EPICS AND TANGO OPTIONS FOR POWER PMAC MOTION CONTROLLER

Observatory Sciences is now able to offer software for Delta Tau's new Power PMAC motion controller compatible with both EPICS and TANGO

Observatory Sciences has worked with Delta Tau motion controllers for many years, and is now providing software support for its latest and most powerful system. The Power PMAC motion controller combines a computer and a motion controller in a single compact unit, making it an extremely flexible option for high end, complex applications with up to 256 axes of control. The Power PMAC provides advanced servo and kinematic algorithms, and runs a Linux real-time operating system using the Xenomai pre-emptive real-time kernel. Observatory Sciences is continuing its work with Brookhaven National Laboratory's Synchrotron Light Source II (NSLS-II) with the latest project for Power PMAC EPICS support. Construction of the NSLS-II began in 2009 and operations are expected to begin in 2015. The new contract follows work to produce control software for their Moveable Gap Damping Wiggler (supplied by Danfysik of Denmark) which will be deployed to reduce the emittance from the ring as well as provide a broadband, high intensity source of X-ray radiation. The ability to use the Power PMAC with both EPICS and now TANGO will enable adoption of these systems at large scientific facilities such as synchrotrons. Observatory Sciences is a recognised leader in EPICS, developing control systems and delivering EPICS training. The EPICS toolkit has been used on many high energy physics facilities as well as on large astronomical telescopes around the world, and EPICS software now provides the core control system for many synchrotron facilities. The addition of TANGO software for the Power PMAC will provide another option for synchrotron motion control. TANGO (TAco Next Generation Object) is a distributed control system, based on object oriented and service oriented approaches to software architecture. It is being actively developed by the collaborative effort of a group of European scientific institutes, including Alba, Desy, Elettra, ESRF, FRM II, Solaris and Soleil.

Soleil synchrotron

The first user of Observatory Sciences TANGO software library for the Power PMAC will be the Soleil synchrotron – the French national synchrotron which provides a multi-disciplinary instrument and research laboratory. The synchrotron is currently home to a number of high profile research projects, including looking into the production of graphene semiconductor nano-ribbons. This two-dimensional crystal composed of a single layer of carbon atoms has very promising properties that could drive major advances in microelectronics. Observatory Sciences experience with Delta Tau goes back over 15 years to work on the Gemini 8 metre Telescopes project. The Gemini mount control system, acquisition and guidance system and cassegrain rotator all use PMAC2 VME cards to provide the servo control to their motors. Observatory Sciences consultants worked with staff at the Argonne National Laboratory, Chicago, to develop and test the PMAC VME device driver. More recently, Observatory Sciences has worked with Delta Tau to integrate its GeoBrick LV controller with EPICS to provide the Diamond Light Source synchrotron with its next generation motor controller solution.

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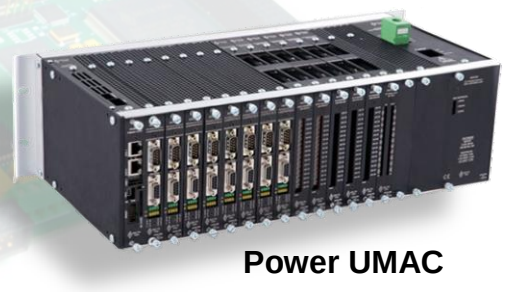

Power UMAC

EPICS/TANGO background, if required:

The Experimental Physics and Industrial Control System (EPICS) is a software environment used to develop and implement distributed control systems to operate devices such as particle accelerators, large telescopes and other large physics experiments. The toolkit is designed to help develop systems which often feature large numbers of networked computers providing control and feedback.

TANGO is an object-oriented distributed control software system that has been adopted by several European facilities. It is being actively developed as a collaborative effort between the Alba, DESY, Elettra, ESRF, FRM II, Solaris and Soleil Institutes.

The Power PMAC communicates with the outside world using command strings passed over an Ether net connection using SSH (Secure Shell), a network protocol used for secure data communications.

The EPICS software module produced by Observatory Sciences includes a low level SSH driver, EPICS asyn driver and device support code for the Delta Tau Power PMAC motion controller. The software has been written to closely match the already existing PMAC EPICS support code where possible and to provide the standard EPICS motor record interface which is already in use at many installations.

A general-purpose Power PMAC communications library has also been produced by Observatory Science which will be used in the TANGO software environment. The library is portable, written in C++ and can be used on either Linux or Windows operating systems. The library uses a low level SSH driver and provides a wide range of Power PMAC functions, including controller status and control, download and control of PMAC motion and PLC programs as well as axis movement control and status.