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STATUS OF THE NSRC SOLARIS CONTROL SYSTEM

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Abstract

A National Synchrotron Radiation Centre SOLARIS is a first synchrotron light source in Poland. SOLARIS consists of a linear accelerator, 1.5 GeV storage ring and 2 beamlines (PEEM and UARPES). The beamlines are in commissioning phase and should be ready for the first users in 2018. Additionally there are plans for a few next beamlines. The control system is based on Tango Controls. The system is fully operational. An archiving system uses HDB, TDB and HDB++ tools. PLC system consists of two parts: MPS (Machine Protection System) and PSS (Personal Safety System). The control system has been upgraded recently and it is constantly being improved to meet expectations of its users. The status of the SOLARIS Control System will be presented.

TANGO CONTROL SYSTEM

A software platform for the SOLARIS control system is Tango Controls [1, 2]. The control system based on Tango Controls has a lot of elements: a Tango Host server with database, an archiving system, high level and low level software [3]. At Solaris, there are three instances of Tango: one for the linac and the storage ring (Tango 9) and one per each of two beamlines (Tango 8 at UARPES and Tango 9 at PEEM/XAS). The upgrade of the control system for the linac and the storage ring from Tango 8 to Tango 9 took place in December 2015, while for the beamline PEEM/XAS in December 2016. During these upgrades the operating system was also changed from CentOS 6.5 to CentOS 7. Control systems are responsible for acqui-sition of more than 5000 signals. The archiving system uses TDB and HDB tools from Soleil. At PEEM/XAS beamline, there are held tests of the HDB++ archiving system. At Solaris, low level applications are developed in the Python program-ming language using an API to the Tango core – the PyTango package. Device servers are used for connection of hardware to the control system. The facade device library from MAX IV (Lund, Sweden) is used for high-level Tango devices. The Taurus package from ALBA (Barcelona, Spain) is used for writing high level soft-ware, like GUIs. In addition, there is preparation work for introducing new synoptic panels of LINAC and water interlocks based on Max IV library svgsynoptic2. Water interlocks panel has been shown on the Fig. 1. For browsing Tango database and checking each device, operators use an open source application ControlProgram. The ControlProgram is also used for running Tango tools and another GUIs. The ControlProgram has been shown on the Fig. 2.

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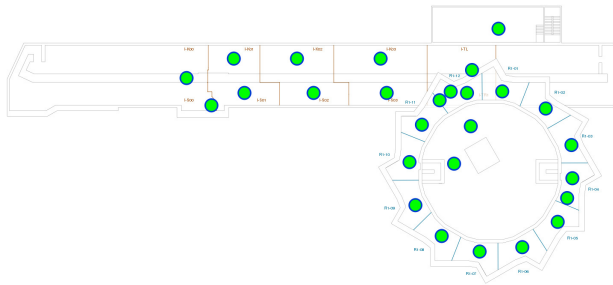

Figure 1: Water interlocks synoptic panel.

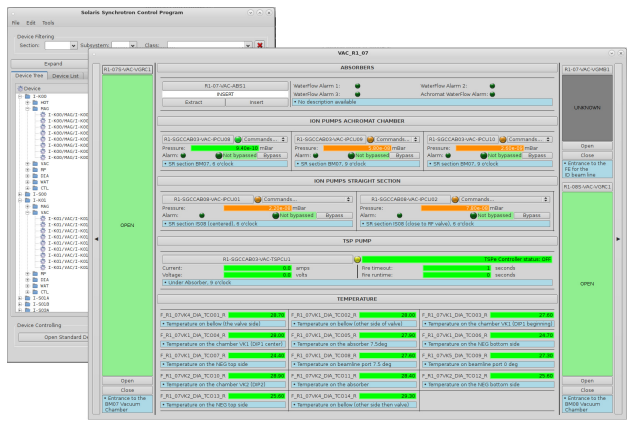

Figure 2: Control Program.

PLC SYSTEMS

There are two different PLC systems at Solaris. The first one is MPS (Machine Protection System). It is used to protect devices against working in unwanted conditions. It is based on Rockwell Automations solutions. The sec-ond one is PSS (Personal Safety System). It provides radiation safety. It is based on the Siemens S7-300 fail-safe controller. The Personal Safety System GUI has been shown on the Fig. 3.

TIMING

The SOLARIS timing system is based on Micro Re-search Finland (MRF) hardware. It consists of event generators (EVG) and event receivers (EVR). EVGs generate a stream of events and send them to EVRs. Upon receipt of the event EVR performs the action. Basic structure of SOLARIS timing system has been shown on the Fig. 4.

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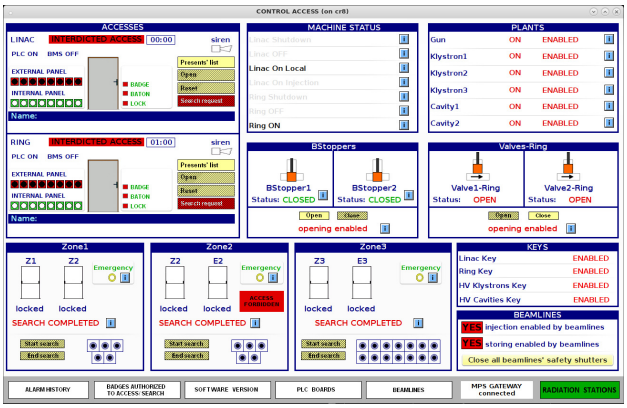

Figure 3: Personal Safety System GUI.

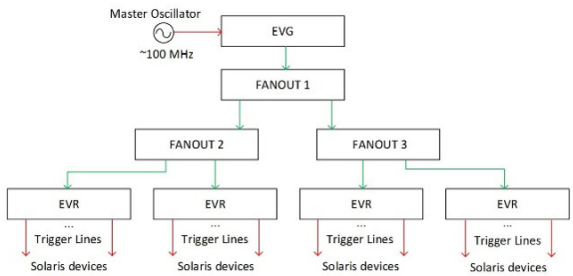

Figure 4: Basic structure of SOLARIS timing system.

MOTORISATION

IcePAP drivers are used for high-precision movement control. They are configured with IcePAP Control Management System from ALBA.

SARDANA ON BEAMLINES

Sardana is an open-source framework serving as SCADA (Supervisory, Control And Data Acquisition) [4]. Its main role is to provide interface for performing scans (contin-uous movements of motors and synchronised acquisition from various sources) which are essential in conducting experiments. The results can be plotted live and stored for later processing. It is also integrated with Tango and facilitates communication with motorisation.

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[3] Tango Controls, `http://www.tango-controls.org`

[4] Sardana, `http://sardana-controls.org`