Detector Support Group
Weekly Report, 2017-11-08

<u>Status</u>

<u>Magnets</u>
- Four new UPSs installed for: Torus (x2), DBX (x1), and Solenoid control systems (x1).
- All twenty-eight solenoid Pre-Power up interlock checkouts completed.

<u>RICH</u>
- Issues with airflow interlocks debugged in hardware interlock LabVIEW program.
  - Interlocks for airflow tripped regardless of what high or low limit were set to.
  - Found that indexing in control loop for airflow was incorrect.
    - Caused limits in use by program for both high and low limits to be 0 L/s.
- D0 value of spherical mirror 3 measured.
  - Fit d0 = 1.43 mm at R = 2715.45 mm
- Troubleshoot of two reflectivity test station issues:
  - Monochromator did not respond to program or move on power-up but could be seen by PC.
    - Solution: manually turn drive-screw to reposition grating so it is between home switches.
  - Program used to control monochromator crashed but monochromator was moving on power-up and seen by PC.
    - Solution: install updated version of monochromator's program on new laptop.
- New UPS received for hardware interlock cRIO.
- N_2 leak rate tested after improvements made to sealing of N_2 panel.
  - Leak went from ~230 SLM to ~mid 40 SLM.
- Temperature variation calculated due to heat generated in the RICH E-panel every second.
  - Power dissipation assumed ~ 250 W, air Cp ~ 1.006 KJ/Kg*°C.
  - Total air mass found ~ 0.142 Kg.
  - Found air differential of temperature ΔT ~ 1.75 °C.
- Adapter plate machined for the new pulley.
- Two inch foam ordered to replicate the missing top row of Aerogel.
- New LN_2 dewar installed in EEL 125.
- High pressure N_2 bottle circuit installed in gas panel.
- Two Visio drawings of RICH gas system—current system and proposed upgrade to system, is being developed.

<u>FT</u>
- Calorimeter temperature sensors issues debugged.
  - Cable was found to be loose on detector end.

<u>SVT</u>
- Slow controls cables debugged and reconnected to patch panel.
  - Humidity sensors were missing ground wire.

- cRIO user interface modified for hardware interlocks for use in the hall.
  - New IP address (.160.196).

DC
- TCU flow of standard gas set at 200 cc/m:
  - Mix 1 TCU reads 2.77 V.
  - Mix 2 TCU reads 2.60 V.
  - For standard gas, values of TCUs should not change.

LTCC
- Omega dp-25 high set point changed from 0.25 iwc to 0.20 iwc for S5 after N_2 was flowing out of overpressure bubbler.
  - Low set point is 0.1 iwc.

Gas Systems
- Hoses and fittings ordered and received for RICH air compressor drainage in Hall B.
- CO_2 ordered for DC.

Antonioli, Mary Ann

- Made two Visio drawings of RICH gas system—current system and potential upgrade to system.

- Attended Workers Safety Committee meeting.

Bonneau, Peter

RICH

- RICH Hardware Interlock System hardware.
    - System architecture design of cRio hardware needed to implement all dual-board temperature and humidity sensors.
    - 14 dual-sensor boards are inside of RICH (e-panel & N2 space).
    - Will use new NI 9035 controller chassis for e-panel sensors for 2 RICH sectors.
    - DSG cRio test station will be used to develop the LabVIEW RT-program.
- Worked with Tyler on the repair of the RICH mirror test stand. The computer that ran the Newport monochromator failed.
    - Setup of laptop and new monochromator control program.
    - New monochromator control program from Newport has 10 sec step delay limitation.
    - Adjusted and tested LabVIEW program step delay to match monochromator control program.
- Received additional RTD temperature sensors for RICH Interlock System.
    - Gave sensors to Mindy for fabrication of spare temperature and humidity sensor boards.

SVT

- SVT Hardware Interlock System
    - Started development of the CS-Studio EPICS slow controls user interface.
    - A softIOC is being developed for the SVT EPICS client interface.
    - Provided troubleshooting steps on debug of humidity sensors and the HV/LV crate inhibit signal.

Forward Tagger

- Worked with Amanda and Pablo on FT Hardware Interlock System debugging.
    - Troubleshooting calorimeter RTD sensors (open at detector end.)
    - Testing and troubleshooting procedures for hodoscope LV interlock and chiller enable and status read-back signal.

- Worked with Mary Ann on development of the National Instruments Compact-Rio test station.
    - Next steps in the development of tests for ADC modules was discussed.

Campero, Pablo

Magnets

- Swapped off four UPS power supplies used for Torus (x2), DBX, and Solenoid control systems.
  - ✴ Re-connected control devices and instrumentation power cables in the power strips of each rack, then connected in the new UPS power supply.
  - ✴ Installed new UPS-supports and brackets to the racks.
  - ✴ Configured time and control settings for the new UPSs.
  - ✴ Installed analog cards in each UPS which are used to send analog signal to the PLC controller when a power outage or UPS-battery low are presented.
  - ✴ Recovered communication and controls of PLCs, cRIOs controllers, instrumentation and hardware devices to reestablished normal operations after the UPS swap outs.
- Completed Solenoid Pre-Power up interlock checkouts.
  - ✴ 28 checks tested and verified, all worked properly.

RICH

- Re-calculated temperature variation due to heat generated in the RICH E-panel every second.
  - ✴ Power dissipation assumed ~ 250 [W], air C_p ~ 1.006 [KJ/Kg*°C]
  - ✴ Total air mass found ~142 [g].
  - ✴ Found air differential of temperature ΔT ~ 1.75 [°C].

FT

- Tested one output of Contact card for the FT Chiller.
  - ✴ Contact card has three relay output available.
  - ✴ Connected a terminal block and key switch on the 15 pole Sub-D socket to test one of the three contact relay output.
    - ▪ Enabled output1 and input 1 in the local controller attached in the Chiller.
    - ▪ Measured voltage = 0 V, which indicates that relay output 1 is not changing the Chiller status signal that needs to be sent to the ADC cRIO module.
- With Amanda debugged six Calorimeter temperature sensor readouts.
  - ✴ Measured infinite resistance in D sub connector located right before the input of the RTD cRIO module.
  - ✴ Tracked sensor cables from the control rack to the FT detector. Higher location of detector did not allow observing the potential points of disconnection for the temperature sensors.
  - ✴ Temperature sensors were connected and the readout issues were solved.

Eng, Brian
SVT

- Debugged/reconnected slow controls cables on patch panel (some humidity sensors were missing ground wire)
- Modified cRIO UI for hardware interlocks to use new IP address (.160.196)
RICH

- Tested N2 leak rate after Sandro & Dario made improvements to sealing, went from ~230 SLM to ~mid 40s
- Installed and connected new LN2 dewar to gas panel

LTCC
- Modified settings on omega dp-25 for S5 after N2 was going out overpressure bubbler

- Took and passed overhead crane operators class

Hoebel, Amanda

LTCC
- Calculated mean and standard deviation of TCU1 and TCU2 for 10/25 to 11/03.
  - Mean for TCU1 found to be 2.75 V with standard deviation 0.03 V.
  - Mean for TCU2 found to be 2.64 V with standard deviation 0.04 V.

FT
- Tested cable for digital module card in chiller with Pablo.
  - Cable fabricated by Mindy, connected to break-out block to measure voltage across channels of digital module card.
  - Cable needed to have 4 more pins inserted to allow for key to switch on channels 2 and 3.
- Temperature sensors working again.
  - Cable was loose.

- Created and edited weekly report.

Jacobs, George
- Ordered hoses and fittings for RICH air compressor drainage in Hall B
- Identified final filter for RICH air compressor additional filtration
- Received hoses and fittings for RICH air compressor drainage in Hall B
- Ordered CO_2 for DC
- Discussions with Sandro about sealing the RICH N2 volume
- Requested quote for Taylor Wharton XL-65 series 240 liter HP LN2 dewar with square base and casters, TWD-MP240SQ, and from Ratermann Mfg.
- Requested quote for MVE 230 liter LN2 dewar, MVE Econo Cyl. 230 RB, from Chart Ind.
- Received quote for Taylor Wharton XL-65 series 240 liter HP LN2 dewar with square base and casters, TWD-MP240SQ, and from Ratermann Mfg.
- Received quote for MVE 230 liter LN2 dewar, MVE Econo Cyl. 230 RB, from Chart Ind.

- Completed new P-Card training
- Completed Overhead Crane Operator Training, SAF403

Leffel, Mindy

FT
- Fabricated interlock test cable.

MVT
- Terminated network cable.

RICH
- Worked with fast electronics, using man lift to remove LTCC signal and HV cables from the forward carriage, to create space for RICH cables.
- Started fabricating four HTSB test cables.
  - ★ Glued temperature sensors and soldered humidity sensors.

Lemon, Tyler

RICH
- Debugged issues with airflow interlocks in hardware interlock LabVIEW code with Peter.
  - ★ Interlocks for airflow tripped regardless of what high or low limit were set to.
  - ★ Found that indexing in control loop for airflow was incorrect.
    - ■ Caused limits in use by program for both high and low limits to be 0 L/min.
  - ★ Correcting indexing error should fix issue; will deploy changes to cRIO when current cosmic tests are complete.
- Measured D0 value of spherical mirror 3.
  - ★ Fit d0 = 1.43 mm at R = 2715.45 mm
- Troubleshoot of two reflectivity test station issues with Peter:
  - ★ Issue 1: monochromator not responding to program or moving on power-up but can be seen by PC.
    - ■ Cause: Monochromator malfunctioned. Grating that allows user to set output wavelength had gone past its home positon.
    - ■ Solution: Manually turned drive screw to reposition grating so it is between home switches.
    - ■ Monochromator worked correctly and was able to be used.
  - ★ Issue 2: Program used to control monochromator crashes but monochromator is moving on power-up and seen by PC.
    - ■ Cause: PC that program ran was having issues and crashed during debugging.
    - ■ Solution: Installed updated version of monochromator's program on new laptop.
    - ■ Monochomator is now able to be controlled using laptop with updated version of control program.
- Investigated how to interface with UPS for hardware interlock system.
  - ★ New UPS received for hardware interlock cRIO.
  - ★ We want to be able to read status of UPS in hardware interlock program.
  - ★ Determined that serial port on UPS provides a certain voltage depending on state:
    - ■ Pin 8 gives AC power status: ~ -7 V indicates UPS receiving AC power; ~9 V indicates UPS is not receiving AC power.

- Pin 1 gives battery status: ~ -7V indicates low UPS battery; ~ 9V indicates UPS battery is charged.
    ★ Will need to investigate further to determine whether ADC channels or a serial input would be best to monitor UPS.

- Attended and passed overhead crane operator training.
    ★ Course included classroom portion, written exam, and practical exam.

McMullen, Marc
DC
- Continued TCU flow of standard @ 200cc/m.
    ★ Mix 1 TCU reading is 2.77V.
    ★ Mix 2 TCU reading is 2.60V.
RICH
- Machined adapter plate for the new pulley.
- Ordered 2" foam to replicate the missing top row of Aerogel.
- Installed the new LN2 dewar in room 125.
- Installed high pressure N2 bottle circuit to gas panel.
- Ordered LN2 dewar.
MVT
- Hall B Mechanical will install the cables on 11/7.
LTCC
- S5 had no flow from 11/1 to 11/4 @ 01:33am. It has been flowing since that time. The pressure is set to flow below 0.25iwc and stop at 0.35iwc, the bubbler is 0.4iwc.

- Completed Crane operator training and practical.