CONTROL SYSTEM USER INTERFACE FOR THE CYCLOTRON DC-280

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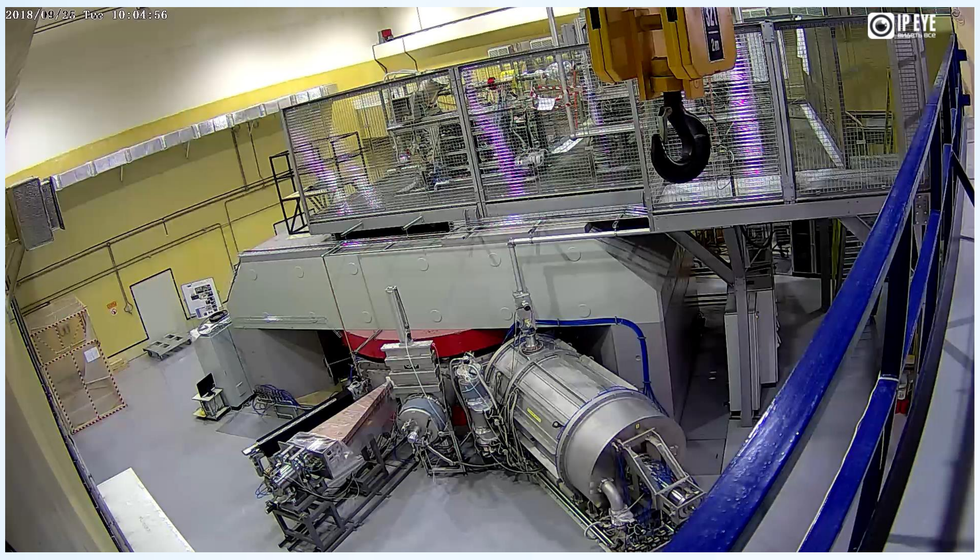
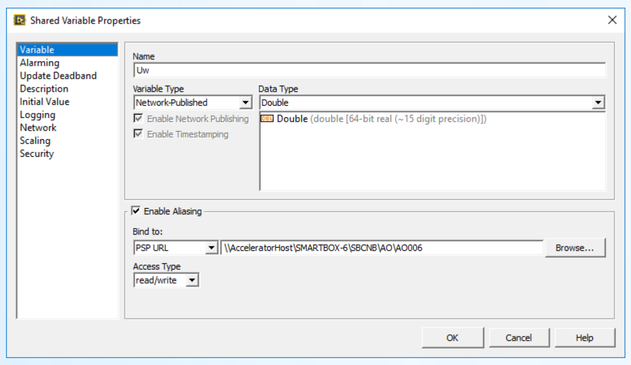
Abstract

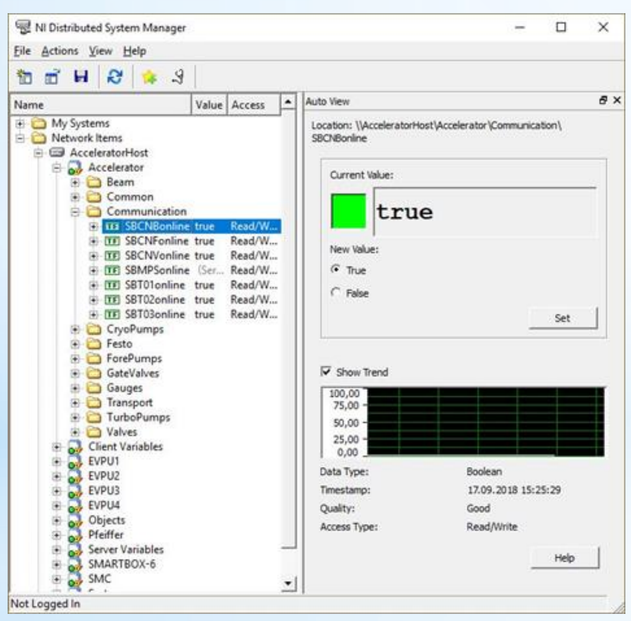
At the end of 2018 new isochronous cyclotron DC-280 will be put into operation at the FLNR, JINR. The distributed control system consists of about 10000 process variables and has developed using LabVIEW DSC module. Based on our experience of many similar projects it was developed the technology to build interface for effective operation and control of the machine. This paper describes basic principles and functions that we applied for user interface.

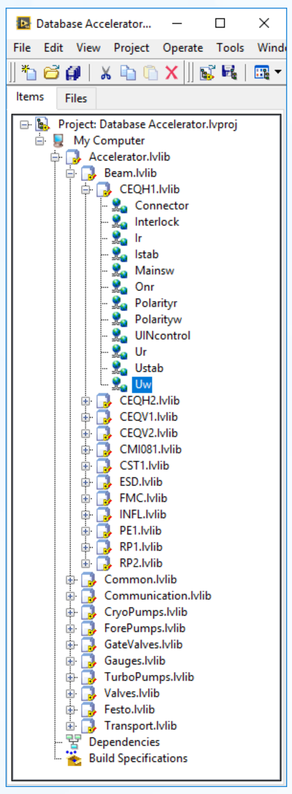


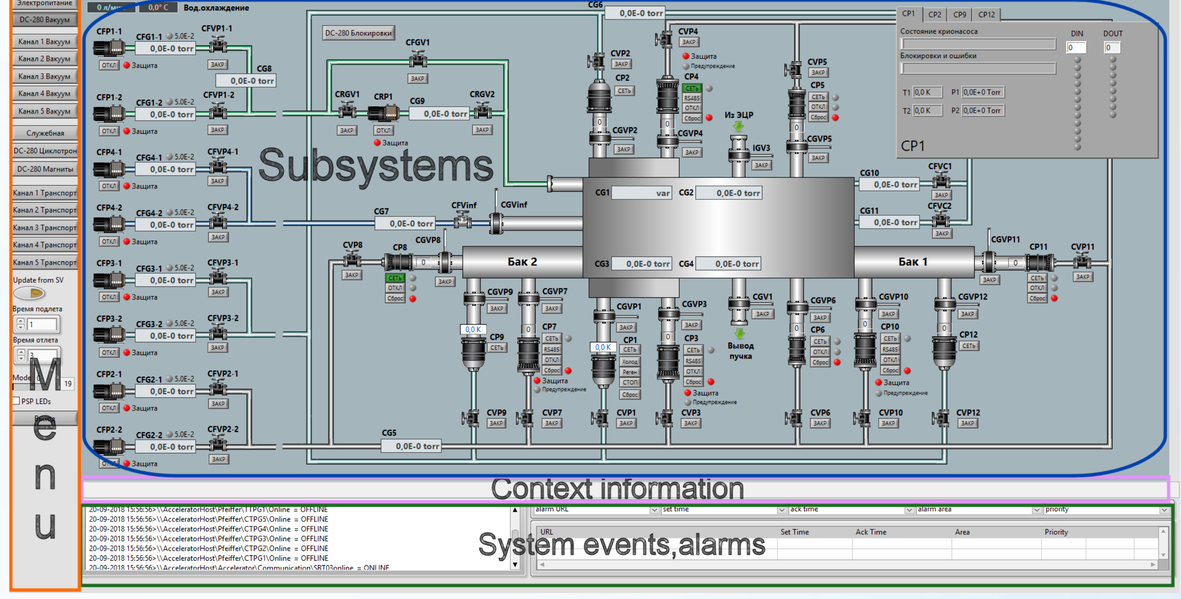
DC-280



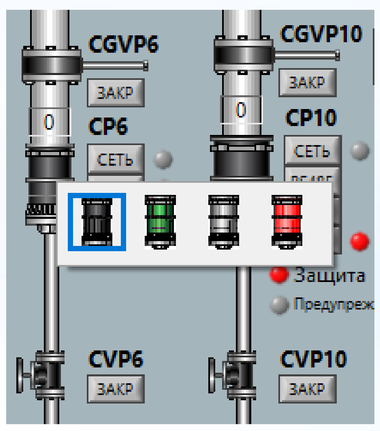
T1GV1 State control is connected to the shared variable \\Accelerator Host\Accelerator\GateValves\T1GV1\State



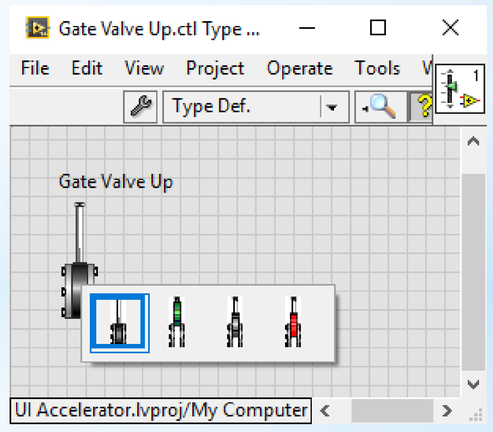




User interface areas



Turbo pump State indicator – Picture ring type

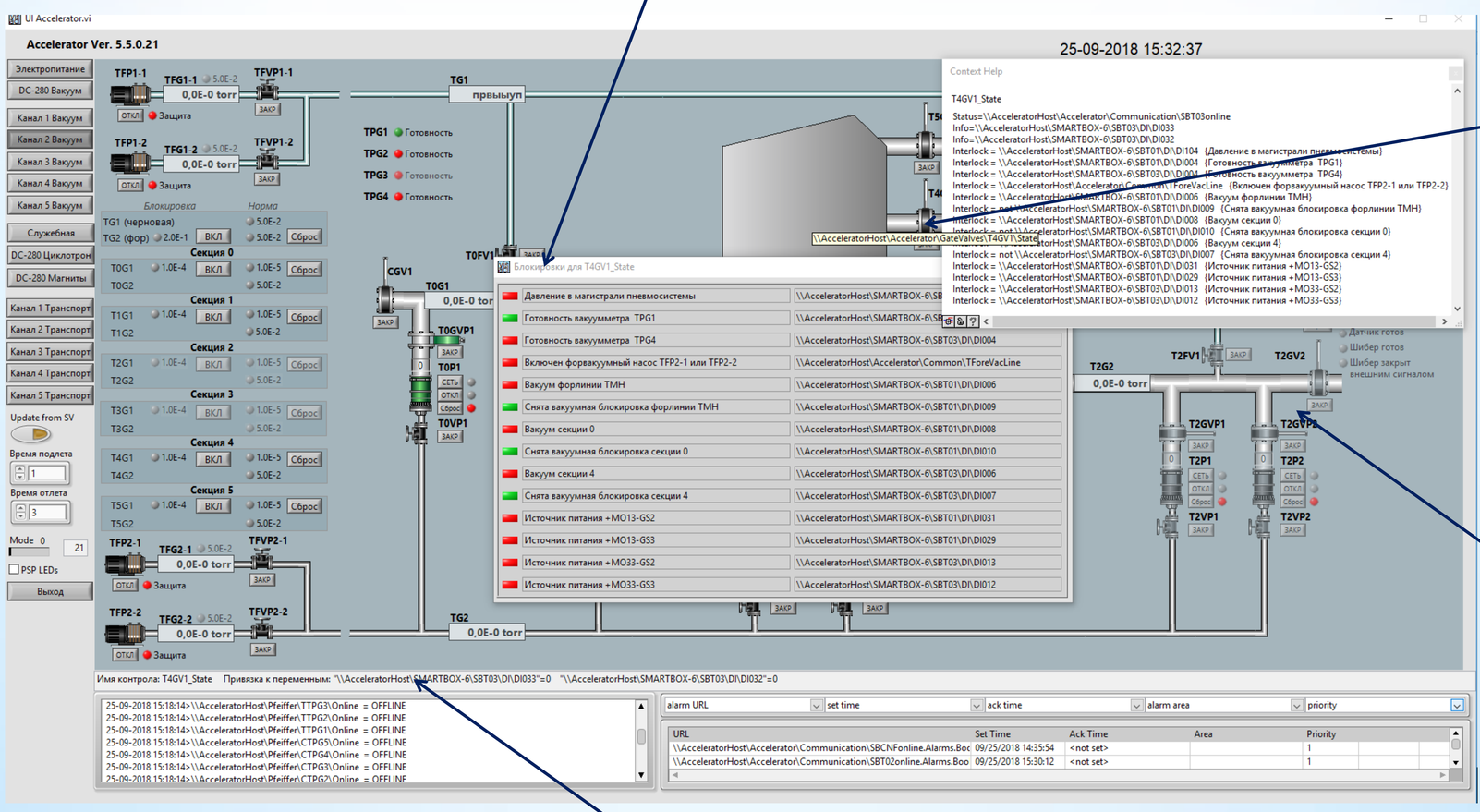


Each control object image is represented in accordance with the actual device. The state of the object is displayed by color and in some cases by shape of the its image.

All control signals are described by process variables. The variables of each subsystem are deployed on a dedicated host. LabVIEW provides fast and reliable data transmission for large and small applications, called Publish-Subscribe Protocol (PSP). It manages shared variables (See Figure 1) that publish data over a network through a software component called the Shared Variable Engine (SVE).

To exchange data on the network HMI uses shared variables. All user interfaces are clients or subscribers to the SVE.

For safety reason the interlocking system has a lot of signals blocking the operation of object. Popup window that appears next to the object provides information about all interlocks that can affect the operation of the object are presented. It contains information about the name of the interlock and the path to it. The red color indicates the locks that triggered.



When the object under the mouse cursor next to it pops up a line with the name of the operating variable and the context information window, that located at the bottom of the screen, displays the name of the control and the path to the associated hardware variable. The lower part of the screen is reserved for system events and alarms.

T4GV1 State control is connected to the shared variable \\Accelerator Host\Accelerator\Gate Valves\T4GV1\State

When a driver loses connection to its device, all controls and indicators that represent this device become disabled and grayed out

If the operator position mouse cursor over an object, the context string displays actual values of raw variables on which that object depends, for example, DI state or Adc code