Detector Support Group

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

Weekly Report, 2021-11-24

Summary

Hall A – SoLID

Mary Ann Antonioli, Pablo Campero, Brian Eng, Mindy Leffel, and Marc McMullen

- Wiring instrumentation racks #1 and #2
  - ✶ Wired motor controller relay board, Dataforth module (including breakout board for vacuum, liquid levels, and pressure transducer signals), and 13 PLC terminal blocks
- Continued modeling SoLID instrumentation racks using NX12
  - ✶ Modeled parts for DIN railing, Motor Controller board, and assembled models for signal conditioners
- Developing index detailing number of sheets per drawing for all developed drawings
- Fabricated 20 ferrule-to-ferrule cables

Hall B – RICH-II

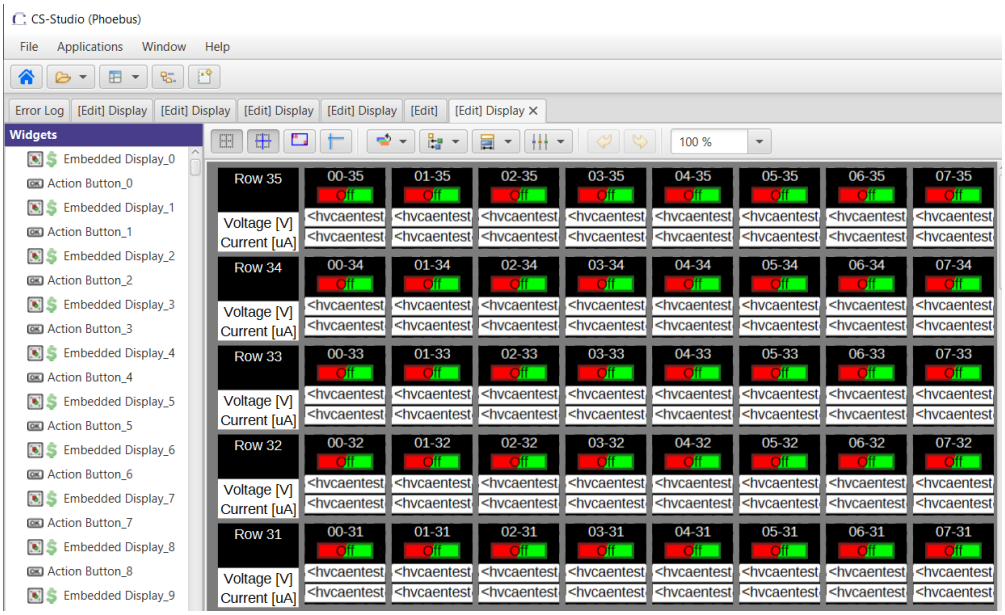
Mary Ann Antonioli, Peter Bonneau, Pablo Campero, Brian Eng, George Jacobs, Tyler Lemon, and Marc McMullen

- Reevaluating rotation forces on winch for detector assembly
  - ✶ Calculation necessary for safety approval of lift plan
  - ✶ Repeated calculation by hand
  - ✶ Starting to perform calculation in Ansys
    - RICH detector and assembly structure model imported into Ansys and going through process of generating meshes for all items
- Submitted procurement requests for RICH hardware interlock system components
- Revising safety documents – lift plan is being modified to account for weight added by stiffening tool (625 lbs.)
- Fabricated 13 Molex cables needed to connect sensors to hardware interlock chassis backplane
- Populating backplane PCB

Hall C – NPS

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

- Developed Python script to generate *Hall C NPS* Phoebus screen
  - ✶ Screen features an embedded display for each PMT channel, made by Mary Ann, with a power status LED and readback voltage and current
  - ✶ Each embedded display is overlaid with a transparent action button that, when clicked, opens a pop-up window for PMT settings, also made by Mary Ann, where user can set voltage and current limit for a channel



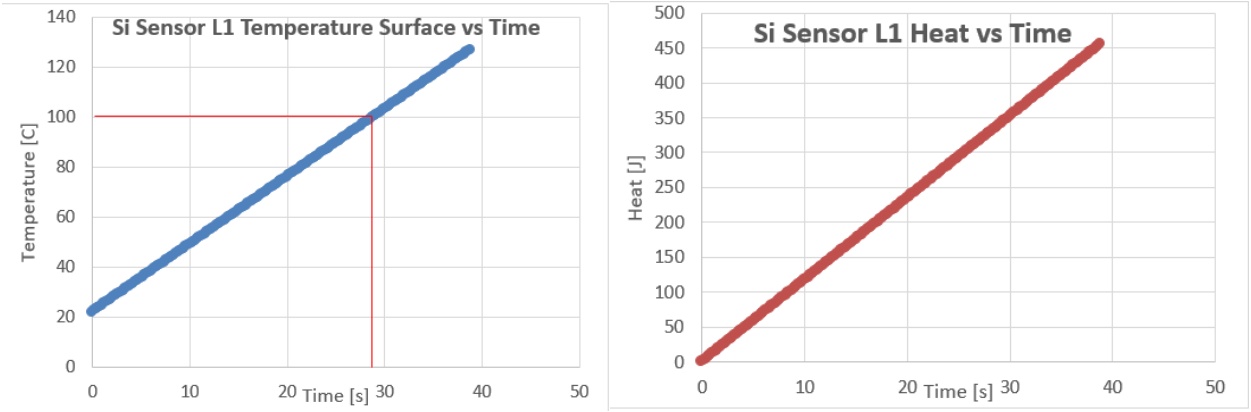
Screenshot of *Hall C NPS* Phoebus screen

- Developing Python script to generate voltage and current stability plots for each channel of a module to be included in the DSG testing & analysis MariaDB database
- Worked on ESR foil pre-shaping – 320 of 600 completed (~53%)

EIC

Pablo Campero, Brian Eng

- Manually calculated heat generated and temperature for the silicon sensor L1
  - ✶ Calculations done based on $T_{surface} = (Q/mc) + T_{ambient}$
  - ✶ Convective heat transfer Q to Si L1 inner surface given by Ansys is 11.71 W
  - ✶ Calculations, done every 0.2 s, indicate needing ~30 s to reach 100°C on Si L1



- Started simulation of the flow using Ansys *Fluid Flow*
  - ✶ Generated enclosure for the model

Antonioli, Mary Ann
Vacation

Bonneau, Peter
Vacation

Brown, Aaron
Hall C – NPS
- Developed Python script to generate *Hall C NPS* Phoebus screen
  - ✶ Screen features an embedded display for each PMT channel, made by Mary Ann, with a power status LED and readback voltage and current
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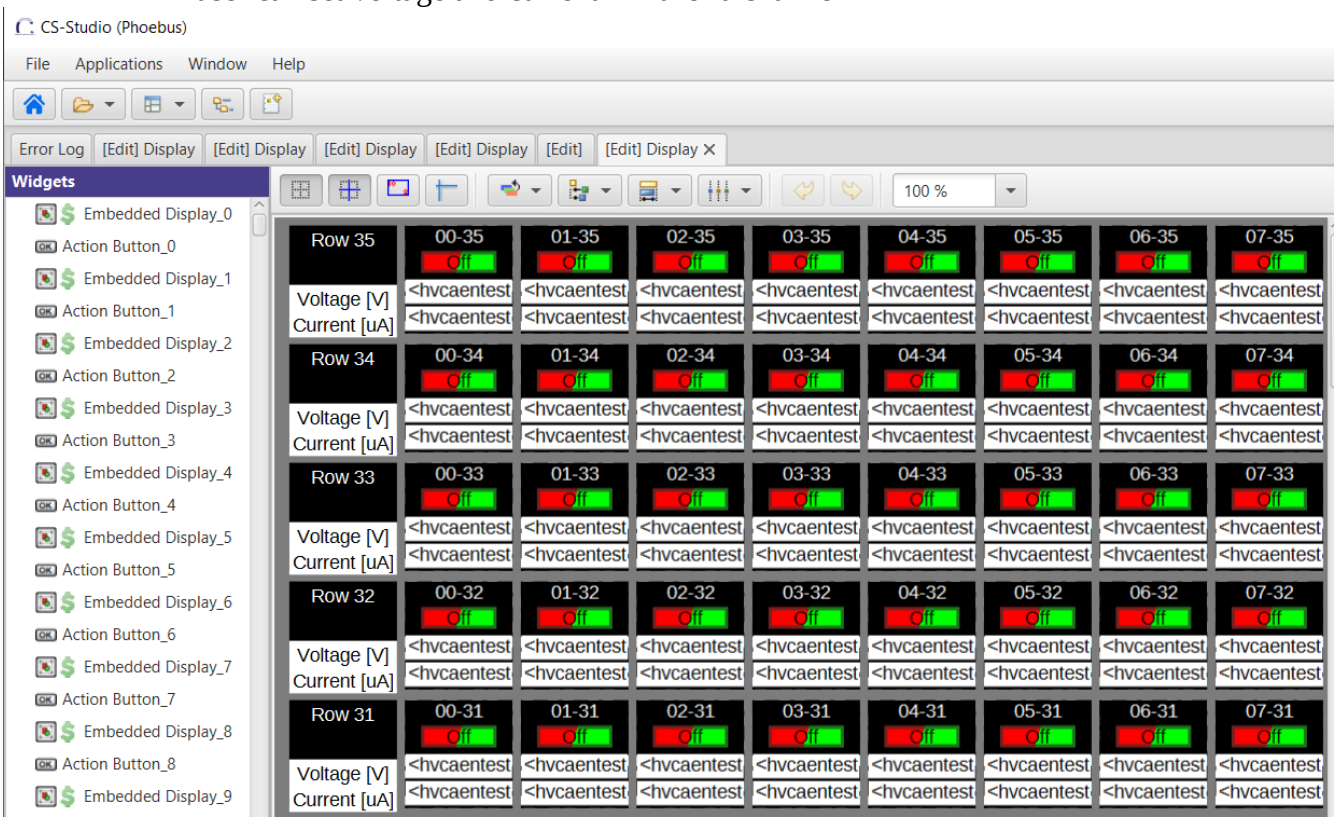


- Developing Python script to generate voltage and current stability plots for each channel of a module to be included in the DSG testing & analysis MariaDB database

DSG
- Attended daily meetings for DSG Projects
- Held weekly DSG-NPS R&D meeting
- Compiled, edited, and posted Weekly Report

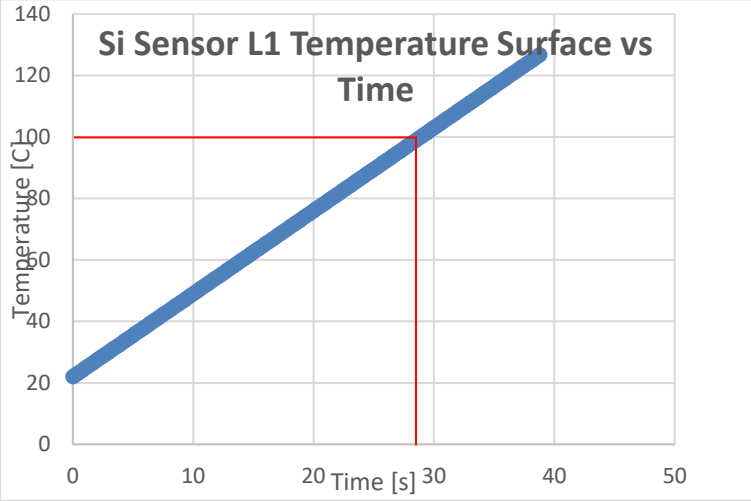
Campero, Pablo

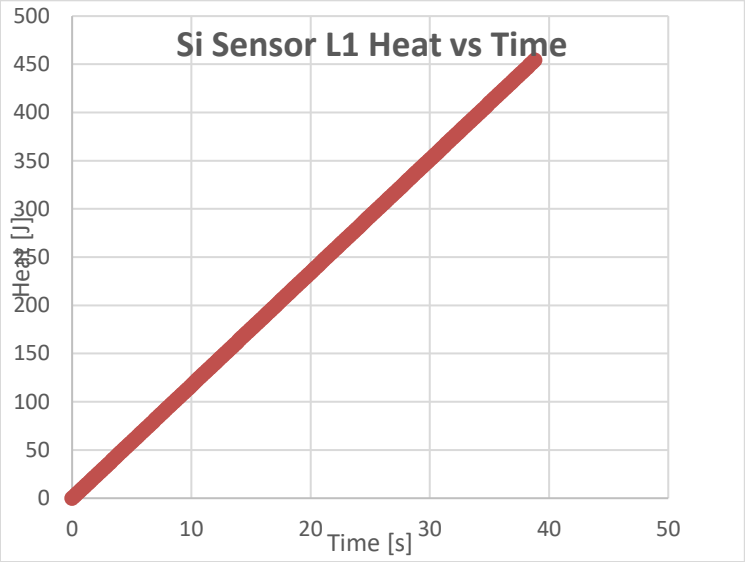
Hall A – SoLID

- With Mindy, worked on instrumentation racks' (#1 and #2) wiring for magnet control system
  - ✶ Wired motor controller relay board
  - ✶ Wired Dataforth module including breakout board for vacuum, liquid levels, and pressure transducer signals
  - ✶ Wired 13 PLC terminal blocks
- Updated *Cable Information* spreadsheet
- With Mary Ann, working on the index sheet (detailing number of sheets/drawing) for all developed drawings

EIC – Thermal Analysis

- Manually calculated heat generated and temperature for the silicon sensor L1
  - ✶ Calculations done based on $T_{surface} = (Q/mc) + T_{ambient}$
  - ✶ Convective heat transfer Q to Si L1 inner surface given by Ansys is 11.71 [W]
  - ✶ Calculation done every 0.2 s
  - ✶ Calculations indicate need ~30 s to reach 100°C on Si L1





- Started simulation of the flow by using Ansys *Fluid Flow*
  - ✶ Generated enclosure for the model

DSG

- Attended to the DSG projects status meetings
- Arranged meetings and generated meeting minutes to discuss the progress of the SoLID Magnet Controls project

Eng, Brian

Vacation

Jacobs, George

Vacation

Leffel, Mindy

Hall A – SoLID

- Fabricated 20 cables (ferrule-to-ferrule)
- Worked with Pablo wiring racks

Hall B – RICH-II

- Started populating backplane PC board
- Fabricated 13 Molex cables (hardware interlock chassis backplane to sensors)

Hall C – NPS

- Reflective film pre-shaping: completed 50, 180 to date; total 320

DSG

- Attended weekly meetings

Lemon, Tyler

Hall B – RICH-II

- Writing note on hardware interlock chassis design in NX12

- Submitted procurement requests (PRs) for RICH hardware interlock system components
  - ✶ PR 408047P – nylon standoffs for PCBs, banana plugs for connecting external ground to chassis' RJ45 ports' shield, gas system sensor USB feedthroughs, and gas system sensors USB and D-Sub connectors
  - ✶ PR 408048 – screws and nuts for mounting PCBs to chassis
  - ✶ PR 408050 – 100-ft flat, CAT7 cable for I^2C connection between hardware interlock chassis and feedthroughs at detector
- Reevaluating rotation forces on winch for detector assembly
  - ✶ Calculation necessary for safety approval of lift plan
  - ✶ Repeated calculation by hand
  - ✶ Starting to perform calculation in Ansys
    - ▪ RICH detector and assembly structure model imported into Ansys and going through process of generating meshes for all items

McMullen, Marc

Hall A – ECal

- Inspected one ECal Supermodule frame for assembly

Hall A – SoLID

- Continued work on SoLID rack in NX12
  - ✶ Modeled parts for DIN railing, Motor Controller board, and assembled models for signal conditioners

Hall B – RICH-II

- RMC update
  - ✶ Projected arrival 12/06/21
- Backplane PCB update
  - ✶ Currently being assembled for testing by Mindy Leffel
- Safety documents
  - ✶ Lift plan is being modified to account for weight added by stiffening tool (625 lbs)
  - ✶ Strap dimensions will reflect the change in location of rigging
- Patch panel quote has been sent to INFN
  - ✶ INFN has requested a final quote from GandR Metals of Newport News for fabrication
  - ✶ Submitted and received quote to fabricate RICH II hardware interlock chassis

DSG/Safety

- Started proposal on multichannel gas control system