# Detector Support Group
## Weekly Report, 2018-06-20

## Summary

### Hall C

- HMS and SHMS Dipole field regulation investigated for use of NMR PT2026 in PLC routine.
    - Found Flex I/O module for HMS in the detector, under the rack on the floor.
    - Specs for Flex I/O adapters and Profibus modules revised.
        - Profibus modules are used to transfer data from serial RS232 to ControlNet in SHMS PLC systems.
    - Commands that are sent to regulation-module RG2024 checked.
        - Commands are used to send and receive data from the NMR and PSU to the PLC.
        - PLC Dipole code sends separate commands to the RG2024 module to perform the field regulation.
    - The implementation of the new routine to perform the Dipole field regulation and NMR PT2026 unit will require modifications in several existent PLC programs and HMI screens.
- SBC card set up and configured to communicate with NMR PT2026 unit.
    - Debian Linux installed on SBC.
    - IP address assigned (129.57.195.33) for the Hall C- DEV subnet.
    - VXI implementation was corrupt on NMR unit- bypassed with Python VXI11 driver.
        - NMR can now communicate with SBC.
- Factory Talk View Studio v10 installed on DSGPLC1 and dsg-hallc-2 PCs to run HMI (.sed) files used for SHMS and HMS.
    - Incorrect software version used to open HMI files caused error.
        - Error showed "unnamed displays".
    - SHMS and HMS projects had to be opened in "grace period", since there is no available license to run more than 25 displays in FactoryTalk View SE.
    - Mike Fowler informed on 6/21/18 the correct version of Factory Talk, version 8.
- Shutter controls and monitoring discussed with Joe Beaufait.
    - For SHMS shutter:
        - Fully opened status gives 24V read-back.
        - Installed and fully closed, or uninstalled gives 0V read-back.
            - No way to distinguish between shutter "uninstalled" and shutter "installed and fully closed".
        - Current wiring only allows remote monitoring/controls via PLC to open shutter or see if shutter is open.
    - Local controls in place for HMS shutter.
    - No actual wiring diagram exists for either shutter.
        - Wiring diagram is "in Joe's head".
    - Implementation of shutter installation monitoring would require a wire loop.
        - Existing wire to shutter most likely does not have enough pins to support this wire-loop connection.
- Hall C 1756-IB16D diagnostic digital input module implemented in DSG's PLC test station for development of UPS monitoring.
    - Relay card for small UPS will send a 24V signal to HMS I/O chassis digital input.
    - There are several spare diagnostic digital inputs for relay card output in the SHMS and HMS PLC systems.
    - Also investigating how to use diagnostic input to sense a broken signal wire to potentially use relay as a short between input terminals without 24 V supply.

## RICH
- Air-cooling compressor powered on for electronics testing.
  - ✦ Airflow 1 set to ~500 slm, airflow 2 set to ~400 slm.
  - ✦ Electronics testing completed, compressor powered off.

## HDice
- NMR program asynchronous mode debugged.
  - ✦ Asynchronous mode would crash with a memory error after ~ 7 cycles.
  - ✦ The memory leak was caused by the field display array not being cleared between cycles while running in asynchronous mode.
- Initialization sequence on Fast Resonance Scanner program debugged.
  - ✦ Program halted with an error during the instrumentation communication check in the initialization sequence.
  - ✦ The model number for the Rack #1 Rohde & Schwarz signal generator is different from Rack 2 causing the instrumentation communication check to fail.
  - ✦ The 7060 relay I/O module check also failed the instrumentation communication check because a 7060D (D for display) was used in the RF box.
  - ✦ Code was changed to accept both model types of signal generators and relay I/O modules.
- Measurements of cable lengths and inventory of connectors and adaptors taken for RF cables in Rack 1.

## SVT
- Wire between the cold plate faraday cage ground and the L1C on S3 M15 repaired.
  - ✦ Was damaged either when MVT was removed from SVT or SVT "drip pan" was removed.
- Hardware interlock system updated to give averaging and trip delay controls to individual sensors.
  - ✦ Program upgraded to LabVIEW 2017 and deployed to test station cRIO for debugging.
  - ✦ Configuration file utility subVI corrected to implement new arrays for individual sensor controls.
    - ▪ Because arrays for new controls were not added to configuration file, the cRIO was always reading the configuration file as having a fault.
    - ▪ Changing averaging and trip delay controls to arrays and creating a new configuration file resolved issue.
  - ✦ Program update complete and running successfully on test station cRIO.
- All 12 HTSB2 cables fabricated.

## LTCC
- Leak test setup for sectors 2 and 3 have been moved to the floor of Hall B for access to 160 subnet.

## HTCC
- Flow increased to 18 Lpm.
  - ✦ Alarm settings in EPICs changed to 25 Lpm.

## Gas System
- Assembly of the first MFC power chassis started.
  - ✦ Machine work necessary to install dual power supplies and power supply redundancy module completed.

## Antonioli, Mary Ann

- Worked on formatting and editing 3-page table for Pablo's Note.
- Attended Hall C safety walk-through.

## Bonneau, Peter

### HDice

- Working with Amanda on the debugging of the asynchronous operating mode on the NMR program.
  - Asynchronous mode would crash with a memory error after ~ 7 cycles.
  - Synchronous mode successfully passed 2000 cycles.
  - The display processing of multiple-cycle field data is different between modes due to the greater density with synchronous operation.
  - The memory leak was caused by the field display array not being cleared between cycles while running in asynchronous mode.
  - The memory leak was fixed and an extended asynchronous test run of 2000 cycle sweeps was started.
- Debugged initialization sequence on Fast Resonance Scanner program.
  - Program halts with an error during the instrumentation communication check in the initialization sequence.
  - The model number for the Rack #1 Rohde & Schwarz signal generator is slightly different from Rack 2 causing the instrumentation communication check to fail.
  - The 7060 relay I/O module check also failed the instrumentation communication check because a 7060D (D for display) was used in the RF box.
  - Code was changed to accept both model types of signal generators and relay I/O modules.

### SVT

- Setup SVTCRIO2 cRio for testing the Hardware Interlock System software upgrade code by Mary Ann and Tyler.

### Hall C

- Held daily status and planning meeting on HMS and SHMS PLC control systems.
  - Work on how the HMS & SHMS field regulation routine and interface to NMR and the power supplies is progressing.
  - HMI control and monitoring screens were reviewed.
  - UPS interface has been received.
  - DSG is waiting on information from Hall C on spectrometer vacuum controls and shutter wiring diagram.

## Campero, Pablo

### Hall C

- Worked on HMS and SHMS Dipole field regulation PLC routine.
  - Analyzed existent SHMS Dipole PLC program to understand current logic and configurations used in the system.

- ✦ Revised specs for Flex I/O adapters and Profibus modules used to transfer data from serial RS232 to ControlNet in SHMS PLC systems.
- ✦ Check commands sent to regulation module RG2024 which is use to send and receive data from the NMR and PSU to the PLC.
  - ▪ PLC Dipole code sends separates commands to the RG2024 module to perform the field regulation.
- ✦ Determined that implementation of new routine to perform the Dipole field regulation and NMR PT2026 unit will request modifications in several existent PLC programs and HMI screens.
- Collaborated with Brian to set up SBC card.
  - ✦ Connected keyboard, mouse, and display to the SBC card to run Linux OS.
  - ✦ Assigned IP address (129.57.195.33) to be in the Hall C- DEV subnet.
  - ✦ Pinged PT2026 NMR unit from the SBC card to test communications.
- Installed Factory Talk View Studio v10 on DSGPLC1 and dsg-hallc-2 PCs to run HMI (.SED) files used for SHM and HMS.
  - ✦ Debugging issues related with "unnamed displays" as consequence of incorrect software version used to open HMI files.
  - ✦ Run SHMS and HMS projects in "grace period", since there is no available license to run more than 25 displays in FactoryTalk View SE.
  - ✦ Started to look into Dipole MPS, Interlocks and NMR screens.
- Met with Joe to discuss about shutter controls and monitoring.
- Generated Hall C weekly report with the status of task performed by DSG.


- Collaborated with Tyler to turn on the **RICH** air compressor to allow test in the electronics.
- Provided layout and measurements for the length for six coaxial cables that will be used in the **HDice NMR** instrumentation at the rack #1.


- Researched about NI 9205 ADC module to be tested in the **cRIO Test Station**
  - ✦ Analyzed specifications for absolute accuracy at different input ranges.
  - ✦ Proposed wiring to connect grounding differential voltage signals to the module.
    - ▪ Differential measurement configuration allows more accurate measurements and less noise in the input signals.
- Revised and edited Solenoid Cooldown PLC Programs **DSG note**
  - ✦ Generated table with detailed explanation for two DBX PLC programs that are used to calculate Solenoid cooldown parameters and enable the cooldown interlock s.
- Installed Studio v31on DSGPLC1 PC.

## Eng, Brian
### SVT

- Repaired L1C ground that was damaged either when MVT was removed from SVT or SVT "drip pan" was removed.
  - ✦ https://logbooks.jlab.org/entry/3577938

## Gas System
- LTCC setup in ESB was moved to Hall B.
  - ✶ Needed to move from 86 to 160 subnet.
  - ✶ Marc and I got the hardware ready for leak testing, need to double check code for IPs.

## Hall C
- Received SBC, installed Debian (official version from vendor) on SD flash while waiting for eMMC storage to arrive.
  - ✶ Found that NI VISA won't install (not supported on that version of Linux or architecture, x86_64 only).
  - ✶ Bypassed bad VXI implementation on NMR unit with Python VXI11 driver, can now communicate with instrument from SBC.

## Hall D
- Slow controls meeting. Scot is changing DC gas setup, after his work is complete will upgrade NBX firmware.
- PXI upgrade on hold while waiting for CC to deploy new PTP server.

# Hoebel, Amanda
## HDIce
- Debugged NMR program.
  - ✶ Program would hang-up during non-sync mode.
  - ✶ Problem found to be not clearing graphs during non-sync mode at the beginning of a sweep.
- Measured RF cables in Rack 1 for Rack 2 fabrication.

## Hall C
- Took Hall C walkthrough.
- Spoke with Joe Beufait on shutter wiring diagram, with Pablo, Tyler, and Brian.
  - ✶ Discussed possible way to allow shutter-in-place detection.
    - ▪ Would have to hook up voltage loop.
    - ▪ Probably not enough pins in the shutter wire.
- Found table of commands in Danfysik 8000 PS manual.

# Jacobs, George
- Ordered additional hardware for RICH N2 ppm H2O sensor installation.

# Leffel, Mindy
## HDICE
- Controls rack cables.
  - ✶ Took inventory of connectors and adaptors, need one SMA connector, will need more of each if more cables are needed.
  - ✶ Started fabricating cables.

### SVT
- HTSB2 cables complete.
  - ★ Tested for continuity.
  - ★ Affixed Kapton tape to back of boards for isolation.
  - ★ Attached two layers of heat shrink for strain relief.

- Hall C safety training.

## Lemon, Tyler
- Powered on **RICH** air-cooling compressor for electronics debugging with Pablo.
  - ★ Airflow 1 set to ~500 slm, airflow 2 set to ~400 slm.

- Tested and debugged update to **SVT** hardware interlock system to give averaging and trip delay controls to individual sensors.
  - ★ Update made by Mary Ann in LabVIEW 2016.
  - ★ Updated program to LabVIEW 2017 and deployed it to test station cRIO for debugging.
  - ★ Corrected configuration file utility subVI to implement new arrays for individual sensor controls.
    - ▪ Because arrays for new controls were not added to configuration file, the cRIO was always reading the configuration file as having a fault.
    - ▪ Changing averaging and trip delay controls to arrays and creating a new configuration file resolved issue.
  - ★ Program update complete and running successfully on test station cRIO.

### Hall C
- Met with Joe Beaufait to discuss SHMS shutter.
  - ★ SHMS shutter uses two separate voltage signals: one causes shutter to close and one to cause shutter to open.
    - ▪ Shutter is only either fully open, fully closed, or uninstalled.
  - ★ SHMS shutter has LED indicators in hall to show whether it is open or closed.
  - ★ SHMS shutter remote monitoring/controls via PLC only allow users to open shutter or see if shutter is open.
- Implemented borrowed Hall C 1756-IB16D diagnostic digital input module in DSG's PLC test station for development of UPS monitoring.
  - ★ Relay card for small UPS will send a 24V signal to HMS I/O chassis digital input.
  - ★ There are several spare diagnostic digital inputs for relay card output.
  - ★ Also investigating how to use diagnostic input to sense a broken wire to potentially use relay as a short between input terminals without 24 V supply.

## McMullen, Marc
### LTCC
- Set up mobile pressure/flow monitor and controls in hall b. Sectors 2 and 3 have been moved to the floor of hall b.

**Gas System**

- Started assembly of the first MFC power chassis. Completed machine work necessary to install dual power supplies and power supply redundancy module.

**HTCC**

- Increased flow to detector to 18Lpm and changed alarm settings in EPICs to 25Lpm.