M3TR

Multiband
Multimode
Multirole
Tactical Radio

The software-defined radio
– secure communications
for the digital battlefield

ROHDE&SCHWARZ

M3TR

The R&S®M3TR, a software-defined radio system with open architecture, provides a unique approach to joint, combined and coalition operation using line of sight (LOS) and beyond line of sight (BLOS) transmission. The R&S®M3TR represents a new generation of affordable, high-performance digital radios, that meet these stringent interoperability needs. The R&S®M3TR is designed for use with military and civilian legacy radios/ waveforms. State-of-the-art technology and the innovative system architecture of the R&S®M3TR provide flexible growth capability through pre planned product improvement (P³I) and enable the customer to benefit from future technologies through the evolutionary acquisition process.

Multiband

For applications using of various services and networks, different types of radio units were previously required. **The R&S®M3TR covers the whole spectrum from the HF to the UHF band**, and thus allows interoperability as well as uniform and reduced inter-service logistics. The frequency flexibility of the R&S®M3TR meets various national and international regulations, thus providing global operation in changing missions and environments. A basic radio station consists of the transceiver with audio and data accessories, power amplifier, and a docking station (DS). This DS is not only a mounting frame for mechanically fixing one or two radios in a vehicular installation but can be equipped for full net integration. Each radio can also be connected to RF amplifiers that increase output power to 50 W in the VHF and UHF bands (30 MHz to 512 MHz) and 150 W in the HF band (1.5 MHz to 30 MHz). **If these power amplifiers are used, a single R&S®M3TR radio (R&S®MR3000H or R&S®MR3000U) will cover the whole frequency range from 1.5 MHz to 512 MHz without any gaps.**

Multimode

A software radio not only offers flexible network solutions but also integrates existing national or company standards in a single unit. Due to optimized protocols and waveforms, the R&S®M3TR attains highest throughput rates for digital voice, data, video and position location.

Military waveforms

Available or prepared for the following:

- BLOS: ALE to MIL-STD-188-141B, App.A, AM, FM, SSB, , STANAG 4285, SECOM-H
- LOS: HQ I, II, SECOM-V

High data rate waveforms

Available or prepared for the following:

- Beyond line of sight (BLOS): R&S®MR3000H/U up to 9.6 kbps user rate
- Line of sight (LOS), VHF/FM, V/UHF up to 72 kbps, open for future extensions
- Civil waveforms, prepared for the following: ATC HF Datalink, VHF ATC (25/8.3 kHz), VHF AM, VHF/FM public services (12.5/5 kHz)

Security

- Embedded COMSEC, NATO approval in progress
- Compatible with various external COMSEC devices

Digital voice

- Vocoders adapted to mode of operation and bandwidth

Multirole

The multirole features of a software-defined radio are mainly determined by its ease of integration into tactical communications networks. In addition to its use as a functional terminal in the respective subnet, e.g. CNR or PRN, it can also act as an interface between the individual subnets. The R&S®M3TR can be used on diverse platforms and features interfaces to fixed networks such as ISDN, WAN, LAN, as well as intelligent gateway and relay functions, such as auto routing of a selective call for subscribers outside the network.

- CNR – combat net radio
- PRP – packet radio services
- RAP – radio access point
- REN – range extension node
- GPS: time and position location
- Gateway/interface:
  - to WAN/LAN
  - between HF/VHF/UHF nets

Embedded EPM

The newly developed SECOM (SECOM-V for the VHF and UHF bands, SECOM-H for HF) with its high hop rates and secure synchronization is setting standards. It ensures powerful protection against detection, interception, jamming and spoofing. Within one SECOM V net, several subnets and sublinks can be established simultaneously in point-to-point, point-to-multipoint and broadcast mode. Network synchronization and access can be planned and controlled individually for each user. Methods such as late net entry or hailing are available for this purpose. The COMSEC part of the SECOM EPM method is based on a crypto algorithm developed by Rohde & Schwarz. The method uses key lengths of up to 256 bits (approx. 107 variants). The keys required for the EPM method can be distributed by means of a KDD (key distribution device) or directly from a PC. All keys are encrypted and the deciphered original is present only in the read-protected security processor. Crypto units to NATO standards or from other manufacturers may be used as an external option.

Key features

- Extended frequency range
  R&S®MR3000H: 1.5 MHz to 108 MHz
  R&S®MR3000U: 25 MHz to 512 MHz
- High data rate up to 72 kbit/s for real-time data and video
- Internet/Intranet access via IP-interface
- Software-configurable and reprogrammable through preplanned product improvement (P^3I)
- Independent selective links in one net including:
  - Point to point
  - Point to multipoint
  - Broadcast
- Integrated GPS time and position report
- Removable control panel

Logistics and readiness

- Minimum volume and weight for drop-in replacement programs
- Highest autonomy by strict power saving management
- Built-in test down to module level with remote diagnostics
- Common logistics concept for reduced life cycle costs
- Common human machine interface
- Reduced training required, assisted by multimedia training material
- Excellent flexibility
- Highest MTBF

SECOM: The smart adaptive hopping waveform for LOS and BLOS

Embedded COMSEC/TRANSEC for voice and data provides the following benefit:

- Fast frequency hopping
- Digital fixed frequency (DFF)
- Free channel search mode (SECOM-V)
- Advanced customized key and frequency management
- Protected synchronization method

5th generation technology for the digital battlefield

Dimensions:	199 mm × 309 mm × 74 mm (W × D × H with battery) 7.83 × 9.21 × 2.91 in.
Weight:	<5.6 kg with battery (R&S®MR3000U) <12.35 lbs

Menu number and status display section

Easy-to-read backlit graphical display

Clear or discard input

Confirm input

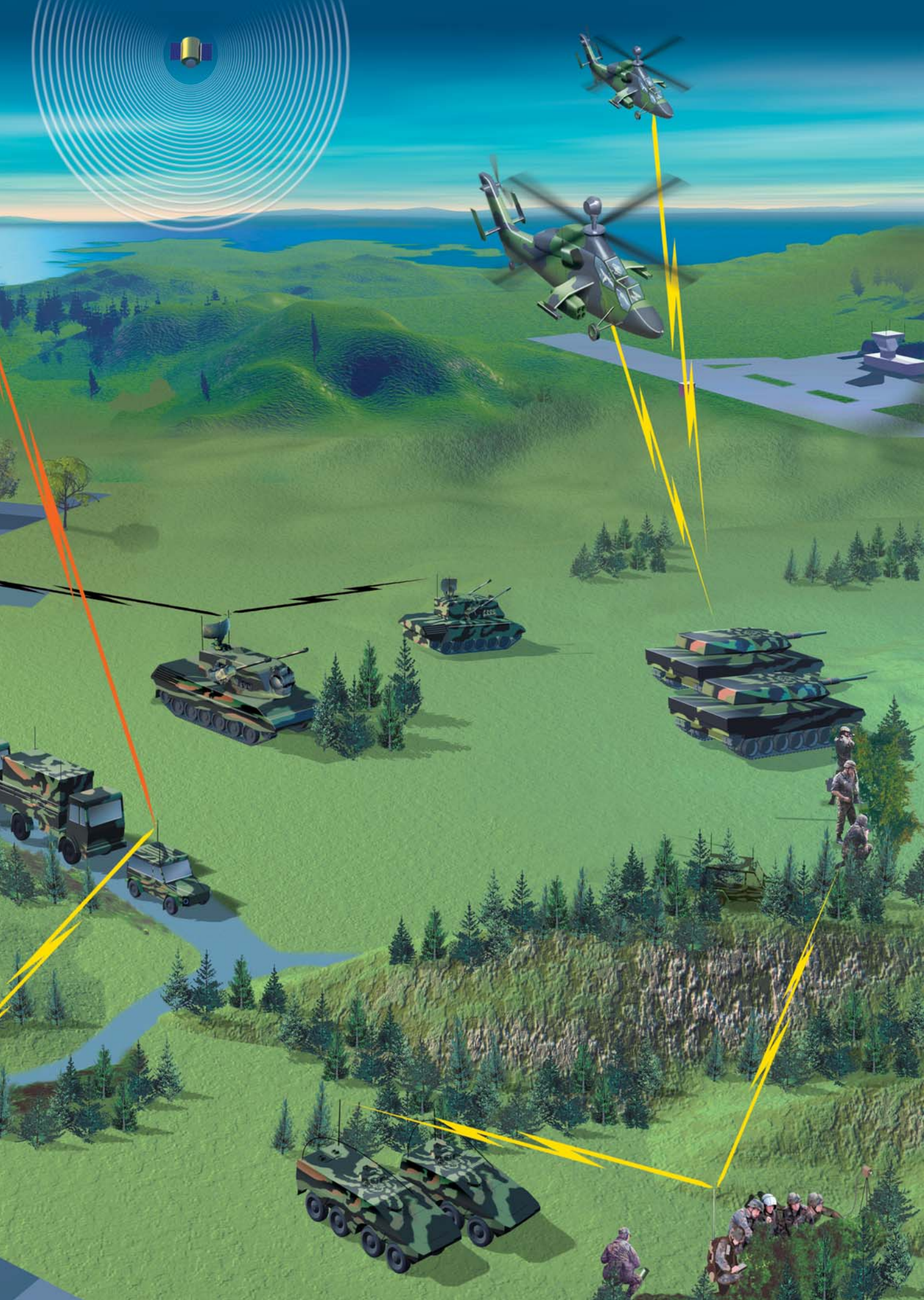
Menu navigation

∧ = First or upper menu (Home)
v = Last menu (End)
< = Previous menu
> = Next menu

Alphanumeric data-entry keypad

A common digital platform – versatile, affordable, available


CNR (combat net radio)
HF link
Air defence
FAC (forward air control)



Internetworking functionality

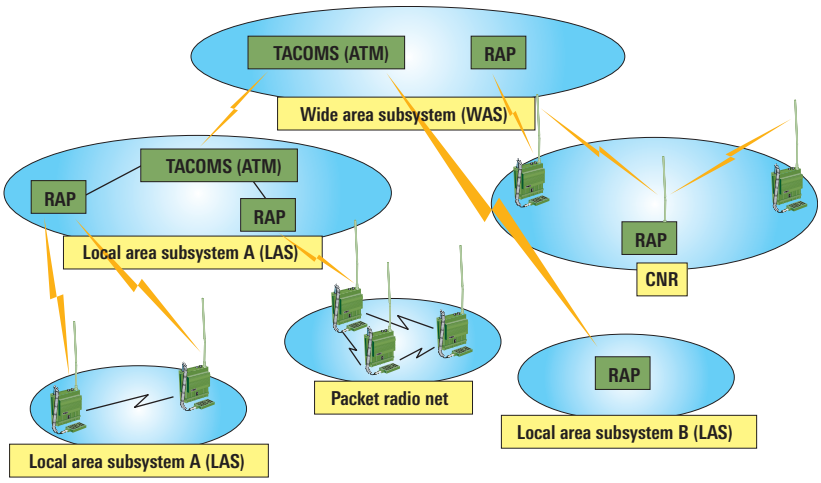
The R&S®M3TR is designed to provide exceptional flexibility for networking services, via on-air RF networks or into host networks (radio wire integration or RWI).

It offers data routing, switching capability and interfacing to tactical analog and digital networks, LAN and WAN networks, as well as to personal computers and other data terminal equipment.

The docking station accommodates one or two radio units (jerk and run design) that operate in different networks. Full-duplex and relay functions can thus be implemented. It includes optional power amplifiers (VHF up to 50 W) and co-site filters, and establishes the necessary connections to all submodules. Cabling therefore is not required on the control panels. The integrated remote-control interface allows full remote control, monitoring and servicing of the system.

The LAN interface enables applications such as e-mail, Internet browsing and tactical Internet. Standardized international protocols such as TCP or UDP ensure seamless interoperability with various platforms, completely independent of manufacturer or operating system.

RAP radio access point
REN range extension node
ATM asynchronous transfer mode
CNR combat net radio



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