

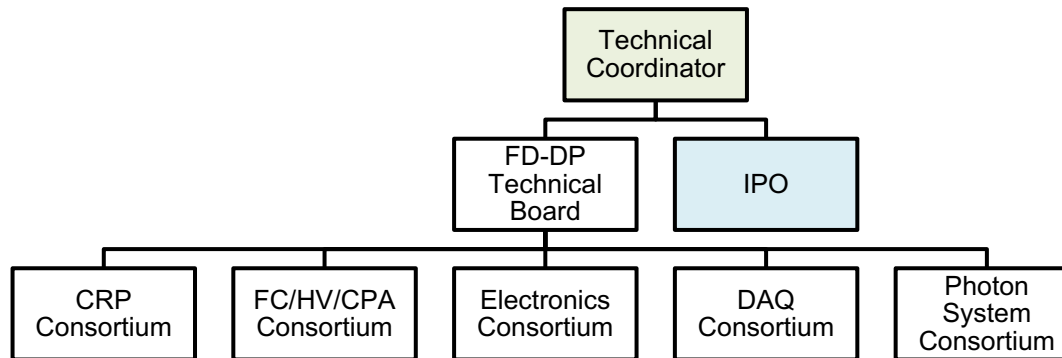
# Dual-Phase Consortia: Summary of yesterday's discussion

Mark Thomson

Dual-Phase Meeting, CERN, 27<sup>th</sup> June 2017

# Consortia: Consensus view?

- **Appeared to be a general consensus on five DP consortia**
  - Some in common with SP



- **General consensus that an Eol process is not necessary**
  - Assuming general approach is agreed, move straight to call for membership of DP consortia at same time as SP

# SP-DP: Consensus view?

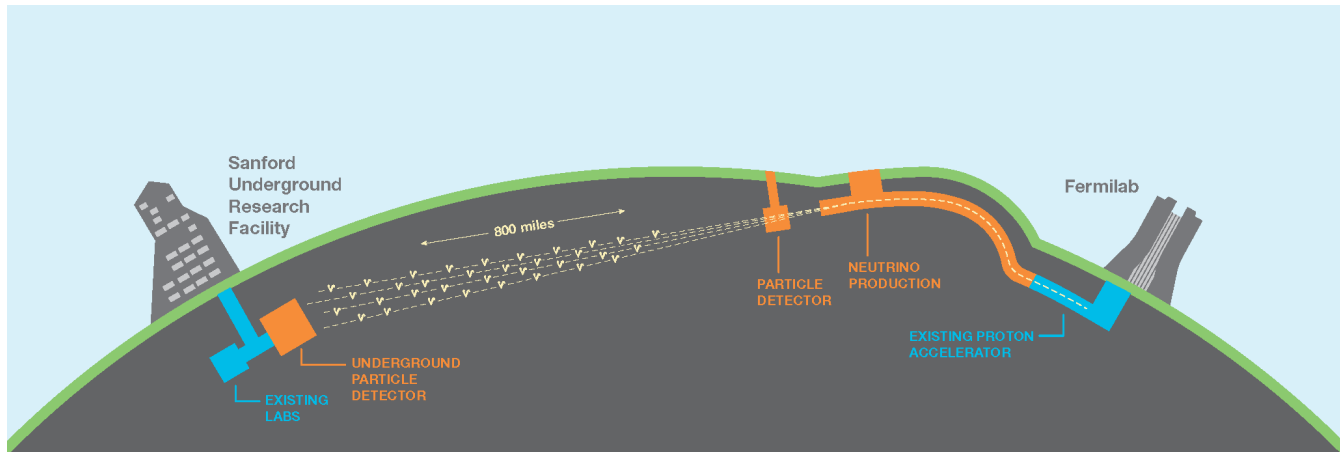
- **Common SP/DP consortia**
  - Slow Controls/Detector Instrumentation Consortium – **yes**
    - Could be part of DAQ
  - Computing “Consortium” – **yes**
  - DAQ: common backend + consider front end – **yes**
  - HV/FC/Cathode: clear overlaps in HV & FC – **possibly**
    - Some common elements (HV feedthroughs, FC profiles), but very different at the system level
    - If not common, encourage institutions to be part of
  - APA/CRP: no overlap – **no**
  - Electronics: two different systems – **no**
  - Photon Detection System: two different solutions, little commonality - **no**

# Next Steps: Consensus view?

- Formally agree on plan described in previous slides
- Define DP consortium deliverables in next week
- Call for SP & DP consortia at the same time
  - DAQ
  - APA
  - CRP
  - Photon-DP, Photon-SP
  - TPC Electronics-DP, TPC Electronics-SP
  - HV System (could be common)
  - Slow Controls/Detector Instrumentation
  - Computing
- Any objections?

# Further Discussion?

- **How to improve integration of SP & DP into to international DUNE collaboration**
  - Improved integration of SP & DP into DUNE:
    - protoDUNE
    - protoDUNE data analysis
    - Physics
    - Management
    - ...
  - From DP perspective, what would help?



# Dual-Phase Consortia: Slides from yesterday's presentation

Mark Thomson

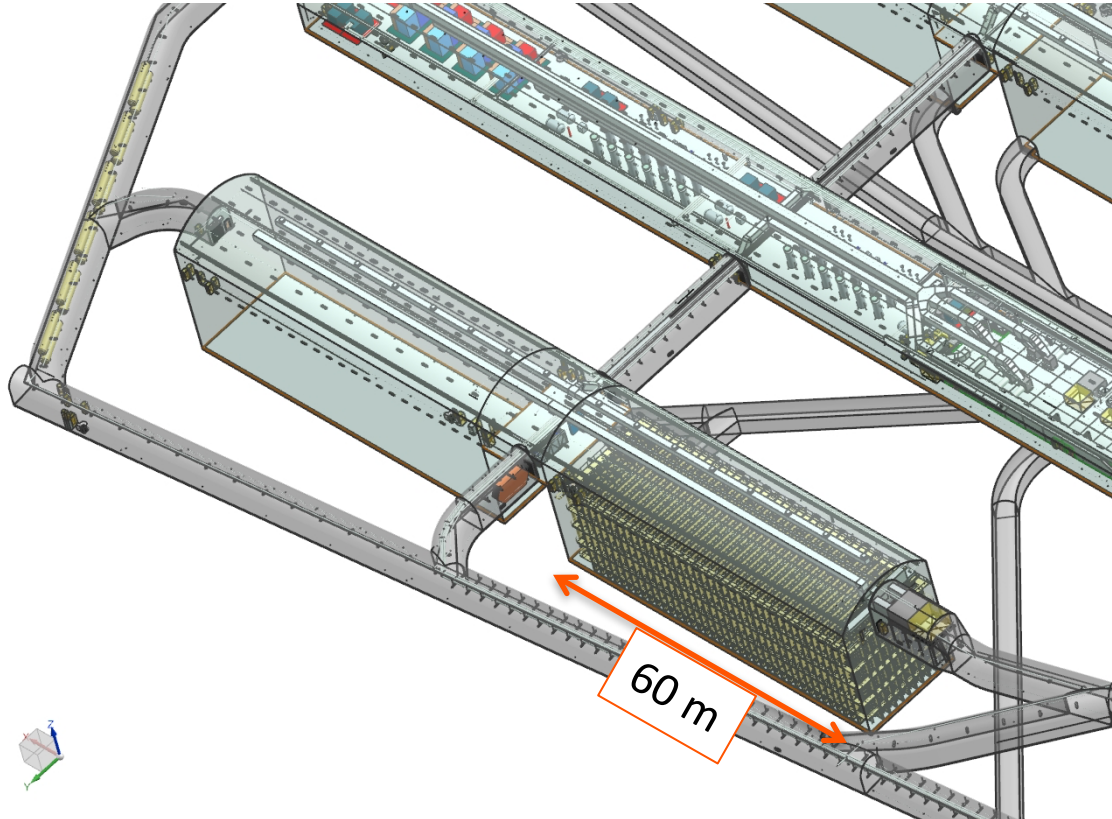
Dual-Phase Meeting, CERN, 26<sup>th</sup> June 2017

# 1. Introduction: Overall Timeline

- **Expected timeline for DUNE (and LBNF) reviews**
  - Mid-2018: **Technical Proposal for FD** (+costs, responsibilities)
  - End-2018: **Decision on** (at least) **first two FD modules**
  - Jan/Feb 2019: **RRB** for to provide funding status
  - July 2019: **LBNC** review of TDRs  
Review of **international** DUNE construction project
  - Sept 2019: **RRB** to confirm **funding** status for construction  
validation of **international** funding model
  - October 2019: DOE **CD-2** Review of LBNF (Far) and DUNE-US:  
**far site and two far detector modules**
  - August 2020: DOE **CD-2** for near facilities and DUNE-US ND
- **In just over two years**
  - Need **FD technical designs** and understanding of **funding model**

# 2. Far Detector Strategy

- **Four chambers hosting four independent 10-kt FD modules**
  - Flexibility for **staging & evolution** of LAr-TPC technology design
    - Assume **four cryostats**: 15.1 (W) x 14.0 (H) x 62 (L) m<sup>3</sup>
    - Assume the four 10-kt modules will be similar but **not identical**





# Far Detector Staging

- **Four chambers hosting four independent 10-kt FD modules**
  - Flexibility for **staging & evolution** of LAr-TPC technology design
    - Assume **four cryostats**: 15.1 (W) x 14.0 (H) x 62 (L) m<sup>3</sup>
    - Assume the four 10-kt modules will be similar but **not identical**
- **Two LAr readout technologies on the table**
  - **Single-Phase** (Ionization read out in the **Liquid Ar**)
    - Demonstrated by ICARUS & MicroBooNE
  - **Dual-Phase** (Ionization amplified and read out in Gas Ar)
    - Being demonstrated by WA105 (!) and then protoDUNE-DP
- **Working towards a concrete plan for (at least) first two far detector modules**
  - with a funding model agreed by the FAs
  - Staging will be an important decision for the collaboration

# Planning Strategy and Decisions

★ Need Resource matrix for (at least) first two FD modules by 2019

★ Planning Strategy is to keep options open:

- Could be two modules of same type
- Could be 1 + 1 (plan for first SP, second DP)
- Identify full scope (4 FD modules) as early as possible

★ Decision on (at least) first two FD modules at end 2018

★ Decision process will be defined in 2017, non-trivial parameter space:

- Detector performance, Cost, Risk, Opportunity
- **Resources** and interest from collaboration

# Updated FD Planning Strategy

- Agreed in EC earlier this year
- Assumes success of both protoDUNE detectors
  - Success is defined in dune-doc-2765
- At this stage wish to keep options open
- For planning purposes:
  - “we are assuming that the first far detector module will be single-phase and the second will be dual-phase”
  - “This planning strategy is not intended to prejudice the actual technology decision in late 2018/early 2019, which will be based on the full knowledge at that time and the availability of funding.”
  - i.e. plan so that all options can be on the table

# 2.1 Far Detector Consortia

- **Motivation:**

- By 2019, need to understand contributions to **at least** the first two FD modules & funding
- **To succeed, need to press forward with this process**

- **Model:**

- Build collaboration detector activities around “**consortia of institutions**” responsible for detector sub-systems
- August 2017: will replace existing FD WG organization with sub-detector consortia
  - **Evolution towards LHC GPD organization structure**
- Use the consortia to facilitate the process whereby **institutions take on responsibility** for concrete tasks
  - **Funding Agency engagement is essential**

# Far Detector Consortia

- **Process**

- Developed over course of last 18 months:
  - Collaboration: EC & collaboration meetings
  - Funding agencies: RRB & DOE
  - Reviews: LBNC & DOE IPR

- **Consortia operate within the DUNE collaboration**

- Each consortium is self-organizing, working within collaboration rules:
  - Elected Consortium Leader (faculty scientist or equivalent)
  - Select a Technical Lead – acts as project manager
  - Consortium Board with a representative from each institution
  - Internal Project Management Board (PMB) with representatives from each contributing national project
  - ...

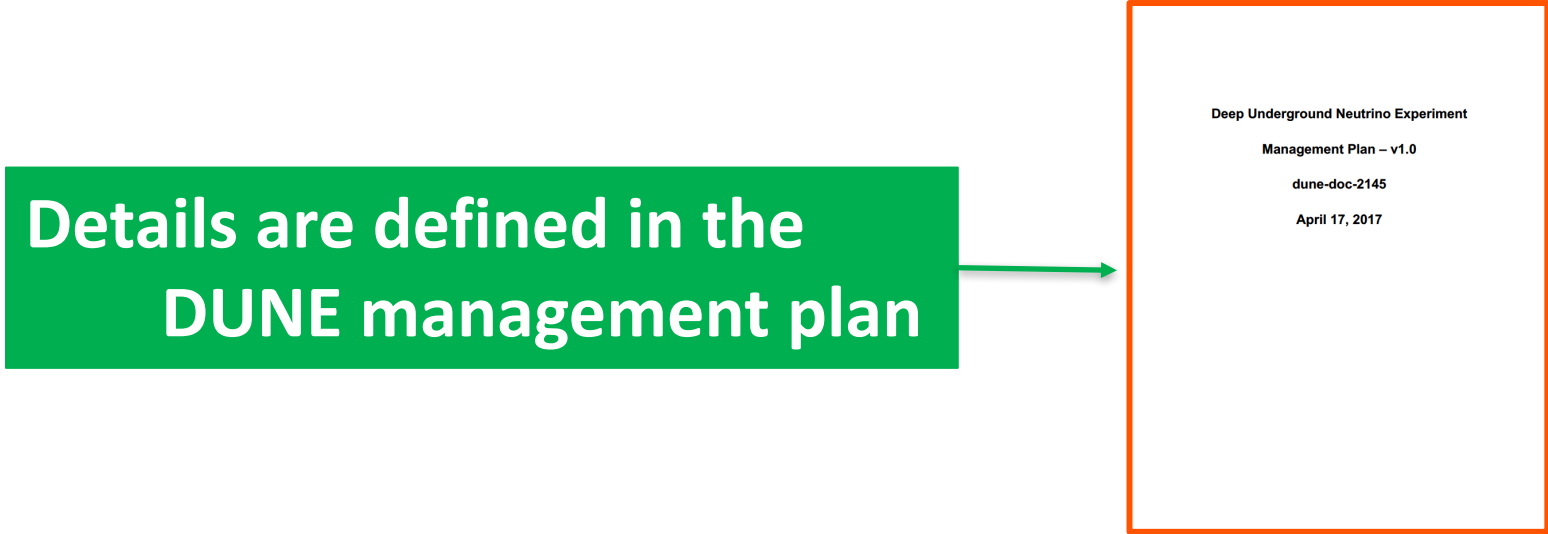
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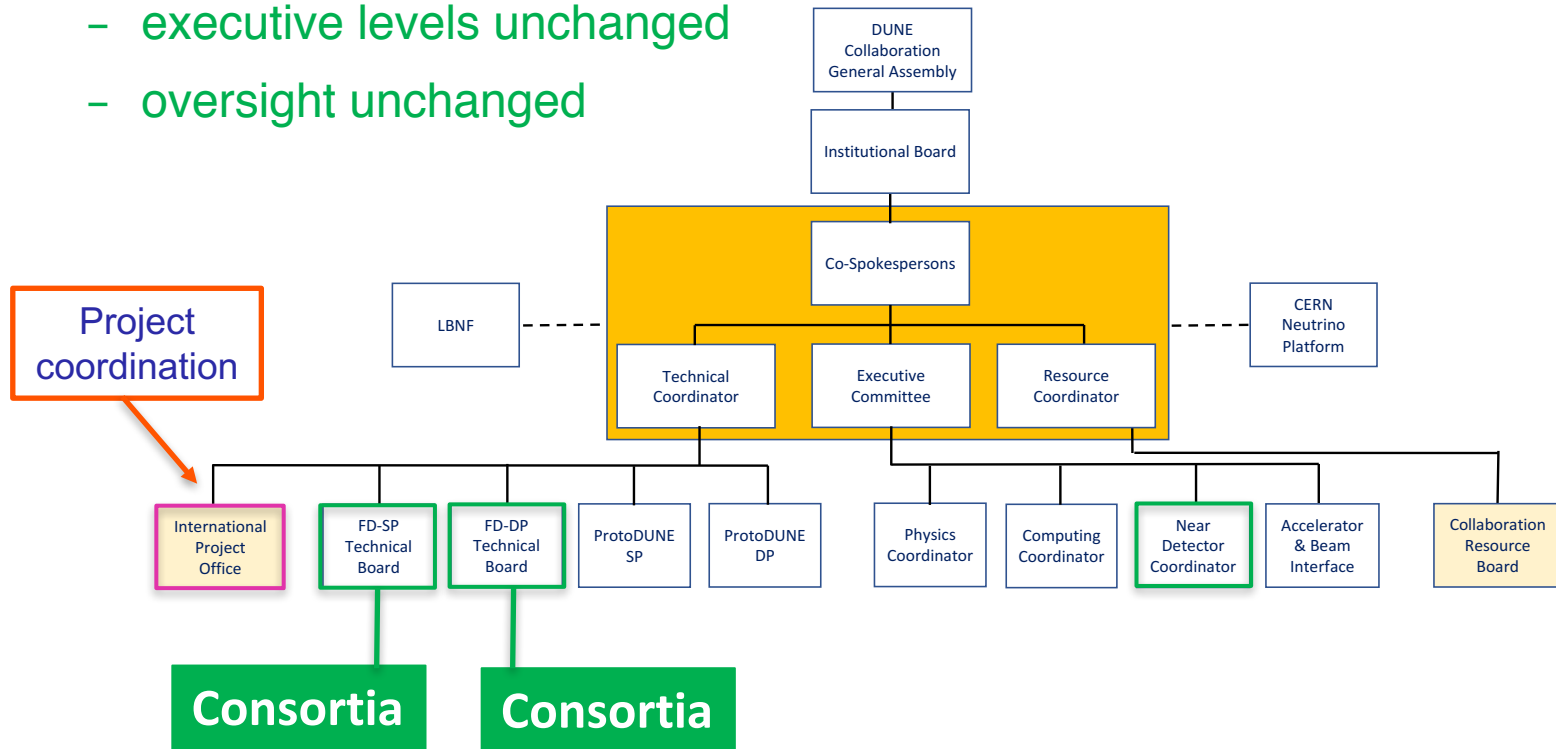
**Details are defined in the  
DUNE management plan**



Deep Underground Neutrino Experiment  
Management Plan – v1.0  
dune-doc-2145  
April 17, 2017

# 2.2 Management Structure ~2017

- **Modified DUNE organizational structure to implement our strategy for CD-2: FD WGs → Construction Consortia**
  - in addition, removed a layer of management to clarify reporting lines
  - executive levels unchanged
  - oversight unchanged

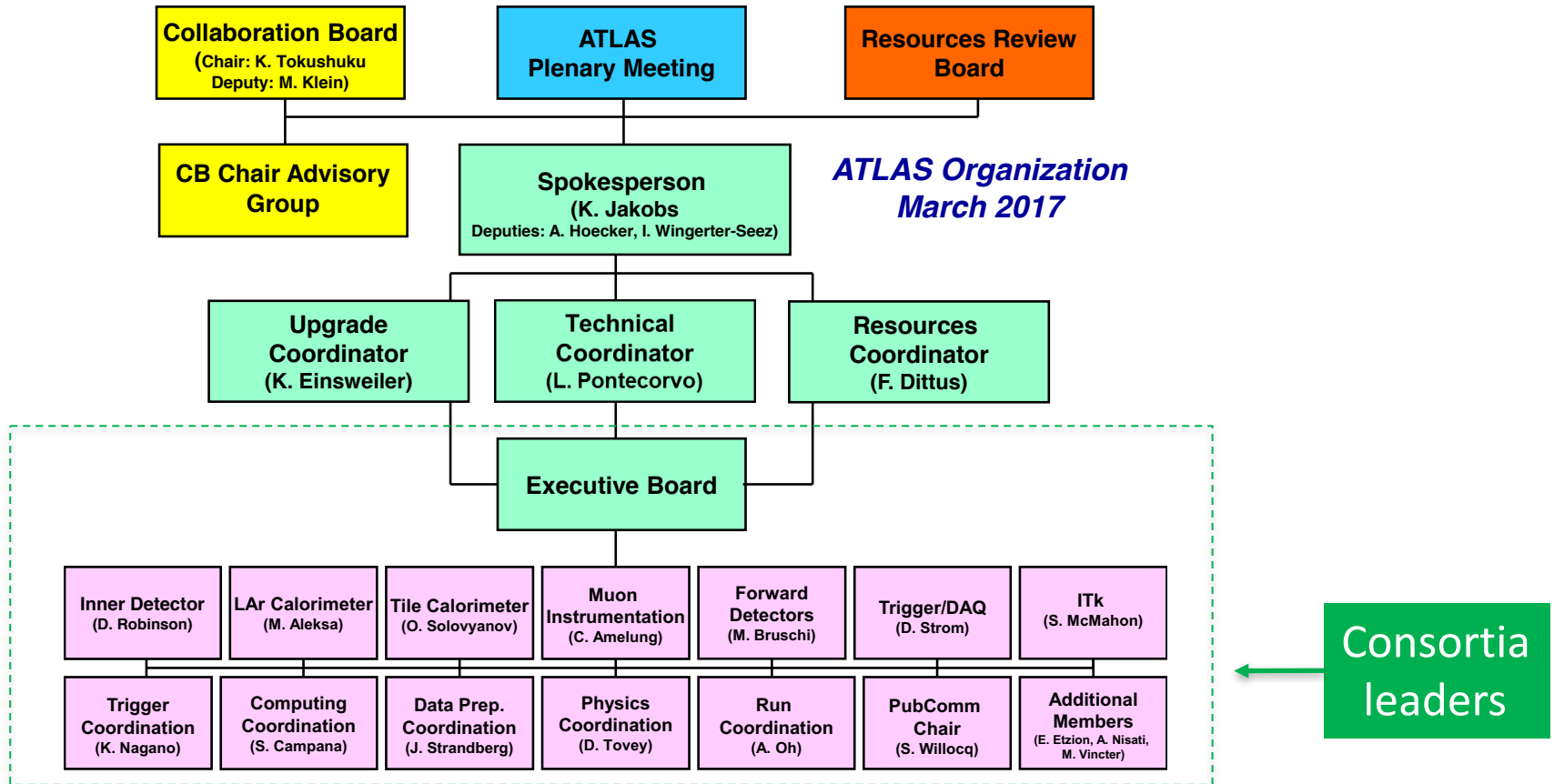


## 2.3 Future DUNE Organization

- **Plan to restructure DUNE EC for construction phase**
  - Agreed by DUNE EC earlier this year
  - Planned for “post-TDR”, eg. sometime in 2019/2020
  - EC becomes central management body
    - Co-Spokes, TC, RC, International Project Coordinator
    - Consortium leaders
    - Physics coordinator, Computing coordinator
    - Possibly with “at large” elected members
- **Collaboration managed by team leading construction**
- **LBNC advice: form the new EC earlier rather than later**
  - See some advantages in this, but timeline yet to be discussed
  - Changes also need to go through IB



# e.g. the ATLAS model



- **EC becomes a true executive body**

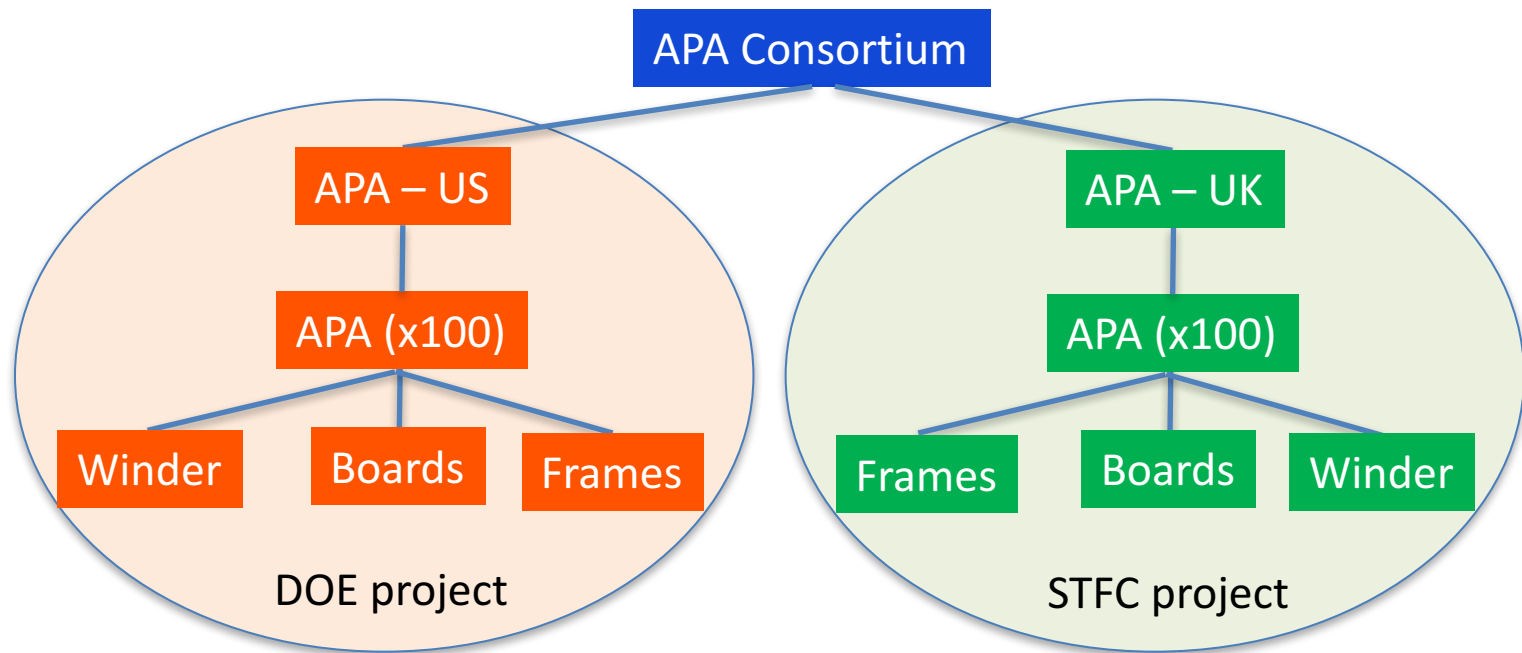
- Would broaden collaboration participation in decision making

# 3. Added value of Consortia?

- **Detectors / detector systems will be international**
  - Different countries/institutions take on elements of scope
  - Top-down project management model is unlikely to work
    - Resources are distributed across multiple funding agencies
    - Responsibilities and management needs to follow resources
  - Consortium model follows the approach that was successful at the LHC
    - The funding agencies understand this model !
- **Organization follows responsibilities**
  - Consortium model gives direct responsibility to institutions doing the work
  - Funding agencies are familiar with this model from the LHC
    - Strong endorsement of this approach from the LBNC and RRB
    - Helps that funding agencies understand how we will manage the construction

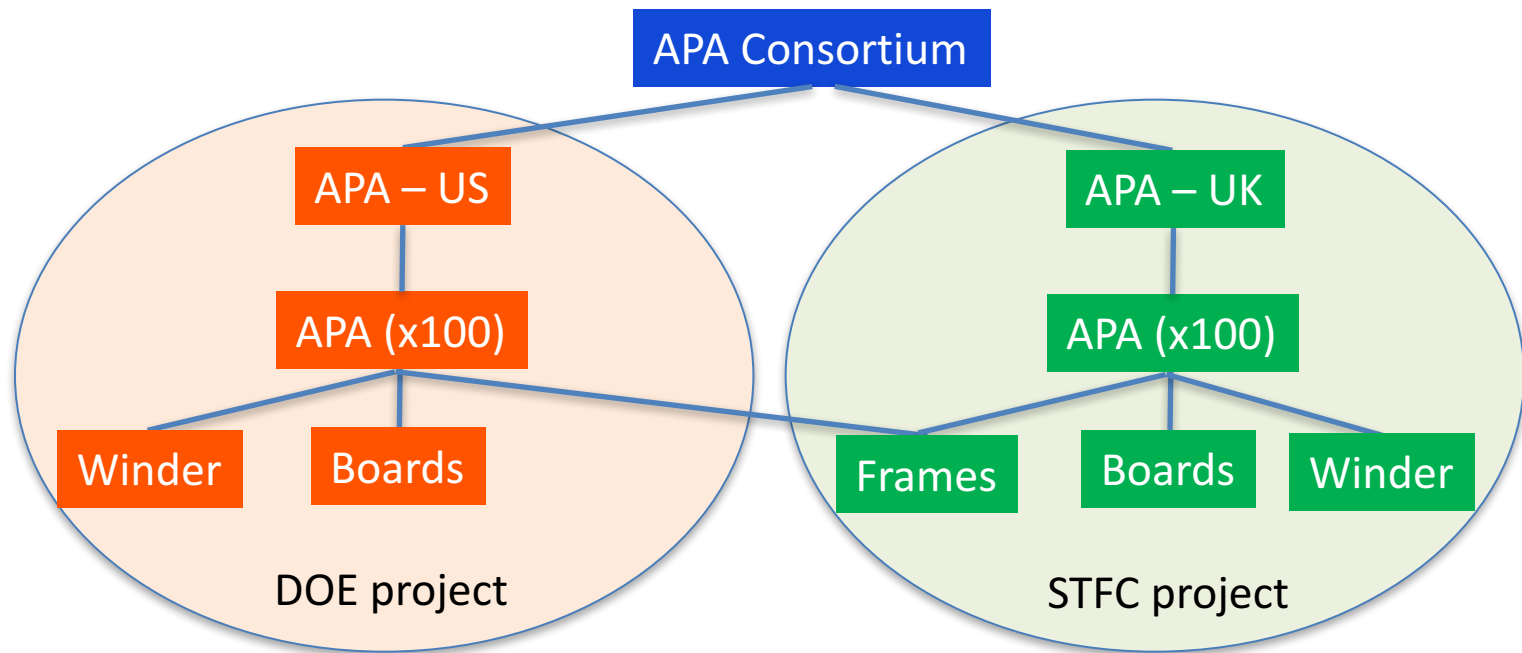
# International vs National

- **International Project Office holds overall WBS**
  - Single APA consortium, but multiple national-level projects



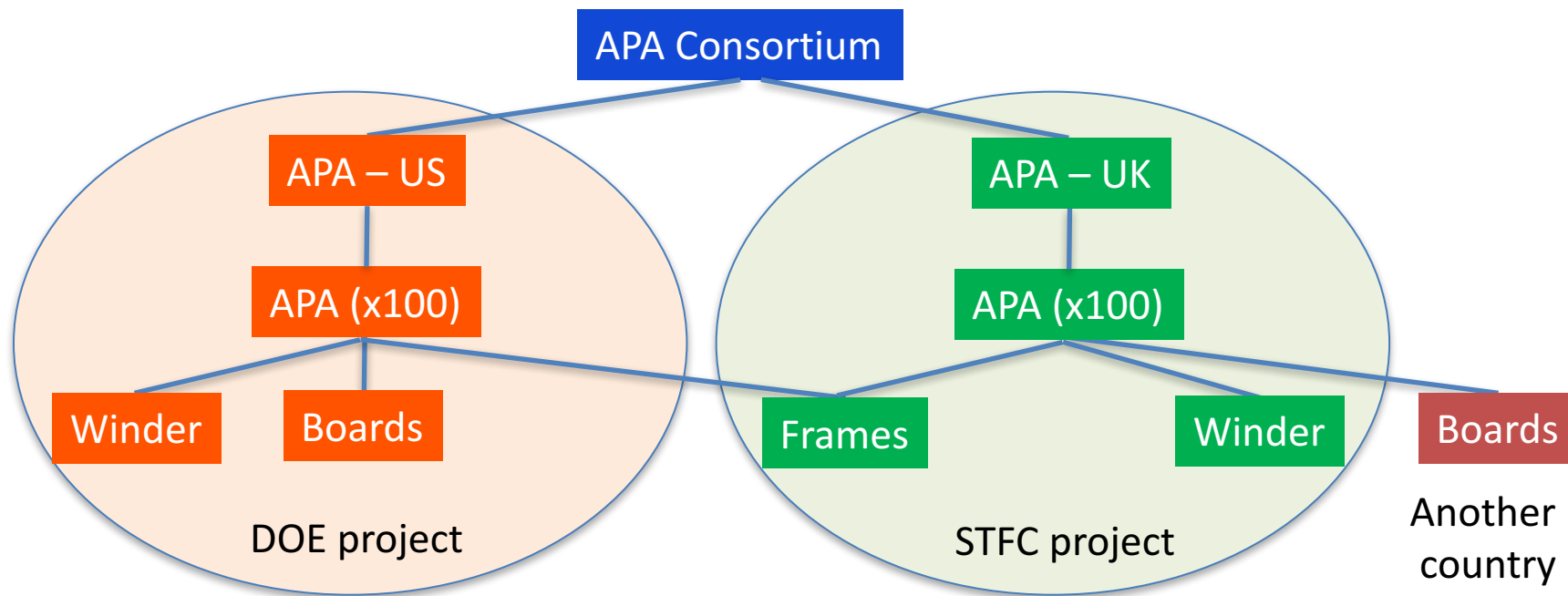
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# International vs National

- **International Project Office holds overall WBS**
  - Single APA consortium, but multiple national-level projects



- **Project management is distributed**
  - each **national-level** project responsible for its assigned deliverables

# International Project Management

- **DUNE operates as an international collaboration**
  - International Project Office **coordinates** international efforts for both SP and DP
- **Project Management**
  - Each participating nation manages its own construction project(s). e.g. there will be:
    - a US DOE project run under DOE rules
    - a Swiss project, managed according to Swiss standards, etc.
  - **International Project Office** responsible for:
    - Maintaining overall schedule through detailed milestones
    - Tracking collaboration progress against milestones
    - Installation planning and management
    - Safety...

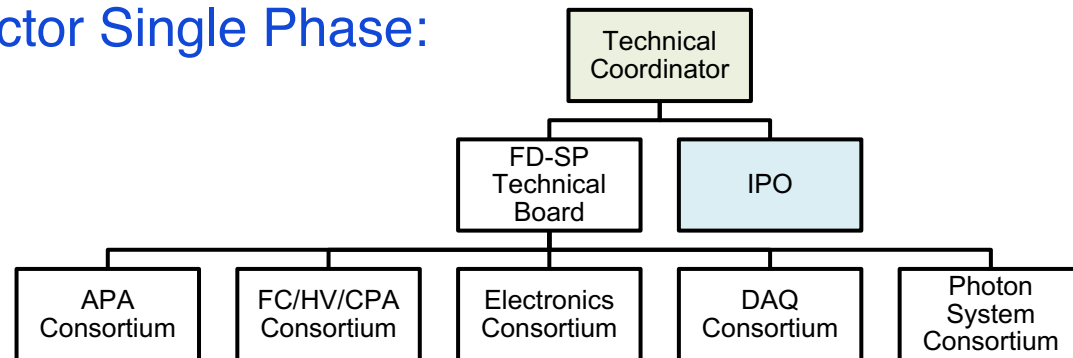
# 4. What are consortia?

- **Consortia within the DUNE collaboration**

- Each consortium is self-organizing, working within collaboration rules
- General concept agreed by EC over one year ago – described in dune-doc-1050 (strategy document)
- Details of how the consortia operate within the collaboration described in the dune-doc-2145 (management plan)

- **Consortia come together under a technical board**

- e.g. Far Detector Single Phase:



- IPO provides overall project coordination

# Consortium Organization

- **Consortium Board (CB)**

- One representative from **each institution** in the consortium
  - “the consortium IB”

- **Consortium Leader**

- Overall responsibility for consortium deliverables
- Represents consortium within collaboration management
- University Faculty or laboratory equivalent
- Elected by consortium board (CB)
- **These are an important role – requires a significant level of commitment**

- **Technical Lead**

- Acts as overall project manager for consortium
- Reports to consortium leader



# 5. Why now?

- **Definition of construction responsibilities and “funding matrix” is on the critical path**
  - Will be an iterative process, **but has to start now**
  - There is a lot of work ahead if we are to keep to 2019 TDR schedule
- **Working backwards**
  - **Q3 2019:** agreements on responsibilities and funding (FA sign-off)
  - **Q2 2019:** **TDR** reviewed by LBNC
  - **Q1 2019:** Presentation of funding-matrix to RRB (FA reps) – sanity check
  - **Q4 2018:** Decision on design of first two FD modules
  - **Q2 2018:** **Technical Proposal:** costs & planned division of responsibilities
  - **Q4 2017:** Presentation of aspirations for consortia responsibilities to RRB
  - **Q3 2017:** First face-to-face meeting at August collaboration meeting

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# Getting Started

- **Timeline**

- Aim to have consortia functioning by August collaboration meeting
  - **Several short-term deliverables: status for RRB, Technical Proposal**
- Want to have consortium leaders in place as soon as possible
- Election ASAP. Necessarily, some element of boot-strapping...

- **Plan**

- Elect consortium leader, initially for 1-year
  - goal to deliver Technical Proposal
- After Technical Proposal, roles and consortium membership will be better defined: at this time there will be a new election for leader
  - Expectation is that the initial CL may continue
  - Term is to the delivery of TDR

# Bootstrapping: SP case

## • Consortium Membership

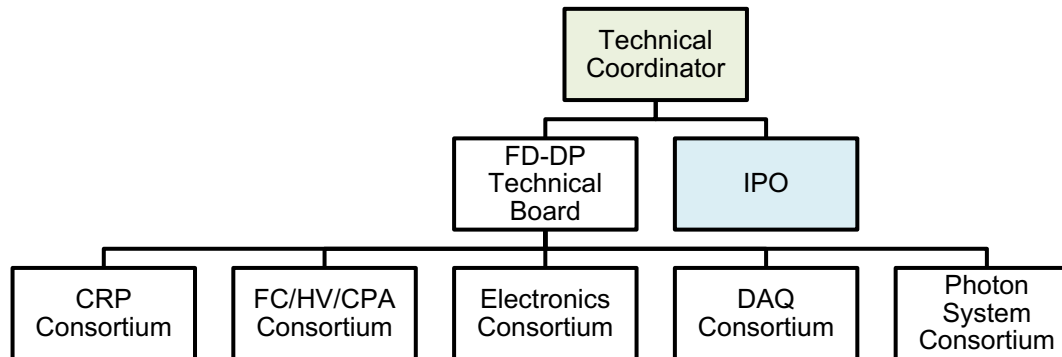
- Define consortium membership by end of June
  - Process organized by Technical Coordinator ✓
  - Phone meeting to identify list of deliverables (hardware + scientific support) ✓
    - Eric will discuss the details
  - IB representatives then contact TC to formally join initial consortium, including a description of possible role and potential funding source(s) ~week
  - Will also be possible to join at a later date

## • Consortium Leader

- Election of Consortium Leader in early July
  - Process will be steered by DUNE Co-spokespersons
  - Consortium Board members nominate candidates for CL to Co-spokes
  - Co-spokes will talk to potential candidates
    - CL is an important position and will be a major commitment
  - EC recommends a slate of candidates for election
  - CB representatives vote (1 vote per institution)

# 6. What does this mean for DP?

- **First need to agree on consortia**
  - Aiming for a symmetric approach
  - A possible model ???



# 6.1 Common activities

- **Envision some common SP/DP consortia**
  - Needs to make sense in terms of deliverables, e.g. common WBS
  - Needs to be an effective management model
  - What *could* be in common?
    - Slow Controls/Detector Instrumentation Consortium - **yes**
    - Computing “Consortium” - **yes**
    - HV/FC/Cathode: clear overlaps in HV & FC - **probably**
    - DAQ: common backend + consider front end - **probably**
    - APA/CRP: no overlap - **no**
    - Electronics: two different systems - **no**
    - Photon Detection System: two different solutions, little commonality - **no**

## 6.2 Next Steps

- **Issue call for consortium membership ASAP**
- **Ideally a common call for SP & DP**
  - Circumvents an EoI process for DP; probably not a major issue (???)
  - Initially set up the five SP and five(?) DP consortia as separate entities. Several advantages:
    - Expediency
    - Understand interests and possible funding models
    - Define required deliverables
  - Investigate common SP/DP DAQ & HV consortia as early as reasonable and at latest, within 6 months.
  - Immediately, also would call for common “Slow Cont./Det. Instrum. consortium” and probably “Computing”
  - Encourage institutions to consider **both** SP & DP

# 7. Discussion

- **Possible topics**

- Is there consensus on DP consortia?
- How to move forward
  - scope/deliverables of consortia [leave until after Eric's talk]
  - call for initial consortium membership in parallel with SP?
- **Common consortia**
  - DAQ and HV/FC/Cathode?
  - timeline
  - leadership
- **Improved integration of SP & DP into DUNE**
  - How to move to a more integrated collaboration?

- **What have I missed?**