

Hall C Data Acquisition System

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b1/Azz Tensor Collaboration Meeting

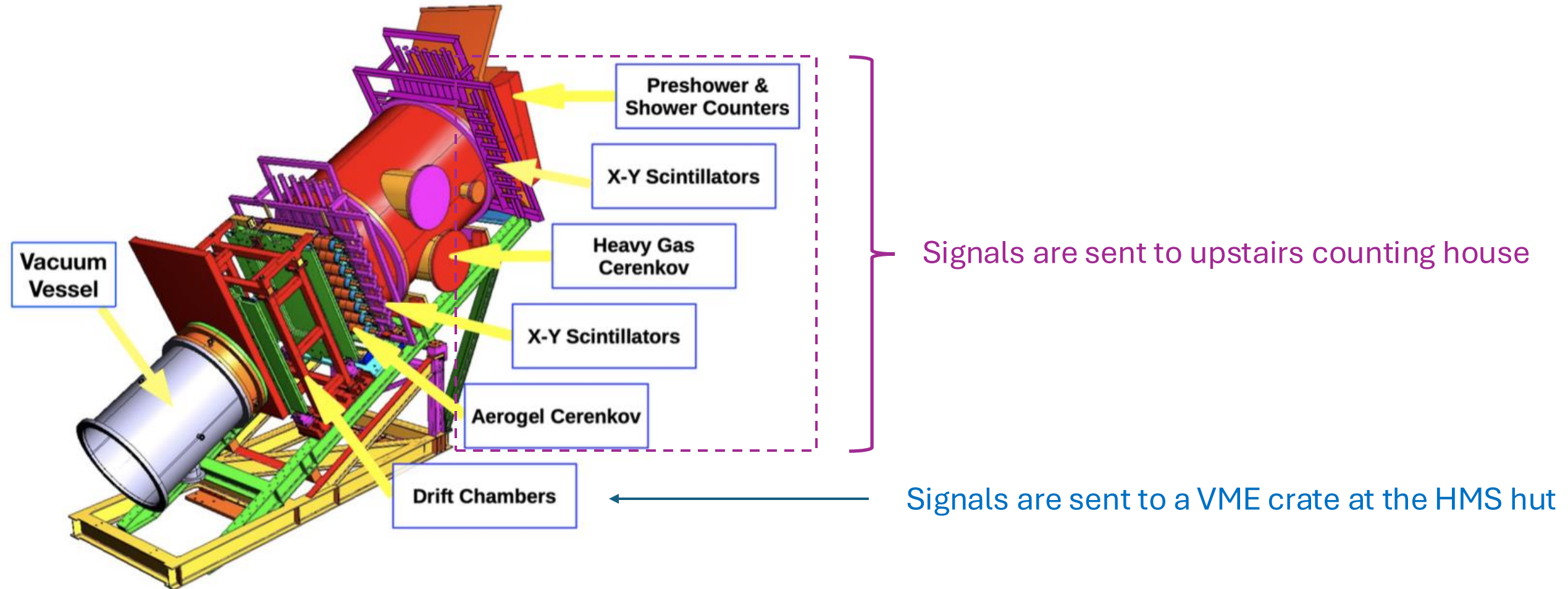
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Outline

- The standard Hall C DAQ system
 - Hardware setup
 - Trigger setup
 - Data rate and trigger rate expectations
- Things for the collaboration to consider

DAQ Hardware Setup

HMS



DAQ Hardware Setup



	ADC (FADC250 V2)	TDC (CAEN1190) (100 ps resolution)	Scaler (SIS3801)
Preshower & Shower	78 channels		
X1, X2, Y1, Y2 Scintillators	104 channels	104 channels	104 channels
Heavy Gas Cerenkov	2 channels		
Aerogel Cerenkov	16 channels		
Triggers/SUMs/Reference s/Helicity	13 channels	51 channels	✓
Rasters	4 channels		
BCMs (1,2, 4A, 4B, 4C)			5 channels
Drift Chambers		1176 channels	

Counting house:

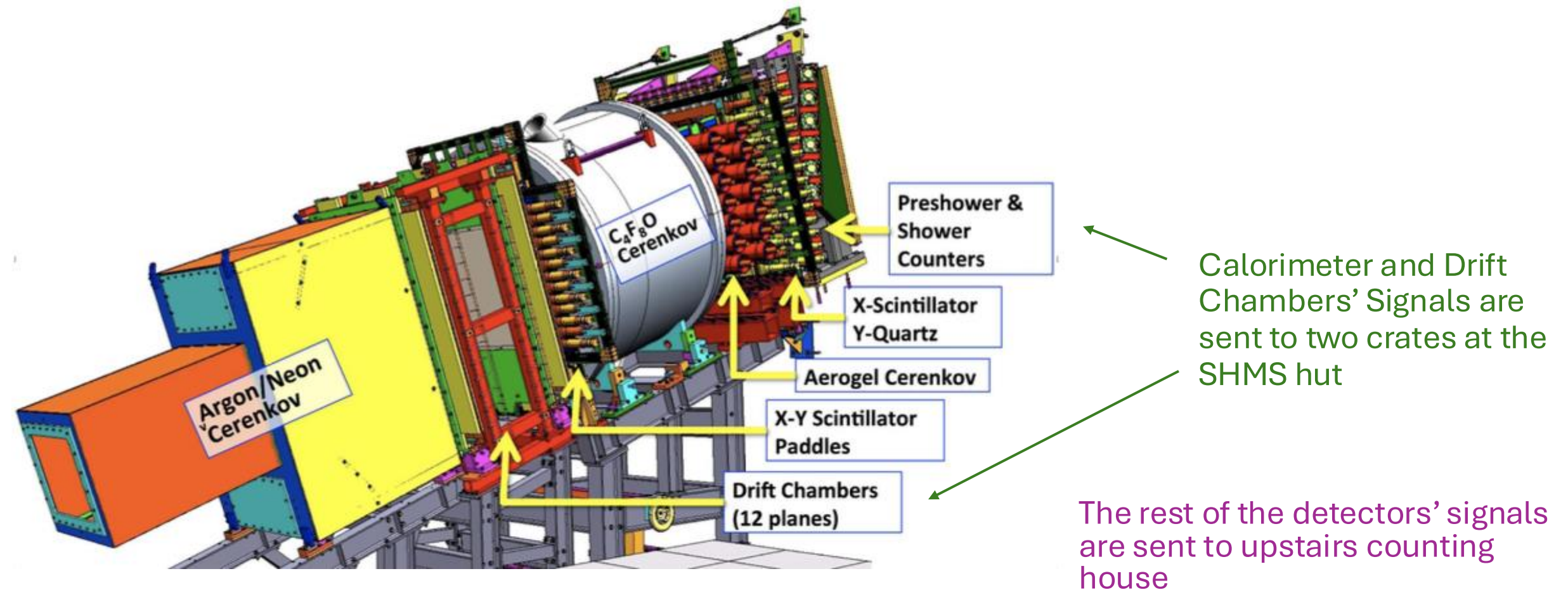
- Crate 1:
- 14 FADCs,
 - 2 CAEN 1190

- Crate 5:
- 7 SIS3801
Scalers

- HMS Hut:
- Cate 3:
- 10 CAEN 1190

DAQ Hardware Setup

SHMS



DAQ Hardware Setup

SHMS

	ADC (FADC250 V2)	TDC (CAEN1190) (100 ps resolution)	Scaler (SIS3801)
X1, X2, Y1, Y2 Scintillators	122 channels	122 channels	122 channels
Heavy Gas Cerenkov	4 channels		
Aerogel Cerenkov	14 channels		
Noble Gas Cerenkov	4 channels		
Triggers/SUMs/References /Helicity	11 channels	46 channels	✓
Rasters	4 channels		
BCMs (1,2, 4A, 4B, 4C)			5 channels
Preshower & Shower	252 channels		
Drift Chambers		1172 channels	

Counting house:
Crate 2:

- 10 FADCs,
- 2 CAEN1190

Crate 8:

- 8 SIS3801
Scalers

SHMS Hut:

- ←Crate 4: 16 FADCs
- ←Crate 6: 10 CAEN1190

Trigger Setup

- Most of the detector signals are sent to the CH; this makes the trigger setup easy to access and modify. (no Hall access requires).
- Common triggers:
 - HODO 3/4 (hodoscope 3 out of 4 planes)
 - EREAL, ECLEAN (preshower, shower, Cherenkov, and hodoscope)
 - Trigger thresholds are adjusted at the NIM modules.
- EDTM system:
 - EDTM is a clock signal at a set frequency
 - It is injected at the trigger logic level in the Counting Room.
 - Can be used for dead time measurement, or BCM calibration etc. where a clock trigger is needed.

Trigger Rate and Data Rate

- CODA3 is used for the data acquisition
- CODA3 supports multi-block events readout, which would reduce the DAQ dead time significantly at the high trigger rates
- No Hall C experiment has run with multi-block events -> the decoder hasn't been tested
- With 1 block readout, the trigger rate should be less than 4 kHz, and the data rate should be less than 120 MB/s (these are rough numbers from experience, the real numbers depend on the DAQ parameters) to have close to zero DAQ dead time.
- The HMS, SHMS can run with independent DAQs or one DAQ

Things to consider

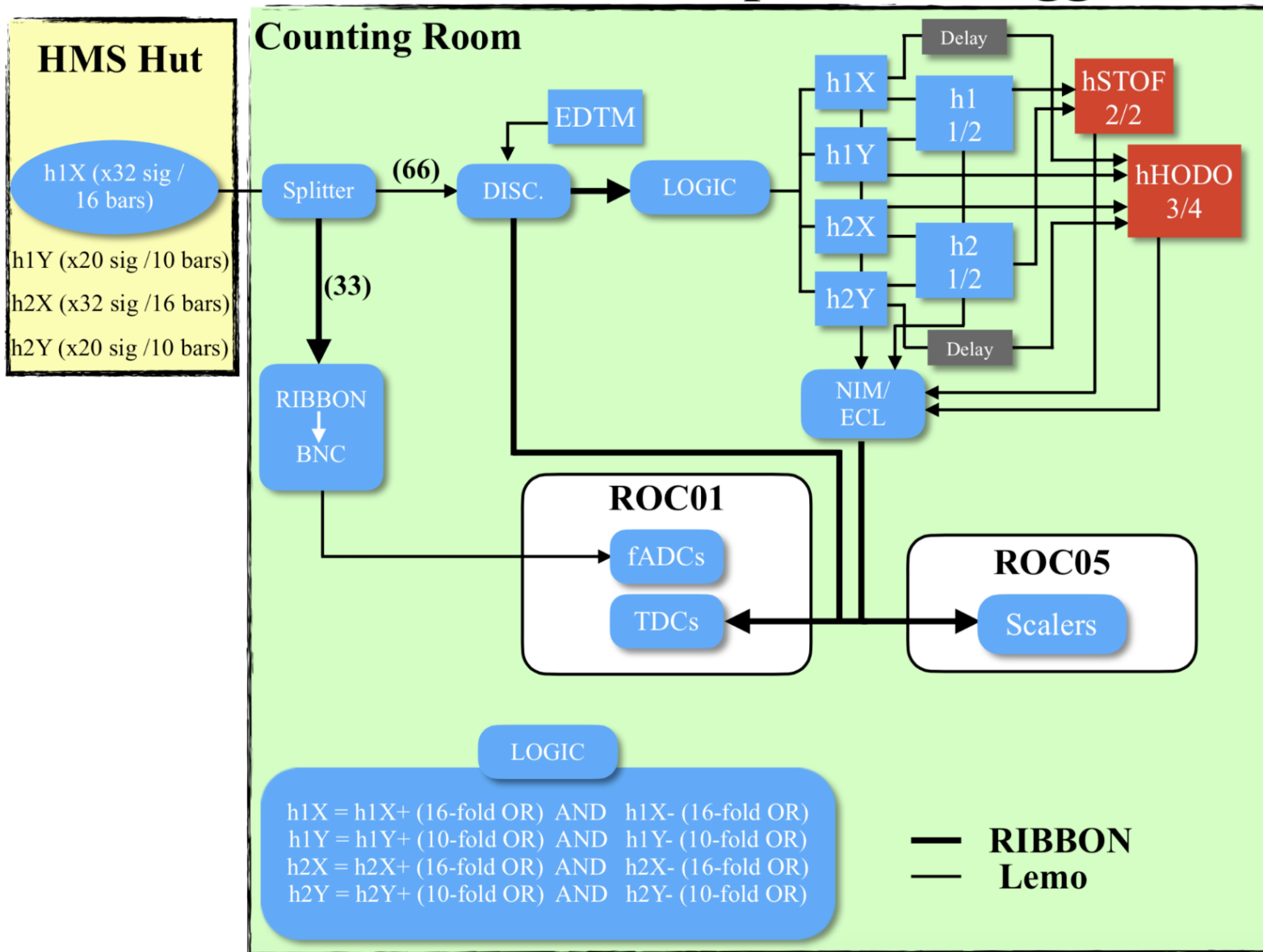
1. Any new equipment needs to be added to the DAQ system?
2. If so, what are the readout requirements for the new equipment?
3. What are the estimated trigger rate and data rate? Or would the trigger rate and data rate be larger than normal Hall C experiments? → What is the DAQ dead time requirement?
4. Any special requirements on the DAQ that are different from the standard Hall C experiments?

If the answers are “no” to the questions above, the DAQ is good to go!

(RSIDIS is the first standard Hall C experiment running with CODA3; The DAQ runs smoothly over the run period.)

Questions?

HMS Hodoscopes Pre-Trigger



HMS Single Arm Pre-Trigger

