THE EXPANDED PROGRAM TOOLS FOR KSRS OPERATION WITH ARCHIVATION OF DATA

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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.

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. The database for preservation of the received parameters of a complex is developed, the program of an archiving received with ADC data 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.

OPERATIONAL MANAGEMENT OF THE COMPLEX

Network operator's machine consists of workstations running Windows XP, in the local network Ethernet (Fig. 1). [2] Program Management and diagnosis of receiving information from the database server based on MS SQL Server, where it comes from the application server. In our case, the database server and application server are located within a single machine. All executable modules, ADC and DAC combined into a CAN-network. On the application server load management program and collect data from performing devices, sensors and diagnostic tools. These servers are only three: Application server, CAMAC messaging server and Vacuum server.
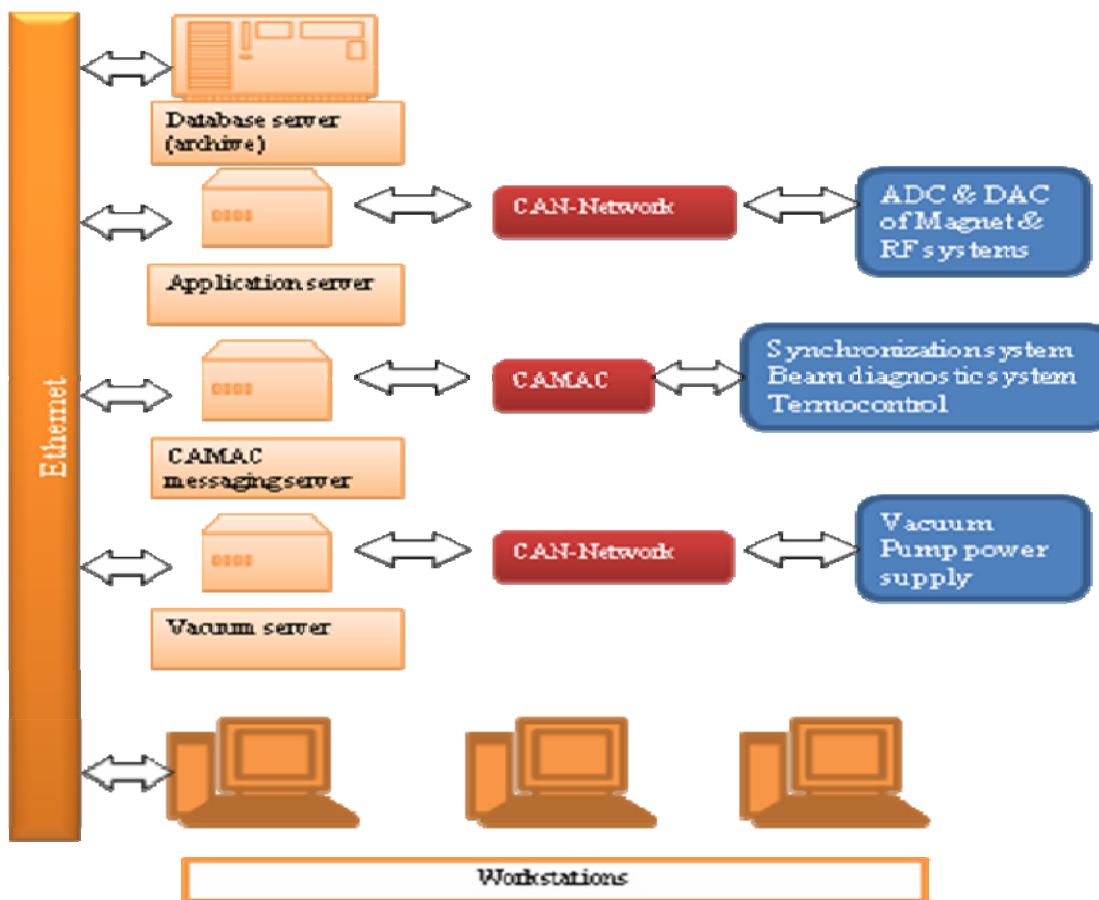

Fig. 1. Scheme of control system.

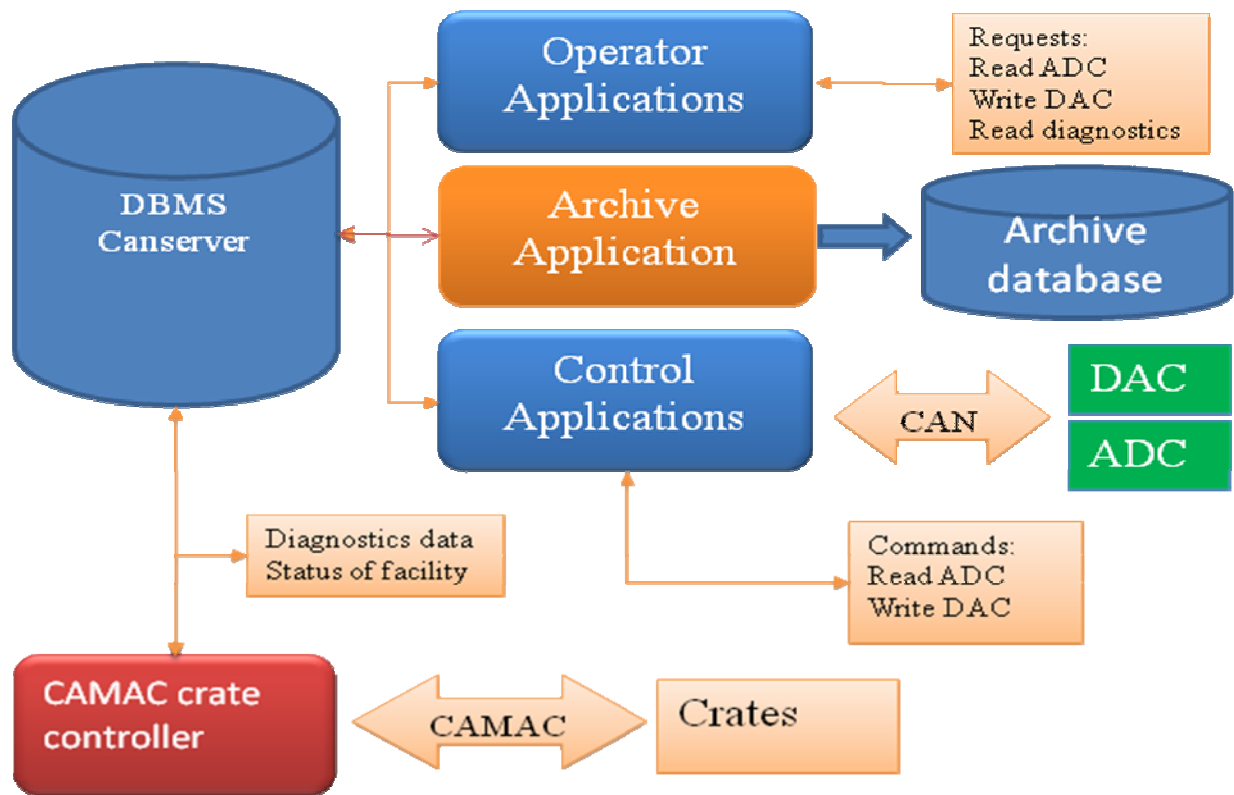02 Synchrotron Light Sources and FELs

Fig. 2 Scheme for software interaction of ACS.

Canserver server used to control the DAC and ADC via the CAN network. On the application server run specialized programs, which support communication on CAN-network with executive devices, such as high-frequency generators and power of magnetic systems. [3]

Messaging Server CAMAC [4] organizes the exchange of data with CAMAC crate controller with CAN interface type of K167 [5].Through it passed all the information from the controllers and modules that have not yet adapted to the standard CAN.

Management server of vacuum system is directly in the vacuum control room. It has its own database that stores the archive currents of vacuum pumps. [6]

THE SOFTWARE OF OPERATOR

The main tasks of the operator:
- Manage the work cycle of the complex.
- The parameters of the magnetic and RF systems.
- Control of the vacuum, temperature, measurement of the orbit.

To implement these tasks, the operator uses a control system whose structure is shown in Fig. 2.

Operator programs form two types of queries: the measurement of parameters and control complex actuators. These requests come in a special table in the database. Management program read these requests and form special teams to the modules of DAC or ADC. The resulting information is delivered back to the database server, where it reads the operator application and presented to the user through the program interface example which is shown in Fig. 3.
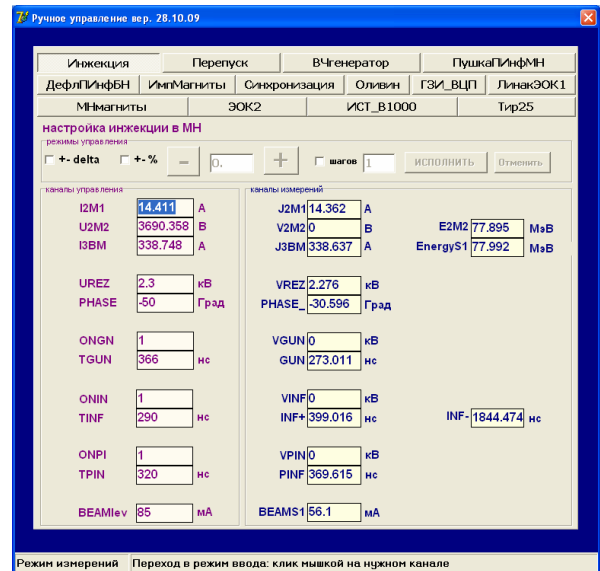

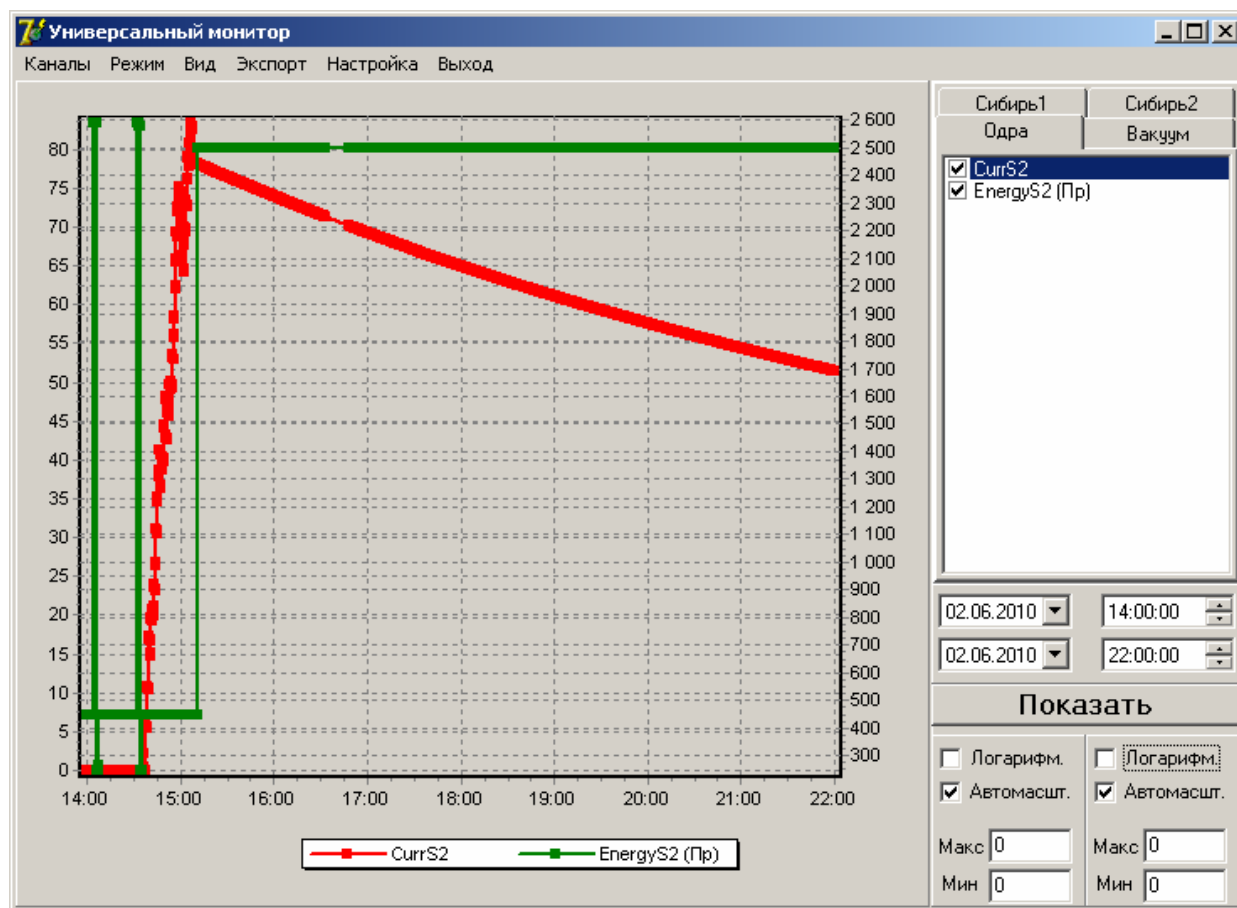Fig. 3. Examples of operator interface software.

Fig. 4. Interface of Universal Monitor.

ARCHIVING AND READING INFORMATION FROM THE ARCHIVE

Subsystem of the archive is intended to store information on installation and allow subsequent analysis of stored data users. To create an archive data designed a special application. The work program is to create an archive of survey measurement channels and record the data in a database on a dedicated server with a large disk array. Programs working with archival data allows the end user to obtain the requested data in the required form.

The program produces a survey measuring channels of ACS with a period of 5 seconds., and a survey of "slow" measurement channels with a period of 15 seconds. The data obtained are checked for relevance and added to the archive table. When changing the days of creating a new archive table, and the results of the old computed value to create a daily report.

To work with archives created program "Universal Monitor (Fig. 4), which provides a graphical user interface to work with him the necessary data set. Possible to select the channel list, the time interval scale charts, etc. The program also allows you as a hard copy, and export to Excel.

Archived data allow us to get a report on the work setting for a day, week or month. In addition, a relatively simple structure of archive tables allows advanced users to use the data directly using SQL-queries.

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