



# Detector Support Group

## Weekly Report, 2018-05-23

### Summary

#### Hall C

- After discussion about the proposed Hall C PLC task list, DSG assigned the following persons to compete the tasks:

Task #	Description	Person
1	Interactive HMI data logging upgrade installation and operation	TBD
2	End of life for Windows 7 upgrade to Windows 10	TBD
3	Develop “on loop” current regulation routine	Tyler
4	Add HMS “spectrometer vacuum” controls	Tyler, start on 5/29/2018
5	Modify SHMS shutter not installed status	Amanda, start on 5/31/2018
5	Connect to system and program UPS status	Tyler
6	Tune valve PID	Brian
7	Rewire and program SHMS LVDT I/O modules to single ended	Pablo
8	Program PLC communication with new NMR units	Pablo, Tyler, Peter (In progress)
9	Add HMS Quadrupole hall probe readouts to PLC	Brian
10	Add HMS Shutter controls and status	Amanda, start on 5/31/2018
11	Add spectrometer rotation electric break control	Brian
12	Remote alarm notification to on-call support staff	Amanda
13	Re-program for replacement SHMS LHe/LN2 meters	Amanda
14	HMS & SHMS Dipole field regulation routine	Pablo

- With regards to task # 8, the NMR Tesla Meter PT2026 communication with the PLC.
  - ★ Downloaded latest manual v2.1 released on 07/2017.
  - ★ Installed MetroLab PT2026 software to set up USB connection with NMR PT2026 Tesla Meter.
    - Tested USB communication with software installed.
  - ★ Installed USB drivers in the DSGPLC1 and dsg-hallc-2 PCs
  - ★ Updated PT2026 Tesla Meter firmware to V 2.6.
  - ★ Investigated communication interfaces available on PT2026 Tesla Meter.
    - Found that Modbus protocol is not implemented in the unit.
    - USB and Ethernet interfaces available.
  - ★ Requested IP address to add NMR Tesla Meter and 490 NBX modules on the Hall C Dev subnet.
    - PT2026 Tesla Meter MAC address not visible on its hardware.
    - Found MAC address by connecting NMR PT2026 Tesla Meter with an Ethernet cross cable.
- Created a new folder named “dsg-hallc\_controls” in M: drive.
  - ★ Folder is intended for storage of HMS or SHM PLC code.
- Created new GitHub repository for storage of HMS and SHMS PLC codes
  - ★ GitHub allows access only to members.
- Submitted PR 377179 for two RSLogix 5000 licenses.
  - ★ The cost for each license is \$ 6580.
  - ★ Licenses support from version 16 to version 31.
  - ★ Quotation for PR submitted is valid for thirty days.
- Configured five computers on Hall C Development subnet.
  - ★ Computers rebuilt with Windows 7.
  - ★ Installed RSLogix 5000 (v. 16.04) using “skylla7” as license server.



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- Generated HMS PLC layouts for eight chassis as part of the documentation needed to start PLC tasks.
  - ★ Initial PLC layout spreadsheet contains detailed information about the description and location of the controllers, PLC I/O modules and Network modules.
- Reviewed HMS PLC program's NMR and Rotation routines.
- Created HMS PLC network map to show communication connections between all HMS instrumentation and devices.

### RICH

- Created RICH Air Cooling Panel Testing.doc
  - ★ Document written for testing air panel capacity and optimizing pressure regulator and flow rotameter operation.
- Updated Hardware Interlock CSS screen to display air-cooling buffer tank's water concentration in EPICS.
  - ★ Pull request submitted to clas12-epics GitHub repository for changes; pull request approved and new screen posted to clascss menu.
- Replaced network cable for N2 cRIO to resolve issue where communication to EPICS IOC is not reestablished when cRIO is rebooted.
  - ★ Occasionally, when RICHcRIO was rebooted, EPICS would not update because communication was not properly reestablished between cRIO and IOC.
  - ★ For similar issue with Gas System cRIOs, new network cable was used to resolve issue.
- Added logic to hardware interlock system's LabVIEW user interface (UI) to force cRIO into EPICS control mode when UI is stopped.
  - ★ Change made for convenience to prevent cRIO from inadvertently being left in LabVIEW control mode from UI.

### SVT

- HFCEB patch panel PCB (board #1) replaced with upgraded version
  - ★ Re-terminated detector environmental control sensor cables to connect to the new patch panel.
  - ★ Fabricated break out adapters for the environmental controls.
- For the HTSB2 cables:
  - ★ Soldered temperature and humidity sensors to 12 remaining boards.
  - ★ Cut and bundled cables.
  - ★ Soldered cables to six boards.
- Initial testing with the humidity sensor PCB (board #2).
  - ★ Found that either the LED/resistor after fuse causes bad readout values.
  - ★ With the HTSB humidity sensors, removing LED/resistor works fine.

### HDice

- NMR program for flush buffer Vis checked.
  - ★ Flush buffer VI solves problem of VISA hanging up in the test program.
- Status of ordered RF Box parts checked.



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- \* Item was damaged during shipping.
- \* Replacement ordered placed to replace damaged item.

### LTCC

- Met with Bob Miller to discuss plans for new recovery system.
- Installed an absolute pressure transducer on the LTCC C4F10 recovery tank.
- Worked on recovering the C<sub>4</sub>F<sub>10</sub> gas in Sector 5.
  - \* Hall B has setup a refrigerant recovery unit and an empty gas tank to pull the gas from the detector.
  - \* C4F10 gas was pushed out the detector with N<sub>2</sub>
  - \* 10.5Kg of C<sub>4</sub>F<sub>10</sub> was recovered on the first day at a rate ~4 Kg/hour.
  - \* After the recovery tank pressure reached ~52 psi (gas line external temp was ~82F), the C4F10 condensed to liquid. Which was visually verified at the tank input rotameter.
  - \* DSG operated the controls and monitored the detector pressure, tank weight, and tank pressure during the operation.

### Gas System

- In preparation for power outage on 5/22/2018:
  - \* HTCC has been switched to a rotameter (10 lpm).
  - \* The space frame gas controls cRIO was moved from utility power to clean power.
  - \* The mass flow controllers on the cart, and interlock cRIO for SVT has been moved to generator back up.

### Hall B Magnets

- Replaced potentiometers and adjusted to original settings for the Quench Detector board.

### cRIO Test Station

- Wrote all six current tests for 9207 channels 12–15.
  - \* Tested OK.
  - \* Tests for Module 9207 are completed.
- Wrote code to test channels 8–15 of module 9264
  - \* Updated 9207 samples subVI to read from ch8–15 of 9264.
  - \* Wrote state machine to test channels.
  - \* Added code to user interface to send 9264 test request to real time.



# Detector Support Group

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### Antonioli, Mary Ann

- Assisted Mindy with cutting SVT cables

#### cRIO test stand

- Wrote all current tests for 9207 channels 12–15.
  - \* Tested OK.
  - \* Tests for Module 9207 are completed.
- Wrote code to test ch8–15 of module 9264
  - \* Updated 9207 samples subVI to read from ch8–15 of 9264.
  - \* Wrote state machine to test channels.
  - \* Added code to user interface to send 9264 test request to real time.
- Made spreadsheet of Hall C PLC chassis modules.

### Bonneau, Peter

Absent

### Campero, Pablo

#### Hall C

- Created a new folder named “dsg-hallc\_controls” in the M: drive.
  - \* Folder is intended to storage any HMS or SHM PLC code.
- Created new GitHub repository to storage HMS and SHMS PLC codes
- Submitted PR 377179 to acquired two RS-Logix5000 licenses.
  - \* The cost for each license is 6580 \$.
  - \* Licenses support from version 16 to latest version 31.
- Worked on the NMR Tesla Meter PT2026 communication with the PLC.
  - \* Downloaded latest manual v2.1.
  - \* Installed MetroLab PT2026 software to set up USB connection with NMR PT2026 Tesla Meter.
  - \* Installed USB drivers in the DSGPLC1 and dsg-hallc-2 PCs
  - \* Updated firmware for PT2026 released on 07/17.
  - \* Tested USB communication with software installed.
  - \* Investigated communication interfaces available on PT2026 Tesla Meter.
    - Found that ModBus protocol is not implemented in the unit.
    - USB and Ethernet interfaces available.
  - \* Requested IP address to add NMR Tesla Meter and 490 NBX modules on the Hall C Dev subnet.
    - PT2026 Tesla Meter MAC address not visible on its hardware.
    - Found MAC address by connecting NMR PT2026 Tesla Meter with local with an Ethernet cross cable.
- Completed setting up five computers on Hall C Development subnet and rebuilt computers to Windows 7.



# Detector Support Group

## Weekly Report, 2018-05-23

- Collaborated with Amanda to generate HMS PLC layouts for eight chassis as part of the documentation needed to start PLC tasks.
  - \* Initial PLC layouts contain detail information of the PLC I/O, Network modules and PLC controllers.
- Generated Hall C task report document with the related progress in the current task performed last week (05/09/2018 to 05/16/2018).
- Edited and reformat DSG weekly report.

### Eng, Brian

#### SVT

- Replaced an HFCB patch panel PCB (board #1) with upgraded version, works fine.
- Initial testing with the humidity sensor PCB (board #2).
  - \* Found that either the LED/resistor after fuse causes issues with the HTSB humidity sensors, removing them works fine.

#### LTCC

- Met with Bob to discuss his plans for new recovery system.
- Tested with S6 using N2, started C4F10 recovery of S5, recovered ~10.5 kg

### Gas System

- Moved SF cRIO from utility power on L3 to clean power on L1
- HTCC moved to a rotameter
- Some SVT components (VME, patch panel, extra MFCs) moved to generator power
- Installed RSLogix 5000 (v 16.04) using skylia7 as license server for Hall C on dsg-hallc-4 computer.

### Hoebel, Amanda

#### RICH

- Replaced network cable for hardware interlocks cRIO, with Tyler.
  - \* EPICS signals would occasionally show as disconnected. Network cable believed to be going bad.

#### HDice

- Checked NMR program for flush buffer VIs.
  - \* Flush buffer VI solves problem of VISA hanging up.
  - \* Clear GPIB buffer VI implemented, but not for VISA.
- Checked on status of ordered parts for RF Box.
  - \* Item was damaged during shipping.
  - \* Another order was placed to replace damaged item.

#### Hall C

- Created list of PLC modules for Mary Ann to put into Excel.
- Picked up 2 computers, with Pablo.
  - \* Installed RSLogix 5000 on computer



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- Renewed Rad Worker 1 training.

### **Jacobs, George**

- Created **RICH** Air Cooling Panel Testing.doc for testing air panel capacity and optimizing pressure regulator and flow rotameter operation.

### **Leffel, Mindy**

#### **SVT**

- For the HTSB2 cables:
  - \* Soldered temperature and humidity sensors to 12 remaining boards.
  - \* Cut and bundled cables.
  - \* Soldered cables to six boards.

#### **Magnets**

- Replaced potentiometers and adjusted to original settings for the Quench Detector board.

### **Lemon, Tyler**

#### **RICH**

- Updated Hardware Interlock CSS screen to display air-cooling buffer tank's water concentration in EPICS.
  - \* Pull request submitted to clas12-epics GitHub repository for changes; pull request approved and new screen posted to *clascss* menu.
- Replaced network cable for N2 cRIO in attempt to resolve issue where communication to EPICS IOC is not reestablished when cRIO is rebooted.
  - \* Occasionally, when RICHCRIO was rebooted, EPICS would not update because communication was not properly reestablished between cRIO and IOC.
  - \* For similar issue with Gas System cRIOs, new network cable resolved issue.
- Added logic to hardware interlock system's LabVIEW user interface (UI) to force cRIO into EPICS control mode when UI is stopped.
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#### **Hall C**

- Created HMS PLC network map to show communication connections between all HMS instrumentation.
- Reviewed HMS PLC program's NMR routine and rotation routine.

### **McMullen, Marc**

#### **SVT**

- Worked with Brian to re-terminate detector environmental control sensor cables to connect to the new patch panel.
- Fabricated break out adapters for the environmental controls.

#### **LTCC**

- Installed an absolute pressure transducer on the LTCC C4F10 recovery tank.



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- Worked with Brian and Hall B Lead Engineer on recovering the C4F10 in Sector 5.
  - \* Hall B has setup a refrigerant recovery unit and an empty gas tank to pull the gas from the detector, while pushing the gas with N2. 10.5Kg were recovered on the first day at a rate of ~4Kg per hour.
  - \* After the recovery tank pressure reached ~52psi (gas line external temp was ~82F), the C4F10 condensed to liquid. Which was visually verified at the tank input rotameter.
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#### Gas Systems

- In preparation for the 5/22 power outage:
  - \* HTCC has been switched to a rotameter (10Lpm).
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