Minutes of the 20th Meeting of the SBN Oversight Board (Fermilab, March 10, 2023)

Committee Attendees:

S. Brice (Chair, Fermilab)
A. Ereditato (Switzerland)
J. Evans (UK)
A. Fava (ICARUS Deputy Spokesperson)
A. Guglielmi (ICARUS Deputy Spokesperson)
O. Palamara (SBND Co-spokesperson)
D. Schmitz (SBND Co-Spokesperson)
R. Wilson (US DOE)

Committee Absentees:

S. Bertolucci (INFN, Italy)
M. Nessi (CERN)
C. Rubbia (ICARUS Spokesperson)
M. Shaevitz (US NSF)

Non-Committee Attendees:

D. Gibin (SBN Analysis WG Leader), G. Karagiorgi (SBN Analysis WG Leader), K. McFarland (SBN-IB Chair), C. Montanari (ICARUS TC), J. Saviano (Secretariat), A. Schukraft (SBND TC), P. Wilson (SBN Program Head)

Action Items:

(Brice) Reach out to Spokespeople to suggest reconstruction experts to form a committee to organize a workshop to be held at Fermi this summer.
(Brice) Hold discussion of a system to replace the SBN Oversight Board and SBN-OB meetings at the next SBN-OB meeting.

Introduction and Review of Last Meeting

Action items from last meeting. Brice reached out to a few reconstruction experts and asked how we are learning from what we're doing and are we applying the knowledge to future/other experiments - or even between current experiments? The response was that we're doing "ok", but we could do better. It's not a huge problem that needs to be addressed immediately, but it should be looked at. One suggestion received from a few people is to have workshops explicitly aimed at propagating reconstruction techniques. Fermilab is in the position to organize such workshops. The lab will take it upon itself to start with one and see how it goes. The general feeling is that with LArSoft and with tools that facilitate sharing, we're doing an ok job, but there's opportunity to do better.

Comments:
We should organize a workshop for this summer and the group should really look at the issues and focus on hot topics. It was suggested a list should be compiled on general principles and focus on clear questions. SBND is trying to have people who have done previous work on proto-DUNE involved in the current SBN reconstruction. Brice said he will reach out to the relevant Spokespeople to discuss who the reconstruction experts are and form a committee who can then put together the workshop and the topics with a goal to hold this at some point in the summer.

There was some discussion in a previous meeting about the SBN OB reaching the end of its useful life. It doesn't look like there's any great objection for the board to start winding down (stepping back) by the end of this calendar year (coincidentally with the start of data taking by SBND). There are some useful functions that the Oversight Board fulfills, so we shouldn't lose sight of those. There should be a larger meeting between SBND and ICARUS groups to share operations and construction information. A discussion should be had about this at the next meeting in June. Should also discuss what other communications should happen as we move to the next phase when both detectors are running. We'll set up a communication about this

Comments: Kevin said the problem is the IB is a large body and when detailed negotiations were needed, the SBN Board played a big part and how that came about was in this body. The board probably isn't needed just for that function but is there a way for an ad-hoc discussion to take place with this group. Some way to resolve issues that get stuck, maintain that capability? Steve responded it's good to raise these topics now so we can discuss in June meeting.

No comments on minutes from previous meeting.

Spokespersons Update - O. Palamara

O. Palamara, C. Rubbia, D. Schmitz, A. Fava, A. Guglielmi

There have not been any recent meetings – not much to report. Ornella was invited to give an SBN talk at the P5 Townhall.

Comments: Brice recommended checking in with Lia and Bonnie ahead of time. Palamara said she planned to.

SBN Institutional Board Update – K. McFarland

K. McFarland (IB Chair), E. Worcester (IB Deputy Chair)

Slides presented

- SBN "Physics" Rules Document
  - Approved by SBN IB, SBND and ICARUS
  - Charges new standing committees to carry out key SBN processes as specified in organization documents.
  - Charges existing committee (SBN Analysis and Analysis Infrastructure groups) with Computing and Dataset Coordination processes (D3C).
  - Process took 1.5 years from the charging of the groups to write rules to this approval.
- SBN Digital Data Management Plan. Required by US funding agencies, DOE and NSF, for proposal submissions. Some suggestions offered, which led to revised draft.
- Reviewed organizational changes in Analysis group, had discussion of FCRSG process and results and discussion of a hybrid SBN IB meeting (mostly in-person if possible) at Fermilab.
- Next IB meeting to be held in April. Topics: plans for staffing new SBN committees, updated DDMP plan, how to navigate different CoC processes between ICARUS/SBND for SBN-wide issues.
- Kevin will be stepping down as IB Chair. Process is by-laws for selecting new chair

which will be discussed in next IB meeting. He will stay on until selection and transition is complete. Worcester will run the process, as IB Deputy Chair.

Questions/Comments:
Brice doesn't see a need to bring in the OB for the discussion on DDMP.
Many thanks to Kevin for his role in the IB.

SBN Joint Working Groups Update – G. Karagiorgi
D. Gibin (SBN Analysis WG Leader), G. Karagiorgi (SBN Analysis WG Leader)

Slides presented

- SBN Working Groups: Review of groups and goals
- SBN DAQ and Data Pre-processing WG: Testing/improving PMT readout and DAQ software, Online-to-offline file transfer, SBND planning for control room setup, maintaining shared software infrastructure/expertise across SBN.
- SBND Slow Control WG: SBND – Ongoing efforts to establish control/monitoring system for critical devices. Two new VME crates for PDS readout. Simultaneous access to cold electronics from both DAQ and Slow Controls.
- SBN CRT WG: ICARUS – Making progress w/data analysis using CRT-PMT, CRT-TPC matching and testing bottom CRT with ICARUS data taken DAQ. Improving side CRT hit reconstruction, CRT-TPC matching algorithm being evaluated. Bottom CRT – half modules integrated in general DAQ; testing being finalized.
- SBN Analysis Infrastructure WG: Change in leadership -S. Gardiner replaced W. Ketchum as co-convener. Consolidating subgroups from 6 to 4. Updated effort requests will be shared soon with SBND/ICARUS leadership.
    - Computing planning: Fermilab Computing Resource Scrutiny group (FCRSG) presented annual review. SBN requests were well received, official recommendations from reviewers will be available in 1-2 months. (Plot shown is mix of actual and requested)
        Question: Brice asked how well matched the actuals vs. requests are. Are we predicting accurately or inaccurately? Karagiorgi said the group's request going forward tried to be reasonable, but as realistic as possible. Computing needs are increasing rapidly. They're becoming limiting factors to how quickly we can bring out results. The group proposed a request that wasn't frivolous. Fear is it may still not be enough. Will find out in 1-2 months.
    - Neutrino interaction model: a lot of discussion about choice of interaction simulation for near-term SBN production. Consensus reached between GENIE authors, experts from SBND, ICARUS and DUNE.
    - SBND & ICARUS still finalizing requirements for new production release. Staged approach is on the table. Simulation consistency between experiments is being re-evaluated (for correlating effects in multi-detector analysis).
- SBN Analysis Trigger: Mini workshops being held on White Rabbit network implementation/usage in SBND and ICARUS. Intend to continue with additional,

similar mini workshops on other topics.

- SBN Analysis WG: Presentation to the Fermilab PAC in Jan 2023, Group restructuring in effort to consolidate/strengthen core efforts. Two key positions still need to be filled. Ongoing discussions on SBN analysis strategy. Considering first SBN joint result on muon neutrino disappearance, targeted for Neutrino 2024. Primary concern is production timelines. Considering having an SBN Analysis Workshop, looking at early summer timeframe. Possible location: Fermilab or US (non-Chicagoland)

Questions/Comments: None

SBN Project Update – A Schukraft

Slides presented
General overview of Near Detector. High-level Status – all complete.

- Post move detector QC performed by collaborators between mid-December and end of January. Minimal issues – group of 32 wires without bias triggered a thorough inspection of entire system. Six pins didn't lock properly in their housing and one connector partially broken off from the wire bias filter board. All issues addressed. Photon detection system QC – visual inspection postponed for east side due to difficult access. On the X-ARAPUCA system, one cable showed a connection between one pin and cable shield which had been repaired. QC process will be repeated after the cold cable routing, after the rigging and after welding the top cap on the cryostat.
- TPC Roof Hangers – will be suspended from top cap with 6 hangers. Successfully assembled and tested at DAB in January.
- Top Cap Attachment – rigged the top cap on top of the ATF on February 16th. Mechanical coupling between top cap and detector was completed March 6. Working on routing cold cables through the top cap.
- Detector Rigging & Building Crane Upgrade – Current estimated weight is 22.8 US tons, with 99% of the weight from actual measurements. Review of rigging plan due on March 15. Target date for rigging detector into cryostat is April 11.
- Cryogenics Installation Progress – on track to be complete by end of June. RTDs inside cryostat and strain gauges on cryostat walls being installed now. Purity monitors and HV FT being tested at NLTF (Nobel Liquid Test Facility - formerly known as PAB).
- Milestones Update: S2 – ready for cryogenics commissioning. SBND detector forecast – should be ready to fill with liquid Argon by 16-June.
- Timeline to S4 – no schedule changes since March 2022. On track for CRT to be operational in Q1 CY 2024
- SBND director's Review 2023 – Presentations: plans for remaining detector and cryogenics installation, plans for detector and cryogenics commissioning, status of planning for transition to operations.
  There are 5 recommendations to address:
  1. Develop more detailed step-by-step detector commissioning plan that identifies people/teams responsible. Review before reaching S2 milestone.
  2. Develop step-by-step cryo commissioning plan including QC and verification steps
  3. Complete comprehensive transition to operations plan for cryogenics and have it reviewed by project and ND leadership.
  4. Monitor the LAr procurement proactively

5. By S2, complete list of criteria for moving from phase to phase in commissioning and then to the initial physics run.

This was the last SN Director's Review. Operations Readiness Review is planned for 6~ months from now.

Questions/Comments: None

ICARUS Commissioning and Operations

C. Montanari (INFN Pavia) – ICARUS Technical Coordinator

Slides presented

- Detector Status: running/stable since end of last year. Free electrons lifetime has stabilized (8 ms is WEST module, 4 ms in EAST module). Calibration activities take place routinely during beam off periods.
    - Brice asked has there been any flooding incidents. No, but water was dripping from the stairs.

  Power glitch on March 8, causing stop of DAQ servers, some PMTs and LAr pumps. Recovered next day.
    - Brice asked if any changes would be made to prevent any other glitches. There was a meeting yesterday with the group who takes care of the automatic systems. Everything worked as planned. Some glitches were so small, no intervention was needed. No modification needed at this time.
- Slides of Free electron lifetime trend in the East and West modules. Periodic venting still required, though venting rate has been reduced. The plan is to regenerate in the summer.
    - Brice asked if there was a solid plan for the regeneration. Not yet – there's a generic plan that needs to be worked on. Need additional discussion, may discuss with MicroBooNE. Brice asked if there will be enough time within the summer shutdown and has a decent electron lifetime when beam returns. Yes.
- Run2 accumulated statistics: Data collection efficiency 96% BNB and 98% NuMI.
- PMT Gain Calibration - new campaign start of RUN2 (fall 2022) data taking
- PMTs timing calibration
- Reducing TPC Wire Noise: Replaced 4 boards to reduce 32-channels coherent noise propagating into the boards through +7 V line.
- CRT Calibration and Timing
- No other activities would interfere with neutrino data taking planned before the end of the present neutrino run. For the summer shutdown, considering to move

Questions/Comments

Brice said this would give ICARUS a permanent filtering capability.

Other Business
None

The SBN-OB meeting was adjourned.

Next meeting 3 months from now - 9 June 2023