Preparing for the Final Design Review

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- A few remarks on the ASICs final design review
- Some remarks on ProtoDUNE-II
- Going through the documentation
- Backup: how to access documents in EDMS

- All the documentation for the final design review should be stored in EDMS

The ASICs FDR

- A few remarks on the ASICs final design review
- Review scheduled for July 22 (was 21+22)
- Deadline for providing documentation to the committee: July 12
- Internal deadline for the first version of the documentation: July 5
- Writing of 2 documents started on July 12…..

Marco Verzocchi
Mon 6/14/2021 3:24 PM
To: David C Christian; Hucheng Chen; Cheng-Ju Stephen Lin; Shanshan Gao; Jack Fried <jfried@bn

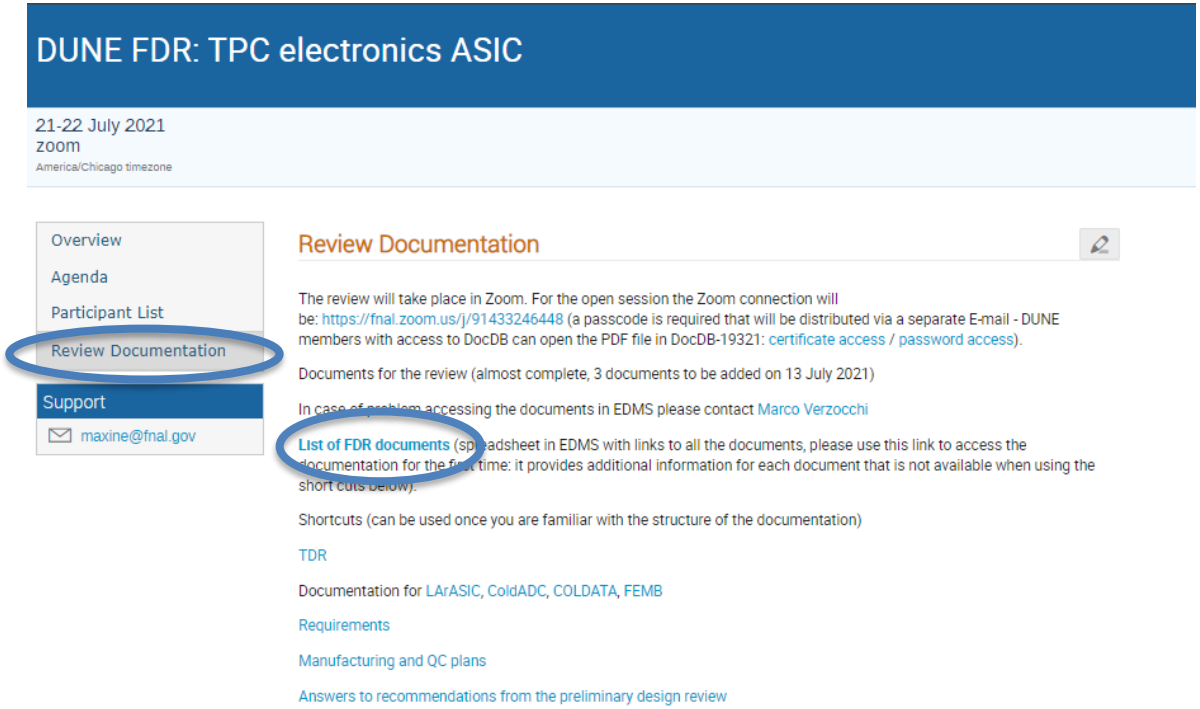
Dear all,
please read the message below about the documentation
for the final design review of the ASICs for DUNE.
Cheers
Marco

Documentation for the ASICs final design review

The final design review (FDR) for the ASICs will tentatively take place on Thursday July 22 (date to be confirmed). The format of the review will be significantly different from that of past reviews. We are not planning for an extensive set of presentations during the meeting of July 22. This is expected to be mostly and question and answer sessions. Therefore all of the material for the review will assume the form of written notes (not slides) that are going to be posted in EDMS prior to the review. The deadline for providing the documentation to the FDR committee is Monday July 12. I would like to have an internal deadline for a first version of the documentation of July 5, in such a way that the documentation can be reviewed before it is posted for the external committee.

Consequences

- Documentation was ready at the last minute
  - Minimal or non-existent internal review
  - Uneven quality, cannot claim that some of the documents that we provided are drafts of publications on the status of ASICs
  - Still the committee was not too unhappy….



DUNE FDR: TPC electronics ASIC

21-22 July 2021
zoom
America/Chicago timezone

Overview
Agenda
Participant List
Review Documentation
Support
maxine@fnal.gov

Review Documentation

The review will take place in Zoom. For the open session the Zoom connection will be: https://fnal.zoom.us/j/91433246448 (a passcode is required that will be distributed via a separate E-mail - DUNE members with access to DocDB can open the PDF file in DocDB-19321: certificate access / password access).

Documents for the review (almost complete, 3 documents to be added on 13 July 2021)

In case of problem accessing the documents in EDMS please contact Marco Verzocchi

List of FDR documents (spreadsheet in EDMS with links to all the documents, please use this link to access the documentation for the first time: it provides additional information for each document that is not available when using the short cuts below).

Shortcuts (can be used once you are familiar with the structure of the documentation)

TDR

Documentation for LArASIC, ColdADC, COLDATA, FEMB

Requirements

Manufacturing and QC plans

Answers to recommendations from the preliminary design review

The TPC Electronics FDR

- I am not going to repeat the same mistake
- I will start discussing the date of the review only when I see significant progress on the documentation for the review
- If I do not see progress with the documentation, I will not schedule the review
- Can you deliver ? (also, can I deliver ? I am as guilty as everybody else…..)
- We really need to have the final design review in the early Fall
- Without the final design review we are not going to get the CD2 approval of the project

ProtoDUNE-II reviews

- I would prefer to focus on the documentation for the first DUNE far detector module
- But we also have to do reviews for ProtoDUNE-II
- I much prefer doing the reviews for the first DUNE far detector module and then telling the committee “this cover also ProtoDUNE-II” rather than reviewing everything twice.
- This is an additional reason for trying to anticipate the final design review as much as possible

The importance of documentation

- Yes, some reviewers did not read the documentation and asked for more slides
- We cannot do an FDR of the entire TPC electronics with slides, it would require ~1 full week of meetings
- The documentation is important also for us, it describes the current detector design
- This is important for bringing on board newcomers and for old-timers that forget why they had decided to route a cable through one side of the APA instead of the other (for example)

Documentation for the FDR (i)

- Update of the TDR
  - Put on hold because the CD1RR review has been put on hold (this was the main driver)
    - Matt Worcester is leading the effort to update the TDR
    - Shekhar is the only person who is doing the work of updating his section (ICEBERG) with the help of others who are writing notes on the analysis of the ICEBERG data
    - There is no reason not to update the sections of the TDR on ASICs using the documentation that was developed for the ASIC FDR
  - I would like to see the TDR fully updated by September 15

Documentation for the FDR (ii)

- Design updates
  - The TDR cannot / will not contain all the details of the design, it needs to be supported by additional documentation
    - ASICs
    - FEMBs
    - Cold cable plant
    - CE boxes
    - Cable trays system and cable restraints for the lower APA
    - Cryostat crossing tube with its cable support system
    - Spool piece
    - Warm interface electronics crate with the PTB, heaters and fans
    - Warm Interface Board
    - Power and timing card
    - Filter boards for bias voltage
    - Warm cable plant and fiber connections
    - Bias voltage and low voltage power supplies
    - Interface with the DUNE detector safety system
    - Details of the QA / QC plan
    - Plans for online software
    - Plans for offline software
    - Naming convention for components
    - Firmware and software management plan

Documentation for the FDR (iii)

- Grounding and shielding plan (to be approved by the grounding committee prior to the FDR)
- Mechanical CAD models (+ engineering drawings, + assembly drawings and parts lists)
  - CE boxes and interface with APA (brackets, tees)
  - Cable trays attached to the DSS (including temporary cable tray)
  - Cable restraint system attached to lower APA
  - TPC Electronics spool piece
  - CE flange with cable restraint system
  - Warm interface electronics crate
  - Cable support system in the cold box including cable routing
  - Cable routing inside the cryostat
  - Cable routing on top of the cryostat
  - CTS / cryogenic + robotic system

Documentation for the FDR (iv)

- Electrical schematics and boards layout

- FEMB
- PCB on the CE flange
- PTB
- WIB
- PTC
- Interface with DDSS (includes power and controls for heaters and fans
- Low voltage power distribution
- Bias voltage power distribution
- Filter cards
- Patch panel for power and signals in the cold box
- ASICs test stand
- FEMB test stand
- Other test stands

For all these items do also

- Specification of electrical cabling and wiring connections
- Bills of materials
- Documentation links for COTS components

Requirements

- We have 3 level of requirements
  - EB held
  - TB held
  - Consortium held

- No point in changing the top level (EB held) requirements. Need to check whether any changes are needed at the level of TB held requirements, need to finalize the consortium ones
- For the ASICs review we looked at a subset of the requirements and made small changes on the consortium held ones

Installation

- We have a very detailed installation plan for FD1 that needs to be reviewed (it would help if the installation review happened prior to our FDR)
- Some minor uncertainties on the timeline for work that takes place on the top of the cryostat to be solved
- Need to have a similar document for ProtoDUNE-II

Interface Documents

- Have very good draft for 5 interface documents
  - APA, HV, PD, DAQ, CALCI

  but some work is required (expect DAQ document to get much more detailed)
- Now have an understanding of what goes in the interface documents with COMP and PHYSICS (need to find the time to write them)
- Drafts exist for interface documents with DSS, Installation, Facility, but there is still a lot of work to de done
- Interface drawings: progress on some, more work to be done on others

Engineering Analysis Plan

- Very good head start with structural analysis plan ready (compliance office has reviewed multiple versions, now in the process of running finite element analyses, need to write report on the results

- Need to something similar for
  - Electrical safety (justify cable gauges, size of traces
  - Fluidodynamics (in the crossing tubes)

QA/QC

- There is a draft document for the QC procedures on ASICs that needs some small revisions
- This document needs to be extended to cover FEMBs
- Need QC plan for all other components

- Update the lessons learned document
- Manufacturing and procurement plan (exists for ASICs)

- Plan for remaining prototyping activities

Cost and Schedule

- There is going to be an internal Fermilab review of cost and schedule in September
  - Updated BOE files to be prepared in August

- Institutional responsibilities
  - Making progress on these, would like to be able to present final distribution of testing activities during the construction at the next DOE review (complete assignment of tasks by mid-October)

EDMS (i)

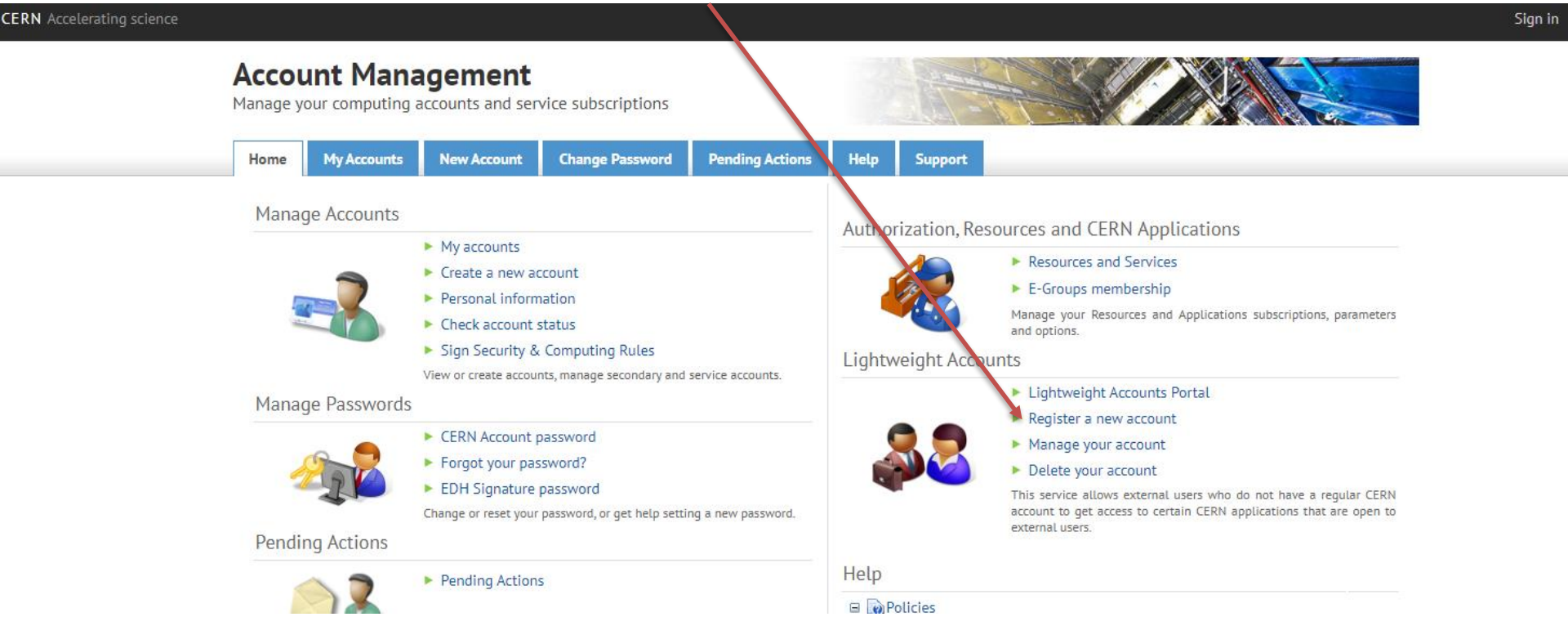
- All the documentation for the final design review should be stored in EDMS
- It is quite annoying to
  1. Having to store documents for others
  2. Having to provide protected documents to people not registered in EDMS
  3. Having to unprotect documents because of 2.

- So please register for EDMS (see backup material)
- If you do not have a CERN computer account please see the next slide on how to get a CERN “lightweight account”
- If you have a CERN computer account (or just created a lightweight account) go to the following slide for instruction on how to register in EDMS

Backup Material

CERN lightweight accounts (i)

- If you don't have a CERN computer account, you can still register for a lightweight account (also used for Indico@CERN), tied to your E-mail address
- Go to https://account.cern.ch



EDMS (ii)

- Registering for EDMS (approval takes ~1 day)
  - Go to https://e-groups.cern.ch
  - Enter CENF-LBNF-DUNE in the search box, then subscribe