Minutes/Notes
ICARUS Technical Meeting
3 June 2020
Prepared by Bruce Howard

Participants (Zoom usernames as necessary, updated a few times during meeting): BH, Claudio M, Fernanda G, Alberto G, Filippo V, Anna H, Andrea S, Bishu B, Bob W, Christian F, Christopher H, Donatella T, Geoff S, Gian Luca R, Gianluca P, Guadalupe M, Guang M, Howard B, Justin M, Mark C, Matthew W, Ryan H, skipman, Tyler B, Umut K, Bill B, Vittorio P, Wes K, Animesh C, Carrie M, cjames, Milind D, *and possibly more*

Claudio reports that there was a meeting:

-> some note at beginning about the protests and Nigel sent the email yesterday

-> Claudio discussed that everyone needs to try to be open-minded

Cryogenics team working on recondenser

-> trying a solution and will order and implement in coming weeks

In meantime, moving forward with coming activities, e.g. the PMTs and Gian Luca will talk to us about this plan.

-> Then look forward with starting up HV system for the drift. Equipment that needs to be moved should be done by end of the week (e.g. power supply). Zack is expected to help set up the system.

-> With the TPC:

-> First thing would be to put all the planes to ground. Requires some care but is relatively safe action

-> Then can raise the high voltage (*note-taker's note: I missed adding this live, but I believe it was said that thoughts were to bias the first induction plane?*)

-> Some preparatory work this week and next week

-> Planning to go over a work plan in the planning meeting tomorrow

-> And then another action is to connect the optical cables for the mini-crates, probably not next week but week after

Next week for sure we will not be raising the high voltage, still doing the installation.

In a little less than a few weeks there will be the collaboration technical meeting:

-> Bob: Mon-Tues 15-16 of June, two half-days.

-> Day 1: focus on detector hardware, Claudio and working group conveners will organize presentations. Hope for short presentations from several people

-> Day 2: focus on software, Daniele and Tracy will organize. Same thing with short updates from different people

-> Should be good opportunity for everyone to get an overview

-> Alberto G: and since new groups joining, this is an introduction too

-> Alberto + Bob: meetings will start 8am central time and go until noon central
-> agenda will be circulated later this morning

Claudio reminds that Neutrino 2020 will be starting in a few weeks, running for a few weeks of half-days. Will try to adjust meetings to not interfere with significant presentations during this time.

-> And Milind brings up Snowmass things will be going on as well
-> Alberto G. reminds from the point of the editorial board to send slides and such well in advance for review

Gian Luca goes over plan for PMT testing with slides

-> Planning to turn on 16 PMTs - 8 in one cryostat and 8 in another
-> If wondering “Why 8?” - a main reason is that the HV distribution from CAEN has switch on for 8 PMTs, so choose 8 from one part
-> General plan:
-> Check resistances e.g.
-> Then start low voltage and test
-> Then go to higher voltages
-> Can test things like gain stability, background rates
-> Potential interest: frequency of background pulses as function of electric field
-> Discussed pulse-finding, gain measurement
-> Notes that activation of PMTs allows checks of the various electronics subsystems:
-> digitizers
-> dynamic range
-> baseline stability (in progress)
-> effect of long cables on signal shape
-> S/N
-> HV Voltage distribution system
-> Slow control
-> GUI for monitoring
-> Additional tests when access allowed to building again, e.g. threshold/LVDS (additional cabling needed), laser system (additional expert presence needed), activation of more PMTs
-> Notes steps related to the Slow Controls and that the GUI still needs to be prepared
-> scripts are being prepared for the shifter that can check the status of PMTs

Follow-up:

-> Claudio notes that there is expectation that shifters will have instructions to monitor the PMTs and check that they are on and there are no problems. Either this or they have to be taking care of the PMTs themselves.
-> Asks for update on Friday
-> Have to verify everything is working well from the point of view of remote control

Claudio said that he forgot to mention that the ground search is moving forward. At the moment there is a long task of isolating the cable trays. Will go on for the rest of this week and possibly into next week. And then Claudio will discuss with Linda the possibility to do DC mode testing (which could happen next week).

-> In this case, things taking power from detector power would have to be turned off

-> As for exactly when this will be is under discussion

More discussion related to the PMTs:

-> Claudio asks about single pulses correlated to other light (early/late light)

-> Milind says it's impossible to tell the dark rate (signal from cosmics + Ar39 overwhelm)

-> but still interested in the singles rate in the LAr

-> Milind ran through some of his analysis steps previously, where e.g. you remove coherent signals where pulses seen at same time in multiple photo-tubes

-> curious to compare to the rates seen before (*<u>note-taker's note</u>: I believe Milind said 15kHz was his previous measurement)*

-> Claudio asks about other tests done with rates. Gian Luca says in vacuum but low temperature rates were less than or approximately 5 kHz

-> Claudio suggests it will require attention to understand what we're seeing

-> Milind reminds it's not easy to calculate by hand (UV, aspects of yield in wavelength-shift, light that is sent back into cryostat can be reflected, etc.)

-> Gian Luca notes that they didn't foresee a task earlier when they prepared the plan:

-> Animesh would like to go onto the detector to check connection of PMTs on the feed-through as part of work. (as opposed to all work being on mezzanine)

-> Are there issues with this?

-> Carrie said as long as social distancing can be respected (6 feet maintained from cryo group or Linda's ground short crew) this can be done. If other activities taking place at the same location then wait for that to be completed (or see if they can wait for you).

-> Milind asked about finding cables and if that would take time?

-> Gian Luca says the cables are plugged in already.

Tyler gives an update on CRT noise investigation with slides

-> Reminder of setup with north and west rolling walls. North wall noisy due to proximity to cryogenics. Thresholds. Etc.

-> *<u>Note-taker's note</u> - Around 9:52 my Zoom connection died briefly. It seems like a number of people were affected? Back now maybe a minute or so later…*

-> Tyler notes they found some effects in the noise on May 20, correlating to when filling had been started up again in ECL

-> Tyler reports some runs taken with a "standalone daq" that allows for changing thresholds

-> Plot of noise rate as function of threshold in the FEBs shows that even with higher thresholds in the North wall you get lots of noise. With lower thresholds get well above 10kHz which is where the other plots saturated - not as bad for West

-> Notes some interesting oscillatory patterns in the noise (and ramp ups and things with the PPS signal)

-> Hoping that Linda's ground fault search will help but otherwise are effectively washed out with noise

Follow-up:

-> Claudio notes the oscillatory spikes seen at different thresholds

-> Bob asks about the frequency of these spikes? Between every 20-30s

-> But Claudio notes that even when it's in the "lower" state it's still sitting on 14.5 kHz on slide 17

-> Tyler says something they could do when they can access building is actually save some of the waveforms

-> Claudio suggests to write out a work plan

-> A bit more follow-up on this point. Claudio says most of the work plan would hinge on the location of the board and how easy to access? (e.g. from point of view of safety and COVID)

-> Tyler says this can also be a call for comments from the cryo group or anyone else who has seen noise like this from the detector hall

Meeting ends around 10:11am