Detector Support Group
**Weekly Report, 2018-08-08**

Summary

Hall C

- PLC program for dipole field regulation in progress
  - ✶ Completed first draft version of Dipole Field Regulation PLC program
  - ✶ Generated four new routines as part of this program.
  - ✶ Upgraded HMI test screen with new options to test PLC code.

- With regards to Windows 7 upgrades to Windows 10.
  - ✶ DSG-HallC-6 computer has been rebuilt to Windows 10.
  - ✶ Computer with faulty video card needs to be replaced

- Tested NMR networking in building 36 as part of the preparation for NMR unit and hall probe test in presence of magnetic field.
  - ✶ Building 36 doesn't have Hall C dev subnet available.
  - ✶ Requested assignation of Hall C dev to one port at the Ethernet switch available.
  - ✶ Requested test NMR and probe by generating magnetic field in test lab (building 36) within the operation range of the probe 1.13-3.4 T

- Modified current loop regulation program to reflect appropriate units.
  - ✶ No information was available on units the tags were in.
  - ✶ Program had MPS_WA_value equal to ADC_readback when they would never be equal, due to not having the same units.
  - ✶ Verified logic and sequence follow agreed flow diagram.
  - ✶ Waiting on verification of modifications made.

- DSG is waiting for information from Hall C on the following tasks:
  - ✶ Valve tune responses
  - ✶ Data logging access
  - ✶ UPS implementation
  - ✶ SHMS LVDT I/O module

RICH Hardware Interlock System

- Added N2 Exhaust Easidew moisture transducer to hardware interlocks' EPICS screen.
  - ✶ PV readout on screen in ppm, added script on screen to convert ppm to relative humidity based on average of all N2 volume temperature sensors.
  - ✶ Pull request submitted and approved on GitHub to add updated screen in clascss.
  - ✶ Submitted request to have data archived.

- Investigated drop in cooling airflow on a daily basis during workday.
  - ✶ EP temperature sensors # 4 & 11 tripped with an over temp condition.
  - ✶ From ~8:00 AM to 12:00 PM airflow 1 drops ~15 slm and airflow 2 drops ~5 slm.
  - ✶ Drop in airflows is enough to cause EP temperatures to increase, tripping interlocks.
  - ✶ The Interlock System correctly detected and tripped on a high temperature condition.
  - ✶ Cause of airflow drop unknown. Investigation underway.
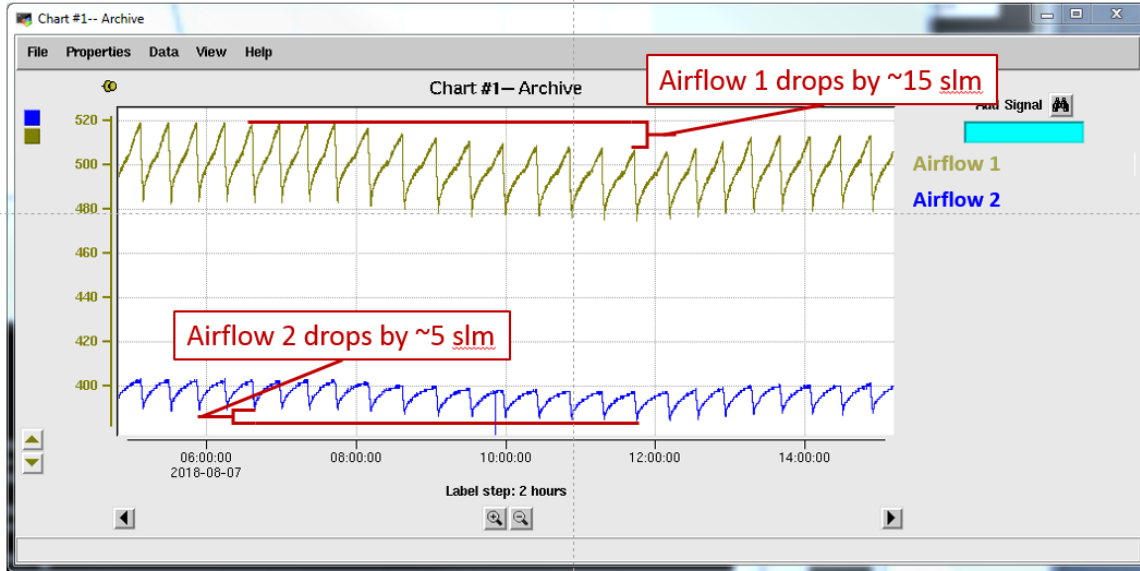
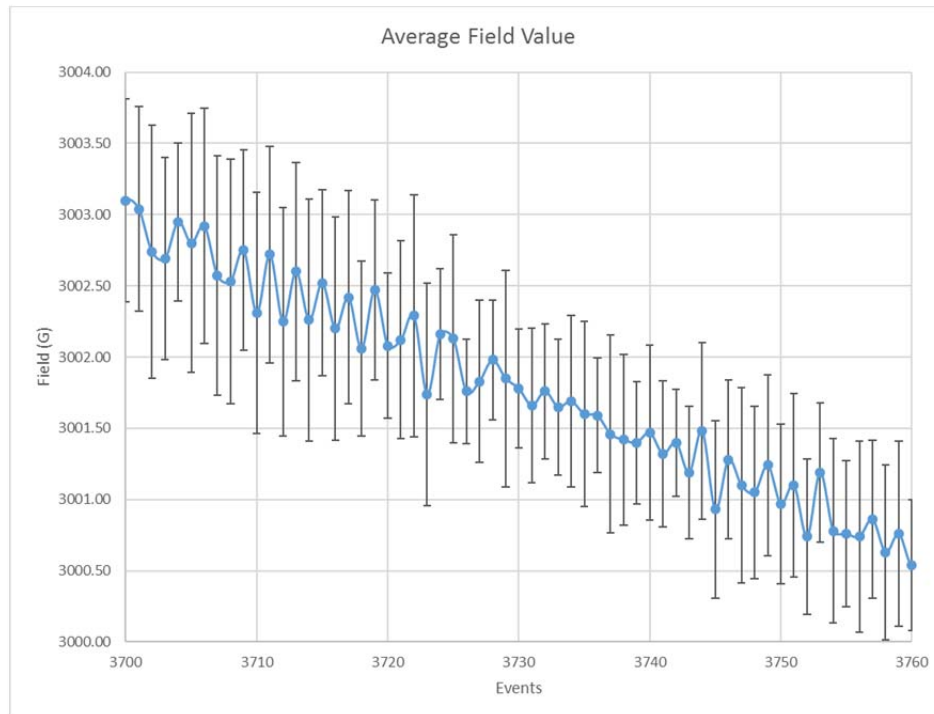Airflow drop that caused interlock trip on August 7, 2018 at 11:46 AM.

HDice

- Modified NMR program to display standard deviation values for average field values.

- Developing documentation for the RF splitter/attenuator box including a simplified block diagram

SVT
- Populated two HTSBs with RTDs.
- Completed development and testing of the cRio real-time code needed to implement the monitoring and interlocking of the pressure in the SVT cooling system.
- Code development of LabVIEW User Interface support for monitoring, setting of threshold levels, and interlock control for cooling system pressure is nearly complete.
- Development of EPICS interface code needed for displaying cooling pressure underway.

FT
- Researched hardware interlock trip that occurred on 8/2/2018.
- High temperature condition reported on calorimeter sensor #1.
- A latched interlock was found indicating CTS #1 had been over the high temperature threshold at an earlier time, and needed a reset.
- Conclusion: Hardware Interlock System correctly detected and tripped on a high temperature condition. No system malfunctions occurred during this event.

LTCC
- Added differential pressure sensors directly on the bubbler to measure sector pressure for S3 and S5.
- Modified exhaust side relay controls on Omega controllers, now opens when pressure is above 2.2 iwc.
- Tested vacuum pump (nearly vertical drop, slopped drop is opening the valve on the exhaust manifold).
  - ✶ Pumps were set to pull the gas back to shed if pressure in the LTCC sector is greater than 2.2 iwc.

Gas Sytem
- Modified FC GUI to used PSP variables so it could be run from any system,
  - ✶ Modifications allow flow value changes from this GUI.
- Restarted weather2epics IOC (converts outside weather data to EPICS).
- Continued work on the Daily Log display in LabView.
  - ✶ Working on plot timing
- Started work on wiring diagram for the mass flow controller power boxes.

LERF
- Cryomodule 2 cable termination.
  - ✶ Terminated 24 cables.
  - ✶ Five different types of MS connectors, 200 pin total.

SRF
- Debugged and repaired 5333 CAMAC card D-sub connections

cRIO Test Stand

- Testing and debugging module 9205 automatic tests for ±10 V range and ±5 V range.
- Made drawing of 9207 test wiring.

Antonioli, Mary Ann

- cRIO test stand
  - ✦ Continued testing and debugging module 9205 automatic tests for ±10 V range and ±5 V range. Final tests OK.
  - ✦ Made drawing of 9207 test wiring.
- Notes
  - ✦ Made RF block diagram for Note on HDice RF Attenuation and Switching Unit.

- Attended monthly Workers Safety Committee meeting.
  - ✦ Discussed notable event of Radcon trash being put in recycle bin.
  - ✦ New procedure for AC outages – Facilities Management will contact Industrial Hygiene, who will then determine if a work stoppage is needed.

Bonneau, Peter

HDice
- Worked with Mary Ann on the development of documentation for the RF splitter/attenuator box including a simplified block diagram.

SVT Hardware Interlock System
- Completed the development and testing of the cRio real-time code needed to implement the monitoring and interlocking of the pressure in the SVT cooling system.
- The code development of the LabVIEW User Interface support for monitoring, setting of threshold levels, and interlock control for the cooling system pressure is nearly complete.
- Development of the EPICS interface code needed for the cooling pressure is underway.

FT Hardware Interlock System
- Researched hardware interlock trip that occurred on 8/2/2018.
- Raffaella De Vita reported a high temperature condition on calorimeter sensor #1.
- A latched interlock was found indicating CTS #1 had been over the high temperature threshold at an earlier time, and needed a reset.
- Conclusion: Hardware Interlock System correctly detected and tripped on a high temperature condition. No system malfunctions occurred during this event.

RICH Hardware Interlock System
- Researched hardware interlock trip that occurred on 8/2/2018.
- EP temperature sensors # 4 & 11 tripped with an over temp condition.
- The EP high temperatures were correlated to a drop in cooling airflow.
- The Interlock System correctly detected and tripped on a high temperature condition.
- Factors that caused the drop in cooling flow is being investigated.

Hall C PLC Control Systems
- Held daily status and planning meeting on HMS and SHMS PLC control systems.
  - ✦ The DSG-HallC-6 computer has been rebuilt to Windows 10.

- ■ Upon testing, the operating system froze during a user-name login change. Machine was returned to the Jlab Computer Center.
  - ✦ DSG is waiting for information and/or cabling work from Hall C on valve tune responses, UPS implementation, and SHMS LVDT I/O module work.

Campero, Pablo

Hall C

- Dipole field regulation PLC program in progress
  - ✦ Completed first draft version of Dipole Field Regulation PLC program
  - ✦ Generated four new routines as part of this program.
  - ✦ Upgraded HMI test screen with new options to test PLC code.
- NMR unit and probe tested in lab at building 37
  - ✦ Requested test NMR and probe by generating magnetic field in test lab within the operation range of the probe.
  - ✦ Set up communication conditions for NMR unit in the Hall C dev Subnet.
    - ■ Requested assignment to one Ethernet port for one switch in building 36.
- Collaborated with Amanda to look into her PLC quad poles regulation current PLC program to find discrepancies in the units used to compare set vs read back current from the Q1 power supply.
  - ✦ Modified tag assignation to compare set and read back values in Amps units.
  - ✦ Verified logic and sequence follow agreed flow diagram.
  - ✦ Waiting on verification of modification made.
- Updated DSG- Hall C PLC task list.
- Generated DSG Hall C PLC weekly report.

Hall B

- Completed all checks on P005- Hall B Solenoid Pre-Power up Interlock Checkout procedure
- Completed all checks on P027 – Hall B Torus Pre-Power up Interlock Checkouts procedure.
- Completed instrumentation checkouts for Solenoid and Torus magnets.
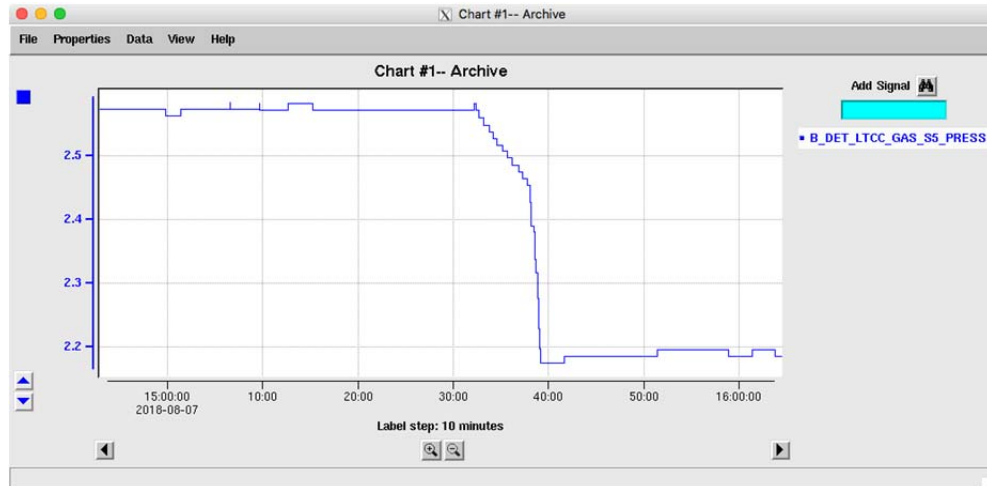
Eng, Brian

LTCC

- Add differential pressure sensors directly on the bubbler to measure sector pressure for S3 & S5.
- Modified exhaust side relay controls on Omega per Bob's request, now opens when pressure is above 2.2"wc
- Tested vacuum pump (nearly vertical drop, slopped drop is opening the valve on the exhaust manifold).

Hall B Gas System
- Modified FC GUI to used PSP variables so it could be run from any system, changed it so the flow value can be modified from it (not just the Gas Shed GUI as before, per Bob's request).
- Restarted weather2epics IOC (converts outside weather data to EPICS).

Hall C
- Tested NMR networking in building 36, doesn't appear to have Hall C dev subnet available.

PLCs
- Rockwell verified that the default TTL for PTP is set to 1, which means it won't work after the recent change CC did (they got rid of the separate servers for the individual Halls and only deployed one, but increased the TTL). Still have open ticket with Rockwell to see if we can modify the TTL (PXI required this change, cRIO default is high enough that it works with no changes).
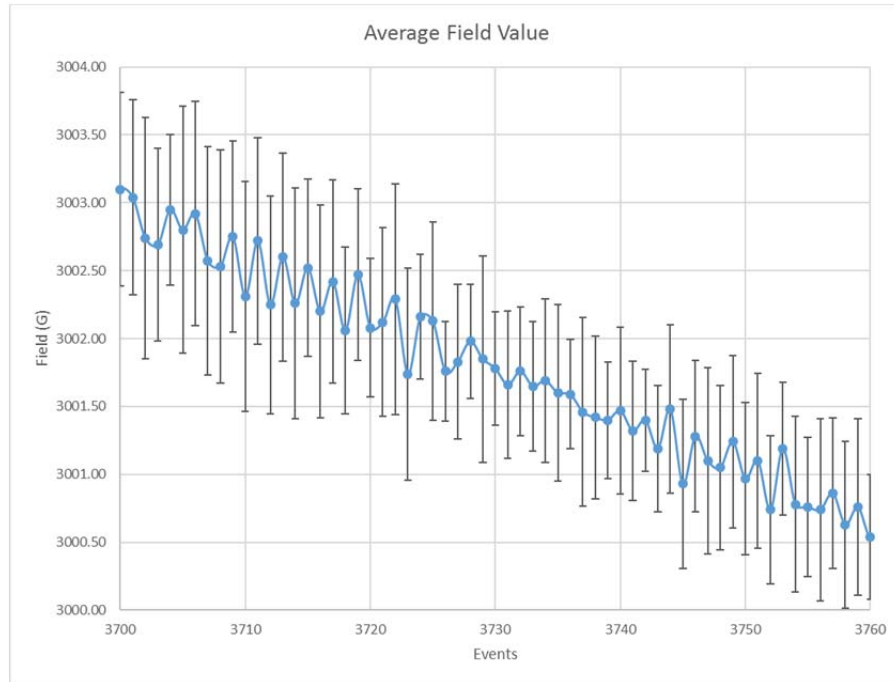
Hoebel, Amanda
HDIce
- Modified NMR program to display standard deviation values for average field values.

Average Field Value

Hall C

- Modified current loop regulation program to reflect appropriate units.
  - ✦ We were not told what units the tags were in.
  - ✦ Program had MPS_WA_value equal to ADC_readback when they would never be equal, due to not having the same units.

Jacobs, George

GAS Systems

- Meetings on RTPC gas system with Carlos and student
- Discussed about LTCC gas system with Brian and Marc
- Discussed about RICH air cooling system with Brian and Marc
- Placed DSG note, The RTPC Gas Supply note.docx, in _001 DSG Notes 2b reviewed folder

Leffel, Mindy

SVT

- Populated two HTSBs with RTDs.

LERF

- Cryomodule 2 cable termination.
  - ✦ Terminated 24 cables.
 - ✦ Five different types of MS connectors, 200 pin total.

SRF

- Worked with Ernest to troubleshoot and repair 5333 CAMAC card D-sub connections

Lemon, Tyler
RICH
- Investigated drop in cooling airflow on a daily basis during workday.
  - ✶ From ~8:00 AM to 12:00 PM airflow 1 drops ~15 slm and airflow 2 drops ~5 slm.
  - ✶ Drop in airflows is enough to cause EP temperatures to increase, tripping interlocks.
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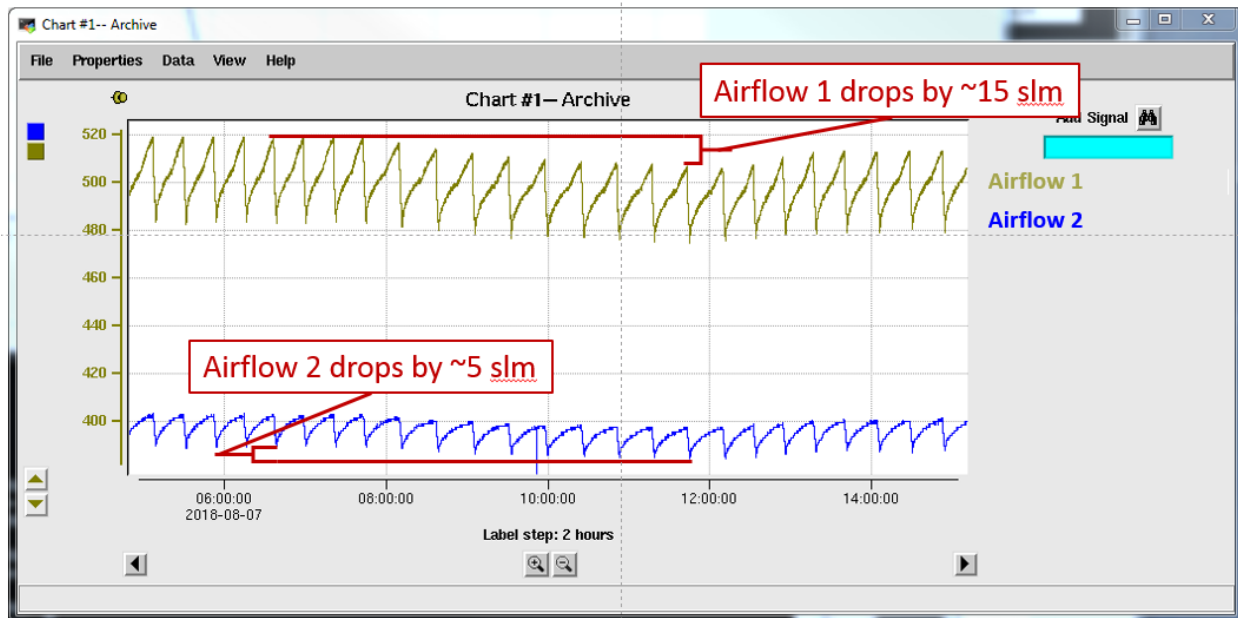
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  - ✶ Pull request submitted and approved on GitHub to add updated screen in *clascss*.
  - ✶ Submitted request to have data archived.

McMullen, Marc
Gas System Controls
- Continued work on the Daily Log display in LabView.
  - ✶ Working on plot timing
    - ▪ Currently the x axis is the entire length of hours of the log after it is input by the user. This could be a static value as long as the log is complete, if it is stopped prior to completing 24 hour, the correct log value must be obtained and entered.
    - ▪ Working on automating the log time value by extracting it from the log.
- Started work on wiring diagram for the mass flow controller power boxes.

LTCC

- Completed the installation of the transducers and started testing Sector 5 for leak rates.
  - ★ Initial rates indicate 13.7 liter per day. Changed the process controller set up for the exhaust.
  - ★ The controllers are set to open the exhaust valve when the sector pressure is greater than 2.2 iwc.
  - ★ The supply solenoid will open and allow gas flow if the pressure falls below 1.9 iwc. So the pressure band is set at 1.9 to 2.2 (iwc).
- Started setting up controls for the vacuum pumps, which will pull the gas back to the gas shed if pressure in the sector is greater than 2.2 iwc.

RICH

- Investigated cause of daily dips in air flow and spikes in temperature.
  - ★ Changes are in-line with daily hall work and do not occur on the weekend.
  - ★ Probable causes for fluctuations are related to the hall roll up door being opened.

- Continued work on a CLASNote on gas system controls overview.