Product brochure

VHF/UHF Airborne Transceiver Family R&S®M3AR

ROHDE&SCHWARZ

The VHF/UHF airborne transceiver family fo

The VHF/UHF Airborne Transceiver Family R&S®M3AR for voice and data communication offers the most important EPM (ECCM) methods and, owing to its P³I philosophy, keeps pace with future operational requirements.

Brief description

The VHF/UHF Airborne Transceivers R&S®M3AR are the product of decades of experience, especially in the design and development of airborne radio equipment and software defined radio technology. The R&S®M3AR multiband, multimode, multirole communication system is designed to provide multimode UHF and VHF, AM and FM, and voice and data communications in normal or EPM (ECCM) mode with embedded COMSEC and TRANSEC.

The R&S®M3AR transceivers are software based radios with preplanned product improvement (P³I) features, which allow upgrading to new developments in the network centric warfare (NCW) scenario simply by loading software.

The VHF/UHF Airborne Transceivers R&S®M3AR are capable of establishing two-way communications links for voice and data for a wide range of fixed- and rotary-wing aircraft and unmanned aerial vehicles (UAV).

Operational demands met by products from Rohde & Schwarz

NCW scenarios call for maximum security and interoperability in the field of radiocommunications. HAVE QUICK I/II and the fast frequency hopping method SATURN, both defined in the relevant STANAGs, ensure security as well as interoperability with NATO-assigned forces. These waveforms can be operated either with external crypto devices (i.e. KY 58, KY 100, ELCRODAT 4-2) or with an embedded NATO algorithm (i.e. the R&S®MR 6000A).

Furthermore, Rohde & Schwarz has developed the fast frequency hopping method R&S®SECOS, which can be implemented together with the HAVE QUICK I/II mode in order to achieve interoperability with NATO in combined missions and to provide a sovereign national waveform. The VHF/UHF Airborne Transceivers R&S®M3AR enable switchover between R&S®SECOS and HAVE QUICK I/II waveforms during a flight mission whenever required.

With the R&S®M3AR and other members of the R&S®M3xR radio family, Rohde & Schwarz provides an allround air-ground-air communications system that is ideal for future digital battlefield scenarios.

The product range comprises the following products:

- VHF/UHF transceivers for voice and data with EPM (ECCM) capability
  - HAVE QUICK I/II, SATURN, R&S®SECOS
  - cockpit or avionic bay installation
- Remote control units
- Accessories
  - Radio net management system
  - R&S®SECOS management station
  - Key distribution device
  - Frequency-agile filter
  - Power amplifier
  - Base station adapter
  - Support and test equipment
  - Mounting trays
  - Mating connector sets

Multitude of platforms

Rohde & Schwarz airborne radios support armed services worldwide on a multitude of airborne platforms including F-4, F-5, F-16, JAS 39 Gripen, SU 30 and the TIGER and NH 90, plus other Eurocopter and Agusta helicopters.

Retrofit solutions are available for replacing existing AN/ARC aircraft radio equipment. The compact design of the R&S®M3AR with serial, parallel or MIL-BUS remote control interfaces simplify the integration into existing and new platforms. The versatility of the control units also adds to the high flexibility.

EPM (ECCM)	**electronic protection measures**
TRANSEC	**transmission security via frequency hopping**
COMSEC	**communications security via encryption**
M³	**multiband, multimode & multirole**
F³	**form, fit & function**
P³I	**preplanned product improvement**
HMI	**human machine interface**

r voice and data communications

R&S®MR 6000L

The R&S®MR 6000L is designed for installation in the cockpit, and its architecture ensures form, fit and function replacement for existing AN/ARC164 radio systems. The transceiver is controlled locally from the integrated front panel.

R&S®MR 6000R

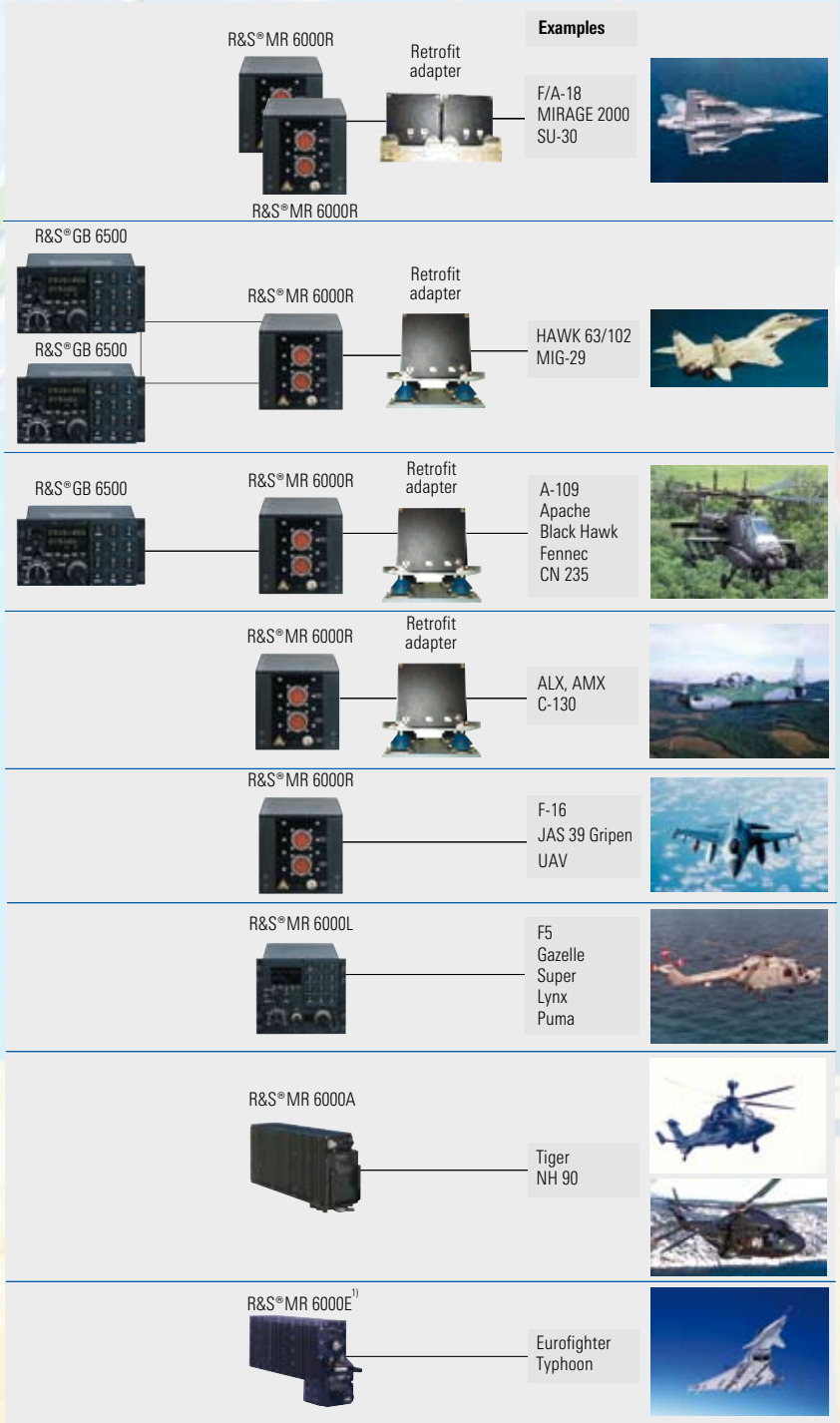
The R&S®MR 6000R is designed for installation in the avionic bay, and its architecture ensures form, fit and function replacement for existing AN/ARC164 radio systems. It is one of the world´s smallest and most lightweight UHF/VHF airborne transceivers.

R&S®MR 6000A

The R&S®MR 6000A comes in standard housing in line with ARINC 600.

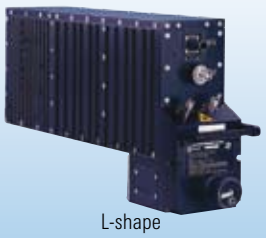
The major advantages of the R&S®MR 6000A are the following:

- High RF output power
  - Increase of range (low flying altitudes)
  - Increase of anti-jam performance
- Integrated fast frequency hopping filter (pre-/post-selector)
  - Reduction of interference with other equipment
  - Increase of jamming resistance
  - Improvement of co-site behaviour
- Remote crypto fill concept with DS-101 black key loading
- Embedded COMSEC with NATO algorithm (optional)
  - TRANSEC-derived COMSEC
  - One-box solution
  - Common HMI



Airborne communications equipment – the R&S®M3AR Family

Software-reprogrammable radios

R&S®MR6000L	R&S®MR6000R	R&S®MR6000A	R&S®MR6000E [1]
			
F³ – ARC 164 10 W – local control	F³ – ARC 164 10 W – remote control	ARINC 600 20 W – embedded NATO-COMSEC (optional)	L-shape 20 W – embedded NATO-COMSEC

compact – lightweight – rugged

Control concept

The flexibility of interfaces and remote control concepts depends on the operational requirements and platform types:

- Local control
- MIL-BUS 1553 B
- Remote control via RS-485
- Remote control via R&S®GB 6500
- Various combinations of the above

Remote Control Unit R&S®GB 6500

The Remote Control Unit R&S®GB 6500 allows remote control of the R&S®M3AR transceivers in fixed-channel or in EPM (ECCM) mode. It is designed for simple operation and needs no scheduled maintenance. It is suitable for installation in cockpits in line with MS 25212.

The Remote Control Unit R&S®GB 6500 can be used as a backup in the case of a MIL-BUS failure, being able to control up to five radios.

Service concept

The individual modules of the VHF/UHF Airborne Transceivers R&S®M3AR have defined interfaces. They can be replaced without any hardware adjustment or alignment and thus ensure fast and economical maintenance.

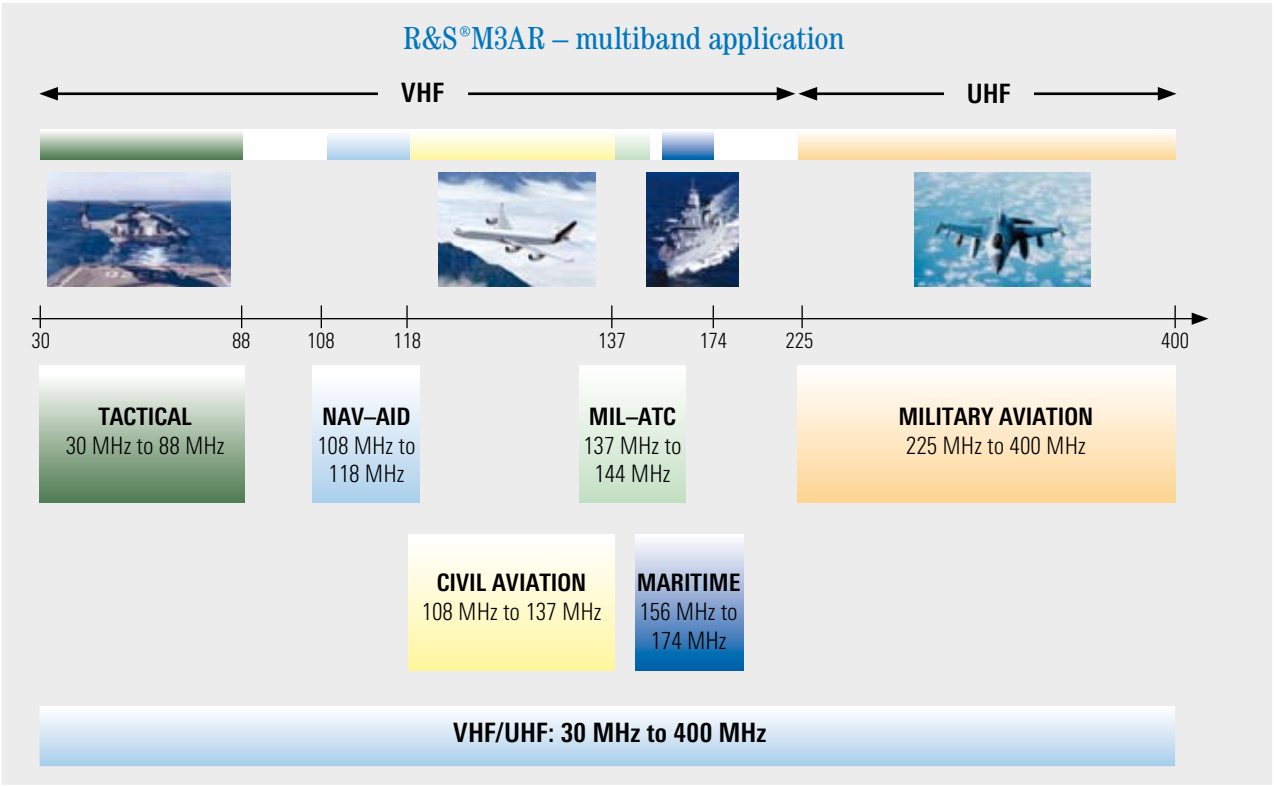
Other benefits include:

- Excellent accessibility
- Standardized components
- Minimum number of tools required
- Minimum scheduled maintenance
- Built-in test with high diagnostic capability (BIT)

For error diagnostics at the various maintenance levels, a manually controlled flight-line tester or an automatic repair test station can be used.

The R&S®MR 6000R remote-control version with the Remote Control Unit R&S®GB 6500

[1] In cooperation with INDRA (Spain) and Marconi Selenia (Italy).



Summary

- The R&S®M3AR is a **digital software-reprogrammable radio family** state-of-the-art technology in order to minimize obsolescence throughout the entire life cycle of airborne programs
- The R&S®M3AR has been designed for **P³I** (preplanned product improvement) so that new or modified functionalities can be added simply by means of software download; this concept ensures maximum flexibility in adapting to future customer-specific requirements
- The R&S®M3AR transceivers are extremely **compact and lightweight**, which is why they have been selected for unmanned aerial vehicle (UAV) programs and on multiple platforms
- The R&S®M3AR is a **multiservice (M³)** technology system, operable in multiband (tactical VHF/VHF/UHF), multimode (different scenarios) and multirole (voice and data)
- The R&S®M3AR transceivers are supported by a sophisticated service concept due to their **modular design**; plug-in modules are easily accessible and can be replaced without hardware alignment or adjustment with special tools, enabling rapid and economical repair

Vast experience in avionics

Rohde&Schwarz is a leading international supplier of professional HF, VHF and UHF radiocommunications systems for use in stationary and mobile ground stations, on ships and on aircraft. Government authorities and armed forces around the world use technology from Rohde&Schwarz for voice and data transmission.

Since 1968, when development of the R&S®XT 3000 V/UHF radio and the R&S®XK 401 HF-SSB radio for the Tornado aircraft began, Rohde&Schwarz has achieved one milestone after the other to become a market leader in providing military avionics equipment for a wide variety of airborne platforms. The most recent example is our advanced R&S®M3AR radio family. As a supplier of VHF/UHF transceivers for the Eurofighter Typhoon and SAAB Gripen, we are very familiar with doing business at the international level. Our customers receive product-related advice, logistics concepts and services.

Based on our vast experience in military avionics, Rohde&Schwarz took the decisive step of entering the commercial avionics market several years ago. In cooperation with the US company Honeywell, we successfully introduced a civil airborne HF transceiver for data link operations in all versions of civil airframes. Over 50 commercial airlines worldwide now use this transceiver.

ROHDE&SCHWARZ

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