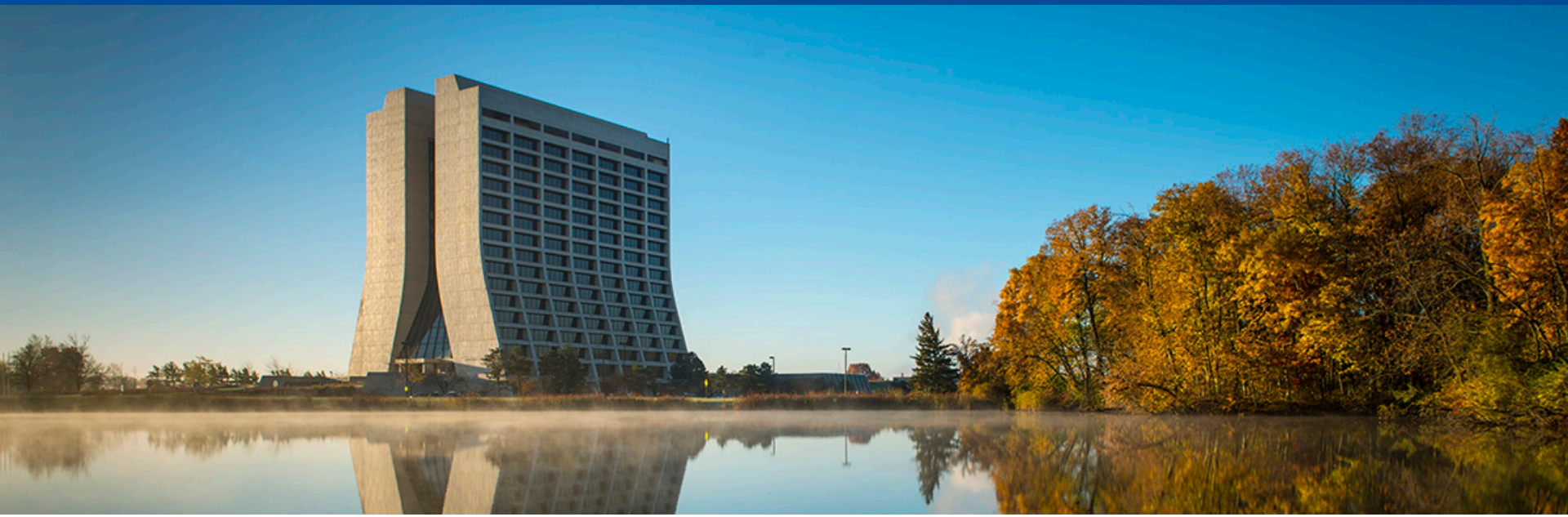


Run4 Ops Thoughts & Suggestions

Mike Wallbank

FAST/IOTA Run4 Ops Retreat

11/2/2023

Disclaimers & Caveats

- I'm still fairly new around these parts, and was only involved at the very very end of Run4.
- I appreciate having the opportunity to share my thoughts, and completely understand if the weighting is appropriated proportionately!
- Perhaps I can give a view from a slightly different perspective.
  - Before moving here, I was most recently run coordinator for an experiment at FTBF (primary MCenter beamline user) for ~4 years, was involved in operations for NOvA, and previously worked on operations for DUNE prototype experiments.
- Happy to aim to take the shortest time today!

What's Great Here

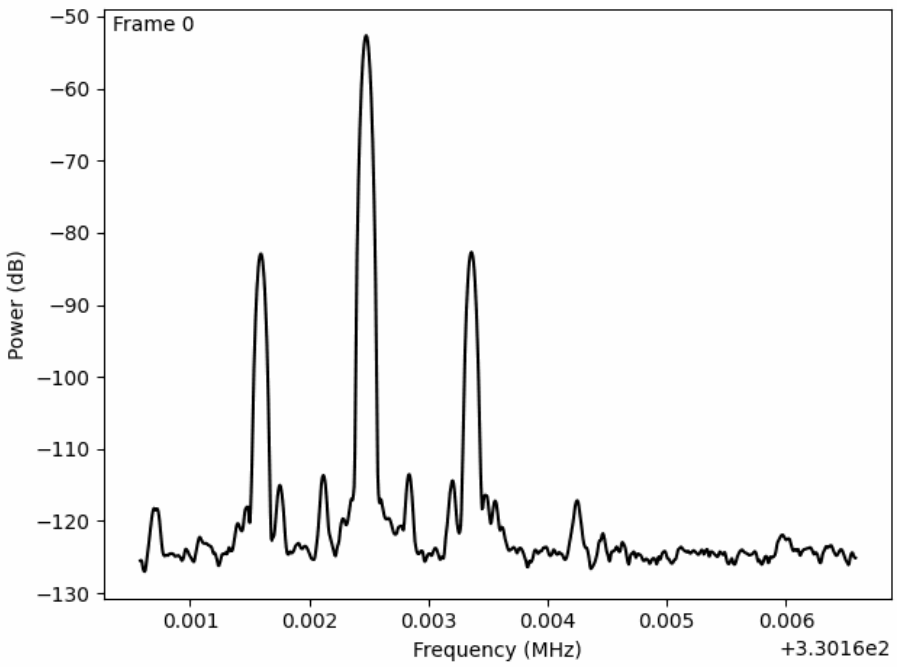
- The team!
- Collaborative environment — feels like everyone is working towards the same thing.
- The run coordination, organization and support is excellent.
  - Having experiment-agnostic, dedicated run coordinators is so good!
  - Easily-accessible run schedule was very useful.
- The control room is a nice place to be (that's important too!).
- Everything provided via standard ACNET scripts/Synoptics are very well put together, informative; in general figured out where to find information.
- The ops training was sufficient, appreciate the autonomy afforded to newbies to get involved.

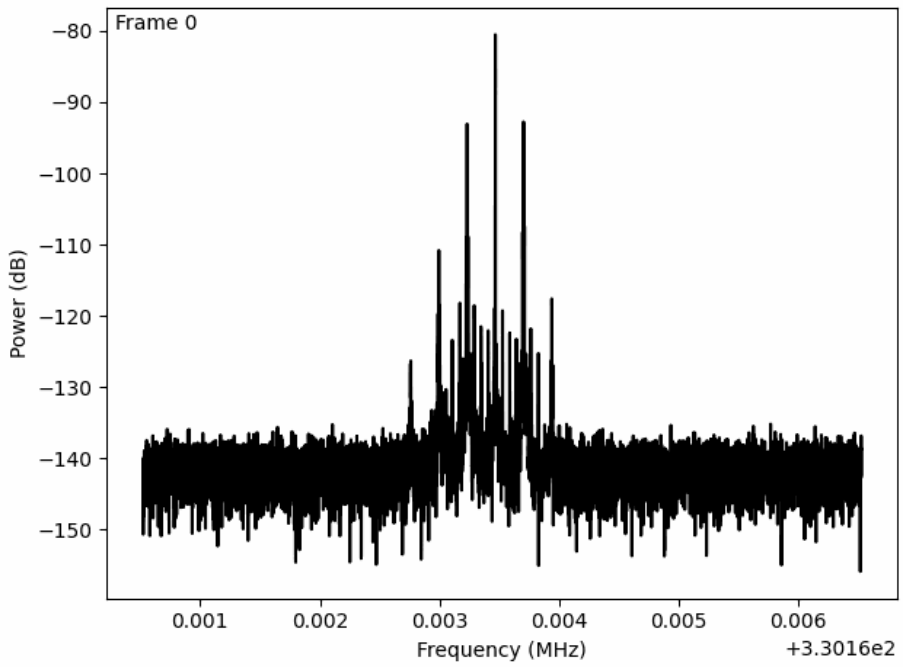
LADR Experiences

- Appreciate receiving all the shifts we initially asked for.
- Instrumentation in general was excellent and enabled us to do what we aimed to.
  - Used spectrum analyzer hooked up to wall current monitor to make measurements of the compaction down to very small values, for incredibly low currents (sub 1μA).
  - Usual problems (no doubt discussed elsewhere) with the C-sext power supplies.
  - Streak camera.
- Gained significant useful expertise in quasi-isochronous operations; the path to zero compaction (and beyond) was clear and perhaps would have been attainable with one or two extra shifts — next time.
  - Developed new measurement techniques and a suite of associated scripts.

Example Spectrum Analyzer Scans

- For illustrative purposes (don't have details about the specifics during each scan right now!).
- Left: higher compaction, low sampling rate (1001 points); right: lower compaction, higher sampling rate (10001 points).





AI/ML Dedicated Scans

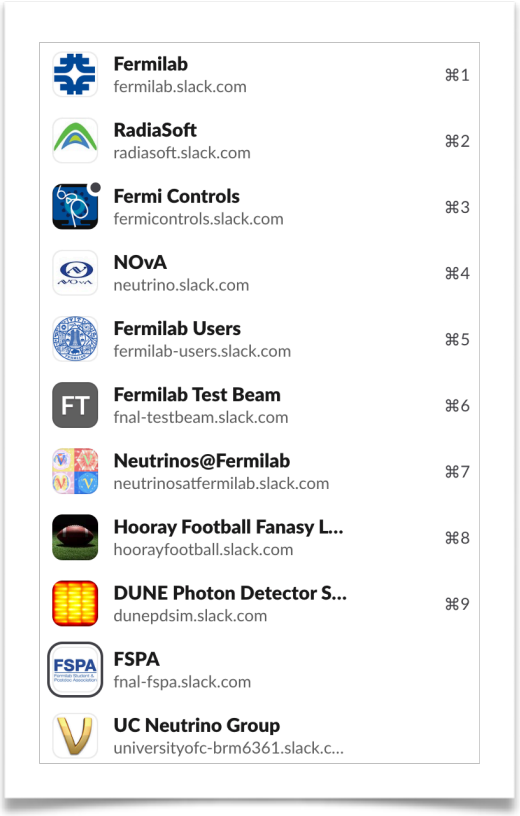
- As part of our work with RadiaSoft, I pulled 'historical' data (just for Run4) from the data loggers for most of the linac devices (trims, quads, BPMs, toroids etc).
  - Found a very inconsistent mix of logged data. I guess it's never really been needed before, but perhaps it could be a good time to check things are being saved as we want them.
  - Also had issues (though could be related to the logger infrastructure) with blocks of data being misaligned in time.
- Related to this, and generally so we had a complete set of data with a good amount of variation, we ran some dedicated scans (during LADR shifts when we didn't need the linac) over various linac parameters. RadiaSoft have the data now.
  - Have a script (which I will absolutely rewrite in something that isn't ACL) validated, and shown the proof of principle. Something we could keep in hand.

My Suggestions

- My primary feedback for this group regards communication.
  - Not necessarily run coordination or department organization, the emails are plenty sufficient. More the day-to-day informal communication.
- It seems most communication is via text… but there's services like Slack and Teams which would be ideal! 📱
- Downsides to current situation: less work-focussed than dedicated services; shifter/coordinators have to communicate with multiple people simultaneously rather than just with one channel; information sent person-to-person is lost to everyone else.
- A couple of times I didn't get information during LADR shifts as it was sent just to Jonathan. Not griping, it's easy to do, but things in my experience are just easier with Slack.
- For someone new (like me), it's harder to find information and to be included in the correct communications consistently.

Slack!

- Disclaimer: I'm a huge Slack fan.
  - 'Topped' the 'leader board' in terms of messages sent pretty much every month when I worked on NOvA (yes I'm proud of that).
- Benefits I've found which would be great here:
  - Easy place to communicate with anyone quickly;
  - Easier/less formal than email;
  - Can have public channels for announcements, reaching everyone quickly with a question, etc;
  - Private channels great for collaborations or groups;
  - Makes it easier to keep across lots of activities/learn about what's happening at the Facility (e.g. can join a channel to follow along);
  - Serves as 'documentation': if an expert explains how something works or how to fix a problem in a channel, it's a searchable record available to everyone;
  - Every useful thing has an API (e.g. emails go to certain channels, can integrate with cloud drives etc);
  - Can also use for quick 'huddles' (but it's no Zoom replacement).



Slack: A Deeper Dive

Maggie Voetberg, Indico link

Using Reinforcement Learning for Telescope Survey Design

Brian Nord, Eric H. Neilsen, Maggie Voetberg, Franco Terranova, Shohini Rhea Sarkar

- Train an algorithm to reactively move a ground telescope
- Needs to react to weather conditions and manual repositioning to recover from interruption
  - Proof of concept with a rough distribution of sites
- Collaborate with Stone Edge Observatory in Sonoma, California (telescope controllable with a Slack API)
- Use a simulation to train agents in parallel and without using observation time

!!

Stone Edge Observatory

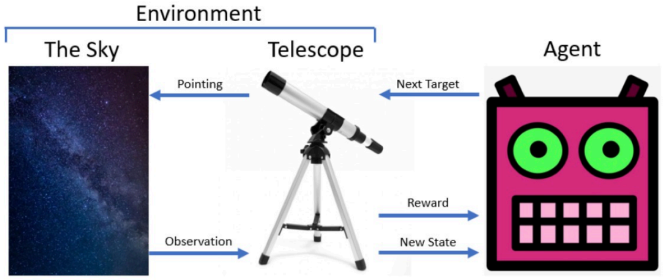


Diagram of the RL setup. A trained agent takes the current state of the sky, and moves the telescope to the next optimal target

Summary

- My first experience of operations here was in general very positive.
  - Lots and lots and lots that I prefer compared with my previous work in operations.
- Appreciated being able to do some real physics on the machine, and how smoothly everything runs.
- Reconsidering platforms of communication would be the only suggestion I have after ~7 months here.
  - Happy to take the lead on this, if people are interested (but obviously it needs buy-in for people to use it).
- Happy to answer questions based on other things I didn't think of!