



Detector Support Group

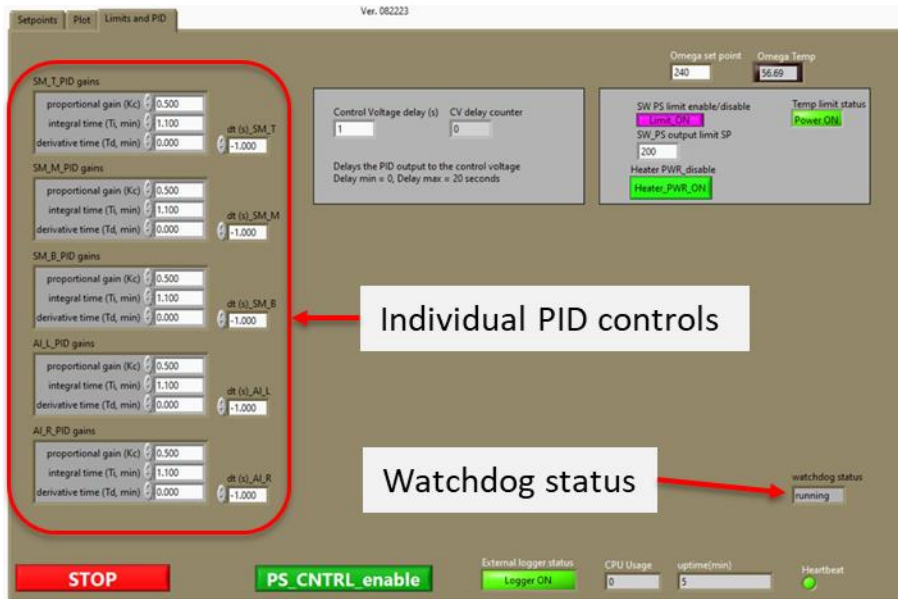
We choose to do these things "not because they are easy, but because they are hard".

Weekly Report, 2023-08-23

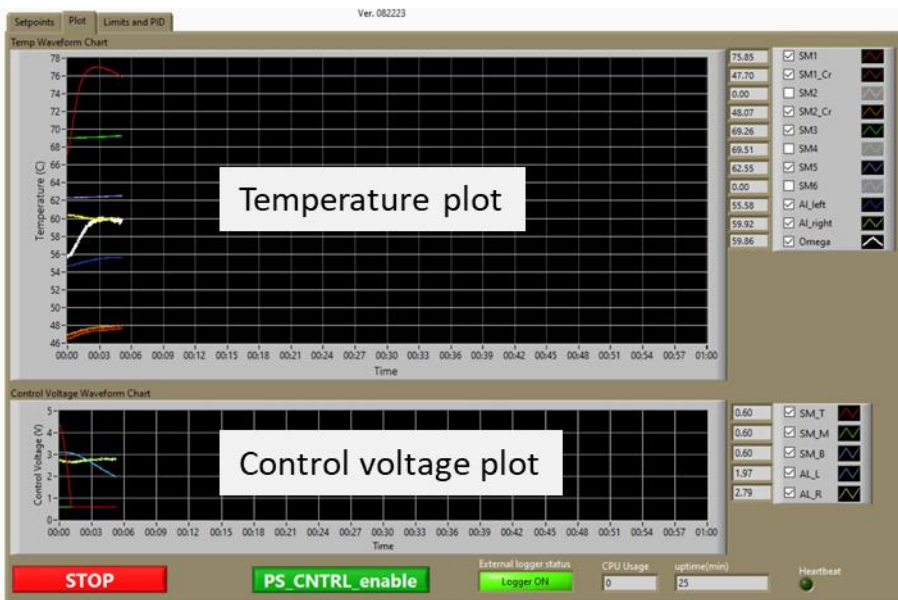
Hall A - ECal

Brian Eng, Mindy Leffel, and Marc McMullen

- Continued optimization of controls software
 - Added individual PID controls and settings for all five channels
 - Installed NI-Watchdog software on cRIO to automatically reboot the cRIO if timer not reset within 30 seconds



- Added code to read and update controls setpoints to a configuration file
- Added a separate plot for control voltage



- Fabricated two high voltage cables with Fischer connectors; 17 of 24 completed



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Hall B – Environmental Monitoring

Brian Eng

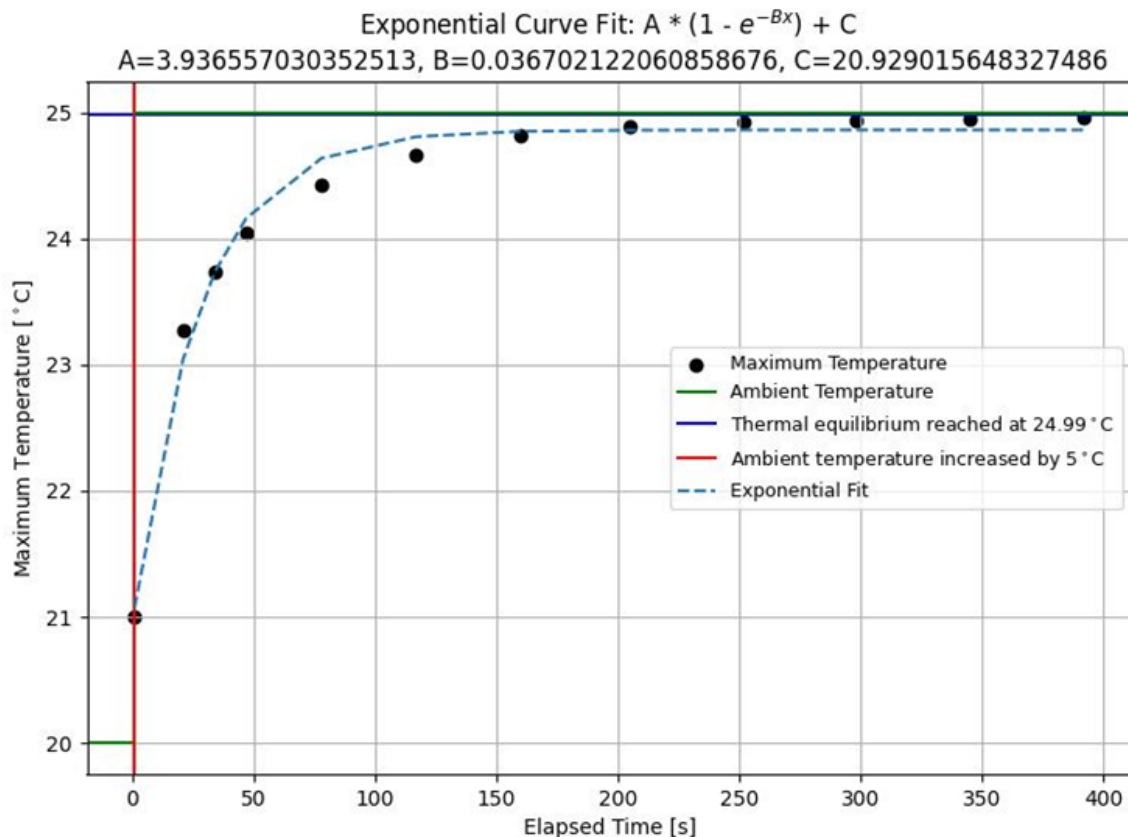
- Working on using existing ActiveMQ broker to accept MQTT
 - ★ Able to update ActiveMQ with both command line programs and microcontroller via MQTT
 - ★ Issues using C++ API on ActiveMQ side to convert data into EPICS; Python script will be used temporarily

Hall C – NPS

Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng,

Mindy Leffel, and Marc McMullen

- Debugging thermal readback and chiller controls LabVIEW program
 - ★ Revised code to read the correct variable to cut power to the high voltage crates and chillers based on flow meter temperature and pressure
 - ★ Added code to check if chiller readback temperature setpoint matches user temperature setpoint, and if not, setpoint is incremented by 1 and sent to chiller
- Wrote Python program to monitor the chiller readback temperature setpoints, and if they do not match the user setpoints, automatically email users
- Set up the cRIO—set hostname and IP address and downloaded necessary software
- Made plot of 5°C increase Ansys transient simulation results with exponential fit





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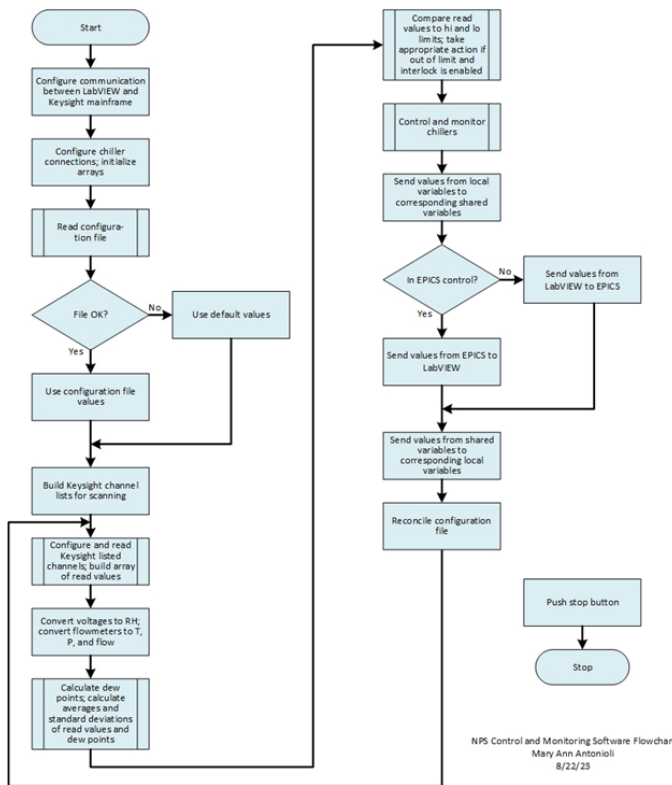
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- Made table showing slope and rate of change for temperature

t [s]	T [C]	m (C/s)	M (C/s ²)
2001	20.998		
2021	23.268	0.1135	
2034.4	23.74	0.035224	-0.00584
2047.8	24.05	0.023134	-0.0009
2078.5	24.426	0.012248	-0.00035
2117	24.671	0.006364	-0.00015
2160.4	24.818	0.003387	-6.9E-05
2205.9	24.89	0.001582	-4E-05
2252.2	24.925	0.000756	-1.8E-05
2298.9	24.944	0.000407	-7.5E-06
2345.8	24.955	0.000235	-3.7E-06
2392.9	24.962	0.000149	-1.8E-06

- Made two LabVIEW subVIs that build a shared variable array from individual shared variables
 - ★ Each subVI handles the same array type (such as sensor enable, average, or lo limit) for each detector area (such as crystal zone or detector frame); one subVI can have up to 14 builds
- Completed Visio flowchart of control and monitoring code

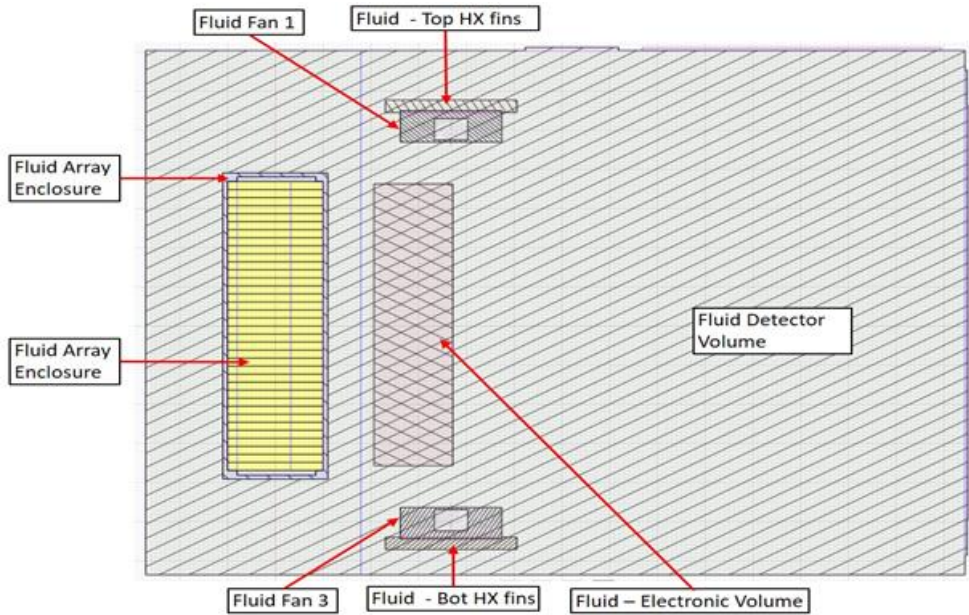


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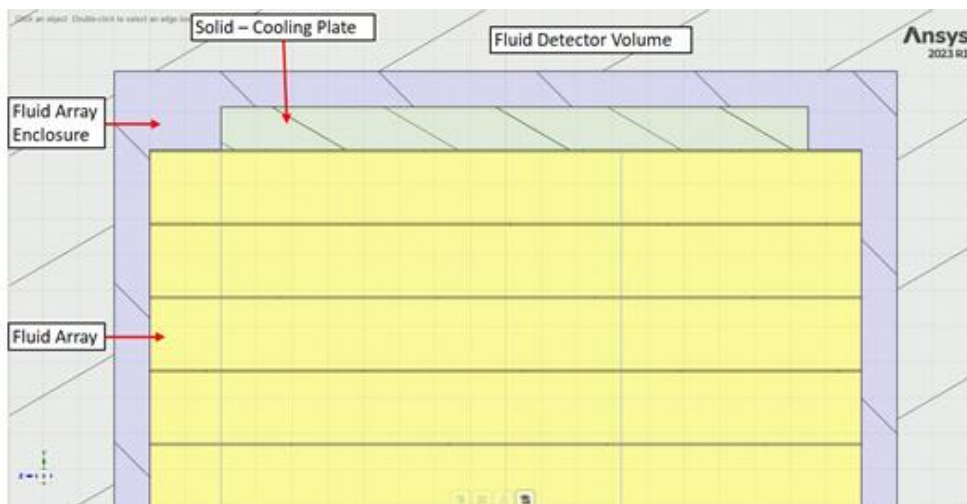
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- Ansys Fluent thermal analysis
 - ★ Reducing number of cells for the mesh with Ansys Meshing
 - Implemented body sizing option for each crystal
 - Generated conformal mesh between crystal and surrounding fluid
 - Received meshing error while trying to mesh heat exchanger fans, due to poor quality
 - Modified model geometry into ten fluid zones



Right side, cross section of model showing portion of fluid zones



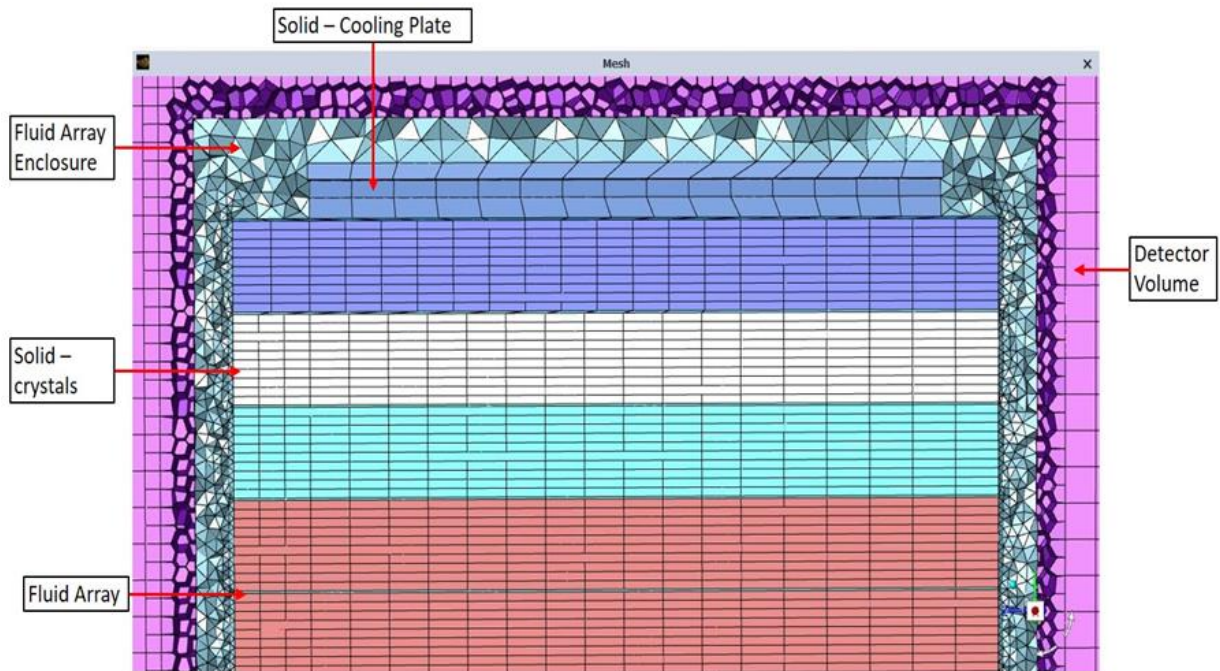
Right side, cross section, close-up of fluid surrounding the crystal array upper section; crystal blocks removed from view

- Reduced number of cells for the model's mesh from ~100 M cells to ~13 M cells; system is operational

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Right side, cross section, close-up of fluid surrounding the crystal array upper section. Used different cell types to mesh solid and fluid domains

Hall D – JEF

Mindy Leffel

- Populated 10 PMT bases; 560 of 1750 completed
- Wrapped five crystals with 3M foil and Tedlar; 816 completed

EIC - DIRC

Mary Ann Antonioli, Mindy Leffel, Tyler Lemon, and Marc McMullen

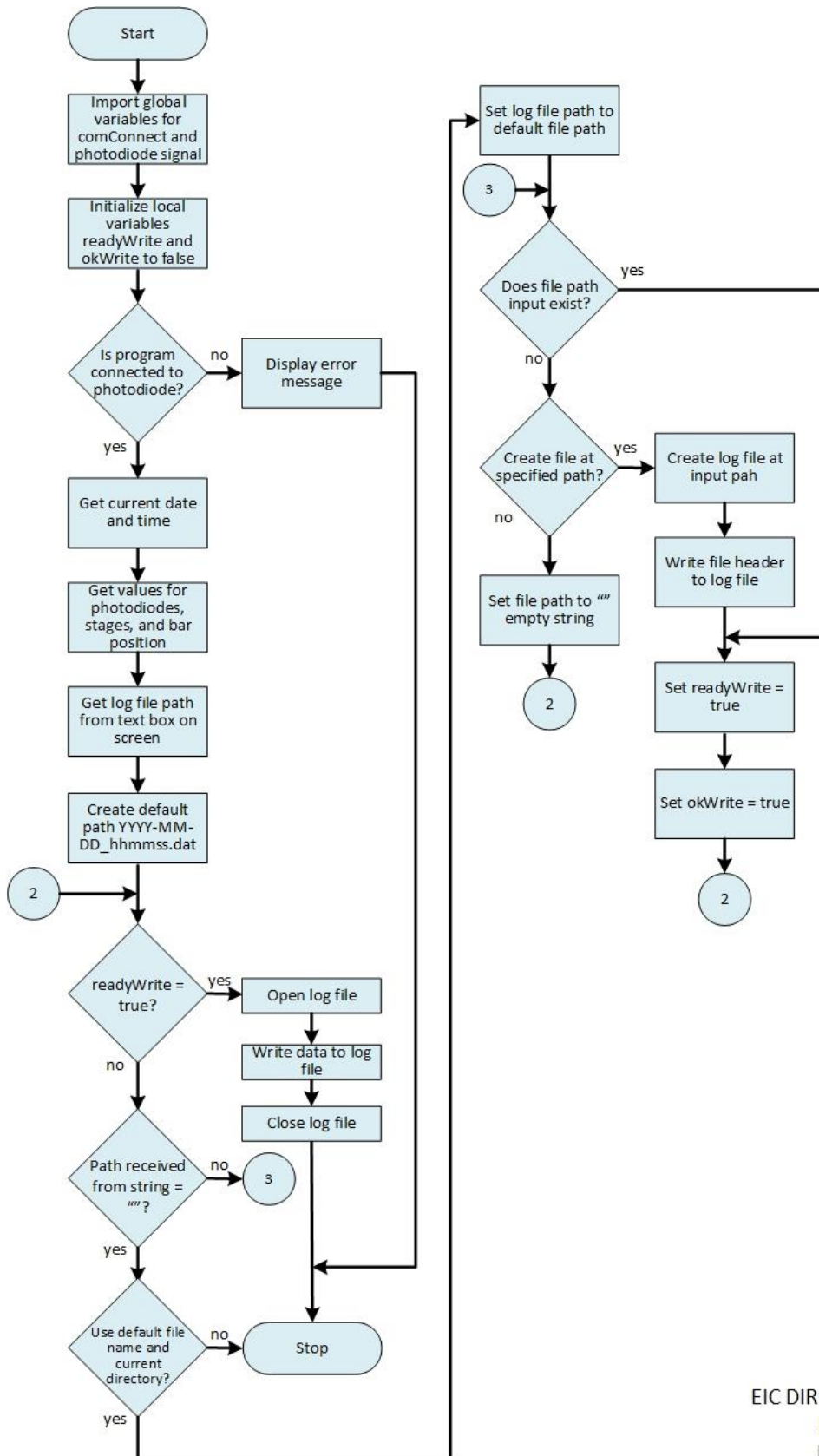
- Modified laser interlock circuit schematic to include 330-Ω resistors to limit current to K1 and K2 relays
- Created logging subroutine Visio flowchart of user interface



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EIC DIRC Remote User Interface –
 Logging Subroutine
 Mary Ann Antonioli
 8/22/23

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EIC – RICH

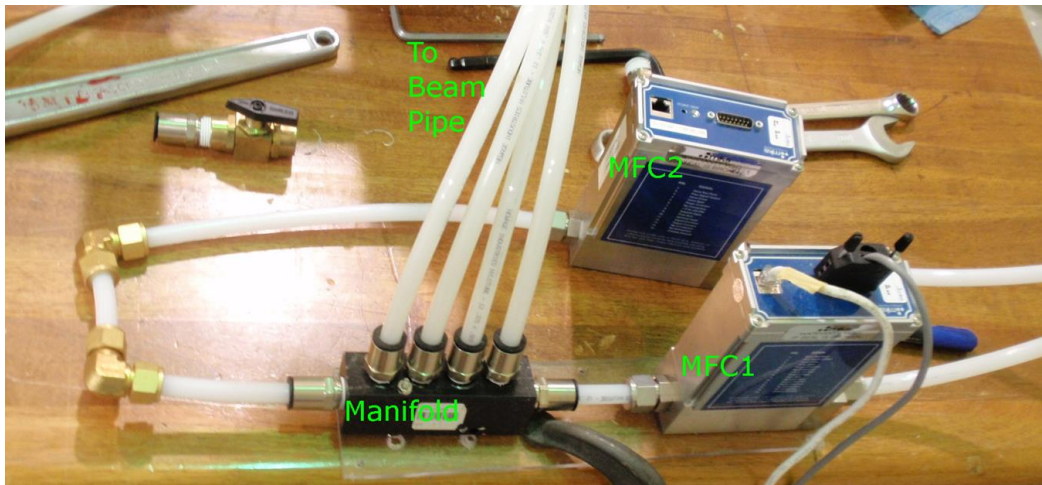
Tyler Lemmon

- Because custom fiber splitter/coupler using UV-damage-resistant fibers is unavailable, investigating ways to use a UV-rated beamsplitter and/or mirrors to direct light for reflectivity tests

EIC - Thermal Test Stand

Pablo Campero, Brian Eng, George Jacobs, and Marc McMullen

- Added MFC2 to increase maximum air flow capacity

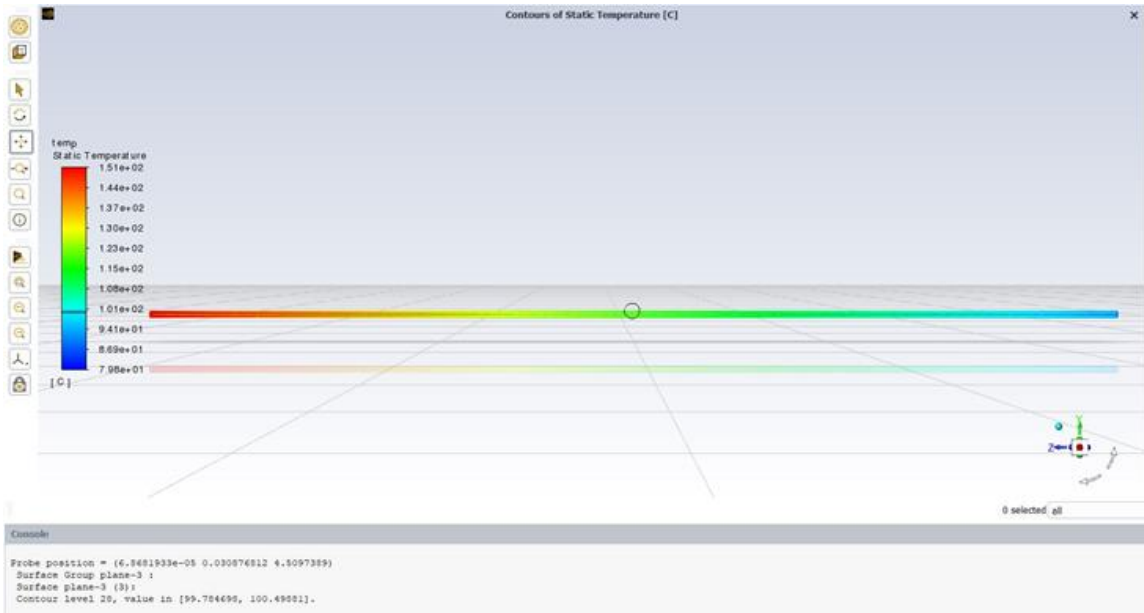


- EIC Ansys Fluent thermal analysis of beryllium pipe length
 - ★ Made two models—pipe inner volume, pipe, and insulator (model 1) and pipe inner volume (model 2)
 - Encountered issues meshing model 1 because of thin components; completed mesh for model 2
 - ★ Performed simulations on model 2

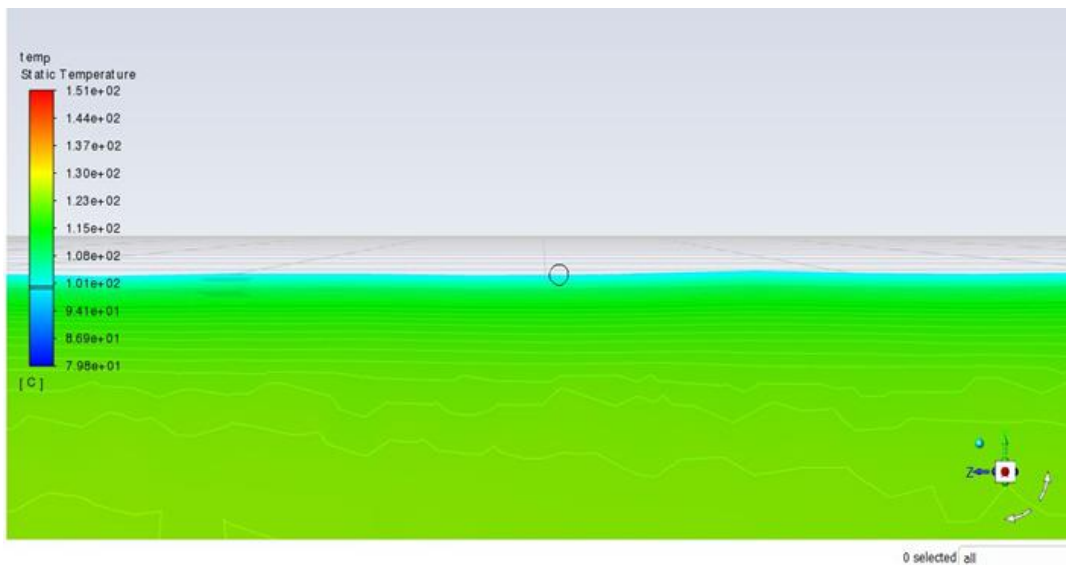
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Temperature profile with probe at the central section of the beampipe when the inlet air flow is set to $\sim 151^{\circ}\text{C}$ with a velocity of 5 m/s. The central section reached $\sim 100^{\circ}\text{C}$.



Right side, cross section, close-up of the beryllium pipe central section. Probe in black circle.

DSG

Tyler Lemmon

- Debugging and testing Fomrlabs 3D printer
 - ★ Disassembled printer and cleaned galvanometer mirrors
 - ★ Recleaned main mirror and optical window
 - ★ Received free samples from Formlabs of gray resin and resin tray to create test prints; prints were improved, but still failed
 - ★ Recleaned galvanometer mirrors, as recommended by Formlabs
 - ★ Print in progress