May 8, 2023 DUNE 2x2 Installation Meeting

- Attendees:
  - Alan Hahn, Andrew L, Elise, MinJeong, Steve H, Geoff, Gary, Linda, Matt, Tom Murphy, Tom Markiewicz, Dave P, Dan D, Anne, Fritz, Sai, Jonny, Kevin Wood, Cindy, Gordon, Carrie, and Ting
- Status and progress reports – all
- MPOD DC power cable fabrication and routing – Matt
  - The PC boards converting DB37 output from MPV to simple twisted cables are living inside DC power rack on the west catwalk
  - There are 8 cables per module from MPVs to TPC feedthrough on the cryostat flange
  - Current design ength of the cables is 30' for all of them – to check with Gary and MinJeong for this
    - To work out cable routing detail including the ones running inside the power rack and VGA rack
    - To work out cable support for the cable runs between VGA rack and Pacman/fans on the cryostat flange
  - Have we considered the higher power requirement from new version Pacman on module #2?
    - Module 0, 1,3 has older version Pacman. Module 2 has newer version
    - Dan D and Kevin W to provide Confirmation, see also https://docs.dunescience.org/cgi-bin/sso/ShowDocument?docid=27122
- Remote control of DC power suppliers – Tom
  - Great tools for installation and commissioning
  - Can we find a way to store the voltage values either in database (Grafana) or txt format?
  - Working on expanding the control to 4 TPCs.
  - Working on GUI

Current DUNE 2x2 Installation Tasks

(May-8-2023 update)

- 2x2-Minerva commissioning: detector checkout with NuMI data, DAQ/nearline
- AC electrical T&M: Leyden contract → ISD & Leyden schedule the work
  - Both IDIQ (688499) and T&M (681206) POs got updated on May 5 by new buyer Ryan O'Sullivan
  - Matt has been sending inquiring to our Gemar Dutollo (2x2 AC RP buyer) but no luck yet.
  - ***Dave/MinJeong comments on contractor access issue with real ID which we will face when contract work starts***
- ODH fans and ducting: ISD code and comment review → procurement approval → contract bidding
  - 26 weeks lead time for 7000CFM direct-drive fans
  - Solution: initial install with belt-drive fans ($18K), then replace with direct-drive fans ←greenlights from ODH expert and ND management
  - ***MinJeong asks whether Leyden to be used on ODH electrical work again: not sure. It is up to the bidder to decide***
- Internal piping and pump installation: electrical connection → cleanup
  - ***Grounding wire received;***
  - ***Removed clamp between conduit and cryo pipe***
  - ***Used a different junction box approved by Linda.***
  - ***Conduit fitting is being ordered through emarketplace.***
  - ***Expect to complete the job this week***
- Finishing cryostat access platform stair steps and gates before TPC insertion – MinJeong
  - Consideration of removing one section of handrail on west side → **topic to be discussed next Monday**
    - ***MinJeong also want to discuss existing infrastructure items on the west catwalk which has interference 2x2 instgallation***
    - ***MinJeong also want to discuss TPC/cryogenics/electronics installation sequences***
- LAr filter vessel installation
  - Filter regeneration → filter vessel placement underground, connection to cryostat and fill manifold
- Gas analyzer: re-assemble valve panel, install new analyzer, and add new pipelines to Ar gas collection points
  - Mike to discuss with Kourosh to o get panel assembly work started
  - New analyzer: most items arrived on April 27 except N2-analyzer
- Cryostat venting and safety relief piping: final layout → procurement and fabrication →
  - PO for Flex hoses is out: May 26 delivery time; Others are off shelf component: to finish ordering them soon
- Condenser support stand fabrication by Dave Butler's group – Sai
  - ***Aiming to finish the fabrication this week.***
  - ***Sai/MinJeong: want to install this AFTER TPC insertion. Fine with the meeting attendees***
- Condenser boil-off and liquid drain lines: drawing→fabrication→leak and pressure tests→installation in June
  - Flex hose delivery delayed but expected to arrive now; Ordering off shelve component
  - Nick to start to work on the pipe fabrication

- Cryo and ODH control designs and reviews – Trevor
    - docDBs: ***28123***, 27319,28114, ***28120*****,** 28117– cryo and ODH control system, hardware, and software designs
    - **ODH control design update on May 15? Yes from Trevor**
- Purity monitor installation in late May before TPC insertion
    - Fabrication of a small Faraday Cage enclosure of SBND design **– *Linda has material list and is about to start ordering***
    - ~~Flash lamp noise level measurement using spectrum analyzer – no need to do this now as we are using SBND design~~
    - Placement of flashlamp TBC: may want to get away from TPC electronics
- Cryostat TPC insertion procedure review and service feedthrough safety review
    - Rigging team for transfer and insertion
    - ND/PPD cryo techs for indium seal, feedthrough connection and pressure testing
- Cable support baseline plan, still needs design detailing
    - MPOD cable fabrication and routing discussion today
    - East-west cable tray from VGA to power rack. Short cable tray between power rack and ADC rack
    - Network cables run south-north with cable tray under west catwalk and west-east (corrugated tubing) under access platform.
    - Purity monitor uses corrugated Panduit tubing with open slit.
- Network installation – docDB 25558 has detail plan
    - network switches already received: in the hand of networking group
    - cable length detail in link: https://docs.dunescience.org/cgi-bin/sso/RetrieveFile?docid=25558&filename=ac2x2-network-cables.xlsx&version=3
    - fibers and connectors to be ordered through FNAL stockroom: 1 month or so lead time**: Geoff says there is no need to worry as networking group has already those items in hand for other purpose. There is no lead time issue**
    - Geoff comments on the need of AC power for computing and network installation **→will try to come up some temporary solution like what we did in LArTF**
- DAQ servers: Servers PO went KOI, June 23 delivery
    - Geoff to clean up the two spare racks at DAB, then arrange techs to transfer to MINOS
- Racks and electrical infrastructure for underground operation
    - UPS for cryo control rack and network rack: APC 3KVA, Tripp-Lite 1.5 or 2.2 KVA – Linda/Trevor/Matt/Geoff
        - LArTF spare needs new battery and NIC card
        - **Geoff, Linda and Matt to get together Tuesday to pick the UPS and also decide the battery and NIC card ordering**
    - GIZMON impendence monitor location – is it part of the AC contract? Do we need it before TPC electronics cabling?
    - Plan and preparation for TPC electronics racks: west catwalk cleanup (old cable tray), grounding strips, grounding monitoring…
    - Purity monitor electronics rack, flash lamp, fiber routing, grounding
    - Cryo PLC rack and ODH control panel
    - ACPS control LabView and PLC inhibit/fault communication (docDB 21958 of 35ton experience)
- Topics for next a few meetings
    - ODH monitoring and control: sensors, PLC, panel, rack, network, FIRUS etc. – Trevor
    - 4-module lifting plan and cryostat insertion procedure and signoff – MinJeong
    - VGA and ADC cable routing and support – Linda/Matt

- Final cryo control implementation: cryocoolers, pump, filter, gas analyzer etc. – Trevor
- Cryostat and TPC service feedthrough operation safety review plan – Mike Z
- Water cooling system design for cryocoolers – Mike Z
- TPC electronics installation and ORC plan – Linda
- TPC slow control plan for commissioning stage – Geoff