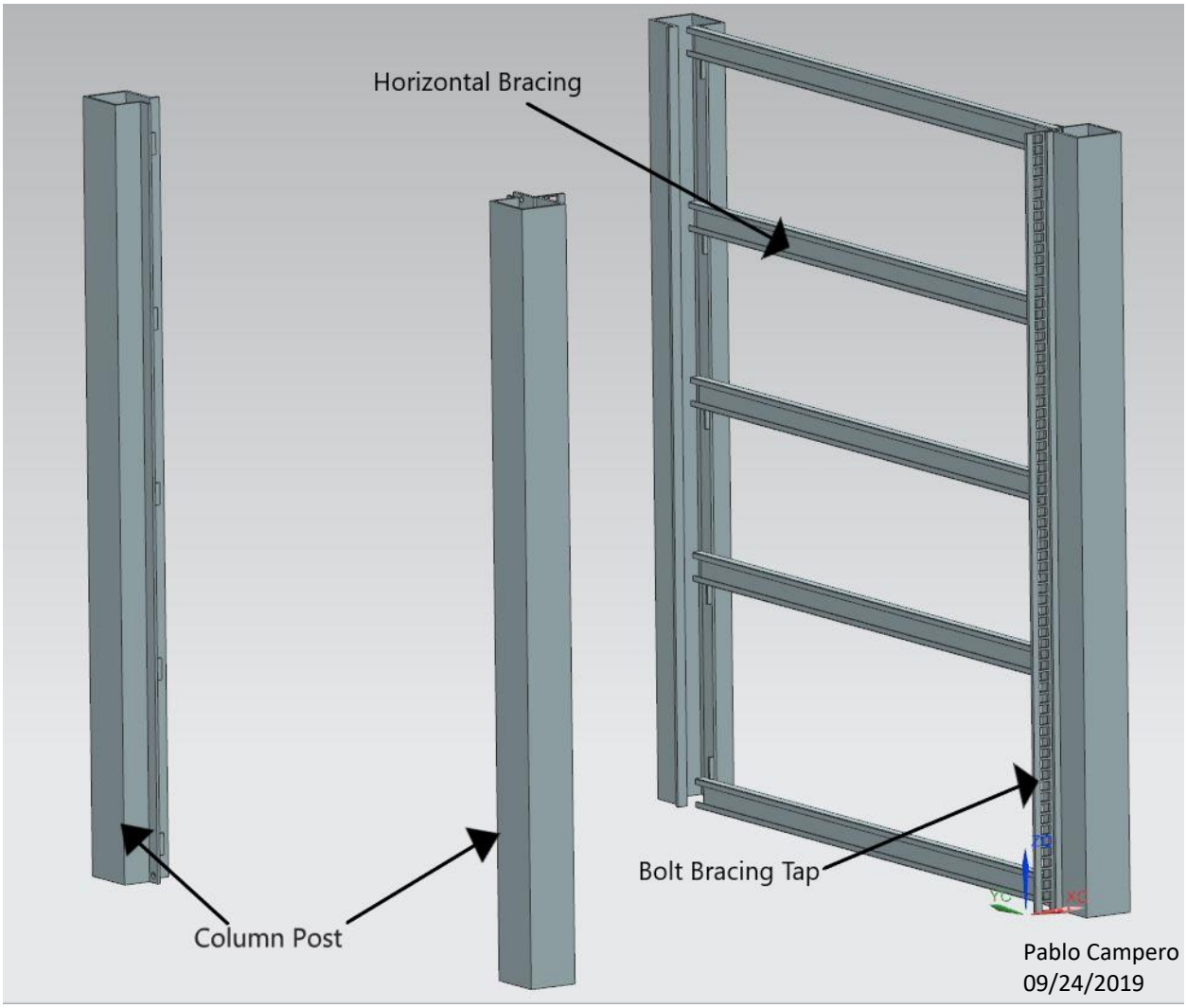
Detector Support Group
Weekly Report, 2019-09-24

Summary

Hall A– GEM Gas Systems

- Created 2-panel version of Hall A GEM Gas Distribution System
- Continued development of 3D model for Gas Distribution System using NX12
    - ✶ Assembly of gas panel rack started (see figure below)



Hall A – Super BigBite Spectrometer HCAL

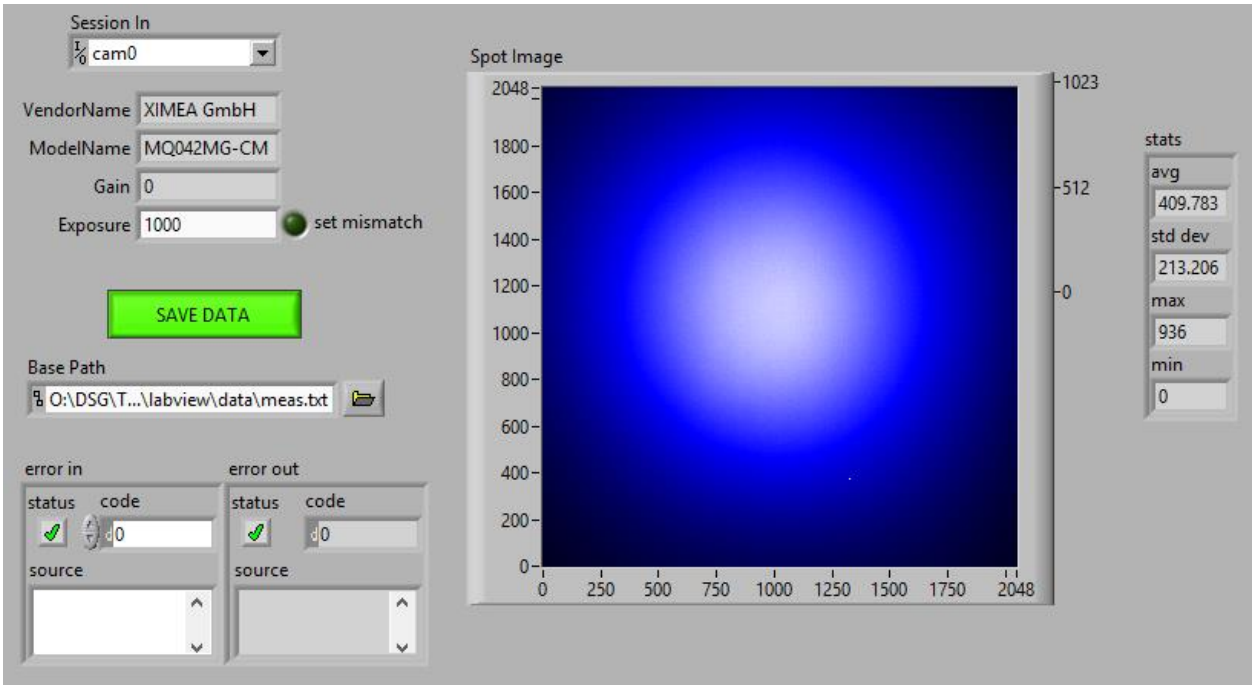
- Cut 129 cables; removed 8 labels and stripped outer jackets and braid of 120 ends
- ~80% completed

Hall B – RICH

- Updated firmware of N2 Volume cRIO and EP cRIO and their LabVIEW programs to LabVIEW 2019
    - ✶ Firmware updated to ver. 7.1.0f0 and software updated to 19.1 – June 2019

- ✶ Before update, N2 Vol cRIO had been running without interruption since 6/14/2019 (~three months) and EP cRIO since 8/6/2018 (~13 months). **Hardware interlock system is extremely reliable**

- Developed four LabVIEW sub-VIs for Ximea CCD data acquisition
- All sub-VIs automate steps previously performed manually from command line
  - ✶ "Find Exposure" – steps through CCD exposure values by 100 µs until maximum number of CCD counts observed by any pixel is greater than 800. Exposure where counts first exceed 800 will be used for data acquisition.
  - ✶ "Take CCD Image" – captures a single CCD image and outputs pixel counts in a 2D array
  - ✶ "Background Subtract" – to lessen effects from background light noise in test environment, sub-VI subtracts previously acquired background image from CCD image
  - ✶ "Alignment Helper" – displays stream of CCD acquisitions while calculating center of spot to help with aligning spot image near center of CCD



Screen shot of "Take CCD Image". Image is artificially colored by LabVIEW, as CCD is black-and-white only. Lighter color correlates to higher pixel count. Light source used for testing was an LED pointed towards CCD.

Hall B – RTPC

- Reconnected all sensors to updated RTPC gas panel
- Found that the differential pressure transducer, DPT332, (DP between RTPC & DMS) was installed backwards, advised RTPC group to reinstall.

Hall C – CAEN HV EPICS Test Station

- Installed CAEN HV Wrapper Library and CAEN OPC Server for testing and debugging

- Tested CAEN-A7030TN boards (S/N: 304 and 297) using GECO2020 script and data logger for controls and monitoring; used CSS-BOY screen to verify obtained results
- Noticed process variable to turn power on/off (*Pw*) doesn't update on the EPICS client and that ramp up latency on some channels is ~10 s
- Test summary given in appendix

Hall C – CAEN HV Test Station

- Wrote and tested GECO2020 script for hardware test of CAEN A7030TN HV boards
- Started assembly of the first Radiall 52 to SHV adapter for the hardware test

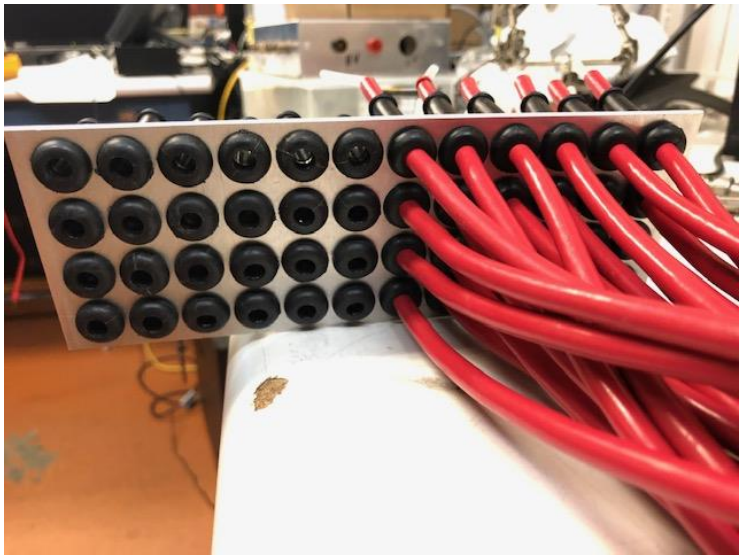


Figure 1. After inserting all grommets, 48 SHV cables are inserted into each grommet.

- Continued modification of two CLAS 6 HV test chassis

DSG R&D – RICH

- Developing LabVIEW scan engine sub-VIs to communicate with the FPGA DAQ functions of the Sensirion SHT85 sensor
- Began LabVIEW code template to read SHT85 sensors

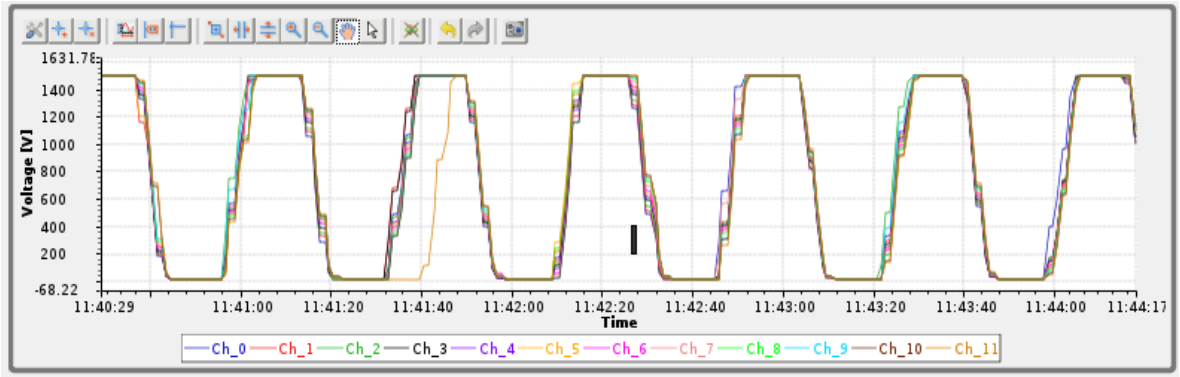
DSG R&D – PLC Test Station

- Continued work on PLC RTD test
  - Replaced CompactLogix L35E PLC controller with Hall A spare CompactLogix L30ER PLC controller and installed FactoryTalk View v. 10 on host PC *dsgwin10*
    - Solved incompatibility issues of the older version (rev. 8) of FactoryTalk View with Windows 10

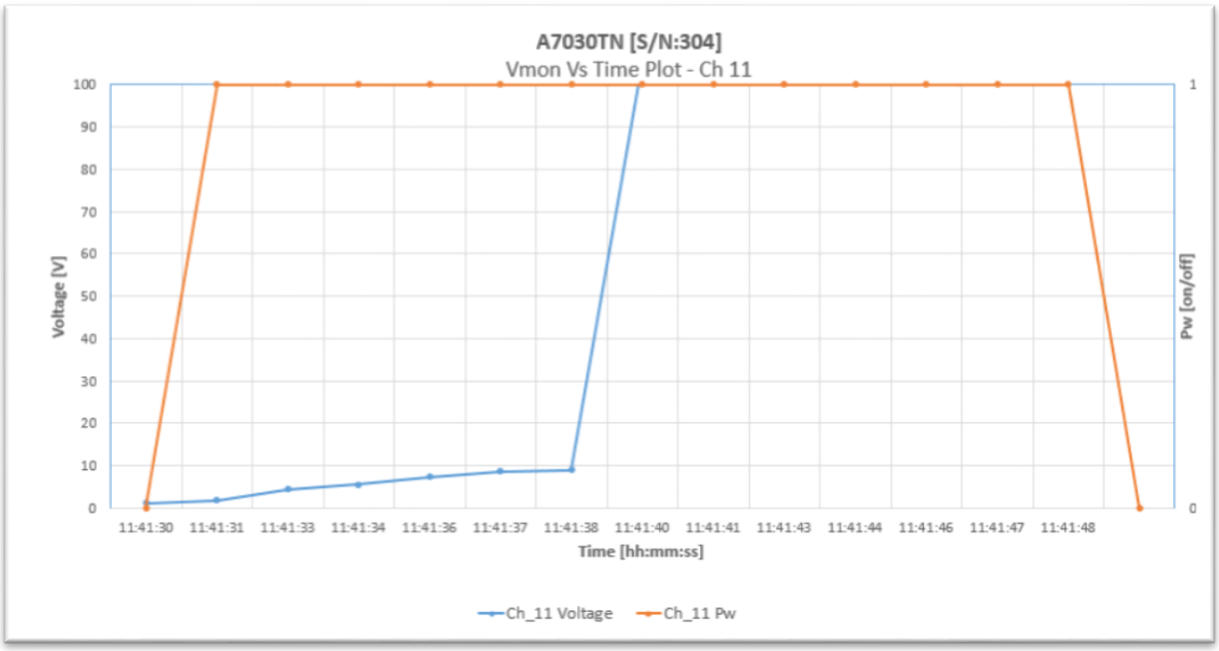
APPENDIX A

- Retested CAEN-A7030TN board (S/N: 304) using GECO2020 script and data logger for controls and monitoring; used CSS-BOY screen to verify obtained results
  - ✶ Test repeated two times with same board to make sure that the latency of ~10 s to ramp up which occurred in previous tests did not happen always on the same channel
  - ✶ Kept conditions and specifications for the tests same as the previous test (see Weekly Report 09/04/19)
  - ✶ From tests performed, noticed:
    - The discrepancy between GECO2020/ssh and EPICS PVs for *Pw* parameter disappear after CSS-BOY screen is refreshed or "*camonitor*" EPICS command is re-executed
    - Only *"Pw"* PV has this issue. The rest of the monitored PVs during the test did not fail when *camonitor* EPICS command was executed only once in the Host PC (EPICS client)
    - *Pw* PV readout for channel 23 had an update latency of ~10 s while ramping to set voltage. Issue occurred twice and recovered by itself in next cycles. See figures below.
    - Latency to ramp up to the set voltage does not occur every time for the same channel. See table below.

A7030TN [S/N:304]			
# Trial	**Channel #**	**# Of Incidents during trial (100 cycles)**	**Comment**
3	11	1	~10 sec latency to ramp up, recover by itself on the next cycle
	23	2	
4	23	1	
Total Incidents		**4**	



Example of latency issues during Trial 3 for A7030TN S/N: 304 board



Example of latency issues during Trial 3 for A7030TN S/N: 304 board – Plot shows channel 11 ramped ~10 s after Pw parameter was set to 1 (channel turned on), data log shows the same values as *Voltage Ramp Test – Slot 0 CSS-BOY screen*

- Tested CAEN-A7030TN board (S/N: 297) using GECO2020 script and data logger for controls and monitoring; used CSS-BOY screen to verify obtained results
  - ✶ Kept conditions and specifications for the tests same as the previous test (see Weekly Report 09/04/19). Ran four trials, each with 100 ramp up/down cycles
  - ✶ From tests performed, noticed same latency issues as the ones presented during test of A7030TN (S/N: 304) board. Table below shows the latency occurrences for each channel

Board - A7030TN [S/N:297]			
# Trial	**Channel #**	**# of incidents during trial (100 cycles)**	**Comment**
1	11	2	~10 sec latency to ramp up, recover by itself on the next cycle
	25	4	
2	35	1	
	25	2	
3	2	1	
	25	1	
4	25	3	
	35	1	
	11	1	
Total Incidents		**16**	

- Generated report with detailed results for each test.