A Control System (not only) for SHIPTRAP

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SHIPTRAP is a facility tailored to slow down, cool and purify short lived trans-uranium isotopes delivered by SHIP. Experiments will be done either with SHIPTRAP itself or with other set-ups that are placed behind SHIPTRAP and which require cooled, purified and low-energy ions. The design and implementation of the control system[1] for such a facility is challenging. About 1000 process variables have to be controlled. The experimental procedure requires periodic execution of a sequence of actions with a precision of about 100 ns. The different operational modes that will be used require the control system to be highly flexible. It must be possible to change between different operational modes during run-time of the system. It is clear, that such a system can not be implemented on a single PC, but a distributed system of many PCs is required. The environment used for development must be easy to use. Maintainability and further development of a control system should not require a long time of learning.

The control system will consist of two parts. First, there is a general framework that is described in the presentation. That framework can be used by other experiments as well. Second, there are SHIPTRAP specific add-ons. For the implementation, an object oriented approach, that is made possible by a toolkit from Vogel Automatisierungstechnik[2], has been used within LabVIEW by National Instruments[3]. The system is developed on normal Windows PCs. This is possible, since time critical sequences are implemented in hardware.

At present, the general framework is still in the development stage. Nevertheless, the major part of the functionality of the core system has already been implemented. The framework in its present state has been applied and tested in a first test application that will be used to control a couple of stepper motors. The software of the framework is GPL licensed and available for download[4].

It is planned, that a first version of the control system for SHIPTRAP is implemented during the summer 2002. It is intended, that the framework will not only be used by SHIPTRAP but for other experiments as well. HITRAP[5], ISOLTRAP[6], WITCH[7], LEBIT[8] and PHELIX[9] are observing the activities with interest. It is hoped, that the framework will be maintained and further developed in a collaborative effort.

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[1] http://www-wnt.gsi.de/shiptrap
[2] http://www.objectview.de
[3] http://www.ni.com
[4] http://labview.gsi.de/CS/cs.htm
[5] http://www-aix.gsi.de/ eurotrap/hitrap.htm
[6] http://isoltrap.web.cern.ch/isoltrap
[7] http://www.fys.kuleuven.ac.be/iks/ko/research/witch/default.htm
[8] http://www.nscl.msu.edu/technology/experimentaldevices/lebit.html
[9] http://www-aix.gsi.de/ phelix