

ERR Talk Outline

- Bullet list of channel count, ADC/TDC needs (HMS + NPS)
- Identify new hardware required to support NPS channels, rates [charge 2d, 2e, 2f]
 - HV, VXS Crates, VTP boards, SBC, TI/TM
 - Network upgrade plan to 10 gigE?
 - » if needed, we'll know within 1–2 wks
- Report on physical layout/ infrastructure plans [charge 2e, 2f]
 - Crate locations (HV, VXS)
 - HV+signal patch: pivot to SHMS hut
 - Add'l trunk fiber SHMS ↔ CH
- Slow Controls [charge 2f, 3]
 - Gain monitoring / LED pulser system
 - » 'meat' of LED system discussed where?
 - Temp readbacks inside NPS detector
 - Cooling system controls/monitoring
 - (HV too, but that is already complete)
- Trigger / DAQ / readout [charge 2f]
 - Rates, bandwidth requirements/estimates
 - » Assuming need full waveforms for all crystals participating in cluster(s)
 - 5x5 cluster
 - 25 samples/channel (100 ns)
 - assuming 75 crystals have data (on average)
 - VTP firmware dev to support the above
 - » Slide with specs delivered to FE group for 'sign off'
 - » FADC waveform compression
 - NB: Podd/hcana decoder work needed here
 - TI/TM firmware updates to support
 - » 5 NPS crates + 3 HMS crates
 - Comment on integration with (existing) HMS readout and trigger formation
 - » ID a set of 'production triggers'

NPS questions/issues

- Most are driven by requirement to handle high-rate kinematics + waveform output
 - 13 kHz DIS triggers (+ background)
 - » need NPS trigger (→ VTP firmware)
 - 'high' multiplicity in NPS (75+ crystals*)
 - waveform output for participating crystals is a 'Must'
- Pending issues TBD
 - VTP firmware development
 - » 5x5 crystal cluster triggers
 - » Emit logic-out suitable for building NIM trigger with HMS
 - » * 'sparsify' F250 readout, *if possible* (only store waveforms from clusters)
 - Analyzer support for VTP payload
 - Analyzer support for Event-Blocking mode
 - » 'Unblock' in secondary ROL
 - may be simplest? no analyzer changes needed [Moffit?]
 - » 'Unblock' at analyzer [Bob M]
- Firmware questions wrt VTP/F250s
 - Hall B firmware has compression, but removes features to achieve this
 - » need to ensure necessary timing, QDC, scaler(?) data still present
 - May require upgrading HMS F250s as well
 - » need to address knock-on changes to CRLs and analyzer assumptions for HMS
- What analyzer package is assumed?
 - Podd, hcana, something else, a hybrid?
 - » What online analysis features will be required to determine systems are 'working' as needed?
 - DVCS shipped data offsite via Globus
 - » Same plan?

VTP/F250/TM Firmware Requests

- VTP
 - Cluster trigger based on 5x5 groups, with 2 rows shared between crates
 - Logic signals emitted by each VTP will be OR'd in NIM to form NPS trigger
 - » CODA trig: HMS .AND. (.OR. of NPS)
 - » Timing latency on VTP triggers deterministic to <12ns (?)
 - What is in VTP data payload?
 - » cluster charge, timing, crystal list?
- F250
 - Hi-res timing required (< 1ns)
 - » Still multi-hit?
 - QDC data, Scaler data?
 - Full waveforms (25 samples)
 - » Compressed?
 - Allow VTP information to sparsify readout channels?
- TI/TM modifications
 - must support 5 NPS crates + 3 HMS crates
 - » TBD layout with multiple TMs
 - require six L1 trigger inputs?
 - » (as with existing TM?)
- CODA assumptions
 - Will need FE support for 'new' VME interface chip on Intel SBCs
 - » to be purchased for NPS crates
 - 'Standard HMS' NIM triggers will be available
 - » $\frac{3}{4}$, EL_{real} , EL_{clean} , ...
 - NPS + HMS $\{\frac{3}{4}, EL_{foo}\}$