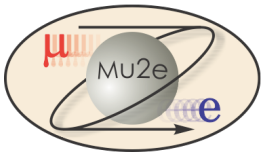
Fermilab

Mu2e Transition to Operations Plan



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Introduction

- Once Mu2e Project is formally complete, Fermilab and the Mu2e Collaboration have responsibility for safely and efficiently operating the experiment
  - Transition is gradual and begins well before the project ends
  - Experiment and Laboratory roles formally spelled-out in
    - Project Management Plan (doc-508)
    - Technical Scope of Work (by CD-3c)
    - Experiment Operations Plan (by CD-4)
- Initial planning discussions have occurred
  - Good start

Initial Discussions

- Have had several discussions with lab leadership
  - Presentation at a Mu2e PMG
  - Dedicated meetings with PPD
  - Topics:
    - Plan once beneficial occupancy has been achieved
    - Operations model
    - Personnel
- Have had many discussions within Project/Collaboration
  - Numerous integration meetings
  - Introductory presentation at a Collaboration Meeting
  - NB. these discussions informed the building design

Transition to Operations - Personnel

- To orchestrate transition to operations
  - Installation and Integration (I&I) Coordinator: Eric James
    (Head of PPD Technical and Engineering Centers)
  - I&I Mech. Engineer: Kurt Krempetz
    (Mu2e Project Mechanical Engineer)
  - I&I Elec. Engineer : Marcus Larwill
    (Mu2e Project Electrical Engineer)
  - I&I Floor Manager: Dervin Allen
    (30+ years experience I&I, maintenance, operations at CDF)
  - Their work begins with project I&I, continues post CD-4, and initiates operations with beam

Transition to Operations – Beneficial Occupancy

Transition to Operations is gradual and begins well before CD-4:

- Beneficial Occupancy for the building is scheduled for summer 2016
  - PPD will be responsible for the outfitting and maintenance of the building
    - Dervin Allen : Floor manager
    - Jamie Grado : Building manager
    - Additional personnel as Mu2e installation activities ramp-up
  - Have produced first list of necessary items to outfit building
    - Shared this with PPD

Transition to Operations – Beam Commissioning

Transition to Operations is gradual and begins well before CD-4:

- First beam commissioning activity using single-turn extraction to the diagnostic absorber is scheduled for early CY2020
  - Once the individual components have been installed and have satisfied their acceptance testing, Mu2e will hand-off the beam to AD for systems level integration and commissioning.
  - Have produced a list of the nominal voltages and currents that constitute each individual component is “ready for operations” (doc-4665).
  - Accelerator Readiness Review

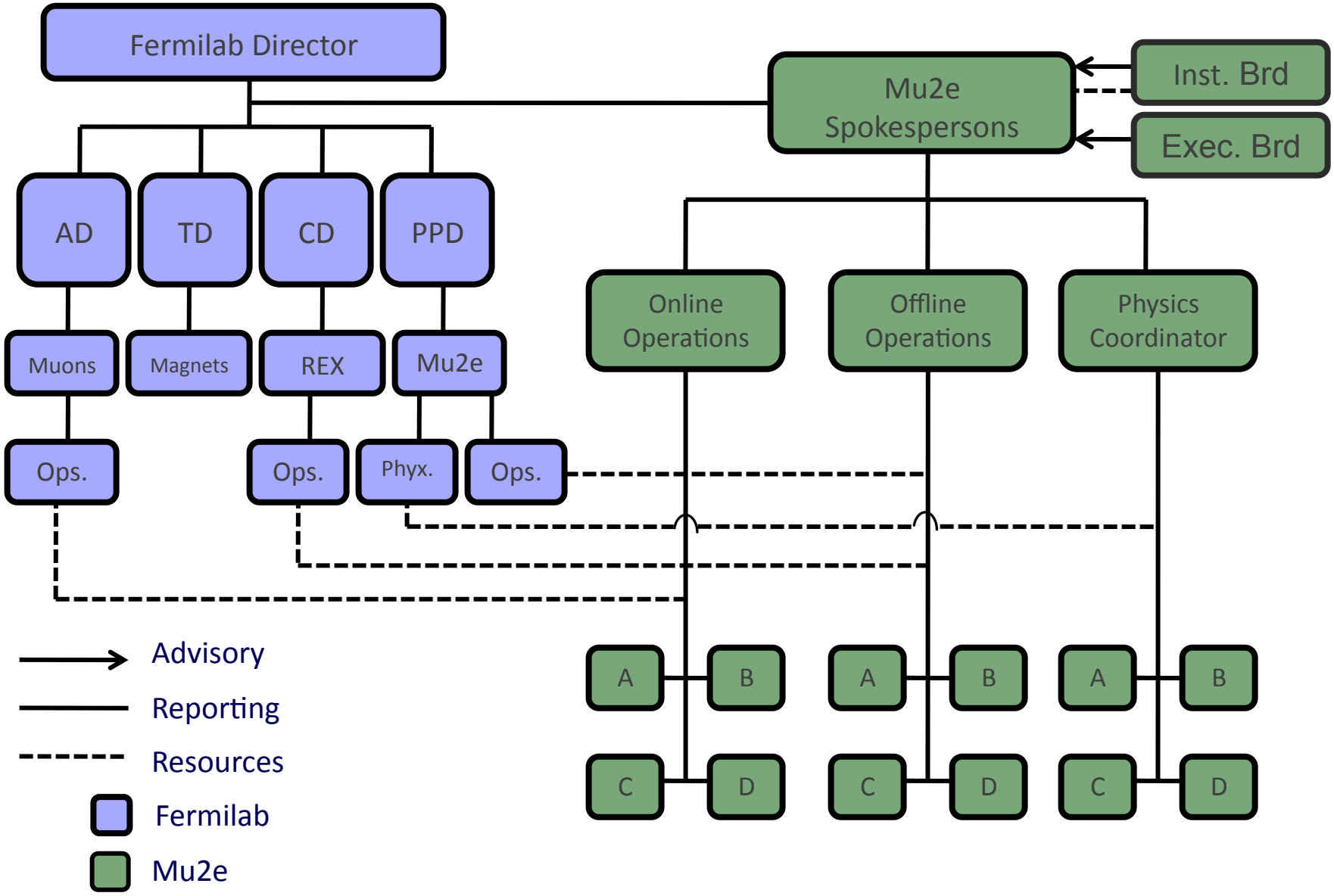
Transition to Operations - Post CD-4 plan

- Have developed a schedule for the work that needs to happen post-CD-4, prior to data-taking
  - Magnetic field mapping and final solenoid adjustments
  - Final installation and check-out of production target and pbar windows
  - Final installation and check-out of beam line vacuum system
  - Final installation of external neutron shielding
  - Final installation and check-out of CRV
  - Final installation of building hatch blocks.
  - Final installation and check-out of DS detector elements
  - Operations Readiness Review
- Good start
  - Schedule logic defined
  - Resource constraints taken into account (e.g. over head crane, available staging space)
  - Resource loading (e.g. labor) initiated

Organization for Operations

- In general, once data-taking begins:
  - Laboratory holds line management responsibility for ESH
    - Each experiment is hosted a particular Division, each of which have an ESH Section
      - Mu2e is hosted in PPD
        - Physicists for operations and physics
        - Engineers & technicians for online operations
      - Other Divisions also contribute physicists & technical expertise
        - CD : Online computing, Offline production & reconstruction
        - TD : Technical expertise (e.g. for solenoids)
        - AD : Beam to experiment
  - Collaboration has responsibility for ensuring
    - Efficient, high quality data-taking
    - Efficient, use of data to produce high quality physics
    - Adherence to ESH guidelines

Organization (straw man)



Operations Model

- Operations model being developed with Laboratory
  - ROC-West control room
    - Mu2e participated in ROC-W workshops
    - First users - NOvA, MINERvA, MINOS+, MicroBoone, soon g-2
    - Mu2e will use this control room for data-taking
  - Cyrogenic operators
    - Shared model with g-2, 24/7 coverage, starts 2015 for g-2.
    - Effort to design g-2 and Mu2e solenoid control systems in a similar manner.
  - CD has developed a common software infrastructure for offline data production/reconstruction and online data-taking
    - NOvA is a first user of these packages
    - Mu2e is using art (offline) and planning to use art-daq (online)
  - Mu2e will benefit from NOvA and g-2 experience

Closing Remarks

- Mu2e has identified an organizational structure and the necessary personnel to facilitate the transition to operations
- Mu2e has developed a post-CD-4 plan that includes schedule logic, duration estimates, and accounts for resource limitations; not yet fully resource loaded
- Mu2e has initiated discussions with the laboratory for
  - Outfitting and maintenance of building
  - Operations model
  - Naming key personnel
- Mu2e will work with laboratory to formalize the transition and operations plans
  - Technical Scope of Work (by CD-3c)
  - Experimental Operations Plan (by CD-4)