



LArSoft 12/6/23 Steering Group Meeting Notes

Attendees: Angela Fava, Herb Greenlee, Tom Junk, Erica Snider, Katherine Lato

We did not have a quorum for approval at the meeting, so we are seeking sign-off from all experiments via email. (DUNE and MicroBooNE already signed off.) Please let us know **by December 13th** if you have any changes you would like in the work plan. The following is a summary of the discussion points presented by the project and some of the ensuing discussion.

Summary:

- Main purpose today is to go over the final update on the 2023 work plan and approve the 2024 work plan.
- First discuss budget situation mentioned at last Steering Group meeting
 - Work continuing to resolve budget issues within CSAID. What we do know:
 - One SciSoft team member has had half of time reassigned. Unsure yet of impact on project work.
 - A second is deeply involved in framework development and the work to develop a new framework for DUNE and IF more generally.
 - Uncertain more generally what the situation will look like for the balance of the FY.
- 2023 work plan update
 - Thread safety, multi-threading, HPC
 - Significant improvements to thread safety and multi-threading
 - Major project to update DB services is near completion.
 - DUNE SN workflow has been multi-threaded
 - GPUaaS has been extended to include more types of DL networks
 - Also initiated work on GPU-enabling LArSoft algorithms
 - Two targets identified: photon simulation for DUNE (for low E bg) and electron drift for ICARUS
 - Spack / build system migration
 - Have builds for art / LArSoft
 - Main trouble has been a development environment. Will speak to this more in the context of the 2024 plan
 - Geometry work to integrate pixel detectors is completed
 - In validation phase now
 - Neutrino event generator refactoring
 - No significant progress, but have identified resources for 2024
 - Continuous updates and improvements in documentation this year
- Overall summary
 - Significant advances in two of the three items that are by design “on-going”
 - Of the remaining five: closed one. Two others near completion (so carry over). Expect one more to be completed in 2024. Remaining one will carry over.

- 2024 work plan summary
 - Broad overview
 - One major addition relative to 2023 plan related to changes to support TPC-dependencies that were not originally designed into the infrastructure
 - eg. sampling frequencies in DUNE; cathode geometry, drift velocities, and electron lifetimes in ICARUS
 - Multi-threading, HPC, acceleration
 - Will focus on
 - replacing select algorithms with portable GPU-enabled algorithms.
 - enabling the use of GPUs in production workflows more generally
 - continuing efforts to ensure production workflows use multi-threading to optimize resource utilization
 - facilitating use of HPC resources for LArSoft workflows (eg, via POMS)
 - Spack
 - Problem has been development environment using Spack
 - Have spent significant time seeking a clear path to completion, so far without success
 - Given proximity to EOL for SL7 (and UPS with it), have decided to re-evaluate current direction
 - Have recently demonstrated significant progress using less ambitious approaches
 - Will make a decision before the end of this year as to how to proceed.
 - Pixel geometry
 - Expect to close this item early in 2024 if not completed by end of CY2023
 - Neutrino generator refactoring
 - This item targets the way the GENIE is integrated, but really about making it easy to integrate generators, and to make that possible without locking a LArSoft release to a specific generator version, something which is currently required
 - Have a plan, but progress has stalled from lack of available effort
 - New effort has been identified and will be available starting in January, 2024
 - Expect this project to be completed, assuming no additional issues identified with the plan
 - Event display
 - The project continues to advocate for this. Believe it is needed across the LArSoft community to address deficiencies in current native EVD. Titus has been proposed as a potential way forward, so would be part of an initial evaluation.
 - SciSoft continues to lack necessary effort to pursue this in a meaningful way. Will definitely pursue if we can identify effort.
- Discussion:
 - Herb: asked for clarification on what “change in direction” of Spack work might mean.
 - A: the current approach has been to develop a new product on top of Spack called SpackDev that provides a working development environment in the same way that mrb does with UPS. For various reasons, the original goals of that work may not be compatible with Spack. There are alternative approaches under investigation that use Spack in a more limited way that may be more fruitful. The Spack developers are

currently focused on weighing the costs and benefits of these alternatives against the current approach.

- Tom: if mrb is going away, then DUNE would like to know. A: Ok.
- Angela: the event display work is very important, so glad the item remains in the plan, and requests that we continue pushing for resources to work on it.

Need experiments to sign off:

- ICARUS -
- SBND -
- SBN Data/Infrastructure -
- MicroBooNE - said okay at meeting on 12/6/23
- DUNE - said okay at meeting on 12/6/23

If you have any comments or changes, please let us know.e

Erica & Katherine