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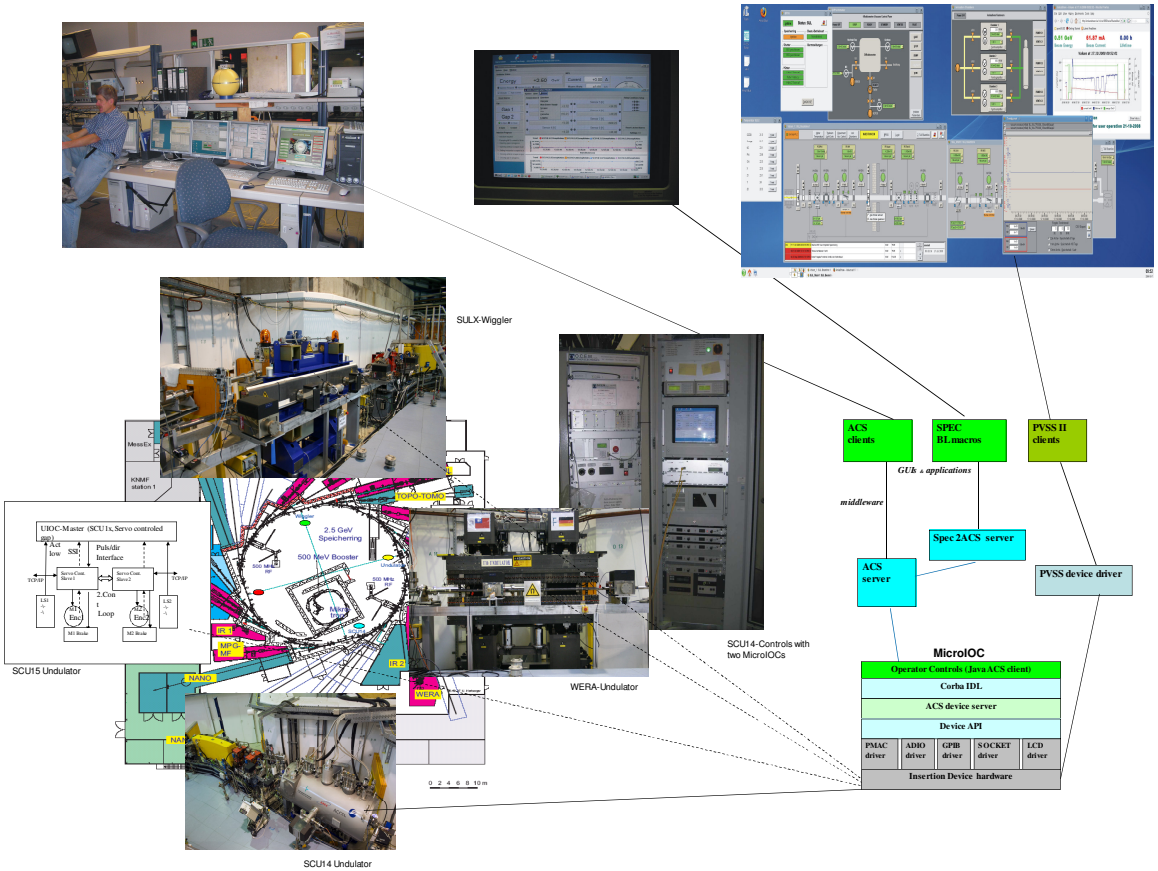
A Modular Control System, based on ACS for present and future ANKA Insertion Devices

Abstract

The 2.5 GeV synchrotron facility ANKA, at Forschungszentrum Karlsruhe, Germany has three insertion devices in operation. The SCU14 was the first superconducting undulator worldwide tested with beam. The successor, SCU15 will be implemented in the ANKA ring in mid 2009.
The paper describes the design and implementation of a modular control system structure, based on object oriented (oo) programming technics for existing and future ANKA-insertion devices with permanent- or superconducting magnets.
A description of the hardware based on Cosylabs MicroIOC Controller interface for undulator motion control of gaps and scrapers, main power supply, corrector power supplies, temperature control and Interlocks (IL). Last but not least the integration of the housekeeping functions, cooling, vacuum control and Interlocks to PVSSII and the communication with ACS are described.



PVSS II is communicating direct to the hardware, it is
- suitable for accelerator and beamline control.
- open structure allows a straightforward integration of the different autonomous systems at ANKA.
-The new alarming and warning features permit preventive maintenance measures

The Software setup corresponds to the ANKA-ACS structure.
Cosylab developed ACS-device servers which communicate with the ACS-manager. The connection to operator control GUI Java applets is provided by the Corba IDL layer

The device properties can be categorized as
- motion properties of undulators , as part of motion programms for gap and scraper devices.,
these describe the motion of an behaviour of all undulator axe axes under normal conditions like start/stop/reach limit switches reached, homing and accelaration rates .
- data readback and logging
The data readback function update the data base with actual state variables of the undulator devices under operation and the GUIs for operator interaction.
The current ramping rate of power supplies can also be summarized here .
- emergency properties, as part of PMAC 2 -PLC programms
This means the failure of mechanics, the lack of synchronous motor movement or a controller failure will also be monitored. The properties are defined with an Application Programming Interface (API) in form of ASCII files.

CONCLUSION

The setup of ACS-Servers and PMAC 2 Controllers for the ANKA-insertion devices gives an operator friendly access to the features of this devices in the ANKA-ring. The control and improvement of beam parameters of beam optics and beam lifetime needs instant and failsafe control of insertion device settings, this can only be accomplished with the embedded, ACS based control system for the ANKA insertion devices.