

Preparation for the Final Design Review (and other management news)

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DOE Project News (i)

- The LBNF/DUNE project went through an IPR at the end of January
 - Very minor comments / recommendations for FD-1
 - Proceed with R&D to demonstrate that vertical drift is a viable technology for FD-2
 - Prepare cost and schedule for FD-2
- Since then
 - LBNF/DUNE being reorganized around 5 sub-projects
 - Far site (FS) conventional facilities (CF)
 - FS cryogenics and Far Detector module 1 (FD-1)
 - Near Site (NS) CF
 - Near detector
 - FD-2

DOE Project News (ii)

- Different subprojects means different DOE approval timelines
 - Director's review in August, CD-1RR in October
 - Will also give the go ahead for FS conventional facilities (need to have final approval from DOE well ahead of April 2022, when we need to start spending funds on FS CF)
 - CD-2 (and possibly CD-3) for FD-1 to take place in April 2022, with director's review in February
 - Construction funds for FD-1 needed at the end of 2022 at the latest
- Different subprojects means different L2 managers for FD-1/2
 - I will continue managing FD-1, Cheng-Ju will be the L2 manager for FD-2

DOE Project News (iii)

- R&D for FD-2
 - Aim for FD-2 is to keep the design of detector components as close as possible to that of FD-1
 - There are some differences
 - Will need to route more cables through the same cryostat penetrations (cables for 40 FEMBs + photon detector in FD-1, could be cables for 60 FEMBs in some of the penetrations of FD-2)
 - Longer cables required for FD-2, may also need patch panel on CRP (i.e. short fixed cable from the FEMB to the patch panel, long cable from the patch panel to the flange)
 - R&D in 2021 is mostly equipping the first prototype CRP for tests in the NP02 cold box
 - Will be done using electronics already used in ProtoDUNE and extracted from the ProtoDUNE detector (going on right now)

DOE Project News (iv)

- R&D for FD-2 in 2022
 - Understand design differences in the cryostat crossing tubes
 - Understand cabling issues
 - Understand system aspects
 - Further tests in NP02 cold box and preparation for ProtoDUNE-VD in the NP02 cold box
 - Use FEMBs from preproduction run (i.e. available after we have 80 FEMBs installed in ProtoDUNE-2)
- Goal for subproject FD-2 is to reach CD-3 stage after initial operation of ProtoDUNE-VD (mid 2023 ?)
 - Construction of components for FD-2 will follow that of components for FD-1

DOE Project News (v)

- What needs to be done for the August 2021 review ?
 - Update all quotes (I will ask a few people for help with this)
 - Define a development plan for the WIB firmware and software
 - What are we going to support by Dec 2021 ? June 2022 ?
 - Assign institutional responsibilities for ASIC/FEMB testing
 - I have said I was going to do this by the end of February, I failed miserably.....

Tests at CERN / ICEBERG (i)

- Plans for tests at CERN
 - Prototype CRP will be tested in NP02 cold box in the Fall
 - Will have 3 view readout (0,90,~45 degrees) plus extra protective shield layer
 - Half of the CRP populated with top electronics (dual phase), half with ProtoDUNE FEMBs
 - Comparison of the performance of the two electronics
 - Demonstrate 2 view / 3 view readout in “larger” scale prototype
 - Installation of electronics on CRP will start in July, will re-use ProtoDUNE components (FEMBs, cables, cryostat penetration, WIB)
 - Hope for no change in WIB firmware, but some software developments are required
 - **Use same low-level libraries for UDP communication between CCM/SC and WIB, but need to port software tools to new DAQ framework**

Tests at CERN / ICEBERG (ii)

- Plans for tests at CERN
 - First DUNE prototype APA to be tested in the NP04 cold box in August
 - Use “final” FEMBs for ProtoDUNE, use new WIB, use new DAQ software
 - We are shipping a WIB to CERN (end of March) to help with development of WIB to FELIX communication
 - Can also provide FEMBs to test entire chain after completion of current ICEBERG run
 - With ~5 additional months of development we should be in the stage where we can take data in the NP04 cold box without many issues

Tests at CERN / ICEBERG (iii)

- ICEBERG tests
 - Some progress at ICEBERG
 - Can see track segments, not yet able to collect cosmics with detector fully synchronized
 - Can record data through FELIX (but not with trigger)
 - ColdADC p1 does not have autocalibration working properly, currently taking data without proper ADC calibration (may try this week ?)
 - Extended run into next week
 - Will be followed by high voltage extender test in April
 - Test of CRYO FEMBs in May
 - Plans after May test unclear

Software

- We are reaching the stage where we need real effort on SW
 - In the fall we will need to test components for ProtoDUNE-2
 - We need to develop procedures for archiving the test results and calibration in the hardware database
 - Hardware DB infrastructure is in place, parts identifiers scheme has been defined
 - It would be good to have somebody in the consortium working on this
 - Need to adapt some of our software to new DAQ application framework (also relevant for data taking for system tests)
 - **Please volunteer**

Preparation for the FDR (i)

- Date of the final design review is slipping toward the end of Summer / early Fall
- Work on documentation needs to start as soon as possible:
 1. Update chapter of Technical Design Report
 - Matt Worcester volunteered to help with this. Many people will be asked to provide inputs
 2. Detailed design documentation
 - ASICs (LArASIC: Nara, ColdADC: team, COLDATA: David, CRYO: team)
 - FEMB design (3 ASIC: Jack+Shanshan, CRYO: Kurtis)
 - Cold Cable plant (Marco)
 - Mechanical aspects (Manhong)

Preparation for the FDR (ii)

2. Detailed design documentation

- WIEC (Jack+Bo)
- WIB (Jack, Alex, Penn)
- PTC (?)
- Filter cards (Bo)
- Warm cable plant (Marco)
- Low voltage and bias voltage supplies (Marco)
- Interface to the DUNE detector safety system (Trevor + Marco)
- QA/QC Plan (Marco)
- Plans for online SW (Penn ?)
- Plans for offline SW (?)
- Naming convention (Marco)
- Firmware and software management plan (Alex, Penn, ???)

Preparation for the FDR (iii)

3. Grounding plan

- ?? (no it cannot be Terri and Linda, they are supposed to review it)

4. Mechanical CAD models

5. Mechanical engineering drawings

6. Mechanical assembly drawings and parts lists

- Manhong

7. Electrical schematics and boards layouts

- FEMBs: Jack + Kurtis
- PCB on the CE flange (???)
- PTB on the WIEC (Jack ?)
- WIB (Jack)
- PTC (???)

Preparation for the FDR (iv)

8. Electrical schematics and boards layouts (include schematics and wiring diagrams)
9. Specification of electrical cabling and wiring connections
10. Bills of Materials for Electronics Board Components
 - FEMBs: Jack + Kurtis
 - PCB on the CE flange (???)
 - PTB on the WIEC (Jack ?)
 - WIB (Jack)
 - PTC (???)
 - Filter cards (2 flavors, Bo)
 - Interface with DDSS (PLC components, multiple drawings, Trevor)
 - Low voltage power distribution (Marco + ??)
 - Bias voltage power distribution (Marco + ??)
 - Power and controls for heaters (including RTDs on the CE flange, Trevor)
 - Power and controls for fans attached to the WIEC (Trevor)
 - ASIC test stands (*N) ???
 - FEMB test stands ???
 - Other test stands ???

Preparation for the FDR (v)

11. EB-held requirements document
12. TB-held requirements document
13. Consortium held requirements document
 - Cheng-Ju, Dave, Marco (need to resume work)
14. Detector installation plan
 - Might be reviewed as part of installation plan (Jim Stewart)
15. Interface documents (consortium-consortium)
16. Interface documents (consortium-installation)
17. Interface documents (consortium-DSS)
18. Interface documents (consortium- facilities)
19. Interface drawings
 - All in good shape, except interface with physics (Marco, Manhong for drawings)

Preparation for the FDR (vii)

20. Engineering analysis documents

- Analysis plan for mechanics (Manhong, working on this)
- Analysis plan for cryogenic (Manhong, who is doing the review ?)
- Analysis plan for electronics (Marco)

21. Structural analysis notes

22. Independent review reports

- See above

23. Preliminary QA/QC plan

- Any volunteer

24. ProtoDUNE lessons learned

- Marco

Preparation for the FDR (viii)

- 25. Preliminary Manufacturing and Procurement Plan
- 26. Plan for Prototyping Activities
- 27. Cost estimate
- 28. Schedule Summary
- 29. Responses to Past Review Recommendations

Status of documentation

- Need to take this seriously
- Need your help in preparing the documentation and most importantly review it prior to submitting it to reviewers
- I hope we start advertising EDMS reference numbers in the next report