

BCDA Activities – July 04

Specific beamline/XOR support

XOR-1ID:

Began working on EPICS motor record device support for the ELMO motion controller being used to drive the new tomography system.

Installed new low cost transition board (BC-037) into 1ID-C system for field testing. Initial tests are good.

XOR-4ID:

Wrote EPICS support for the Stanford SR400 dual channel photon counter (database, SNL code, displays).

XOR - Sector 2:

Tomography

- Troubleshoot a new problem with the tomography acquisition program. It's suddenly timing out—but in a weird way--when trying to connect with PVs at startup. This is having all kinds of negative results. We initially increased all the capendio timeouts to >double their previous values. Later, it was found that a misconfiguration in the 2IDA crate was leading to exceedingly long CA connect times to PVs in the 2IDA crate.
- Started looking into what it might take to integrate the new Danaher motor drivers into the tomography system. This integration might allow us to run in a mode that could potentially cut the total overhead by two thirds.
- Helped Joe Maj with a problem he was having with scans and the CCD Image Server in the topography lab.

Helped Chris Roerhig get started on bringing an old PCAS application back up to date. Explained a bit about how the PCAS works and how to get started building the application.

MHATT-CAT - Sector 7:

- Worked with Don Arms to upgrade the processors on several beamline crates. This involved installing vxWorks bootrom code on MVME5100 boards.

IMMY-CAT - Sector 8:

Met with Alec Sandy to discuss near-term 8ID EPICS support plans.

E Station

- Developed a requirements list for converting the E Station Micro-diffraction setup to EPICS.

- R. Sluiter assisted in determining if the MM2000 motor controller currently being used could be ported to EPICS. Since the controller did not have a serial interface (ISA Bus only) we decided to recommend that it be replaced by the MM4000 controller. A. Sandy has agreed to this approach.
- Setup test stand for New Focus PicoMotor Controller and began work on Motor Record driver development.
- Setup test stand for Keithley Electrometer for database/MEDM development support.

I Station

- Added command line access to XIA Slit controller. Required to access setup control parameters that are not supported by the sequencer program.

MultiTau cluster

- Began development of the multitau cluster. Started a single process C program to build the data structures and perform the necessary calculations. This single process will be used to prove the algorithm functions properly and to gain some performance experience prior to starting to parallelize the processing.
- Created a C++ class structure for autocorrelation algorithms. The class structure is an attempt to define an interface to make it trivial to change—at run time—the algorithm used for correlations.
- Converted Mark Sutton's Yorick code to C. This was as direct a translation as I could make and is used for comparison purposes.
- Created a multitau class that implements the base correlation class. Although the correlation algorithm is the same as the original Yorick code, the implementation and interface are different.
- Created a "brute force" correlation class that implements the base correlation class. While the multitau algorithm uses a "backing off" algorithm to both conserve memory and CPU cycles, this algorithm does the entire calculation and so consumes a lot of memory and time. It has proven useful in helping debug the multitau algorithm.
- Spent some time optimizing the multitau class and playing with the algorithm to better understand how it functions.

GEOCARS – Sector 13:

Assisted Gouyin Shen from CARS in getting new updated catcher package for IDL 6.0, their data base has been update to new sscan record

GM/CA – Sector 23:

Worked with Sergey Stepanov (GM/CA) to understand problems they're seeing with the Joerger VS-series (they're running the beta version of devScaler_VS.c, with an early version of the Joerger VS firmware). When the card is in a crate by itself, I haven't noticed any problems. (The problem was that the ip330 had the same interrupt vector as

the scaler.)

NANOCAT – Sector 26:

- Looked into problem people were having with the Keithley DMM. Eventually got Ron Sluiter and Bob Laird involved as it was looking like a problem they've both encountered recently. Eventually turned out to be that two different CPU boards were configured as system controllers and were both contending to control the bus.
- Set up thermocouples and an sdds monitor program to monitor them to look for correlations in motor drift with temperature. Looked into some issues sddsmonitor is having reading PVs from the labview PCAS.
- Cleaned up some of the raw thermocouple reading logs to pass along to the nanoprobe people for analysis.
- Researched barometric pressure and relative humidity transducers for data logging and trending the room the nanoprobe is in. Also found some cheap thermocouple signal conditioners for logging and trending as well.

UNICAT – Sector 33:

Installed newest version of CCD Image Server in Sector 33.

XOR:

Assisted Felix Krasnicki from Metrology Lab. They encountered a problem in the catcher program. I fixed their 1D data catcher file for them. I found out the problem in his case is due to system error, no more space available in their device.

Assisted Abu Saleem Khaliefeh from X-ray Lab on setting up environment and using the old 'scanSee' object to do image data manipulations.

Assisted Gouyin Shen from CARS in getting new updated catcher package for IDL 6.0, their data base has been update to new sscan record

General

Web pages for the EPICS training course were produced and went live.

Worked on PowerPoint view graphs for Visualization tools lecture.

Re-designed the PCB layout of the manual stepper motor driver.

Confirmed that the long standing OMS VX2-006 "initialization problem" has been resolved.

Completed the conversion of the motor record from MPF to ASYN. This will greatly simplify software maintenance and development in future.

Verified that the Newport MM2000 motor controller works with the existing MM3000 device driver.

Continued working with Delta Tau and OMS on problems with their respective PMAC and MAXv controllers. This has involved detailed discussions with both manufacturers.

SCANSEE R3.3

- Modified color 1D PS plot in scanSee (requested by Dan Legnini):
The 1D plot has been modified such that a different line style is automatically used for black and white plot.

A user now has the option of setting color and different line style in 1D plot.

The postscript output now is exactly same as the plot style as shown in the drawing area.

Starting R3.3, a color postscript printer is the default

- Modified sscan.pro such that if there is no 2D data array found in a 3D scan, the second Zslice from the 3D data array will be displayed by the panimage window, the detector not defined will be labeled by the corresponding detector name.
- Added new 1D features in ViewData: 1D_OVERLAY..., 1D_CALIBRA...
- Modified TIFF/PNG/PICT/PS image plot for pseudo/true color display
- Modified 1D main window by default for displaying the 1D data array, added the scan1/scanH droplist option to allow a user to display scan1/scanH data array
- Created IDLVM save files for catcher.R3.1 and scanSee.R3.3 Tested catcher.R3.1 and scanSee.R3.3 with 8bit and 24bit display devices Installed new runtime and developer version on beams server
- Prepared and updated download complete catcher and IDL tar files
- Downloaded and tested new catcher and IDL tar files on beams server and they are built with EPICS R3.14 solaris-sparc on beams

VIEWER

- Modified colorbar.pro to set fixed color lines in 1D plot
- Modified plot1d.pro to combined the Printer, PS Plot and Print buttons as a pulldown menu to reduce the width of the main window widget area. Added a dialog of loading IDL color tables to the Print Menu
- Modified view1d and view2d to support 24 bit, in order to use this new option, the set value for IDL graphic devices in .Xdefaults must be commented out
- *Modified calibration_factor.pro such that 1D overlay plot will include all the selected curves plus the calculated resultant, add the button of displaying of text data
- Modified IDL setup requirements for web page

Sscan IDL Objects

- Implemented sscan object program sscan__define.pro which provides various object methods for easy extracting data array and accessing various visualization tools for any 1D/2D/3D scan mda file.

CCD Image Server

- Cleaned up the code a bit and thought about features for next version.

Access Grid

- Met with computer support to discuss what needs to be done to get a computer set up as an AG server. Explained to them what the goal of the proof of concept setup will be.

eBrick

- Started updating all the pieces I've been running on the ebrick to the newest versions. Also wanted to see if I could get the brick running from scratch again...

Leutl

- Looked into a problem with one of the VUV cameras installed in Leutl. Problem turned out to be that the trigger cable was a) not plugged in and b) faulty once it was plugged in.

Helped Andrei Tkachuk start down the road to the wonderful world of building channel access clients. For Andrei's case, this will most likely be in Igor.

Merged enhancements in `sscanRecord`, `saveData`, `scalerRecord`, and `autosave` from 3.13 branch to `synApps 5.1` development.

Worked with Joerger to understand intermittent, failures of the hardware to respond to the gate-trigger command, and report the status of the gate, in internal-gate mode (i.e., timed-counting mode) with 'low' (<50kHz) clock frequencies. Joerger thinks the board is bad.

LDRD-proposal evaluation. Wrote comments for selected proposals that will not get funding.

Working on EPICS-course outline.

Updated "support-modules" info in EPICS web pages.

Added documentation pages to `bcdWeb`. Wrote `swaitRecord` docs.

Wrote `arrayTest` (database and `medm` display) to verify that the `sscanRecord` and `saveData` really are doing what they should be doing in double-buffered data acquisition. Acquired and wrote to disk (`/local`) a 1000 x 2000 point scan (4 2000-element arrays), with 50 ms detector dwell time, in 56 seconds. This corresponds to 4 ms overhead per data point for acquiring and writing data (8 MB/s), and 2 ms per data point to generate the arrays.

Translated a few `synApps` databases from `gdct` to `VDCT`. The `gdct` translator tells `VDCT`

to display many fields with default values, which VDCT would not ordinarily display, so the display is hopelessly cluttered with field values. However, VDCT does a good enough job of translating simple databases that gdct's translation isn't needed anyway. For complicated databases, the best method seems to be to manually add gdct's translated position information to a pristine copy of the database.

Rewrote array-interpolation software to allow unlimited array size, check bounds and polynomial order

APS Hardware Catalog

- Announced beta release of BCDA web interface to the hardware catalog to the APS Beamline developer community.

Prepared introductory lecture for EPICS course.

Spent time in coordination of the EPICS lecture series.

BCDA lab was moved from the third floor to the first floor so that it's now on the same floor as the rest of the group. The new location is L1111.