



# Detector Support Group

Weekly Report, 2017-05-03

## Status

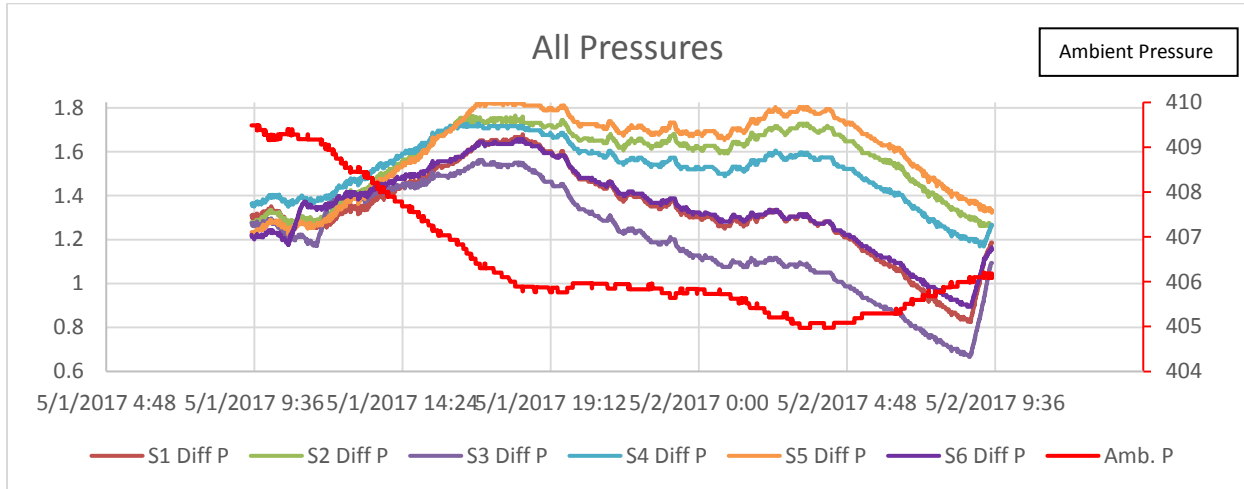
### Solenoid

- MOOG pump controller calibrated to have an output range (operation frequency) of 0–200 Hz.
- Signal conditioner, which monitors vacuum guard pump status, tested.
- PLC code to monitor guard vacuum pump status signal, added.
- MPS to PLC communications tested.

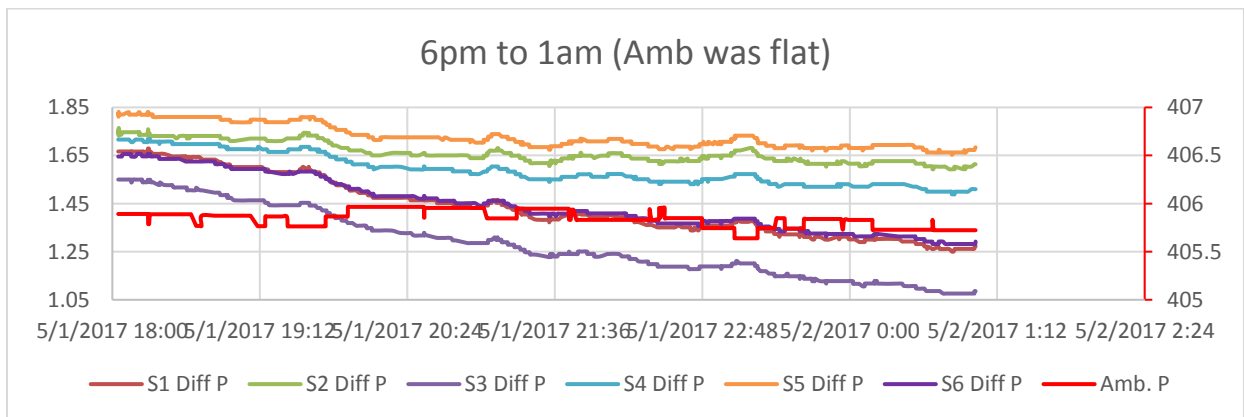
### Gas System

#### LTCC

- Leakage rate determined to be from the detector itself, not the piping or the valves.
- Detectors (sectors) sensitive to ambient pressure changes, see graphs below.



Graph 1. Pressure from six LTCC sectors and ambient pressure in Hall B.



Graph 2. Zoomed in graph of graph 1, shows even small changes in ambient pressure changes the differential pressure of the sectors, as it should. Since the detectors/sectors leak: whenever the ambient pressure changes significantly, (graph 1) there is more leakage than during stable period of ambient pressure.



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### DC

- Pressure testing of system completed.
- Purge of system started as schedule on 5/1/17.

### SVT

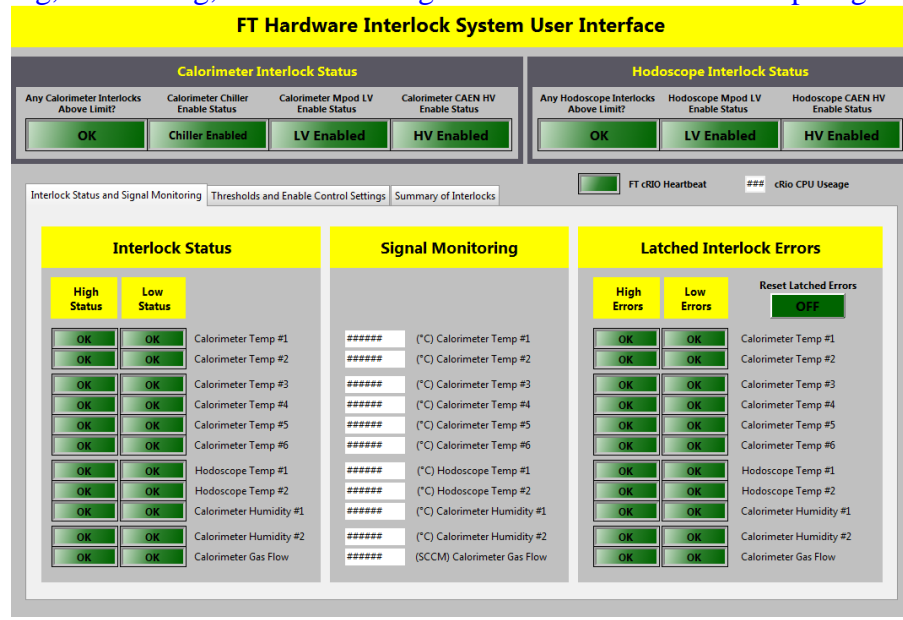
- Tested noise on R1 modules with stepper motor; no increase in ENC.

### RICH

- Dave Meekins has completed the air part of the valve panel, the N2 part should be finished by next week.
  - ★ Completion was scheduled for 5/1/17.
- Signal hardware disconnects at cRIO chassis for temperature, humidity, gas flow, and HV/LV interlocks designed.

### FT

- EPICS CSS-Boy based, GUI test interface developed, tested, and debugged for threshold controlling, monitoring, and interlocking of calorimeter and hodoscope signals.



Epics based test GUI

### Hall D

- Logbook entries and EPICs screens monitored and analyzed daily.
  - ★ Solenoid power supply bus bars were repaired and reinstalled into supply. During testing, DAC module failed. Module replaced and supply successfully ramped to 1350 A.
  - ★ FDC chiller turned off on 04/30/17. Reason for turn-off is unknown.



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### Antonioli, Mary Ann

- Continued **RICH** interlock LabVIEW code — wrote configuration bundle VI and health and monitoring loop.
- Assisted Mindy with cutting **ET** cables.
- Made final edits to and posted Note 2017-02.
- Imported text and pictures into InDesign, laid out, and began editing Tyler's Note on RICH rotation analysis.
- Imported text and pictures into InDesign, laid out, and began editing Amanda's Note on HDice CT-BOX noise test.

### Arslan, Sahin

Absent

### Bonneau, Peter

#### Forward Tagger

- Worked with Wesley Moore and Nathan Baltzell on adding FT EPICS control and monitoring GUI into CLAS12 slow controls menu structure; successfully tested using NI EPICS server mode.
- Designed signal hardware disconnects at cRIO chassis for temperature, humidity, gas flow, and HV/LV interlocks. Discussed each cable type design with Mindy.

#### RICH

- Discussed with Mary Ann the System Health and Monitoring real-time loop, periodically sends monitoring signals to UI.
- Discussed debugging of system handling loop for initialization of user interface values with Mary Ann.
- Worked with Amanda, Tyler, and Pablo on development of CS-Studio GUIs for testing of EPICS slow control applications.
- Reviewed messaging communication interface and development of front panel for LabVIEW User Interface for interlock system with Pablo.
- Held daily meeting on Hall D status and EPICS controls monitoring.
  - \* Solenoid power supply bus bars were repaired and reinstalled into supply. During testing, DAC module failed. Module was replaced and supply successfully ramped to 1350 A.
- Coordinated configuration of new desktop development computers for DSG group members.
- Renewed license for photo-log on DSG website.



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### Campero, Pablo

#### Solenoid

- Worked on monitoring guard vacuum pump status.
  - \* Calibrated MOOG pump controller to have an output range (operation frequency) of 0–200 Hz.
  - \* Tested signal conditioner that will monitor vacuum guard pump status.
    - Configured DIP switches to have input frequency of 0–200 Hz and 4–20 mA output.
    - Measured output signal 4 mA to 0 RPM, and 20 mA to Max RPM.
  - \* Added PLC code to monitor guard vacuum pump status signal.
- With Brian, tested Solenoid MPS
  - \* Tested communication between MPS and PLC.
  - \* Debugged Solenoid PLC code by removing unused old Torus tags.
  - \* Tested functionality of MPS screen.
  - \* Modified MPS control PLC program.
    - Solved unstable communication with MPS due to sending wrong commands from PLC to MPS.
    - Fixed ramp rates were added (400,700 mA/s), but they were commented out in program because they will be implemented right after commissioning of Solenoid.
    - Changed maximum current operation limit from 4000 A to 2435 A.
- Tested Sequence of Events (SOE) response and MPS dump switch functionality.
  - \* Tested 8 of 13 SOE events.
    - Channels 0–7 do not show status indicators in local display of SOE module.
    - PLC program reads status of SOE module properly.
    - Verified wiring to PLC SOE module (24 VDC).
  - \* Verified that MPS dump switch open for each of 8 trips generated during test.
  - \* Made spreadsheet of test results.

### RICH

- Began to develop LabVIEW RICH interlock system User Interface that will work with interlock system code being written by Mary Ann.
  - \* Created main shared variables to monitor the status of the interlocks.
  - \* Started User Interface by adding indicators for low and high interlock status.
- Monitored and analyzed Logbook entries and EPICs screens daily.
  - \* On 04/28, vapor cooled lead downstream in Solenoid was displaying alarm due to low flow rate of ~28 SLPM.
- Made Hall D- BCAL presentation in Power Point.



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### Eng. Brian

#### SVT

- R2 S6 U2 now has data; no changes were made. Cable will be replaced when R4 is removed.
- Tested noise on R1 modules with stepper motor; no increase in ENC.
- Swapped Lauda chillers again: <https://logbooks.jlab.org/entry/3471712>

#### Gas System

- Tried switching Gas Shed to real-time executable, but it didn't update EPICS PVs so disabled RT Apps on startup.
- Switched all DC MFCs back to normal mode; previously they had been set to valve override position for leak testing.
- LabVIEW code is on GitHub in private repository (might reorganize to not use sub-trees in future): [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_github.com\\_JeffersonLab\\_clas12-2Dcrio-2Dgas&d=DwIFAg&c=lz9TcOasaINaaC3U7FbMev2lsutwpI4--09aP8Lu18s&r=0W-9XeHax0\\_bvYeccp9FwXKeeqSq5NWA9sRA0IIoNyM&m=DGRBoya5j5ZarhBTooReAQ6HERhEpuKb5jzZL\\_nbbjs&s=kvqdSphGgV5EevGskYUXPDVpk4icEyq28BIvh-vM2JU&e=](https://urldefense.proofpoint.com/v2/url?u=https-3A_github.com_JeffersonLab_clas12-2Dcrio-2Dgas&d=DwIFAg&c=lz9TcOasaINaaC3U7FbMev2lsutwpI4--09aP8Lu18s&r=0W-9XeHax0_bvYeccp9FwXKeeqSq5NWA9sRA0IIoNyM&m=DGRBoya5j5ZarhBTooReAQ6HERhEpuKb5jzZL_nbbjs&s=kvqdSphGgV5EevGskYUXPDVpk4icEyq28BIvh-vM2JU&e=)

#### Magnets

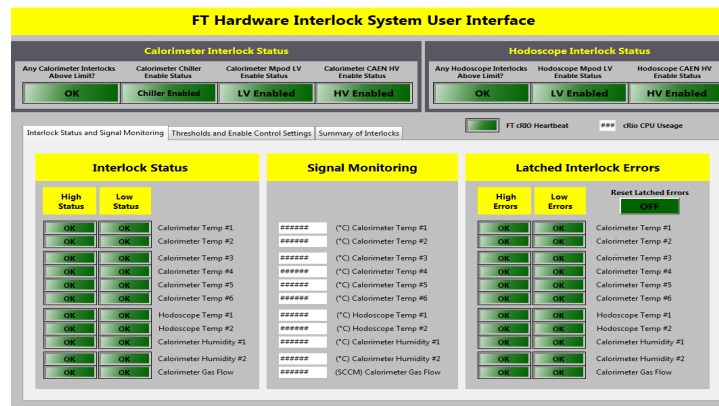
- Cernox on Torus went to 325 K, but recovered. Removed cernox re-initialization functionality to see if algorithm will recover on its own: <https://logbooks.jlab.org/entry/3471561>
- Tested MPS - PLC communications (mostly worked, some small items to re-verify after changes): <https://logbooks.jlab.org/entry/3471372>

### Hoebel, Amanda

- Looked at **LTCC** pressure changes for each sector with Marc.
  - ★ Calculated pressure differential for S2 in Python.

#### FT

- Installed and worked examples in CSS.
- Recreated Pete's hardware interlock GUI using CSS BOY.



FT hardware interlock screen in CSS.



## Detector Support Group

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- Monitored EPICS and logbook.
  - \* FDC chiller turned off on 04/30/17. Reason for turn-off is unknown.

### Jacobs, George

#### GAS Systems

- Completed pressure testing of DC system.
- Commenced purge of DC system.
- Met with RICH DA multiple times.
- Met with DC DA multiple times.
- Met with MVT DA multiple times.
- Discussed bulk liquid Ar delivery status and hot fill with AirGas and procurement .

### Leffel, Mindy

#### ET

- Worked on cables.
  - \* Met with Peter to discuss specifics for each cable type.
  - \* Fabricated and tested four disconnect cables (three temperature and one humidity).
  - \* Worked with Mary Ann to cut two 150' cable lengths in ESB.

#### RICH

- Worked on HTSB cables.
  - \* Recut cable bundles, first cuts were not staggered enough.
  - \* Cut humidity cables one inch shorter than temperature cables and staggered conductors.

### Lemon, Tyler

- Created CSS-BOY screen for **RICH** hardware interlock system.
  - \* CSS screen can be modified to match LabVIEW UI once it is completed.
- Modified **Torus** local display VI to record  $dV = V1 - V2$  and resistance for LV Chassis Cerenoxes.
  - \*  $dV$  gives indicator of how  $V2$  changes over time during LV cRIO operation since  $V1$  is now set to a fixed voltage.
  - \* Developing Python script to plot results.
- Monitored logbook and EPICS on a daily basis.
  - Noted on 2017-05-02 that FDC chiller was turned off in error. Did not affect detector since LV is not on.

### McMullen, Marc

#### Gas System

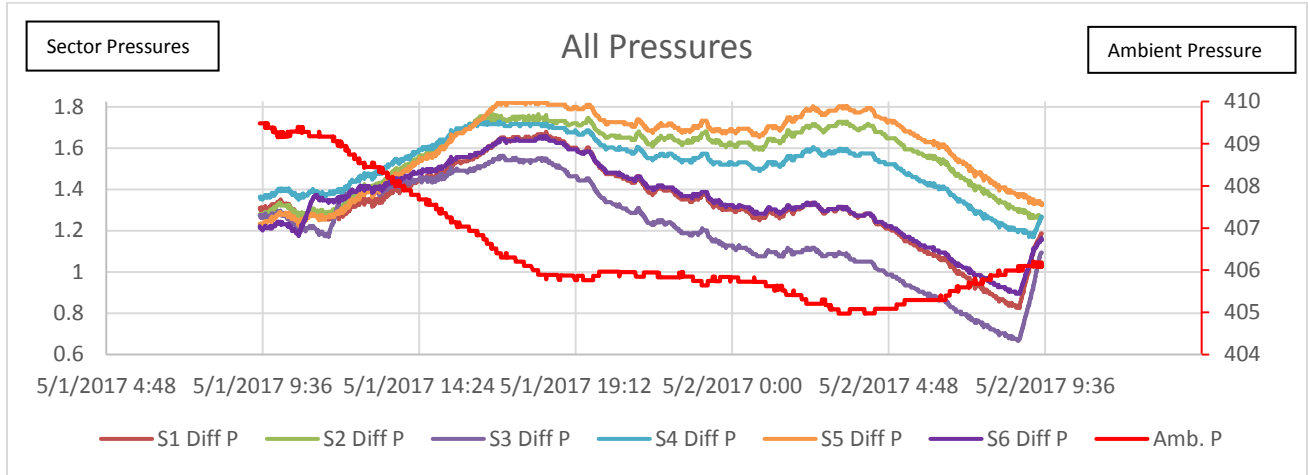
- Replaced wire nut connections on DC safety system solenoids with connectors.
- Completed internal wiring of RICH flow and pressure signals.



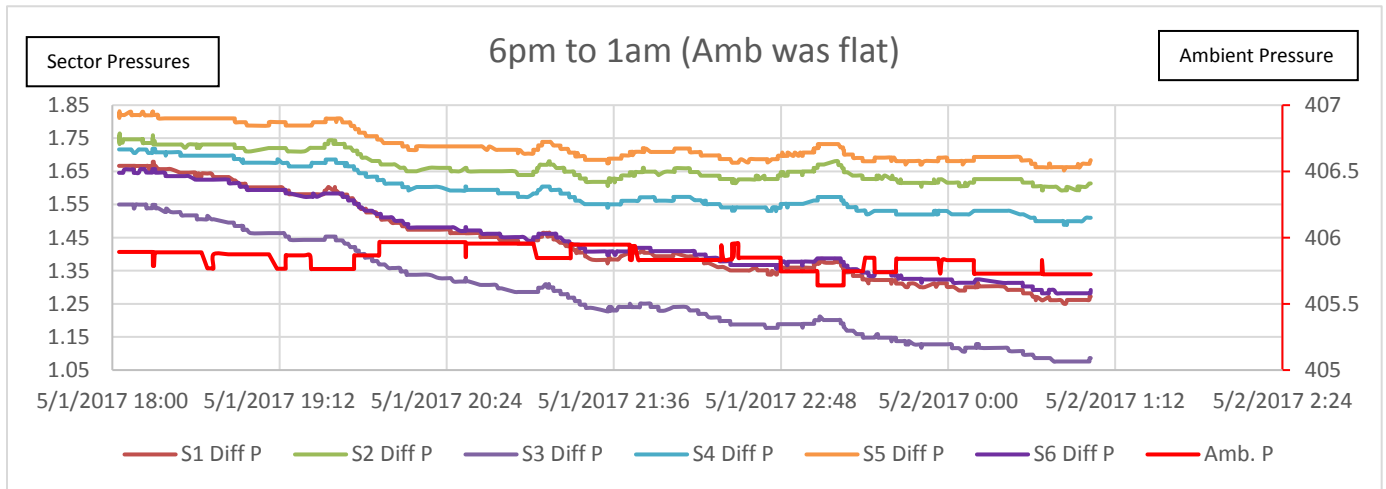
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- LTCC gas was shut off on 5/1/17 just after noon until around 9am on 5/2/17. Leak rate can be studied, particularly during 6 pm to 1am, when ambient pressure was essentially flat 405.9(iwc) to 405.7(iwc).



Pressure from six LTCC sector vs. ambient pressure in Hall B.



Same as above during a period of stable ambient pressure.