SCADA "HoroCycle" for automation and control of complex experimental facilities: The profilometer system for beam control in Booster and Nuclotron and beam transportation to collider rings of the NICA JINR accelerator complex

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A hardware and software kit for controlling and monitoring of complex systems of accelerators and experimental facilities is presented. SCADA (supervisory control and data acquisition) "HoroCycle" is an advanced user-friendly tool for development of monitoring and control systems of experimental equipment, acquisition, processing and visualization of experimental data from various detectors. The implementation of SCADA "HoroCycle" for profilometers (based on a microchannel plate) at Booster and Nuclotron of the accelerator complex NICA and ionization multichannel profilometers of beam transfer channels from Nuclotron to the rings of the NICA JINR (Joint Institute for Nuclear Research) collider is reported. The specific feature of the system is the application of advanced algorithms for calibration and analysis of acquired data. SCADA "HoroCycle" is embedded in the programmable logic controller "Fisht" which allows automation of both existing and novel additional equipment.