Series 4400

Software-based radios: one platform – many applications

Conventional ground-based radio systems are backed up by different platforms and units for the various frequency ranges and applications. By contrast, the new radio generation of Series 4400 is based on a uniform platform which offers multiband/multimode/multifunction capabilities by means of modules and software.

Photo 43 402/4

FIG 1   Series 4400 radios are multifunctional: based on uniform hardware modules they can be configured for a host of tasks by software

Multifunctional radios for military tasks

Like the successful predecessor Series 400U, the application range of the new Series 4400 radios covers military ATC, air defence and complex naval communication systems (FIG 1). But they can also be deployed to perform special missions, for example on AWACS aircraft. What is actually the difference between the old and the new generation?

With the changed economic and technical conditions, military users' requirements have changed too. They call for a system concept that is able to cover different applications and requirements on a single platform. Future deployment scenarios will be characterized by secured waveforms such as SATURN or STANAG 4444 and by user-specific waveforms for which the radios must be upgradable. A further requirement is multiline capability, ie concurrent operation of several communication lines in a single radio.

With Series 4400, Rohde & Schwarz offers a very compact and flexible platform that meets these requirements. The platform is multiband-compatible and has been designed to cover all relevant frequency ranges and procedures.

## Future-proof plus upgraded combat effectiveness

The concept of Series 4400 fully meets the requirements for future-proofness, flexibility and modularity. Based on an embedded realtime operating system, the platform handles internal communications, provides interfaces and ensures AF signal processing as well as device control. In addition to available hard-ware module functions, special performance features can be defined by software. If a system is to be retrofitted with extra channels, for example, it is sufficient to simply plug additional modules to the platform and create new functions by downloading the software. The purchasing of new radios which would strain the budget and take away valuable space becomes superfluous. And a universal use of the same modules for different applications also keeps logistic costs down. Identical receiver modules are for example used for both digital EPM systems and fixed-frequency voice operation.

Since Series 4400 is equipped with LSI components, space requirements are reduced by up to 50% compared to conventional units. And this together with higher performance is a clear advantage for shipboard applications.

FIG 2
Multiband Series 4400 presently covers the frequency range 100 MHz to 512 MHz. Future modules with adequate software will considerably extend this range – deploying the same platform
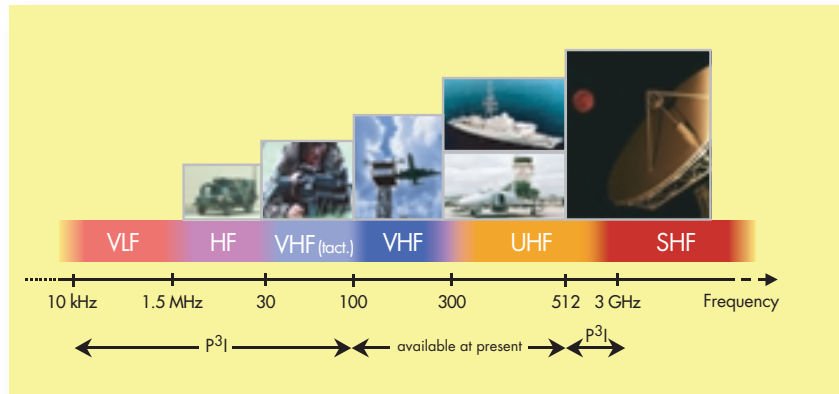
Made to measure with P³I

In tune with the philosophy of a universal platform concept, a variety of software and hardware extensions, called preplanned product improvements (P³I), have been conceived for the base unit. This includes the extension of the frequency range (FIG 2) and also integrated high-performance modems. One example of such an extension is a 64 kbit modem which is described on page 23 of this issue.

Optimum integration into modern networks

Integration into networks is facilitated by a multitude of standardized interfaces. The LAN hubs integrated into the radios provide for easy intersystem networking and networking with other communication components. LAN and ISDN interfaces thus allow the configuration of units

in detached military ATC radio stations. A sophisticated system of passwords for user groups ensures authorized access.

Real "Plug & Play"

To keep maintenance to a minimum, the individual radio modules are fully independent of each other. If an individual module is replaced, neither hardware adjustment nor an exchange of the platform software is required. The radios recognize the used hardware on booting and perform the correct configuration.

Multimode allrounder

Jam-resistant and interception-proof links are indispensable in military radiocommunication. Like in Series 400U, NATO methods HAVE QUICK or SATURN as well as the proprietary SECOS EPM system from

Rohde & Schwarz are employed [*]. New waveforms or modifications to the EPM system can be implemented simply using a software download. New techniques however call for high computing power of the controlling processor in the radio and fast frequency settings. No problem for Series 4400: an additional processor module performs all required computing and controlling operations for the loaded waveforms.

In its maximum configuration, Series 4400 is able to operate two independent EPM lines in a basic unit of only 3 HUs which is a novelty in the field of ground-based radios.

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REFERENCES
[*] SECOS EPM system for the three forces.
MIL NEWS from Rohde & Schwarz (1999)
No. 2, pp 12–14

Specifications	
Frequency range VHF/UHF	100 MHz to 512 MHz
Output power	30 W AM/100 W FM
Operating modes	fixed-frequency halfduplex, duplex, HAVE QUICK I/II, SATURN, SECOS, diverse combinations of these modes
Number of parallel EPM lines	2
Number of parallel receiver/exciter lines	4
Remote-control interfaces	LAN, RS-232-C/485, ISDN, DTMF