InterCAT Technical Working Group Meeting
January 16, 2003

Agenda Review and TWG Activity Summary: (Reinhard Pahl)
Reinhard called the meeting to order and reviewed the agenda.

APS Updates/News

(John Noonan, ASD)
Most of the activities during this shutdown were related to routine maintenance. John gave a summary of several tasks which will influence future operations:

- Two sections of the LINAC saw significant efforts to correct for an error in the energy gradient (L4) and optimization of the accelerator structure (L5).
- The booster ring required just routine maintenance.
- In the storage ring area a RF cavity needed to be vented in order to exchange a gauge (processing of the unit is ongoing). AOD started to replace ion-pumps in the ring and in the beamline front-ends (Ti deposition on ceramic parts is leading to increased leakage current and eventually to failure). Approx. four sectors can be finished during a shutdown – it will take about four years to finish this task. In addition, all power supplies inside the storage ring will be replaced over the next few years (1400 units total).
- 5-ID required work at the front-end: a vacuum gauge and a leak in the photon shutter needed repair.
- 18-BM front-end vacuum chambers had to be vented to repair an Xbpm.
- The wall collimators at 6-ID and 1-ID show early symptoms of failure. They will be replaced during the next shutdown period.
- Decker distortion has been implemented in Sectors 9, 10 and 21.

Efforts are being made to reduce negative impact on the initial startup of the machine due to the vacuum work in several sections of the ring and front-ends.

(Pat Den Hartog, XFD)
Pat presented an update on the design and schedule for the installation of the canted undulator beamlines (Sectors 21 and 23). Currently the vacuum chamber and utilities are installed for Sector 23. During the next shutdown the undulator, dipole and corrector magnets and the power supplies will be installed at Sector 23 while vacuum chamber and utilities will be installed at Sector 21. During the fall maintenance period Sector 21 will obtain their undulator. Both sectors should see first light during APS run 3-2003.
(The canted undulator beams are separated by 1mrad; the source is a modified Undulator-A of 2m length and 62 periods.)

(Liz Moog, XFD)
Liz summarized the status of the insertion devices. A number of IDs were removed during this shutdown for testing and maintenance. The repair of U33-17 (Sectors 13) and U33-30 (Sector 22) will take longer; these IDs have therefore been replaced with new devices.
In addition Liz also gave an overview of the absorbed radiation dose of all insertion devices. As reported earlier (Nov-2002) both undulators in Sector 3 show significant deterioration of the magnetic field. APS has ordered a re-magnetizer to rebuild the IDs. Experience at other SR sources indicates that remagnetization of the poles will restore the magnetic flux to its original value. (The detailed information presented is available in the Minutes section of the TWG website, *ref.* Moog_030116.pdf).

Presentations

Beam-position monitor and its applications (Randy Alkire, SBC-CAT)
SBC-CAT developed a quad-PIN array detector for fast and accurate measurement of the beam position (*ref.* J.Sync.Rad.7 (2000) pp.61-68). Detector and associated electronics were modified later to enable quick EXAFS experiments at Sector 32 (see also TWG minutes from Nov. 2002). Randy provided insight into design, calibration, and applications of the system in beamline controls and diagnostic. The fast response of the detector is used in a feedback system to stabilize beam position and intensity at the sample. The high position accuracy of 20 microns also allows for analysis and optimization of the (focusing) X-ray optics. For details visit the TWG website www.aps.anl.gov/cats/twg/, *ref.* Alkire_030116.pdf.

Implementation of the EPICS software feedback system at CARS (Robert Henning, Mark Rivers, CARS-CAT)
BioCARS used software developed by Mark Rivers to stabilize their monochromator operation and speed up energy scans (see the Minutes section of the TWG website, *ref.* Rivers_020118.pdf and Henning_030116.pdf). The enhanced PID record proved to be flexible and easy to implement. Currently only the 'slow' feedback is used, the 'fast' feedback implementation would allow intensity stabilization at a rate of up to 10 kHz.
The EPID record is also used to control the relative humidity in the sample environment for crystallographic experiments. Operation of several instruments, NESLAB chiller, temperature controller, dew point meter and mass flow controller is combined by a simple MEDM interface.
Mark Rivers added to this presentation by listing the GSE-CARS applications of the EPID record:
- monochromator 2nd crystal feedback on 13-ID and 13-BM,
- furnace temperature control in large volume press,
- pressure control in large volume press via hydraulic pump,
- temperature stabilization via laser power control in laser-heated diamond anvil cell.

The digital monochromator stabilization system SIS2900 (Klaus Attenkofer, BESSRC-CAT)
The many monochromator stabilization systems which have been developed at the SR sources can be classified as analog and digital feedback systems. Klaus described why HASYLAB at DESY chose to design a digital system and explained how the beamline design and the experimental requirements determine the setup procedure for the digital MOSTAB.
Klaus has been part of the development team and he will be happy to supply anyone interested with additional information or support the implementation of hard- and software for the SIS2900.

Next TWG meeting:
The next meeting will be held at 10h30 on Thursday February 20, 2003 in Bldg.401, Room A1100.