

FEE Teststand and SRCF Production System

- [Schedule:](#)
- [General to do](#)
- [s3df to-do](#)
- [tmo to-do](#)
- [rix to-do](#)

Schedule:

- FEE Commissioning: December 1st?
- TMO first light (easier): Jan. 24, 2023
 - KPP: MUST have ability to read out the piranha line camera on FZP and ability to read out two HSD channels on MBES but only if GMD /XGMD measurement doesn't work; could also be an opal
- RIX first light (harder): ~March 2023
- LCLS-II KPP test with soft-x-ray in the hxr line in txi (March/April) they may need a wave8 or a hsd or a (controls?) camera to see the signal? (phil heimann is coordinating) - air attenuation tests; 3 keV
- KPP measurements on hard x-ray line in the FEE (may only need power meter, or slow signal that gets fed back to ACR)

General to do

- recabling to srcf (cpo+ric+others)
 - use data volume to each node to figure out cabling
 - what should go through the bos? exclude opals?
 - what should use MPO (Nov 1 checkpoint for laser locker/XPP; switch on Nov 16; revert by Nov 18 if unsuccessful) including BLD, IOC, FIM, XTCAV, Mono Enc TPR (we can switch daq timing independently of controls timing)
 - IOC depends on Kukhee's software
 - high rate BLD depends on Dawood's software
 - Jeremy Mock writes about XTCAV: "Hi Chris, we can test the camera triggering soon, probably in October some time. However, I think XTCAV proper (the klystron) won't run on lcls2 timing until sometime next year. I think I heard maybe February...?". Pat Krejick is coordinating the change.
- 33kHz BLD: ebeam, gmd, test asap. waiting for software development (depends on Dawood)
 - test reception of 33kHz gmd without beam ASAP working with Marcio
- commission s3df
- migrate ctl nodes (move hsd processes onto daq-tmo-hsd-01 (Ric), but not mono encoder)
- commission xpm0 in 208 (weaver)
- (would be nice) xtca v "nice" for acr? how do we share between tmo/rix: need bos-switchable timing?
- (would be nice) test psana2 live mode again (mona)
- training for scientists (e.g. on timing system and sequences) (matt)
 - check we have psana2 detector interface for "sequence bits" (Matt thinks we have this: 272 bits)
- timing in all detectors

s3df to-do

- (done) psana1 (mikhail, valerio) psana2 (mikhail, mona, valerio)
- (done) smalldata code (silke, vincent)
 - will ask wilko to move some psana1 data over
 - need path to install packages
 - done by early february?
- movers (wilko)
 - few days of work. still needs some work on feb. 15
- need some kafka work for movers and elog (wilko)
 - should be ready for early february. still needs some work on feb. 15
- need some data management machines and irods (replaced by rucio in a few months) integration (wilko)
 - still needs some work on feb. 15
- data storage (omar)?
 - backend spinning-disk (aka "s3") 10's of PB done early january
 - will get 1.5PB of flash free space by third of week of january
 - **serious issue (has been worked-around by using "/home" and relaxing ACLs for FFB):** no extended ACL's since mounted via nfs. need multi-cluster feature? (expected in april?) or fully functional nfs?
 - could workaround by making group the expt group, but then access via ps-data (e.g. silke) wouldn't work
- mon-node mount of calibdir (under /sdf/data/lcls) via weka-nfs (IT) (done)
 - will try third week of january
- ARP (murali, wilko)
 - should be straightforward copy of what we currently have. confirm with murali. (still needs work on feb. 15)
- jupyter/ondemand (wilko, riccardo) (done)
 - could provide yee with default kernels (cpo will contact yee/wilko)
 - can run in batch queues (charged) and interactive nodes (free!!!)
- (done) LCLS group permissions syncing (wilko)
- finalize high-priority analysis mechanism (reservations, we believe)

- need coact (like iris at nersc) stuff from murali available by beginning of february
 - need management accounts to create per-account CPU allocations with coact. still needs work on feb. 15
- will also coact to enable their s3df account
- enable user access to s3df (IT)

tmo to-do

Equipment list:

- magnetic bottle (few hsd channels)
- 2 opals (fzp, atm). atm alignment could be in controls? eventually cvmi opal in run 22.
- 2 piranha (atm, fzp)
- bld (ebeam, gmd, xgmd)

Tasks:

- when can we switch from opals to piranhas?
- ATM background images (what happens if slow update is too slow? put background data in every event)
- will fzp/atm opals run at same time?
- hsd fex overflow damage flagged? (yes)
- test hsd prescale raw waveform buffering (ric already done at 10 or 71kHz, should be OK at MHz). ric tested with 16kB buffers. At 100kHz might have to go to 120kB buffers. Alert James to the fact that rate changes from 1MHz to 100kHz require buffer reconfiguration.
- move away from xpm0 to xpm2 for all tmo timing (cpo+others)
- early 120Hz testing of piranhas in october
- they may need teb-monitoring python scripts to select low-rate FZP opal or ATM opal: need to confirm with James (ric)

Info from James on switching from opal to piranha:

```
[camera,    need by date,    retire date]
[cvmi_opal_1, oct 27, nov 19] - retire date is negotiable, (maybe needs to be earlier?)
[cvmi_opal_2, oct 27, nov 19] - retire date is negotiable, (maybe needs to be earlier?)
[atm_opal,    oct 27, possibly run 22]
[fzp_opal,    oct 27, possibly run 22]
[atm_pirhana, oct 27, not planned]
[fzp_pirhana, oct 27, not planned]
```

rix to-do

Equipment list:

- 3 andor newton
- 3 wave8
- 1 piranha (atm)
- 1 opal (atm)
- bld (ebeam, gmd, xgmd)
- high-rate interpolated mono encoder (caf)
 - what is the right way to use that encoder (absolute or relative for the motor?)
 - relative encoder is still with vendor; early next year arrival at SLAC; try to integrate and read out at higher rates (work with Zach)
- EXS Manta (coordinate with controls for timing/sequencing)
- 1 channel HSD for coarse timing (rate? 1 kHz ok if we can see the whole waveform)

Tasks:

- integrating-andor timestamping (I think Dan said this is fine as-is)
 - procedure changes needed to included Kukhee's new module
 - dan is not sure if the EVR we have is compatible with LCLS2 timing
 - first "start exposure" event-code doesn't need to trigger readout, just the last "readout" event code
- accelerator burst-mode operation using BYKIKS to preserve accelerator stability
 - just have to write a json file using a script, somewhat more complicated than this because there are some "keep alive" (or "standby trigger") issues with kicker magnets, depends on beam-rate: <https://github.com/slac-lcls/lcls2/blob/master/psdaq/psdaq/seq/burst.py>
- scans with burst-mode (one burst is one andor event)
 - **NEEDS THOUGHT/WORK.** can we do multiple-bursts per step? e.g. if a burst is 1000 fast-detector events (and 1 andor event), and we set the xpm to end the step at 5000 events, will the step end in a natural way? no. deadtime can mess it up.
- high-rate interpolated mono encoder for fly-scans
 - offline second-pass with interpolation could also work
 - step-scans with slow mono are another option
- psana2 algorithm testing (mona)
 - continuous monochrometer scan with laser
 - delay scan with the ATM, scanning ATM delay stage
- ATM backgrounds broadcast to all cores, or may duplicate in each shot. Currently using the 1 Hz backgrounds
 - could we get higher rate backgrounds? Could make the analysis unreproducible

- are there ways around this?
 - Xiang may want a customized algorithm to the DAQ for ATM
- need teb python scripts to make and/or visible in AML (ric)
- Develop integrating analysis for HSD
- Accelerator diagnostic feedback: do not overlap BYKIK with 1, 10, 100 Hz (TBD) - Tim Maxwell?