-ons as desktop   Photo 42 134/2

The purpose of interception and monitoring is to provide information about radiocommunications for the determination of a scenario (systems, positions, movements, distribution, concentrations, intentions). A few **typical activities of radiomonitoring** are:
- searching for known and unknown signals,
- monitoring of radiocommunication activities and alarm frequencies,
- identification, detection or recognition of transmitters,
- direction finding and location of radio stations,
- aural monitoring and recording of radio messages,
- analysis under technical and textual aspects,
- preparation of reports,
- evaluation and comparison of obtained data,
- setting up and updating of a database,
- preparation of statistics.

Modular design

To permit the great variety of tasks to be performed, Radiomonitoring System RAMON is of modular design. The number of modules used and their associated tasks vary depending on application. RAMON may be configured as required from a compact system with only one operator position through to a hierarchical system with an appropriate number of operator positions (FIG 1). Thus each system can be optimally adapted to the desired application and reliability is ensured through the use of tried and tested modules. The following **modules** are available:

- RAMON-supervise,
- RAMON-search,
- RAMON-monitor,
- RAMON-analyze,
- RAMON-locate,
- RAMON-compact.

Each module is a configurable unit comprising radiomonitoring equipment, a controller and software tailored to the particular application and complement. Operators of the individual modules exchange data within the system via LAN for sending messages, giving orders or storing reports. The variety of systems that can be set up with the aid of these modules ranges from single-position systems (RAMON-compact) through medium-sized systems
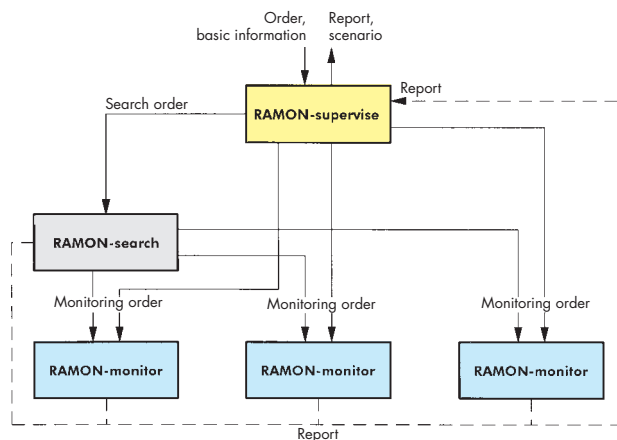

FIG 2
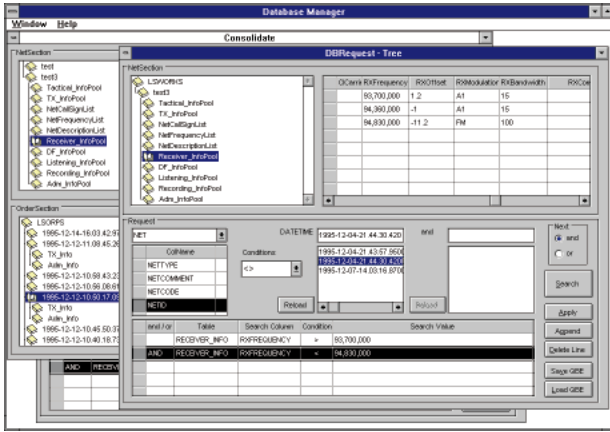Block diagram of medium-sized radio-monitoring system

FIG 3
Evaluation of reports
using database

mation obtained to control monitoring activities. Based on this information and his specialist knowledge and experience he prepares reports for the superordinate level, which is his contribution to fixing the scenario. All his activities are supported by the graphics user interface of RAMON-supervise, permitting fast acquisition of results.

RAMON-search (FIG 4) comprises a Search Receiver ESMA [1] and one or more Compact Receivers ESMC [2]. The module permits a fast search through frequency bands and rapid signal identification. The search opera-

(FIG 2) to large, hierarchically organized systems made up of several subsystems.

The operator position **RAMON-supervise** offers functions allowing the supervisor to control radiomonitoring and prepare reports. Thus assignments can be issued, their handling checked, reports or results examined and allocated to individual radio stations. The super-
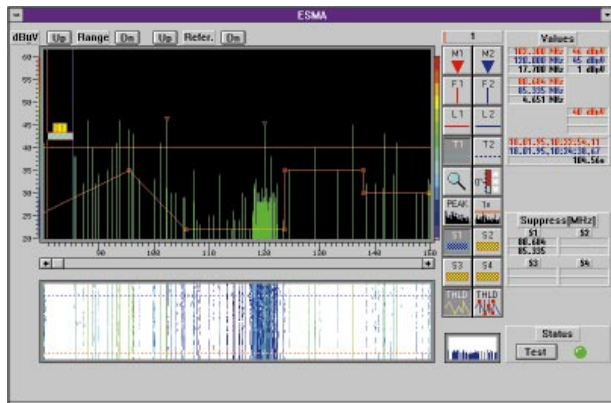
visor is the interface with the superordinate level, from where he receives orders and further information. The supervisor prepares search and monitoring orders and passes them on to the operators. Results obtained by the operators are stored as reports in a database. If the results are not post-processed, the supervisor carries out evaluation with the aid of the database and supporting functions (FIG 3). He utilizes the infor-

FIG 4   Single-rack operator position RAMON-search

Overview mode in search operation
The figure shows a snapshot of a search receiver operating in overview mode. Single frequencies and frequency bands are combined to a scan sequence of up to 10,000 channels. Known signals or unwanted bands may

be suppressed. The overview provides tools permitting signals to be measured or the display to be zoomed or frozen. Recommended search receivers are ESMA and ESMC.
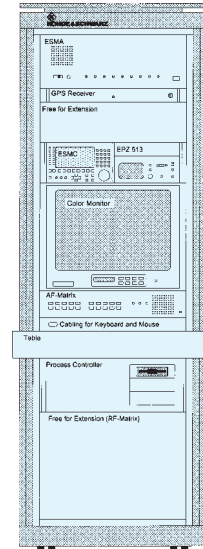
tor scans specified frequency bands for active transmitters with his receiver in the overview mode (see box). In this mode the search receiver scans the defined range at maximum speed. Detected signals are shown in a panoramic display. Frequencies of interest are marked in the display and sent at a click to the compact receiver, where they are aurally identified and measured. If a signal is to be further monitored and analyzed, he sends an automatically prepared order to the monitoring operator by a single keystroke. Supported by RAMON-search the operator is able to respond quickly to

new signals, identify a multitude of emissions and execute a great number of search orders.

RAMON-monitor (FIG 5) contains several aural-monitoring receivers and at least one recorder. The software of the position guarantees efficient monitoring performance. The monitoring operator receives an order from the supervisor or search operator and the system immediately tunes a receiver to the frequency to be monitored. He records the detected signal and notes down important information in a report in which receiver settings are automati-

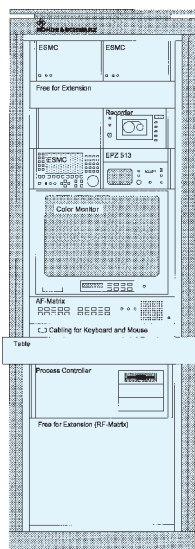FIG 6 Direction finding and radiolocation in monitoring mode with map (R&S MapView software)

FIG 5   Rack layout of RAMON-monitor

cally included. The operator locates the transmitter with the aid of direction finders and is able to view the position on his map (FIG 6). Detected emissions are recorded on tape for subsequent evaluation. Depending on the technical facilities of his position, the operator may carry out detailed signal measurements. The results are also noted down in the report. RAMON-monitor allows the operator to monitor several frequencies simultaneously and speedily prepare detailed reports.

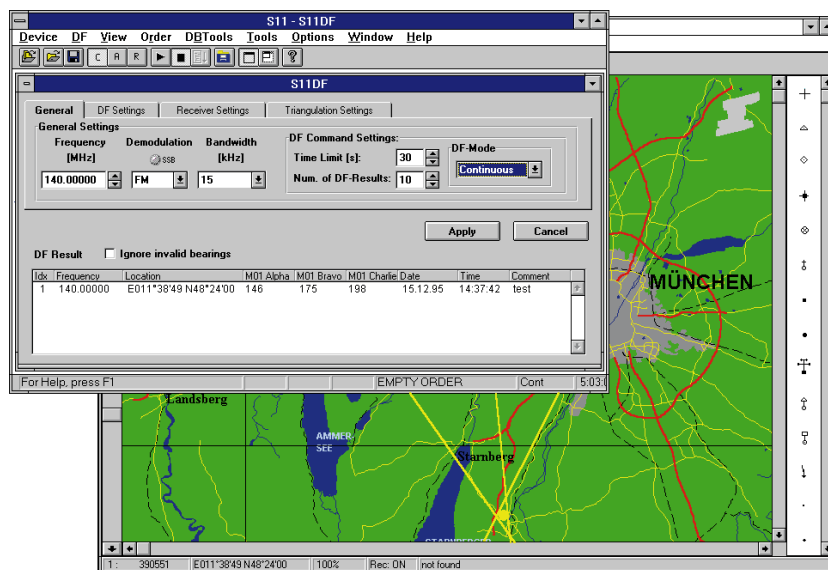The single-position system **RAMON-compact** includes a search receiver, an

aural-monitoring receiver and a recorder. The software includes all main functions of RAMON-supervise, -search and -monitor. The tasks normally performed at the supervisor, search and monitoring positions are concentrated in one position. Procedures are similar to those performed at the separate positions but the individual tasks are carried out at a less detailed level. This makes system software support so particularly important. With RAMON-compact a single operator is able to obtain all essential information by means of radiomonitoring and to add this information to the scenario.

Optimization and upgrading

Rohde & Schwarz continuously enhances existing modules and is developing new ones like RAMON-analyze and

RAMON-locate. This allows systems in use to be upgraded and improved by updates. Thanks to the modular design, upgrading may be carried out in steps so that even a small installation can be expanded to an increasingly powerful radiomonitoring system.

Reiner Ehrichs; Claus Holland; Günther Klenner

REFERENCES

[1] Oberbuchner, E.: Search Receiver ESMA – The ideal frontend for VHF-UHF monitoring systems. News from Rohde & Schwarz (1995) No. 149, pp 7–9

[2] Boguslawski, R.; Egert, H.-J.: VHF-UHF Compact Receiver ESMC – Easy radio detection in VHF-UHF range. News from Rohde & Schwarz (1994) No. 143, pp 11–13

Modules of Radiomonitoring System RAMON

RAMON-supervise	coordinator position
RAMON-search	search and identification position
RAMON-monitor	monitoring position
RAMON-analyze	analyzer position (in development)
RAMON-locate	radiolocation position (in development)
RAMON-compact	compact single-position system

Reader service card 151/06