

# LBNF/DUNE-US National Laboratories Directors' Council

Participants: Argonne, Brookhaven, Fermilab, LBNL, SLAC

Time: Noon-1:30pm EST/11:00am-12:30pm CST/9:00am-10:30am PST

## Agenda

Welcome	10'	Nigel Lockyer
LBNF/DUNE-US update	40'	Chris Mossey
Host Lab update	10'	Kevin Pitts
Executive Session	30'	Lab Director or designee (1 per lab)



## Host Lab Update

Kevin Pitts

LBNF/DUNE National Laboratories Directors' Council

5 Jan 2022

# Definitions and underlying philosophy

## LBNF is the facility:

- Far site detector/utilities caverns, conventional facilities
- Near site detector hall and facilities
- Beamline

## DUNE is the international experiment and collaboration

## Philosophy:

- **LBNF/DUNE is an international effort that includes a large US DOE 413.3b project.**
- Follows CERN-like model with Fermilab as “host lab”

## Definitions:

- LBNF/DUNE-US is the US 413.3b project
- DUNE experiment/collaboration international body (50% of detectors)

# High Level Organizational Relationships

## Fermi National Accelerator Laboratory

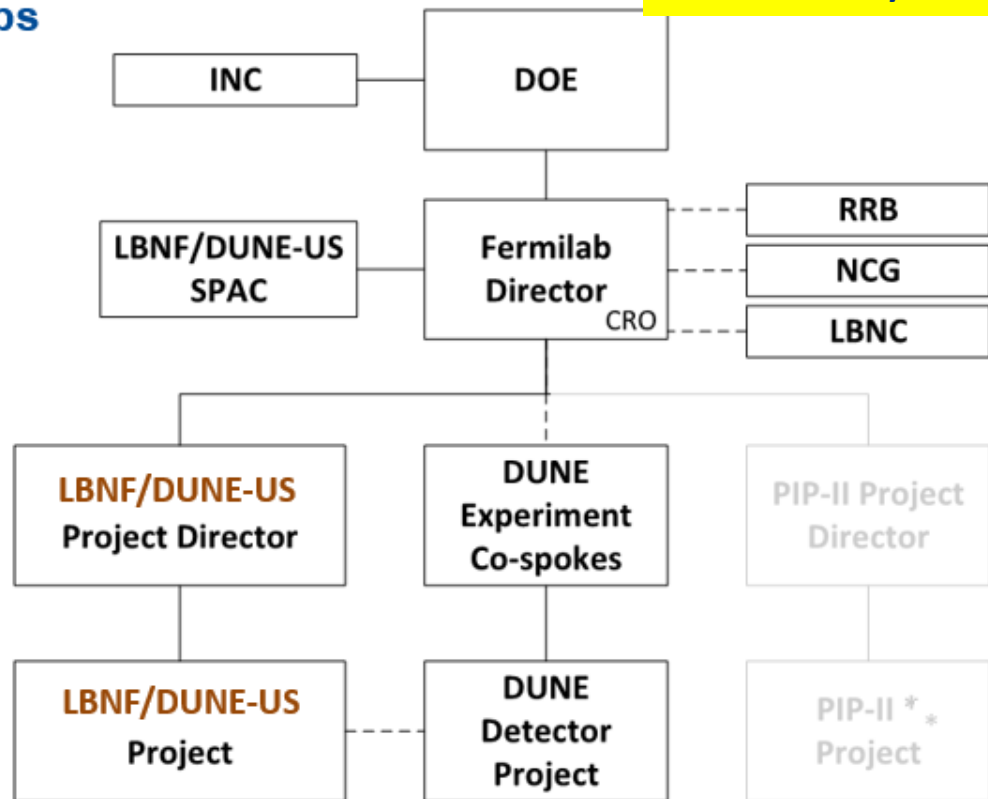
- **Fermilab (Host Lab) Directorate:**  
[Fermilab Director and CRO]

## DUNE

- **RRB: DUNE Resources Review Board**  
[International Funding Agencies + Representative of Fermilab Management]
- **NCG: Neutrino Cost Group**  
[cost & schedule focus – modeled after the LHC Upgrade Cost Group]
- **LBNC: Long-Baseline Neutrino Committee**  
[technical focus - modeled after LHCC scientific committee]

## LBNF

- **INC: International Neutrino Council**  
[DOE and Representatives of Regional International Funding Agencies + Fermilab Directorate for PIP-II and LBNF]
- **LBNF/DUNE-US Strategic Project Advisory Committee**  
[Outside experts]



\* INC also coordinates PIP-II international funding agencies

# Fermilab Role as Host Laboratory for LBNF/DUNE

## Major LBNF/DUNE Partners:

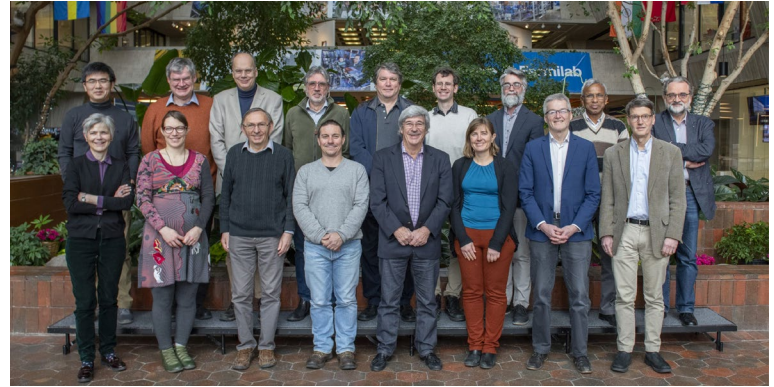
- DUNE Collaboration:
  - scientists, institutions, detector consortia
- LBNF/DUNE-US DOE Project:
  - facilities, infrastructure, detector, installation
- US DOE: project, research program, operations
- International funding agencies
- US National Labs: detector contributions, advisory
- South Dakota Science and Technology Authority
- Fermilab: host laboratory

## Fermilab's role:

- Work with all contributors and stakeholders (federal, state, local governments, other entities) to ensure strategy, collaboration and communication that lead to success
  - Formalizing international agreements with US DOE as the lead
  - Interface between agencies/entities
  - Identify needs and secure resources
- Responsible for environment, safety and health, work with DOE, SDSTA, Fermi Site Office and Project
- Ensure lab operations (shutdowns, beam delivery) consistent with LBNF/DUNE (and PIP-II) needs
- **Work with review bodies: Long Baseline Neutrino Committee & Neutrino Cost Group** to receive (and act upon) input and advice to ensure success
- **Work with Resources Review Board** and International Neutrino Committee on issues related to international support and governance model
- **Work with US National Laboratories to ensure collaboration and coordination**
- Advocate on behalf of DUNE and LBNF for support and resources (US government, international partners)

# Long Baseline Neutrino Committee (LBNC) Membership

- Hugh Montgomery, JLab retired, chair
- Ties Behnke, DESY
- Simone Campana, CERN
- Dave Charlton, Birmingham
- Francesco Forti, University of Pisa
- Joel Fuerst, SLAC
- Cristiano Galbiati, Princeton
- Alexander Gottberg, TRIUMF
- Heather Gray, Berkeley
- Eric Kajfasz, IPhU, Marseille
- Joachim Kopp, Johannes Gutenberg University
- Gobinda Majumder, TIFR
- Scott Oser, University of British Columbia
- John Parsons, Columbia
- Tom Peterson, SLAC
- Niki Saoulidou, University of Athens
- Jeff Spalding, FNAL retired
- Darien Wood, Northeastern University
- Angela Fava, FNAL, scientific secretary



“The LBNC is charged by the Fermilab Director to review the scientific, technical, and managerial progress, plans and decisions associated with the Fermilab Long Baseline Neutrino Facility (LBNF) and the Deep Underground Neutrino Experiment (DUNE).”

# LBNC December 2021 meeting

## Areas of review:

- LBNF status (including beamline)
- DUNE status (collaboration, staffing)
- FD-1 horizontal drift
- FD-2 vertical drift (including simulation)
- Near Detector
- Computing
- ProtoDUNE Analyses
- Data acquisition

## High level summary:

- Impressive technical progress (vertical drift, ND-LAr, ProtoDUNE-II, beamline)
- Concern regarding US funding profile (competition, “pause” in beamline/ND)
- Comments on longer-term plan (US Snowmass process)
- Identified: Elaine McCluskey’s departure, TMS staffing as areas that need attention

# Neutrino Cost Group

- Charged to review appropriateness, feasibility, accuracy of:
  - **Cost estimate for all of DUNE using CORE costing**
  - **Schedule**
  - **Staffing estimates**
  - **Risks and mitigation strategies**for the entire international DUNE effort.

- **Membership:**
  - Didier Contardo, IP2I Lyon
  - Luisella Lari, FNAL
  - Antonello Di Mauro, CERN
  - Steve Nahn, FNAL, chair
  - Markus Nordberg, CERN
  - Adriana Telesca, CERN

**Format: reviews proceed asynchronously over 6 weeks.**

- **Far Detector 1 review in progress now**
- **Far Detector 2 review Mar/Apr 2022**
- **Near Detector review summer/fall 2022**



# DUNE Resources Review Board (RRB) September 2021 meeting

## Participants:

- UK (STFC)
- U.S. (DOE-HEP)
- France (IN2P3 & CEA)
- Brazil (FAPESP & CBPF)
- CERN
- Spain
- Germany
- Czech Republic
- Portugal
- Switzerland
- Italy (INFN)
- Japan (KEK)
- Georgia
- Canada
- Mexico
- Netherlands
- Serbia

## Topics:

- Facility, detector, collaboration progress
- DUNE Multi-institutional MOU
- **US funding profile/timeline**



# Potential upgrades for LBNF/DUNE program

- 2013-14 P5 said:
  - On 2035 timescale: 1.2 MW beam, 120 kt\*MW\*yr (e.g., =25 kt \* 1.2 MW \* 4 yr)
  - Upgrade to: multi-MW (=2.4MW), 40kt fiducial
  - We were on this path prior to new funding profile
- Potential upgrades:
  - Booster replacement (1.2 → 2.4MW) } Increase exposure
  - Far Detectors 3 (& 4) }
  - Near Detector improvements: ND-GAr (magnetized gaseous Ar TPC) } Improve sensitivity
- 25-Oct-21 letter from Jim Siegrist to Nigel
  - P5 to review potential upgrades
  - ND-GAr not part of existing project, potential MIE, modest R&D \$ potentially available

# Priorities for calendar 2022

## ✓ **First meeting of LBNF/DUNE US National Laboratory Directors' Council**

- **MOU with each lab (originally discussed Aug/Sept 2021)**
- **LBNF/DUNE operations cost task force**
- **Further review/consider long-range accelerator schedule**
- **Review bodies:**
  - **LBNC recently recommended Vertical Drift CDR for approval**
  - **NCG review of Horizontal Drift cost/schedule/risks in progress (VD to follow)**
- **Resources (e.g., Common Fund) – RRB**
- **Lab staffing/support of LBNF/DUNE-US project**
- **Work with Collaboration re: upgrades/Snowmass**

# Directors' Council

- **Thanks for participating**
- Plan is to meet 3 times/year  $\Rightarrow$  next meeting in May (ahead of CD1-RR review)
- Welcome conversation/consultation/discussion outside of these meetings
  
- Potential future presentations/discussion
  - DUNE Collaboration/International DUNE
  - Activities at each lab
  - Neutrino Cost Group/Long Baseline Neutrino Committee reports
  - Funding profile and options/strategies for acceleration
  - Transition to operations planning
  - Upgrade strategies
  - what else?



# End

# CRO Role as Host Lab Representative/Oversight

- **Represent the interests of the Host Lab** in successful execution of the overall DUNE effort. (DUNE experiment = international experiment and collaboration)
- **Interface with:**
  - DUNE Collaboration (Spokespersons, Technical Coordinators, Resource Coordinator)
  - LBNF/DUNE-US DOE Project (project management, FPD)
  - DOE: HEP (project, facilities, operations, research program), Site Office
  - International funding agencies/projects (Resources Review Board, INC, agreements)
  - Fermilab entities (e.g., Neutrino division, Accelerator division, Projects Office, ASIC dept, cryo, facilities)
  - Counterparts at other national laboratories (ANL, BNL, LBNL, SLAC)
  - LNBF/DUNE Review Office
- **Organize and oversee review bodies:**
  - Long Baseline Neutrino Committee (LBNC)
  - Neutrino Cost Group (NCG)
- **Ensure closure on all the above**
  - **Example:** ensure collaboration acts upon LBNC recommendations
  - **Example:** Fermilab allocating resources as needed in support of broader effort (project + off-project needs)

# LBNC Activities, last 13 months

- December 2020 **LBNC meeting.** Vertical drift concept proposed for FD-2.
- January 2021 Review of Near Detector Conceptual Design Report
- February 2021 Near Detector mini-review
- March 2021 **LBNC meeting.**
- April/May 2021 LBNC dedicated review of FD-2 (vertical drift)
- July 2021 Informal LBNC/Collaboration updates
- August 2021 LBNC review of FD-2 CDR commences
- September 2021 FD-1 mini-review  
**LBNC meeting**
- November 2021 FD-2 mini-review
- December 2021 **LBNC meeting**  
FD-2 CDR sign-off

# Neutrino Cost Group

- **Approach:**
  - Detailed cost review aligned with subprojects (Far Detector #1, FD#2, Near Detector)
  - Review cost and schedule for entire experiment (includes DUNE-US component)
  - Collaboration+Project made a big effort to get non-US components into P6
  - For US components: feedback well in advance of CD-2 to provide time to respond
- **Format: reviews proceed asynchronously over 4-6 weeks.**
  - Far Detector 1 review in progress now, kickoff was Nov 17
  - Far Detector 2 review will be Feb/Mar 2022
  - Near Detector review in summer/fall 2022



# DUNE Resources Review Board (RRB) September 2021 meeting

## Comments from Partners

- Partners stressed the importance of continuity at Fermilab for LBNF/DUNE with the upcoming leadership transition. Partners appreciated hearing assurances of continuity from US-DOE and Fermilab.
- Partners including the UK urged that the resolution of comments/input on the DUNE MOU and Common Fund move quickly so that the MOU may progress to obtaining signatures as soon as possible, such as by the next RRB meeting in six months.
- Partners appreciated transparency regarding projected project dates and timing and encouraged continued specificity on US project plans so that international partners may similarly set expectations and coordinate their deliverables.

# LBNF/DUNE-US National Laboratories Directors' Council

## Membership:

- ANL Paul Kearns, Director Kawtar Hafidi, ALD Physical Sciences
- BNL Doon Gibbs, Director Bob Tribble, Deputy Director Sci/Tech
- FNAL Nigel Lockyer, Director Kevin Pitts, Chief Research Officer
- LBNL Mike Witherell, Director Natalie Roe, ALD Physical Sciences
- SLAC Chi-Chang Kao, Director JoAnne Hewett, Chief Research Officer

## Goals:

- Coordinate national lab activities for LBNF/DUNE
- Discuss areas of need, priorities, resources and advocacy

First meeting January 5, 2022. Will meet 3x per year.

We are also working on MOUs with each National Lab to clarify/codify deliverables.