

# DUNE Project Status

Jolie Macier

DUNE PMG Meeting

17 August 2017

# Outline

- ES&H Update
- QA Update
- Schedule & Budget Status
- PM Update
- Far Detector Report
- ProtoDUNE-SP Report
  - Design & Construction – reports by subsystem
  - Onsite - installation & instrumentation
- ProtoDUNE-DP Report
- Upcoming Events

# ES&H

- Supporting the DUNE Production Readiness Review process, including the Photon Detector Readout Production Readiness Review at ANL on July 19th
  - ESH Roles & responsibilities are clearly defined for ProtoDUNE personnel
  - ANL Physics Department ESH Manager, provides ESH support and oversight to validate ProtoDUNE work activities are compliant with ANL ESH requirements
- Support meetings & discussions relating to installation activities relating to ProtoDUNE detector at CERN
- Equivalency review for training classes at Fermilab and CERN.
  - CERN EHS completed a equivalency review of Fermilab fall protection, confined space and aerial lift operations training classes for use during the ProtoDUNE installation
  - Partial equivalency for fall protection & confined space was granted
  - CERN practical factors for fall protection and a general medical exam for confined space will be required

*THANKS to Fermilab ESH for scheduling an extra fall protection course on 14 August – 10 DUNE participants!*

# Quality Assurance

- Met with DUNE Project Managers to discuss the LBNF/DUNE QA Plan and the responsibilities of DUNE Project Managers and Consortium leaders.
- Developing a revision to the LBNF/DUNE QA Plan to incorporate the responsibilities of the DUNE Technical Director, Project Managers and Consortium Leaders.
- Production Readiness Reviews
  - The Photon Detector Readout Production Readiness Review on 7/19/2017. Report was issued 7/28/2017.
  - Performing follow up of the status of the recommendations made during the Production Readiness Reviews

# DUNE Milestones

	July 2017 P6 Update	June 2017 P6 Update	Variance	Comments
<b>Completed In July</b>				
T4 MS - ProtoDUNE PSL APA #1 Arrives @ CERN	7/13/2017	7/14/2017	1	
T4 MS - ProtoDUNE SP PD First 10 modules ready to ship to CERN	7/21/2017	7/21/2017	-	
T4 MS - ProtoDUNE SP Ash River Trial Assembly Complete	7/31/2017	8/11/2017	11	
T4 MS - ProtoDUNE SP First APA Production Electronics @ CERN	8/29/2017	9/6/2017	8	
T4 MS - ProtoDUNE SP Cryostat Installation Complete	8/31/2017	7/31/2017	(31)	Welding still in progress. Welding of the roof is proceeding very slowly because of the number of penetrations, which are a deviation from GTT standard practice.
T4 MS - Stakeholders Submit FINAL Requirements & Interfaces for FSCF	9/12/2017	8/28/2017	(15)	This is driven by the CF need at the end of September
T4 MS - ProtoDUNE SP 35ton HV Test (Phase 2) Complete	9/12/2017	9/11/2017	(1)	

## DUNE Stop Light Report – Cumulative as of July 31, 2017

	Budget	Earned	Actuals	SV (\$)	SV (%)	CV (\$)	CV (%)	SPI	CPI
131.02 DUNE	22,014	21,509	23,486	(505)	-2%	(1,977)	-9%	0.98	0.92
131.02.01 Project Office - DUNE	2,940	2,940	3,036	0	0%	(96)	-3%	1.00	0.97
131.02.01 Project Office - DUNE	0	0	3,036	0	0%	(3,036)	-	-	0.00
131.02.01.01 Project Management Level of Effort	2,940	2,940	0	0	0%	2,940	100%	1.00	-
131.02.02 Far Detector	19,074	18,570	20,450	(505)	-3%	(1,880)	-10%	0.97	0.91
131.02.02.20 Far Detector - Detectors 1-4	2,836	2,915	3,337	79	3%	(422)	-14%	1.03	0.87
131.02.02.30 ProtoDUNE Design and Construction	14,816	14,269	15,635	(547)	-4%	(1,365)	-10%	0.96	0.91
131.02.02.40 ProtoDUNE Onsite	1,422	1,385	1,479	(37)	-3%	(94)	-7%	0.97	0.94
<b>Total</b>	<b>22,014</b>	<b>21,509</b>	<b>23,486</b>	<b>(505)</b>	<b>-2%</b>	<b>(1,977)</b>	<b>-9%</b>	<b>0.98</b>	<b>0.92</b>

Last month: SPI = 0.95, CPI = 0.91

# Project Management Highlights

- Installation work at CERN well underway
  - Teams on site; stationed in Neutrino Platform offices in nearby building
  - Safety analysis and documentation approved for DSS, provisionally for APA; CPA/FC/HV in process
  - Shipping & logistics – delivery record improved
  - Procedures continue to be developed
- FY18 Planning
  - CR
  - Budget & schedule review
    - ProtoDUNE – Q1 & Q2
    - Far Detector activities revised to align with US consortia priorities
    - Initiating work on FY18 SOWs
  - Funding profile scenarios (with LBNF)

## Project Management Highlights

### *DUNE Review Recommendations, DOE IPR, 28 Feb-2 Mar*

Define minimal, quantifiable requirements that ProtoDUNE must achieve so that DUNE will have successful LBNC, CD-2, and CD-3b reviews. Define a date for each of these sets of requirements to be achieved. Due Date: <b>May 1, 2017.</b>	James, with Thomson	Complete 17 March 2017; docdb#2765
Use project management tools to manage the schedule, costs, and possible scope reductions so as to achieve the ProtoDUNE requirements. The planning should extend beyond integration. Due Date: <b>June 1, 2017.</b>	Macier	Added milestone for FD decisions; Evaluating additional milestones
Develop a plan and budget with clearly defined objectives for operating ProtoDUNE at CERN. Due Date: <b>October 1, 2017.</b>	James	FY18 operations budget
Assemble a task force to address photon detection in preparation for CD-2. Due Date: <b>May 1, 2017.</b>	James	Complete
Establish and document, with the DUNE Collaboration, the detector performance requirements necessary to achieve the physics goals for CP violation, proton decay, and astrophysical neutrinos of the DUNE project for the TDR.	James	
Perform a comprehensive review of your bottom-up cost estimate (including CORE costs) prior to the next OPA review.	Macier	FY18 planning & Consortia Technical Proposals
DOE should work with LBNF/DUNE and international partners to better define CD2 requirements for non-DOE contributions.	Carolan	



## Project Management Highlights

### *DUNE Review Recommendations, LBNC, 22-24 June*

Recommendation	Responsible
The ProtoDUNE-SP management team should prepare a table with the list of the CE components to be delivered by the BNL team, their status (e.g. “Prototype”, “procurement in progress”, “all components on hand”), expected or estimated delivery dates for APA1, 2,3,4,5,6). This table should also include details of any staged delivery plan. A prioritized plan for assignment of resources to these components should be prepared.	James
The WIB is in a second iteration. 5 are needed for use in the cold box test of APA1 at CERN and only 1 board is available. The ProtoDUNE-SP management should work with the BNL team to identify sufficient WIBs to allow efficient operation of the cold box testing for APA1, presently scheduled for the first week in August, and to provide boards as needed to DAQ developers for system integration.	James
The ProtoDUNE-SP CE System Manager should communicate with the Construction Coordinator on a weekly basis through this critical period (4-16 weeks).	James
The LBNC points of contact for CE, Planning and Schedule should follow up with ProtoDUNE-SP management and the BNL team responsible for the cold and warm electronics deliverables in the next POC interaction, which should take place in approximately one month.	James

# Far Detector - Cryostat Interface Definition

## 1. Signal Penetration specification

Cable Routing –mock-up center APA tube done. Will now plan a realistic prototype. No cryostat changes foreseen.

## 2. Detector Support Structure

Endwall loads indicate additional support feedthru is needed. Will seek change request after the structural review.

Concept for detector installation is developed. Need to coordinate this system with the cryostat team.

## 3. Cleanroom-TCO interface

New iteration of the cleanroom was developed. Waiting for feedback from CF.

## 4. HV feedthru Penetrations

No Change

## 5. Cryogenic monitoring Interface

Investigating integrating this with the calibration feedthrus.

## 6. Calibration Penetrations

[Mini-Workshop on Calibration](#) July 26-27  
Suggested addition of Laser system and 4 additional instrumentation feedthrus. Feedthru design was frozen in July in preparation for the Aug design review. Will need to work on change requests before end of October.

## 7. Rack Placement and Cable Trays

No progress

## 8. Infrastructure Floor load, Lights, HVAC, cable hooks

No Progress

# SPPD Design & Construction – Subsystem Reports

## APA

- US APA#1: Arrived at CERN 13 July; crate opened 10 August; moved into clean room 11 August; wire inspection initiated 15 August
- US APA#2: first half of x-plane winding & soldering finished 11 August; goal to ship by mid-November
- UK APA#1: first winding week of 14 August; goal to ship by mid-November

## Photon Detector

- Teams & materials headed to CERN; production continues; assembly of next bars will not occur until after installation of the first set at CERN, 22-24 August

## DSS

- Analysis approved by CERN HSE; installation of support rods & railway beams

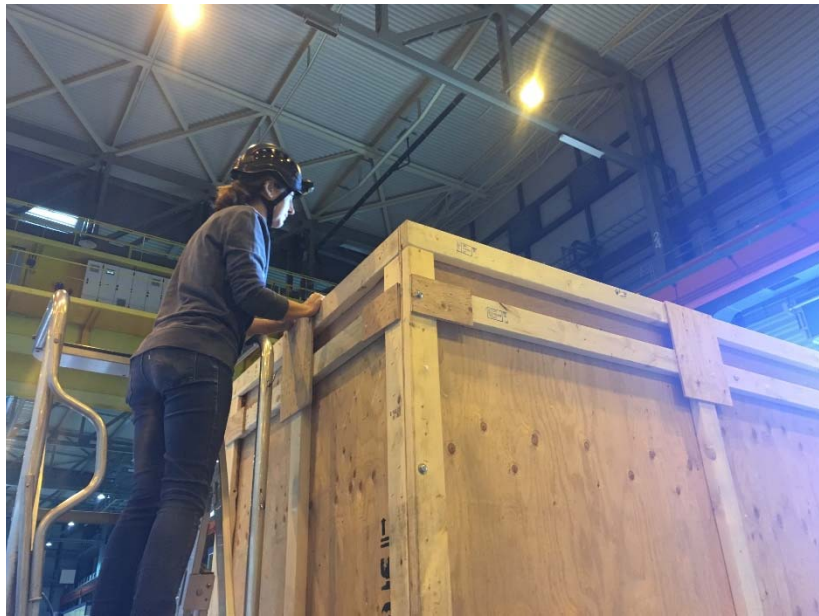
## Cold Electronics

- Evaluation of production ASICs (FE & ADC); BNL testing FEMBs in the CE boxes

## CPA/FC/HV

- CPA assembly underway; Field cage fabrication: first modules completed & delivered to EHN1; HV Phase 2 test at PC4 (with beam plug) setup complete; need cryo approval for operations

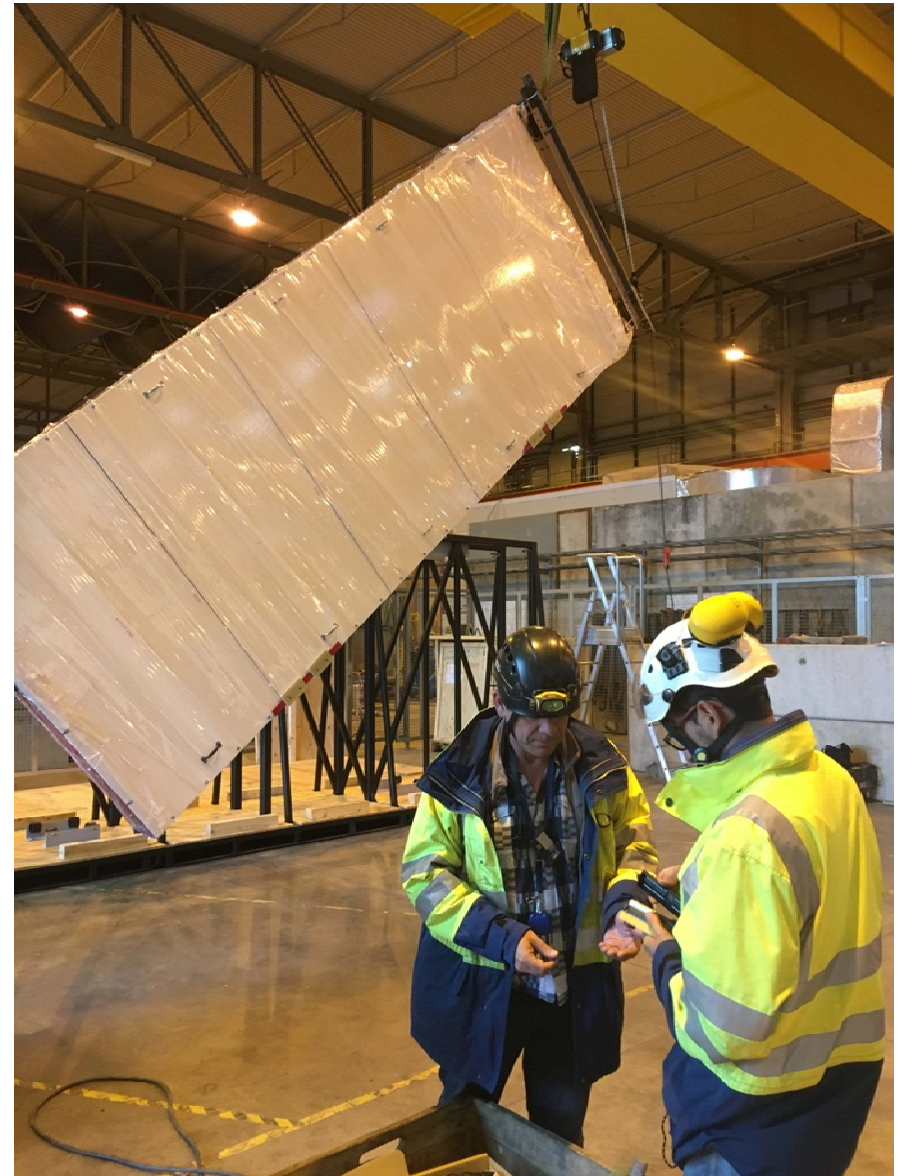
## APA#1, opening the crate



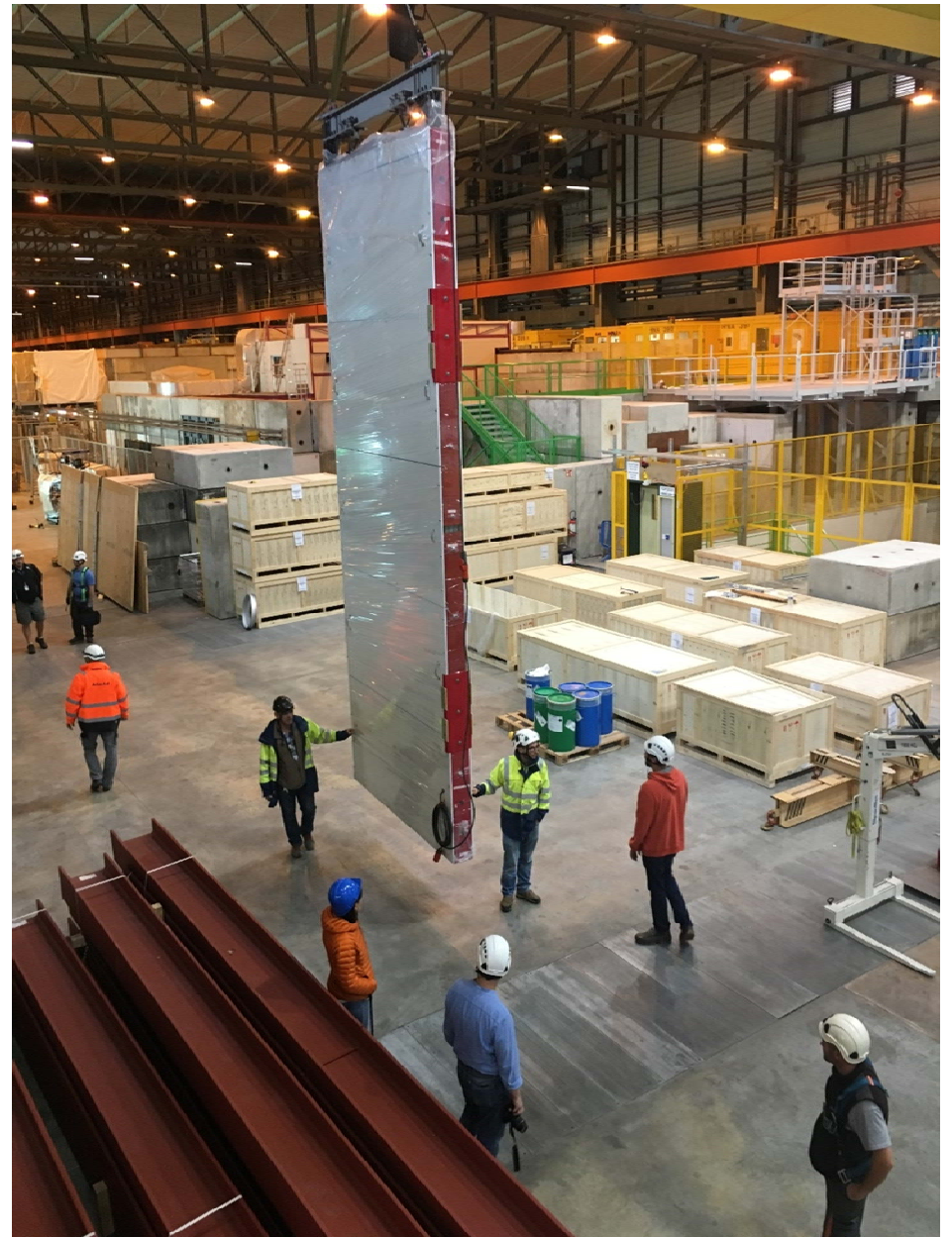
# APA#1, into the Clean Room



## APA#1, into the Clean Room



## APA#1, into the clean room



# APA#1, into the clean room



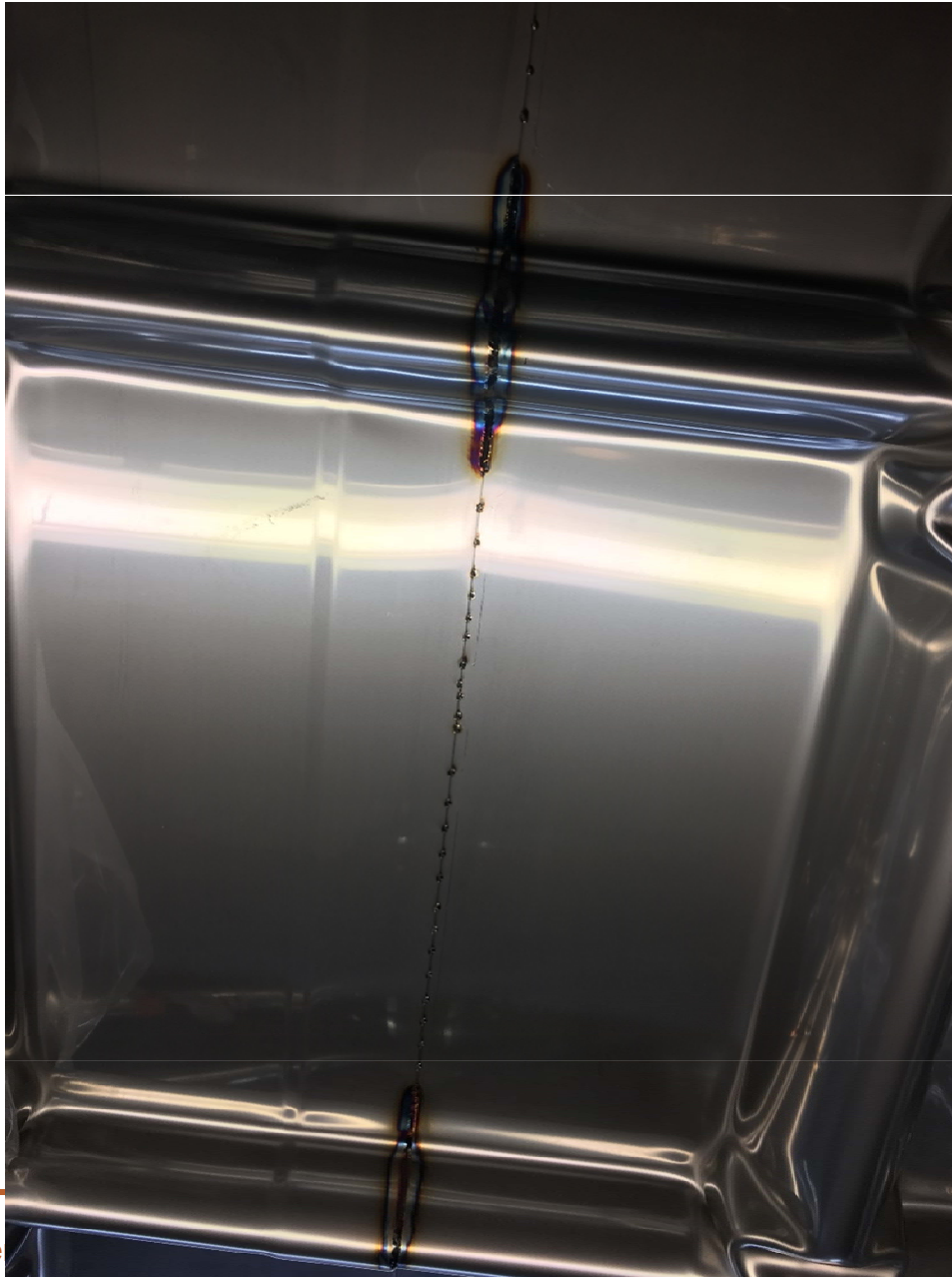
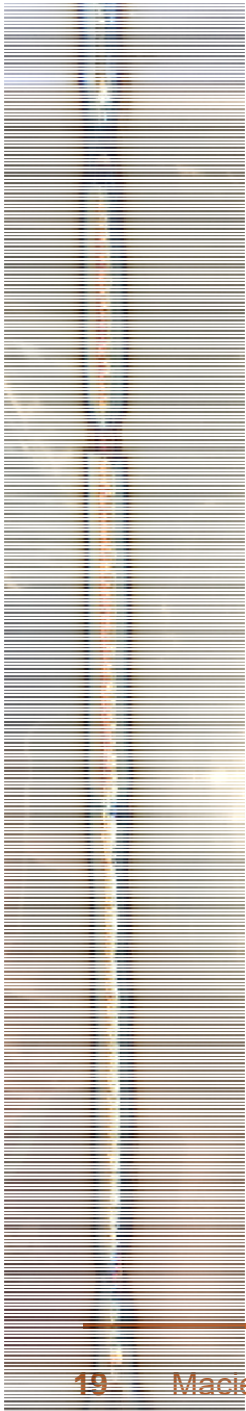


APA onto the clean room rail,  
unwrapped

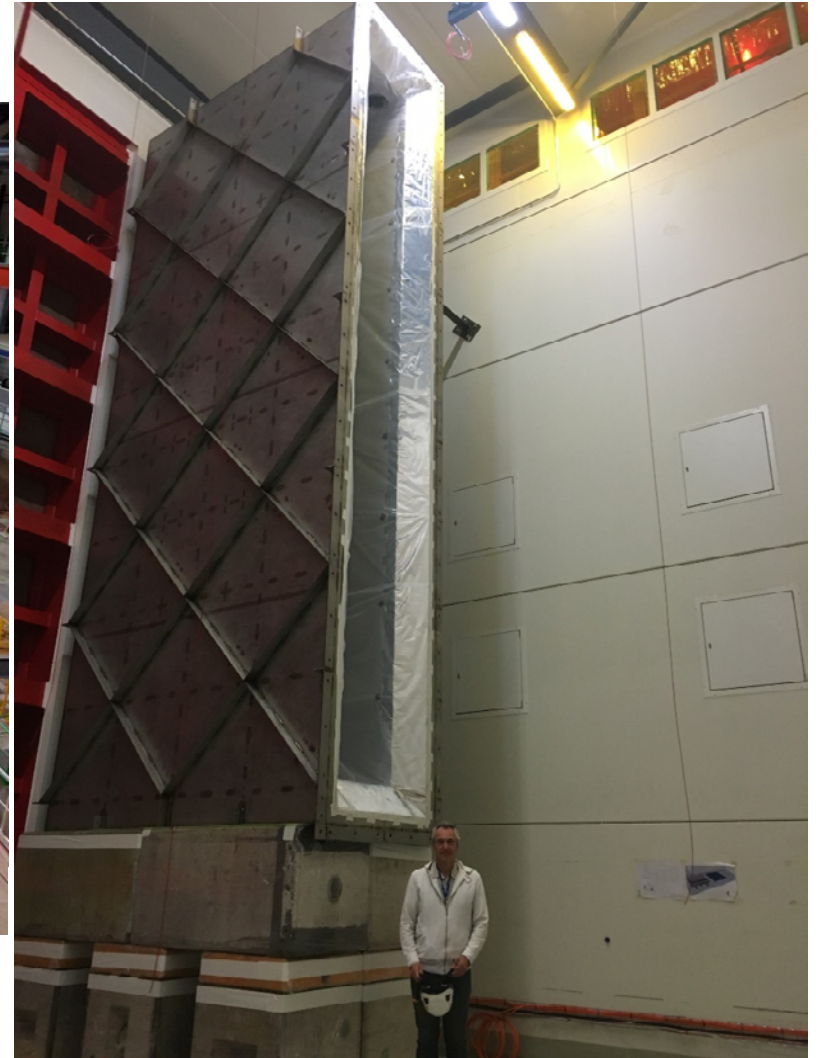




## Cryostat welding, DSS support rod feedthrough

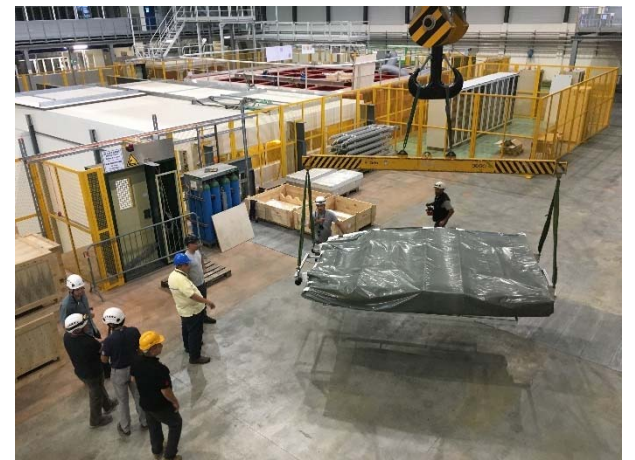
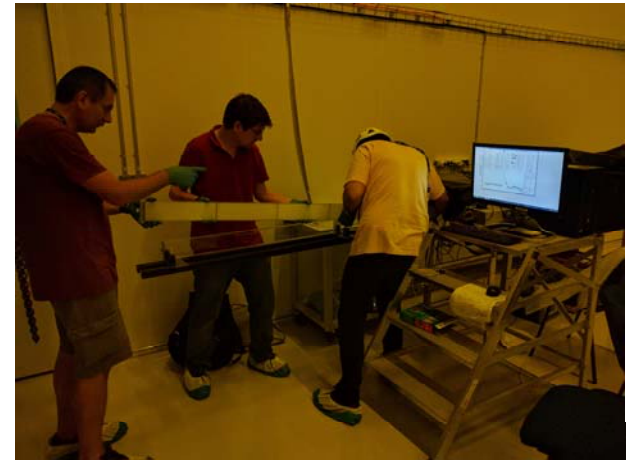


# Cold Box into the Clean Room



## ProtoDUNE-SP Onsite

- Integration, Test and Installation at EHN1
  - *Photon Detectors, installation tools, testing apparatus at CERN; installation in the APA next week*
  - *Top/bottom field cage modules assembled at CERN; first module completed & delivered to EHN1, 10 August*
  - *Impedance monitor installed for SP & DP*
  - *Assembled & tested FEMBs shipped to CERN 16 August for installation; CE mechanical components at CERN*
- DAQ: connections to cold box anticipated week of 21 August
- Cryo instrumentation: work on purity monitors continues



# Dual-Phase - Technical Progress

- Dual phase 1x1x3 prototype continues operations
- Fabrication of ProtoDUNE-DP components underway
- Integration working group active since June
- Working to redesign cameras for protoDUNE-DP
- Updated schedule to be complete by end of August

# Upcoming Events

- DUNE Collaboration Meeting, 15-18 August at FNAL
- Cryostat Steel Frame final design review, 21-22 August at SURF
- FS Integration Meeting, 23-24 August at SURF
- LBNC Review, 26-28 October at SURF
- Near Detector workshop, 6-7 November at CERN