



BERKELEY LAB



2x2 Shifting and Operational Readiness Status

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ND-LAr Consortium General Meeting

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Shifting Start Date

- Cryogenic installation and testing should be such that we are ready for cryogenic system pORC March 18 (best projection as of today, more on next slide)
 - ~1 week needed to commission LRO once cleared for final cabling
- Proposal: start “proto-shifting” week of March 18
 - One 8 hour shift per day. Shake out any issues with monitoring tools, procedures, checklists, etc.
 - Continue this way through the fill
- April 2 - Transition to 24/7 shifting after the fill, cover cold commissioning into operations
 - Shifts can be taken remotely as well. We still need to define the requirements for offsite shifting
 - If you plan on coming to Fermilab to contribute to shifts and/or commissioning, please do reach out to myself, Luis, and Louise ahead of time

Cryogenic Work Timeline (from Jen)

- Still on schedule to complete all cryo work & ODH no later than March 15
 - Cryo controls checkouts will start ~next week (as soon as SBND filling is finished)
 - “Backup” Pressure Relief Valve (PRV) tested & piping currently being assembled, likely ready for installation on vessel in the next ~1-1.5 weeks
 - Then last round of tightening bolts for indium seal, followed by pressure test
- When PRV installation & pressure test are done, consortium can finish making cabling connections to the feedthroughs on top of the cryostat
- ODH strobe/horn installations in progress/nearly finished
 - Strobes/horns near cryostat and by NOvA door are installed & tested, and also emergency button near LAr fill manifold
 - Strobe/horn at base of elevator should be done this week or early next week
- Aiming for pORC of cryo/ODH system early in week of March 18
 - Won't schedule until we're really sure the cryo work will be done by then
 - When we pass the cryo pORC, we will be cleared to start filling but will coordinate timing with LRO/CRO warm checkout activities
- Full/final ORC will be for the collection of all signed-off pORCs, along with a final walkthrough

“Backup” PRV (from Jen)

- The “backup” PRV comes from our older LAPD cryogenic system, and is now ‘Plan A’ for 2x2 cryo system, since vendor repair of original valve is taking too long
- This one is physically larger than the original PRV, so requires additional piping to plumb into cryo system without causing interferences with other equipment



ROC-W Control Station

- 2x computers and 2x 43" monitors have been installed in ROC-West (position 09, in the back near the kitchenette area)
 - SLAM is working on installing the correct OS and configuring
- Working on some options for a sign for 2x2 + Mx2 to hang above our station
 - A logo and a few sentences describing the 2x2 + Mx2 setup
 - If we have multiple good options, we can have a consortium vote (for fun)



2x2 Shifting and Operational Readiness Status

Operational Readiness Overview

- We have only very recently begun commissioning activities
- LRS, Mx2 making good progress and CRS is starting back up after the preliminary checkouts some months ago
- Slow Controls are in development, as is detector monitoring
- Many many details I could include here, but instead I'll just try to give an impression of where key subsystems stand

Operational Readiness - Slow Controls & Monitoring

- Monitoring in good shape and will be developed over commissioning
- Have good starting point for slow controls, developing and testing picking up now

Detector ground monitoring (GlzMo)



Temperature measurements in 4 modules

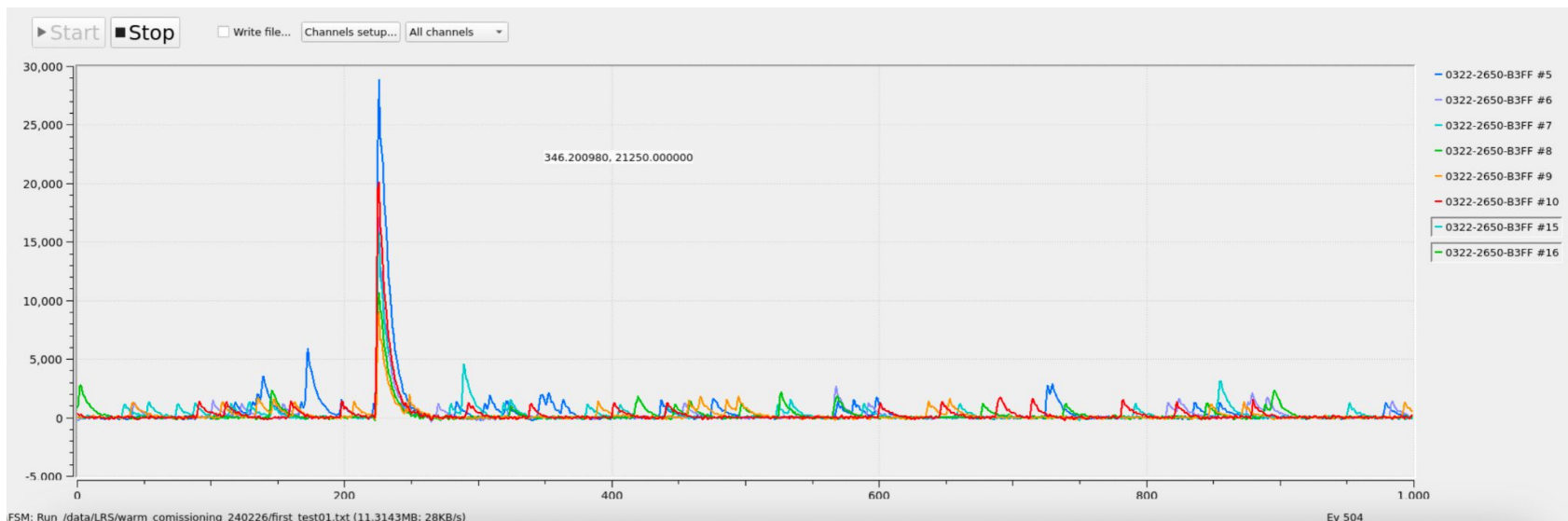


acd server usage (memory, disk, CPU, data rate)



Operational Readiness - LRS

- Starting to checkout full chain from pulser → sipm readout → DAQ
- Catching and addressing some issues - e.g. ID flipped ribbon cable connector
- Not able to finalize cabling until cryo work on lid is complete. Once final cabling is in place, need ~ 1 week to warm commission



Operational Readiness - CRS

- Read out single TPCs opportunistically over the past months
- As of this week, we have cabling and ORC to readout 1 complete module
- Cables and interlocks for remaining modules expected imminently → enabling readout of entire 2x2
- Updating firmware for tile-by-tile resets
- Installed DQM onto underground servers
- Gearing back up with exercising DAQ
- Working towards establishing automated configuration and DAQ initialization as run control is being developed

Highest level DQM view



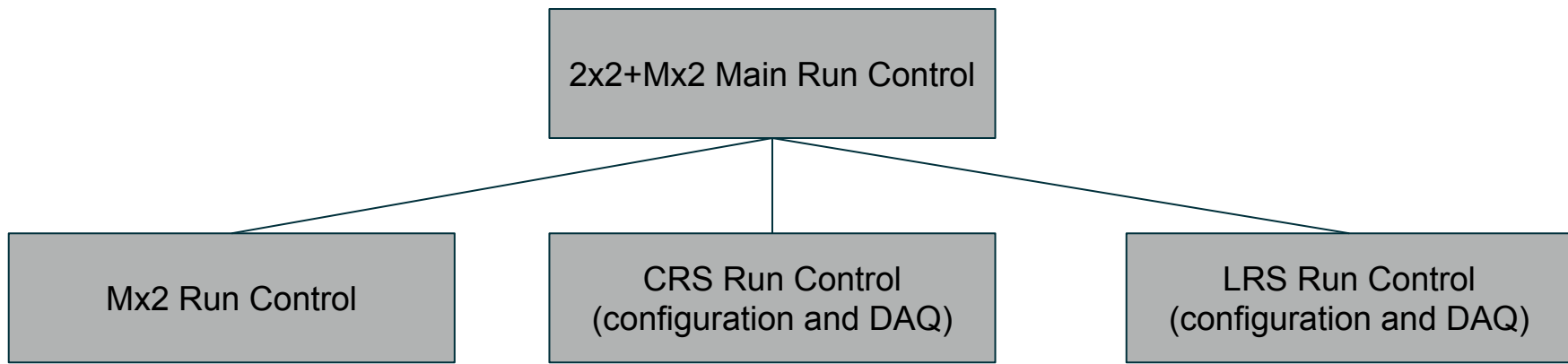
Operational Readiness - HV

- Have clearance to turn on spellman, but not to ramp up voltage (even w/o cable attached)
- Working on control software
- We are discussing how much access to HV controls to provide shifters
 - Nominally, shifters will only monitor the system. Any required intervention would be communicated to and handled by system experts
 - Are there particular situations where we would benefit from shifters having access to controls?
 - Should at least be able to turn off (software kill switch)?
 - Need clear procedures and safeguards against misuse

Operational Readiness - Mx2

- A lot of recent progress thanks to Akeem and Jack on updating the DAQ & Run Control code for AL9 compatibility
 - Also able to run on test stand and Mx2 in parallel now
 - Taking light injection data runs continuously to exercise the system
 - Planning for metadata definitions, cataloging, data transfer and will start exercising imminently
- Also, working to include RWM into readout to synchronize with 2x2 readouts and correct for jitter on the early warning signal used for triggering (\$A9)

Operational Readiness - Run Control



- Lots of discussion, finishing up planning phase, and starting to move into development phase (M. Kramer)
- Start and stop subruns (separates data files), communicate metadata information, handle errors appropriately (e.g. Mx2 failures don't stop 2x2 data taking), ...
- Coupled to data management

Summary / Closing

- We, of course, are not ready for operations, but making very nice progress
- We have been and are coordinating with installation activities as much as possible, but will need some time to warm commission once we have full access
- You can monitor the ELog: <https://dbweb9.fnal.gov:8443/ECL/argoncube>
 - Let me know if you need an account. Please include your Fermilab services username (e.g. mine is kwood)
- If you have any concerns, questions, or suggestions, please let Luis and I know. We appreciate feedback from other perspectives