Detector Support Group

We choose to do these things "not because they are easy, but because they are hard".

Weekly Report, 2022-07-20

Summary

Hall A – ECal

Brian Eng, George Jacobs, Mindy Leffel, and Marc McMullen

- Investigating alternative solutions for the Supermodule heating elements other than heat tape

Hall A – GEM

Brian Eng, George Jacobs, and Marc McMullen

- Restored N_2 flow to the SBS GEMs – resumed remote monitoring

Hall A – GEp

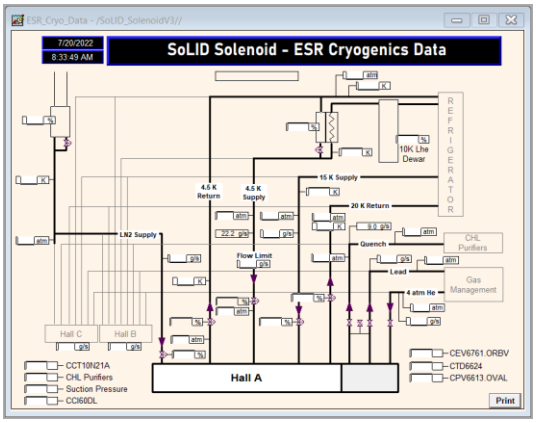
Mindy Leffel

- Terminated, tested, and labeled 60 RG59 SHV cables – 400 of 400 complete

Hall A – SoLID

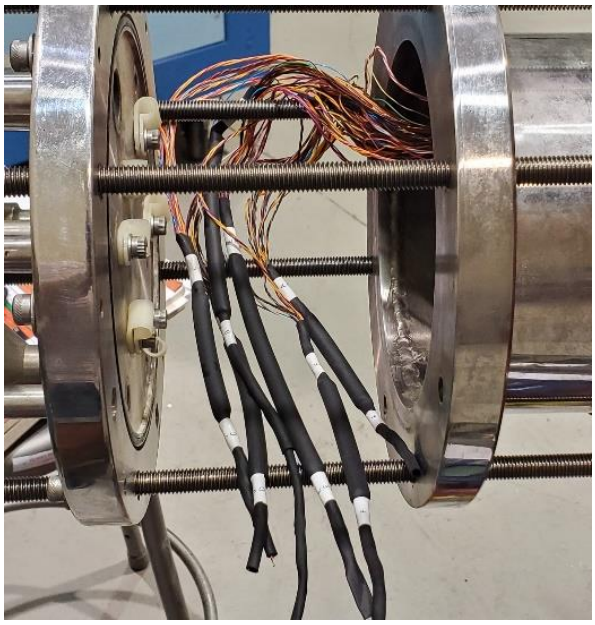
Pablo Campero, Brian Eng, Mindy Leffel, and Marc McMullen

- Debugged PT-102 and diode temperature sensors
  - ✶ Found that vendor of the CCR did not follow the specifications and recommendations from JLab to wire the instrumentation connectors
  - ✶ Modified wiring on instrumentation racks side to match wiring from vendor; drawings will need modifications as well
- Developed FactoryTalk View data logger
  - ✶ Setup Open Database Connectivity (ODBC) module to archive sensor readout data (temperature sensors, radial and axial support load sensors) on Phycad58 server
  - ✶ Configured files to be purged every 10 days
  - ✶ Changed data source for all trends from Tag (live data) to Data Log model, so trends can be displayed from the archived database
- Completed *Constant Current Source Board Controls* and *ESR Cryogenics Data* HMI screens



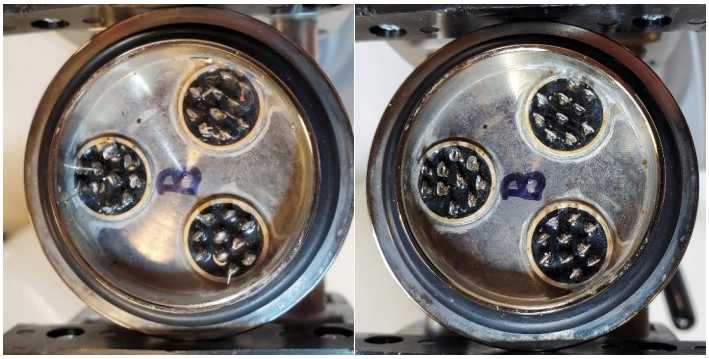
Screenshot of *Solenoid ESR Cryogenics Data* HMI screen

- Cut and isolated wires in turret flanges B-F – all wires disconnected
  - ✶ Straightened pins and cleaned solder from contacts



Wires disconnected and isolated

Bent pin before (left) and after (right)

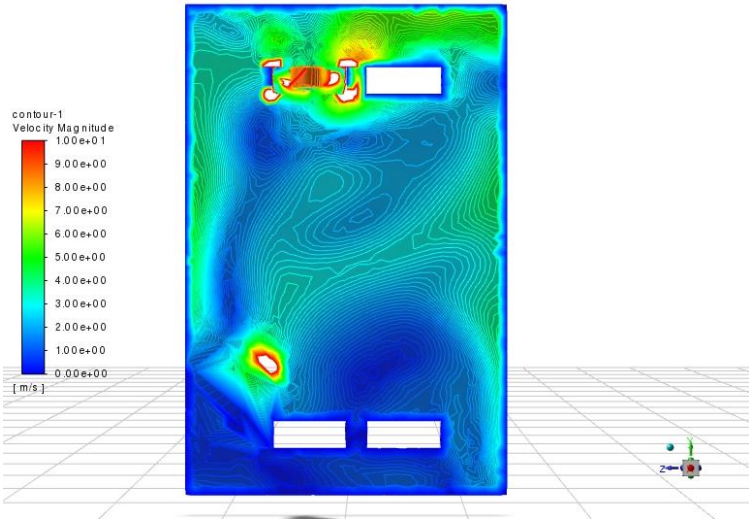


Contacts before (left) and after cleaning (right)

Hall C – NPS

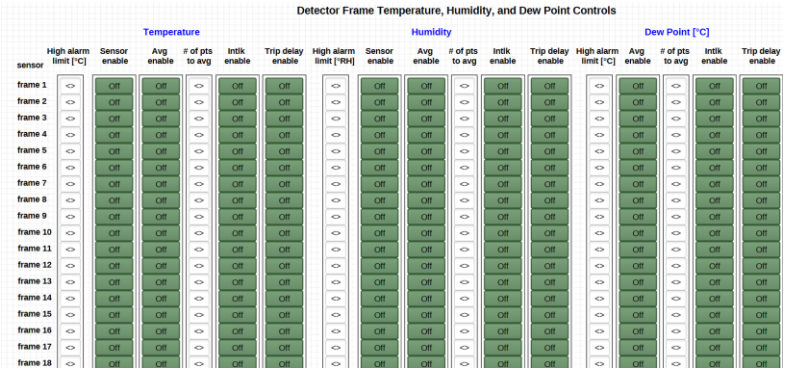
Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, George Jacobs, Mindy Leffel, Tyler Lemon, and Marc McMullen

- Developing Ansys Fluent thermal simulations which include heat exchangers' heat removal effects by adding rotation to the fans in a perfectly isolated detector enclosure
  - ✶ Ran simulation with rotation coordinates at x=0, y=1, and z=0 to see the fan rotation changes
  - ✶ Generated velocity contour plot



Velocity contour plot of YZ-plane; scale from 0 to 10 m/s

- Revised controls and monitoring Phoebus screens for crystal zones, electronics zone, crystal zone cooling, and detector frame



Screenshot of part of detector frame controls Phoebus screen

- HV CAEN cable testing – 40 of 40 cables complete

EIC

Pablo Campero, Brian Eng

- Updated services spreadsheet for MPGD tracking based on Hall A SBS/BB GEMs

DSG R&D – EPICS Alarm System

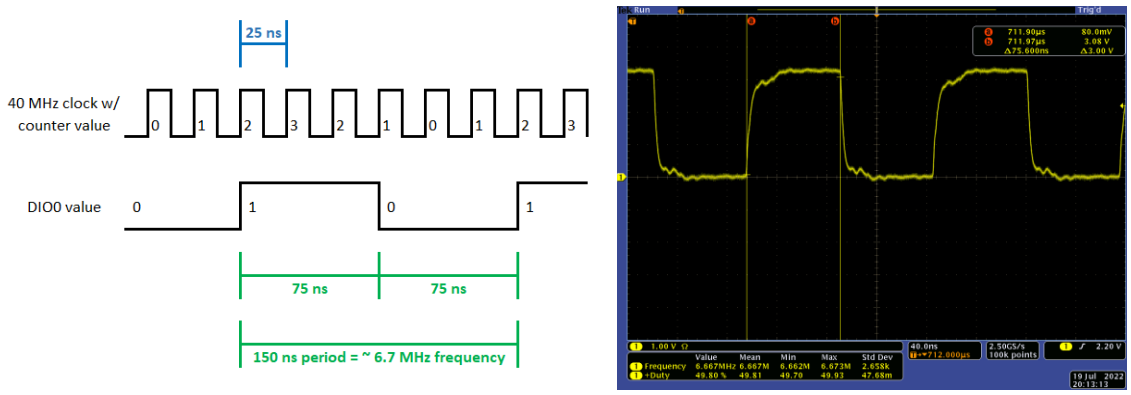
Peter Bonneau

- Developed alarm system preference properties file in the Phoebus 4.6.10 source code to define the NPS alarm configuration name, default values, and user interface settings
- Developing Kafka streams for Hall C NPS for Phoebus 4.6.10
  - ✶ Three Kafka streams are being developed to support NPS alarm system
    - Alarm state stream – reports to EPICS clients the alarm conditions of monitored PVs
    - Alarm configuration stream – streams alarm system configuration settings for PVs from the Phoebus user interface and from Alarm Server XML files to the alarm server
    - Alarm annunciator stream – streams PV alarm status data to an annunciator for audible warnings for users

DSG R&D – PXI

Peter Bonneau and Tyler Lemon

- Modified SHT35 sensor readout program for PXI
- Developed simple peer-to-peer streaming program
  - ✶ In this application, peer-to-peer streaming refers to writing data *to* and reading data *from* two FPGA modules installed in the PXI without going through the PXI's real-time processor or memory
  - ✶ Three programs needed – one to act as a writer to the stream, another to act as a reader from the stream, and a host program to configure and enable the stream
  - ✶ FPGA of PXIe-791R module was used as writer
    - Program executes and writes data to stream at 40 MHz rate
  - ✶ FPGA of PXIe-7846R module was used as reader
    - Program executes and reads data from stream at 40 MHz rate
  - ✶ Peer-to-peer stream configured in real-time program deployed to CPU of PXI controller
  - ✶ Resulting square wave from DIO0 channel was as expected – 6.67-MHz frequency square wave with a 50% duty cycle



Ideal timing and signal diagram for DIO0 (left), screenshot of oscilloscope showing actual DIO0 output (right)