

The LArSoft Project

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Outline

- Project overview
- Current initiatives and priorities
- Concerns

LArSoft Steering Committee Meeting
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LArSoft project

- A collaboration of experiments, Fermilab, other stakeholders
 - LBNE/LBNF
 - MicroBooNE
 - 35T
 - LAr1ND
 - LArIAT
 - ArgoNeuT
 - NuTools
 - art
 - Pandora
 - LArSoft project
- The experiments define requirements, schedules, priorities

LArSoft project

- Technical goal:
 - To provide an integrated, art-based, experiment-agnostic set of software tools to be used by multiple LAr neutrino experiments to perform
 - Simulation
 - Data reconstruction
 - Analysis
- Broader goal:
 - By developing common
 - algorithms, services, data structures, architecture,dramatically reduce the cost of developing, maintaining and supporting the reconstruction and simulation software for collaboration members.

All made possible by the choice of LAr technology,
the resulting similarities in detector design

Experiment responsibilities*

- Development effort and management
 - Provide effort needed to develop core LArSoft software
 - Contribute effort to carry out module coordination responsibilities
 - Solely responsible for experiment-specific software interfacing to LArSoft
- Project management
 - Communicate input needed to establish and maintain project requirements, metrics, milestones and schedules
 - Includes experiences, priorities, changes, etc.
 - Contribute to project oversight

* Full project, experiment responsibilities outlined in Statement of Work document approved by stakeholders:
<https://fermipoint.fnal.gov/project/LArSoft/Shared%20Documents/larsoft-proj-statement-of-work-v3.docx>

Current project initiatives and priorities

These are always subject to discussion, change based on input from the experiments

- Ensure cross-experiment compatibility of all reconstruction / simulation algorithms
 - Need algorithms to run out of the box for all experiments
- Continuous integration system *a new capability*
 - An extremely important facility
 - Runs after every contribution to the code repositories
 - Enables immediate monitoring for problems, e.g., cross-experiment compatibility
 - Now need experiments to add tests to catch problems

Current project initiatives and priorities

- Software architecture
 - Good design choices can greatly facilitate development of sophisticated algorithms
 - Currently reviewing the code to identify, fix problems
- Optimization
 - Ensure that software runs within available resources in terms of CPU time and memory footprint

Current project initiatives and priorities

- User support
 - Consulting, problem-solving
- Documentation
 - Have agreed to implement a documentation requirement for contributed software
 - Covers all major software elements
- Work closely with experiments to meet evolving requirements
 - Maintain an environment fosters rapid development, allows the experiments to meet schedules

Concerns

- Project is effort limited
 - Cannot address all important work at the same time
 - Have needed to prioritize in order to make progress
- Current staffing
 - Gianluca Petrillo is a consultant
 - Actively seeking permanent position
 - His contributions have been critical
 - Eric Church
 - Actively seeking a permanent position
 - May already be leaving
 - Have a fraction of his time for a short period of time
 - Has been instrumental in getting CI system out with a multi-experiment test suite
 - Possesses enormous amount of institutional knowledge

Backup

Project scope

- The common software infrastructure for the reconstruction and simulation of LAr-based detectors
 - Perform all functions necessary to facilitate creation and maintenance
 - Project management
 - Software management
 - Architecture
 - Software expertise, liaison to external dependencies, etc.
 - Common software includes
 - Geometry + detector interfaces
 - Data structures
 - Reconstruction + simulation algorithms
 - Interfaces to experiment-specific software plug-ins
 - Detector-independent visualization
 - Various utilities and infrastructure
 - Build and distribution systems
 - [Continuous integration system](#)