

ProtoDUNE-II
Trial Assembly
Frame

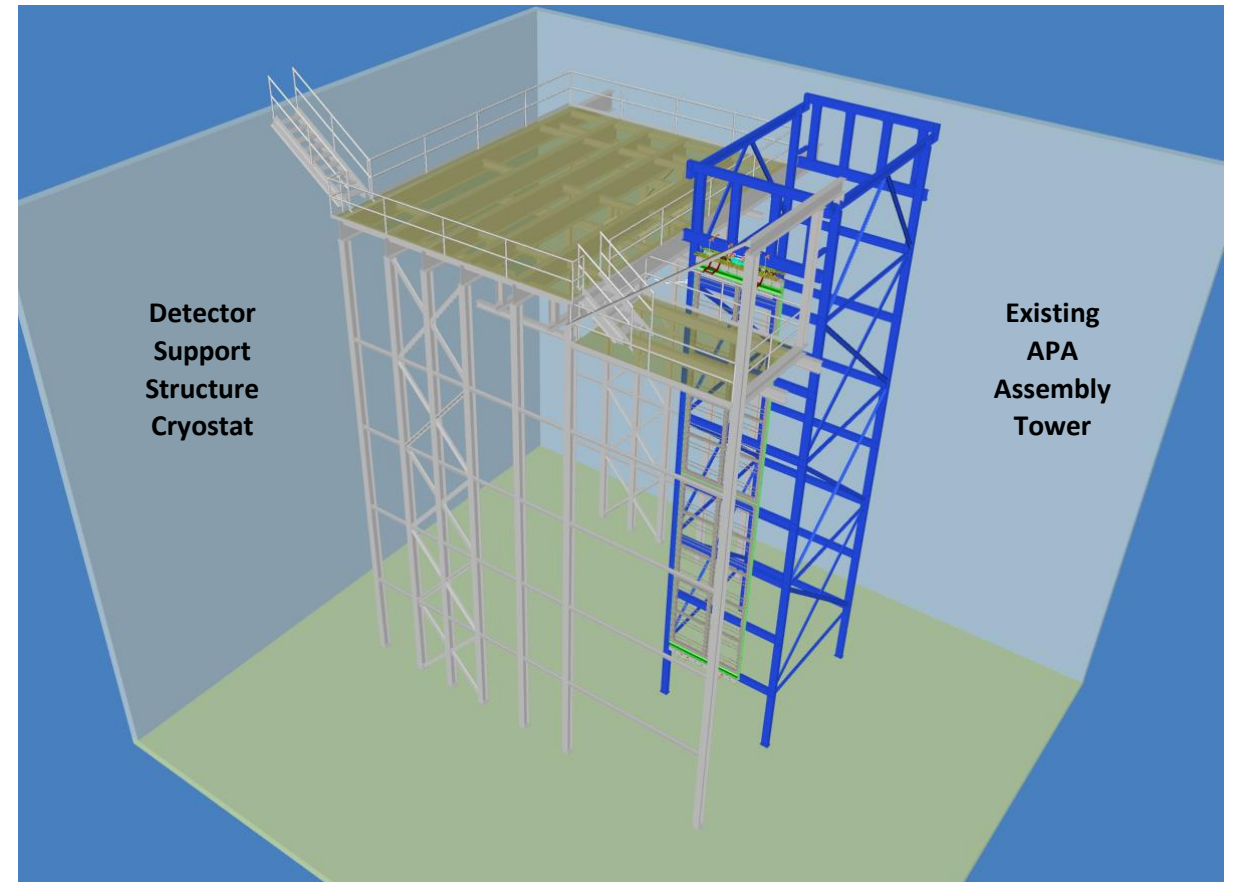
Ash River ProtoDUNE II and DUNE status

William Miller and Crew
University of Minnesota

New Schedule- DUNE Trial Assembly Phase 2

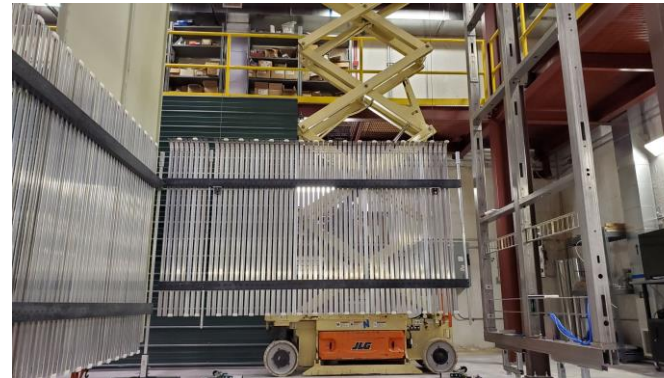
- I have received the OK to proceed with getting bids for the DSS Support steel structure
- After working with one of the fabricators to determine a reasonable timeline
 - Bids are out now
 - Site visit May 18th (4 of 6 have RSVPed)
 - Quotes are Due June 1st with award on June 5th to proceed with fabrication
 - **Remove the ProtoDUNE II structure and all TPC components by July 17th**
 - Complete DSS-Cryostat Steel Structure by the end of August

Fabrication and Installation ~3 months

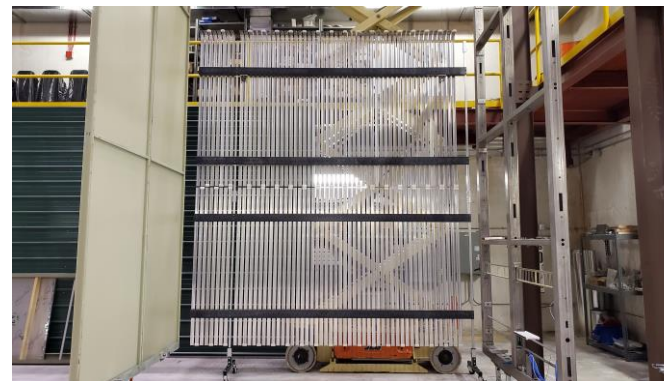


EW Progress

The documentation was completed, all 6 EW have been built, load test done, and first EW lift was very successful



First End Wall panel



2 End Wall panels



3-End Wall panels



EW Phase 1 is in good shape!

ProtoDUNE II-Phase 1 Beam left Top APA			
End Wall Tests			
Complete By	Item	Responsibility	Status
13-Mar-20	Parts breakdown structure for items shipped	LSU	DONE
13-Mar-20	Shipping and tracking information	LSU	DONE
20-Mar-20	Ship End Wall Components (Some extrusions at AR)	LSU, UMN	DONE
20-Mar-20	End Wall Assembly Tooling	LSU	DONE
20-Mar-20	Build End Wall transport equipment	UMN	DONE
17-Apr-20	Order End Wall AI I-beam	ANL, UMN	DONE
15-May-20	5-End Wall Hanger Blocks and blocks	ANL, UMN	In progress
17-Apr-20	EW Cable and Cable attachment-UMN to order, ANL specs	ANL, UMN	DONE
17-Apr-20	Assembly 6 EW panels carts	UMN	DONE
30-Apr-20	Assembly 6 EW panels for 2 drifts	UMN	DONE
5-May-20	Summary of Documents on EDMS	UMN, ANL, FNAL	DONE
11-May-20	Load test on EW Lifting beam	UMN	DONE
11-May-20	Build first End End Wall	UMN	
21-May-20	Hang End Wall on hangers	UMN	
??	APA to Endwall connection	ANL	

Summary of Documentation
 HV End Wall Installation
 W. Miller 4-26-20
 EDMS # 2369688

Description	EDMS # or comments	Status	Approval
Drawing of location of End Wall on Ash River Trial structure	Ash River Crew will lay out location after EW lift test	New drawing	
EW hangers	Vic supplied EW hanger mounting drawing	Done	
End Wall Trial Assembly drawings	https://edms.cern.ch/document/2364484/1	Done	Approved
ProtoDUNE Trial Assembly Structure Cals	https://edms.cern.ch/document/2364485/1	Done	Approved
Loads for ProtoDUNE II	Need to update load list with ProtoDUNE II loads		
End Wall Drawings	DFD-22-EWA_100419	https://edms.cern.ch/document/2144459/2	Done G. Gallo
Structural Review	End Wall winch installation beam	https://edms.cern.ch/document/2365083/1	Done G. Gallo
	End Wall-Structural Analysis	https://edms.cern.ch/document/2282359/2	Done G. Gallo
	End Wall beam winch slide	https://edms.cern.ch/document/2369723/1	Done G. Gallo
	End Wall Hanger	https://edms.cern.ch/document/2369724/1	Done G. Gallo
	Load test winch lifting beam		
Procedure Review	Assembly of End Wall panels	https://edms.cern.ch/document/2349666/1	Done C.Cadeau, J.Cranston
	Installation of End Wall	https://edms.cern.ch/document/2364660/1	Done C.Cadeau, J.Cranston
	HA End Wall	https://edms.cern.ch/document/2364666/3	Done C.Cadeau, J.Cranston

Could use some help updating ProtoDUNE II TPC components loads



FC Progress

Two top and two bottom Field Cages have been completed

The Field Cage cart was built, and FC was lifted and loaded into cart



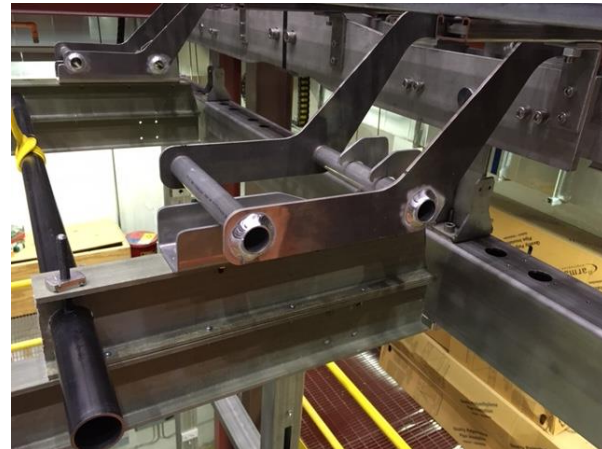
FC Deployment Phase 1 Status

HV SP Field Cages			
Complete By	Item	Responsibility	Status
10-Apr-20	Parts breakdown structure for items shipped	UTA, SBU, ANL	DONE
10-Apr-20	Shipping and tracking information	UTA, SBU	DONE
10-Apr-20	Deliver FC Assembly fixture	UTA, SBU	DONE
10-Apr-20	Deliver FC components	UTA, SBU, ANL	DONE
15-May-20	2- sets of latches for second drift volume	ANL	In progress
17-Apr-20	Move left I-Beam to proper drift pitch	UMN	DONE
17-Apr-20	Second block and winch for lower field cage deployment	ANL, UMN	DONE
17-Apr-20	Design/Build new lifting device Bottom FC	ANL	DONE
17-Apr-20	Build improved lower FC latch pivot frame old/new APA	UMN	
??	Designed Lower FC latch pivot frame	PSL	
18-May-20	New AI CPA hinges- 2 top and 2 bottoms	ANL	Ordered
18-May-20	Updated pin design between CPA panels	ANL	
18-May-20	Connection between APA and End wall	HV, ANL	Conceptual
18-May-20	Connection between CPA and End Wall	ANL	Ordered
5-May-20	FC storage cart-Design done, fabrication by UMN	BNL,UMN	DONE
5-May-20	Complete two top and two bottom Field Cages	UMN	DONE
15-May-20	Summary of Documents on EDMS		In progress
18-May-20	Load test FC deployment winches	UMN	
21-May-20	Complete Top APA Drift volume	UMN	

Summary of Documentation
 Field Cage (FC) Installation
 Cole Hraban 5-5-20v2
 EDMS # 2373450

Task	Description	EDMS # or comments	Status	Approval
Loads for ProtoDUNE II	Need to update load list with ProtoDUNE II loads	Help from PSL		
DUNE SP Top/Bottom Field Cage	2144458 v.2 Parts Drawings	https://edms.cern.ch/document/2144458/2	DONE	
Structural Review	Field Cage-Structural Analysis	https://edms.cern.ch/document/2282359/2	Pending	
	Top and Bottom Winch Analysis	https://edms.cern.ch/document/2372931/1	Pending	
	Winch (Bottom FC)	https://edms.cern.ch/document/2372930/1	Pending	
	Winching bar (Top FC)	https://edms.cern.ch/document/2372927/1	Pending	
	Completed Review Document			
	Load test lifting fixtures	To be completed after review of documents		
Procedure Review	Assembly of FC Table	https://edms.cern.ch/document/2349665/1	Done	
	Assembly of Field Cage	https://edms.cern.ch/document/2349665/1	Done	
	Field Cage Assembly Procedures	https://edms.cern.ch/document/2366961/1	Done	
	Field Cage Installation Procedures	https://edms.cern.ch/document/2369917/1	Draft	
	HA Field Cage	https://edms.cern.ch/document/2192540/1	Draft	

We did indicial tests in February with the FC latches on the APA and those worked well.



Phase 1 tests should be completed before the end of May

ProtoDUNE II Phase 2 Inverted APA

- I have not started a summary of documents for this phase yet, but the HV components and documents will all be completed in ~week
- We have the month of June to complete any additional ProtoDUNE II tests before we need to take the structure down for the DUNE Trial Assembly DSS steel structure.
- I believe with an inverted APA Yoke and APA link we could accomplish ~90% of the ProtoDUNE II mechanical tests.
- The rest could be done using the DUNE DSS as the design for raising/lowering the bottom APA is still many months off

Open question: Are there any ProtoDUNE de-commissioning procedures that need to be tested?

ProtoDUNE II-Phase 2 Beam right Bottom APA			
Complete By	Item	Responsibility	Status
15-May-20	Updated ProtoDUNE II TPC 3-D model	PSL, HV	In progress
4-Sep-20	Install ProtoDUNE Support Structure	UMN	
31-Aug-20	Yoke including raising/lowering device	PSL	
31-Aug-20	FC Latch pivots and frame for cable trays for Bottom APA	PSL, BNL, UMN	
31-Aug-20	Bottom FC latch frame and pivots for Top APA	PSL	
31-Aug-20	Lifting fixture for Top and Bottom APA out of APA shipping frame-sized with ProtoDUNE SS I-beams	PSL, UMN	
31-Aug-20	Modifications to any FC lifting fixtures after Phase 1	ANL, UMN	
31-Aug-20	Connection between APA and End wall-Phase 2	HV, ANL	
31-Aug-20	Connection between CPA and End Wall-Phase 2	ANL	Ordered
25-Sep-20	Begin Phase 2 mechanical tests	HV, UMN	
~Sept 2020	Begin installation tests using APA shipping frame	HV, UMN	
Late Sept	Beam Plug support tests	HV, UMN	
Mid-Oct	Complete ProtoDUNE II tests	UMN	
Late-Oct	Remove ProtoDUNE II support structure	UMN	

Updated Schedule - ProtoDUNE II & DUNE 2020

	2020												
	May	June	July	August	September	October	November	December					
ProtoDUNE 2 Trial Assembly-Phase 1	←→												
Built 6 End Wall	X												
Build 4 FC and Cart	X												
Complete Documentation-EW and FC	X												
EW Installation													
First ProtoDUNE 2 installation tests													
Remove ProtoDUNE Support structure													
Reinstall ProtoDUNE Support structure													
ProtoDUNE 2 TAssembly-Phase 2- Upside down APA						←→							
Remove ProtoDUNE Support structure													
Design DSS Steel Support/Platform System-Barr													
Review design, bid documents, procure													
Fabricate DSS steel support structure													
Install DSS steel support structure				←→									
Initial Test DSS													
APA Shipping Frame Tests: 4 weeks								←→					
Ship APA Box Plus APAs to SURF- 3-4 Weeks ??										←→			
Complete Review Documentation Process													
Module 0 HV TPC components fabricated/delivered													
First Row installation/deployment tests													

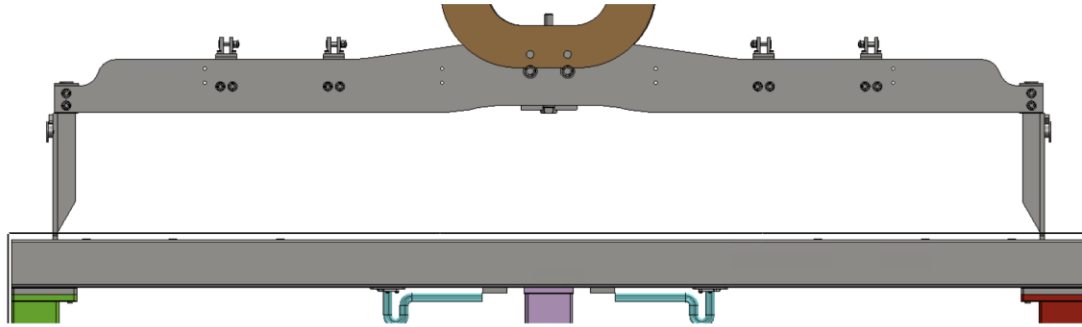
Next steps – Phase 1

- Continue to update the ProtoDUNE Installation procedure and HA documentation on EDMS
- Giuseppe Gallo is reviewing Vic's engineer note for the FC Winches. This is very straight forward since it is using mostly certified and documented component
- Review of the Structural Engineering Notes on the HV structure is close to complete
- A meeting is set for Thursday afternoon to go over installation procedures and HA for Field Cage deployment with M. Andrews and D. Newhart and J. Cranston for approval to test first drift volume

- ▲ Ash River ProtoDUNE II
 - ▲ Ash River ProtoDUNE II Drawings and Models
 - 2144457 (v.2) DUNE SP Cathode Drawings
 - 2144458 (v.2) DUNE SP Top/Bottom Field Cage Drawings
 - 2144459 (v.2) DUNE SP Endwall Field Cage Drawings
 - ▲ Ash River ProtoDUNE II Assembly and Installation Procedures
 - 2349665 (v.1) FC_Assembly_Procedure_Presentation
 - 2349666 (v.1) EndWall Assembly
 - 2364660 (v.1) EndWall Installation Procedured
 - 2366961 (v.1) CPA Installation Procedures
 - 2369917 (v.1) Field Cage Installation Procedures
 - ▲ Ash River ProtoDUNE II Summary Documents and Engineer Notes
 - 2369688 (v.1) End Wall Documentation Summary
 - 2369688 (v.2) End Wall Documentation Summary
 - 2372928 (v.1) Technical comments and approval (Ash River End Wall Activities)
 - 2372929 (v.1) End Wall Analysis Documents
 - 2372931 (v.1) Top and Bottom FC Deployment Winch Analysis
 - 2373450 (v.1) Summary of Documentation- FC Installation
 - ▲ Ash River ProtoDUNE II Lifting tools and fixtures
 - 2365083 (v.1) End Wall Installation Beam
 - 2369723 (v.1) Winch Slider
 - 2369724 (v.1) EWA_Hanger_032320
 - 2372927 (v.1) Top FC Winch
 - 2372930 (v.1) Bottom FC Winch Drawings

ProtoDUNE-II Trial Assembly-Phase 2

The second drift volume with the upside-down APA is missing many documents and components. We will not be able to complete this before we must remove the ProtoDUNE structure. We “could” complete most of the tests with a prototype Bottom APA yoke.



Deliverables HV Consortia:

- Second set of FC latches- May 15th
- 3 sets of End Wall Hangers- May 15th
- All CPA hinges 2 top and 2 bottom- End of May
- New interface brackets between End Wall and APA and End Wall and CPA

Deliverables UMN:

- Updated documents, keep PUSHING for approval
- Remove and reinstall ProtoDUNE steel structure
- Improve and lifting fixtures and deployment tools after phase 1 lessons learned

Deliverables PSL:

- Updated 3-D models and drawings- ProtoDUNE II
- New yoke/trolley system for bottom APA
- FC latch support for both APAs
- APA Lifting fixture design for APA Shipping Box

Deliverables BNL:

- Updated cable trays design drawings with assembly drawings