UAB "SIGMA TELAS"

AN AUTOMATED INFORMATION-METERING SYSTEM FOR COMMERCIAL METERING (AMR) FOR MOBILE COMMUNICATIONS OPERATORS

In recent years communication systems based on the GSM 900/1800 standard have been rapidly developing and now they are servicing over 90% of people in Lithuania and cover nearly all the areas of this country. However, in order to have a reliable sort of communication, it is necessary to place the antennas of receiver-transmitter systems that belong to mobile communications operators in most diverse locations, sometimes in areas that are hard to access. At present, there are over 1000 receiver-transmitter systems on the territory of Lithuania alone.

Under these conditions trustworthy and timely metering of electric energy has become an urgent issue for both energy supplying companies and energy end users.

A group of system designers of the UAB "SIGMA TELAS", who possess both competence, technologies and expertise in the area of developing both small and large area distribution projects in the field of power metering, set for themselves the goal to develop a centralized and automatic data acquisition, metering and energy carrier management system for the receiver-transmitter systems of mobile telephone systems operators. As a result of technical, structural-algorithmic and software-hardware solutions that were adopted the said task was successfully solved.

The basic principles that were used as basis for the AMR system development are as follows:
• metering of electric power that allows to determine the value of accountancy indexes that are used in the financial accountancy practice of companies;
• to secure a continuous sort of monitoring for the purpose of short-term and long-term planning of power consumption;
• it is possible, when necessary, as far as the applied technical and software means are concerned, to make connections to the energy sales system of the wholesale electric energy market;
• it is possible to exchange information with senior and/or allied organizations, that act as energy suppliers;
• when it is required, it is possible to monitor remote signaling systems (like door opening, storage batteries status etc.).

This system is based on the AMR system that was developed by the UAB "SIGMA TELAS" and it is certified in the Russian Federation, Uzbekistan, Kazakhstan and Ukraine under the name of "EMCOS". The certification process is underway in Belarus and Georgia.

The "EMCOS"-type system is a multifunctional metering tool that can be complemented in terms of its design and software. It is a set of certified metering tools (measurement instruments) for energy media metering, of software elements and auxiliary data collection and transmission tools.

The "EMCOS" system in terms of its hierarchy includes several levels:
− meters and concentrators as sources of information;

− controllers supporting different interfaces and supporting data transmission over RS232, RS485 directly or via a current loop, Ethernet, modems, GSM-modems (including the ones that support GPRS), by radio;

− a computer(s), a server(s) for data acquisition, is one of the basic components of a local user's system of metering at a company, featuring the "EMCOS" server software, produced by UAB „SIGMA TELAS" and introduced to real use. The said data acquisition servers are in charge of all links with system devices and of the correct saving of events history files;

− the customer software is a package of programs for viewing data, extracted from data archives, and also directly from power meters on a special request, real-time mimic diagrams, a report generation program. In case the "EMCOS Corporate" software version is used, there is no need to install customer programs, since this function is then fulfilled by the Internet browser, through connection to the energy metering system portal.

When a large number of metering points is used (over 300) the "EMCOS Corporate" version must be used, in such a case the number of power metering points is unlimited.

The functioning of the AMR system is secured by three servers:

1) a WEB server presenting information to automated work places. The user interface is built up applying the WEB-technologies;

2) the data collection server secures data collection and commercial metering data placement into a data base;

3) the data base server Oracle SQL is designed for data storage and processing.
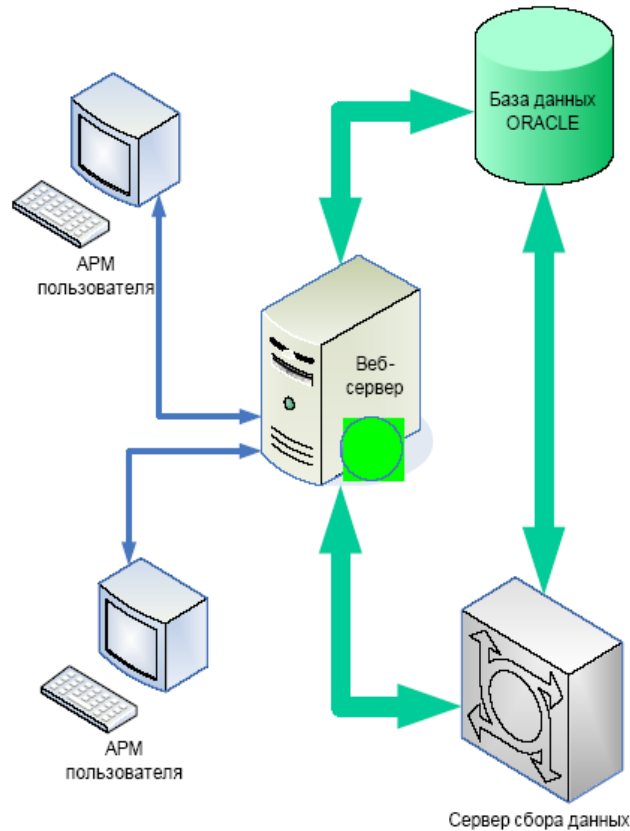
The information part of EMCOS Corporate

Currently, both technical and software possibilities have been developed to establish the EMCOS Corporate AMR system on the bases of one server.
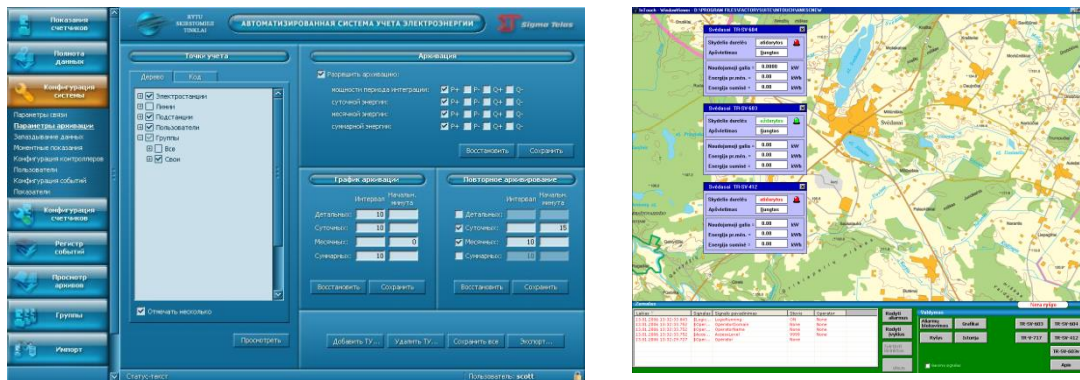
Data between the software modules of the system are conveyed applying the WINDOWS COM (DCOM) technology while the HTTP protocol is used to present data to WEB server users.

The information basis of this AMR system on the level of the Information-Computing Energy Complex includes:
- a system for information classification and coding;
- description of data structures;
- operation and technical documentation;
- internal AMR information:
    -- commercial (calculation) information used in financial calculations related to metered energy;

-- technical information that can be used when solving calculation problems related to energy metering (measured quantities of physical units (electric energy, capacity, voltage, phase currents).

− service information of the status of metering tools (logbooks of events, events statuses);

− outlet (reporting) information (certificates, tables, graphs).
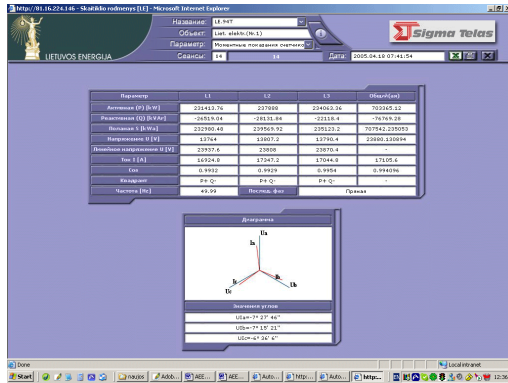
The window for viewing momentary meter hour meter data

The window for viewing ½-profile

The basic functional subsystems:

.   • An information acquisition subsystem.
.   • A verification subsystem.
.   • A monitoring subsystem.
.   • A real time enquiries subsystem.
.   • A visualization subsystem.
.   • A security subsystem.
.   • A configuration subsystem.
.   • A subsystem for data exchanges with external systems.

In terms of its functional structure the data acquisition and transmission device is built on the basis a multifunctional controller with an integral GPRS modem that is in

a compact way placed in the same enclosure as the electricity meter.

The positioning of a power metering pillar on the territory of the receiving-transmitting system of a mobile communication system operator

The AMR complex developed by the UAB "SIGMA TELAS" can maintain and carry out the following operations:
- to present to a central dispatcher point information about the quantitative parameters of consumed power;
- to remote measure phase currents, voltages, consumed capacity, active and reactive energy (depending on the type of the meter used);
- to set automatic protocols over all the events that are monitored by this equipment complex, including emergencies and system situations, switchings, reports on consumed energy (it is possible to create also other reports in accordance with customer requirements);
- keeping archives of all the events during the period of operation and the reporting period – continuous monitoring over the status of communication channels and the state of repair of controllers;
- on customer's request it is possible to connect operation signals from security, fire safety systems and power automation control systems. Alongside this, it is possible to monitor the status of the security and fire safety signaling system of a given facility and to register the time when it operates and inform the dispatcher personnel;
- it is possible (at the request of the customer) to issue brief messages (SMS) to mobile phones of maintenance personnel in case the said AMR system issues alarm signals, develops emergency situations etc.

The AMR system developed by UAB "SIGMA TELAS" for electric energy metering has been introduced to use and is operated successfully at numerous facilities in this country.

According to many references on the part of our customers and maintenance specialists this system is simple to manage, it is reliable and convenient to use, it features a vast information stock, it is flexible and well secured.