

Coordinate Detector Update

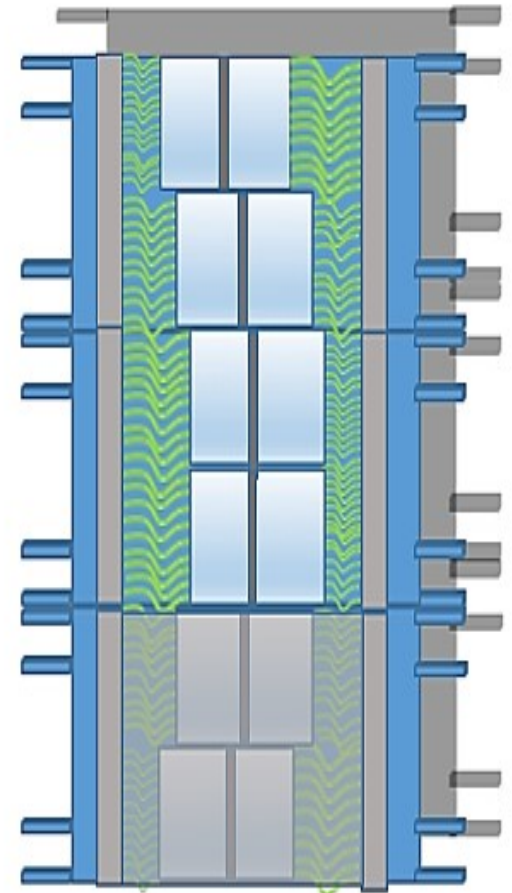
Peter Monaghan
Taylor Edwards & Kara Ferner

Christopher Newport University

SBS Winter Collaboration Meeting
18th February 2021

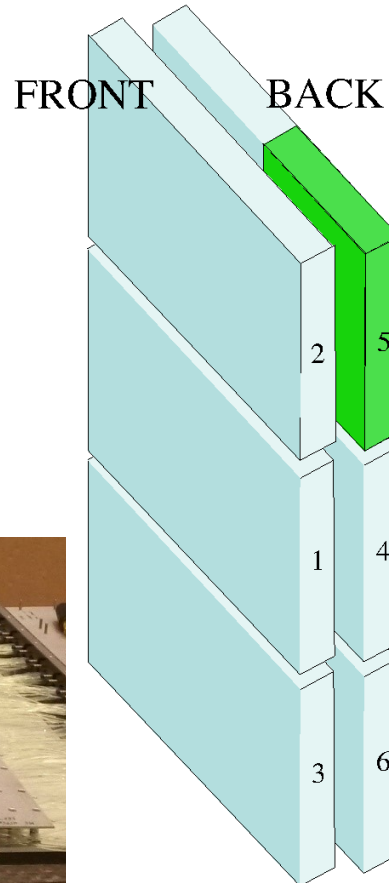
Coordinate Detector Configuration

- Detector has two planes each with an active area of $(102 \times 294) \text{ cm}^2$
- 6 modules; 3 per plane; 28 scintillator **groups** in each module.
- Each group consists of 14 scintillator **paddles**.
- Total of 2352 channels.
- Each paddle has a **wavelength shifting fiber** (WLS) along its center for light collection.
- Each group of WLS connected to 16-channel **maPMT**



Coordinate Detector Configuration

- Left/Right split by mirror.
- Paddles angular spread $\pm 17^\circ$
- Detector over 3 m tall

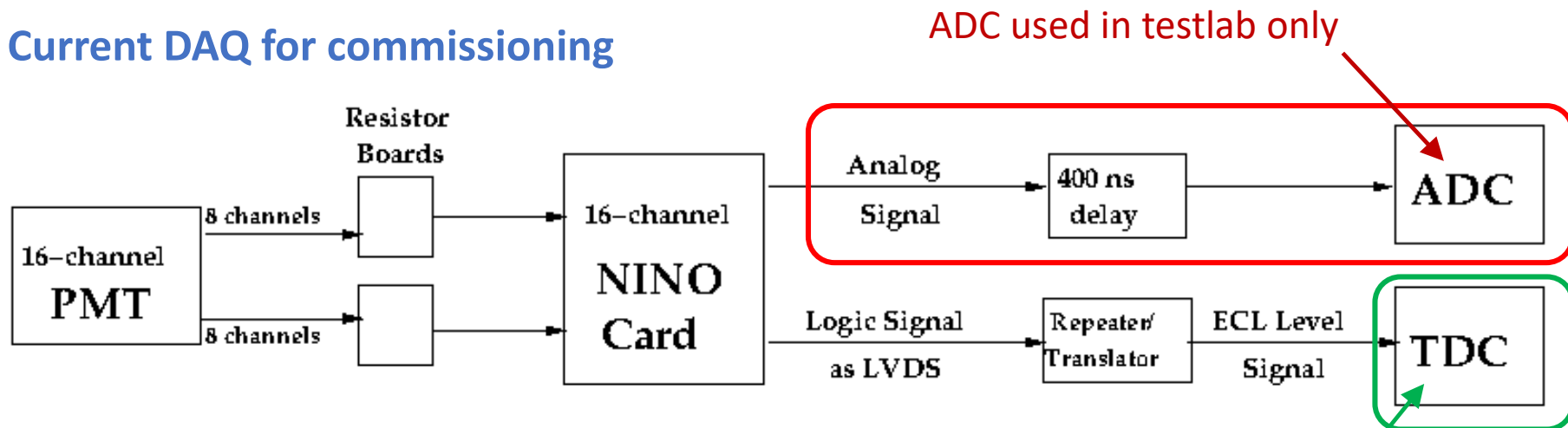


Module Commissioning Progress

| | | Light-tightness | Charge normalised | Threshold | Efficiency & HV | Complete |
|----------|-------|-----------------|-------------------|-----------|-----------------|----------|
| Module 1 | RIGHT | ✓ | ✓ | ✓ | ✓ | ✓ |
| | LEFT | ✓ | ✓ | ✓ | ✓ | ✓ |
| Module 2 | RIGHT | ✓ | ✓ | ✓ | ✓ | ✓ |
| | LEFT | ✓ | ✓ | ✓ | ✓ | ✓ |
| Module 3 | RIGHT | ✓ | ✓ | ✓ | ✓ | ✓ |
| | LEFT | ✓ | ✓ | ✓ | ✓ | ✓ |
| Module 5 | RIGHT | ✓ | ✓ | ✓ | ✓ | ✓ |
| | LEFT | ✓ | ✓ | ✓ | ✓ | ✓ |
| Module 4 | | ✗ | ✗ | ✗ | ✗ | ✗ |

DAQ: Fastbus → VETROC

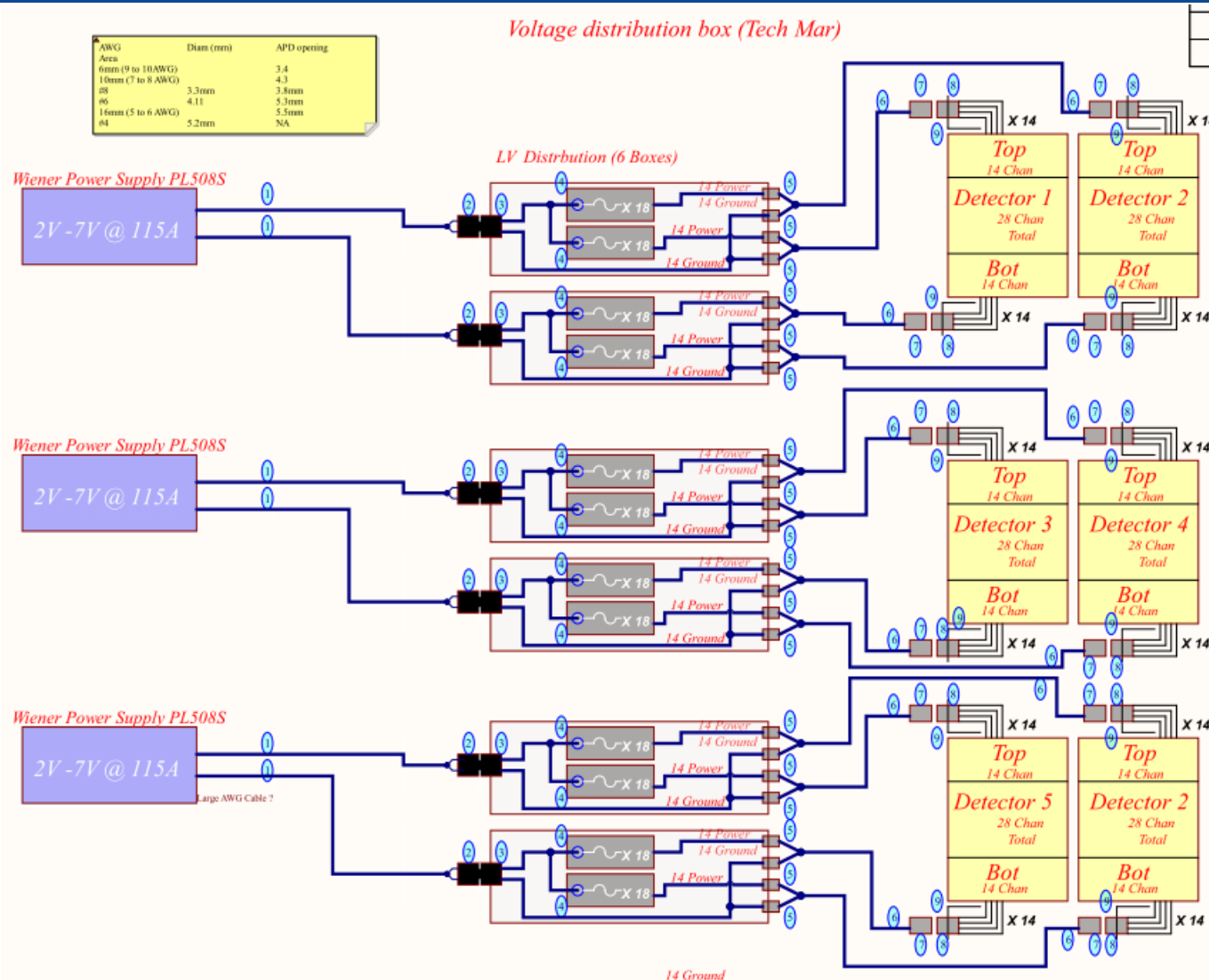
Current DAQ for commissioning



- VXS FPGA-based flash TDC
- Single module can support 192 inputs
- Data rates ~ 200 MB/s; faster and lower deadtime.
- Need 13 modules in a single VXS crate; ordered.
- Require adapter connection for ribbon cables
- Thanks to David Flay and Alexandre Camsonne.

Replace Fastbus with
VETROC modules

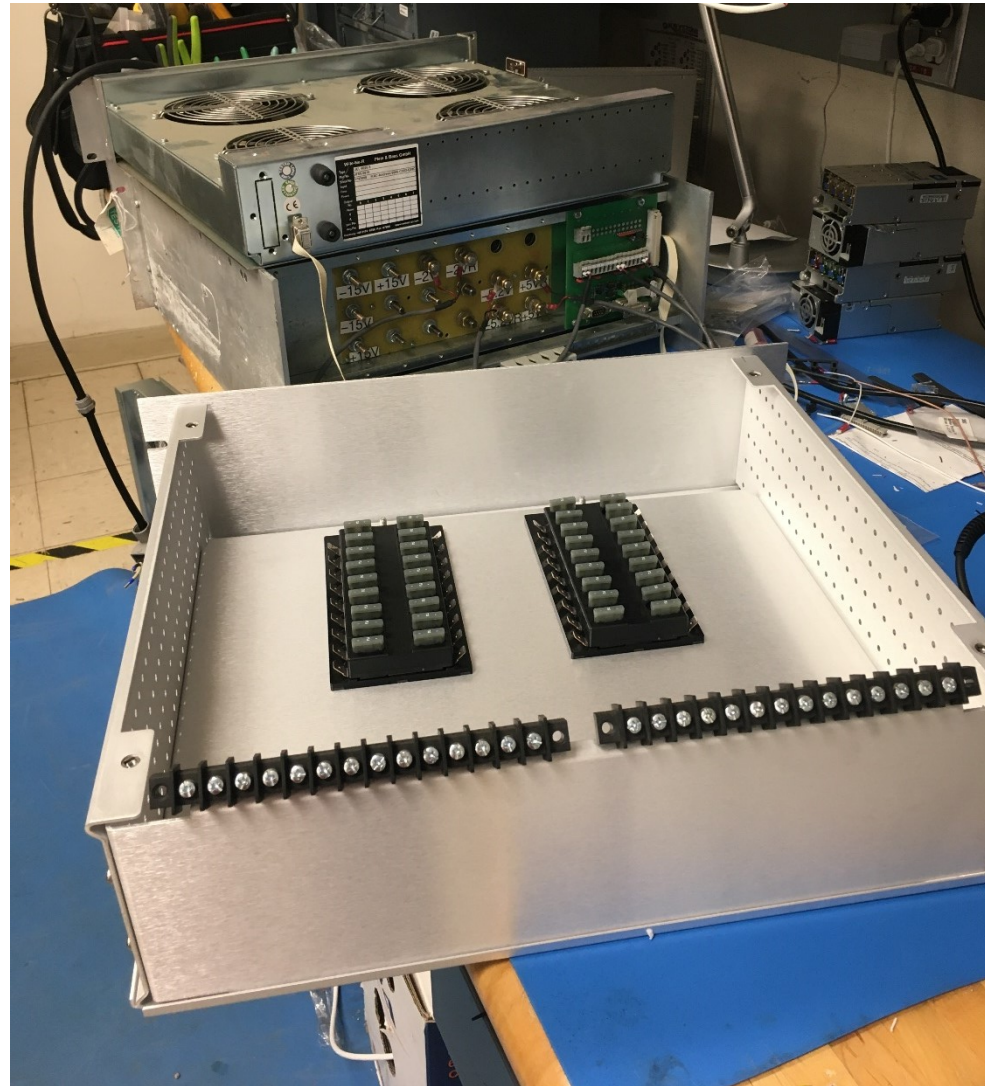
NINO Power Supply Schematic



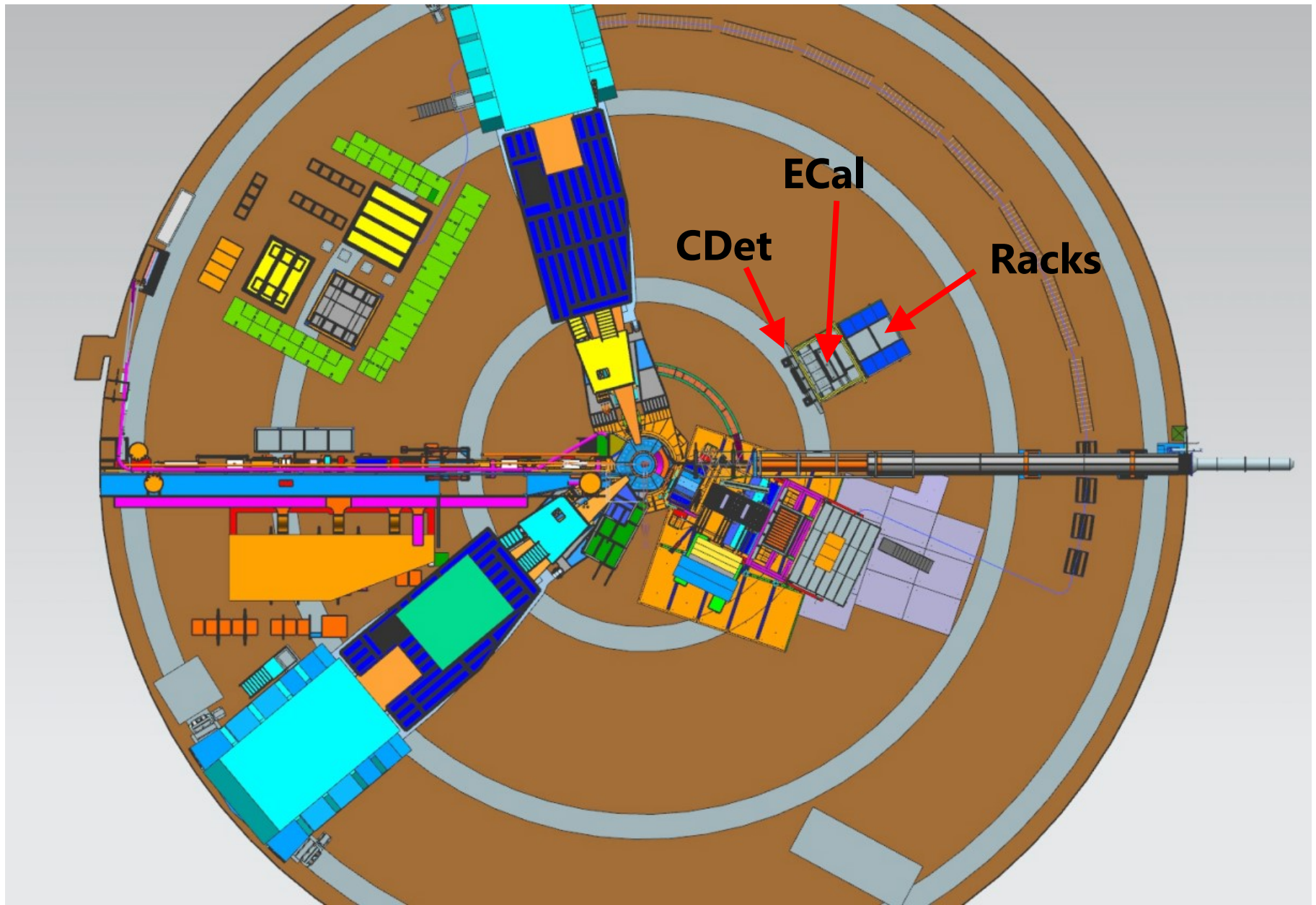
- Thanks to Chris Cuevas, Mark Taylor (Fast Electronics Group)
- Four groups of NINOs (14 cards) per supply.
- Each group pulls ~20 A

NINO Card Power Supply

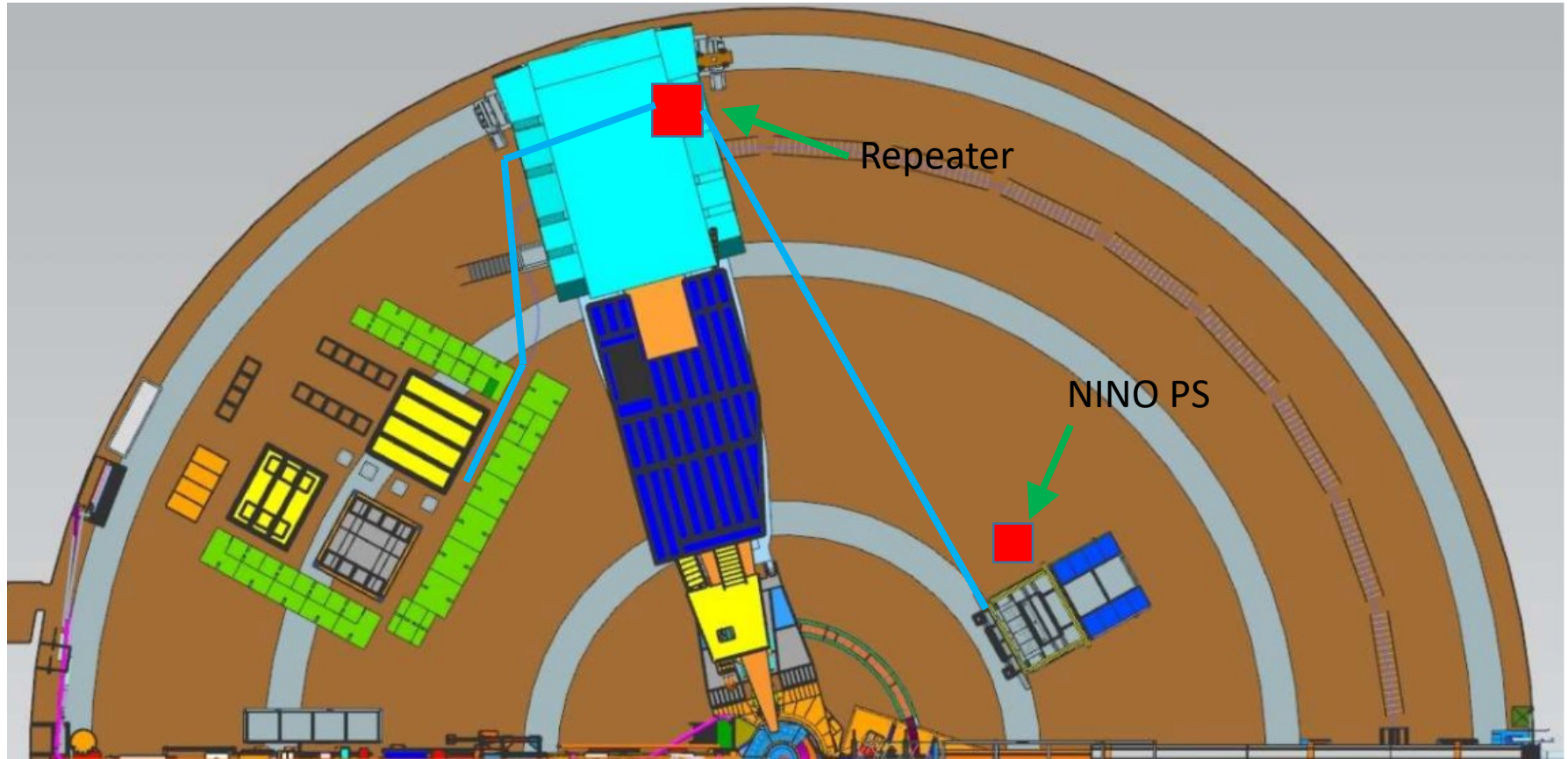
- Each NINO card requires 5 V and ~1.5 A supply.
- Wiener PL508S modules
 - 115 A at 5 V (upto 7 V)
 - Low noise
 - Interlocked settings
- Remote control with both current and voltage readback



GEp Hall Layout

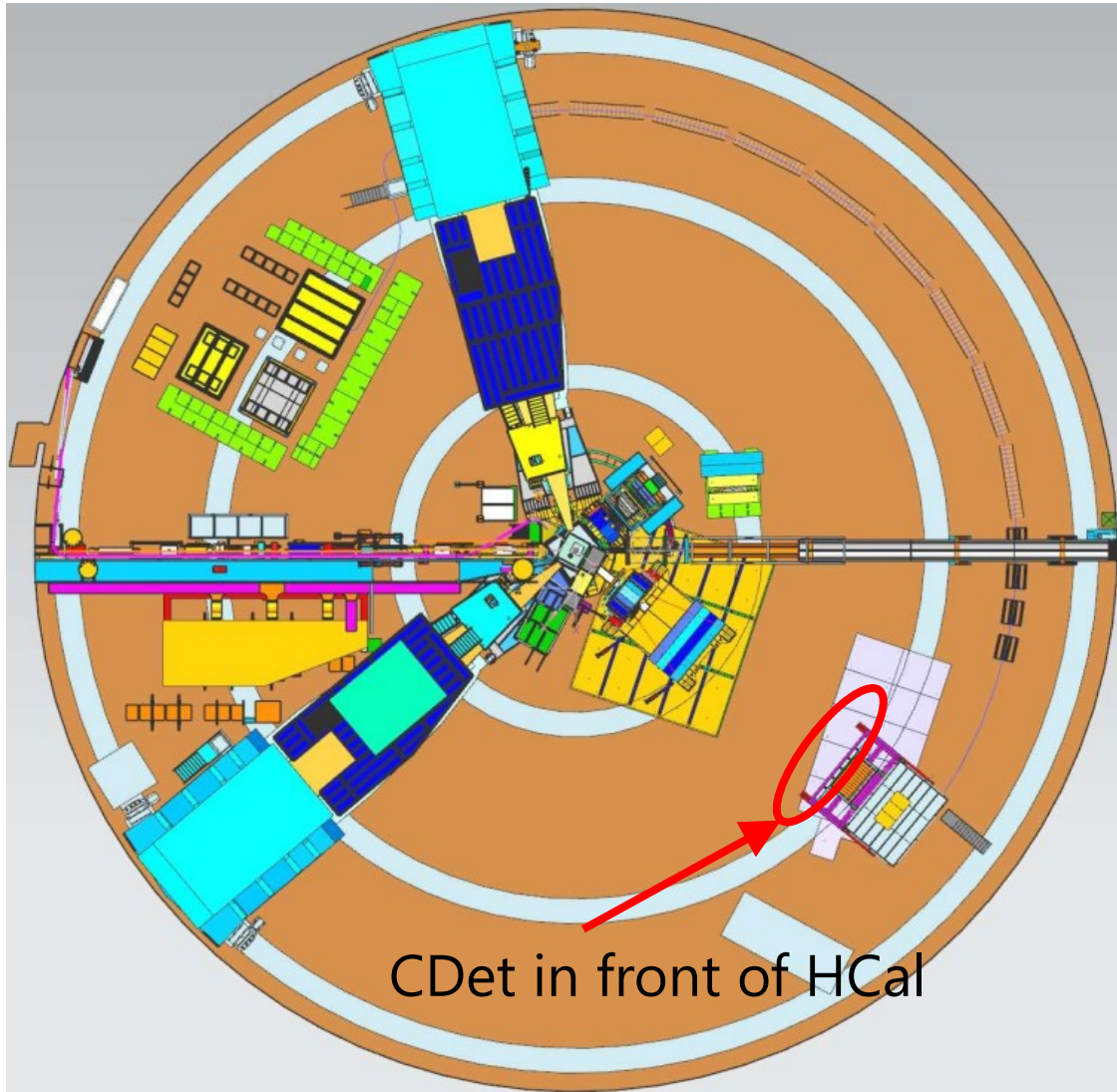


Layout, Cabling etc.



- NINO → LVDS-ECL → VETROC ribbon cables must be less than 30 m (100 ft) long (336 cables)

GEn Hall Layout



- Different mount to HCal required.
- Run cables under R-HRS?

Summary

- Progress severely impacted by Covid restrictions
 - No undergrads allowed on site!
 - New students joining group – hope to participate this summer**
- Continuing with commissioning
- DAQ changing to use VETROC system
 - Fewer modules, improved deadtime
- Robust power supply for NINO cards developed with Fast Electronics Group
- Developing plans for installation and requirements for experiment.