

CASE STUDY

EDB Medium Voltage Automation

Netcontrol utility communication products supplied to EDB for the monitoring and control of Belgrade's medium voltage network



In order to modernize existing distribution system and make it less sensitive to power supply interruptions, EDB (Electric Utility of Belgrade) of Serbia decided to upgrade their Medium Voltage Distribution Network, with radio system for remote monitoring and control. Before the realization of this system, the field crew teams made all equipment manipulation manually. Only few critical points included some kind of local automation for emergency control.

PROJECT SUMMARY

Since a large number of consumers is concentrated in Belgrade metropolitan area, long blackouts can't be tolerated, so EDB contracted Netcontrol to supply and install a distribution automation system for remote control of pole mounted auto reclosers and switches on the overhead network, and ring main/pad mounted units for the underground networks.

The implemented system is used to remotely monitor and control equipment across a large geographic area within the main city of Belgrade and the outlying rural communities. Distribution network covers operational

area of 100 km in diameter, with low and high terrain, as well as with broad urban regions. Transmission of a radio signal is difficult, due to existence of blocks of high residential and office buildings.



CUSTOMER REQUIREMENTS

The whole system has to be controlled from a single control center

- System needs to be expandable to 500 points
- Dual/redundant architecture for critical system performance
- Event driven communication
- From end points with reclosers, in addition to digital information, analog data (current, voltage, active and reactive power, DC voltage of devices) must be transmitted
- Integration into existing SCADA system, by applying standard DNP3 protocol
- Coverage area of 100km in diameter
- Radio system has an opened structure which includes other telecommunication ways for connecting the remote stations

TELECOMMUNICATIONS PLANNING

To satisfy future system expansion and provide high availability of radio links, Netcontrol has done a comprehensive telecommunication-planning project based on all relevant measurements and parameters. Devised solution includes the use of packet data radios (Radius PDR) for control center to data concentrator communication. System NetMan utilising our RNO and RNI data radios were selected for communication with remote stations.

SYSTEM COMPOSITION

There are two independent PDR Master systems in the control center, for communication between 5 data concentrator units and the SCADA system in the dispatcher center. Each PDR system consists of two radios (Radius PDR 121) in dual configuration. They are connected to SCADA through the DNP3 protocol. RND100 software is used for data radio diagnostics.

- 5 remote Radius PDR slave sub-systems, each with dual NetMan data-concentration systems.
- 9 repeater stations.
- 110 remote end-points (69 auto-reclosers by Tavrida Electric, 41 Ring Main Units - Easergy T200i manufactured by Schneider Electric) communicate with NetMan data concentrators over RNO 501 radio units.
- Communication protocol between concentrator radio RNI 12 and remote stations RNO 501 radios is proprietary R4E3 protocol.
- NetMan systems use 5 frequencies from UHF range.
- Radius PDR subsystems use two frequencies from UHF range.
- Measurement data from each remote station consists of up to 48 digital statuses and 8 analog measurements

BENEFITS

- Fast and reliable fault localization and isolation
- Reduced impact on the distribution network due to faults and therefore reduced outage time.
- Fast energy supply restoration.
- Increased overall system reliability.
- High degree of future expansion possibilities.
- Alternative radio paths.
- Redundant system with alternative radio paths.

