THE PROGRAM TOOLS FOR KSRS OPERATION

E.Kaportsev, Yu.Krylov, V.Korchuganov, K.Kuznetsov, L.Moseiko, N.Moseiko, Yu.Yupinov
RRC Kurchatov Institute, Moscow, Russia

Abstract

The running cycle of Kurchatov Synchrotron Radiation Source (KSRS) [1] includes the injection of electrons with energy 80 MeV from the linear accelerator in the booster storage ring Siberia-1, the accumulation of a electron current up to 400 mA and, then, electron energy ramping up to 450 MeV with the subsequent extraction of electrons in the main ring, storage ring Siberia-2, and accumulation there up to 300 mA, and at last the energy ramping up to 2.5 GeV. The control system is based on the distributed network of the processors operating technological systems of KSRS. The operational level of control system is realized as a local network of the personal computer.

Instrument of work of the operator is a set of the applied programs realizing the inquiries to the control system. The database describing logic channels of the control, modes of the technological systems and the script of the running cycle of accelerating facilities is developed. Logic channels of the control are a basis for creation of the user interface. The examples of realization of the software used in operative work KSRS are given.

OPERATING CONTROL

The network of operating terminals consists of workstations under control of MS Windows XP, united in local network Ethernet (see Figure 1). [2] Programs of management and diagnostics receive the information from a database server on the basis of MS SQL Server where it arrives from the application server. All executing modules, ADC and DAC are united in a CAN-network.
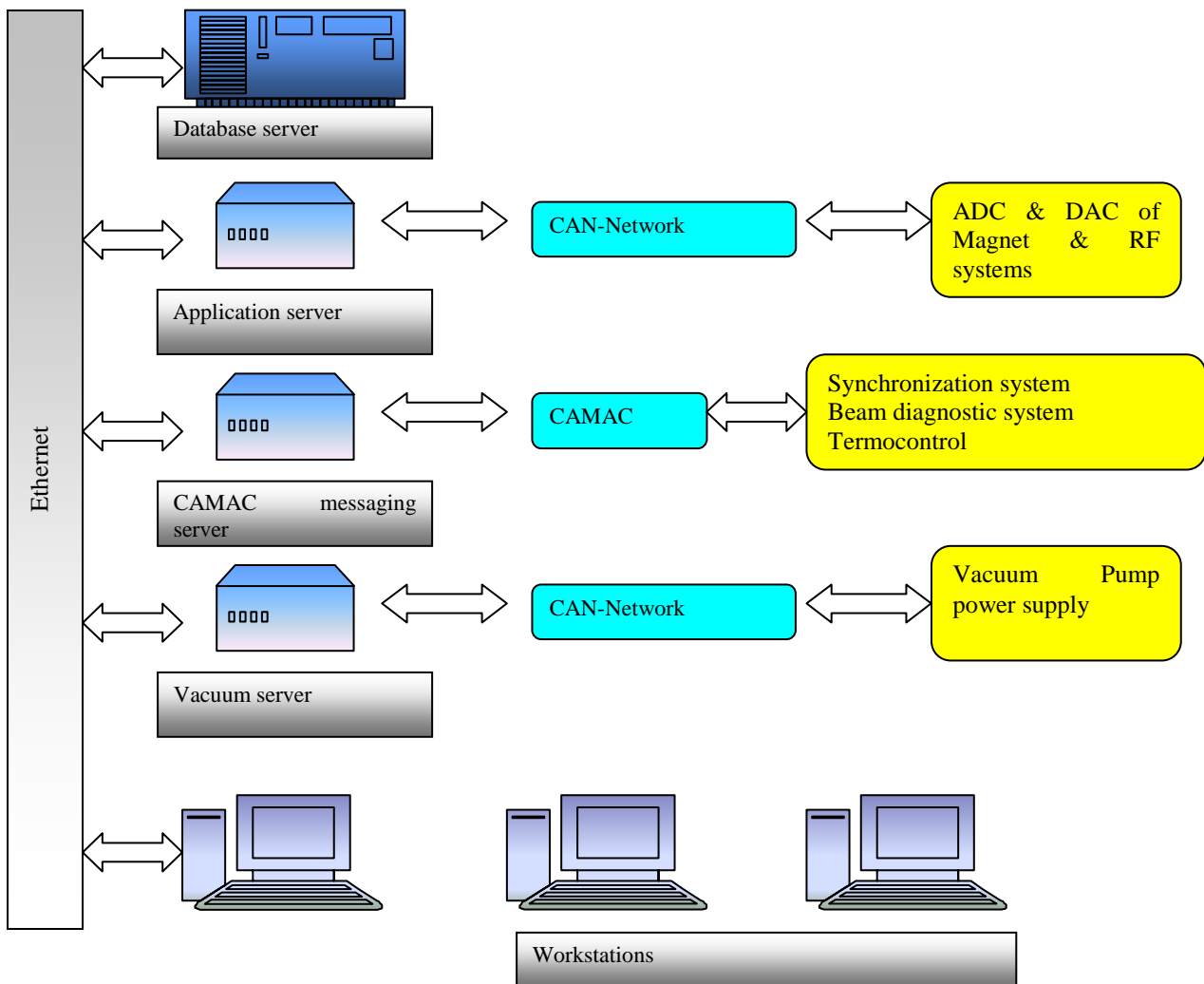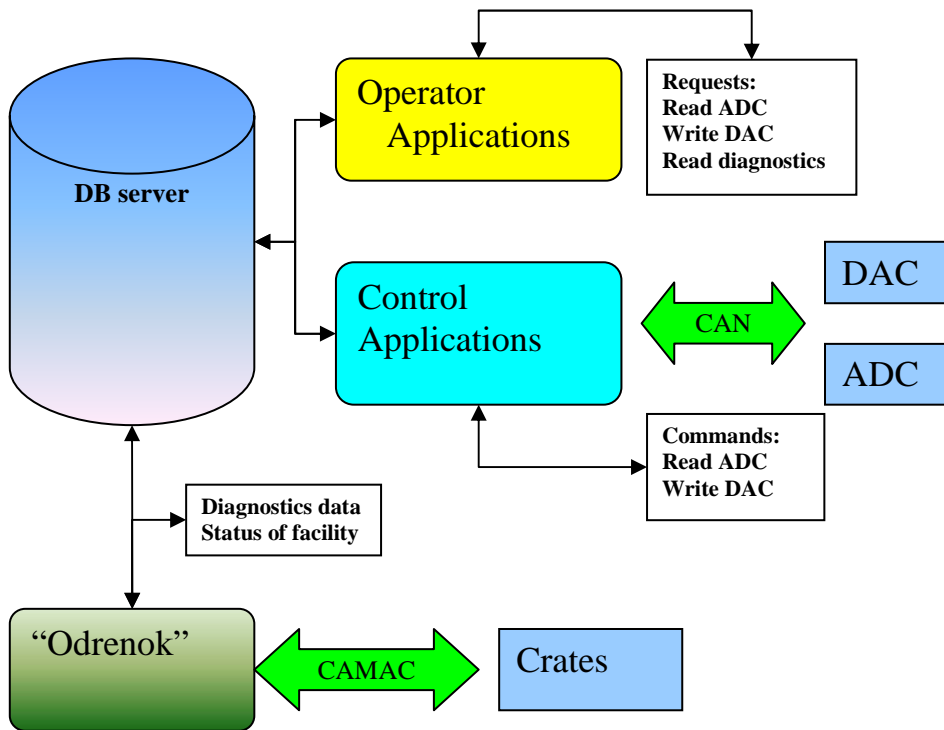

Figure. 1. The control system diagram

Figure2. Control system interaction diagram.

The application server, on which programs of management and data gathering from executing devices, gauges and diagnostic aids are loaded, is connected to this network also. The application server represents the personal computer in industrial execution on chassis Advantix. There are three such servers: Application server, CAMAC messaging server and Vacuum server.

On the application server the specialized programs which are keeping in contact on a CAN-network with executing devices, such as RF-generators and power supplies of magnetic systems are executed.

The CAMAC messaging server organizing data exchange from the microprocessor system of type "Odrenok". [3] Through it all information from controllers and units which are not adapted yet under CAN standard is transferred.
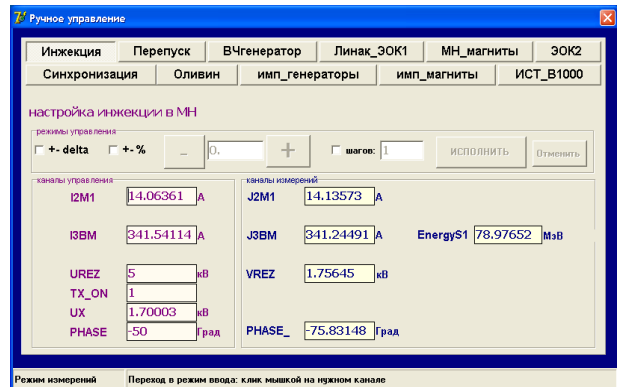

Figure 3. KSRS status window.

Figure 4 The main interface of operator.

All information arriving from these two servers is brought in a database on a DB server. It is the isolated computer on chassis HP ProLiant DL380G5.

Separately these servers there is a vacuum server. It has an own database in which the archive of values of currents of vacuum pumps remains. The server also through a CAN-network receives the information from power supplies about currents of vacuum pumps and puts it in the table. The information from this table then can be seen by means of the client application. [4]

THE CONTROL PROGRAMS

The primary goals of the operator:
- Handle of a complex running cycle.
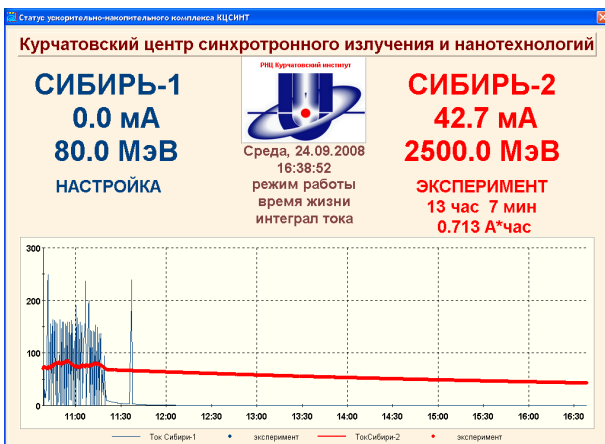- Handle in parameters magnetic and RF systems.

- The control of vacuum, temperatures, orbit measurement.

For realization of these tasks the operator uses a control system which structure is presented on figure 2.

Control programs form two types of queries: measurement of parameters of the complex and handle of executing devices. These queries register in special tables on a DB server.

Handle programs read out these queries and form special commands to units of a CAN-network or, through the microprocessor system of type "Odrenok", access to CAMAC crates. The received information sends back on a DB server. Then it is read out by the operator application and it is represented to the user through the programs which example of the interface is shown on figure 3, 4.

DATABASE

The database structure of KSRS consists of three principal views of tables: static, dynamic and archive. The static table contains a complete data set about all available control units and crates. The key field is the unique name of the channel.

The dynamic table contains the data about the channels accessible to the control and handle. The archive table contains descriptions selected for channels to be archived and the measured values.

REFERENCES

[1] V.Korchuganov et al., Modernization and Development of Kurchatov Center of Synchrotron Radiation, This Conference.

[2] Yu. Krylov et al., Upgrading the control system at KCSR. Proceedings of RuPAC XIX, Dubna, Russia, 2004.

[3] S. Kuznetsov et al., Control system of synchrotron radiation SIBERIA. NIM A352 (1994), p.161-165.

[4] Yu. Krylov et al., Enhancement of vacuum monitoring system of KCSR accelerator facility. Proceedings of RuPAC XX, Novosibirsk, Russia, 2006.