

# DUNE ND-LAr Institute Board

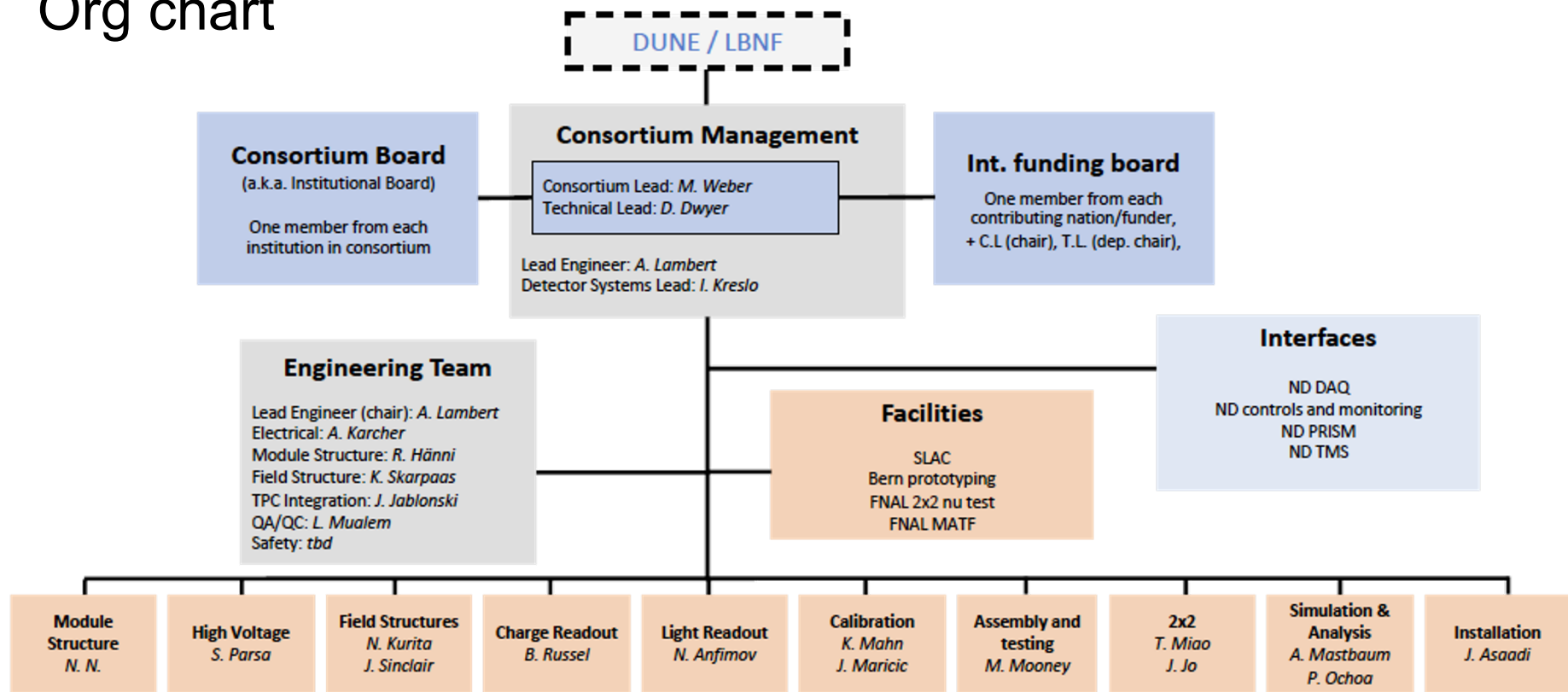
30. September 2021



# Topics

- Organization Chart
- Timeline
- Funding
- MoU status
- Task Force on Quality Assurance / Quality Control (QA/QC)

# Org chart





# Funding on US side

- Cost growth (excavation, installation, ND, contingency), results in high peaks in funding need
- CD1RR new baseline
- Assume conservative and realistic funding to allow to complete the planning
  - Flat funding
  - Sub-projects (FS-excav, FS-bdg, FS-det, ND-site, ND-det)
  - Adjusted organizational structure
  - Adjusted schedule to reduce peaks in funding, delay ND



# Collaboration list

ANL

Bern

BNL

Caltech

Cambridge

CSU

Fermilab

Houston

Iowa

JINR

Lancaster

LBNL

Manchester

Minnesota Deluth

MSU

Pennsylvania

Rochester

Rutgers

Sheffield

SLAC

Syracuse

Tufts

UC Berkeley

UC Davis

UC Irvine

UC Santa Barbara

U Colorado

UTA

Warwick

Wichita State

William and Mary

Yale

York

# MoUs

- DUNE wide MoUs will define participation in the experiment
- There will be Annexes for consortia, e.g. ND-LAr

The annex for the ND-LAr will define:

- Scope / deliverables
- Which institution provides which item (or funds)
- Which institution contributes to which item

One annex listing all institutions, NOT on an institution-by-institution base



# General (main part) MoU

Version 3.4 (August 26, 2021)

## **Memorandum of Understanding for Collaboration in the Deep Underground Neutrino Experiment**

The Fermi National Accelerator Laboratory (hereinafter referred to as “Fermilab”), a United States Department of Energy (“DOE”) National Laboratory managed and operated by Fermi Research Alliance, LLC,

and

The funding agencies, research institutions and universities participating in the Deep Underground Neutrino Experiment, hosted by Fermilab, that are signatories of this Memorandum of Understanding (“MOU”),

hereinafter referred to individually as a “Participant” and collectively as the “Participants:”

CONSIDERING:

That, as recommended by the 2014 report of the U.S. Particle Physics Project Prioritization Panel and supported by the 2020 update of the European Strategy for Particle Physics, Fermilab, as host laboratory, is undertaking the construction of the Long-Baseline Neutrino Facility (“LBNF”) to provide the infrastructure necessary to

Forwarded to the RRB today

# Annexes

## ANNEX 6: Guide to Annexes for Deliverables

This Table shows the Annexes which are expected to be prepared to document the deliverables for each of the major DUNE subsystems, delivered by the Consortia. The MOU Annex Document is expected to be amended annually to include any new Annexes. New Participant signatures are expected to be added at that time.

Consortium	Annex #	Annex Content	Annex to be incorporated (Date)
APA Consortium	7	APA's for FD1	2021
TPC Electronics	8	TPC Electronics for FD1	2021
Photon Detector Consortium	9	Photon Detector System for FD1	2021
High Voltage Consortium	10	HV System for FD1	2021
DAQ & SC Consortium	11	DAQ & SC for FD1	2021
DUNE Collaboration	12	List of Acronyms and Abbreviations for MOU and its Annexes	2021
CRP Consortium	13*	CRPs's for FD2	2022
TPC Electronics	14	TPC Electronics for FD2	2022
Photon Detector Consortium	15	Photon Detector System for FD2	2022
High Voltage Consortium	16	HV System for FD2	2022
DAQ & SC Consortium	17	DAQ & SC for FD2	2022
ND LAr Consortium	18	LAr Near Detector System	2022
SAND Consortium	19	SAND Components for ND	2022
DAQ & SC Consortium	20	DAQ and SC for Near Detector Systems	2023

# Main structure of annex

## ANNEX 7: APA Consortium – FD1

The APA Consortium is responsible for delivering Anode Plane Assemblies (APAs) for FD1.

This Annex describes the planned design and construction, and integration and installation APA tasks for FD1. The APAs are funded as a collaboration between the DUNE-UK project (STFC/UKRI) and the Fermilab DUNE-US project (DOE).

### Consortium Leadership

Institution	Lead (2021)
University of Liverpool, United Kingdom	*Christos Touramanis
University of Manchester, United Kingdom	**Justin Evans
University of Wisconsin/Fermilab, USA	**Brian Rebel

\*Consortium Leader

\*\* Technical Lead

### Scope of the Work

The Scope of Work for the FD1 APAs includes production, assembly and quality assurance

...

### Deliverables and Contributing Institutions

The Task Table below outlines the deliverables and Contributing Institutions carrying out the Scope of Work described above.

Subsystem	Description	Quantity (FD1)	Contributing Institutions	Funding Agencies
ADA	Includae	152 ADAe	U Wisconsin	Fermilab

### Ownership of equipment for the DUNE Experiment

All deliverables under this Consortium are intended to become the property of DOE upon their delivery to SURF, in accordance with the procedures specified in Annex 4 to the MOU.

### Key System Milestones

Subsystem	Milestone Description	Baseline Date
APA	APA Final Design Review	Jun 2021
APA	APA Production Readiness Review	Sep 2021
	Receiving of APA	Sen 2021

### Consortium Contributing Institutions, Principal Investigators (PIs), and Areas of Contribution

Contributing Institution	Principal Investigator(s)	Areas of Contribution
United Kingdom		

Univ of Bla

Bla boss

PCBs

# Scope

131.02.03.02.01	Module Structure
131.02.03.02.02	HV
131.02.03.02.03	Field Structures
131.02.03.02.04	Charge Readout
131.02.03.02.05	Light Readout
131.02.03.02.06	Calibration
131.02.03.02.07	TPC Module Assembly & Testing
131.02.03.02.08	TPC Installation & Integration
131.02.03.02.09	ND LArTPC Management
131.02.03.02.10	Module Assembly & Test Facility @ FNAL
131.02.03.02.11	Full-scale Demonstrator Test Facility @ SLAC
131.02.03.02.12	2x2 Neutrino Beam Test @ FNAL
131.02.03.02.13	ArgonCube Test Facility @ Bern

# 2x2

- Aim at the start of neutrino beam operation underground at NuMI in late 2022
- Setup starts on surface at LArTF in 2021
  - The goal is to prepare an efficient installation at NuMI in 2022
  - Can do a cryogenic run with at least one module taking cosmic data
  - Preparations for cryo, slow-control, readout, ...
  - **Planning of personnel to work at FNAL -> Jay J**



2x2 Module-0 leaving Bern



NuMI hall emptied for 2x2



2x2 cryostat @ LArTF

# 2x2 + MINERvA

- Many open tasks
- Looking for interested institutes
- "This is the first piece of 2x2 installation underground and the work will take 3 months to complete. The work for students/postdoc includes on-detector electronics installation, cabling, PMT/FEB check out with light injection and with NuMI data -- yes real neutrino data is need to finish the checkout. We can use people with hardware and software experience. Some work can even be done off-site --- like making TSD file and do "nearline" analysis for PMT/FEB performance. A UK postdoc is doing nearline, but we need more people."

## MINERvA Electronics Reinstallation for of 2x2

- Current plan is to install all MINERvA modules before ArgonCube cryostat
  - To start in August 2021: 1-2 weeks for the first MS, then 2 days each MS
  - Platform lifter is available ([training schedule](#)), ladders ([Howard and Ting to order](#))
- Cable trays and cabling plan are being developed – [Howard](#)
  - Put back PMT/FEB exact the way they were before decommissioning
  - Light injection is to be used to check out electronics after each module set be installed
- The minimum requirement for installation QA/QC
  - LI system: run DAQ in MINOS or in one-west or in the office? **Can be done with laptop in the hall**
    - Nearline needed for analysis test
    - Full blown DAQ needed
    - see mirror from fiber to reject bad fibers
    - HV setting in configuration file - modified old files
    - **Need a detailed procedure**
  - Will also use NuMI data runs later Oct-Nov to checkout PMTs
    - **LI will not check PMT-accelerator connection**
- Testing DAQ and LI system at Lab F test-stand first (**March-April**) – [Geoff/Howard/Clairence/Anne](#)
  - Howard had the ORC reviewed last Thursday – passed?
  - Geoff is updating operation system. **Other software update work needs?**
    - **run control configuration --- Anne to help**
  - Need instruction on testing steps for the system: procedure
    - Data need to go to offline storage (Abbey)
    - Row → CST (Abbey)
- MINERvA racks re-installation at downstream (**Sept**) – [Steve/Howard/Linda/JB/JH](#)
  - Rack cleanup and equipment re-arrangement work
  - Rack building using Linda's tool – discussion in next Thursday's integration meeting?
  - **Do we need to move the ACNET rack and network rack downstream**
    - Steve states there were too much effort involved to move these two racks. We do prefer to have longer cables from MINERvA/ArgonCube racks
  - ORC committee: Dave Mertz – to confirm with Angela
- DAQ re-commissioning in MINOS for checkout (**May-June**) – [Geoff/Anne/Clairence/Everardo/Abbey](#)
  - Do we need to run DAQ remotely during installation? No
  - Do we need new servers – status of software update on old one at Lab F?
  - **Additional DAQ software work in addition to Lab F test stand**
    - Geoff should be straightforward and no need of extra work
- Cable routing plan for the B+3 module sets (**April-May**) – [Howard/Everardo](#)
  - **LI fiber length limit maybe a problem for the two groups of modules?**
  - Gary to measure the length to see whether there is a problem.
    - Howard states we may have problem for the most upstream module set
    - Still beam muons will be able to check out the PMTs
- Checkout QA/QC test and bookkeeping procedures (**Sept-Oct**) – [Clairence/Steve/Abbey/Everardo](#)
  - Need a procedure for fix/repair for PMT/FEB/FESB? Or just replace.
  - Following sequence of PMTs in the configuration file? (PMT is the order we took them out)
- Installation sequences, procedure, and HAs (**Aug-Sept**) – [Clairence/Anne/Howard/Abbey/Everardo](#)
  - Rigging crew can do two module sets a day. Should we plan to do electronics on two module sets too?

# TPC testing task force

- Funding not secured for module testing QC in LAr
- To get this effort back on track, we must revisit the QA/QC requirements, including those for the testing of fully-assembled modules. The main questions are:
  - What are the major risks for the performance of assembled ND-LAr TPC modules, and what are the consequences should these risks be realized?
  - Which of these risks can be mitigated through component testing alone or via a single engineering demonstrator (i.e. FSD), and which ones can only be addressed via direct testing of each production module?
  - For those risks that require direct testing of each module, what is the minimally-sufficient test that would retire the risk? Are the resources (personnel, equipment, time) required for such tests commensurate with the risk? Are there alternative QA plans that could replace the test and mitigate these risks?

## Task Force Members:

- Christopher Mauger (chair)
- Mike Mooney
- Louise Suter
- Saba Parsa
- (Mike Geynisman)

- **Several meetings held**
- **Collected input on testing needs, risks, scope**
- **Preparing overall new QA/QC exploring the need for cold LAr tests**