

Minutes – Calibration Task Force Meeting, July 3, 2018

Agenda: <https://indico.fnal.gov/event/17501/>

Attendees: K. Mahn, S. Gollapinni, H. Rogers, J. Maricic, J. Wang, J. Chaves, J. Maneira, J. Reichenbacher, R. Diurba, R. Svoboda, S. Conlon, E. Tatar, J. Klein and possibly others

Talk 1: News! – S. Gollapinni presented

1) LBNC report is out, see email from Spokes. We encourage people to look at it. We discussed some of the main points raised in one of the earlier meetings. Next LBNC meeting Aug 1-3. We have to address the comments and what progress we've done in trying to address them.

2) At the last Calibration TF meeting, we talked about rack/space requirements at the DUNE FD site. We reached out to several people with a standard template to collect the information, it's important for us to get that information as soon as we can. This will be an iterative process. Putting in some information is important and we will hear feedback from the installation/integration coordinators and will have an opportunity to refine what we have there.

3) DAQ needs. As mentioned need to provide explanation of the rough numbers we have. We have asked Josh Klein to prepare a document and we will reach out to people to confirm/iterate.

Talk 2: Detector Systematics in CafAna – S. Jones (deferred to next week due to bad internet)

Talk 3: Calibration Insertion system of DarkSide-50 experiment – J. Maricic presented

SG: Push buttons? are those the hardware limit switches? (slide 11)

JM: What we use for them is, very thin cables, so you can tether the source separately and the arms separately to the central disc. In case, whoever it was deploying it to the source arm, gets disengaged, will still hang on those cables. Whole purpose of them, is like screws. But for Screws, there can be vibration which may unscrew them. Push button only disengage when pushed. Totally separate. Limit switches are connected to the motor, independent, hardware interlock Simple circuit, engages, and cuts power.

SG: OK, thanks. Was interested in what mitigation strategies are in place to avoid stuck sources.

JM: "Source stuck"? – what does it mean? What kind of scenario?

SG: It fell into the system, and is in the TPC.

JM: Yes, whole point of the safety lines in addition to the screws/pushbuttons. Exactly for that reason. Someone can always do that... impossible to avoid.

SG: Right, but people are nervous about it. It happened in previous experiments. This is a well-founded concern.

JM: Yes, happened in a bunch of experiments, Gerda, CTF (predecessor of Borexino) and plenty of ones where they did fine with extensive calibration/no issue.

JoseM: (slide 7) Disc is mounted on a plate, hanging by the two wires. Only thing connecting the plate to the top is the two wires?

JM: Disc is not freely rotating. There is also a connection to the (left picture) disc rotates and attached to the assembly behind. Entire assembly hangs on the two cables. Assembly hangs on swivel hooks to ensure no twisting. Also hanged the system on the stairs in Gran Sasso, (8m?) tested it. One of the reasons to put additional weight, better control of the rotation.

JM: There, did not deploy anything into cryogenics.

RS: So for DUNE, would have to go into cryogenics, difficult problem.

JM: That's true.

JK: If trying to use the neutron, neutron will get in.

RS: Would have to put it over the top surface, since no side.

JK: But you can walk around up there, no manipulator?

JM: Challenge for any sources

JR: Cesium, and Talium sources, and you really need to be close to the field cage for those sources. Mechanically can work nicely with the arm going up. Biggest problem is the HV breakdown, because of the E field because you are close. May need to talk to Bo Yu.

JM: Heard from Bo before, his answer was just use non-metallic which is doable but will increase cost.

JR: Nickel source, mostly 10 kg moderator which is an insulator. Safe distance from field cage is 20 cm at least (from Bo's studies). Here a smaller pointy source.

JM: Agreed, as you get closer, need to consider it, and shape is a factor.

JR: Get a lot of light and charge from Ar42, and Ar39, fighting the exponential if near anode.

SG: There is a radioactive source system that Juergen proposed with different sources. If I have to compare the two systems, what would be the main differences? (cost wise, separately) depends on how close you want to get.

JR: Can have 3 guidewires for the moderator. Safe distance, much higher energy gamma source for SNB and solar nueutrinos. But what can't do with the system, is move as close. Just vertically down.

JM: Yes, this was not a presentation that we should use this for DUNE— it's a dark matter experiment. Main point here is this is like a fishline system, two spools and a disc, gain ability to not just go in z, and can go more range for single location.

JR: Would think the main issue is the weight— neutron or Ngamma sources? and how would that couple?

JM: Yes, this is not great for a bulky source. Would like to look into other ways to produce neutron source with different moderator.

JR: Can also make a system with no glove box, purge box, doing on LZ.

SG: Glove box is bulky because Dark Matter experiment, right?

JM: Agreed, DUNE may not need that.

Josh (unrelated to talk 3): did send out a document for data volumes for DUNE FD, given what DAQ want to do. A lot to speculate about, they should look on DocDB, and look there.

SG: Yes, thank you Josh, we haven't had a chance to look at it, but will do so soon and we can circulate it to the group

JR: Have put in the partitioned read out of 2 APAs?

JK: Think it assumes 1 APA. We call it localization. Trigger command sent to the APA level, in this case only sent to that APA.