FD2 PDS Status

DUNE Far Detector #2
Photon Detector System

Last update: August 27, 2021
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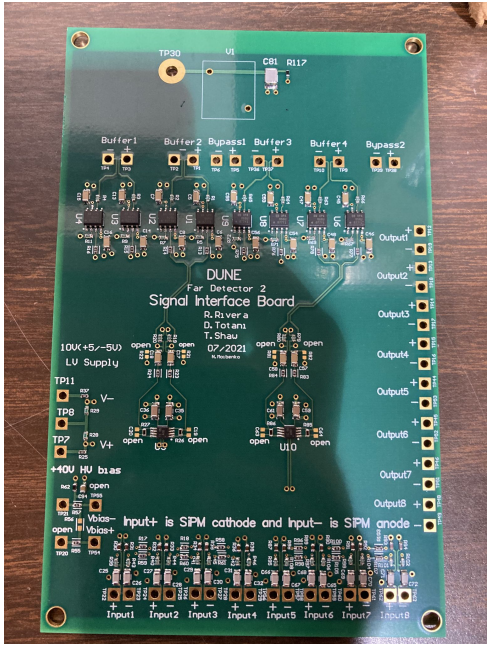
Cold Box 1 PDS Schedule

Week of September 6th	mechanical (aluminum and G10) mounting components for PD cathode installation arrive at CERN. September 8-10 first PD team members arrive at CERN, work with Philippe on integration of mounting plates in cathode
Week of September 13th	establish readout chain **test stand** to test components received at CERN. Complete integration of **mounting plates** in cathode.
Week of September 20th	cathode ready to move. At test stand, test components received at CERN.
Week of September 27th	ship remaining components from US. At test stand, test components received at CERN.
Week of October 4th	cathode **rotated** (upside down) for easy access to install cold electronics and **solder** jumper wires. **Feedthroughs** installed. Cold box wall-mounted components installed.
Week of October 11th	cathode lowered and **final** PDS fiber connections made to pre-installed fibers on the wall.
October 18+	PD readout optimization from **warm side** and DAQ integration.

In our hands

- 2 populated Interface Boards are in our hands (from FNAL/PPD).
- 4 populated 2-channel ARGON2x2 analog readout boards are in our hands
  - 1 shipped to UK and 1 shipped to Paris



Remaining steps to Cold Box 1

- Fabricate mounting plates
  - UK fabricating aluminum pieces
- Assemble 20-SiPM card with mini-ARAPUCA frame (6 units)
  - CSU fabricating G10 pieces
  - CSU stretch goal for one full-size xARAPUCA
  - Fabricate flanges
    - Fermilab PoF flange, CSU signal flange, UK cryosub flange
- Qualify LV PoF insulation or optimize exposed LV PoF module
- Continue optimization of signal
- Get components to CERN

Open Orders

- Feedthroughs expected delivery next week
  - Then place order for feedthrough fiber termination (one-week lead time)
- Additional power-over-fiber units expected delivery mid-September

Cold Box 1 goals

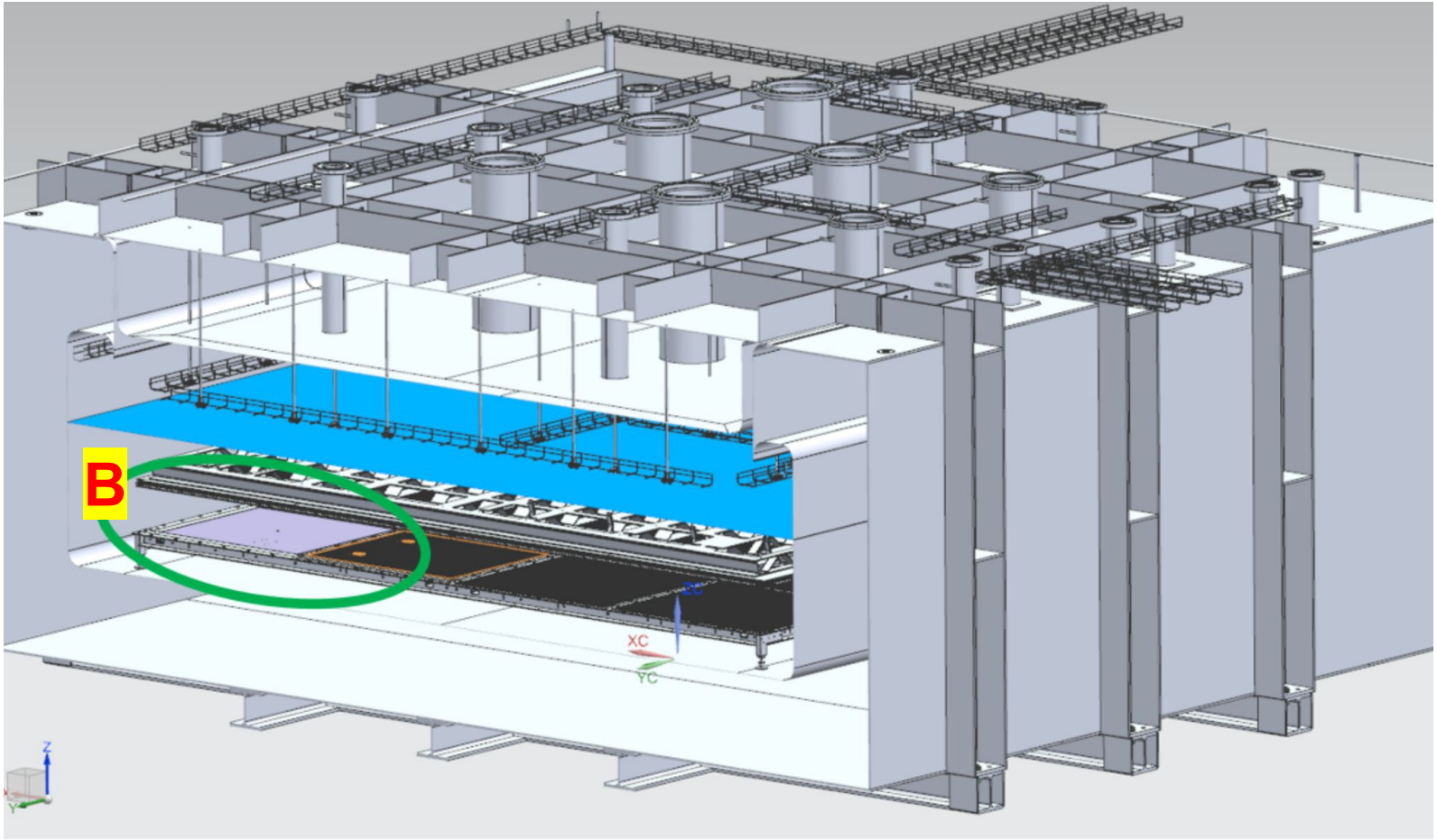
Observe PD event with CRP with power over fiber.

A Base goal: membrane-mount style, basis of comparison for cathode-mount
- **5x4 Test Board + Analog Readout**
- Mounted **on wall**.
- LV power through copper.

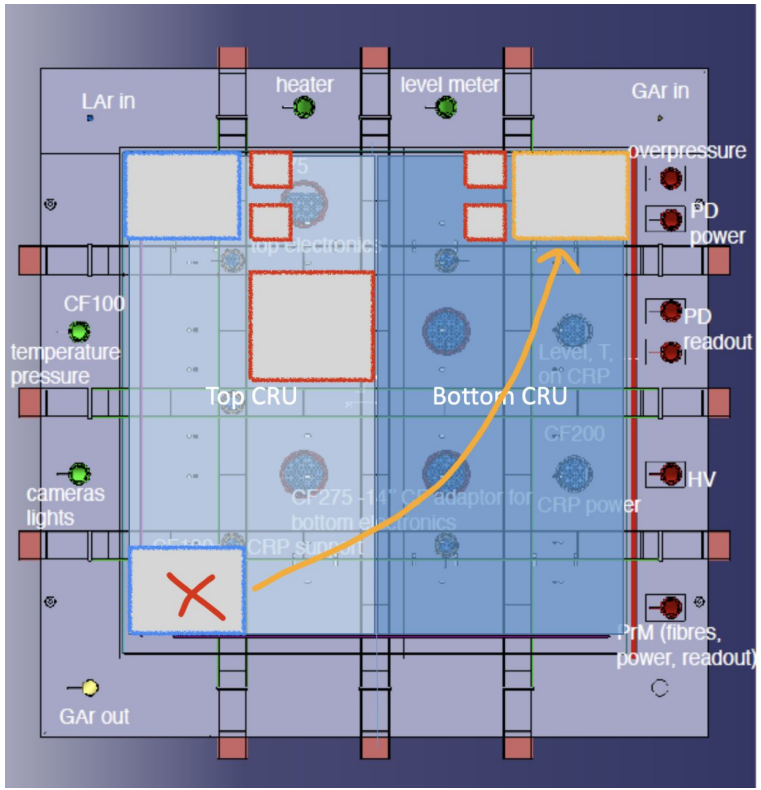
B **Target goal**: cathode-mount style...
- **Bias PoF + 5x4 Test Board + Analog/Cryosub Readout + LV PoF**
- Mounted on **cathode**

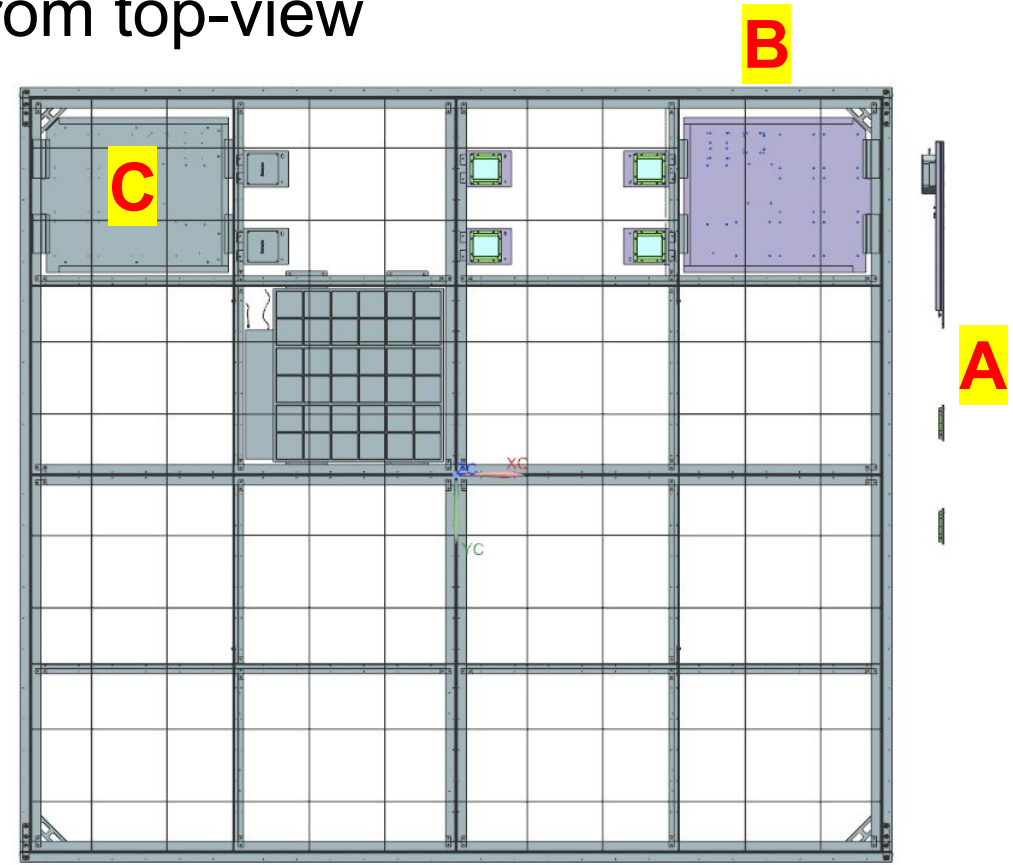
C **Achievable Stretch goal**: add xARAPUCA so that…
- **xARAPUCA + Bias PoF + Analog/Cryosub Readout + LV PoF**
- Mounted on **cathode**

One of two cathode locations

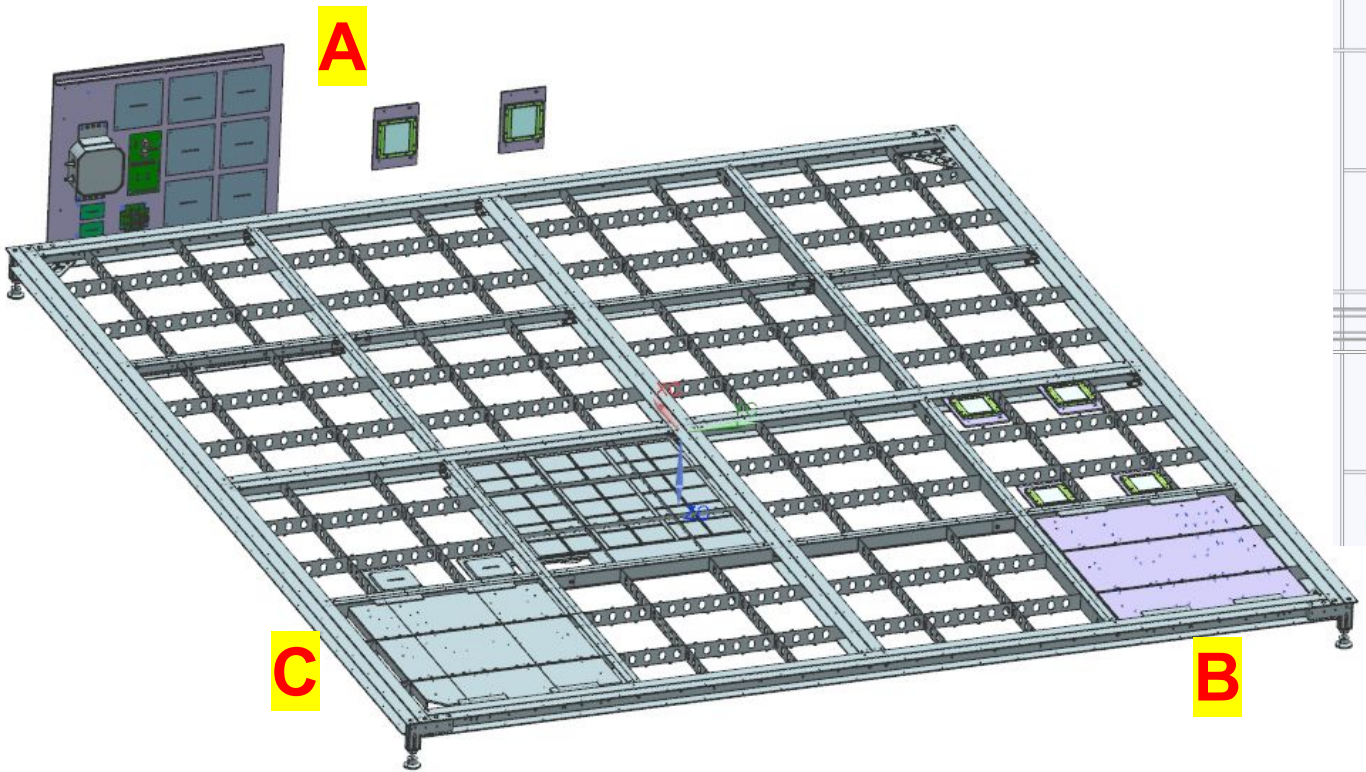


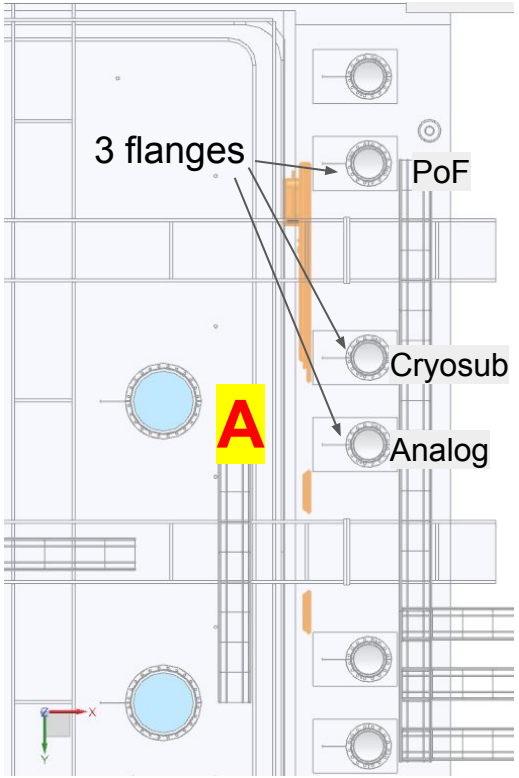
Position for CRP halves from top-view



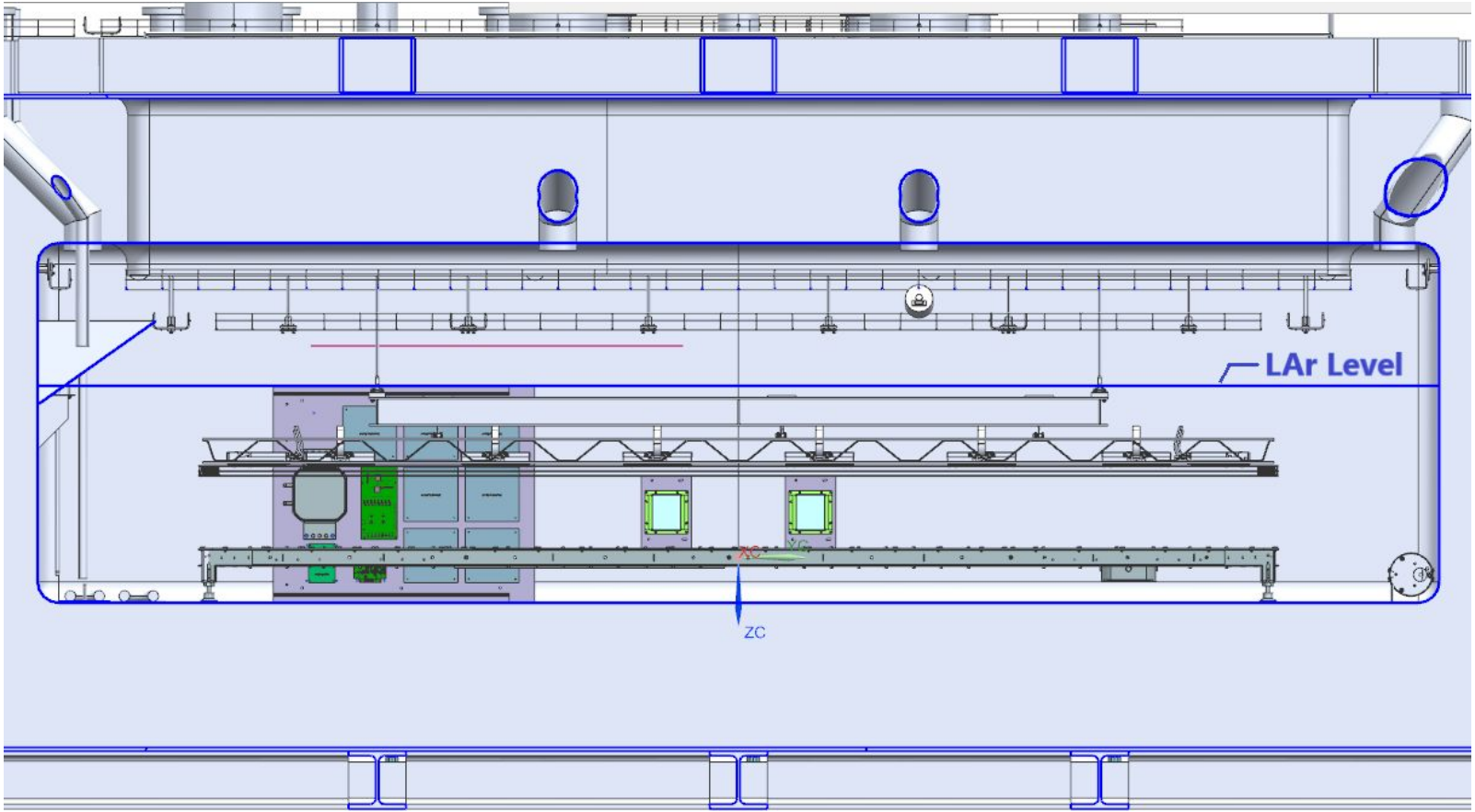


All cold component original locations





Side view towards PD flanges



Detector cell & electronics cell

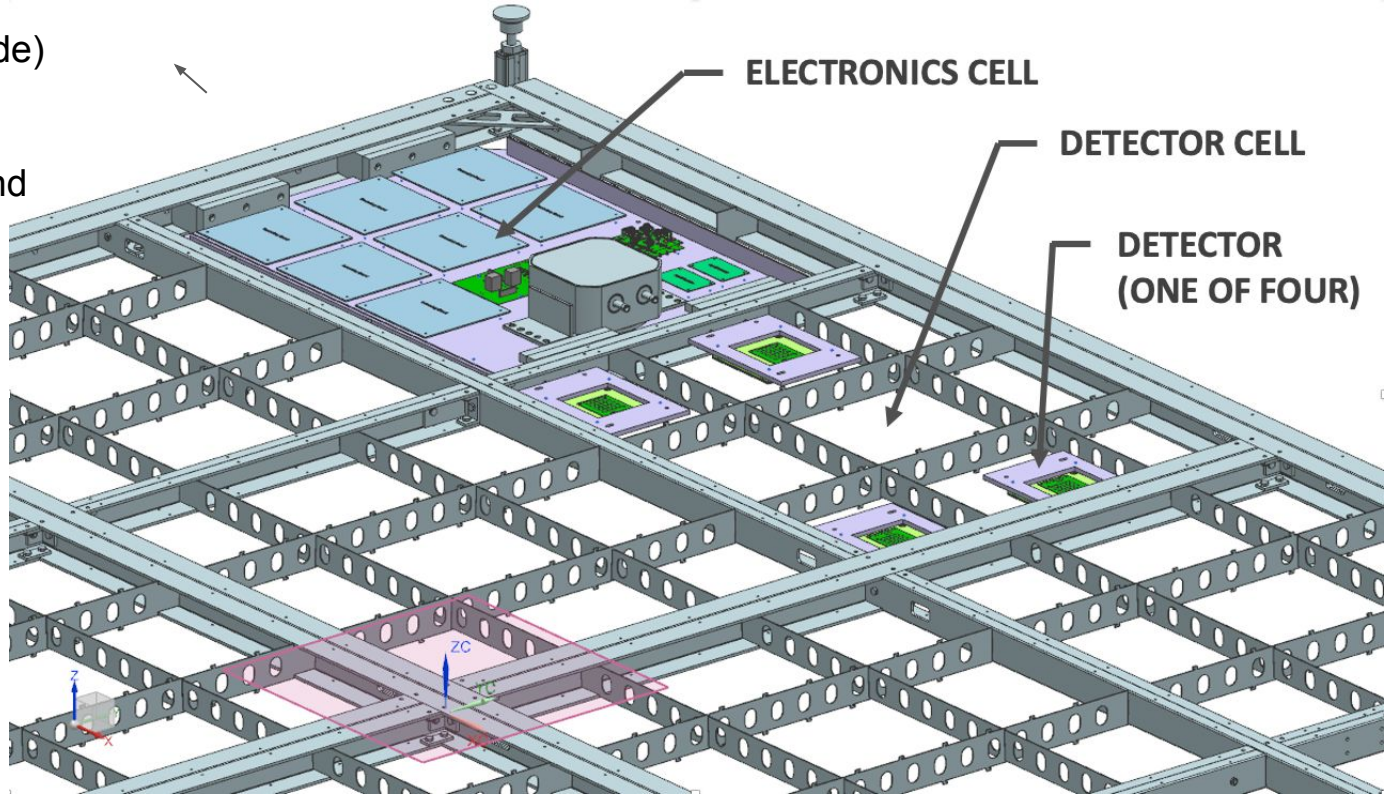
- Electronics plate is angled to guide bubbles to edge of cathode (away from anode)

- All copper cabling is teflon/PTFE insulation and shielded. Modeled after HD cables.

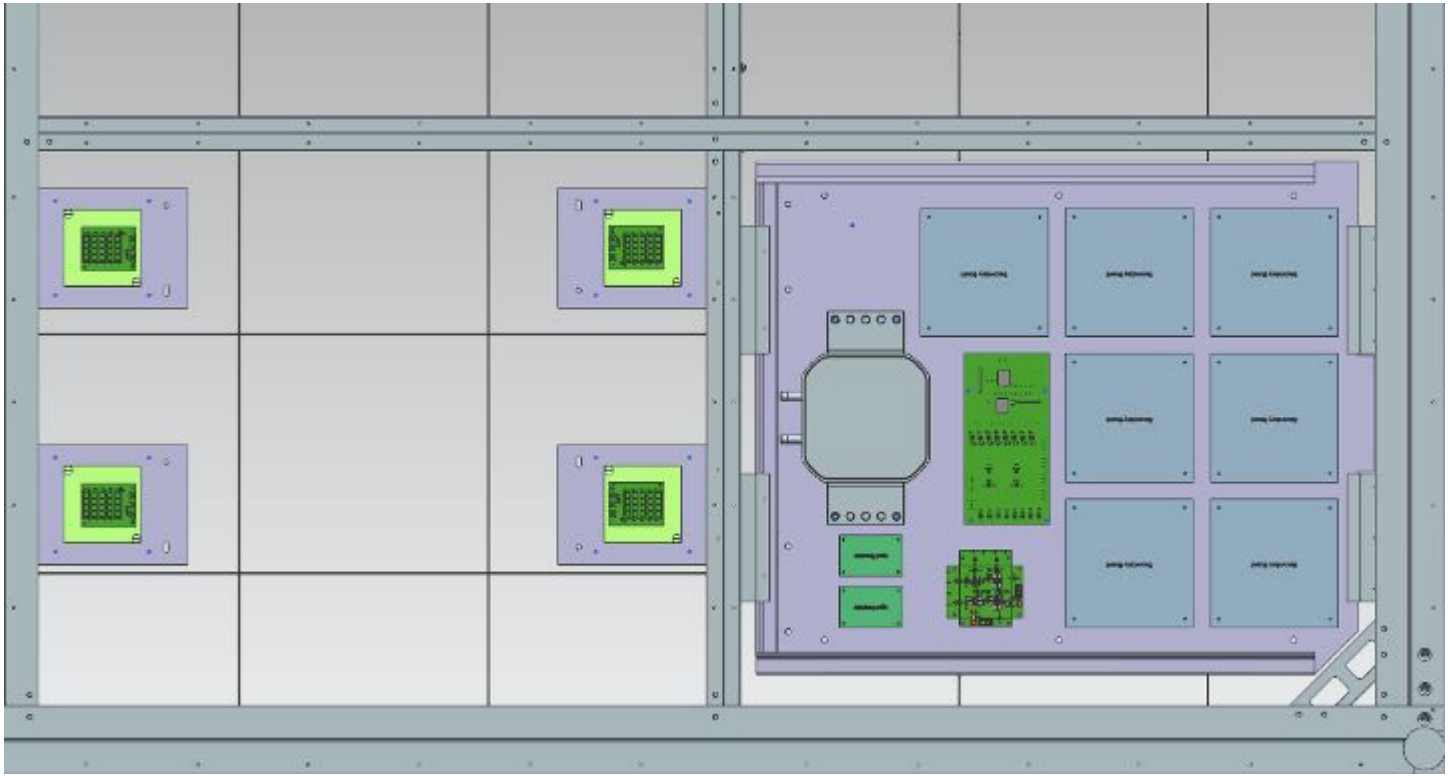
- Referenced to mesh on cathode

- Referenced to wall on wall

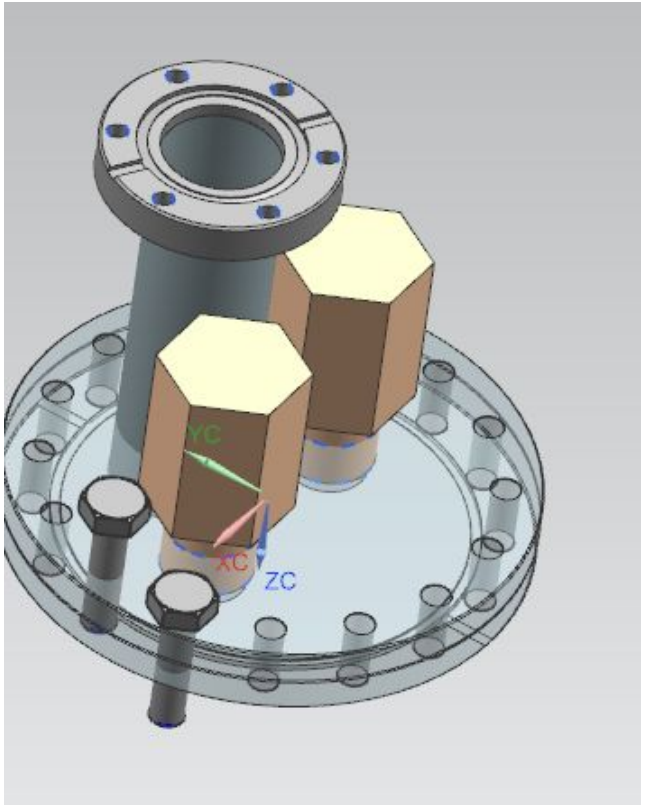
- No floating conductors



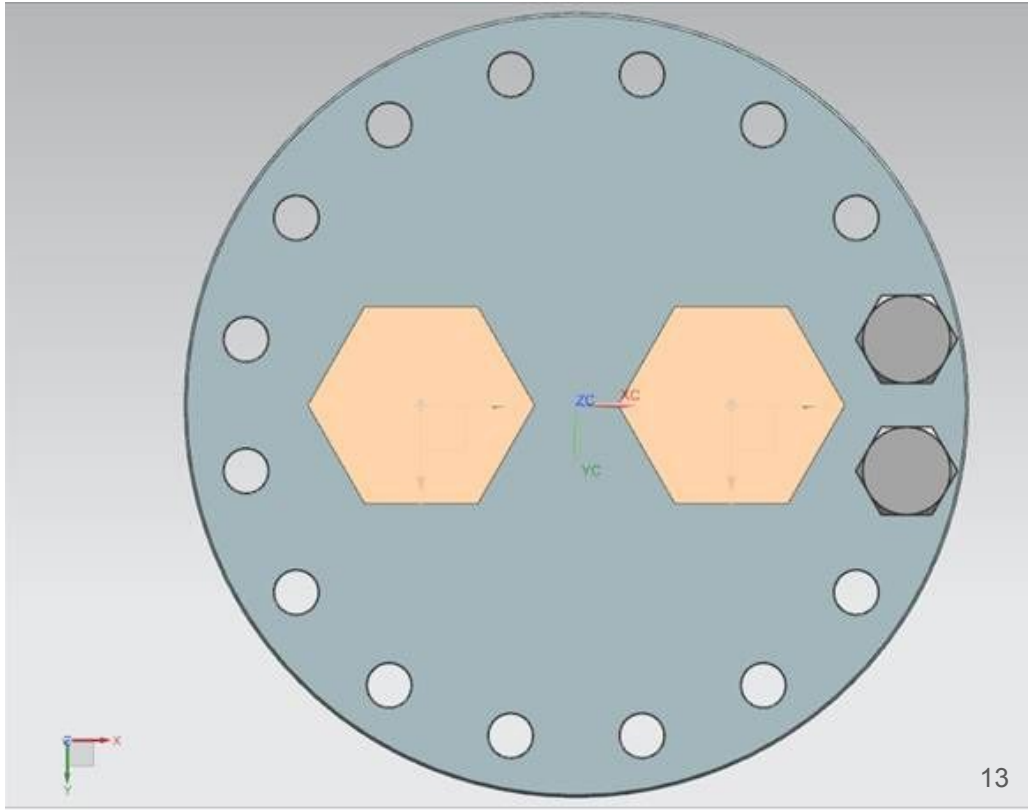
Detector & electronics cell from above



Signal Feedthrough

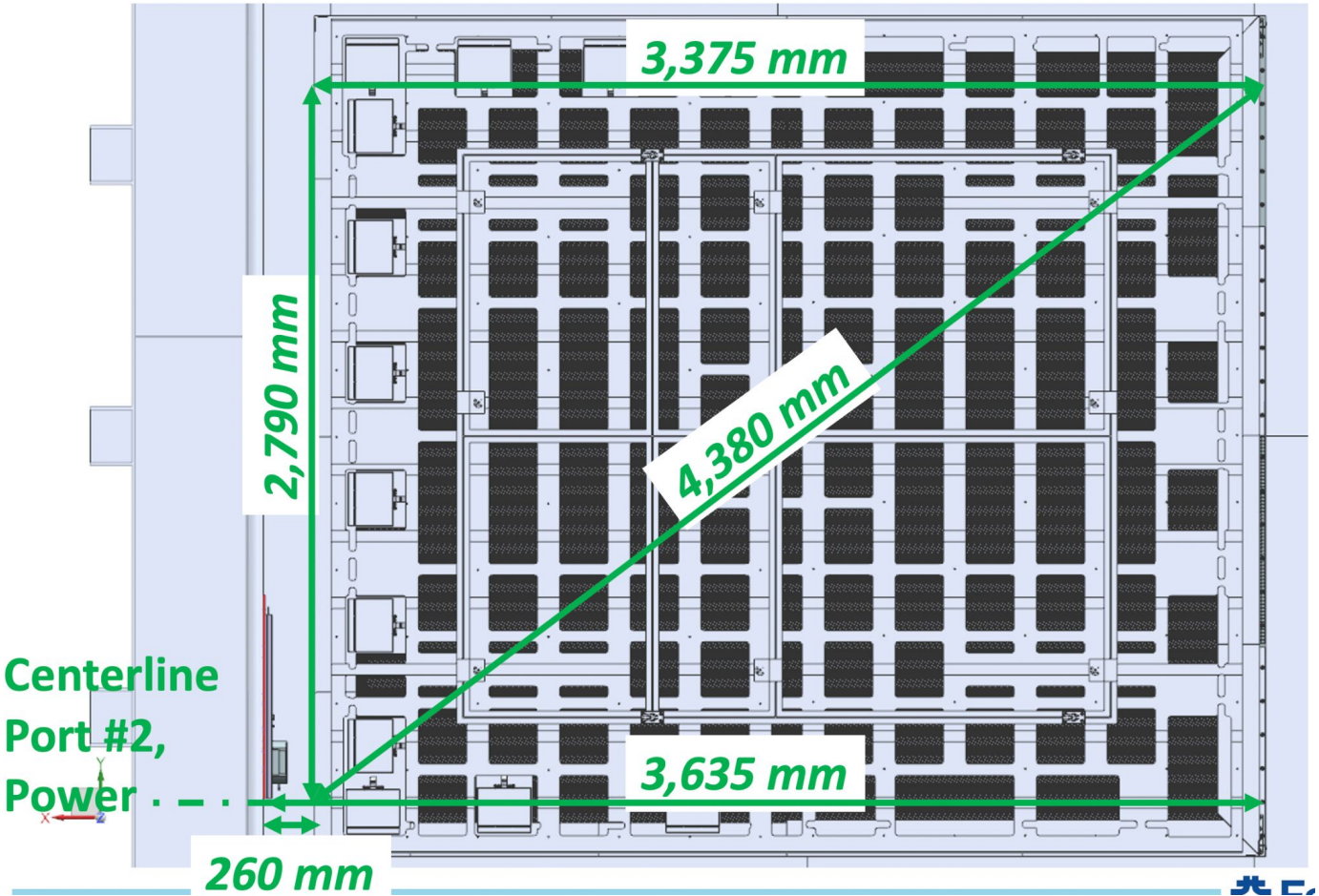


Power Feedthrough



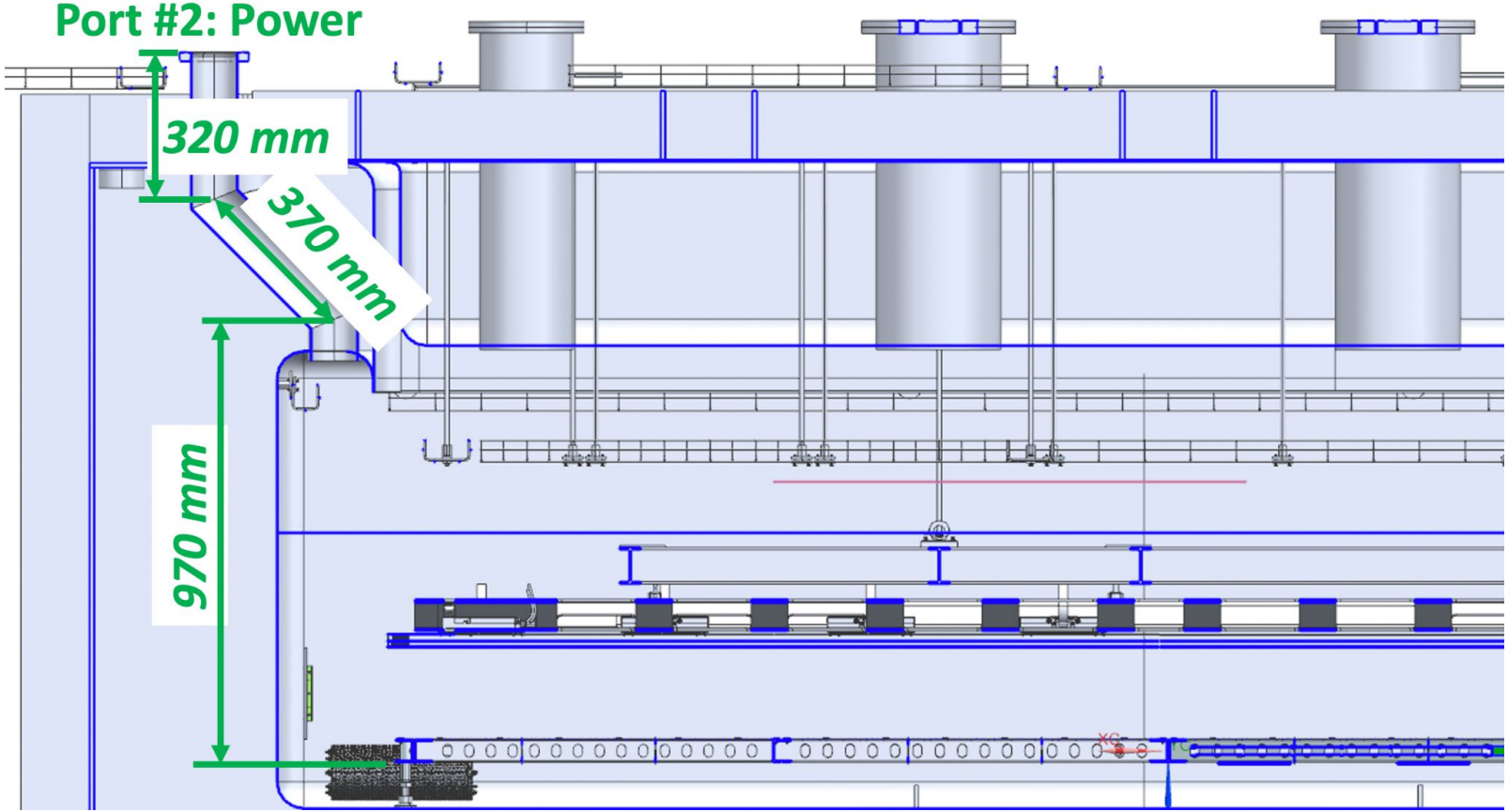
From Andy S.

- Straight horizontal cable run lengths on the cathode



From Andy S.

- Straight vertical cable run lengths from the underside of the cathode to the feed-through flange:



Cable conclusions

- 4m can reach edge of cathode
  - 5m can reach comfortable positions on cathode
- 3m can reach flange from edge of cathode