SO-5 system

in automation and supervision of wind farms

MIKRONIKA has gained an extensive experience in implementation of local systems for supervision of wind farms, photovoltaic farms or other sources of renewable energy; in result a wind farm-specific version of our SO-5 Substation Automation System was developed.

Already existing products and special, dedicated equipment were the foundation for development of automation system for wind farm specificity. The system ensures:

- data acquisition
- execution of control function
- creation of interface for data exchange with SCADA systems, supervising farm operation

The system is also equipped with multidirectional interfaces for data exchange with power distribution companies, on whose area the farm is located.

Data acquisition is executed directly from:

- contacts of primary equipment
- indirectly, from protection relays, power quality analyzers, measuring transducers, voltage regulators, converters, inverters, meteo stations or other devices of various producers, using transmission protocols

The system communicates with the equipment via easy to configure, standard IEC 60870-5-101 / -103 / -104, IEC 81850, DNP 3.0, ModBus protocols.
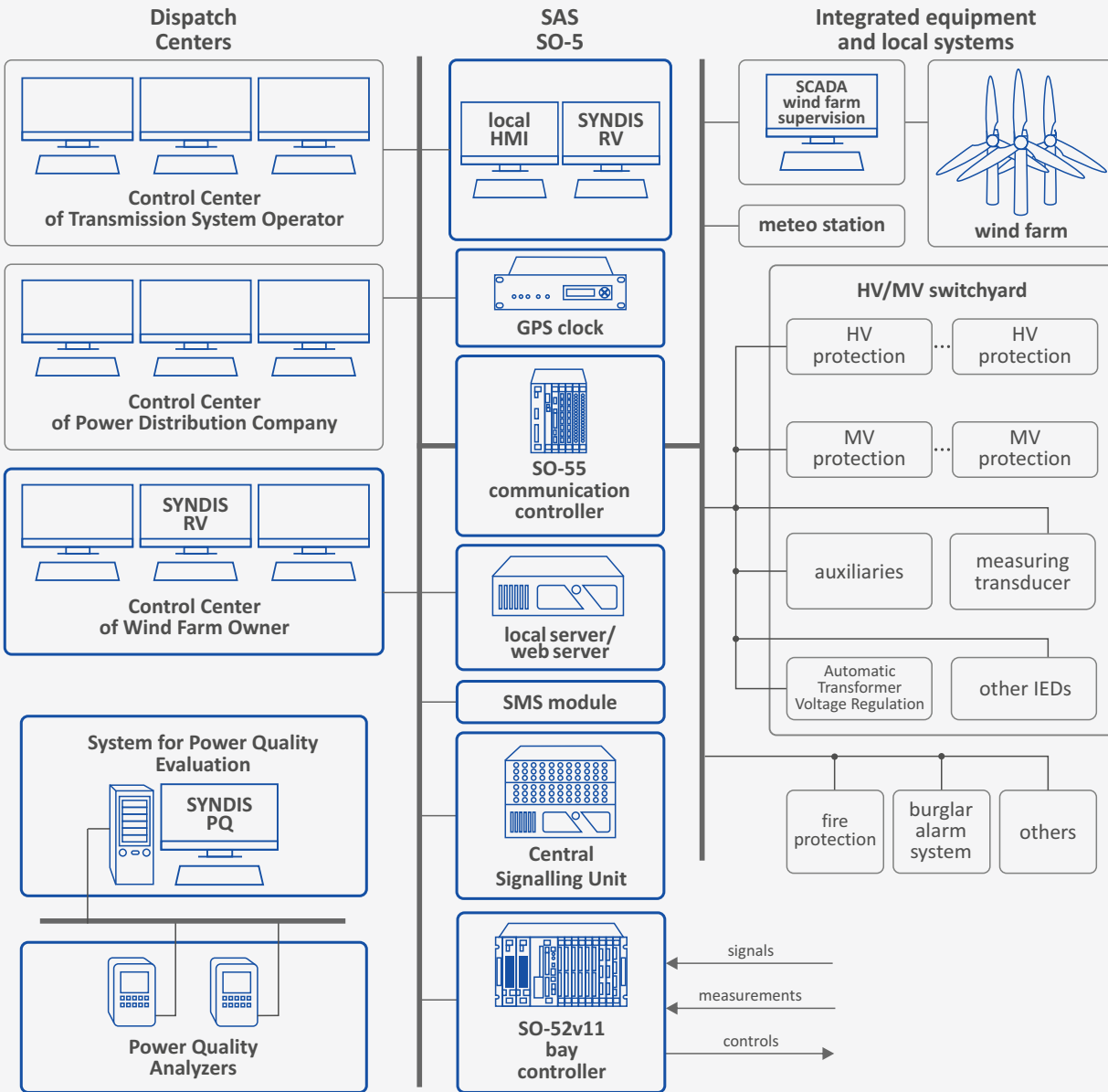
Communication in native protocols, often met in such applications, is also possible. Control commands are also transmitted directly to contacts of executing device or indirectly, through station IED devices.
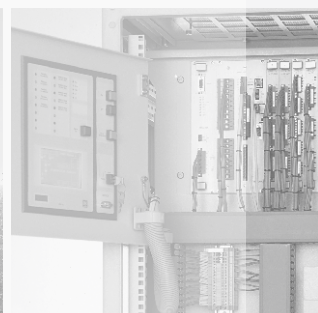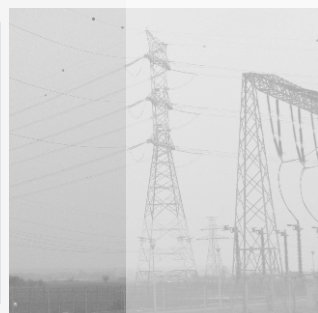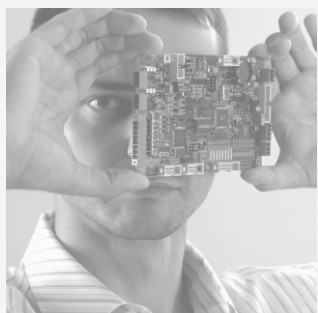
MIKRONIKA

System structure

The system for control and supervision, dedicated for wind farms, offered by MIKRONIKA, is equipped with - successfully tested in practice - interfaces for co-operation with applications of other producers, e.g. Vestas, Nordex, Enercon, Gamesa or Acciona. Through these interfaces, working in DNP 3.0, ModBus protocols, OPC-DA standard, I/O systems data from process control systems and meteo stations are acquired; the data, together with information on power parameters, state of monitored devices, warnings and alarms, may be transmitted by a standardized protocol or database interface to control center of the wind farm owner. The scope of accessible data and form of their presentation is user-configurable.

In the same time, on-line measurements and states of switching equipment may be transmitted via an independent communication interface to the system working in the control center of power distribution company.

Dispatch Centers

Control Center of Transmission System Operator

Control Center of Power Distribution Company

SYNDIS RV

Control Center of Wind Farm Owner

System for Power Quality Evaluation

SYNDIS PQ

Power Quality Analyzers

SAS SO-5

local HMI

SYNDIS RV

GPS clock

SO-55 communication controller

local server/ web server

SMS module

Central Signalling Unit

SO-52v11 bay controller

signals

measurements

controls

Integrated equipment and local systems

SCADA wind farm supervision

meteo station

wind farm

HV/MV switchyard

HV protection ... HV protection

MV protection ... MV protection

auxiliaries

measuring transducer

Automatic Transformer Voltage Regulation

other IEDs

fire protection

burglar alarm system

others

Legend:

☐ MIKRONIKA scope of delivery

Beside local systems for control and supervision, MIKRONIKA offers central systems of SYNDIS RV type for collective, synchronized management of many diverse sources of renewable energy generation. The range of central system's functionality may be easily extended, in line with individual preferences of the Client, with additional report and/or balancing functions. The system may interface with ERP system deployed by the owner or the manager of a group of wind farms.
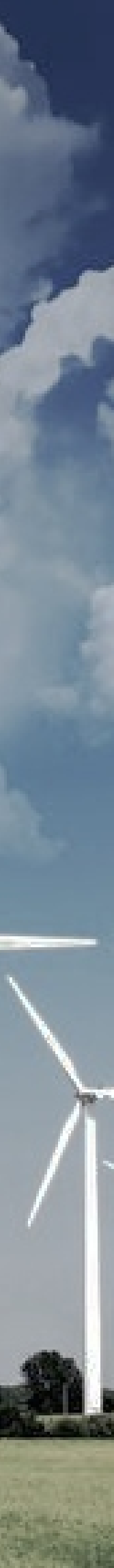
Example of wind park components visualization
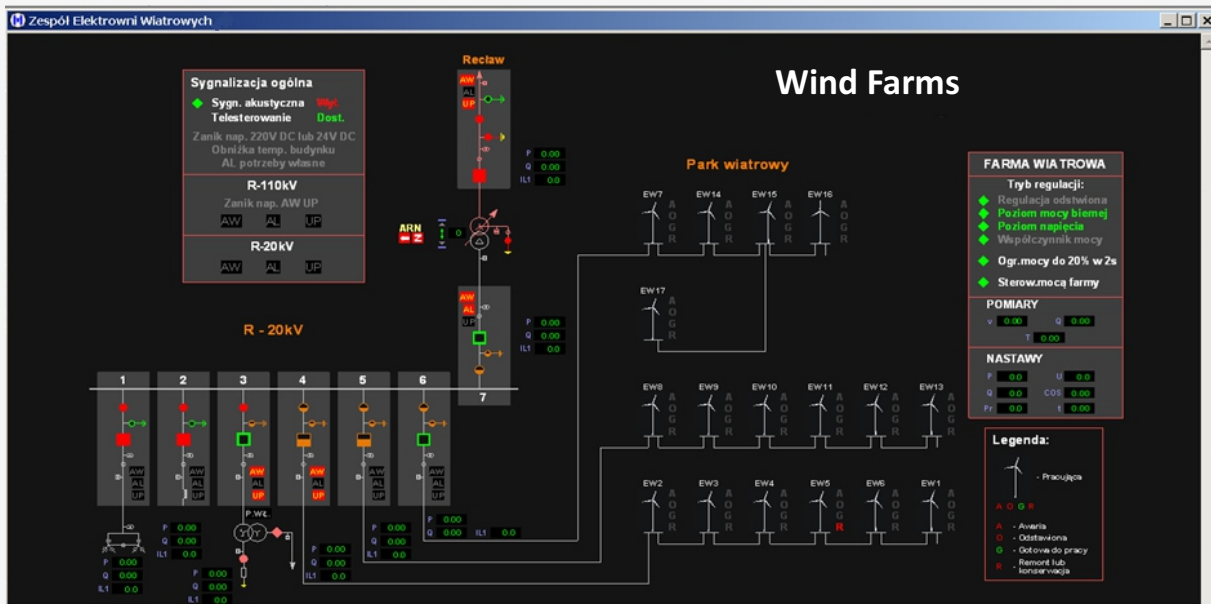
MIKRONIKA's system for control and supervision consists mainly of the following products:

- SYNDIS RV SCADA system software
- Communication controller / data concentrator of SO-55 or SO-5S type
- SO-52v11 or SO-52v21 local controller, equipped with the relevant quantity of I/O modules, measur-ements

Additional equipment:

- GPS clocks / time servers of SO-5530GT or RTS/GPS type in NTP/SNTP standard
- GSM-GPRS/3G in APN communication modules of MSG type; installation of 2 SIM cards is available
- Central/emergency signaling of SO-52SC type with editable signal panel
- SO-52v11-eME power quality analyzers with registration of transient-type disturbances

SYNDIS RV software constitutes a base for:

- system servers
- web servers
- system operator workstations, local and remote

Their architecture and hardware configuration depend on the Client's requirements; their execution may be based on MIKRONIKA hardware or other, as preferred.

SO-55 communication controllers establish communication channels with devices equipped with digital interfaces, with local systems of third parties, with the system of wind farm owner, with systems of local power distribution company and, if required, with the system of transmission system operator.

Configuration of communication channels may be performed via various serial or Ethernet connectors, executed on copper, fiber optic or radio connections and may use various communication protocols. The controller also serves as protocol converter, transmitting data acquired from local devices in various protocols to master systems in their standardized protocols.

SO-52v11 (or SO-52v21) controller collects data via binary inputs of various voltage levels and executes measur-ements or controls that are not - or cannot be - executed by IEDs.

Examples of SYNDIS SO-5 cabinet for wind farms

network infrastructure

local terminal

system server

serial server

controller

power strip

controller with
communication module

disk array system

network infrastructure

main server

reserve server

spare room

power strip

www.mikronika.pl