

SBN Program Status

Peter Wilson – SBN Program Coordinator

Oversight Board

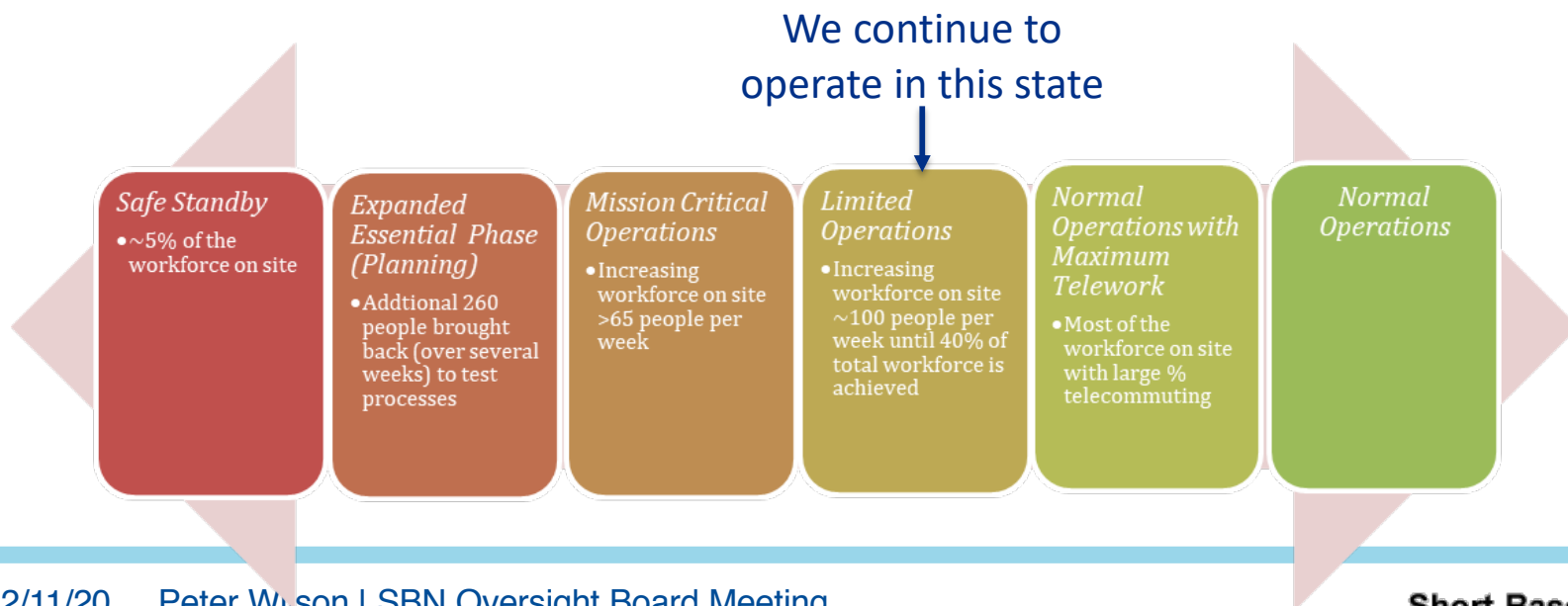
11 December 2020

Outline

- COVID 19 reopening status
- Director's Mini-Review of SBND and SBND Installation Review
- SBND technical progress

COVID 19: Fermilab re-opening

- Reopening process
 - Coordinated plan across Fermilab organizations
 - I was the Neutrino Division representative for planning process
 - Continue to handle the ND part of the essential Personnel list
 - Added personnel to Essential Personnel list in steps late-May until mid-September
 - Included SBN Users as needed throughout
- Current state
 - About 800 people come on-site every day (about 50% of employees)
 - With increasing cases and hospitalizations Fermilab work rules have been tightened and maximum telework further encouraged
 - E.g. Neutrino Division put moratorium on close proximity work (<2 meters)



Users on site

- On-site Housing remains open with some restrictions
- [Lab travel guidance](#) – particularly impacts people traveling by plane:
 - Choice of 14 day quarantine (preferred) or COVID test after 5 days
- SBN piloted process for international travelers (simultaneous with Mu2e)
 - Alberto Guglielmi and Gabriele Rampazo from Padova at Fermilab Nov 28-Dec 9 to work on TPC noise
 - Many preparations required for the trip – for example:
 - Approvals from DOE and INFN, with invitations letters from Fermilab Directorate
 - J-1 visas (no ESTA)
 - Addition to Essential Personnel list and coordination with Housing
 - Arrangement with Medical Office for alternative to ODH medical and for COVID tests after arrival
 - Prioritized all work planning in SBN FD building to maximize efficiency and minimize potential exposures
 - See Angela’s presentation for technical results of their successful trip
- Planning upcoming trips (next few months)
 - Return of Padova team to continue work on ICARUS TPC noise
 - Nicola McConkey for SBND assembly
 - INFN and CERN team for ICARUS top CRT installation
 - CERN and CERN contractors for SBND cryostat and cryostat top cap

October SBND Directors Mini-Review

- Primary focus:
 - Performance on revised schedule since last review
 - Response to COVID impacts

- From the executive summary:

The Review Committee was impressed with what the team has been able to accomplish through this challenging period. The team appears to be very coherent and work well together. The presentations were clear and concise, specifically addressing the charge questions. The team was also very responsive and cooperative in responding to the lines of inquiry from the Review Committee.

However, the project schedule remains optimistic, with several significant challenges remaining after the replan.

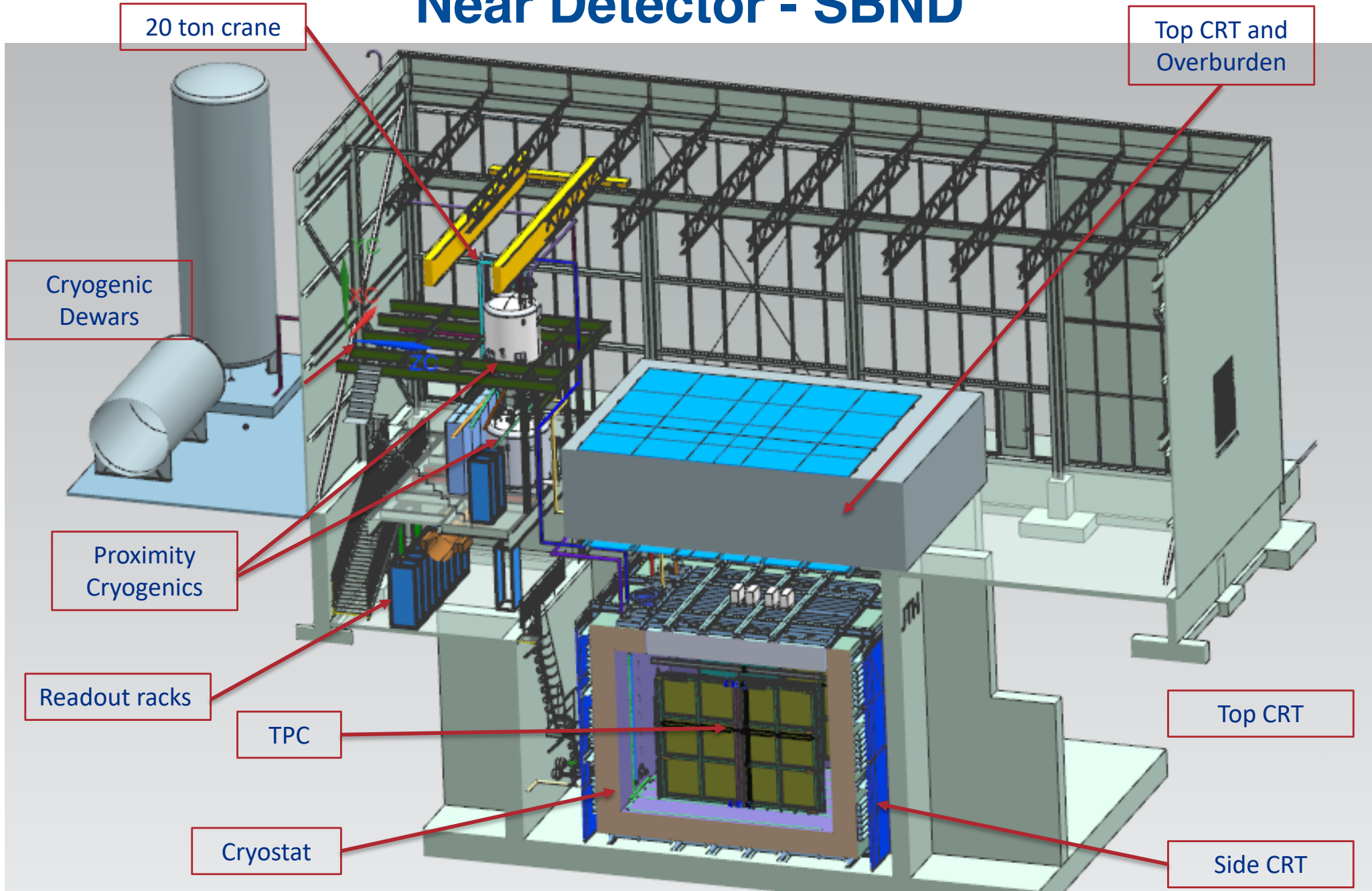
- There were 10 recommendations that address these challenges:
 - Planned activities in FY21 significantly exceed budget – partially a COVID impact
 - Technician demand in plan exceeds available resources
 - Final definition of cryogenics scope
 - COVID delays and uncertainty particularly onsite activities for non-US collaborators
- Primary action in progress is to update the schedule accounting for financial and labor resource limitations in FY21

SBND Installation Review

2-day Installation Review was held on Nov 16 & 19

- <https://sbn-docdb.fnal.gov/cgi-bin/private/DisplayMeeting?sessionid=9917>
- Organized internal to SBN by Anne Schukraft and Roberto Acciarri following model of the successful TPC Assembly review in Sept 2019
- Focus:
 - General installation sequence, cryostat & top cap, detector move & rigging, detector work & QA/QC (on loading deck)
- Thanks to our reviewers:
 - Allen Dervin (FNAL), Jim Kilmer (FNAL), Bill Miller (UMN), Filippo Resnati (CERN), Jason St John (chair, FNAL)
- Very successful review with excellent discussion and input from the committee
 - Received four recommendations – action plan being developed
- Discussion in review suggests a revised order of cryostat/top cap installation work by CERN in spring 2021
 - On going discussion with CERN and will incorporate into schedule rework post Director's Review (previous slide)
- Second review in early 2021 will focus on installation of other detector components

Near Detector - SBND

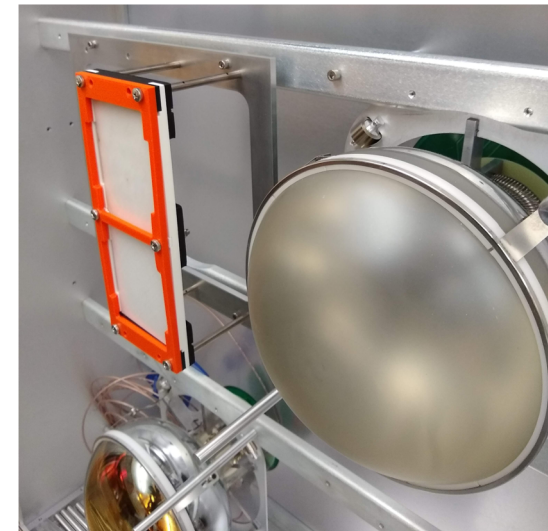


Light Systems (WBS 2.04)

- Continuing to finalize X-ARAPUCA test stand setup for SiPM mass testing
 - Light injection system upgrade: from single LED + fiber to bulb LED in the ullage
 - Eliminate noise
- Successful test fitting of new ARAPUCA standoffs and adapter plate in PDS box
- PMT readout shipment from LANL on its way
 - half of the CAEN 1730 readout boards, to be installed at ND mezzanine level PMT rack



Light injection system at Stella test stand



Test fit of 3D printed X-ARAPUCA frame in PDS box with new adapter & stand offs

DAQ and Electrical Installation (WBS 2.07)

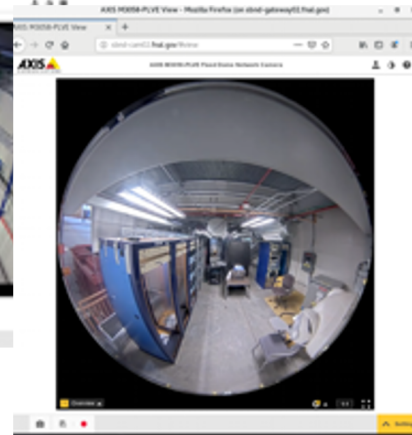
- Camera installation at the ND building complete
 - on SBND private network
- Awaiting arrival of PMT readout electronics from LANL for installation
- Continued debugging BNL to Nevis electronics data transfer



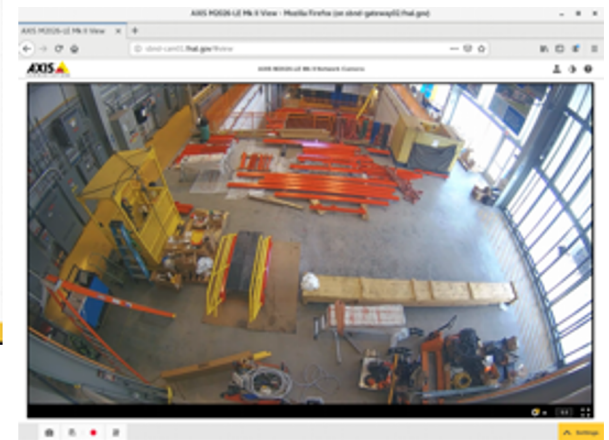
On cryogenics platform, facing cryostat and pit



NW desk area



Mezzanine readout racks and WOW test stand

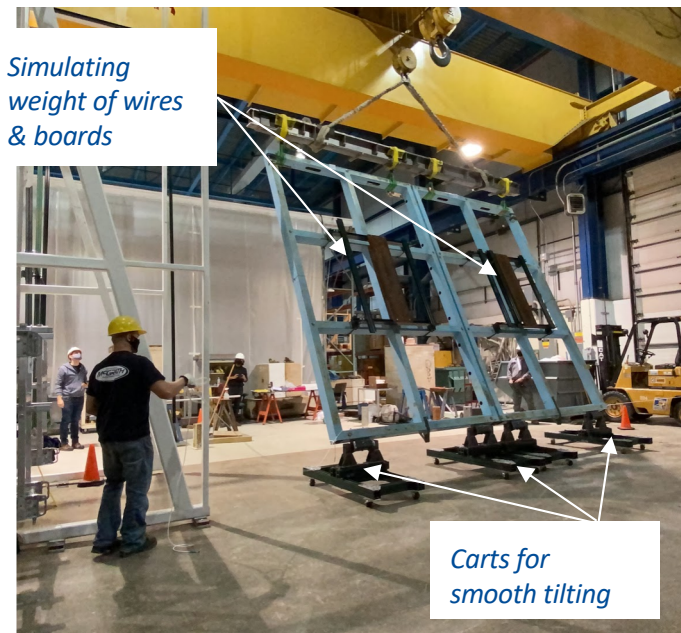


Loading deck

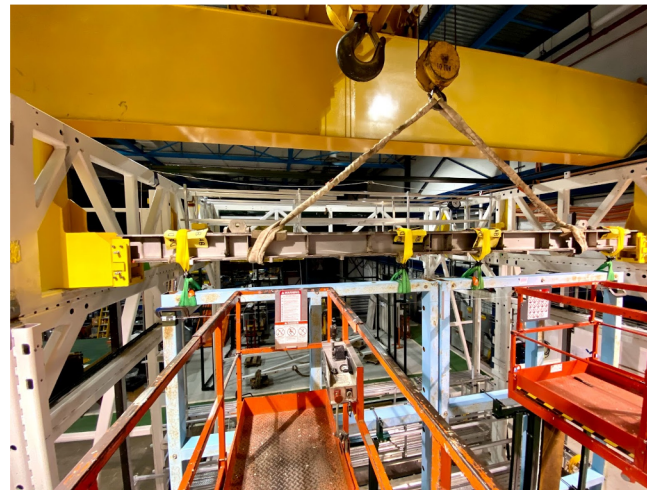
(5th camera on pit level facing sump pump not shown here)

Assembly (WBS 2.08)

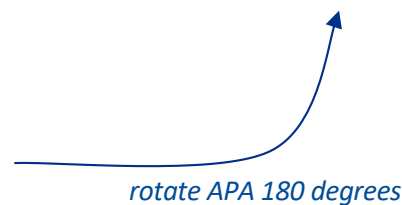
- On Thursday, Nov 12, we practiced the installation of an APA plane into the atf using our APA mock frame
 - weeks of planning @ SBND Assembly meetings with input from ES&H
 - Made possible with help from various collaborators on the essential list
 - Social distancing maintained throughout the process
 - Process went smoothly (< 1h). Lessons learned will be incorporated into the updated procedure for actual APA installation.



APA being brought up vertically



Placing in atf rest pads



Installed in atf

Assembly (WBS 2.08) - cont.

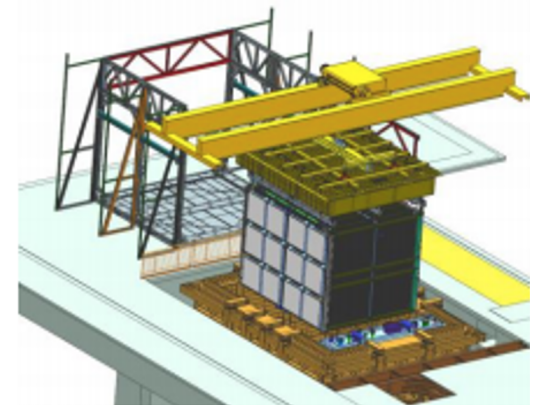
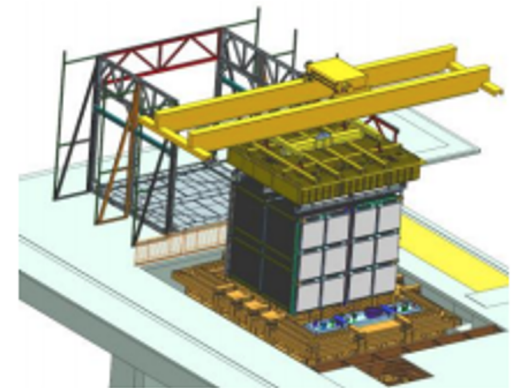
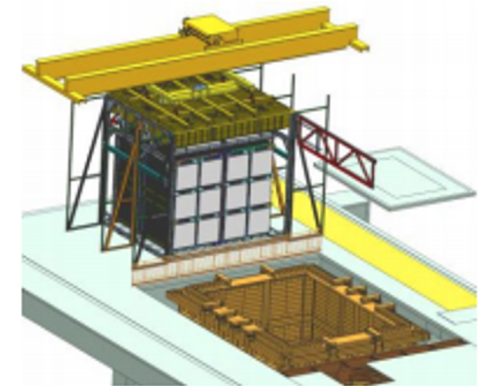
- Hinge installation at DAB completed
 - Need for detector rigging @ ND building
 - Extra planning allowed us to find a hinge installation procedure not requiring close proximity work



4 hinge blocks mounted to atf.



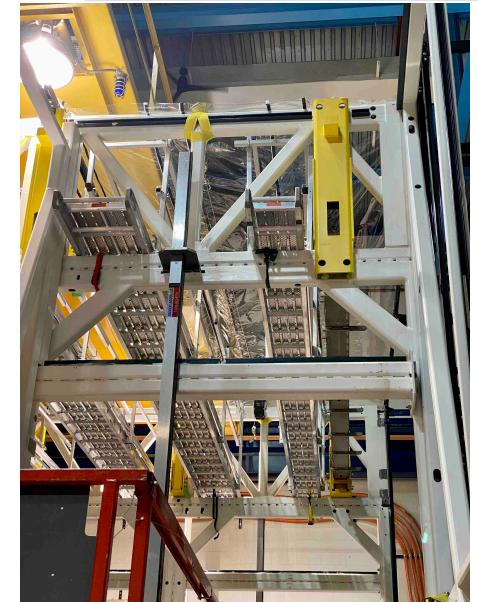
Hinge test, Nov 17 @ DAB



Assembly (WBS 2.08) - cont.

Next assembly tasks

- Inner clean tent
 - Installation started
- Outer clean tent
 - UV filtering plastic has been ordered. Designing unistrut enforcement of outer clean tent roof structure.
- CPA support beam
 - Beam needed some rework by vendor – completed
 - Polishing completed on-site at Fermilab
 - Continued testing of CPA hanger rods @SolutionEngineering
 - Planning to start load test before winter break
- APA plane re-coupling and alignment
 - work planning in progress for remaining clean tent work on first APA plane. Keeping > 6ft distance challenging.



Clean tent installation



CPA beam polished

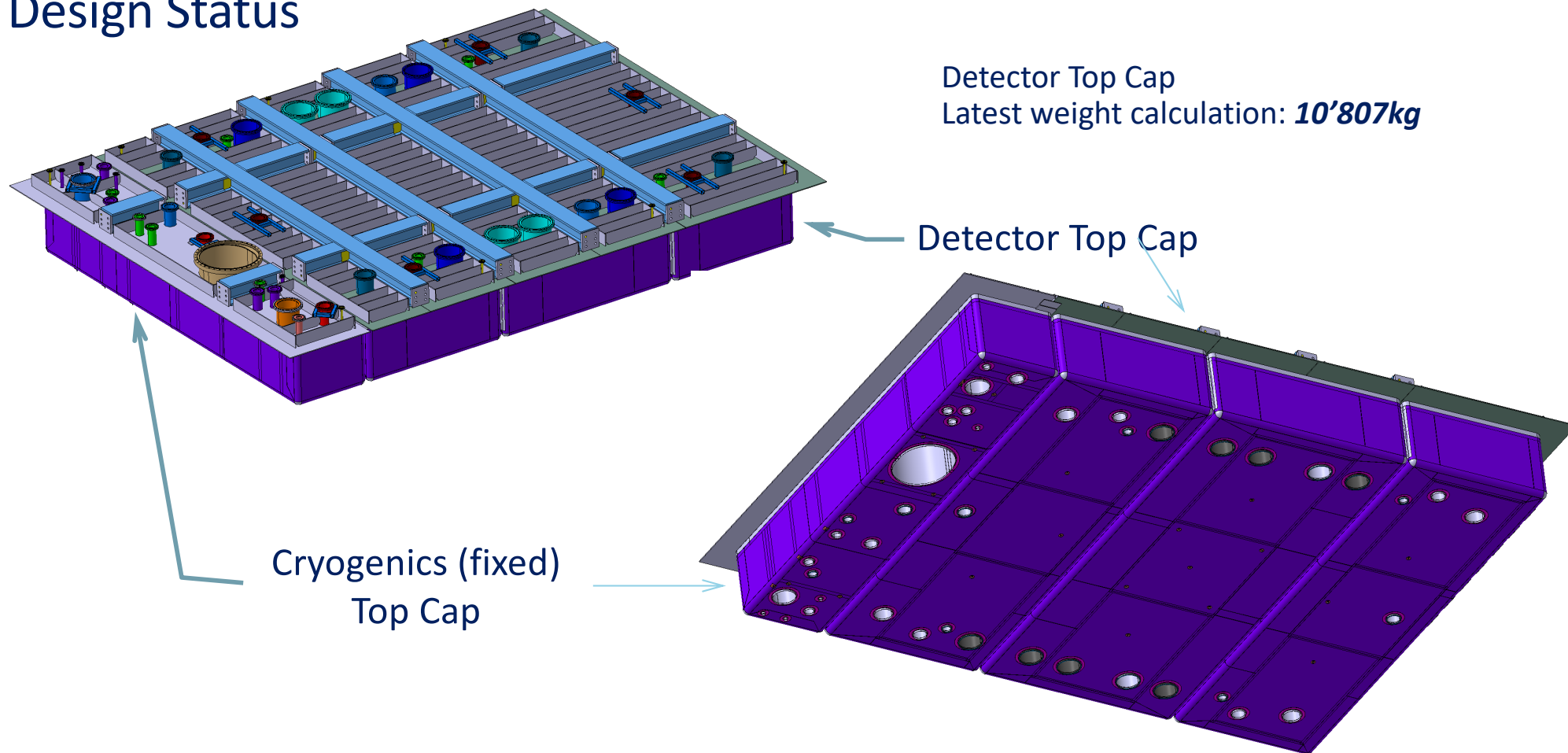
Installation & cryostat (WBS 2.08 + 2.09)

- Cryostat membrane & insulation fabrication complete.
 - Shipment of materials from South Korea to FNAL has started
 - First shipment due in 10 days, next in mid-January
- Cryostat stairs, decking, guardrails & false floor awaiting installation
 - work paused due to ICARUS cryogenics technician demands & close proximity
 - Leak check of warm vessel @ 80%, paused for same reasons
 - Re-planned for no close proximity – expect to resume in 10 days



Top Cap

Design Status

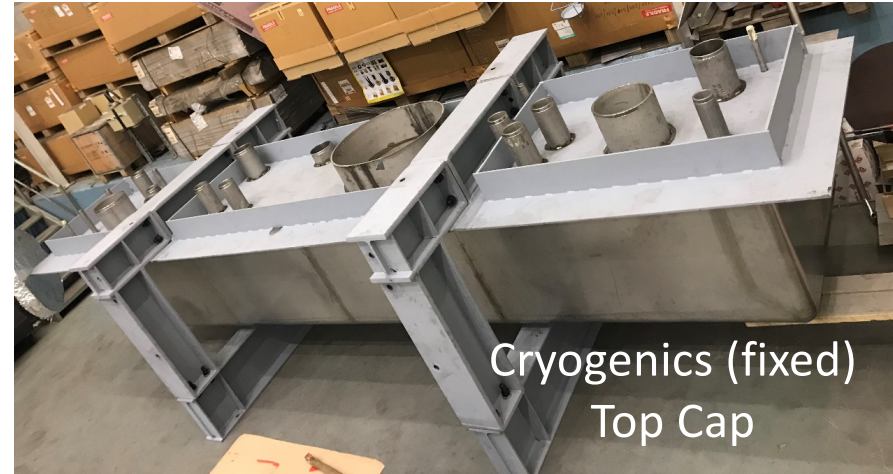


Top Cap

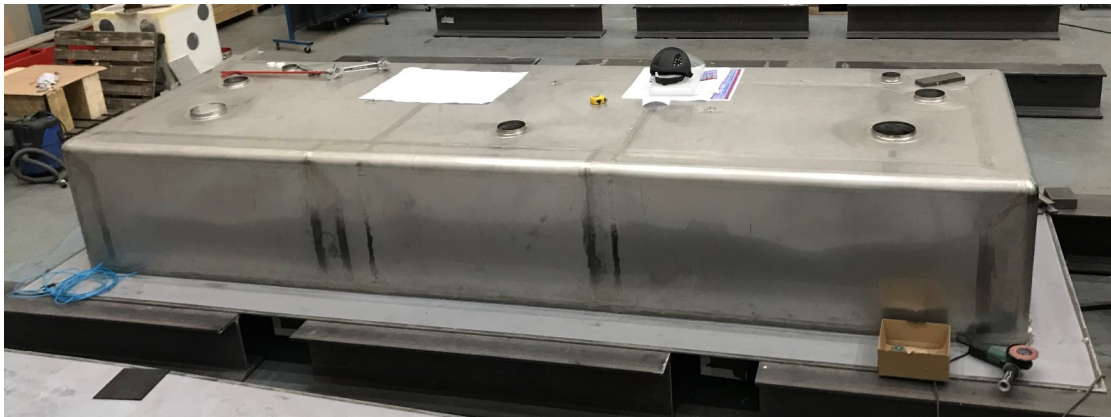
Production Status

- Current plan is (if COVID-19 allow us):
- To be completed by December 2020
 - transported in January 2021
 - arrive at FNAL in February 2021

Discussion: adjust shipping date to optimize for installation sequence

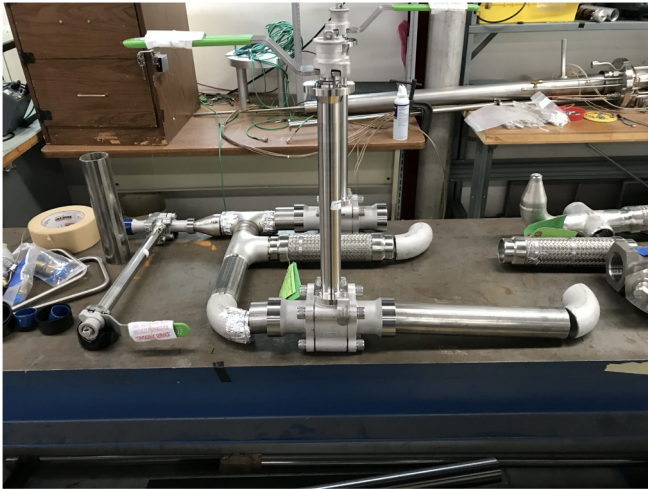


Detector Top Cap(s)



Cryogenics (WBS 4.03)

- Finalized P&ID with warm piping updates
- Design work beginning on Vent piping
- Beginning assembly of Cryogenic Controls boxes.
- Internal piping discussions with CERN finalized – preparing
- Developing envelop in 3D model for 5 vacuum jacketed Transfer lines
- Dewar piping being assembled at PAB (welder availability critical to this task)
- Vaporizer delivered to ND building ready for installation
- Uni-strut piping stands assembled and delivered to ND building



Piping assembly at PAB

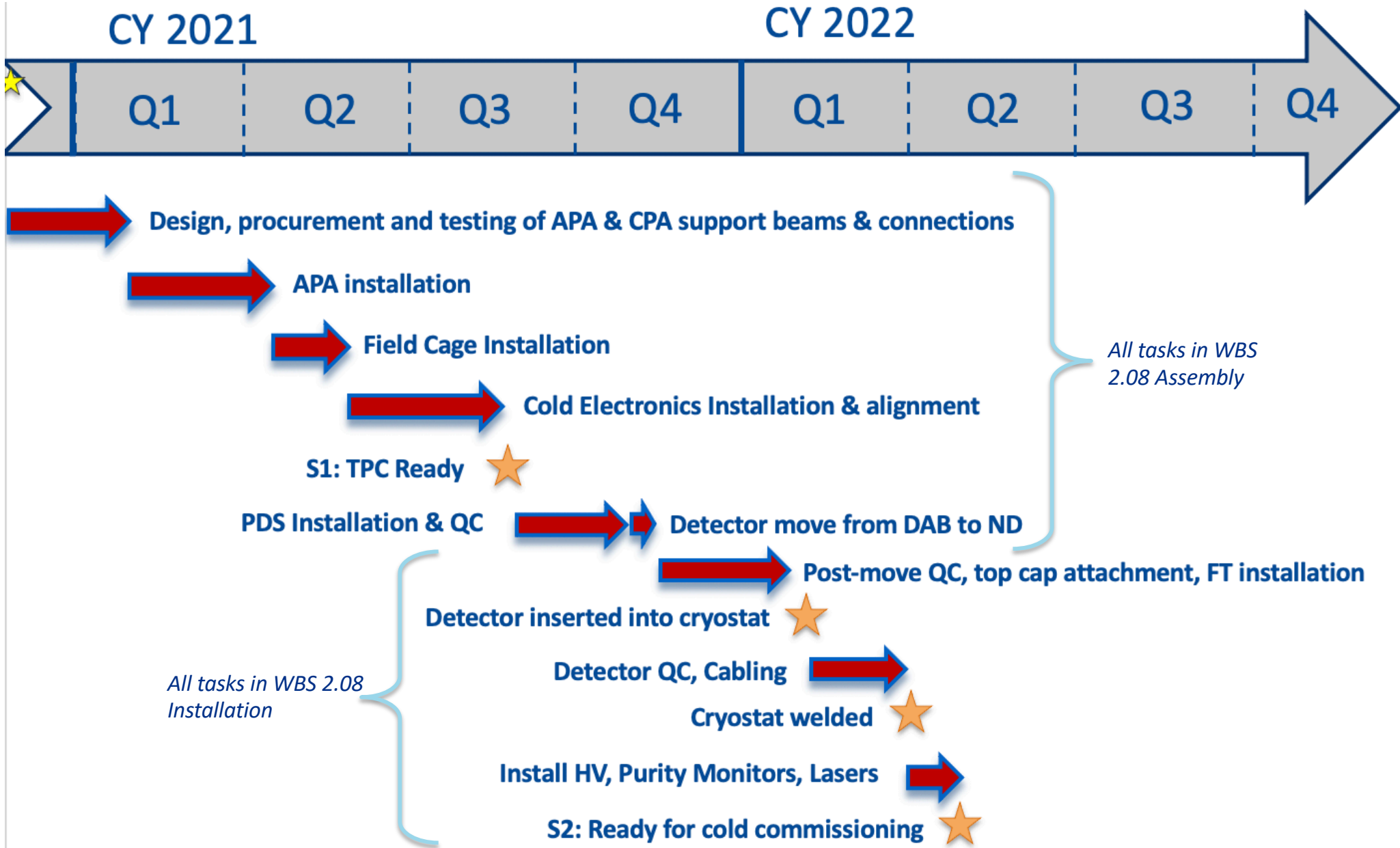


Unistrut support stands outside ND



Vaporizer outside ND

SBND Critical Path



Milestone update - S1

Intermediate Milestone	Owner	Baseline Date	Forecast Date		Actual Date
First set of APAs shipped to Fermilab	K. Mavrokoridis	24-Sept 2018		✓	4-Mar-2019
PO for COTS ADCs placed	H. Chen	10-Oct-2018		✓	30-Oct-2018
All TPC Components at Fermilab	K. Mavrokoridis	1-Mar-2019		✓	27-Mar-2019
Complete atf assembly at DAB	J. Zennamo	1-May-2019		✓	27-Nov-2019
50% of motherboards delivered to Fermilab	H. Chen	15-May-2019		✓	22-May-19
APAs and CPAs installed in atf	N. McConkey/ R. Acciarri	25-Nov-2020	3-May-2021		
Field cage assembly complete	N. McConkey/ R. Acciarri	23-Dec-2020	7-Jun-2021		
Cold electronics installed and tested	H. Chen	12-Feb-2021	14-Jul-2021		
S1: TPC ready to move to SBN ND	A. Schukraft	19-Feb-2021	25-Aug-2021		

Accumulated 2 week delay compared to schedule presented at Directors Review due to work progressing slower at DAB.

Milestone update - S2

Intermediate Milestone	Owner	Baseline Date	Forecast Date		Actual Date
GTT Design Study Begins	M. Nessi	1-Feb-2019		✓	26-Apr-2019
Delivery of warm box steel	M. Nessi	15-Jun-2019		✓	16-Sep-2019
Warm vessel installation complete	M. Nessi	15-Jul-2019		✓	15-Nov-2019
LN2 and LAr Dewar Systems Complete	M. Dinnon	23-Dec-2020	29-Dec-2020		
TPC Transport to ND building complete	R. Acciarri	15-Jul-2021	15-Dec-2021		
Cryostat material arrives at Fermilab	M. Nessi	15-Jan-2021	15-Jan-2021		
Cryostat top plug is ready to attach to atf	M. Nessi	25-Nov-2020	8-Mar-2021		
Protego valve installed	M. Dinnon/ D. Montanari	30-Apr-2021	3-May-2021		
Membrane Cryostat Completed	R. Acciarri	28-May-2021	1-Jun-2021		
External cryogenics install #3 (Common) complete	M. Dinnon	27-Aug-2021	14-Jul-2021		
Plug welded to cryostat	R. Acciarri	29-Oct-2021	12-Apr-2022		
Cryogenic operation approved	M. Dinnon	18-Nov-2021	12-Apr-2022		
S2: SBND detector is ready to fill with liquid Argon	A. Schukraft	25-Nov-2021	5-May-2022		

2 week delay from S1 propagating to S2 from last months statusing.

Expect to include updated cryostat and top cap assembly timeline next months, possibly adjust installation sequence as COVID response.

Backup

COVID 19 Safety

- COVID 19 Safety
 - Must maintain social distancing of >6 ft (2m)
 - Must wear a mask when indoors (except alone in an office)
 - If can't maintain >6ft, additional PPE and Hazard Analysis are required
 - Increased cleaning protocols
 - Bathrooms all single occupancy
 - Occupancy rules on elevators, conference rooms
- Screening process for entry onsite including questions and temperature scan

COVID 19: coordination of work

- Work must be carefully planned to ensure additional safety rules are followed
 - Avoid conflicts of too many jobs at one time
 - Each facility has point of contact with responsibility for the daily/weekly plan in the facility
 - Authority to say work can proceed based on safety plans, scheduling etc
 - SBN FD (ICARUS): Carrie McGivern
 - SBN ND (SBND): Roberto Acciarri (Anne Schukraft)
 - Dzero (SBND Assembly): Pete Simon (Joseph Zennamo)
 - PAB (R&D): Flor de María Blaszczyk
 - Weekly planning meetings set priorities for the upcoming week at each facility