Detector Support Group
Weekly Report, 2018-15-08

Summary

Hall C

- PLC program for dipole field regulation in progress
  - Testing first version of PLC code with fake tags used to simulate NMR magnetic field and MPS current readouts.
  - Modified HMI screen created to test PLC code.
- Installed PT2026 NMR unit's probe on top of HMS Dipole
  - Got a lock at ~1.4 [T]
  - Placed NMR PT2026 unit under the floor of the HMS hut.
  - Configured Ethernet communication for the NMR.
    - Assigned new Hall C IP address (129.57.165.20) to NMR unit.
    - Ran Ethernet cable from HMS Ethernet switch in the Hall C hut to NMR unit.
  - Found right spot for NMR probe at the top of the HMS Dipole.
    - Ran cable through floor penetration to probe placed at peak field location in HMS dipole.
  - Readouts got for PT2026 NMR probe were close to the value of the existing NMR on the PT2025
    - PT2025 NMR ~14027 [gauss]
    - PT2026 NMR ~14044 [gauss]
  - Ran remote reset NMR cable from Aux port at NMR to HMS Dipole I/O Rack.
    - Cable allows the NMR unit to be reset remotely from the PLC
      - Unit froze several times due to the firmware issues not solved in this unit.
    - Verified that cable works by power cycling NMR unit
      - Shorted cable after it was connected to the terminals in the AUX port.
    - Waiting for Hall C to connect the cable on one of HMS PLC relay channel.
- With regards to Windows 7 upgrades to Windows 10.
  - Sent PR #379205 to acquire new graphics card for dsg-hallc-6 PC.
- Developed wiring/cabling plan for UPS monitoring.
  - DSG will fabricate and run cables to racks in Hall C.
  - Hall C will be responsible for making final connections to terminal blocks or PLC.
- Continued development of Python Danfysik Magnet Power Supply simulator.
  - Improved error handling of version 1 of program.
  - Adding in functionality to respond to status queries in the same syntax as an actual Danfysik power supply.
  - Developed test program in LabVIEW as a PLC stand-in.
    - Using LabVIEW program is a simpler way to observe responses from and send commands to Python MPS simulator.
- Modified current loop regulation program to take into account appropriate units.
  - Made PDFs of changes in current field regulation program for SHMS and HMS.
  - Tested modifications of PLC code by using Danfysik simulator running in Python.
- Generated table with details about Hall C Human Machine Interface Software licenses running on Skylla7 Server.
- DSG is waiting for information from Hall C on:
  - What they mean by "Valve tune responses"
  - Data logging access
    - Steven Lassiter denied the request to access HMS and SHMS HMI screens.
    - Work cannot start on the data-logger task until access is given.
  - SHMS LVDT I/O module.
  - HMS quadrupoles.

Detector Support Group
Weekly Report, 2018-15-08

RICH Hardware Interlock System
- Corrected indexing error causing incorrect humidity and temperature status summation on EP cRIO's EPICS interface.
  - Interlocks on EP cRIO temperature 16 caused EPICS to indicate a humidity interlock trip in addition to a temperature interlock.
  - Correcting indexing of status summation subVI in EP cRIO's EPICS interface fixed error.

HDice
- Developing documentation for the NMR program for both synchronous and asynchronous modes.
  - Changes needed for the program flow diagram were discussed.
- Wrote program to calculate chi squared value in Python for linear fit of T_{down} data of NMR scan.
- Computer in NMR Rack #1 crashed twice.
  - Computer was not running any programs.
  - Problem is with computer itself and may need to go back to computer center.

SVT
- SVT Hardware Interlock System
  - Completed the system installation, debugging and testing of the cRio real-time program needed to implement the monitoring and interlocking of the pressure in the SVT cooling system.
  - Tested code for the EPICS LabVIEW User Interface support.
  - Completed cRio RT EPICS interface code needed for the cooling pressure monitoring and controls.
  - Worked on the integration of the new hardware interlock PV's into the EPICS SoftIOC.
  - Programmed interlock EPICS CSS screens for Hall B SVT slow controls.
  - Added 7 EPICS SVT hardware interlock PV's to Mya archiving.
- Provided detailed analysis of recent interlock trips due to the instability of the SVT cooling system.
  - Analysis proved that the Hardware Interlock System correctly responded to each of the trips.
- Researched new task request for interlocking the cooling pump.

FT Interlock System
- Calorimeter temperature sensor #1 read-back continues to be unstable.
  - Instability started in CTS #1 after the repairs this summer to the FT cooling system.
  - All RTD cables and connectors external to the detector were inspected.
  - Determined the sensor inside the detector is the cause of the instability issue. No access is possible when installed in CLAS12.
  - Interlock high temperature threshold level set to 2000 [C] to prevent trips.

Hall B Magnets
- Increased priority of PLC time synchronization so they would act as the grandmaster clock.
  - The individual PTP servers for each hall had to be rolled back to a single server located in the CC data center.
  - Priority 1 value of the Solenoid/ Torus PLCs has been changed (128 -> 32) to assign one of them to be the grandmaster clock.

LTCC

- Updated cRio software with pressure controls to initiate the AC power switches, which control the vacuum pump connected to the LTCC manifold exhaust.
  - The controls will actuate the pumps based on the value of a pressure set point.
  - Installed the AC switches which are controlled by the software.
  - Tested C4F10 return vacuum pumps in gas shed
    - Pump will now turn on as the pressure exceeds a set point (2.25 iwc)
    - Verified that the exhaust solenoid and Omega Process Controller on the FC are working.
  - Started system test using LTCC sector 5.

Gas System

- Completed wiring diagram for mass flow controller power boxes.
- Modified mechanical layout of flow controller power boxes to move the terminal blocks, and add additional wiring clearance.

RTPC

- Created RTPC gas panel Rev. 3 diagram.
- Created RTPC gas system RTPC-08-13-2018 diagram.
- Generated power point presentation with details for RTPC gas system.

Hall D

- Swapped PXI controller back to old version since new one was unstable.
  - Found that new PXI controller was not booting properly.
  - Checked that it was booted into safe mode due to an unknown software error.
  - Created a service ticket with NI with the console out, some error logs and the technical report.
  - Replaced new PXI Controller 8840 with the previous PXI 8135 controller.
  - Took the new PXI controller to the EEL and it booted fine, but stopped with an error when it couldn't communicate with any of the ADC channels (which was expected).

LERF

- Cryomodule 2 cable termination.
  - Terminated 12 cables.
  - Five different types of MS connectors, 104 pin total.

cRIO Test Stand

- Set up cRIO Test Station to perform test on NI 9205 ADC input module at ± 1V and ± 200 mV range.
  - Connected Krohn Hite voltage calibrator source to “dsgcontrols2” PC via GPIB/USB connector
    - Installed utility application to debug communication issues.
  - Terminated one end of test cable that is required to connect cRIO module NI 9205 with Krohn Hite Voltage calibrator source.

Antonioli, Mary Ann

- Notes
  - Made final edits to and posted Note 2018-10.
  - Wrote first draft of Note on cRIO module 9207 tests and results.

Bonneau, Peter

HDice

- Worked with Amanda on the development of documentation for the NMR program for both synchronous and asynchronous modes.
  - Changes needed for the program flow diagram were discussed.

SVT

- SVT Hardware Interlock System
  - Completed the system installation debugging and testing of the cRio real-time program needed to implement the monitoring and interlocking of the pressure in the SVT cooling system.
  - Developed, tested, and debugged code for the EPICS LabVIEW User Interface support.
  - Completed development of the cRio RT EPICS interface code needed for the cooling pressure monitoring and controls.
  - Worked with Nathan Baltzell on the integration of the new hardware interlock PV's into the EPICS SoftIOC.
  - Programmed interlock EPICS CSS screens for Hall B SVT slow controls.
  - Added 7 EPICS SVT hardware interlock PV's to Mya archiving.
- Provided detailed analysis of recent interlock trips due to the instability of the SVT cooling system. Analysis proved that the Hardware Interlock System correctly responded to each of the trips.
- Researched new task request for interlocking the cooling pump.

FT Hardware Interlock System

- Calorimeter temperature sensor #1 read-back continues to be unstable.
  - Instability started in CTS #1 after the repairs this summer to the FT cooling system.
  - All RTD cables and connectors external to the detector were inspected.
  - It was determined the sensor inside the detector is the cause of the instability issue. No access is possible when installed in CLAS12.
  - Raffaella De Vita has set the hardware interlock high temperature threshold level to 2000C to prevent trips.

Hall C

- Held daily status and planning meeting on HMS and SHMS PLC control systems.
  - DSG repeated the request for access to HMI licenses and permissions that are absolutely required to accomplish Hall C PLC task requests.
    - Steven Lassiter denied the request.
    - Work cannot start on the data-logger task request until access is given.

- DSG is waiting for information and/or cabling work from Hall C on valve tune responses and SHMS LVDT I/O module work.

Campero, Pablo

Hall C

- Dipole field regulation PLC program in progress
  - Testing first version of PLC code with fake tags used for NMR magnetic field and MPS current readouts.
  - Modified HMI screen created to test PLC code.
- Installed NMR at Hall C in the HMS hut.
  - NMR probe installed in the central area of the HMS Dipole.
  - Configured Ethernet communication for the NMR
    - Assigned new Hall C IP address (129.57.165.20) to NMR unit
    - Run Ethernet cable from HMS switch in the Hall C hut to NMR unit.
  - Ran cable from NMR AUX port to HMS Dipole rack to power cycle NMR unit remotely.
    - NMR unit frizzes constantly due firmware issues not solve by MetroLab
    - Verified that cable work by shorting to terminal in the AUX port and powered cycle NMR unit.
    - Waiting to cable be connected in one of HMS PLC relay channel.
- 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.
  - Provided latest HMS PLC code to add modifications.
  - Verified logic and sequence follow agreed flow diagram.
  - Showed Amanda how to print PLC routines form RSLogix5000.
  - Waiting on verification of modification made.
- Generated table with details about Hall C Human Machine Interface Software licenses running on Skylla7 Server.
- Set up RSLogix5000 PLC software licenses in the Cadlm2 Server and dsg-hallc-2 PC server.
- Updated DSG- Hall C PLC task list.
- Generated DSG Hall C PLC weekly report.

DSG

- Set up **cRIO Test Station** to perform test on NI 9205 ADC input module at ± 1V and ± 200 mV range
  - Connected Krohn Hite voltage calibrator source to “dsgcontrols2” PC via GPIB/USB connector
    - Installed utility application to debug communication issues.
  - Proposed wiring connection between NI9205 module and Krohn Hite voltage output.
- Took Aerial Lift Practical **Training**.
- Edited and compile DSG weekly report

Eng, Brian

LTCC

- Tested C4F10 return vacuum pumps in gas shed:

- https://logbooks.jlab.org/entry/3586857
- https://logbooks.jlab.org/entry/3587024

DC

- Increased Mix2 pressure setpoint after Morgan increased CO2 pressure:
  - https://logbooks.jlab.org/entry/3586293

Hall B Magnets

- Increased priority of PLC time synchronization so they would act as the grandmaster clock: https://logbooks.jlab.org/entry/3585603 .

Hall C

- Installed PT2026 NMR probe on top of HMS Dipole and tested that it got a lock at ~1.4T https://logbooks.jlab.org/entry/3585571
- Ran remote reset NMR cable with Pablo to HMS Dipole I/O Rack.

Hall D

- Swapped PXI controller back to old version since new one was unstable: https://logbooks.jlab.org/entry/3585550 https://logbooks.jlab.org/entry/3586291

Hoebel, Amanda

HDIce

- Wrote program to calculate chi squared values in python.
  - Chi squared for Tdown was 0.089 with goodness of fit value 986.6
- Computer in NMR Rack #1 crashed twice.
  - Computer was not running any programs.
  - Problem is with computer itself and may need to go back to computer center.

Hall C

- Connected NMR unit in middle of dipole HMS magnet with Brian, Pablo, and Tyler.
  - NMR unit could not pick up current in previous location and had to be moved into middle of dipole magnet.
- Made PDFs of changes in current field regulation program for SHMS and HMS.
- Tested dipole current field routine using pyserial program, with Pablo.

Jacobs, George

GAS Systems

- Meetings on RTPC gas system with Carlos.
- Discussions about LTCC gas system with Brian and Marc.
- Discussions about RICH air cooling system with Brian and Marc.
- Discussions with Sebastian Kuhn on RTPC gas system.
- Created RTPC gas panel Rev. 3 diagram.
- Created RTPC gas system diagram, RTPC-08-13-2018.
- Excessed 96b PC and laptop, removed from DSG computer spreadsheet.
- Created RTPC gas system power point.

Leffel, Mindy

Hall B Gas Systems

- Started prep work for MFC power chassis fabrication.

LERF

- Cryomodule 2 cable termination.
  - Terminated 12 cables.
  - Five different types of MS connectors, 104 pin total.

- Terminated cables with D-sub connectors for UPS used on **Hall C** PLC systems.

cRIO Test Station

- Terminated one end of test cable that is required to connect cRIO module NI 9205 with Krohn Hite Voltage calibrator source.

Lemon, Tyler

Hall C

- Installed PT2026 NMR unit in Hall C with Brian, Pablo, and Amanda.
  - NMR unit placed in HMS detector hut and cable ran through floor penetration to probe placed at peak field location in HMS dipole.
  - Ramping HMS dipole to ~1600 A generated a ~1.4 T field, allowing NMR unit to lock on to field for testing of Brian's SBC program.
- Developed wiring/cabling plan for UPS monitoring.
  - DSG will fabricate and run cables to racks in Hall C.
  - Hall C will be responsible for making final connections to terminal blocks or PLC.
- Continued development of Python Danfysik Magnet Power Supply simulator.
  - Improved error handling of version 1 of program.
  - Adding in functionality to respond to status queries in the same syntax as an actual Danfysik power supply.
  - Developed test program in LabVIEW as a PLC stand-in.
    - LabVIEW program acts as simpler way to observe responses from and send commands to Python MPS simulator.

RICH

- Corrected indexing error causing incorrect humidity and temperature status summation on EP cRIO's EPICS interface.
  - Interlocks on EP cRIO temperature 16 caused EPICS to indicate a humidity interlock trip in addition to a temperature interlock.
  - Correcting indexing of status summation subVI in EP cRIO's EPICS interface fixed error.

- Attended aerial lift practical training.

McMullen, Marc

Gas System Controls

- Completed wiring diagram for mass flow controller power boxes.
- Modified mechanical layout of flow controller power boxes to move the terminal blocks, and add additional wiring clearance.

LTCC

- Wrote pump control software in LabView.
    - ✶ The controls will actuate the pumps based on the value of a pressure set point.
    - ✶ Installed the AC switches which are controlled by the software.
    - ✶ Started system test using sector 5.
    - ✶ The set point to turn on the vacuum pump is 2.25 iwc, set point for the solenoids is 2.2 iwc, 0.05 iwc difference is to delay the pumps until the solenoids are open, this will keep the piping pressure from going into vacuum.

- Completed Areal Lift training.