



Detector Support Group

Weekly Report, 2017-09-06

Status

Solenoid

- Incorrect readouts for helium liquid level probes in magnet and lead reservoirs debugged.
 - ★ Negative readout (-17%) for liquid level based on differential pressure for magnet reservoir taken between top of SST and bottom of Solenoid.
 - ★ 100 % readout (frozen) for liquid level probe in lead reservoir.
 - ★ Wiring change fixed incorrect readouts.
- Noise level of ± 5 K for Cernox temperature sensors reduced.
 - ★ Faulty thermistor was used for cartridge heater on lead A.
 - ★ Thermistor replaced
 - ★ Noise level reduced from ± 5 K to ± 0.5 K.
- Cryocon unit #1 replaced with new spare unit.
 - ★ Old unit lost Ethernet connection.

RICH

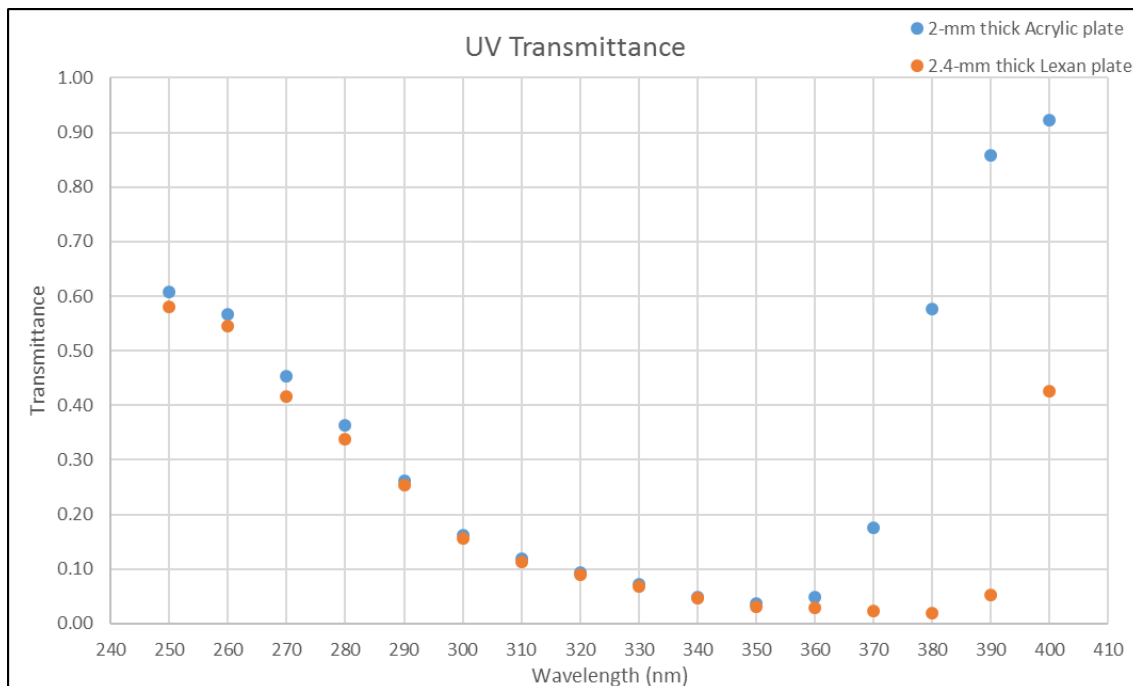
- DSGList for air-cooling compressor tests submitted.
 - ★ Tests will use higher output pressure of compressor to achieve 600 l/min airflow.
- Initial set-up of Hardware Interlock System for cosmic tests completed.
 - ★ LabVIEW program's interlock logic and cRIO's interface to CAEN mainframe verified.
- UV transmittance of 2-mm thick acrylic plate and 2.4-mm thick LEXAN plate measured.
 - ★ Results (shown in plot below) support that, depending on wavelength, plastic plates block 40% – 95% of UV light.



Mindy Leffel aligning optics and photodiode of test station used to measure UV transmittance.



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Results from plastic plates' UV transmittance test. Blue points are for 2-mm thick acrylic plate. Orange points for 2.4-mm thick LEXAN plate.

- Additional hardware for Stiffening Tool was received.
- First batch of 3D printed parts received.

HDIce

- NMR program loses control of power supply around 400 sweeps.
 - ★ Traded out USB-GPIB connection for GPIB card.
 - ★ GPIB connection causes program to lose control of power supply at about 30 sweeps.

Gas Systems

- Pressure regulators received for MVT C₄H₁₀ and CF₄ gas supply cylinders.
- LTCC S5 inlet solenoid valve replaced.
- All six leaking three-way valves for LTCC replaced.



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Antonioli, Mary Ann

- Worked on cRIO test stand code.
 - * Troubleshooting connection problems with cRIO.
 - * Worked on code to test one channel of module 9264 through all values -10–10 V.
- Made Visio drawing for Marc's Note on LTCC leak study. Completed Note edits and formatting. Posted to website (Note 2017-08).
- Began editing and formatting Pablo's Note on Solenoid ramp up.
 - * Formatted four tables.
- Began formatting and editing of George's Note on MVT gas system.
- Edited George's ppt.

Bonneau, Peter

Vacation

Campero, Pablo

Solenoid

- Debugged incorrect readouts (negative values) for helium liquid level probes in magnet and lead reservoirs.
 - * Verified configurations and operation ranges in the analog input PLC module.
 - Pressure transducers 4-20 mA signals (0-50 psi).
 - Liquid level sensors 0-10 V signals (0-100%).
 - Differential pressure transducers 4-20 mA signals (0-5 in H₂O and 0-25 in H₂O).
 - * Measured resistance at connector located on AMI 135 liquid level controller for each probe (Magnet ~ 7 Ω, and Lead ~195 Ω).
 - * Revised formula used in PLC code to calculate helium liquid level on reservoirs based on differential pressure.
 - * Issue not solved, still negative readout for liquid level based on differential of pressure for magnet reservoir and 100 % (static value) readout for liquid level probe in lead reservoir.
- Solved issues of noise level of ± 5 K for the Cernox temperature sensors due to faulty thermistor used for cartridge heater on lead A.
 - * Noticed greater noise level for temperature sensors on the Solenoid splices.
 - * Replaced thermal switch (Normally used model 130 °F, available spare 185° F)
 - * Noise level reduced from ± 5K to ± 0.5 K.
 - * Tested addition of ground cable on the Sol-LV-cRIO chassis.
 - Not the source of the noise.
- Replaced Cryocon unit #1 with new spare unit.
 - * Monitored operations, over the past 7 days.

RICH

- Performed static structural analysis for the RICH electronics panel
 - * Calculated maximum deflection (1.5 mm) and maximum stress (1.26*10⁷ Pa).



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- ★ Simulated normal stress, total deformation by using ANSYS mechanical structural analysis software.
- ★ Compare calculated values with the ANSYS results after the simulation for a uniform load of 180 lbf.
- Installed ANSYS workbench V18.2 in DSGPLC1 computer.

Eng. Brian

SVT

- Noticed R2 S6 U2 fails register test.
 - ★ Most likely it is a flakey data cable.
 - ★ Will do more debugging next time SVT is powered off.
- Swapped N2 bottle.

RICH

- Received first batch of 3D printed parts from Medical Imaging group.

Solenoid

- Replaced Cryocon #1 with the spare unit, so far no issues.
- Set up a test stand with a cRIO communicating with Cryocon unit that was removed to see if error will manifest itself locally.
- Found extra noise on Cernox sensors on magnet, narrowed down to VCL heaters. Replacing temperature switch has lowered (but not eliminated the noise).

Hoebel, Amanda

- Developed signal monitoring for HFCB temperatures, humidity, dew point, and coolant flow for **SVT** hardware interlocks.
- Switched to standard gas and monitored TCU changes for **DC** gas system with Marc.
 - ★ Signal looks flat compared to Mix gas signals, which fluctuated.
- Replaced **LTCC** S5 solenoid valve with Marc and George.
 - ★ S5 was showing constant gas flow, even when solenoid valve is supposed to be closed.
 - ★ It is believed solenoid valve is not closing all the way.

HDICE

- NMR program loses control of power supply around 400 sweeps.
 - ★ Traded out USB-GPIB connection for GPIB card.
 - ★ GPIB connection causes program to lose control of power supply at about 30 sweeps.
- Attempted to run NMR program in control room with synchronization setup for 1500 sweeps, which is the number of sweeps HDIce group tried running the program.
 - ★ Computer crashed several times around sweep 16.
- Created and edited weekly report.



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Jacobs, George

GAS Systems

- Received pressure regulators for MVT C₄H₁₀ and CF₄ gas supply cylinders.
- Attended 96B flammable gas meeting with Matt M. and Tim Minga.
- AirGas has installed the liquid argon tank remote telemetry unit.
- Replacement of LTCC S5 inlet solenoid valve and all 6 leaking 3 way valves.

HALLB

- Produced Hall B gas system status PPT.
- Participated in Hall B Engineering Meeting.

Leffel, Mindy

SVT

- Disassembled original patch panel.
 - * Used original as template to mark drill holes.
 - * Drilled and tapped holes in new panel.
 - * Assembled new panel.
 - * Three rails need modification before attachment.

RICH

- Modified LV interlock cable.
- Measured transmittance of UV light for the acrylic and Lexan plates with Tyler.

Lemon, Tyler

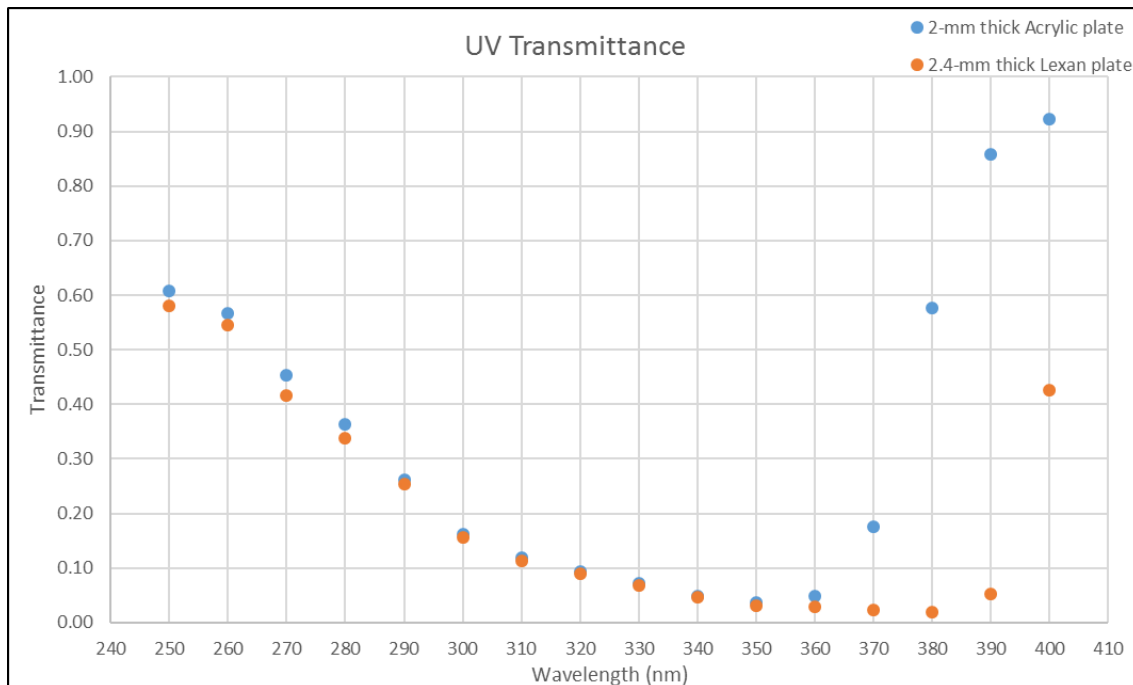
RICH

- Moved empty wooden crates with Mindy to be able to take crates to CMSA with forklift.
- Wrote DSG note on reflectivity tests of spherical mirrors 3 and 4.
- Submitted DSGList for air-cooling compressor tests.
 - * Tests will use higher output pressure of compressor to achieve 600 l/min airflow.
- Completed initial set-up of Hardware Interlock System for cosmic tests.
 - * LabVIEW program's interlock logic and cRIO's interface to CAEN mainframe verified using cable fabricated by Mindy.
 - * cRIO set up to monitor two temperature signals and one humidity signal.
 - Temperature limits:
 - High limit: 40° C
 - Low limit: 10° C
 - Humidity limits not enabled.
 - Only used to monitor humidity.
 - Interlock program will not act on humidity going out of limits.
 - * Requested temperature signals added to Mya archiver with 0.01° C deadband. Signals listed under HB_RICH group as:
 - B_DET_RICH_INTLK_TEMP1
 - B_DET_RICH_INTLK_TEMP2
- Measured UV transmittance of plastic plates with Mindy.



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- ★ INFN collaborators wanted to build holder for aerogel out of plastic plates but were concerned with potential UV damage to aerogel.
- ★ UV transmittance measured using UV lamp, UV beamsplitter, and photodiodes of reflectivity test station in EEL 108A.
- ★ Measured transmittance of 2-mm thick acrylic plate and 2.4-mm thick LEXAN plate.
- ★ Results (shown in plot below) support that, depending on wavelength, plastic plates block 40% – 95% of UV light.



Results from plastic plates' UV transmittance test. Blue points are for 2-mm thick acrylic plate. Orange points for 2.4-mm thick LEXAN plate.

McMullen, Marc

DC

- Monitored TCU value of mix with Amanda.
 - ★ On 9/5 we switched the TCU to read from the standard, this test will run for about a week. We will then compare the two studies (TCU mix vs. TCU standard).

RICH

- Procurement department has ordered three purchase orders for the RICH components to be manufactured at GandR.
 - ★ INFN has revised 4 of the drawings for the Trolley. Hall B Engineering is reviewing the changes. Contacted GandR to halt the job.
- Additional hardware for the Stiffening Tool was received.
- Met with RICH Jlab representative to ensure the testing of the electronics panel falls within the scope of the OSP.



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LTCC

- Leak test of sector 4 continues. Sector 3 and 5 have been bypassed in the same manner as sector 4.
 - * Sector 3 continues to show signs of leaks as it cannot maintain pressure. S3 flow rate is 5.3 L/d since 9/1.
 - * Sector 4 flow is 1.29 L/d since 8/28.
 - * Sector 5 flow is 17.11 L/d. Since the sector holds pressure a closer look at the flow shows a trickle of ~0.1 L/m when the valve is closed. The other sectors flow at ~0.007 L/m with the solenoid closed.
 - Worked with George and Amanda to modify the supply manifold and change S5 solenoid.
 - * We will observe the flow rates and pressures before giving further recommendations to Hall B.