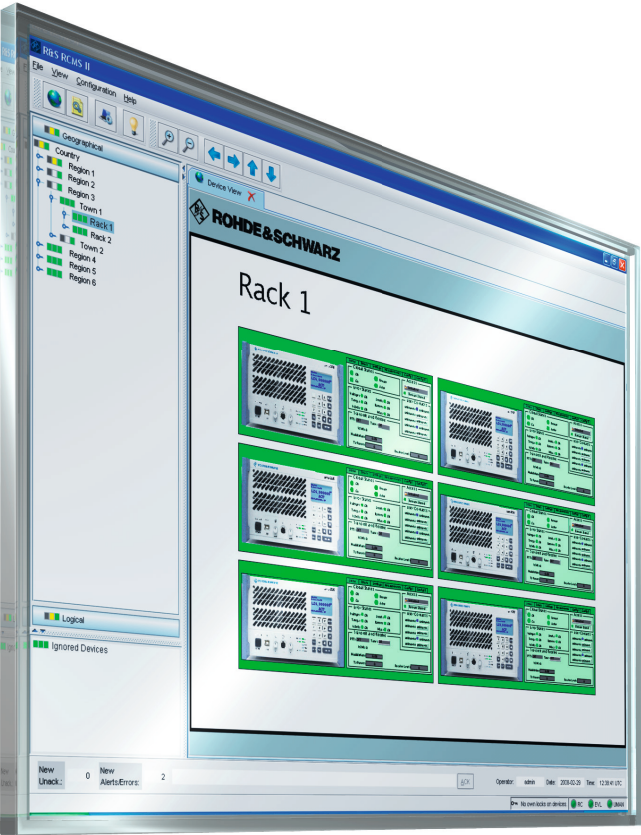


# R&S®RCMS II

## Remote Control & Monitoring System

### For ATC and air defense applications



# R&S®RCMS II

## Remote Control & Monitoring System

### At a glance

R&S®RCMS II is a software solution for monitoring the complete communications chain from the controller working position to the radio and for remote control of Rohde & Schwarz radios.

R&S®RCMS II enables operators of air traffic control (ATC) systems and air defense (AD) systems to monitor Rohde & Schwarz radios, R&S®VCS-4G devices and other SNMP-capable components from one or more locations. Remote control of Rohde & Schwarz radios is also supported. This allows a cost-effective quick response to error conditions and provides the ability to set operational parameters for various ATC/AD scenarios.

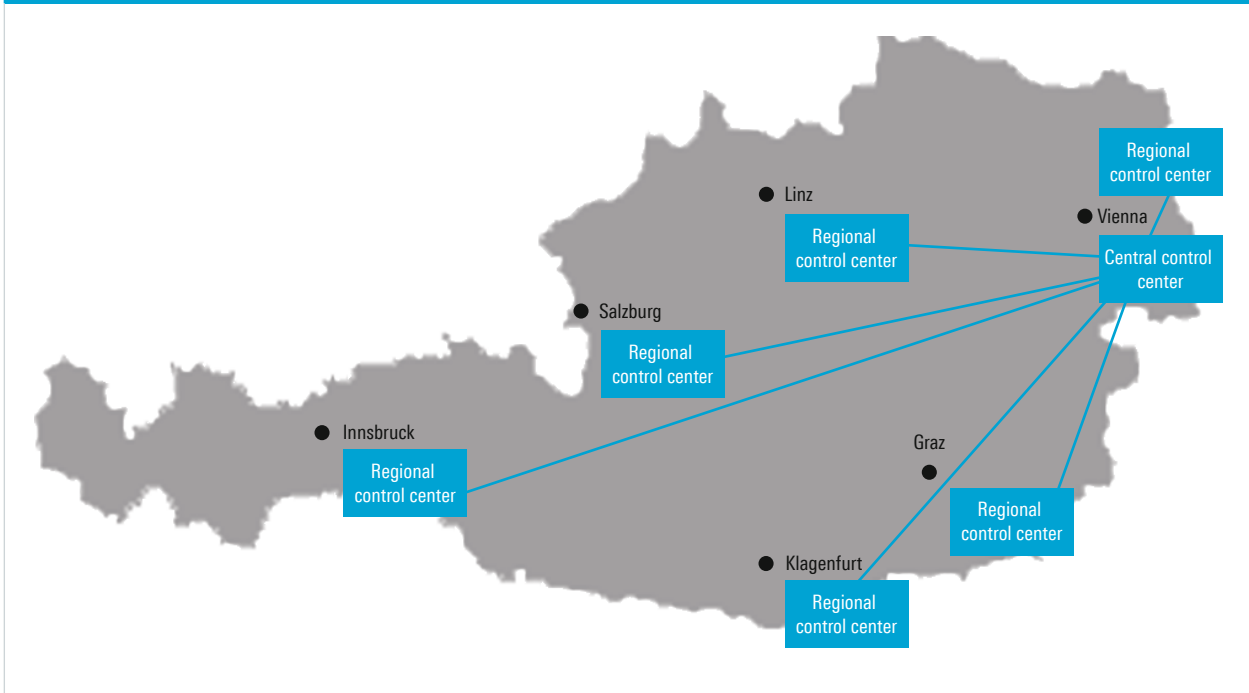
R&S®RCMS II is designed for monitoring scenarios ranging from individual airports to countrywide radiocommunications systems. The monitored and controlled devices are shown in both a tree view and a map view. The map view shows the location and basic configuration of each device. Individual devices can be selected and managed quickly and easily. The system data is recorded for customer-specific statistical analysis using third-party applications.

The R&S®RCMS II software can easily be configured for customer-specific ATC/AD systems. By using off-the-shelf computer hardware and existing network infrastructure, the required capital expenditures and operational costs can be kept to a minimum. With R&S®RCMS II, it is quick and easy to integrate completely new sites or add to-be-monitored devices to expand an existing site.

#### Key facts

- Monitoring of the complete communications chain from controller working position to the radio
- No additional hardware required for monitoring and controlling radios at the individual sites
- Support for Rohde & Schwarz radios with EPM (ECCM) capabilities for military applications
- Redundant system for continuous monitoring and control
- Overall status report sent to higher-level monitoring system via SNMP
- Complete situational overview of the radio sites through monitoring of SNMP-capable devices

#### Countrywide R&S®RCMS II in Austria (AustroControl)



# R&S®RCMS II

## Remote Control & Monitoring System

### Benefits and key features

#### **Optimum operational efficiency**

- ▮ Remote monitoring of radios and R&S®VCS-4G devices
- ▮ Remote control of radios

▷ [page 4](#)

#### **Wide range of analysis features**

- ▮ Recording and analysis of system events
- ▮ Data stored for customer-specific statistical analysis

▷ [page 5](#)

#### **Customized system solutions**

- ▮ High level of scalability
- ▮ Expandability of existing R&S®RCMS II systems

▷ [page 6](#)

#### **State-of-the-art technology with off-the-shelf hardware**

- ▮ Windows platform
- ▮ IP technology
- ▮ Time synchronization via network time protocol (NTP)

▷ [page 7](#)

#### **Secure and reliable operation**

- ▮ Flexible user management
- ▮ High availability

▷ [page 8](#)

#### **Interoperation with other components in the ATC/AD system**

- ▮ Integration of SNMP-capable devices
- ▮ Status information for higher-level monitoring center

▷ [page 9](#)

# Optimum operational efficiency

## Remote monitoring of radios and R&S®VCS-4G devices

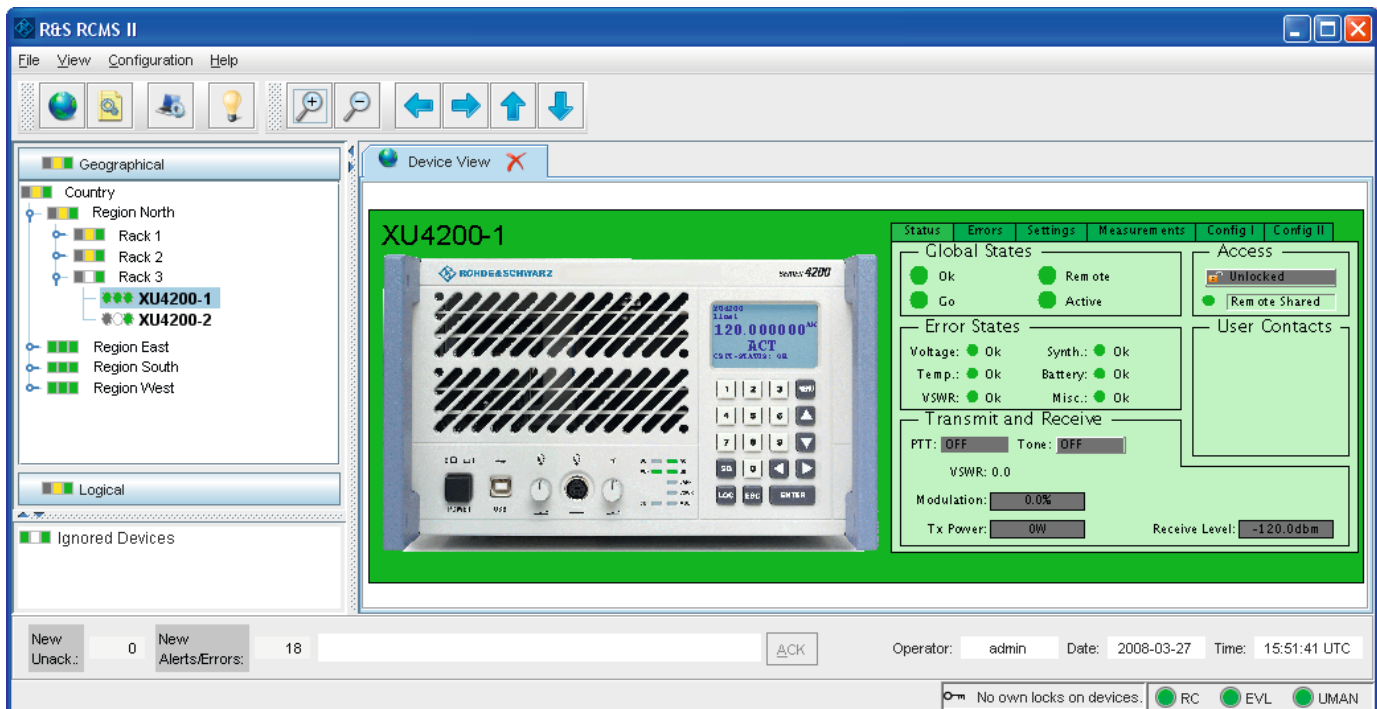
R&S®RCMS II enables comprehensive monitoring of Rohde&Schwarz radios and R&S®VCS-4G voice communications system, including all relevant operational parameters of the individual devices. The easy-to-use graphical user interface provides an overview of the entire communications system as well as information regarding the status of each individual device.

Information about each device is displayed on the screen with specific colors to indicate the status of the link and the device itself. The user-friendly interface makes it easy to navigate between a countrywide overview of the system and detailed information about each individual device, including its parameters and status. In this way, details can quickly be determined regarding the status of individual modules, error messages and current settings.

## Remote control of radios

Using R&S®RCMS II, radio parameters can easily be set and/or changed in order to adapt the radio system to current operational needs. This can be accomplished from one or more locations. In addition to monitoring, the radios can also be managed without any interruption of the monitoring activities in progress.

Standard RCMS configuration for the R&S®Series4200.



# Wide range of analysis features

## Recording and analysis of system events

The R&S®RCMS II remote control & monitoring system stores all system events for the devices being monitored in a database. In addition to error messages and warnings, information such as user login or logout is also stored. This information is displayed in tabular form and can be filtered according to various criteria such as time frame, message type, message code or device name. As a result, the history of an individual device or the entire system can be tracked at any time.

## Data stored for customer-specific statistical analysis

R&S®RCMS II stores the incoming status messages from the devices being monitored in a database and can export them for external analysis. The customer can use this data for carrying out further analysis such as determining the frequency of errors.

Extended RCMS configuration for the R&S®M3SR Series 4400.

The screenshot displays the 'Radio 'XT4410M' - XT44x0M-SECOS\_2\_12 - ONLINE' window. The interface is divided into several sections:

- Operation:** Includes 'OP Mode' set to 'FF', an 'ECCM Erase...' button, and a 'Radio Status' indicator (green dot).
- Transmit:** Features a 'PTT' button, 'Tone' button, and 'VSWR: 1.0'.
- Receive:** Includes an 'Emerg.' button, a 'Squelch' indicator (green dot), and a '-120dBm' level.
- Fixed Frequency Table:** A table with columns for PP, Def. OP Mode, TX-Freq. [MHz], RX-Freq. [MHz], Spacing [kHz], TX-Offset [kHz], TX-PWR, MOD, and CommMode. It lists three preset pages (0, 1, 2) with their respective frequencies and settings.
- FF PresetPage Settings:** Shows detailed settings for the selected preset page (N), including Modulation (AM), Type (HALFDUPLEX), CommMode (V/D UNCP), TX Frequency (140.150000 MHz), RX Frequency (130.150000 MHz), Spacing (25.00 kHz), TX Power (HIGH), and Offset (OFF).
- Operational Settings:** Includes checkboxes for AGC, Clipper, and Squelch, and a TX Power dropdown set to HIGH.
- Bottom Panel:** Contains 'PresetPage Selection' (Single, Group, All), 'PresetPage(s)' (Program, Activate, Clear, Undo), 'Device' (Lock, BIT...), 'Additional Setti...' (Extended...), and 'Help'/'Exit' buttons.

The status bar at the bottom indicates 'ONLINE' and 'Not locked REMOTE SHARED'.

# Customized system solutions

## High level of scalability

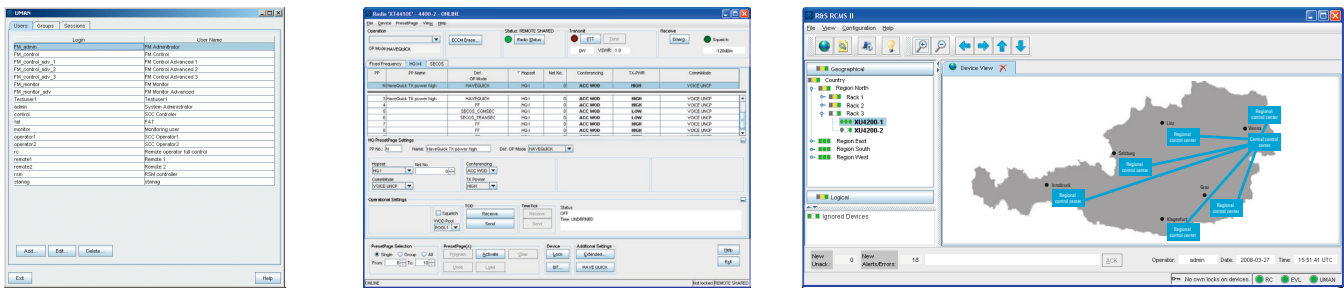
R&S®RCMS II is based on a client/server architecture. The system can be sized to support a single airport, a region or an entire country in accordance with the customer's requirements.

The client/server architecture permits the operation of systems distributed across various locations. An example of this would be an R&S®RCMS II server at a central location, workstations at regional centers and radios at remote sites.

## Expandability of existing R&S®RCMS II systems

R&S®RCMS II can easily be adapted when civil and military air traffic control operators need to expand their communications systems. Radios at a new site can be added to an existing R&S®RCMS II system cost-effectively. R&S®Series4200, R&S®M3SR Series4400, R&S®M3SR Series4100 radios and R&S®VCS-4G devices can be connected directly to existing IP infrastructure without requiring additional hardware.

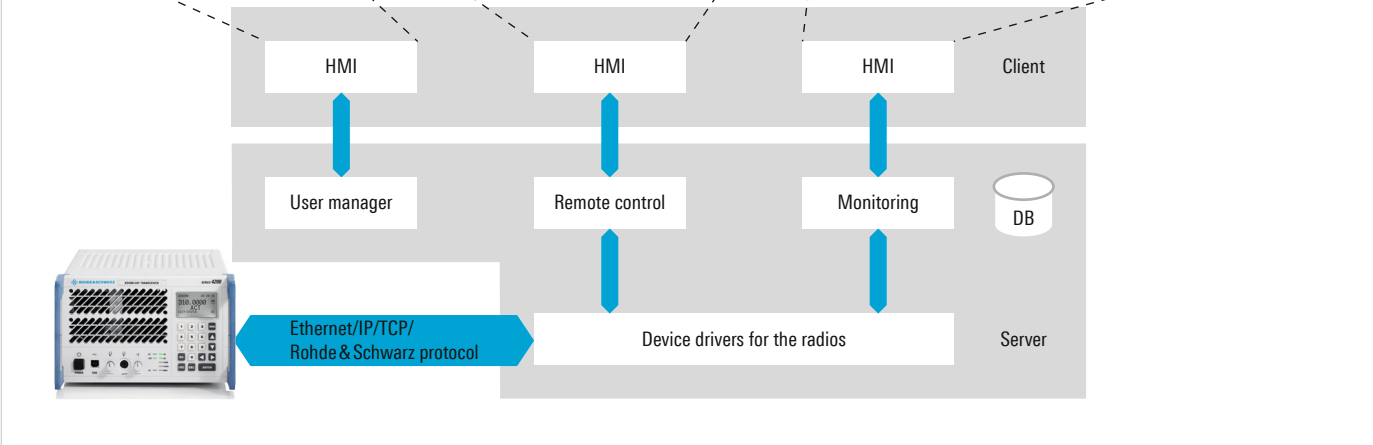
## Various applications using the R&S®RCMS II architecture



User manager

Remote control

Monitoring



# State-of-the-art technology with off-the-shelf hardware

## Windows platform

R&S®RCMS II uses off-the-shelf computer hardware running Windows 7 Professional.

## IP technology

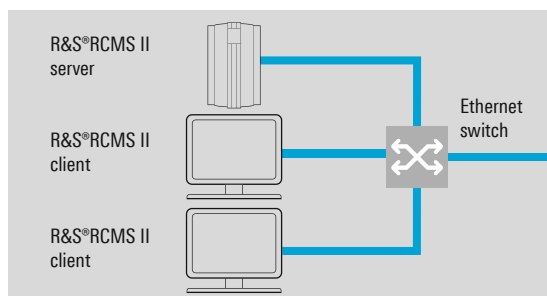
R&S®RCMS II uses IP technology. Communications between R&S®RCMS II workstations, servers and monitored devices are handled via IPv4. IPv6 is also fully supported by R&S®RCMS II. The existing LAN/WAN infrastructure can be used if it meets the requirements of R&S®RCMS II.

## Time synchronization via network time protocol (NTP)

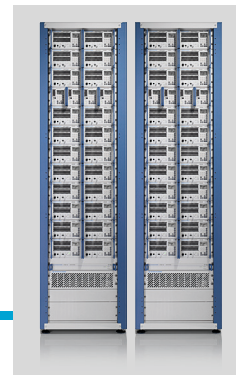
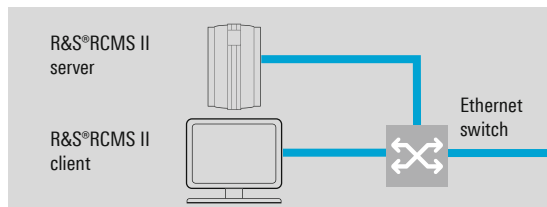
The system time on the R&S®RCMS II server can be synchronized with the central time provisioning system by means of NTP. In this way, events in the R&S®RCMS II database will have a precise timestamp and can be compared with other events in the communications system much more conveniently.

## Connecting the radio sites using IP technology

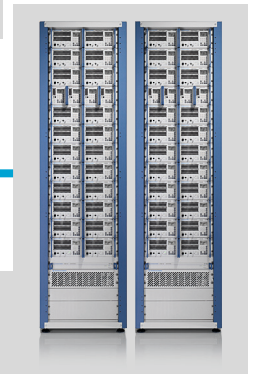
### Central control and maintenance center



### Regional control and maintenance center



Radio sites





# Secure and reliable operation

## Flexible user management

The user management features facilitate the assigning of access rights. Authorizations for monitoring and/or controlling the radios/devices can be assigned with various user levels. System administrators can revise existing authorizations and create new users and user groups. The system administrator can also load customer-specific alarm/warning sounds via the R&S®RCMS II system. Each user can then define individually the duration of the sound in case of an alarm or warning.

## High availability

Voice and data transmission remains unaffected in the event that the R&S®RCMS II system is not available. It is possible to increase system availability for monitoring and controlling R&S®Series4200, R&S®M3SR Series4400 and R&S®M3SR Series4100 radios and for monitoring of R&S®VCS-4G devices by expanding R&S®RCMS II to include a secondary server. The secondary server can be used for monitoring and control activities in case the primary server fails.

Standard RCMS configuration for the R&S®VCS-4G controller working position (CWP) processing unit.

The screenshot displays the R&S RCMS II RCMSII Server interface. The left sidebar shows a hierarchical tree structure of the system configuration, including Lab R:21, Test Lab R:21, Cabinet 1 R:10, and Cabinet 2 R:9. The main area shows a 'Device View' of a 'CWP\_1' unit. The interface includes a status panel on the right with sections for Global Status (Ok), Error States (Bonding, CCTL: Running, Misc: Ok), CWP (User, Mission), and SIP (# SIP Sessions: 0). The bottom status bar shows the Operator as 'admin', Date as '2014-04-16', Time as '17:35:07 UTC', and a 'No own locks on devices' indicator.



# Interoperation with other components in the ATC/AD system

## Integration of SNMP-capable devices

SNMP-capable devices from other manufacturers can be monitored with R&S®RCMS II as long as the device has a suitable SNMP MIB. Furthermore, off-the-shelf SNMP-capable sensors can also be integrated and monitored. Using a single monitoring system saves both time and money.

## Status information for higher-level monitoring center

The role of a central monitoring center is to collect and display an overview of the status information for all applications and active devices within an ATC/AD system. R&S®RCMS II supports this by sending a status summary for the communications system to the central monitoring center via SNMP. The details and the status of the individual devices are available in the R&S®RCMS II system.

ATC applications using R&S®M3SRSeries4400 and R&S®Series4200 radios.



# R&S®RCMS II

## System configuration

The number of workstations, servers, radios, radio sites, R&S®VCS-4G and SNMP-capable devices in the R&S®RCMS II system is easily scalable. Small, mid-sized and countrywide communications systems can be supported by means of various configurations:

- Single server solution for small and mid-sized communications systems
- MultiServer solution for large-scale communications systems with central monitoring center

### Single server solution for small and mid-sized radio systems

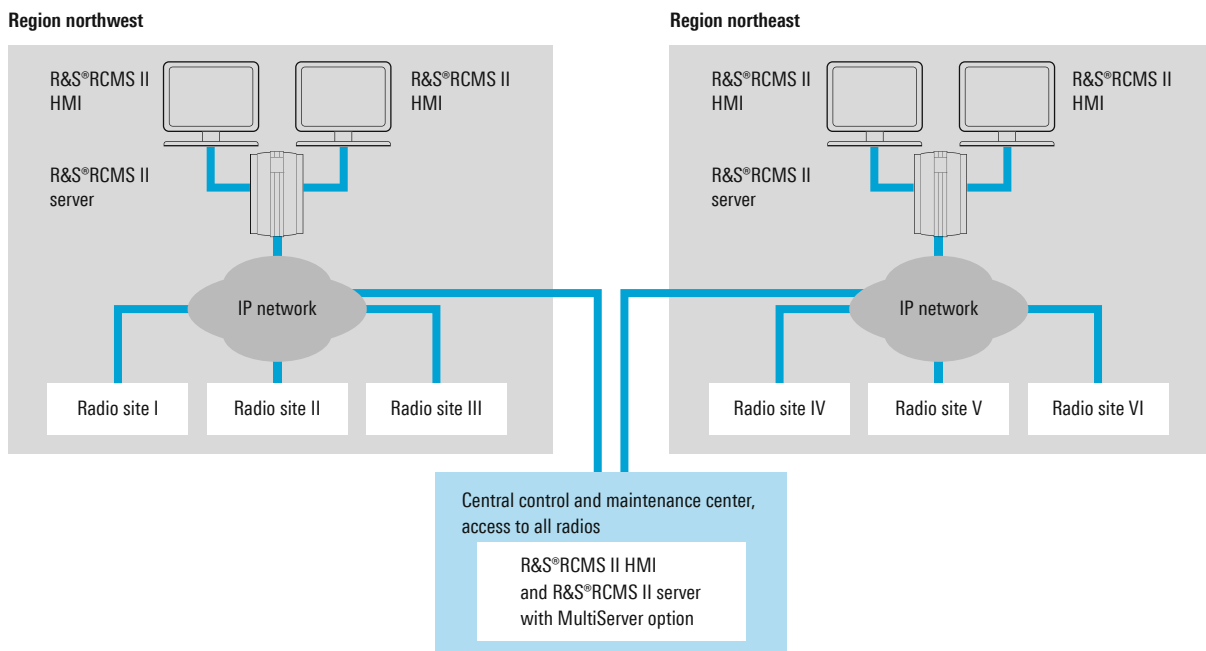
The R&S®RCMS II single server solution operates on a single desktop or laptop on which the server applications and the graphical user interface are installed. In this way, a small radio system for a single airport can be implemented cost-effectively using just one off-the-shelf desktop or laptop.

Moreover, additional R&S®RCMS II workstations can be connected to the R&S®RCMS II server via IP to enable the simultaneous monitoring and operation of the radios by several users, even from multiple locations.

### MultiServer solution for large-scale communications systems with central monitoring center

Large-scale countrywide ATC and air defense operators often establish regional structures for their communications systems in the form of regional management centers. A regional center is responsible for a specific region and operates autonomously with its own R&S®RCMS II server and multiple workstations. Additionally, the overall status of the devices in the regions can be monitored from a central location. In this case, the monitoring activities are handled by an additional R&S®RCMS II server with MultiServer option in the central maintenance center, retrieving summarized device status information from each regional R&S®RCMS II server.

#### Example of MultiServer solution



# R&S®RCMS II

## Supported radios

R&S®RCMS II supports R&S®Series4200<sup>1)</sup>, R&S®M3SR Series4400, R&S®M3SR Series4100, R&S®Series2000<sup>2)</sup> and R&S®Series200<sup>3)</sup> radios. R&S®Series400U<sup>2)</sup> radios can be integrated into the R&S®RCMS II system upon request.

The R&S®RCMS II data sheet contains a list of all parameters that can be monitored and controlled for each of the Rohde&Schwarz radio types supported.

- <sup>1)</sup> Including n+m redundancy via R&S®GV4000 model .31, .32 or .33.
- <sup>2)</sup> For radios that do not support monitoring and control via IP, the radio site must provide a converter from Ethernet to the radio interface. Radios with an RS-232 interface can only be monitored and controlled from a single system.
- <sup>3)</sup> The following types of R&S®Series200 radios are supported via R&S®GV4000 model .03: R&S®EU231, R&S®SU251, R&S®XU251, R&S®XU221\*, R&S®XD231, R&S®EU230, R&S®SU250, R&S®XU250A, R&S®XU251 MS, R&S®EU230 MS, R&S®SU250 MS\*, R&S®EU231 MS, R&S®SU251 MS and R&S®XU221 MS\*. For radio types marked with "\*" additional release tests have to be planned on a customer-specific project basis.



# R&S®RCMS II

## Platform requirements

The hardware requirements for the R&S®RCMS II server and workstations depend on the number of devices to be monitored and/or controlled by each server. The following example illustrates the hardware configuration for one R&S®RCMS II server and workstation for monitoring and controlling a mid-sized communications system.

### Server

- Intel Core 2 Quad core 2.4 GHz processor, 3 Gbyte RAM, > 100 Gbyte HDD, CD-ROM, mouse with scroll wheel, keyboard, USB interface, 100 Mbit/s Ethernet interface, 19" monitor
- Operating system: Windows 7 Professional (64 bit), English or German

### Workstation

- Intel Core 2 Dual core 3.0 GHz processor, 3 Gbyte RAM, 20 Gbyte HDD, CD-ROM, mouse with scroll wheel, keyboard, 100 Mbit/s Ethernet interface, 19" monitor
- Operating system: Windows 7 Professional (64 bit), English or German

The hardware will be scaled according to the size of the communications system to be monitored.



# R&S®RCMS II

## Application scenarios

### Scenario 1: Failure of a radio at an airport

One of the radios at an airport with separate transmitter and receiver locations has exhibited a fault. The corresponding standby radio was activated automatically and is now in operation. R&S®RCMS II registers the event and displays it on the R&S®RCMS II workstation in the management center. By selecting the radio with the fault, more detailed information about the fault is shown, such as temperature, voltage and VSWR. Upon command, R&S®RCMS II instructs the radios to carry out a built-in test, which will then provide additional information about the fault condition. This information is forwarded to the maintenance center where the appropriate repair measures are initiated.

### Scenario 2: Countrywide ATC system with multilevel monitoring

R&S®VCS-4G devices and radios at various locations around the country are monitored by regional ATC centers throughout the day. At night, when traffic volumes are low, communications activities are monitored from a central location. R&S®RCMS II monitors all the R&S®VCS-4G devices and radios at night from this central location as well.

### Scenario 3: Changing radio parameters for an air defense application

A military operation requires changing the frequencies and modes of operations used for each mission. For a new mission, a predefined mission parameter set is selected. Upon command, R&S®RCMS II in the control center activates the mission parameter set (preset page) in the ground radios at the remote sites.

R&S®M3SR Series4400 in operation in an R&S®MX400 mobile tower.



# Software options

Options	Description
The R&S®RCMS II software is available as a basic package with additional software options.	
Standard RCMS (basic package)	Complete monitoring and basic control functionality for Rohde&Schwarz radios. The supported parameters depend on the types of radio used. <sup>1)</sup>
Extended RCMS	Complete remote control functionality for R&S®M3SR Series4400, R&S®M3SR Series4100 and R&S®Series2000 radios, including EPM (ECCM) parameters. The supported parameters depend on the types of radio used. <sup>1)</sup>
MultiServer RCMS	Supervision of multiple regional Standard RCMS servers and connected radios (summarized status information).
Remote Firmware Upload for R&S®Series4200	Remote firmware upload for one or more R&S®Series4200 radios in parallel
Additional R&S®RCMS II client software	Software licenses for additional R&S®RCMS II workstations.
Licenses for radios	In order for the R&S®RCMS II system to support various Rohde&Schwarz radios, the corresponding license for each radio is required.
License for R&S®VCS-4G devices	In order for the R&S®RCMS II system to support R&S®VCS-4G devices, one license for each device is required.
License for SNMP-capable devices	In order for the R&S®RCMS II system to support multiple SNMP-capable devices, one license per R&S®RCMS II server is required.
R&S®RCMS II status information via SNMP	Communications of status information for all radios being monitored by an R&S®RCMS II server to a primary monitoring system.

<sup>1)</sup> The R&S®RCMS II data sheet contains a list of all parameters that can be monitored and controlled for every supported Rohde&Schwarz radio.

The radio systems described are hardware- and software-configurable. The system delivered has the configuration as confirmed in the order.

# Product overview

Designation	Type
<b>Basic software</b>	
Standard RCMS Server Software with one client license <ul style="list-style-type: none"> <li>▮ Fault management and remote control</li> <li>▮ For R&amp;S®Series4200, R&amp;S®M3SR Series4100, R&amp;S®M3SR Series4400, R&amp;S®Series2000 and R&amp;S®Series200</li> </ul>	R&S®DS3800
<b>Software options ("Extended RCMS" functionality for the basic software package)</b>	
Extended RCMS Server Software for one Standard RCMS server <ul style="list-style-type: none"> <li>▮ Enhanced remote control for fixed frequency</li> <li>▮ For R&amp;S®M3SR Series4100, R&amp;S®M3SR Series4400 and R&amp;S®Series2000</li> </ul>	R&S®DS3801
Extended RCMS Server Software for one Standard RCMS server <ul style="list-style-type: none"> <li>▮ Enhanced remote control for fixed frequency and R&amp;S®SECOS waveform</li> <li>▮ For R&amp;S®M3SR Series4400</li> </ul>	R&S®DS3802
Extended RCMS Server Software for one Standard RCMS server <ul style="list-style-type: none"> <li>▮ Enhanced remote control for fixed frequency and HAVE QUICK I/II waveform</li> <li>▮ For R&amp;S®M3SR Series4400</li> </ul>	R&S®DS3803
Extended RCMS Server Software for one Standard RCMS server <ul style="list-style-type: none"> <li>▮ Enhanced remote control for fixed frequency and SATURN/HAVE QUICK I/II waveform</li> <li>▮ For R&amp;S®M3SR Series4400</li> </ul>	R&S®DS3804
<b>Software options (additional functionality for the basic software package)</b>	
MultiServer RCMS Server Software for one Standard RCMS server <ul style="list-style-type: none"> <li>▮ For monitoring of several regional Standard RCMS servers and connected radios</li> </ul>	R&S®DS3808
Standard RCMS Server Software Extension <ul style="list-style-type: none"> <li>▮ For remote firmware upload and update for R&amp;S®Series4200</li> </ul>	R&S®DS3809
<b>Licenses for additional R&amp;S®RCMS II workstations</b>	
One Additional Client License <ul style="list-style-type: none"> <li>▮ For operational access to one RCMS server (Standard or Extended)</li> </ul>	R&S®DS3820
<b>Licenses for radios</b>	
R&S®RCMS II License for one receiver or transmitter of R&S®Series4200	R&S®DS3830
R&S®RCMS II License for one transceiver of R&S®Series4200	R&S®DS3831
R&S®RCMS II License for one radio of R&S®M3SR Series4400 or R&S®Series2000	R&S®DS3833
R&S®RCMS II License for one radio of R&S®M3SR Series4100	R&S®DS3834
R&S®RCMS II License for one receiver or transmitter of R&S®Series200 via R&S®GV4000 model .03	R&S®DS3838
R&S®RCMS II License for one transceiver of R&S®Series200 via R&S®GV4000 model .03	R&S®DS3839
<b>SNMP support</b>	
R&S®RCMS II License for monitoring of third-party SNMP-capable devices connected to one R&S®RCMS II server	R&S®DS3840
R&S®RCMS II License to provide R&S®RCMS II summary status information via SNMP to a third-party monitoring system	R&S®DS3841
R&S®RCMS II License for monitoring of R&S®VCS-4G devices	R&S®DS3845
<b>Services</b>	
R&S®RCMS II server installation and configuration	on request
R&S®RCMS II server configuration of one third-party SNMP device (LUA script)	on request

For data sheet, see **PD 5213.6464.22** and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)



## Service that adds value

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

## About Rohde & Schwarz

The Rohde & Schwarz electronics group is a leading supplier of solutions in the fields of test and measurement, broadcasting, secure communications, and radiomonitoring and radiolocation. Founded more than 80 years ago, this independent global company has an extensive sales network and is present in more than 70 countries. The company is headquartered in Munich, Germany.

## 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**

Certified Quality System

**AQAP-2110**

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R&S®RCMS II Remote Control & Monitoring System

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