Project Name	Project Lead	Project Manager	Project Sponsor	Reporting Period
LarSoft Core	Erica Snider	Ruth Pordes	Rob Roser, Panagiotis Spentzouris	April 2015

Project Description	
	The purpose of this project is to partner with experiments to provide an integrated, art-based, experiment-agnostic set of software tools, collectively called LArSoft, for liquid argon neutrino experiments to perform simulation, data reconstruction and analysis.

Progress Report from past Month:

- Expanded effort available for the project. Working on how to best have people responsible for each thread and then coordinate the set as the effort available expands.
- Continuing to work on architecture where main priority is to ensure release for MicroBoone MCC reconstruction/anlsysis and code contributed by MicroBoone will work for the 35ton.
- Improvements to build /configuration phase made as a result of consulting from profiling/performance group.
- Initial meeting with MicroBoone on how LALite - the experiment specific light analysis framework used by many of the postdocs and students - and LarSoft can interface such that algorithms can be used in both frameworks and the data model allows data to be written by one framework and read by the other (it is not yet sure that this need to be bidirectional – for example, CMS does not support the Lite frameworks writing data that CMSSW can read.)
- Brett Viren has released a first version of Worch based build support for LarSoft. The changes needed to build LArSoft with worch have been checked into the LArSoft repositories, with the worch product available from github. (Brett Viren https://indico.fnal.gov/conferenceDisplay.py?confId=9419) Jim Amundson is leading SCD testing of this – no report yet.
- All Larsoft coordination meetings have Indico sites and slides and minutes are posted https://indico.fnal.gov/categoryDisplay.py?categId=405

Release	Date	Purpose	Changes / notes	Full release notes
v04.05.00	04/16/2015	integration release		Release Notes
v04.04.00	04/09/2015	Weekly tag	MicroBooNE MCC6 **reconstruction**	Release Notes
v04.03.03	04/01/2015	Weekly tag		Release Notes
v04.03.02	03/27/2015	Weekly tag	uses cetbuildtools v4_09_01	Release Notes
v04.03.01	03/19/2015	Weekly tag	uses cetbuildtools v4_08_01	Release Notes

Current issues (small and large)
- Difficulty of building offsite – need an organized, full coverage effort to check these across the many linux systems and Mac laptops across the collaborations (potential project for Thomas Wester, summer student coming at end of June).
- Natural timelines for and broader communication, and understanding at all levels of the experiments/management, of the status of development tasks– we hear unhappiness about the same issues many times when the design and implementation for mitigations are in progress or planned.
- How to integrate with light experiment specific frameworks
- Some MicroBoone code committed to the common repositories cannot be used by DUNE without significant effort. Note: Others require only modest effort, while others actually work as is with the DUNE geometry.
- CI slave MacOSX problem.
- New experiments support.
- Need to start discussion of how to make this program accommodate international contributions, recognized co-ownership by the experiments etc.
- Difficulty of using LarSoft based executables on distributed resources e.g. OSG. The Larsoft project has suggested a prescription for a work-around, which involves work with the job submission group (FIFE etc).

- Another "optimization" issue is the build speed that still needs optimization. The cmake changes helped, there is still a problem (not currently scoped within the optimization effort, so needs an area/track from which to get attention.)
- Myriad documentation, training etc issues.

Project Management:
- Need to adapt to increase in effort available and work that can be achieved each quarter; brings need for better/more communication across all experiments and users and spokespeople and management
- Steering meeting plan to discuss future organization of the coherent/collaborative effort as experiments take data and use of LarSoft is under more fire.
- Biweekly coordination meetings are well attended and wide ranging. Sample agenda
  - Release and project report — Erica
  - Status of architecture project — Gianluca Petrillo
  - Changes to DAQHeader — David Caratelli and Mike Kirby
  - Database interfaces in LArSoft — Brandon Eberly
  - Update on photon-detector data products — Alex Himmel
  - Adapting ChannelMapAlg for optical channels — Mike Wallbank
  - ClusterCrawler updates — Tingjun Yang

Architecture Design and Development:
- *Coordinator: Gianluca Petrillo*
- Work completed for uBoone MCC6 event generation and reconstruction phases (analysis done by LArLite so no support needed from LarSoft); some of the modules used are in LarSoft but are not run automatically in the MCC.
- Factorization of code towards environment-independent algorithms (ideally)
- Test bench is Kazuhiro Terao, MicroBooNE, LarLight and 35Ton, Tingjun Yang.
- Services as wrappers of framework-independent functional code
- Goal for DUNE to not have to spend the current much time in disentangling code
- Converter module creates input tree interfaces to DUNE RED35 event display. Low priority request in the queue for effort for improvement of LArSoft event display(s).

Git repository name	services	modules
LArSoft	26	154
argoneutcode	1	25
lbnecode	6	33
uboonecode	4	22

Continuous Integration V2:
- *SCD Coordinator: Erica Snider.*
- LArSoft OSX is still not building, issues with dependencies e.g. ifdh data movement module.
- V2 Release candidate scheduled for 4/17
- Vito Di Benedetto from the Offline Production operations Group is joining the project and coming up to speed (30% but new to Fermilab). Goal to eventually focus on physics tests and outputs of the daily CI system.
- After V2 released will also engage Geant4 to add LarSoft physics validation to the existing suite. https://g4cpt.fnal.gov/perfanalysis/g4p/ https://g4cpt.fnal.gov/perfanalysis/g4p/admin/task.html. Question of what mix of Geant4 and LarSoft effort is needed for this.

Code Profiling and Performance:
- *SCD Coordinator: Jim K* - will coordinate between LArSoft project and requests/delivery of performance and code profiling and assessment (~0.5 FTE ongoing together with art support)
- MicroBoone Coordinator: Wes Ketchum
- Lariat Coordinator: Jason St John
- Report delivered to experiments/project of the recent profiling effort driven by Lariat's statement of "slow performance" that turned out to be a need to profile Microboone code. https://indico.fnal.gov/getFile.py/access?resId=0&materialId=0&confId=9714.:
  - LArSoft will informally inquire with DH team about impact on SAM – done?

- o Paul Russo will send Gianluca Petrillo a link per the sparse array discussion – done?
- o Root v6 – in discussion
- o Next request is for some simulation code profiling.

LArLite/LarSoft integration:
SCD coordinator: Chris Jones, Marc Paterno; MicroBoone coordinator: Kazuhiro Terao
- Good first meeting held. Follow up will be after Chep (this week). Technical discussion at the end that was quite good. Kazu commented that he found it quite useful.
- Possibility that migrating to root 6 will make some of the integration work easier.
- After the main part of the meeting, Chris/Marc were immediately able to help fix some problems using Root with LArLite data products.

art/LArSoft summer school:
- *LarSoft coordinator: Saba Sahrish,* Whole Summer School: Marc Paterno, Jim K.
- aim is a workshop/users meeting co-scheduled with the FIFE June workshop – 3rd June - and then the full school, with classes in early August.
- Draft Vision: https://cdcvs.fnal.gov/redmine/projects/hep-soft-train mixture of lectures and periods of doing exercises. The duration of the course is 4 days. The audience is graduate students and postdocs who may know how to write simple analysis code (ROOT macros), and already know the basics of C++: how to write procedural code in C++, including how to use classes and how to write simple classes. They should know have some familiarity with class and function templates. They need to know "mechanics" of C++, and the fundamentals of editing and building code. They must have basic Unix usage skills.
- Outcomes: develop analysis, simulation, and reconstruction code of production quality in the art framework environment; develop algorithms of sufficient quality to be able to extend the shared LarSoft and art products.

Current Effort:

	Project Lead	E. Snider	0.5 FTE
	Project Manager	R. Pordes	0.05 FTE
Operations	Bug fixes	G. Petrillo	0.5 FTE
	Operations/Builds	L. Garren	0.25 FTE
	Continuous Integration (V1) support	M. Mengel	0.1 FTE
	CI experiment tests and monitoring	V. Di Benedetto	0.3 FTE (3 months)
	Evaluation of Worch (from Brookhaven) build of LArSoft	J. Amundson, L. Garren	
Architecture Development	Development	G. Petrillo	0.5 FTE
	LArSoft summer school development and architecture development	S. Sahrish	0.5 FTE
Continuous Integration	CI V2 development	M. Mengel	0.25 FTE
		V. Podstavkov	0.3 FTE
Performance Improvements	Code profiling and assessment	J. Kowalkowski and team	0.25 FTE
LarSoft/LArLite	LarLite/LarSoft integration	C. Jones, M. Paterno & team	0.5 FTE
		Current total:	**3.95**