

Air Navigation Services of the Czech Republic, state enterprise

Monitoring of Radio Communications



Air Navigation Services
of the Czech Republic

Situation

Air Navigation Services of the Czech Republic, state enterprise (ANS CR, www.ans.cz) is currently a modern and recognized Czech company that ranks among the European elite in the provision of safe and cost-effective air traffic services. At current level of traffic in the airspace, the technical infrastructure, the so-called ATM systems for the provision of air traffic services is necessary. The ATM system is a general name for any device that is used by the air traffic controllers to control the traffic in the airspace of the Czech Republic. The voice communication between the air traffic controller and the flight crew is necessary for air traffic control. For ensuring high reliability the voice communication system consists of three independent systems - primary, backup and emergency system.

Primary system

For good radio coverage of the whole territory of the republic, the transmission and reception from the radio transmitters and receivers is performed from one or more different locations, which is geographically appropriate for the controlled area. Routing of radio communication between the air traffic controllers and pilots of aircraft provides the main radiophone exchange.

Business objectives

The main objective of deploying a new system for radio communication device monitoring was the modification and extension of the RCMS RCOM/NAVCOM systems, i.e. the removal of the old Rohde & Schwarz technology 200 series with GV4000 and the integration of newly acquired Rohde & Schwarz technology 4200 series and Cordex into the remote surveillance (RCMS) at the airports LKPR, LKKV, LKTB and LKMT.

Key requirements of the investor:

- Data exchange between the Rohde & Schwarz devices of 4200 series and Cordex with a controlling server
- Data exchange with CMOS system (Central Monitoring and Control System, www.elvacolutions.eu)
- Displaying data via CitectSCADA (www.citect.schneider-electric.com)
- System users access rights

Source: www.ans.cz

Backup system

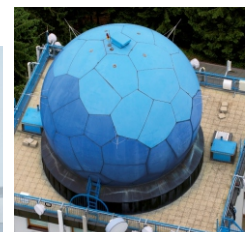
The backup system also includes all used channels that are connected to the workplace of the air traffic controllers via the backup radio communication exchange. It is used operationally in case of a channel failure in the primary system and serves as a full replacement.

Emergency system

Its use is restricted only to the case of a simultaneous failure of the primary and backup system. It contains the selected radio frequencies.

The original solution used the old technologies of Rohde & Schwarz 200 series with GV4000. Currently it is gradually replaced by the modern technology of Rohde & Schwarz 4200 series with Cordex backup power mainly due to broader support of new means of communication (VoIP). With this change arose a request for the revision of existing monitoring and control systems RCMS RCOM and RCMS NAVCOM. At present, about 600 radio communication devices of Rohde & Schwarz 4200 series are deployed in the Czech Republic, mainly around the major airports (Prague - Ruzyně / LKPR, Ostrava - Mošnov / LKMT, Brno - Tuřany / LKTB and Karlovy Vary / LKKV).

- Requirement for HW and SW system configuration
- Ability of time synchronization via NTP protocol
- Redundant system configuration
- Continuous monitoring of communication routes
- Archiving of changes into the database



Solution

The systems adjustment for remote control and monitoring of radio communication devices (hereinafter RCMS RCOM - Prague airport and RCMS NAVCOM - regional airports).

The task of RCMS RCOM system is to monitor and control the radio communication systems used within the Air Navigation Services of the Czech Republic. It is designed to support staff of technical halls during the monitoring and control of radio communication devices.

The RCMS RCOM and RCMS NAVCOM systems are built on a distributed architecture CitectSCADA (SCADA/HMI, www.citect.schneider-electric.com) in the version 7.20 or higher, for the Windows platform. They are developed on the extensible client/server architecture with the built-in redundancy support, alarm, trendy and reporter system. The openness ensures the information exchange between the CitectSCADA software and other applications using the CTAPI application interface. Since its inception, the systems are designed as redundant

for 24 hour operation. The communication with various radio communication devices of Rohde & Schwarz 4200 series takes place via the TCP/IP network layers and special 4200 GB2PP communication protocol. The communication with power devices of the CORDEX type is via the SNMP protocol and their availability is verified by the ICMP protocol. All changes to the data obtained from each device are stored in the Microsoft SQL database.

The system is built on the client/server architecture. The server part is composed of two independent functionally identical units, respectively dedicated redundant hardware. Each of the system modules (data collection, alarm evaluation, compilation of trends and reports) is fully operated redundantly. Due to this full redundancy fundamentally built on parallel processing, the uniformity of distributed data between the connected clients with added benefit of the load distribution possibility is guaranteed. The system is deployed in four geographic locations that mutually exchange the data.

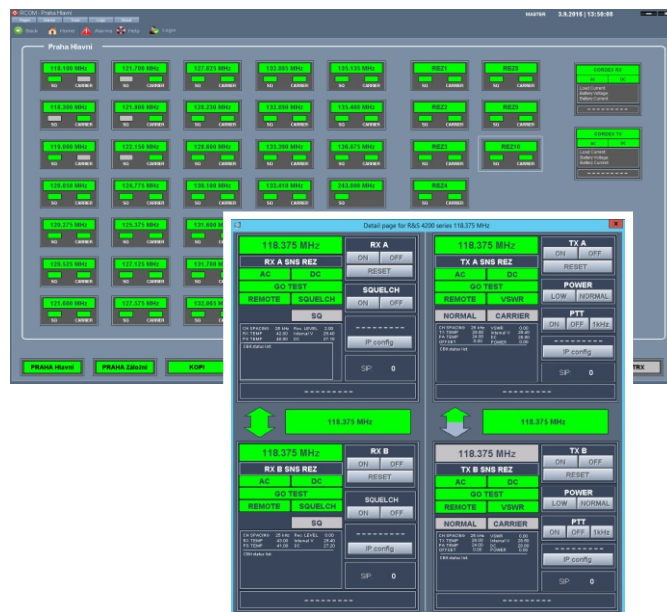
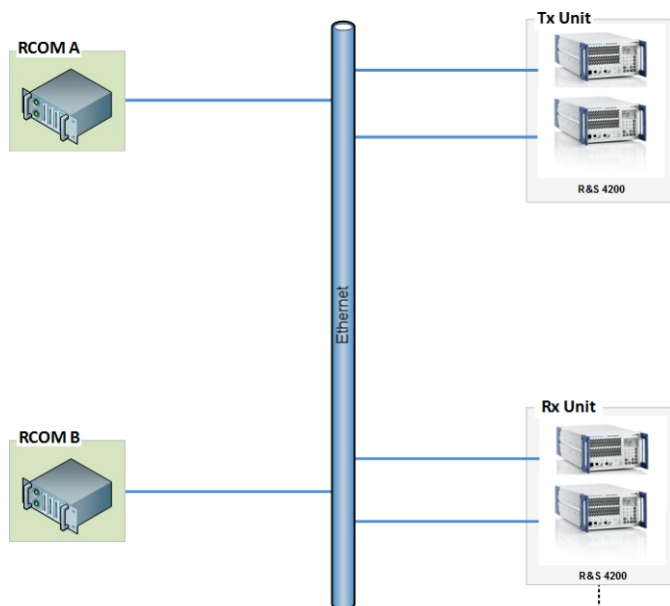
Within the solution was necessary to develop the special communication CitectSCADA drivers, which are briefly described in the following table.

DRIVER	PROTOCOL	DESCRIPTION
CTPING	ICMP	The driver ensures the availability monitoring of network devices via ICMP protocol.
ROHDESCHWARZ	Rohde & Schwarz 4200 GB2PP protocol (TCP/IP)	The driver provides the communication between RCMS RCOM/NAVCOM and Rohde & Schwarz radio of 4200 series.

The functional capabilities of the RCMS RCOM and RCMS NAVCOM system are listed in the following table.

SYSTEM / DEVICE	TYPE
Radio communication device of 4200 series	EU 4200 Rx ED 4200 Rx SU 4200 Tx SD 4200 Tx XU 4200 TxRx

Communication scheme



Benefits

- Comprehensive availability of information on a device status.
- Provides remote control and monitoring of VHF technology.
- Centrally keeps track about VHF technology.
- Provides information to the technical maintenance workplace and ATS workplace, or informs the neighboring ATS systems on the local serviceability.
- Automates some functions related to the technical condition of the systems (such as operating configuration).
- Optimizes the organizational structure of technical maintenance.
- Archives the information on VHF technology status and its operation.
- Uniform user interface for all monitored values.
- High system reliability.

Products and technologies

- CitectSCADA
- CTPING driver
- ROHDESCHWARZ driver
- Proprietary communication protocol RS 4200 GB2PP
- SNMP driver
- Microsoft SQL
- Microsoft .NET

Statistics in focus

Tags	22 000
Servers	8
Clients	6
Alarms	4 200
Pages	60
Drivers	CTPING, ROHDESCHWARZ, SNMP



ELVAC SOLUTIONS s.r.o.
Hasičská 53
700 30 Ostrava-Hrabůvka

Phone: +420 597 407 500
E-mail: solutions@elvac.eu
www.elvac.eu