

ROHDE & SCHWARZ

Make ideas real



MILITARY SPECTRUM MONITORING

Exploring the electromagnetic spectrum





AIRBORNE
COMMUNICATIONS



TACTICAL
COMMUNICATIONS



SATELLITE
MONITORING AND
INTERCEPTION



COMMUNICATIONS
INTELLIGENCE
(COMINT)



ELECTRONIC
INTELLIGENCE
(ELINT)



ELECTRONIC
SUPPORT



AIR TRAFFIC
CONTROL



SYSTEM SOLUTION PARTNER

To achieve information superiority and digital sovereignty, Rohde & Schwarz provides turnkey communications, intelligence and security solutions from a single source. Rohde & Schwarz is the partner of choice when it comes to integrating tomorrow's technology into today's networks. As a system integrator and manufacturer of all core components, the company delivers trusted turnkey solutions for the whole lifecycle – from systems engineering to project implementation and aftersales services.



MILITARY SPECTRUM MONITORING

Monitoring the electromagnetic spectrum (EMS) helps armed forces to optimize frequency management. Spectrum awareness of intended or unintended radio emissions helps to protect military assets and assist rescue missions. Spectrum monitoring systems help deconflict the EMS and verify emissions control (EMCON). They also help commanders to coordinate the use of the EMS and achieve spectrum superiority.

SPECTRUM SUPERIORITY

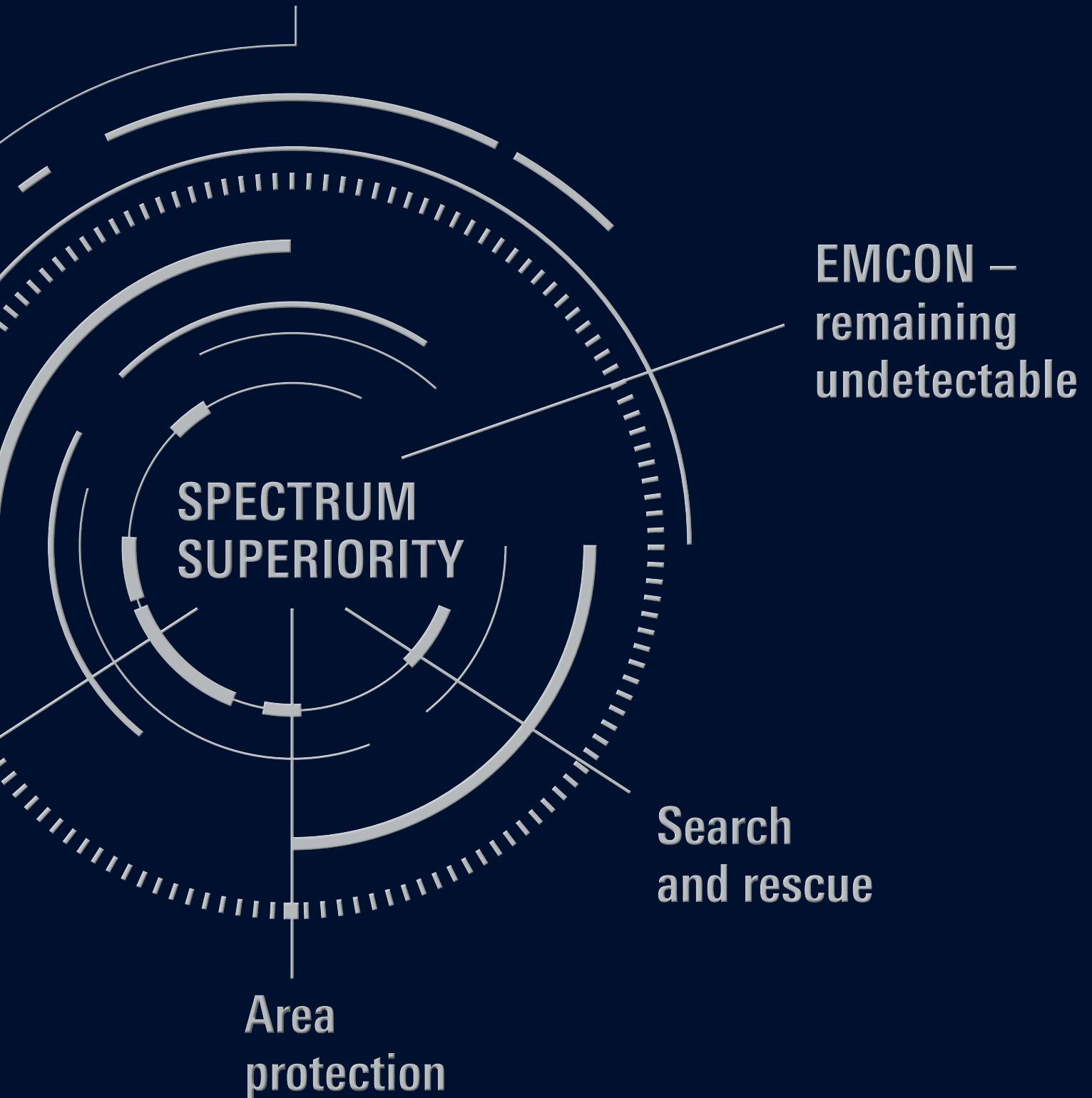
Spectrum monitoring systems can be employed in a diverse range of applications and operational areas, such as military training grounds and exercise areas, proving grounds, test ranges, missile launch sites and military bases of all kinds. In deployment areas and theaters of operations, spectrum monitoring increases the reliability of deployed forces' radio links, ultimately contributing to mission success.

Rohde & Schwarz spectrum monitoring systems offer comprehensive features for whatever spectrum monitoring task arises. The product line includes a wide range of equipment for portable, mobile and stationary use. With high sensitivity, wideband monitoring capability and excellent signal processing performance, the systems can cope with any signal environment. For geolocating emitters, the systems offer AOA, TDOA and combined hybrid methods. Its ergonomic operational concept, clear presentation of results and robust design make this equipment ideally suited to effective field operations.



Interference
resolution

Spectrum awareness



SPECTRUM AWARENESS





Spectrum monitoring systems reveal the actual utilization of the frequency spectrum. This is an essential precondition for proper frequency planning and assignment. Monitoring systems make planning and assigning frequencies easier by identifying the “white spaces” in the spectrum. Measurements validate assigned frequency utilization in specific areas and provide information about possible re-use of frequencies, which enables more precise channel assignment, ensuring reliable radio communications free from interference.

OCCUPANCY ANALYSIS

When several users heavily occupy single frequencies or fill up entire frequency bands, they can cause radio interference to each other. Blocked or dropped calls interrupt information flows. This is an annoyance during exercises, but it can lead to tactical disadvantages during real world operations. The opposite is true for unused or rarely occupied frequencies: they can offer the advantage of available spectrum.

Rohde & Schwarz monitoring systems take efficient occupancy measurements to detect high loads and find available capacities in the frequency spectrum. They offer automatic measurement and analysis procedures to assess the actual use of single channels and entire frequency bands. This assessment is a basis for improving frequency assignments and optimizing radio spectrum use.

COVERAGE VERIFICATION

When assigning frequencies or planning missions, spectrum managers must be aware of the radio coverage of each transmitter to ensure gapless signal reception and avoid conflicts with other transmitters on the same frequencies in the field. Computer simulations can provide an initial assessment but cannot reveal actual coverage and spectrum usage.

Rohde & Schwarz spectrum monitoring systems enable spectrum managers to measure actual propagation ranges. Measurements are the only way to obtain proof of reliable communications links in specific areas. The results also provide indications of potentially reusable frequencies at remote sites. In operational areas, coverage measurements can even check whether adversaries can detect friendly radio communications.

INTERFERENCE RESOLUTION

With the increase of wireless devices and other electronic equipment at military facilities and in the field, radio interference is on the rise. It degrades communications and as a result undermines command and reporting capabilities. It can also disrupt remote control and telemetry data links for missiles, drones or other platforms with disastrous consequences. Deconflicting the electromagnetic environment has therefore evolved into an increasingly critical task.

Rohde&Schwarz spectrum monitoring systems are effective tools for mitigating radio interference. They can troubleshoot friendly transmissions that are disrupted – not intentionally jammed by adversaries – and trace the interference step-by-step back to its source. The wide portfolio of interference hunting tools from Rohde&Schwarz ranges from mobile to transportable and portable systems. They can detect, identify and geolocate co-channel emissions and likewise sporadically active interference.





AREA PROTECTION

The electromagnetic spectrum can be a critical domain at airbases, exercise areas, proving grounds, test ranges and other critical military bases. At such locations, uninterrupted availability of specific frequencies is often a critical factor for full operational capability of sensors, weapons, manned and unmanned platforms. Interference in air traffic communications or disrupted wireless data links can result in a crash or other fatal consequences. Spectrum monitoring has therefore taken on an increasingly higher priority at critical military installations.

Rohde&Schwarz spectrum monitoring systems monitor critical frequency bands 24/7, detecting and geolocating new electromagnetic emissions from inside or outside facilities. An instantaneous alarm feature enables a rapid response to changing situations. With geolocation or directional information, the systems can guide personnel towards the emissions source and potential threat. The systems can also record this data to provide evidence.





**EMCON
REMAIN
UNDETECTABLE**



Friendly forces actively use the EMS for radio communications, navigation, targeting and many other applications. In doing so, they emit electromagnetic waves that can be intercepted and exploited by adversaries. Intercepted emissions can reveal the locations of friendly forces, their intentions and other essential elements of friendly information, putting the mission at risk. Close consideration of unavoidable transmissions and issuing proper emissions control (EMCON) orders are paramount.

Rohde & Schwarz spectrum monitoring systems can deliver reliable information about EMCON discipline by detecting and locating each emission within a defined area. Commanders can ensure that troops are complying with their EMCON orders during exercises and operations. This helps forces to remain undetected by adversaries and reliably accomplish their missions.



SEARCH AND RESCUE

When forward deployed troops call for close air support or medevac, the key information needed to send help is the location of the unit in distress. But military units lost in unknown terrain, injured soldiers, or squads under fire often do not know their exact location. Also, vessels in emergency situations in coastal waters are not always able to include their exact positions in their mayday calls. If rescuers in these situations can obtain a precise location of the caller's radio, it can mean the difference between mission success or failure. It also reduces the risk of time-consuming and dangerous search maneuvers.

Rohde&Schwarz spectrum monitoring systems quickly geolocate the origins of emergency calls. No valuable time is lost to imprecise or missing position reports, allowing rescuers to initiate a focused mission immediately and to reduce risks to themselves and the soldiers in distress. The systems are stationary, mobile, transportable and portable and can significantly increase the survivability of soldiers in distress.





PLATFORMS

Rohde & Schwarz offers military spectrum monitoring systems for any task or environment. It offers stationary, transportable, mobile and portable solutions. Each platform has its own advantages and is typically deployed for specific missions. Rohde & Schwarz also provides integration services either on site or in the company's factories.



Fixed monitoring stations

- ▶ 24/7 spectrum awareness and signal measurement
- ▶ Early detection of irregular emissions
- ▶ Compact, weatherproof and easily installed



Mobile monitoring systems

- ▶ Fast deployment for multi-purpose or specialized missions
- ▶ For spectrum clearance, interference resolution and many other tasks
- ▶ Well integrated for safe and efficient field operations



Transportable monitoring systems

- ▶ Rapid deployment to any site
- ▶ Controllable directly or autonomous 24/7 operations
- ▶ Minimal infrastructure, simple setup, compact, light-weight design, and highly flexible





Portable monitoring equipment

- ▶ Versatile equipment for efficient field operations
- ▶ Tool of choice for diverse measurements, interference resolution and many other tasks
- ▶ Handheld, light-weight, and battery-powered




Control center

- ▶ Direct remote control of spectrum monitoring stations
- ▶ Remote configuration of automatic measurements
- ▶ Evaluation of measurements and report compilations



**TRUSTED PARTNER
THROUGHOUT THE
PROJECT LIFECYCLE
AND IN SERVICE**



Rohde & Schwarz has extensive experience in managing spectrum monitoring system integration. Internal company standards ensuring comprehensive quality management and efficient organizational structure, as well as project teams with many years of experience in spectrum monitoring technologies, provide a strong basis for successful projects.

Training programs prepare customers for spectrum monitoring system operations. The operational training courses combine formal classroom instruction with hands-on training on the systems. Trainers teach well-prepared educational material adapted to the individual knowledge level of the operators.

Once the systems are put into operation, Rohde & Schwarz provides comprehensive lifecycle support and full lifecycle service. This includes software updates and hardware upgrades – e.g. to expand frequency ranges, enhance system functions or extend the number of monitoring stations. Customers benefit from additional training and maintenance services to ensure successful operation of their spectrum monitoring systems over the long term.

Service at Rohde & Schwarz You're in great hands

- ▶ Worldwide
- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

Information Security Management System

ISO/IEC 27001

Certified Quality Management

AQAP-2110

Rohde & Schwarz training

www.training.rohde-schwarz.com

Rohde & Schwarz customer support

www.rohde-schwarz.com/support



R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG

Trade names are trademarks of the owners

PD 3684.1566.32 | Version 02.00 | February 2023 (nk)

Military spectrum monitoring

Data without tolerance limits is not binding | Subject to change

© 2024 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany



3684.1566.32.02.00 PDP/PPDW | en