GEOSYNOPTIC PANEL*

Ł. Żytniak#, C. J. Bocchetta, P. Goryl, A. I. Wawrzyniak, P. Pamuła, M. Zając,
National Synchrotron Radiation Centre Solaris at the Jagiellonian University, Krakow, Poland
V. Hardion, D. Spruce, MAX IV Laboratory, Sweden

Abstract

Solaris is a third generation Polish Synchrotron under construction at the Jagiellonian University in Krakow. Moreover, National Synchrotron Radiation Center is member of the Tango Collaboration. The project is based on the 1.5 GeV storage ring which is built at the same time for the MAX IV project in Lund, Sweden. The Solaris project is a prime example of the efficient use of EU regional development funds and sharing the knowledge and resources for the rapid establishment of a national research infrastructure. The Solaris develops highly customizable and adaptable application called the GeoSynoptic Panel. Main goal of the GeoSynoptic Panel is to provide a graphical map of devices based on information stored in the Tango database. It is achieved by providing additional device/class properties which describe location and graphical components (such as icons and particular GUI window) related to a particular device or class. The application is expected to reduce time needed for preparation of synoptic applications for each individual (part of) machines or subsystems and to reduce effort related to debugging and change management.

INTRODUCTION

National Synchrotron Radiation Centre Solaris budget is 191MLN PLN secured by the EU regional development funds. The Jagiellonian Universityhas allocated land for the facility. The Jagiellonian University and Lund University in Sweden have signed an agreement for the mutual cooperation and sharing of ideas and designs related to the construction of both facilities. Solaris storage ring is an adaptation of smaller ring built in the MAX IV Laboratory in Lund, Sweden with an energy of 1.5 GeV, 6nmrad emittance and 96 m circumference ring [1-3]. See Fig. 1.

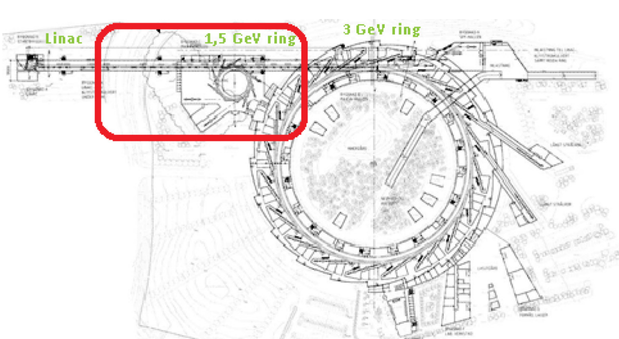

Figure 1. Sister project of MAX IV.

FACILITY

Building

The entire surface of the building is nearly 8000 m^2. Experimental hall area with the storage ring is about 3000m^2. The rest of the space, includes laboratories, offices and conference rooms, see Fig. 2.

Main building parameters:

- Height of the building: 19.7 m
- Building height above ground: 12.5 m
- Experimental hall 's depth: 3.2 m below ground level
- Linac: length of about 110 m, width of 4.15 m
- Technological tunnel: length of 110 m, width 5.20 m
- Linac tunnel and technological tunnel is located at a depth of 7.7 m below ground level.

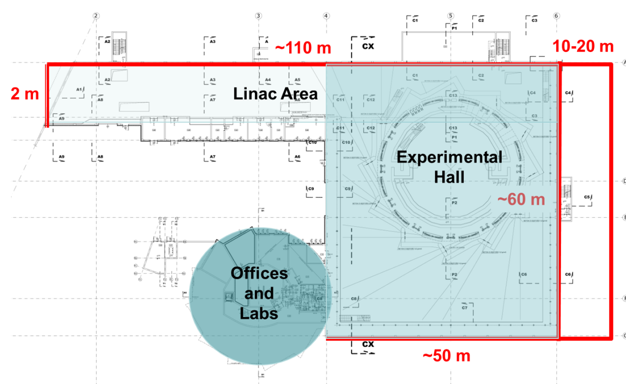

Figure 2. Solaris Building Overview.

Beamlines

The first phase of the project financed by EU funds includes the design and the construction of two beamlines.

The first beamline will use bending magnet radiation. It will be optimized for energy range from 200 to 2000 eV and will be equipped in two end-stations: a X-PEEM and XAS chamber.

The second beamline will use an elliptically polarizing undulator. The photon energy range will be from 8 to 100 eV, with the U-ARPES end station.

*Work supported by the European Regional Development Fund within the frame of the Innovative Economy Operational Program: POIG.02.01.00-12-213/09

#lukasz.zytniak@uj.edu.pl

Next two beamlines are in the design and concept phase:

- Beamline for soft X-ray spectroscopy.
- Beamline for structural studies of biological macromolecules and new materials.

Experimental hall is design to accommodate 10-12 beamlines and 20-25 end stations, see Figs. 3 and 4.

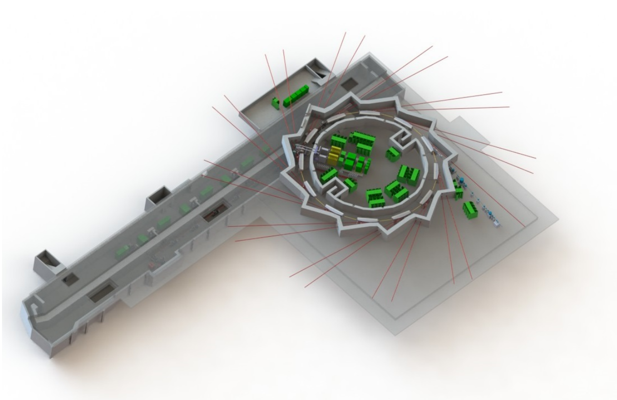

Figure 3. Visualization of example location of beamlines in Solaris building.

SCHEDULE AND MILESTONES

The project deadline for the first light is a first quarter of 2015. Beneficial occupancy of the building is programmed for the end of December 2013. Component schedules and purchasing milestones are linked to the MAX IV project schedule and are compatible with Solaris installation [2].

Figure 4. Visualization of Synchrotron Radiation Centre building.

Figure 5. Logo GeoSynoptic Panel.

GEOSYNOPTIC PANEL APPLICATION

Solaris is developing highly customizable and adaptable application called the GeoSynoptic Panel, which will provide a graphical map of devices based on information stored in the Tango database [4]. It is achieved by providing additional device/class properties which describe location and graphical components related to a particular device or class, see Figs. 5 and 6.

The application is based on two parts. The first part is GSP Configurator and the second part is Generic Panel. GSP Configurator saves all configuration settings in XML file and in the last step after user's confirmation, all settings data are saved in the properties of the device in the database.

In first step, the GPS Configurator allows the users to choose one of the three modes.

- Test
- Full configuration
- Choose devices

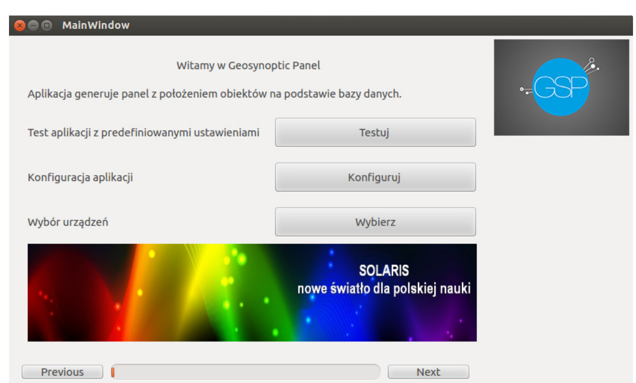

Figure 6. GeoSynoptic Panel - GSP Configurator.

Test - allows users to run Generic Panel without any interaction with database. Using this mode users can see only default icon in top left corner of Generic Panel.

ISBN 978-3-95450-139-7

This mode is prepared for users who want to see the application without configuration.

Choose devices – allows users to choose devices to configure. Using this mode users can see only chosen (group of) devices on Generic Panel. This mode is prepared for users who want to see only devices they are interested in. (e.g. vacuum, motion, etc.).

Full configuration – allows users to see all the devices from database on Generic Panel. Using layers, users can select the group of devices which they are interested in. They can easily find the device on Generic Panel. Moreover users can check the basic properties of the device (e.g.: state, position, acceleration, deceleration, velocity), see Figs. 7 and 8.

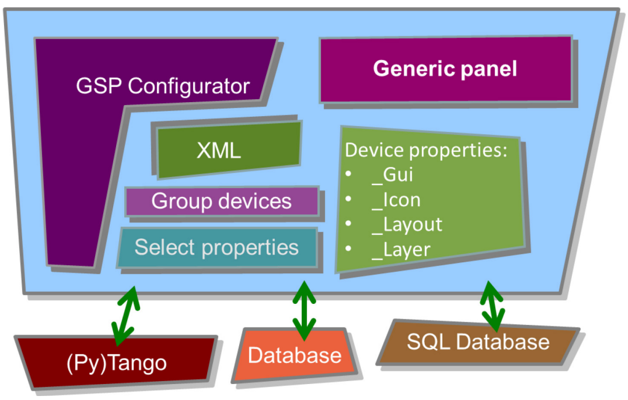

Figure 7. Application diagram.

Full configuration is easy and user friendly. It includes few steps:

The first step informs users that the four new properties will be added at the end of configuration to every device in database. These properties are:

- _Gui
- _Icon
- _Layout
- _Layer

The second step allows users to choose the group of devices like: vacuum, motion or simply beamline. The important factor is that one device can be chosen to more than one group, but the user must select primary group. One device can be one group.

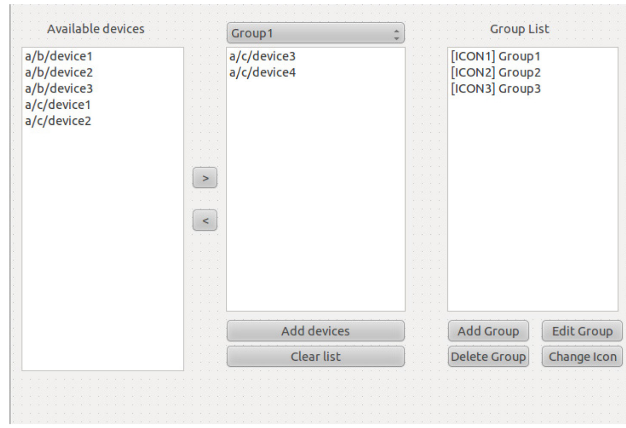

Figure 8. GSP Configurator - chose group of devices.

Third step enables the users to match group with dedicated icon. In this step application checks if Taurus is installed [5]. If it is found, it shows all available icons in Taurus. Under the list of icon or if Taurus is not installed, there is an option that allows users for browsing the computer in order to find dedicated icon.

All icons are copied to the application folder with the name of matched group. An icon cannot be duplicated and every group must have the icon. Nevertheless, users can choose default icon, see Fig. 9.

Users can see all groups with dedicated icon before move to another step.

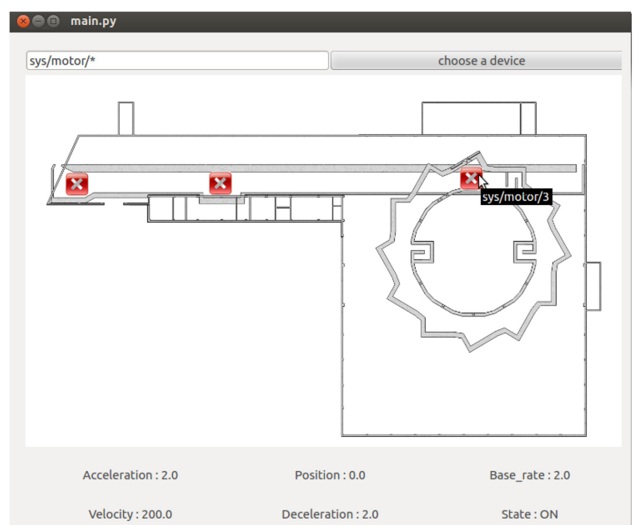

Figure 9. Working application with default icons.

Next step allows users to choose whether information about device will be displayed in a special prepared widget [4] in Generic Panel or in TaurusTrend.

The following step enables the users to create a layer and match the group of devices with a dedicated layer. Therefore, one group of devices may be on more than one layer. In this step, users can verify what devices

ISBN 978-3-95450-139-7

are in the selected layer. All group of devices must be matched to some layer.

Next step allows users to choose the location of the device. The devices are located on the basis of x and y coordinates.

Last step is the confirmation that all selected properties of devices will be saved in database. This step is designed to confirm all settings. Data are stored in XML file and after verification saved in devices properties. Afterwards, Generic Panel starts working, see Fig. 10.

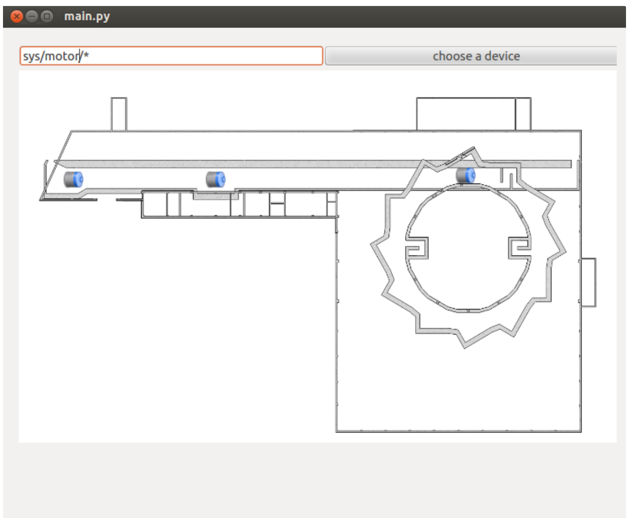

Figure 10. Working application.

FUTURE REQUESTS

Due to the fact that a current version of application is still the beta version. The first aim is to deliver a stable version. Nevertheless, the future development will concentrate on:

New solution for devices location. Present solution with x and y coordinates is temporary, time-consuming and not very effective. The new idea is to divide a graphical map of machine into sections and place devices in selected sections like: linac, (booster +) storage ring, beamlines (e.g. in storage ring in Solaris is 12 bending magnets, each magnets is one section, selecting icon with magnets users can easy and fast split storage ring into sections).

Import/export XML file in the GSP Configurator.

Integration application **with EPICS** - Experimental Physics and Industrial Control System.

CONCLUSIONS

The GeoSynoptic Panel application is based on database. That solution has both pros and cons. The important advantage is the fact that it is automatically generic. The deleted device from database will be not available in GeoSynoptic Panel. The added device in database will be automatically reflected in application (restart of the application is required). Additionally, the whole facility can use the application by the usage of the same database.

The disadvantage is that the user-operator need to run GSP Configurator and setup configuration for all applications.

It is worth to mention that the application is not only dedicated for synchrotron radiation facilities. Every facility, institution or company can use it, if they use the database.

REFERENCES

[1] C. J. Bocchetta, The 2nd International Particle Accelerator Conference, San Sebastían, Spain, THPC054 (2011).

[2] C. J. Bocchetta, The 4th International Particle Accelerator Conference, Shanghai, China, MOPEA046 (2013).

[3] A. I. Wawrzyniak, National Synchrotron Radiation Centre Solaris at the Jagiellonian University, private communication.

[4] http://www.tango-controls.org/

[5] Taurus's 3.0 documentation; http://www.tango-controls.org/static/taurus/latest/doc/html/index.html

ISBN 978-3-95450-139-7