

# Status of Planning

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LArSoft Steering Group Meeting

18 December 2015

## From Ornella in October: Outcomes and Next Steps

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- Complete the document, reviewed by all attendees, signed off by the LArSoft Steering Group/Collaboration, by November 26<sup>th</sup> (Thanksgiving)
- Follow with an initial Plan for Implementation based on requirements including resources needed
- Head of LBNC will organize request/charge to the LArSoft Collaboration for an external Review of architecture and code, to meet the requirements, for early 2016
  - Outcome of review will be used by experiments to determine their adoption of LArsoft framework for the near/medium term
  - Identify areas where things can be improved and an estimate of the resources.

## Current status

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- Requirements document current round complete and “not objected to” by Steering Group
- Architecture document in draft in repository.
- Organizing group held first planning meeting ½ day on Friday 11<sup>th</sup> Dec.

## First Pass Approach to Planning

- Make summary of experiment goals with dates.
- Compare goals to high level capabilities in the requirements document.
  - Identify gaps and update the requirements document
- Drill down into capabilities to identify and document what is needed for each goal

# DUNE 35ton Goals

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- Reconstruct straight tracks 3/1/2016
- Complete operations 6/1/2016
- Publish papers – lifetime, geometry tests, studies on showers 1/1/2017

# LArIAT Goals

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- Upgrade Geant4 version for Kaon lifetime analysis 4.10 – 1/1/2016
- Support for Pion, Kaon, and lifetime publications 3/1/2016
- Exclusive cross section measurements for pion interactions, charge exchange, mu anti-mu analysis, michel electrons, pi-zero analysis 9/1/2016
- Continued analysis and paper writing in FY17
- Decision on further running 7/1/2016
- Support for publications from 2015-2017

## MicroBoone Goals (errors mine)

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- Cosmic rate paper, diffusion measurement and purity paper 3/1/2016
- Cosmic tagging sufficient for cross section measurement 4/1/2016
- Muon inclusive cross-section measurement 6/1/2016
- Oscillations group output and included TBA (1/1/2017)
- CCQE, Pion production, neutral current/Pizero cross-section papers 6/1/2017
- Publication of Pizero reconstructed mass peak, gamma separation 6/1/2017
- Support for the new cosmic veto TBA 7/1/2017
- Oscillation measurement TBA Post-2017
- Support for  $6.6 \times 10^{20}$  POTs, as SBN Microboone TBA 10/1/2018

## ProtoDUNE Goals (errors mine)

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- Data taking starts early in 2018 and must complete during the year
- Analyze data for publication in 2019

## DUNE - Goals (errors mine)

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- Working full chain of the reconstruction by 6/1/2016
- Results from FD and ND task force simulations with as much of the reconstruction capability working 3/1/2016
  - Dual phase simulation 1/31/2016
  - Detector optimization for ProtoDUNE decisions 6/1/2016
  - Interactive visualization that feeds back to LArSoft – Bee – version that allows handscan that can feed back into LArSoft to deliver to optimization conclusions – TBA 6/1/2016
  - Decision on whether to use handscans as well as automated reconstruction for conclusions of optimization TBA 1/1/2016
  - Conclusions of optimization 1/1/2017
- Decide on path for framework, infrastructure and toolkit for 2025 framework – 2018/2019
- Detector installation starts 2021.

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• Data taking 2025



## SBND Goals (errors mine)

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- Full reconstruction chain 6/1/2016
- MC data challenge 1 with full reconstruction 10/1/2016
- Neutrino and cosmic ray
- MC data challenge 2 with full reconstruction and automated analysis 3/1/2017
- Ready for reconstruction of data for commissioning TBA 6/1/2018

# Principles

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- Critical Stakeholders determine the ultimate deliverables of a project.
- Critical Stakeholders can “demand” an end-date.
- Project management “best practices” should help to determine whether the critical stakeholder’s expectations are realistic.
- “Realism” requires understanding the “tasks” to be completed and the time to perform those tasks.
- Define what we want it to be and the resources it will take. “Above our pay grade” will then define resource constraints and stimulate de-scoping.
- All steps and deliverables include a distributed set of all types of resources.
- De-scoping needs stakeholders who understand the impact (both science goals and technology needs) in the loop at the right time.

## ***Definition/Scope: from the requirements document***

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Provide for offline software and computing to meet the physics requirements of our present and future liquid argon-based experiments, including data simulation, reconstruction and analysis systems necessary to extract physics results. To include the human and organizational components as well as software, computing hardware, workflows, processes, interfaces, protocols and communications.”

## Methodologies proposed

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- Rolling Wave Planning: [project planning](#) in waves as the project proceeds and later details become clearer.
- Agile development: in which requirements and solutions evolve through collaboration between self-organizing, [cross-functional teams](#).
- Use git terminology for releases – tags, branches, versions, releases.

# Capability areas from the Requirements Document

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- Raw event manipulations
- Calibration data -
- Conditions data
- Signal processing
- Hit-finding
- Cluster-finding
- Track finding
- Shower reconstruction
- Vertex finding
- Event time ( $t_0$ )
- Particle identification
- General reconstruction
- Event-level reconstruction
- Simulation output and data structures
- General simulation features and capabilities
- Random number seeds
- Reconstruction and simulation
- Dual-phase LArTPC simulation
- Documentation of data structures and algorithms
- Documentation of the environments
- Data files
- Data objects and event data model
- Analysis processing
- Visualization for debugging and tuning
- Interactive capabilities of the visualization
- Data distribution and preservation
- Metadata management
- Software build tools
- Software environment configuration tools
- Database support
- Analysis workflow support
- Computing systems and related support
- Organizational structures and processes

# Additional outcomes of the planning meeting

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- Recorded LArSoft Redmine issue raised for support of releases and builds on Ubuntu.
- Propose/will act on continuation of the planning and replanning through Coordination/Management body which will meet at least monthly (ore frequently if needed for planning, reviews etc) whose members are those who manage the effort internal to the various contributing organizations (experiments, computing groups, projects). Will provide prioritization recommendations (to LarSoft leads and steering group ), definition of scope and deciding what/how to request and acquire resources.
- Initial discussion of prioritization for calendar 2016 (including work on Usability, Architecture, Algorithms, Visualization/event displays, optimization, support for HPC systems, multi-threading – modules, algorithms, multi-event parallelism, single-event parallelism) will be followed up on for more specific recommendations.

# Next Steps

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- For Planning
  - Further planning meeting of organizing committee participants. Proposed for January 8<sup>th</sup> ½ day
  - Endorsement of coordination/management body of leads of experiments s/c and LArSoft core (propose every four weeks in off-week of Coordination meeting slot)
- For 2016 activities for LArSoft project
  - Will bring initial proposal to Steering Group in January having discussed and got endorsement of the coordination/management body.
  - Presented issues to SCD management and got an initial list of action items to follow up on (<https://fermipoint.fnal.gov/organization/cs/ocio/sm/brm/sppmwg/Shared%20Documents/Larsoft-sppmwg-1217155.pptx> ) 12/17/2015
  - Discussion of architecture leading to idea of monthly-architecture (remote white boarding) meeting focusing on longer term issues