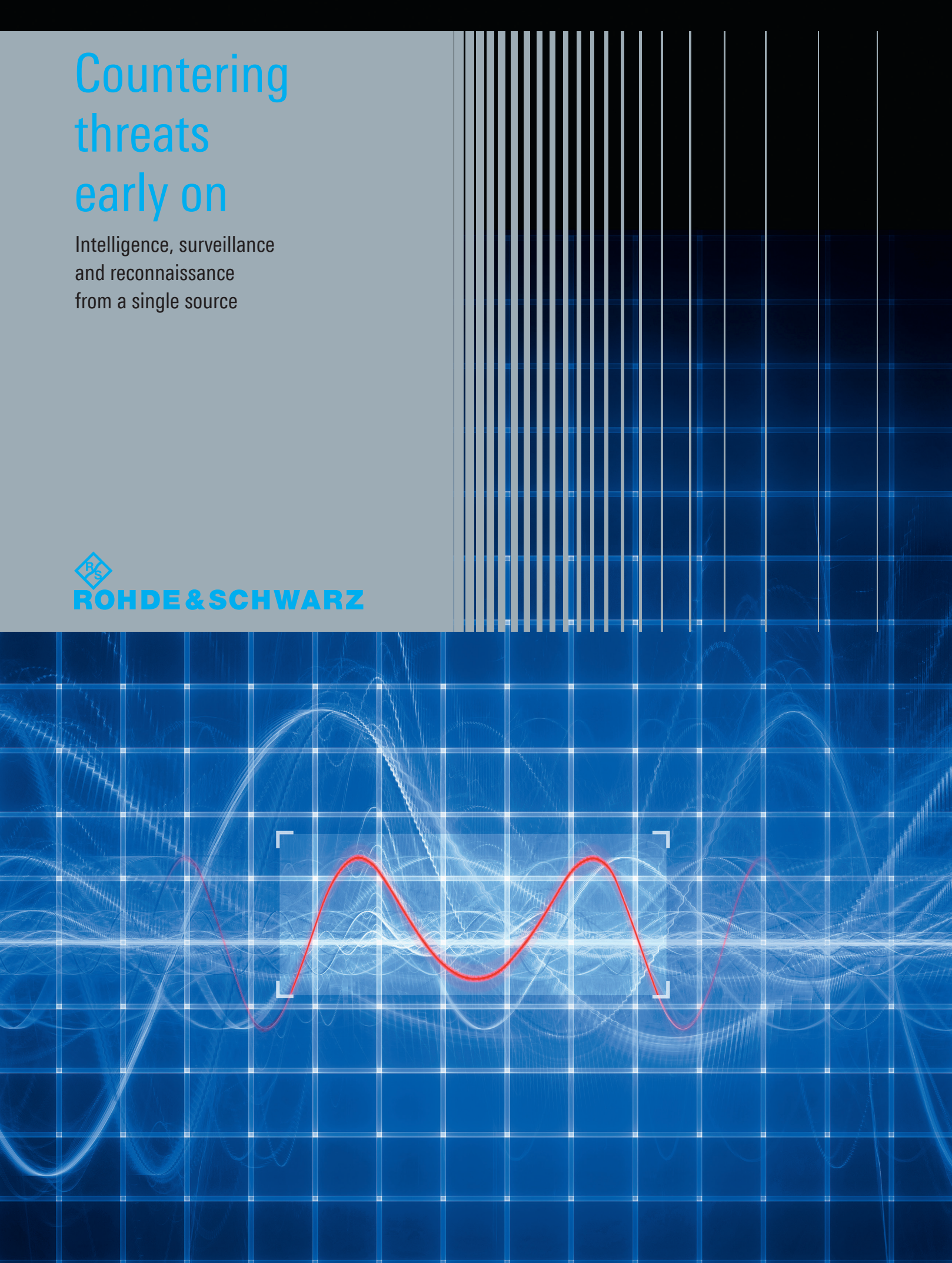


# Countering threats early on

Intelligence, surveillance  
and reconnaissance  
from a single source



**ROHDE & SCHWARZ**





Strategic intelligence systems, early information gathering and preventive crisis management help to avoid conflicts and detect terrorist activities.

Rohde & Schwarz develops, produces and supplies innovative solutions that allow governments to enhance their national security and increase their citizens' safety. The company can provide the one that's right for you.







### Contributing to safety and security

A changing world-political landscape, the increasing diversity of wireless communications and the presence of asymmetric threats are making it more difficult to detect and pursue organized crime and terrorists. Modular concepts and custom-built solutions are required in order to precisely adapt existing monitoring systems to the ever growing number of new communications standards and equipment.

Using a wide range of systems and instruments from Rohde&Schwarz, government agencies and armed forces can speed up the process of gathering information and detecting emitters in the context of crisis management and peacekeeping missions. Users in the fields of homeland and external security, spectrum monitoring and frequency management work with solutions from Rohde&Schwarz.

For customers in defense and security, Rohde&Schwarz is a key partner in radio reconnaissance, intelligence, surveillance, security scanning and cybersecurity. To ensure that they can adequately respond to the challenges they face, the company offers complete signals intelligence (SIGINT) and electronic warfare (EW) systems ranging from sensor technology (antennas, receivers, direction finders, analysis equipment) to software that supports technical and operational evaluation. Everything is available from a single source, including portable receivers, complete antenna systems, outfitting of different platforms and nationwide systems. Rohde&Schwarz customers have successfully deployed these solutions all around the globe.



# Results are what counts

## Facts prepare decisions

In an age of growing threats, information superiority is a key factor for decision makers in governmental and military organizations. In order to gather reliable information, organizations usually exploit more than one information source. Overlapping, correlating and combining data from the different origins confirms results and reduces ambiguities. This improves assessments of situations, delivers more details and allows more targeted responses to situations.

Rohde&Schwarz offers sensor equipment and comprehensive information processing solutions for fusing, correlating and aggregating intelligence data. The SIGINT systems provide different interceptions like pieces of a puzzle. Bringing them together allows timely assessments of situations and threats.

Decision makers in command and control centers rely on the results of analysis solutions from Rohde&Schwarz.

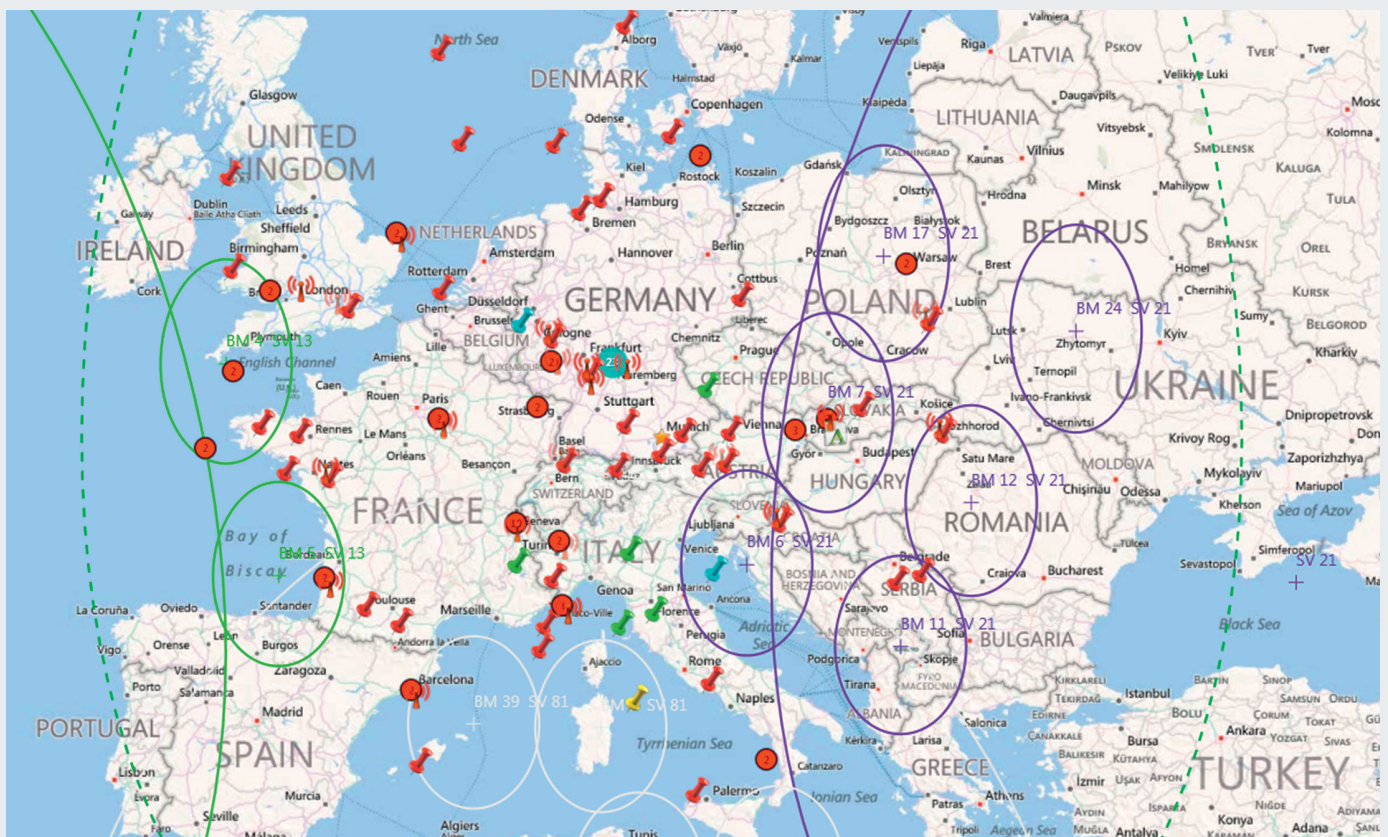




Rohde & Schwarz reconnaissance systems convert intercepted signals to valuable facts. Covering the entire signal path from the antenna to the situation picture, the company's wide product portfolio supports information gathering. These systems are modular and can be integrated into existing C4I network structures. They include the following:

- HF and VHF/UHF reconnaissance
- Satellite monitoring
- Mobile phone monitoring
- Network intelligence and lawful interception

A satellite mobile phone monitoring system displays geographically the intercepted results









# Worldwide intelligence – local action

## Long-range reconnaissance

Discovering occurrences in the world with their related background information is a vital basis for making political and military decisions. Satellite-based as well as HF and strategic COMINT systems play an important role in worldwide intelligence. They allow non-escalating information gathering without geographical limitations, since their deployment does not entail penetration into foreign airspace or territory.

Far-reaching intelligence lays the foundation for considering action in different fields:

- Early recognition of possible threats
- Conflict avoidance
- Political decisions
- Combating terrorism
- Efficient conflict management

Organizations that are a threat to our security are making increasing use of the full scope of modern radio data transmission technologies ranging from HF, VHF/UHF, SHF and SatCom to GSM/UMTS/LTE. Therefore, automated, highly integrated and adaptable multisensor systems must be deployed to ensure interception of valuable data and corresponding provisions.

## Satellite intelligence

Obtaining basic reference data from satellite communications involves interception and automatic filtering of all voice, fax and data channels from visible satellites. Rohde&Schwarz offers efficient solutions for modern satellite communications systems. If necessary, the range that is covered in satellite monitoring can be expanded using remote and transportable sensors.

## Worldwide HF intelligence

Despite increasingly powerful alternatives, HF communications links continue to play an important role due to their wide range of coverage. Typical HF communications problems such as fading and other types of interference can be largely compensated using advanced communications systems, thereby increasing the data rate and security of the transmissions. Multichannel HF monitoring systems from Rohde&Schwarz allow largely automated monitoring without gaps – even when faced with changing operating modes and extremely challenging environments.

## Airborne intelligence

Rohde&Schwarz COMINT systems have already been successfully integrated into aircraft since the end of the 1990s. Airborne platforms offer a major benefit: a wide detection range that is not attainable with other types of systems. Special mission aircraft are able to detect radio traffic in areas not accessible by land-based or sea-based systems. Such systems always require a highly customized, sophisticated design, since they must be tailored for use in different types of aircraft. Integrating the full range of hardware components (antennas, receivers, direction finders and process controllers) presents a major challenge. Our solutions are designed to cope with the large volume of simultaneously intercepted radio signals.



# Experience situational awareness



## Platforms for CESM systems







## Short-range reconnaissance

Despite the wide distribution of mobile phones, conventional VHF and UHF radio services remain in use. New generations of devices make use of modern communications standards with digital transmission modes. These commercially available radios are used also in asymmetric and hybrid warfare and are accordingly targets of reconnaissance operations.

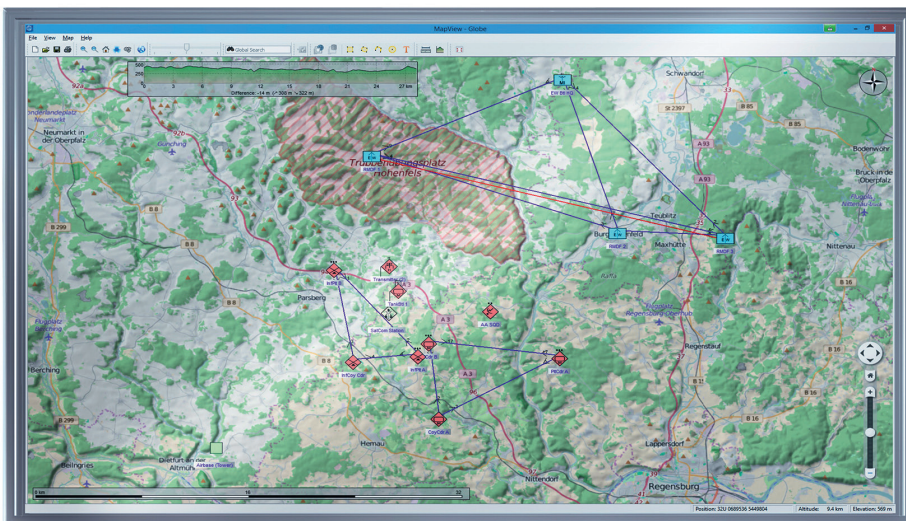
Modern CESM systems for tactical applications, e.g. in peacekeeping or peace-making UN missions involving an asymmetric threat scenario, are deployed for the following tasks:

- ▮ Timely intelligence gathering and compilation of electronic order of battle (EOB) for direct intelligence support in the field, early warning and protection of own forces
- ▮ Monitoring capability for all state-of-the-art communications equipment (combat net radio, mobile phones, etc.)
- ▮ Situation reporting
- ▮ Target identification, correlation and threat assessment
- ▮ Obtaining reference data as a basis for electronic support measures and countermeasures

Rohde & Schwarz integrates SIGINT/EW systems for different applications into a wide variety of platforms. Due to their high mobility and versatile communications means, they support prompt reconnaissance of radio scenarios as well as electronic countermeasures (ECM). The systems can be connected to command/control and evaluation centers.

## Electronic countermeasures (ECM)

The Rohde & Schwarz communications jamming system can be used to selectively jam the most advanced communications systems in the HF/VHF/UHF range. It is available in a variety of customized configurations, and can be integrated into land-, air- and sea-based platforms. The system features a combined wideband detector and exciter, which enables it to jam normal and even state-of-the-art frequency-hopping radiocommunications systems at high hop rates. It can be integrated into a CESM intercept system. The required jamming parameters can be transferred directly from the intercept to the jamming system.



Rohde & Schwarz CESM systems provide tactical situation pictures.



# ELINT goes digital





## Get maximum information from minimum signal

Modern radar systems use new technologies. These demand a new generation of ELINT systems in order to gain situational awareness on the battlefield and protect own forces. Today's platforms operate with multifunction radars that simultaneously operate in different modes.

Many modern radars apply low probability of intercept (LPI) technologies, such as frequency-modulated continuous wave (FMCW) radars. Intercepting and analyzing them requires new capabilities and features. Solid-state radars operate at very low power levels and require high system sensitivity for detecting and processing them.

Rohde&Schwarz ELINT systems provide comprehensive intelligence gathering capability for such modern radar signals. Cutting-edge sensitivity and digital wideband recording preserves all signal properties such as instantaneous amplitude, frequency and phase. This enables in-depth analysis of even complex signals that can be used to regenerate true replicas of the signals and ultimately update reference databases.

The compact sensors can be integrated into airborne, naval and land-based platforms. They not only feature the latest technological advances but incorporate the operational requirements in the supporting workflow. All these facts make Rohde&Schwarz ELINT systems a future-ready asset for situational awareness and protection of own forces.

## Efficiency in complex signal scenarios

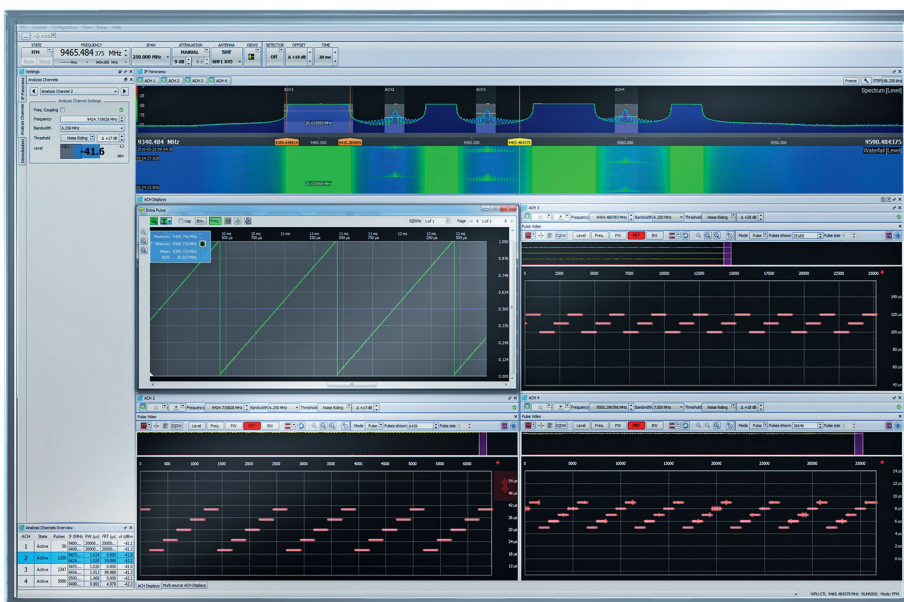
- Rohde&Schwarz ELINT systems integrate search for radar signals, collection and efficient analysis. They allow multichannel operation in dense signal environments, processing advanced pulsed and CW radar signals.

## Highest data quality

- Rohde&Schwarz ELINT systems accurately visualize all radar and pulse parameters. The digital design preserves the frequency and phase characteristics of the recordings. It provides lossless post-processing and high-quality results.

## Future-ready system design

- Rohde&Schwarz radar signal collection and analysis systems are fully digital and scalable. They can be designed for single operators as well as nationwide systems, and allow remote control of unattended or detached collection sites. Thanks to their open interfaces, they can be integrated into existing signal intelligence systems.



The system displays four FMCW radar signals and three airborne intercept radar signals in the spectrum.



# Ensuring homeland security







## Advanced monitoring and surveillance solutions

Many nations put high priority on security against terrorist attacks and other threats. To protect their population and infrastructure, they count on communications surveillance and intelligence systems from Rohde&Schwarz. These systems provide law enforcement authorities with valuable information about illegal activities.

### Border surveillance

At international boundaries radio surveillance systems can find and track suspects, provide indications of forthcoming illegal activities and detect and locate specific targets. By exploiting the electromagnetic environment, the automated radiomonitoring systems help to secure borders and coastlines.

### Mobile phone monitoring

Law enforcement authorities rely on mobile phone monitoring systems from Rohde&Schwarz. The systems allow surveillance tasks, data collection and target-oriented operations. They work actively or passively, and include features that even detect abnormalities in cellular phone networks.

### Drone defense

Commercially available drones have become widely used, sometimes also abusively. Rohde&Schwarz drone defense systems reliably detect, identify and counter these threats without interfering other radio services in the neighborhoods.

### Network intelligence

Worldwide communications increasingly run via the Internet. This is why authorities gather targets' cyberdata. The Rohde&Schwarz network intelligence solutions recognize different types of IP traffic, analyze protocols and extract metadata as well as content.

## Security in places of public life (borders, critical infrastructure, public transport and traffic)





# Focus on public safety

## Protection and threat prevention

Security in any country is subject to diverse threats and hazards. Rohde&Schwarz radiomonitoring systems support authorities in charge of internal security in many different ways. Both the components and the systems are built for users' specific needs.

## Securing critical infrastructure

Radiomonitoring systems maintain efficient 24/7 radio surveillance well beyond the perimeter. The compact units detect suspicious emissions and warn about evolving threats before these come within the security forces' operating range. The systems can locate potential intruders and create time to counteract.





### Large-scale event monitoring

When organizing large-scale events, responsible bodies minimize the risk of unwanted incidents caused by electromagnetic interferences. To do so, they search for abnormal emissions in the vicinity before and during the event.



### ATC and VTS

Air traffic direction finders not only secure the aircraft activities around airfields but also allow traffic to be safely routed. They locate aircraft while their pilots send radio messages. Vessel traffic direction finders from Rohde&Schwarz can locate emitters on all maritime radio channels, including the distress channel in parallel.

### Search and rescue (SAR)

Vessel traffic direction finders locate mariners in distress, thus reducing the need for time-consuming search maneuvers and increasing survivability. Also on land, in remote or disaster areas, Rohde&Schwarz systems support SAR missions by detecting and locating mobile phones.

### Interference hunting

Rohde&Schwarz offers a comprehensive portfolio of devices and systems for mitigating interference. Fixed, mobile, transportable and portable radiomonitoring and direction finding tools are the basis for reliable wireless communications.

### Security scanning

Deployed at security checkpoints in airports and other public locations or events with high threat potential, Rohde&Schwarz security scanners increase safety dramatically. They detect unauthorized objects and prevent them from being taken on board an aircraft or other location behind the checkpoint.

The R&S®UMS300 compact monitoring and radiolocation system with R&S®HE600 active omnidirectional receiving antenna.







cybersecurity



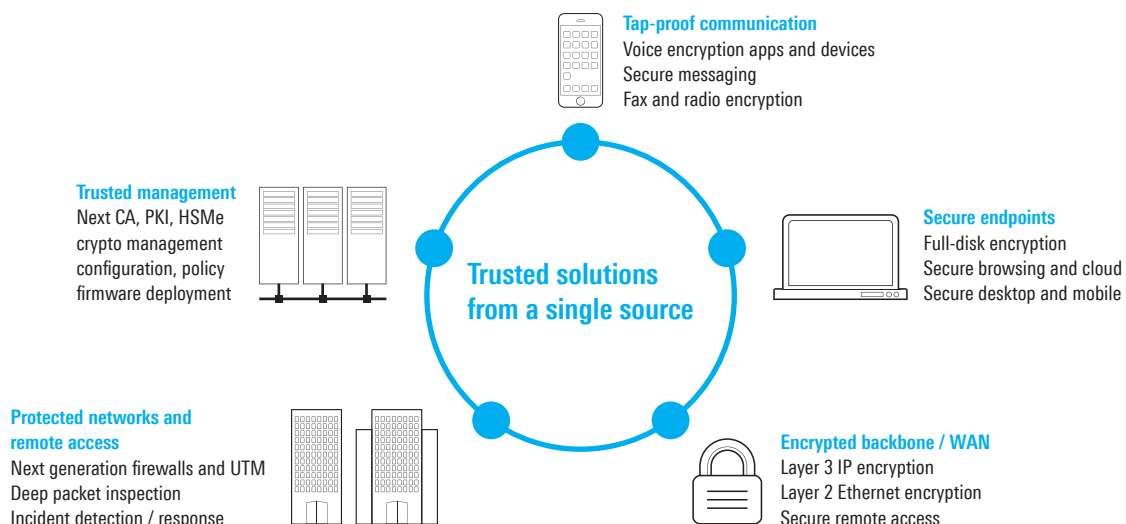
# Protecting critical communications infrastructure

## Cybersecurity

Rohde&Schwarz Cybersecurity protects companies and public institutions worldwide against espionage and cyberattacks. The company develops and produces high-end encryption products, next generation firewalls, network traffic analytics and endpoint security software as leading-edge technical solutions for information and network security requirements. The award-winning “made in Germany” IT security solutions range from compact all-in-one products to bespoke solutions for critical infrastructures.

The development of trustworthy IT solutions is founded on the “security by design” principle, which proactively prevents cyberattacks rather than reacting to a known threat. This radically new approach even protects against complex attacks that, for example, use zero-day exploits to expose the weaknesses of current antivirus software and traditional firewalls.

## Comprehensive cybersecurity product and system portfolio

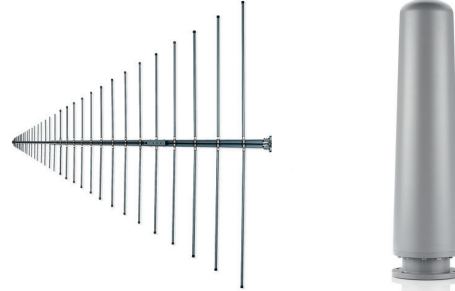




# Wide product range and turnkey systems

## Antennas

The Rohde & Schwarz antenna portfolio encompasses a wide range of highly sensitive active and passive broadband units. They are optimized for mobile and stationary use, providing complete coverage of the frequency range from 100 Hz to 40 GHz.



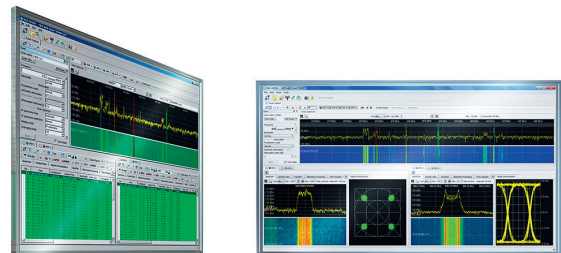
## Monitoring receivers

The range of Rohde & Schwarz monitoring receivers comprises powerful units for portable, mobile and fixed applications up to the high-end units for broadband and multichannel signal detection, classification and surveillance. They range from 8 kHz to 26.5 GHz and even up to 100 GHz using frequency converters. Rohde & Schwarz radar receivers cover the range from 8 kHz to 40 GHz.



## Signal analysis

Rohde & Schwarz signal analysis software allows automatic multichannel signal processing, significantly increasing the efficiency in reconnaissance operations. With extensive demodulator and decoder libraries the software provides signal contents and allows interactive analysis. Further products include wideband recording devices, bitstream and radar signal analysis software.



## Direction finders

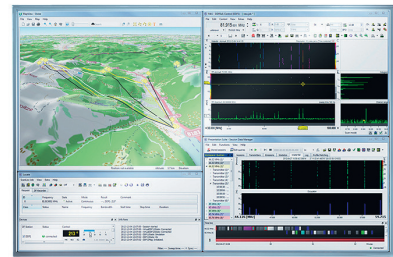
The large Rohde & Schwarz family of direction finders ranges from portable instruments to high-speed scanning direction finders and covers all DF and radiolocation applications, covering the frequency range from 300 kHz to 8.2 GHz for communications and to 18 GHz for radar signals. The direction finding antenna's innovative active/passive switchover capabilities make it possible to adapt operations to practically any signal environment.





## System software

The R&S®RAMON system software suite is used as core component in advanced and highly automated systems for communications and electronic intelligence. It covers a broad scope of functions from mission planning, device control and presentation of intercept results to communications traffic evaluation and reporting. The modular software allows configurations ranging from compact single-operator units to large and hierarchically structured multi-user systems.



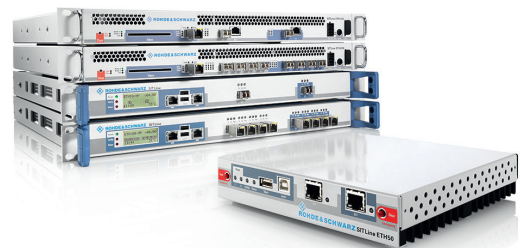
## Satellite monitoring systems

The Rohde&Schwarz satellite monitoring system portfolio ranges from compact, transportable units to scalable strategic monitoring solutions for mobile satellite systems (MSS) and fixed satellite systems (FSS/VSAT). The standards include Thuraya, Inmarsat III/IV/IsatPhone Pro/ACeS/IsatPhone, Iridium and a wide range of FSS/VSAT systems based on TDM, DVB-S, S2 and more.



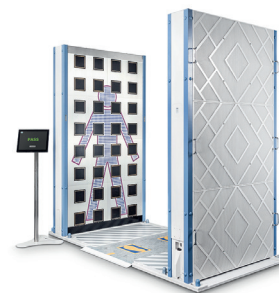
## Cybersecurity

Rohde&Schwarz IP analysis products and solutions make it possible to examine data streams continuously and in realtime. Based on Rohde&Schwarz next generation IP analysis software, our cybersecurity product range can provide deep insights into IP-based network traffic by identifying thousands of services, applications and even application attributes.



## Security scanners

Rohde&Schwarz millimeter-wave full-body scanners automatically detect potentially dangerous items carried hidden on the body. The systems reliably detect not only all metal objects but also, independent from their substance, items made of ceramic or plastic and even liquids.



## Turnkey tailored systems

Depending on the customer requirements, Rohde&Schwarz configures individually scalable reconnaissance and intelligence systems. Due to the numerous open (and documented) interfaces, the (sub)systems can also be integrated or connected to other systems. Along with the procurement process, Rohde&Schwarz provides a broad portfolio of project-relevant services ranging from installation right up to trainings. Even when a system has been in service for years, Rohde&Schwarz provides lifecycle support as a basis for its long-term successful operation.



# A strong partner

- For over 80 years, Rohde&Schwarz has stood for quality and innovation in the fields of test and measurement, broadcasting, secure communications and radiomonitoring and radiolocation. The company has developed and manufactured equipment for detecting, locating and analyzing radio signals for seven decades.
- With about 9900 employees, we generated a net revenue of more than EUR 1.8 billion in fiscal year 2014/2015. Our sales and service network in more than 70 countries around the globe ensures the necessary customer proximity. The Rohde&Schwarz export share is about 80 %. Some 15 % of our annual turnover flows back into research and development. In order to maintain our high quality standards, nearly the entire value chain is covered in-house.

These factors set us apart:

- Comprehensive portfolio:  
C4I-capable SIGINT solutions, from individual components to nationwide systems
- In-house development and production:  
turnkey solutions designed to budget
- Prime contractor or team player,  
depending on customer requirements
- Perfect system integration







  
**ROHDE & SCHWARZ**



# Service, logistics and support

For users, the operational readiness and availability of their outstanding radiomonitoring and radiolocation products are of central importance. Rohde&Schwarz has a global service, logistics and support network with subsidiaries and offices in more than 70 countries to provide local, on-site customer care.

Rohde&Schwarz offers customers flexible, individually tailored service packages spanning a product's entire lifecycle and operating life to ensure maximum system availability at minimum cost. Services include:

- Definition and optimization of maintenance concepts aligned to customer-specific requirements
- Spare parts service including inventory quantity proposal and optimization of inventory locations
- Detailed system and equipment documentation
- Spare parts data and catalogs
- User and maintenance training
- Computer-based training (CBT)
- On-site repair, calibration and customer support services
- Support and test equipment (S&TE)
- Configuration and obsolescence management





Rohde&Schwarz has considerable experience in these areas of logistics and can adapt its services flexibly to meet specific customer requirements and deliver optimized support. Customers benefit from maximum system availability at minimum cost.

**The Rohde&Schwarz advantage:**

- Long-term trusted partnerships
- Outstanding radiomonitoring and radiolocation products featuring high reliability and high availability
- Transparent, low lifecycle costs and logistics costs





## Service that adds value

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

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