

# Technical Coordinator Report

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DUNE Monthly Collaboration Call

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# Introduction

- At last week's Technical Board Meeting, Sowjanya and Kendall presented a comprehensive list of desired Far Detector cryostat penetrations for instrumentation and calibration
  - <https://indico.fnal.gov/event/15351/>
- The end result was a request for many (~50-60) additional penetrations beyond what was being included in the initial layout to accommodate a wide range of calibration and monitoring systems

# Next Steps

- Last week, these requests were discussed among the technical group working on the cryostat design
- This group is pushing back against adding such a large number of additional penetrations
- Larger numbers of penetrations
  - Negatively effect the mechanical structural integrity of the cryostat
  - Increase the heat loss through the top of the cryostat
  - Significantly increase the overall cost of the cryostat

# Feedback

- Technical group would like the consortia working on instrumentation and calibration to consider the following possibilities
  - Take advantage of the large number of DSS penetrations, each of which can accommodate a small bundle of cables, wherever possible (e.g. for temperature sensors, cold cameras, and LED flashers)
  - Consider the idea of multi-purpose penetrations for systems that require larger openings (e.g. warm cameras, radioactive source deployment, and laser system)

# Multi-purpose Penetrations

- The idea is to have a valve on the lower end of the penetration flange that can be closed and then later re-opened so that the instrumentation on the upper end of the flange can be swapped out
  - Implies a time-ordering as to when each penetration is utilized for different purposes
  - Most sensible for radioactive sources and warm cameras so that we can have a few of each that can be moved around to different locations

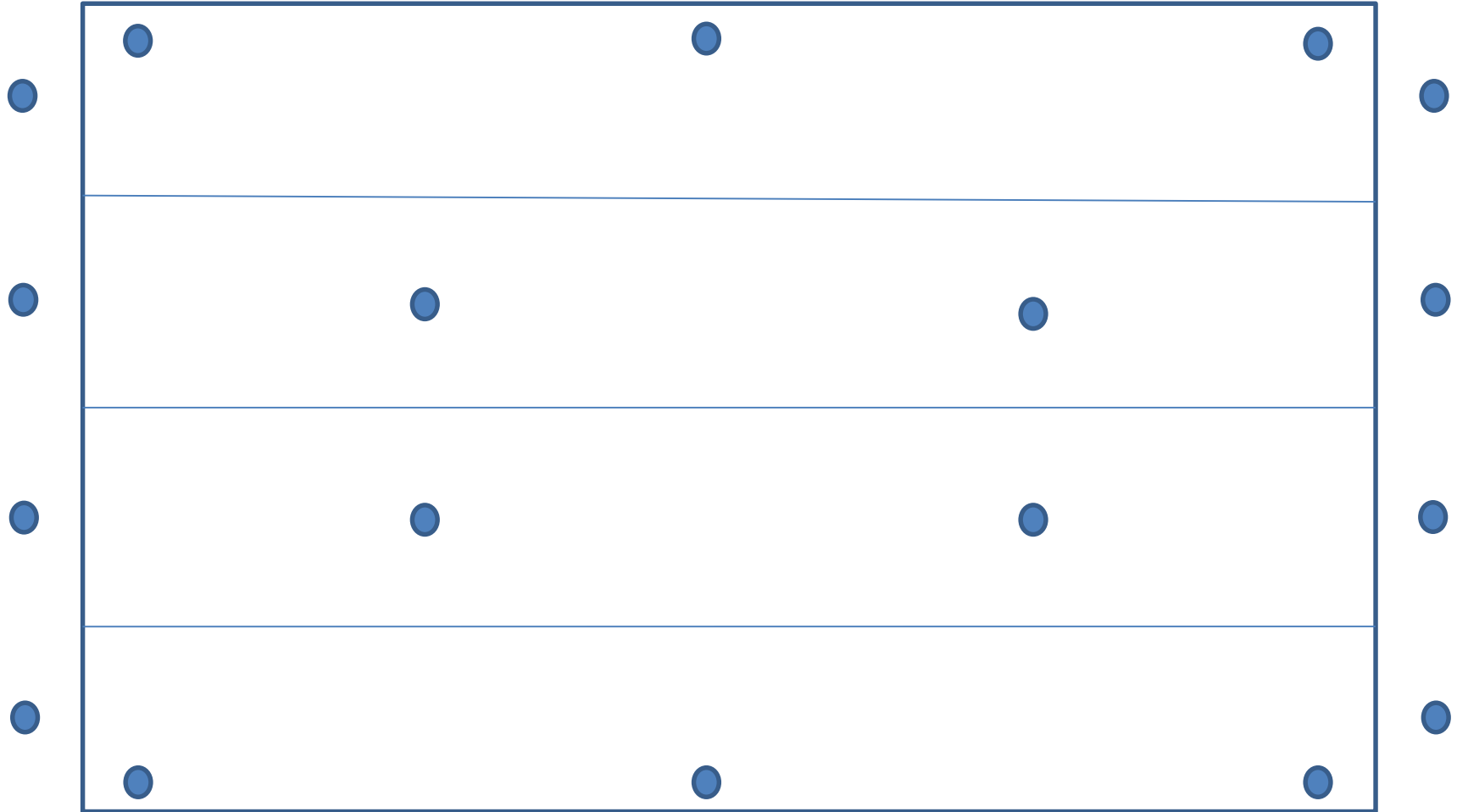
# Laser System

- If it was decided to implement a laser system, the required penetrations would in the end likely need to be dedicated to that system
  - Lots of concerns regarding the costs and technical challenges associated with such a system (particularly if openings in the TPC field cage and ground planes are required)
  - Need to carefully consider the trade-offs between a full blown system (crossing beams everywhere) versus a more limited system (e.g. single beams in each drift region with no openings in TPC field cage or ground planes)

# Counter Proposal

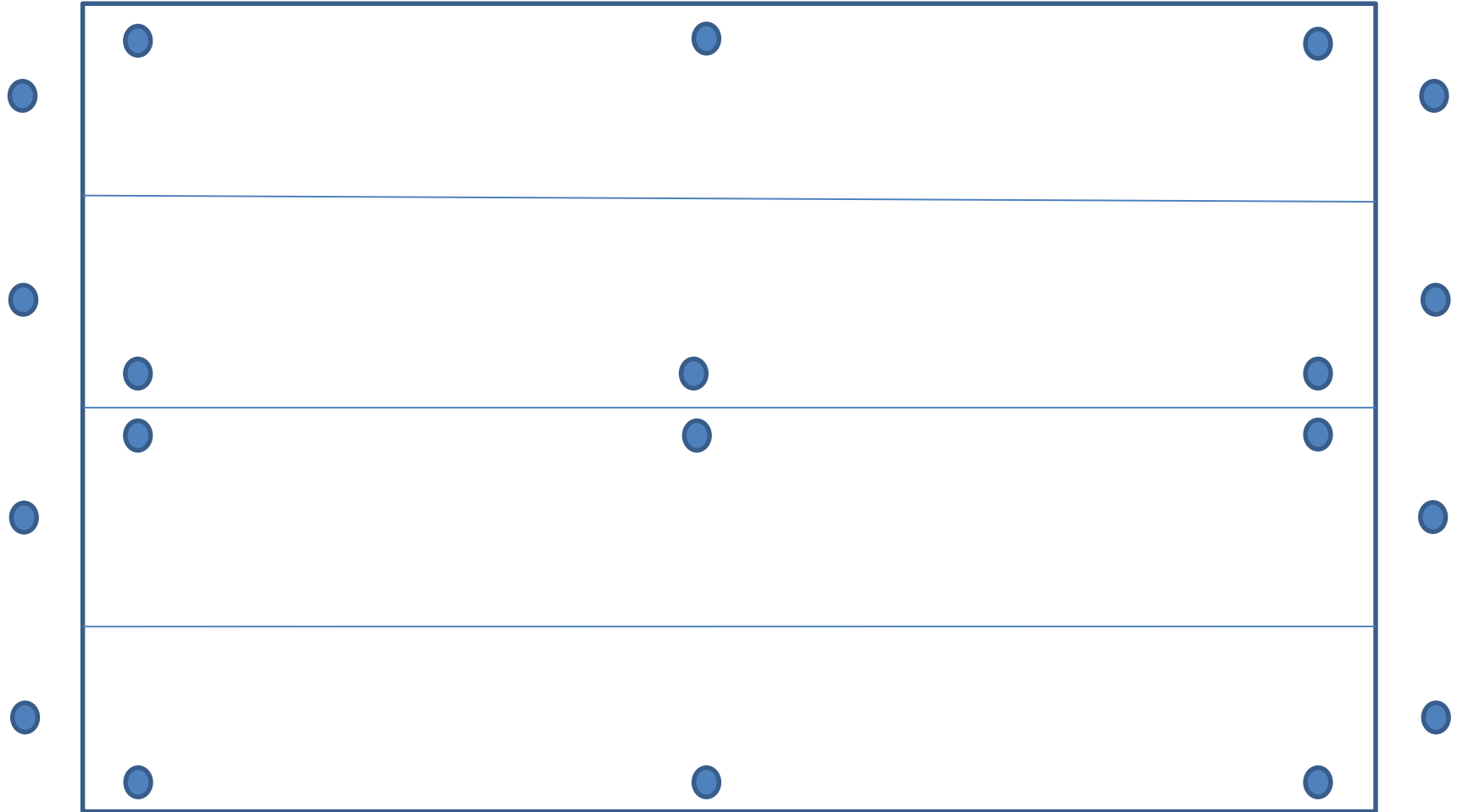
- Technical group is coming back to the consortia with a counter-proposal for a more limited number of multi-purpose penetrations
  - Somewhat constrained by the availability of only three open penetration locations along the outer APA walls
  - Requires some trade-off between the most ideal locations for the different systems that could take advantage of these penetrations – requires further consortia discussion
  - Two suggested configurations as shown on the following slides

# Proposal I





# Proposal II



# Follow-up

- On the time scale of about a week, would like the consortia to consider preferences for Proposal I, Proposal II, or some “small” modification of these
- On a slightly longer time scale (a few weeks), attempt to understand and document the things we would be giving up by restricting ourselves to this more limited layout
- On the six month time scale be prepared to present justifications for a more complex layout

# Purity and Vertical Temperature Monitors

- Technical team expressed concerns about ~15m support rods dropping vertical from top penetrations
- Would like consortia to consider different mounting schemes for these devices
  - Could attach to cable trays running from top to bottom of cryostat along walls (straight-forward in corners but also imagined to be possible mounted to bolts that run along top and bottom of cryostat walls)
- Manholes could be safest location for long support rods if these prove to be absolutely necessary