Detector Support Group

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

Weekly Report, 2022-06-08

Summary

Hall A – GEn-II

Mindy Leffel

- Received 440 SHV cables with one end terminated and 450 connectors – removed existing labels

Hall A – SoLID

Pablo Campero, Mindy Leffel, and Marc McMullen

- Developing *Solenoid Interlock* HMI screen
  - ✶ Added indicators for cryogenic and vacuum interlocks
  - ✶ Added indicators for radial and axial support interlocks

Hall B – LTCC

Brian Eng

- Resolved unstable mass flow meter readout – issue caused by faulty hardware; replaced with spare: https://logbooks.jlab.org/entry/399859
- Resolved incorrect Omega pressure readout – https://logbooks.jlab.org/entry/3999547
- Prototyping method of initializing, and storing, startup values for MFCs and DAQ
  - ✶ Currently, handled separately in their own VIs
  - ✶ Want to update file on value changes above a specified threshold

Hall B – RICH-II

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

- Set up cooling system monitoring and verified correct sensor readout
- Set up uninterruptable power supply for hardware interlock system
- Debugged SHT35 sensor communication errors for three electronic panel sensors
  - ✶ Error occurs when signal to sensor is temporarily interrupted and temperature reading is 130°C for 1-3 DAQ cycles before communication is restored and normal temperature reading is received again
  - ✶ Implemented a 30 s trip delay for all temperature sensors to resolve issue
    - Temperature must be constantly over set limit for 30 seconds before HV and LV are disabled
  - ✶ Investigating adjusting timing of I^2C communication to SHT35 sensors to see if slower communication resolves issues (long term solution)

Hall C – NPS

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

- Developing hardware interlock LabVIEW program
  - ✶ Added network variables to LabVIEW code to enable EPICS Phoebus program control
  - ✶ Added random number generator for testing purposes

- Updating PV List spreadsheet with current list of all PVs
- Developing NX12 model of NPS detector for use in Ansys steady-state thermal and Ansys Fluent simulations
    - ✶ Inserted crystal array and heat exchangers with cooling tubes into model
- Developing Ansys Fluent thermal simulation which includes heat removal effects of heat exchangers
    - ✶ Using Ansys DesignModeler, created enclosures for each of the four fans to represent the rotation domain for each
    - ✶ Set temperatures for each heat exchanger plate to 10°C
- Glued four high voltage supply cable Radiall connectors – 40 of 40 complete
- Testing high voltage supply cables using Python – 27 of 40 complete

Hall D – JEF

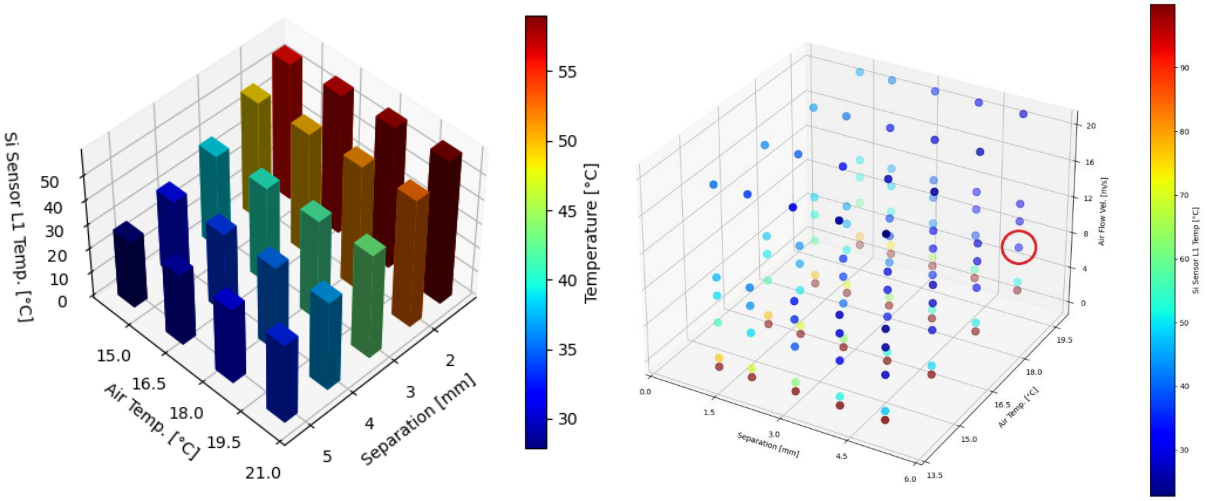
Mary Ann Antonioli, Aaron Brown, George Jacobs, and Mindy Leffel

- ESR foil pre-shaping – 1243 of 1600 foils complete
- Wrapped four crystals with ESR foil and Tedlar

EIC

Pablo Campero, Brian Eng

- Developed Python code to generate 3D bar plots
    - ✶ Plotted the temperature of Si sensor layer 1 when the airflow velocity in the annulus space and ambient is 5 m/s
    - ✶ Plotted the temperature of Si sensor layer 1 when the air temperature at the annulus space and ambient is 20°C
    - ✶ 3D bar plot (below) shows the temperature of Si sensor layer 1 when the separation between the inner face of Si sensor layer 1 and the outer face of the Be pipe is 5 mm
- Developed Python code to generated 3D scatter plot
    - ✶ 3D scatter plot (below) displays the separation between the Be pipe and the inner face of Si sensor layer 1, air temperature, airflow velocity, and the resulting Si sensor layer 1 temperature
    - ✶ Si sensor layer 1 temperature is ~33°C when there is a separation of 5 mm between the inner face of Si sensor layer 1 and the outer face of the Be pipe with air flowing at 20°C and 5 m/s (circled in red)



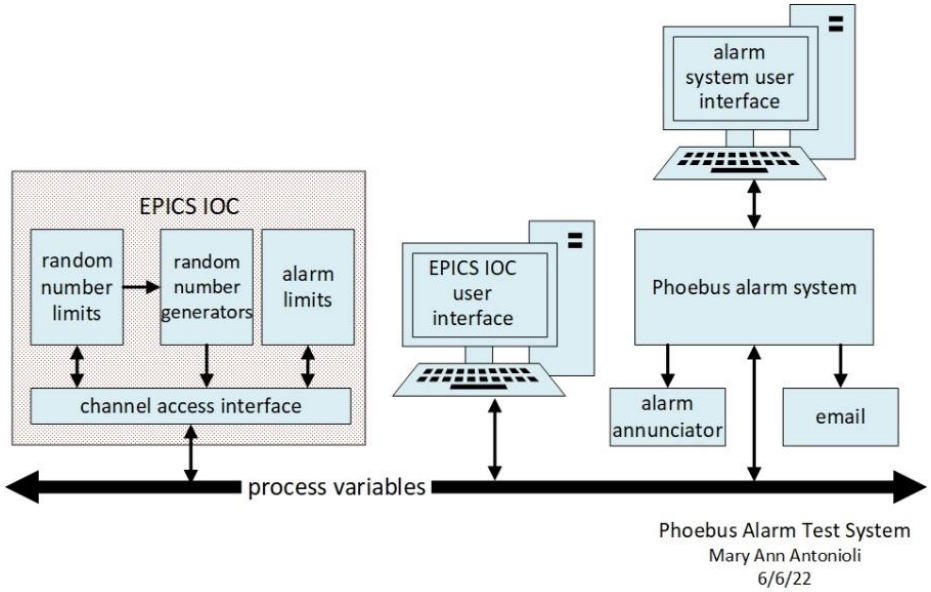
3D bar plot (left) and scatter plot (right) of Si sensor layer 1's temperature

- Attended Silicon Consortium meeting – presented slides on beam pipe simulation results

DSG R&D – EPICS Alarm System

Peter Bonneau

- Development of a modular test station for the Phoebus alarm system
  - ✶ Design includes an EPICS softIOC which generates Hall C NPS PVs to simulate a specific part of detector system (e.g. HV) for alarm system testing before implementation in the actual system
  - ✶ Test station uses Phoebus monitoring and control screens developed for experimental use
  - ✶ Test system will use same PV names implemented in the detector system



Phoebus alarm test station schematic