InterCAT Technical Working Group Meeting
August 15, 2002

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

APS Updates

(John Noonan, ASD)
John reported on the continued efforts to determine the origin of the PS-2 photon shutter failure at Sector-6: Analysis at 150°C revealed five cracks in a high stress region of the shutter. Two of these cracks penetrated to the water-channels causing the vacuum failure. It is unclear if the failure is caused by mechanical or thermal fatigue or a material flaw. A task force has been formed to investigate the problem and prevent further incidents. In addition the PS-2 shutter from Sector-2 will be removed and checked for indication of material failure.
A procedure has been developed should a similar incident occur at any other beamline: In order to keep the beamline operational the damaged shutter will be disabled and adjusted so it is not obstructing the beam. After reconfiguration the EPS the second photon shutter will be used for beamline operation. (There are no 'spare' photon shutters available, although one is in construction now.)

CAT Presentations

KB-mirrors for micro- and nano-focusing (A.Khounsary, XFD)
Ali summarized current technologies in mirror manufacturing and their limitations on optical quality. The need for even better optical finishing could be addressed by applying deterministic polishing, a technique developed for EUV lithography. Few (prototypes) of these super-mirrors have been produced with excellent results. Metrology showed slope errors of 1.1nm (RMS) and slope errors of 0.2 μrad. The size of these optics, approx. 200mm, makes them ideal components for a KB-system with micro- or nano-focusing capabilities. Deterministic polishing can in principle polish a surface to any figure desired (including an ellipse), provided a high quality reference surface is available. The large startup cost for this technique is due to the fabrication of a high quality reference. Ali has procured a flat for testing purposes (300mm x 40mm x 15mm, 0.2 μrad in clear aperture) and his collaboration will determine the performance of the flat in the near future in a bendable multilayer system.
It was suggested to form an interest group at the APS in order to pursue the acquisition of several super-mirrors. A combined purchase would amortize the relatively high set-up costs for the production. For questions and additional information please contact Ali Khounsary at amk@aps.anl.gov.

Tools and Toys: X-ray cameras and motion controls (E.Dufresne, P.Ilinski, R.Pahl, J.Quintana, M.Rivers, S.Weigand)
Design and performance of X-ray cameras developed for a variety of applications were presented. The spectrum covered low-cost devices for simple beam diagnostics to high-end cameras used in specialized imaging systems. Some of the X-ray cameras are described in documents available in the Minutes section of the TWG WebPage http://www.aps.anl.gov/cats/twg/ (*ref.* CARS_020815.pdf, DND_020815.pdf, Dufresne_020815.pdf, Ilinski_020815.pdf)

John brought several interesting devices to the attention of the auditorium:
The MDrive23, a motor with built-in driver and communication port offers a simple method to implement motion controls (*ref.* www.imshome.com). In combination with a standard linear translation stage (e.g. THK from McMaster Carr) changing experimental conditions can be accommodated at a relatively low cost. An interface box which can connect 2 or 4 serial ports to an ethernet port (*ref.* NPort Server Lite at www.moxa.com) increases the flexibility of the experimental setup.
John also demonstrated the use of a laser alignment tool – a self-leveling rotary laser (Class-2) – ideal for coarse alignment of beamline and experiment components (Lasermark LM400-2, CST Corporation, purchased from www.MytoolStore.com). This system is installed at beamline 5-ID-D.
Finally, John briefly described how he adapted DVD burner with IDE interface to the SCSI interface (*ref.* SCSI-to-IDE cabinet at MegaHaus.com or SCSI-to-IDE bridge at www.acard.com). This way the devices can easily be configured in Linux and backup capabilities significantly improved.

Next TWG meeting:
The next meeting will be held at 10h30 on September 19, 2002 in Bldg.401, Room A1100.