



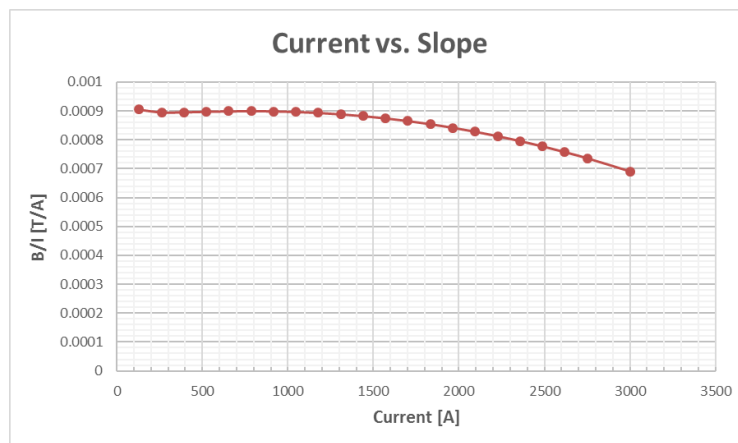
Detector Support Group

Weekly Report, 2018-07-25

Summary

Hall C

- Upgrade continued of Hall C PLC system from RSLogix 5000 version 16 to version 20.
 - ★ RSLogix 5000 v20 and RSNetworkx v27 installed on Hall C's controls PCs.
- HMS PLC updated to from RSLogix 5000 v16 to v20, but firmware incompatibilities in redundancy modules, ControlNet modules, and Ethernet modules prompted system to be downgraded back to v16.
 - ★ Primary and Secondary chassis ENBT Ethernet modules' firmware upgraded from v4.8 to v6.6.
 - ★ Firmware upgrade not available for Primary and Secondary chassis' ControlNet modules (CNB/D) due to modules being older models.
 - ★ Converted HMS PLC project to RSLogix 5000 v20 and downloaded program to the controller.
 - ★ Redundancy modules (1757-SRM) caused errors after update to v20.
 - Redundancy modules in HMS PLC system are older model than SHMS's and are not compatible with RSLogix 5000 v20 (highest compatible version is v16 for HMS redundancy modules).
 - In redundant systems, ENBT modules are not supported with controller firmware v20.58
 - ★ If redundancy is not used, HMS PLC program can run in v20 with no issues.
 - ★ Incompatibilities and need for redundancy prompted downgrade of system back to v16.
- New redundancy modules, ControlNet modules, and Ethernet modules are needed for the HMS Primary and Secondary PLC chassis to be able to upgrade from v16 to v20.
 - ★ CNB/D ControlNet modules in Primary and Secondary HMS PLC chassis must be replaced with CN2 ControlNet modules.
 - Confirmed with Rockwell technical support that 1756-CNB ControlNet modules used for the five HMS Remote PLC chassis do not need to be replaced.
 - ★ 1756-RM redundant module must be replaced with the newer 1756-RM2 module.
 - ★ 1756-ENBT Ethernet modules must be replaced with 1756-EN2T modules.
- Analysis of current vs magnetic field relation for HMS Dipole continued.
 - ★ Plot generated to study how magnetic field changes as current changes and how the Dipole's magnetic field starts to become saturated at higher currents.





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- PLC code for HMS spectrometer vacuum task completed.
 - * HMS PLC program updated to add WRG vacuum gauge to HMS Q3 I/O chassis and turned over to Hall C.
 - Hall C will determine when to download changes to HMS PLC system.
 - * DSG's portion of task is completed.
- Python Magnet Power Supply (MPS) simulation (version 1) developed to simulate communication to/from Hall C's Danfysik power supply.
 - * Since DSG cannot use actual MPS and PLC system to test/debug code changes, program will allow debugging of new PLC logic and serial communication.
 - * NBX 435 module used as PLC-to-serial gateway.
- Current monitoring loop program successfully tested on DSG-PLC using Python MPS simulation.
- DSG is still waiting on information and/or cabling work from Hall C on:
 - * HMS & SHMS shutter controls
 - * UPS status read-back
 - * Spectrometer break controls
 - * Valve tune responses
 - * SHMS LVDT I/O module work.

Hall B Magnets

- Solenoid Pre-power-up interlock and instrumentation checklists completed.
- Torus Pre-power-up interlock and instrumentation checklists completed.
- DSG Note 2018-09 *Controls and Monitoring System to Power Up the Hall B Solenoid* finalized and posted to DSG webpage.

RICH

- Upgraded nitrogen panel with increased flow capabilities installed on Forward Carriage.
 - * Maximum flow possible is ~60 slm over two output channels (~120 slm total).
 - * Both input lines to RICH are connected to a T-fitting at output channel 1 of panel.
 - * Panel regulator set to ~5 psi to prevent changes in supply pressure from affecting nitrogen flow.
 - * Manual rotameter for channel 1 set to ~40 slm.
 - Flow verified using local flowmeter display.
 - ~40 slm is the same flow capability as the full scale of the old panel.
 - * N2 cRIO hardware interlock program modified to convert voltage to flow in liters/minutes for new, higher capacity flowmeters.
- Update started of hardware interlock system to LabVIEW 2018.

HDice

- Rack #1 instrumentation and computer installed and tested in HDice lab.
 - * Successfully completed a 1000-cycle test run of the NRM program while in synchronization mode.
 - * Configuration and operation of the new NMR program in synchronous mode demonstrated to the HDice group.
- CT-Box field value averaging added to data file.



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SVT

- Investigation in progress to determine cause configuration file corruption on the hardware interlock system.
 - * SVT cRIO was not rebooted at the time of file corruption.
 - * SoftIOC reboot is being investigated as a probable cause of the file corruption.
- Upgrade of the hardware interlock program to LabVIEW 2018 started.

MVT/FTT

- All five mixing system Mass Flow Controllers (MFCs) zeroed.
- FTT moved from Mix 1 to Mix 2.
 - * FTT gas connection changed to use Mix 2, requiring gas controls program to be updated.

DC

- Mixing system pressure set points increased.
 - * Low set point increased from 60 psi to 80 psi.
 - * High set point increased from 80 psi to 100 psi.
 - * Maximum pressure limit increased from 100 to 120 psi.

LTCC

- Confirmation received for C₄F₁₀ order; delivery estimate is August 20, 2018.
- Sector 2 daily flow observed to have increased from ~40 L/day to ~80 L/day.
 - * Increase in daily flow may be due to leaking connections after reinstallation on Forward Carriage.
 - * Hall B notified of increase, resulting in request to stop flow to detector.

Hall B Gas

- All gas system cRIO firmware and software updated to LabVIEW 2018.
- MFC power chassis completed, tested, and installed in the Hall B Gas Shed.
- Gas Shed control chassis taken offline for repairs.
 - * Analog output cable repaired.
 - * Ground wire re-soldered inside the chassis, as bad ground was causing intermittent pressure reading failures on mix 1 pressure.
- Upgrade proposal written for the Hall B gas system.
 - * Upgrade will implement an auto-generated gas systems report, providing a quick reference for monitoring system parameters.

cRIO Test Stand

- Code developed for NI-9205 ADC module manual tests for gain error and offset error in the ± 10 V range.
- Development started of automatic test for ± 10 V range.
- Code developed for all NI-9205 ADC module tests for the ± 5 V range.



Detector Support Group

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LERF Cryomodule 1

- Cable insulation stripped to length on all conductors.
- One type of every connector and cable terminated to ensure proper strip lengths and to develop termination procedure.

DSG Shared Drive Management

- Quotas increased to 150GB for DSG's shared drives *O:\DSG* and *O:\DSG_Slow_Controls*.
- Group management updated for shared drive groups to include only active DSG members.



Detector Support Group

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Antonioli, Mary Ann

cRIO test stand

- Wrote code for NI-9205 ADC module manual tests for gain error and offset error (± 10 V range)
- Wrote code for all NI-9205 ADC module tests for the ± 5 V range.
- Began development of automatic test for ± 10 V range.

- Made final edits to and posted *Controls and Monitoring System to Power Up the Hall B Solenoid* (Note 2018-09).

Bonneau, Peter

HDice

- The Rack #1 instrumentation and computer installed and tested in the HDice lab.
 - ★ A test run of 1000 cycles of the NRM program while in synchronization mode successfully completed.
 - ★ The configuration and operation of the new NMR program demonstrated to the HDice group while running in synchronized mode.

SVT Hardware Interlock System

- The threshold configuration file has been corrupted on the SVT.
 - ★ The SVT cRIO was not rebooted at the time of file corruption.
 - ★ SoftIOC reboot is being investigation as a probable cause of the file corruption.
- Upgrade of the hardware interlock program to LabVIEW 2018 started.

Hall C PLC Control Systems

- Held daily status and planning meeting on HMS and SHMS PLC control systems.
 - ★ Reviewed the new task of upgrading HMS PLC to RSLogix version 20.4.
 - Redundancy and ControlNet modules are too old to upgrade to firmware required for V20.
 - New modules will need to be purchased.
 - ★ Discussed development of the quadrupoles current monitoring loop program.
 - ★ DSG is still waiting on information and/or cabling work from Hall C on HMS & SHMS shutter controls, UPS status read-back, spectrometer break controls, valve tune responses, and SHMS LVDT I/O module work.

- Increased shared drive quota to 150GB for directory *O:\DSG*
- Updated group management for the *dsggrp* group to active DSG members only.
- Increased shared drive quota to 150GB for directory *O:\DSG_Slow_Controls*
- Updated group management for the *dsgslowc* group to active DSG members only.



Detector Support Group

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Campero, Pablo

Hall C

- Upgrade Hall PLC system from version 16 to version 20 continued.
 - * RSLogix v20 and RSNetworx v27 installed on Hall C's controls computers.
 - * Updated firmware version for the 1756-L62 controllers in the HMS Primary and Secondary PLC chassis from v16 to v20.
 - * Upgraded firmware version for Ethernet modules (ENBT) in the primary and secondary HMS PLC chassis from v 4.8 to version 6.6.
 - * Verified firmware version running on ControlNet modules (CNB/D).
 - Compared with latest version available from Rockwell, and found that there was not a new available firmware for this type of ControlNet modules.
 - * Verified firmware versions for Redundancy modules (1757-SRM); firmware version 5.3.
 - Noted that Redundancy modules used in HMS PLC were older model in comparison with Redundancy modules used for SHMS.
 - * Generated HMS PLC project with RSLogix 5000 v20.
 - PLC project program included all modification a configuration for PLC controller and ENBT module.
 - * Downloaded PLC program v20 in the PLC controller.
 - * Noted that ENBT modules were not supported in the redundant system by PLC controller firmware version 20.58
 - * Noted issues to re-synchronize the redundancy modules
 - * Able to run new HMS PLC program with version 20, but there was a fault due to the Redundancy modules (1757-SRM)
 - 1757-SRM redundancy modules are not compatible with RSLogix 5000 v20, the highest RSLogix 5000 version that is compatible with this redundancy modules is RSLogix 5000 v16.
 - * Since the problems in the redundancy configuration could not be solved due to its Redundancy hardware limitations, DSG had to return HMS PLC back to v16.
- Analyzed compatibility for communication and redundancy modules in order to upgrade HMS PLC from v16 to v20.
 - * Requires replacing CNB/D ControlNet modules with CN2 ControlNet modules in the Primary and Secondary HMS PLC chassis.
 - Confirmed with Rockwell's technical support that 1756-CNB ControlNet modules used for the five HMS Remote PLC chassis do not need to be replaced.
 - * 1756-RM2 is the newer version of the 1756-RM redundant module
 - 1756-RM2 modules are supported with the firmware controller 20.58 and can be used to replace 1757 SRM modules in Primary and Secondary PLC chassis
 - * The two 1756-ENBT modules need to be replaced in the Primary and Secondary HMS PLC by 1756-EN2T modules.



Detector Support Group

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- Worked on Python code to simulate the Danfysik power supply.
 - * Configured 435NBX module on the Hall C subnet to connect PLC to Hall C computer running Python program via serial.
 - * Started testing code by sending and receiving commands between DSG-PLC and Python.
- Updated DSG-Hall C PLC task list.
- Generated DSG Hall C PLC weekly report.

Eng. Brian

MVT

- All five mixing system Mass Flow Controllers (MFCs) zeroed.
 - * <https://logbooks.jlab.org/entry/3581864>
- Moved FTT from mix 1 to mix 2.
 - * Collaborators changed FTT gas system to use Mix 2, requiring gas controls program to be updated.
 - * <https://logbooks.jlab.org/entry/3581897>

DC

- Increased the mixing pressure set points by 20 psi.
 - * Low set point increased from 60 psi to 80 psi.
 - * High set point increased from 80 psi to 100 psi.
 - * Maximum pressure limit increased from 100 to 120 psi.
 - * <https://logbooks.jlab.org/entry/3581875>

Hall B Gas

- Upgraded all cRIO firmware/software to LabVIEW 2018
 - * <https://logbooks.jlab.org/entry/3581662>
 - * <https://logbooks.jlab.org/entry/3581789>
- Found a bad ground connection on gas shed breakout box, which was causing intermittent pressure reading failures on mix 1 pressure.
 - * <https://logbooks.jlab.org/entry/3581889>

Hall B Magnets

- Meeting to discuss pre-power up checklist
 - * DSG will be using the approved checklists but performing the reduced checkout procedure.

Hall C

- Tried upgrading the HMS PLC to version 20, but some of the modules aren't supported with anything past version 16, prompting system to be so downgraded back to version 16.
 - * <https://logbooks.jlab.org/entry/3581548>



Detector Support Group

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Hoebel, Amanda

HDIce

- Successfully tested NMR Rack #1.
 - ★ Tested for sync and async runs.
 - ★ Tested for 1,000 cycles.
- Added CT-Box field value averaging to data file.

Hall C

- Put current monitoring loop program on DSG-PLC for testing.
 - ★ Program successfully tested with *pyserial* and Tyler's Python program.
 - ★ Current monitoring loop program worked.
- Installed LabVIEW 2018 on Hall C computer.

Jacobs, George

GAS Systems

- Received Swagelock gap inspection gauges
- Discussions with procurement and vendor on C4F10 PO
- Meeting on RTPC gas system with Carlos and student
- Confirmation of C4F10 order received, F2 delivery estimate; 20 Aug
- Installed RICH N2 panel upgrade and verified proper flow and operation

Leffel, Mindy

LERF Cryomodule 1

- Stripped cable insulation on all conductors to length.
- Terminated one type of every connector and cable to ensure proper strip lengths.
- Instructed technicians working overtime to on how to complete cables.

Lemon, Tyler

RICH

- Installed, with George, updated nitrogen panel with increased flow capabilities on Forward Carriage.
 - ★ Maximum flow possible is 60 slm over two output channels (~120 slm total).
 - ★ Both input lines to RICH are connected to a T-fitting at output channel 1 of panel.
 - ★ Panel's regulator was set to ~5 psi to prevent changes in supply pressure from affecting nitrogen flow.
 - ★ Manual rotameter for channel 1 set to ~40 slm
 - Flow verified using local flowmeter display.
 - ~40 slm is the same flow capability as the full scale of the old panel.
 - ★ N2 cRIO hardware interlock program modified to convert voltage to flow in liters/minutes for new, higher capacity flowmeters.



Detector Support Group

Weekly Report, 2018-07-25

- EP cRIO hardware interlock program successfully converted to LabVIEW 2018 and tested on DSG's development cRIO.
 - * N2 cRIO program conversion to LabVIEW 2018 in progress; waiting on availability of spare modules.
 - * Will wait to update both interlock cRIOs in Hall B at the same time.

Hall C

- Completed PLC code for HMS spectrometer vacuum task.
 - * HMS PLC program updated to add WRG vacuum gauge to HMS Q3 I/O chassis.
 - * Updated program turned over to Hall C; Hall C will determine when to download changes to HMS PLC system.
 - * DSG's portion of task complete.
- Developed Python program to simulate communication to/from Danfysik power supply.
 - * Since DSG cannot use actual MPS and PLC system to debug code additions, Python program will allow debugging of serial commands and PLC logic.
 - * NBX 435 module used as PLC-to-serial gateway.
 - NBX 435 module set up on Hall C development subnet.
 - Code added to DSG-PLC program to read/send messages to module.
 - * Version 1 of Python program:
 - Listens to serial port on PC for MPS commands in the correct syntax.
 - Simulates ramping up to a set current upon receipt of correct command.
 - Responds to PLC via serial with present simulated current value.
 - * Version 2 will have program giving responses in the same syntax of the MPS.
 - Version 1 only responds with current value.
- Installation of *pyserial* package debugged on computers running *Spyder* IDE.
 - * *Pyserial* package adds serial communication functionality to Python.
 - * Scientific Python Development Environment (*Spyder*) is the recommended integrated development environment (IDE) for scientific programming in Python.
 - * During installation of *pyserial* on experimental hall subnet computers, problems arose from accelerator firewall preventing direct download of *pyserial* from Python's package repository.
 - * Solution used to install *pyserial* was to download its source code and then use Python's package installer to install it from the local copy of source code.
 - * After package installation, *Spyder*'s path to Python packages had to be updated to include location where the Python's package installer placed it.



Detector Support Group

Weekly Report, 2018-07-25

McMullen, Marc

Gas System Controls

- MFC power chassis is complete, tested and installed in the Hall B Gas Shed
 - * All operational MFCs are connected and running.
- Gas Shed control chassis taken offline for repairs.
 - * Analog output cable repaired.
 - * Ground wire re-soldered inside the chassis.

LTCC

- Sector 2 daily flow has been observed to be much greater than previous measurements.
 - * Flow measured to be almost double the previous rate
 - Increased from ~40 L/day to ~80 L/day.
 - * Increase in daily flow may be due to leaking connections after reinstallation on Forward Carriage.
 - * Hall B notified of increase, resulting in request to stop flow to detector.
- Wrote upgrade proposal document for the Hall B gas system.
 - * First upgrade will implement an auto-generated gas systems report.
 - * Report generated by upgraded program will provide a quick reference for monitoring all the system parameters.