



## Detector Support Group

### Weekly Report, 2016-02-24

Glossary: EDC = Estimated Date of Completion.  
MFC = Mass Flow Controller.

## Ongoing Projects

### I. Hall B Magnet Slow Controls (Brian, Peter, Amanda, Tyler)

Task: Test Power supply.

EDC: 2/25/2016

Work done: After several fits and starts (had slow discharge and water flow interlocks that needed to be bypassed) *finished testing PLC & MPS communication*. Along the way fixed a few errors with the PLC code. Verified that the PLC can turn on and turn off the supply, can read back the current as well as set it. Trying to determine slew-rate settings for MPS, currently doesn't match the manual. Per manual there should be a DAC that accepts absolute values [mA/sec], but that doesn't work, we also have a 12-bit DAC available to set the slew-rate. Ruben is contacting Danfysik with findings. Will need to duplicate similar testing once EPICS GUIs are available.

Comments: **Brian :** I'm going to run to the Hall one more time today to test a change we made in the PLC code that was preventing us from turning on the MPS while it was in remote mode.  
After that the next testing (Task 1a) we need to do with the MPS is to verify the EPICS GUIs mirror what the PLC tags say (so basically similar tests that we just performed today, put a small amount of current and make sure it is read back).  
Since I don't have an exact time frame for when the GUIs will be completed (could be tomorrow, could be next week). I'll leave the schedule up to you guys (Josh and Rubin) (I wasn't sure when the water cooled cable needed to be removed).  
I'll be sure to let everyone know when we're ready to need current from the supply again, in the meantime the low voltage supply to just the controls that Krister had wired up before will be fine if you wanted to lock out the 480VAC.

Status: **Task 1 completed, 2/22/2016. Task 1a started.**



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#### II. Hall B Gas System Hardware (George, Marc, Sahin, Mindy, Anatoly)

Task: Install Gas System hardware.

EDC: **TBD**

Work done: Installed 6 MFCs for the LTCC.  
Supervised installation of LTCC.

Comments:

1. Rack on forward carriage still needs to be installed by Hall B Engineering. Once rack is installed, cRIO chassis and the interface chassis can be installed. Till the rack is installed, DSG has to wait.
2. The gas mixing system cannot be checked until ASME approved valves are installed. Saptarshi, upon his return from vacation, is expected to address this issue. DSG has to wait.
  - a. To check the gas mixing system DSG needs about 2—3 weeks, after the valves have been installed. DSG is of the opinion that the scheduled is tight, and *most probably can not be met*.
3. To run DC gas lines, the gas manifolds and the cable trays have to be installed on the Torus by Hall B Engineering. DSG has to wait.
4. Most of the gas system work by DSG can be performed only after Hall B Engineering facilitates the undertaking. So, DSG has to wait. “*They also serve who stand and wait*” John Milton.
5. No news about procurement of C<sub>4</sub>F<sub>10</sub> for LTCC. **Lead time for C<sub>4</sub>F<sub>10</sub> is about six to nine months.**
6. Argon for DCs yet to be ordered. Lead time is one month.
7. Four of the existing DC pumps have failed. DCGAS needs 6 new pumps (\$18,000), two are to be spares. DSG recommends phased procurement, starting March 2016 two pumps every four months.

**Status:** **Work in progress.**

#### III. Hall B SVT (Amanda, Brian, Mary Ann, Peter)

Task: Monitor long term test of the eight modules.

EDC: Test is expected to run till end of July 2016.

Work done: A program has been written to automatically acquire the data into SQLite. Once the data has been acquired the results are plotted using Mathematica.

Comments: Data is looked at once a week. For details, see Amanda’s section in the weekly report.

**Status:** **Analyzing data on a weekly basis.**



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#### IV. Hall B SVT (Amanda, Brian, Mary Ann, Peter)

Task: Bend test of HFCB  
EDC: 02/26/2016  
Work done: To check whether the bending of the wing cable was the source of the increase in HV current for certain modules, bend test of the HFCB was performed. Wing cable was bent and resistance and current were measured.  
Comments: Bend test of this HFCB showed no increase in current. Note, the manufacturer has had to perform bend test to comply with specifications. Only upon passing the bend test (done 10 times) were the HFCBs accepted.  
**DSG has ruled out sensors and HFCBs as the source of the problem.**  
**Status: Completed 02/24/2016**

#### V. Hall D PLC Systems (Peter, Tyler, Amanda, Mary Ann, Marc)

Task: Locate and document (including spares) the eight PLC systems in use.  
EDC: 03/15/2016  
Work done: All project files and all signals identified. Documentation complete. List of spares modules generated.  
Comments: **DSG will be sending the spares list to Nick Sandoval and Hovanes Egiyan. List has to be verified by one of them.**  
**DSG still needs to acquire photo of Tagger, Target, BCAL\_DS Point I/O, BCAL\_U Point I/O, FDC/CDC Point I/O.**  
**Status: Work in progress.**

#### VI. Hall B Gas System Slow Controls (Brian, George, Marc, Mary Ann.)

Task: Deploy all LabVIEW based slow controls software system  
EDC: 07/31/2016  
Work done: Deployed PID controller system.  
Comments: None  
**Status: Work in Progress.**



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VII. Hall B HDICE (Peter, Brian, Mary Ann, Amanda, Tyler, Mindy, Sahin)

Task: Fabricate RF box.

EDC: TBD

Work done: Receiving RF box components.

Comments: Regarding RF cables.

Hi Peter and Brian,

The results of noise study last week made no sense. We need more time to qualify the modified long Molex cable.

Due to some unknown reasons, the NMR rack in HDice lab picked up a lot of noise between last Tuesday and Friday. The averaged noise level in one of the Lock-in channels was more than 10 times bigger than another.

Looking into the individual scans we found that channel picked huge spikes (100 times bigger than the noise band) from every few seconds to up to a minute. Several conditions, including put in the 10 feet Molex cable (modified by Mindy), wiring-in and operating two large motors into the same HDice power loop (several kilo watts, by facility operation), etc., changed prior to the measurements. We finally got away the spikes Friday evening and mapping the noise again. We are now also trying to find the source of spike. This week will be really slow for both data taking and analyzing, because of CLAS collaboration meeting and training schedules.

Thanks,

Xiangdong

**Status:** Work in Progress

VIII. Hall B HTCC (Mary Ann, Mindy, Anatoly, Sahin)

Task: Fabricate cables.

EDC: 07/31/2016

Work done: Fabricating signal cables.

Comments: No news on ccompensation cables and connectors.

**Status:** Work in progress.



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#### Antonioli, Mary Ann

##### Hall B

###### HDice

- Began AutoCAD drawing of front and back panels of RF/attenuation box.

###### Gas System

- Completed Visio diagram of DC gas system pressure controls.

##### Hall D

###### PLC System

- Updated spares spreadsheet with numbers of modules being used for each detector.

##### DSG

- Formatting and editing SVT Hardware Interlock System note in InDesign.

#### Arslan, Sahin

##### Hall B

###### DC

- Replaced (Mindy and I) Ar/CO2 gas bottle for R1S4 in EEL Bldg room 125.

###### LTCC

- Removed the 6 obsolete MFC's from the panel and set aside for property excess.
- Removed old fitting and cleaned off old Teflon tape.
- Cut 2"x12 tubing for MFC assembly.
- Attached the new fittings and 6 new MFC assemblies to LTCC solenoid valve panel.
- Re-enforced (Mindy and I) LTCC valve panel support frame with unistruts.

#### Bonneau, Peter

##### Hall B

###### Magnet Systems

- Next DSG – Hall B Magnet Controls Meeting will be on Tuesday 3/1/16.
- Work on the distribution box controls expected to start ~ April 10th.

###### HDice

###### RF Switching/Attenuation Unit

- Debugging issues with NI-USB to RS-485 converter.
  - ★ The setup program for the DAQ modules within the RF Switching/Attenuation Unit is not working.
- Developed calibration program architecture for CAENels CT-box
  - ★ Calibration instrument drivers will be written with NI-VISA
- Xiangdong Wei reported problems with the HDice noise study on the Molex RF cable. HDice team needs more time to qualify the modified long Molex cable.
  - ★ Due to some unknown reasons, the NMR rack in HDice lab picked up *a lot of* noise between last Tuesday and Friday.



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- \* Several conditions, including addition of the 10 feet Molex cable (modified by Mindy), wiring-in and operating two large motors into the same HDice power loop were changed prior to the measurements.
- \* Working on trying to find the source of the noise spikes.

#### SVT

- Started review of control system software on Hardware Interlock System for upgrades.
- Monitored SVT Hardware Interlock System on a daily basis.

#### **Hall D**

- Attended Hall D Collaboration meetings.
  - \* Solenoid has been operating at 1200 Amps without incident.
  - \* Plans to raise solenoid current to 1300 Amps after spring run.
- Added missing signal names and tags to the PLC layout files for the Point I/O BCAL, Point I/O for FCAL/PS, Target, and the two Point I/O units for the Solenoid.

#### **DSG**

- Trained A. Hoebel and T. Lemon on Allen Bradley PLC systems.
  - \* Showed how program a function block diagram subroutine to process raw data from the ADC for the humidity sensors.
  - \* How to add subroutines to ladder logic.

#### **Eng. Brian**

##### **Hall B**

##### Gas System

- Confirmed that NI EPICS Client can only access PVs from an IOC on the same subnet.
- Installed and setup NI EPICS Server on development cRIO (on .86 subnet) for evaluation by Wesley, already found that it doesn't retain values between reboots.

##### Magnets

- After several fits and starts (had slow discharge and water flow interlocks that needed to be bypassed) finished testing PLC & MPS communication when supply current. Along the way fixed a few errors with the PLC code. Verified that the PLC can turn on and off the supply, can read back the current as well as set it.
- Trying to determine slew-rate settings for MPS, currently doesn't match the manual. Says there should be a DAC that accepts absolute values (mA/sec), but that doesn't work, we also have a 12-bit DAC available to set the slew-rate. Ruben is contacting Danfysik with findings.
- Will need to duplicate similar testing once EPICS GUIs are available.

#### **Hoebel, Amanda**

##### **Hall B**

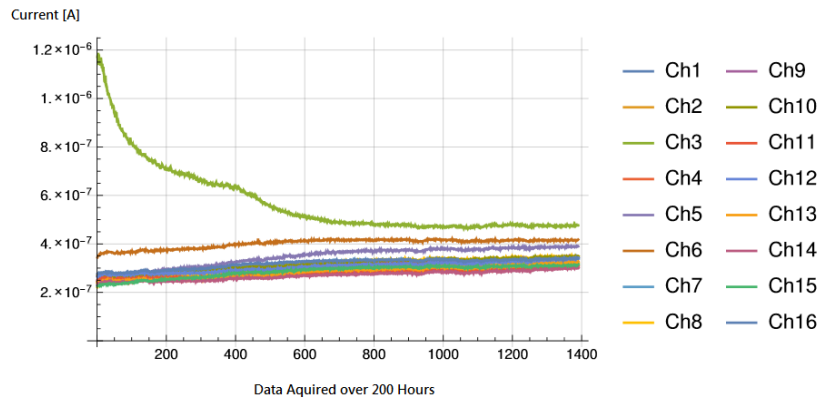
##### SVT

- Updated chart on current draws for spare modules.
  - \* Most currents appear to be steady- some may be increasing slightly.



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### Hall D

#### Detector

- Attended GlueX Collaboration Meeting.
- ★ Overall status of detectors and future goals discussed.

### DSG

- Worked with Pete and Tyler on PLC.
- ★ Created function block diagram in RSLogix to read humidity from ADC.

### Jacobs, George

#### Hall B

#### Gas Systems

- Produced new DCGAS diagram, DCGAS-clas12-Mixing-2-19-2016.pdf
- Updated DCGAS diagram, DCGAS-pressure-controls-2-19-2016.pdf
- Updated DCGAS diagram, DCGAS-clas12-Block-Diagram-2-22-2016.pdf
- Supported MicroMegas detector test and ordered more 10% Isobutane in argon gas
- Transferred Panametrics Moisture Monitor series 3 sensor chassis to Eugene Pasyuk.
- Conversations with Hall B staff about webcams for monitoring the gas systems bubblers.
- Participated in Hall B eng meeting, TORUS cable trays, TORUS DC mounts, Panel 2 TOF, and LTCC gas system work.
- Discussions on DC Gas system pump purchasing, spares, replacement time line, current system status.

### Leffel, Mindy

#### Hall B

#### DC

- Replaced Argon/CO2 cylinder with Sahin.

#### HDICE

- Terminated all four RF cables.

#### HTCC

- Terminated BNC end of 10 signal cables.

#### LTCC

- Worked with Sahin reinforcing valve panel support structure.



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### Lemon, Tyler

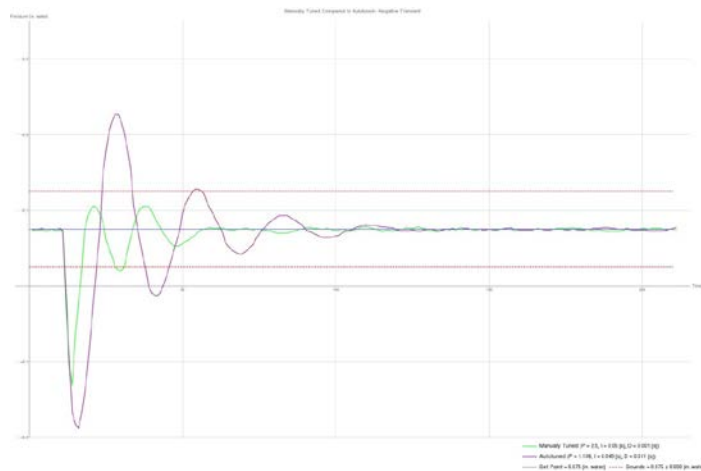
#### Hall B

##### Magnet

- Tested with Brian MPS control program on Magnet PLC.
  - \* Put MPS control board into Local and Remote mode using the PLC.
  - \* Set the current on the MPS control board and confirmed the PLC tags properly read the current values.
  - \* Forced communication error by unplugging power to check PLC shows a communication error and can reset the error.
  - \* Repeated communication error test with the network connection unplugged.

##### Gas System

- Implemented with Amanda and Marc Autotuning PID function.
  - \* Turned autotuning on for R3.
  - \* Implemented resulting autotuned PID parameters in R3.
  - \* Induced transients to compare to previous manual tuning.
  - \* Autotuned parameters used: P=1.108, I=0.045 [s], D=0.011 [s].
  - \* Manually tuned parameters used: P=2.5, I=0.05 [s], D=0.001 [s].
  - \* Autotuned takes longer to recover from transients and longer to get within the  $0.075 \pm 0.05$  [in. water] bound.



Autotuning response

### McMullen, Marc

#### Hall B

##### Gas System

- Installed cRIO in Gas Shed with Anatoli.
  - \* Connected DC return pressure mass flow transducers and added these signals in the software.
  - \* Made GUI for DC gas.





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- ★ Attended Hall B Engineering meeting.
  - Installation of cable trays on Torus to begin while LTCC cabling is being done.
  - ASME engineering for DC pressure relief valves will begin in April.

### DSG

#### Safety

- Completed quarterly walkthrough of EEL with EHS/Industrial Hygiene.
- Reported unsanitary conditions of 96b to EH&S/IH, they will investigate the problem.

### Sitnikov, Anatoly

#### Hall B,

- Tested HFCB board using 237 HV unit and 2002 Multimeter for SVT.
- Fabricated 6 cables for Gas Control system.