

**Minutes of the 22nd Meeting of the SBN Oversight
Board (Fermilab, September 8, 2023)**

Committee Attendees:

- A. Fava (ICARUS Deputy Spokesperson)
- A. Guglielmi (ICARUS Deputy Spokesperson)
- O. Palamara (SBND Co-spokesperson)
- J. Raaf (Interim Chair, Fermilab)
- C. Rubbia (ICARUS Spokesperson)
- D. Schmitz (SBND Co-Spokesperson)
- M. Shaevitz (US NSF)
- R. Wilson (US DOE)

Committee Absentees:

- A. Ereditato (Switzerland)
- J. Evans (UK)
- M. Nesi (CERN)
- S. Bertolucci (INFN, Italy)

Non-Committee Attendees:

P. Wilson (SBN Program Head), M. Pallavicini (SBN IB Chair) J. Saviano (Secretariat), D. Gibin (INFN, Italy), C. Montanari (Fermilab), G. Karagiorgi (Columbia U), D. Salmieri (CERN, ICARUS Scientific Secretary)

Welcome Comments – P. Wilson

Steve Brice is no longer the Division Head for Neutrino Division, so he will no longer run this meeting. Jen Raaf is the new Division Head. Since the new Division Head is not a part of either collaboration, it needs to be determined who the appropriate person would be to host these meetings. Raaf and P. Wilson will discuss (with input from both collaborations).

Introduction and Review of Last Meeting/Minutes – P. Wilson

Review of action items from last meeting

1. Brice reached out to spokespeople to talk about reconstruction experts and the possibility of workshops to be held at Fermilab.
2. Brice would suggest edits to the Oversight Board founding document to reflect the changing role of the board as we transition from ICARUS construction to stable operations and shortly from SBND construction to stable operations. A draft has been sent around and it will be the last topic on the agenda today.

Questions/Comments: No comments or questions on minutes

Spokespersons Update - O. Palamara

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

Slides presented.

- Meetings continue to be held as needed.
- Members from SBND and ICARUS for SBN IB committees have been identified. M. Pallavicini is new Chair for IB. He will help organize work with the new committees.
- In June, an update of the SBN Analysis group activities was presented and a plan was proposed for the first SBND/ICARUS combined analysis.
- Recent meetings concentrated on FY24 accelerator running plan.

Spokes or deputies for both collaborations attended FY24 beam meeting with K. Burkett (PPD Division Head), J. Raaf (Neutrino Division Head) and B. Fleming (Deputy Director for Research), who presented on FNAL's behalf.

There are 3 issues that could result in reduction of BNB and NuMI beam time in 2024

1. lab research budget cuts (including operations),
2. LINAC maintenance required (by UK company),
3. addressing new safety documentation requirements for running the accelerator complex.

Fleming indicated the situation is evolving and hoped to provide more detailed information in a few weeks.

Next steps - Fermilab requested input from SBN on impact of less beam in FY24.

Two action items were discussed,

1. Writing a short statement detailing the SBN beam needs and run plan for FY24.
2. Writing a more formal letter for FNAL management about seriousness of the issue for SBN science and SBN community.

Last topic (not on slides) - the charge of the OB is to revisit the composition of the group and be sure it's the right one for the charge.

Questions/Comments: Rubbia said the situation regarding the beam running needs clarification on where we stand. P. Wilson hopes it will become clearer in the meeting next week. Shaevitz asked what kind of run reduction are they talking about in the 40 weeks? Palamara said there are 2 scenarios (case studies – any combination), but they weren't presented here on slides because they're evolving. Beam runs for 40 weeks (Oct-June). Reduction possibilities: Running BNB + NuMI (16 weeks), only running the booster for 13 weeks, or a combination of both (NuMI + Booster – 14 wks). Fava said these scenarios were driven by budget. The 3rd scenario (regarding safety) doesn't have a timeline yet. Shaevitz asked when SBND will start running? Palamara said powering of the detector would be in beginning of Feb. Bertolucci said it would be good to know if the cuts due to budget is permanent and he suggested lab management should inform the collaborations of the funding urgency with formal letters because there are implications. Palamara said the slides presented by Fleming stated this was just one-time cut, but we cannot predict what the budget will be in 2025. It will be a one-year loss for SBND if we don't do the commissioning now and it will completely change the SBND plan. ICARUS won't be affected as much.

Question was posed by Palamara - do we fill the detector now (if we have no beam) or do we wait until we have money? If we wait, we will lose people. Guglielmi said more information is needed to understand the situation.

SBN Project Update – SBND Installation P Wilson

Slides presented.

- High level status (since June)
- TPC calibration laser feedthroughs– installed wk of June 12
- HV feedthrough – successfully tested in June.
- Preparation for HV feedthrough installation – 1st access inside cryostat on June 16
- HV feedthrough installation – successfully installed on July 20
- Purity monitors – testing nearly complete.
- TPC cold electronics – installed 4 flanges week of June 19.
- QC checks & top cap welding – complete
- Installation post welding – complete
- Electrical installation – cabling in progress.
- Detector installation outlook –
- Cryogenics remaining tasks – see slide. Full commissioning forecast to start early Nov.
- Preparing for commissioning & operations – aiming towards operations readiness review by Fermilab in late 2023.

Next OB meeting there will be a report on commissioning.

Questions/Comments: Montanari asked when shifts will start. Palamara said there was an Operations Task Force Working Group recently formed. A lot of different topics are being developed, one of which is defining rules and procedures for the shifts. The thought is to start some shifts during the cool-down of the detector (to do some measurements of the electronics- monitoring the noise during the process). We could also operate some part of the CRT so we have some part of the detector which can be monitored at that time. We are in the process of developing the process now.

ICARUS Operations

C. Montanari (INFN Pavia) – ICARUS Technical Coordinator

Slides presented.

- Detector Status: Neutrino RUN2 completed July 14, 2023
- ICARUS RUN2
- Beam collection performance during RUN2
- PMT system new signal cables, new cable performance, PMTs cables replacements
- TPC electronics tests and improvements
- Trigger system: ongoing/planned activities.
- Top CRT: external telescope SiPM replacement, automated calibration
- Bottom CRT

Questions/Comments: Guglielmi made comments on the amplitude of PMT signals in addition to the count of signals to better trigger on lower energy events.

SBN Institutional Board Update – M. Pallavicini

M. Pallavicini (IB Chair), E. Worcester (IB Deputy Chair)

Election for new Chair held in July. M. Pallavicini has accepted position as Chair of SBN IB. He is working with both collaborations and the previous chair to organize the transition. Will try to schedule meeting in next few weeks, as schedules allow. Will have more to report at that time meeting.

Pallavicini pointed out the reduction of the beam is a very serious matter. Both collaborations are concerned of the consequences.

Questions/Comments: None

SBN Joint Working Groups Update – G. Karagiorgi

D. Gibin (INFN Italy), G. Karagiorgi (Columbia University)

Slides presented.

- SBN Working Groups: Review of groups and goals.
- SBND DAQ Overview: list of subsystems and status updates
- SBN DAQ & data pre-processing (see C. Montanari slides for ICARUS updates)
- SBND DAQ overview and status update
- SBN Slow control – SBND overview, TPC power improvements, alarms
- SBN Cosmic Ray Tagger – A-frame test stand and SBND CRT at near detector hall.
- ICARUS CRT – status and updates
- SBN Analysis Trigger – no updates
- SBN Analysis Infrastructure
- SBN Analysis – workshop recap (Closer coordination needed between Analysis Infrastructure and Analysis group (and subgroups) to develop a viable plan for our first result.

Questions/Comments: Schmitz asked if more will be added about production timelines. Are we talking about next summer or right now? Karagiorgi said they're trying to put together a list of what needs to be done (and when) before we can have the major production that will facilitate our first joint analysis. There is no complete schedule yet. For earlier tasks, a set of 2-3 pre-productions will improve the approach of simulation in reconstruction. Hope to have the first one in December. Will have to see where next pre-production and production will be after meeting and will try to bring to SBND & ICARUS leadership. Schmitz said the idea is that these pre-productions are relatively small and they're just a medium scale stress test of new

developments. Karagiorgi responded yes, and/or test of new calibrations. Schmitz asked if the list of those new developments is part of that new planning or is it - we'll do one here and incorporate whatever is ready? How much is being managed? Karagiorgi said they've attempted to make a list of the necessary improvements or fixes that will be needed or the necessary calibration campaigns, for example. Different analyzers and developers are working on their own improvements/features. The thought is socializing and/or advertising the timelines for these pre-productions so if there are new features to be included, those would need to be available at least 2 weeks in advance to be incorporated into those pre-productions. If they weren't available, then they would have to wait until the next pre-production. This model has received good support from SBN conveners. Schmitz said (for example) we have this one in December and are targeting to have these critical elements, and if an analyzer has something, they will be aware of the deadline [to have their work turned in].

Gibin commented there were some complaints by the production team that sometimes the way the code is deployed is not the optimal one, increasing the burden on their shoulders to go into production. Improvement also needs to come from this side.

Discussion of edits to SBN-OB founding document

A review of the proposed updates to the SBN-OB founding documents that Brice posted on Indico. The point is not to make a major change but to consider we've moved from construction to operations phase and make sure we are correctly organized around that new phase.

Review of some proposed changes:

Addition of "SBN OB should meet regularly with leaders of Joint Analysis Groups and leaders of detector operations to review and advise on analysis and operations status." Remove comments referring to the construction phases. The phrasing of "leaders of detector operations" was specifically written in lowercase (by Brice) because the leaders in the 2 experiments may not be identical and it's based on the organization of each collaboration. P. Wilson asked if this is the appropriate language. Guglielmi said using that phrasing is fine, as long as technical coordinators are included inside the general wording. P. Wilson said he believes Brice's intent was to have it accommodate however the collaboration is organized now and how the organization might change in the future. It's up to the collaboration to define what is intended by "leaders of detector operations". Guglielmi said sometime in the future we may have new ideas and possibly have an "advisor of technical coordinator" noted because they are the first person to be contacted in an emergency. The role could be called the "Technical Operations Coordinator." P. Wilson asked the SBND spokes if the language covers who should be involved (should be participating). Palamara said the way it's worded could work for SBND and doesn't see a difference in the intent and doesn't believe there would be any objections. P. Wilson said he believes the intent is to not use a specific title, so this document won't need to be updated in the future due to a title.

Shaevitz said adding in "technical coordinators" in lower case plus the "leaders of detectors operations" would be inclusive as well remove ambiguity. Those leaders should come and talk to the OB. Fava suggested "Leaders of the joint analysis group". A revised version will be sent around for more discussion via email. Montanari gave a list of topics that would be discussed in this group; a status of analysis, data collection and run conditions, technical issues. Will need 3 different entry points.

SBN OVERSIGHT BOARD

September 8, 2023

Add some language as to how the Chair should be chosen. R. Wilson asked if it would fall to the Chair to invite these people? Is it implicit? P. Wilson said yes, he believes it will be the Chair – in consultation with the Neutrino Division and the spokespeople (collaborations) and then approved by the board. Raaf stated the need to consider whether Chair should be the head of the Fermilab Neutrino Division because the Head is not a part of either collaboration. P. Wilson said this should be reviewed as a separate topic. He will discuss with Raaf and make a proposal to the board.

Action Items

1. Adopt language to the SBN Organization document to make it inclusive to the operations of technical coordination. (Modification of language “leaders of detector operations”.)
2. Proposal for new Chair of the Oversight Board. Add language on how Chair is to be chosen (something like “in consultation with Spokes and Neutrino Division”).
3. Palamara proposed to have a discussion of the composition of the group now that both collaborations are transitioning to a different phase.
4. R. Wilson mentioned appendix 1 still refers to MicroBooNE. Need to clarify now while working on this document. P. Wilson added Appendix 2 also needs to be revised.

The SBN-OB meeting was adjourned at 11:08am.

Next meeting will be in December.