DSG NPS Work Status Meeting

Date: July 30, 2020
Time: 10:00AM – 11:00AM

Attendees: Peter Bonneau, Aaron Brown, Brian Eng, George Jacobs, Tyler Lemon, Marc McMullen, Brad Sawatzky, Jack Segal, Stephen Wood

1. CAEN System Testing Status Update
    - 1.1. Currently completing voltage stability tests using EPICS. Thirteen of the 34 modules have been tested with 2 MΩ resistor load. Stability tests using GECO 2020 have been completed for 32 of 34 modules.
        - 1.1.1. Module #349 channel #13 never reached the set 1500 V (hovered around 70-80 V).
        - 1.1.2. A detail report of how modules performed will be provided once testing is completed.
    - 1.2. For CAEN SY4527 crates and A7030TN modules currently in use in Hall C, firmware will be upgraded with the latest version before the experiment starts.
    - 1.3. Decided to wait until a representative from CAEN can come to the lab to have the pin issue resolved for all modules rather than have the boards sent to Italy.

2. Cable Fabrication
    - 2.1. Five hundred of ~1100 HV divider cables have been fabricated.

3. EPICS Controls & Monitoring Screens Development
    - 3.1. Overview and Voltage/Current Readback screens are being developed. In addition to these screens, there will be a need to develop at least one controls screen to enable setting of voltage/current and ramp rates.
    - 3.2. Discussed types of environmental monitoring screens and instrumentation that will be needed.
        - 3.2.1. Researching appropriate sensors for high radiation areas. Thermistors were suggested as they are more radiation hard.
        - 3.2.2. NPS Environmental Monitoring System Signal List can be found on DSG website: https://www.jlab.org/div_dept/physics_division/dsg/technical_documentation/Hall_C/NPS_3/Manuals_and_Specifications/NPS_Environmental_Monitoring_Signal_list.pdf

4. Planned Work
    - 4.1. Discussed procurement of materials for, and fabrication of, thirty-four 140’ multi-conductor cables.
        - 4.1.1. Received quotes from CAEN for 40 Radiall 52-pin connectors ($17,587) and one Radiall insertion/extraction tool ($333).
        - 4.1.2. Waiting for quote from General Wire for 6000 ft. of 52-conductor, 5 KV, multi-conductor wire; Hall D just purchased 2000 ft. at $5.79 per foot.
        - 4.1.3. Brad will get clarification from Carlos regarding part numbers for connectors.

5. Miscellaneous
    - 5.1. Progress on work done by DSG for NPS will be updated on the Hall C Technical Documentation section of DSG website: https://www.jlab.org/physics/dsg/technical_documentation/hall_c/NPS

Appendix

From Brad's first email:

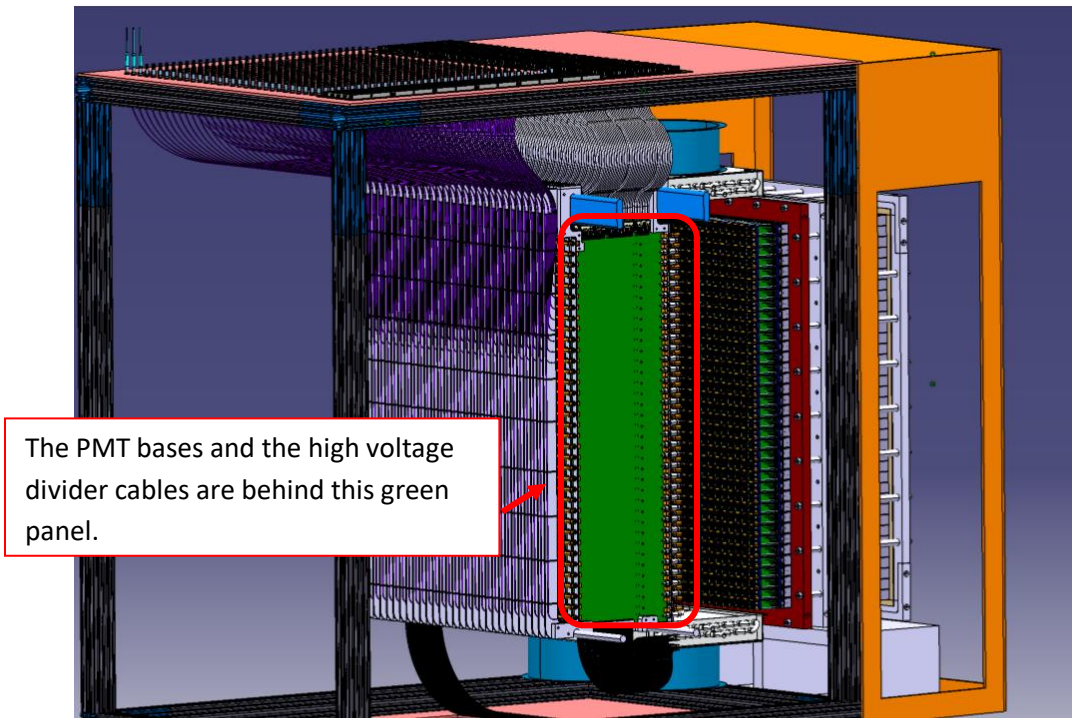
The part in document 1 is actually a cable assembly (PMSD), which comes with connectors and cables. If the DSG is going to be making the cables then we only need the part number for the connectors alone.

Brad believes that the part we should be concerned with is the SAMTEC IPBD units (the connectors that are part of the cable assembly).

Either way, both the PMSD and the IPBD units are only rated to 600 VDC, but the voltage to be used in the experiment is ~1100 VDC. Even though these units have been quality tested to 1000 V (so they *may* be okay), this would definitely trigger some sort of safety review.

Brad is asking if the HV patch panel on the top exterior of the NPS has been fabricated already or if the parts have already been procured. He wants to know if there is still a window to redesign this with new, properly rated connectors.

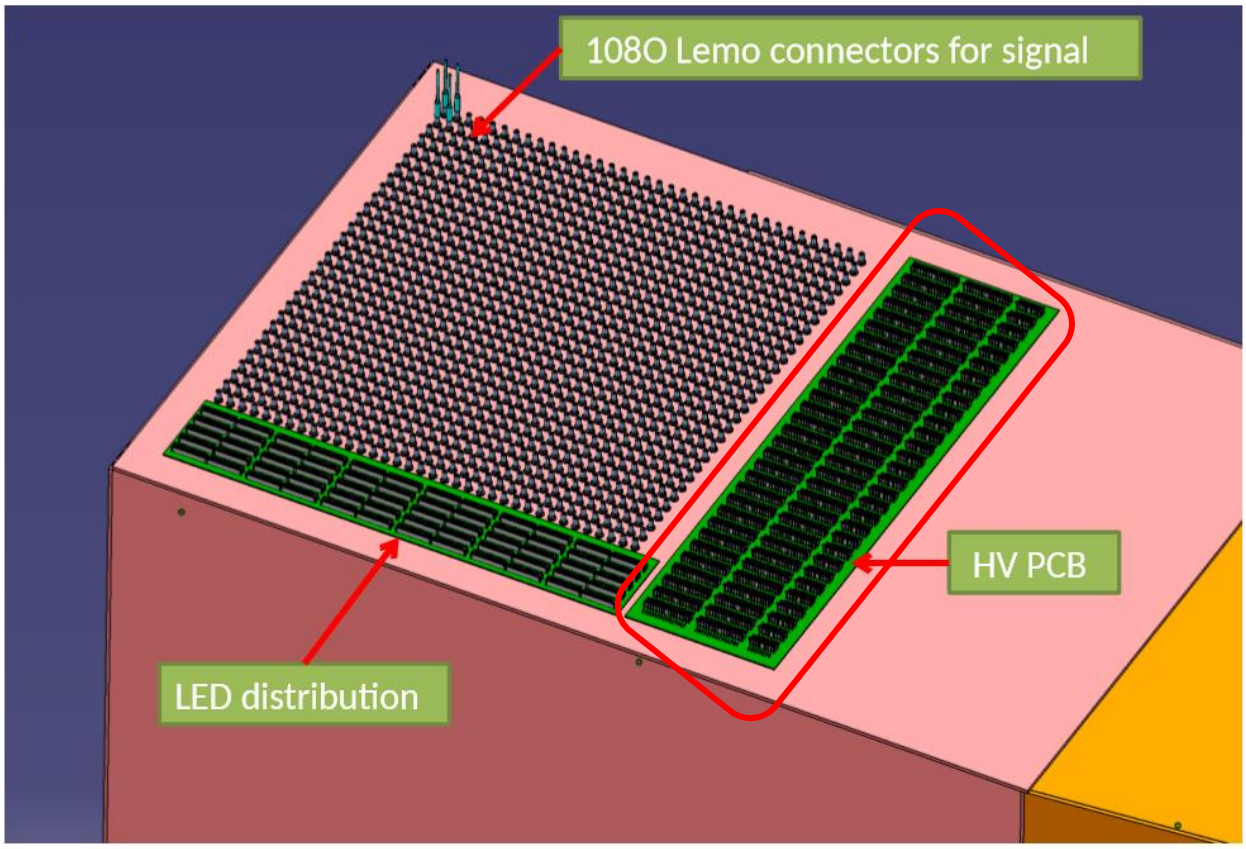
Finally, Brad asks for a more detailed assembly/design model that shows how the internal connections inside the NPS box are laid out. Specifically, CAD drawings that show connections from the PMTs to the "green panel area" and from the "green panel area" to the interior patch panel on the roof of the NPS structure. *The green panel area refers to the green panel shown in the 3D rendering in document 4.



From [4]. Behind the green panel are the high voltage divider cables that connect to the PMT bases. What is unclear is what the other end of those cables are connected to and how they get connected to the patch panel on the roof interior.

From Carlos' response:

Carlos states that this confusion started because he was thinking about the wrong SAMTEC connector. When we initially asked about the low rated SAMTEC connector he assumed that we were referring to the connector that attaches to the base of the PMT when in fact we were referring to the to the connectors on the top exterior.



The pcb outlined in red is the location of the SAMTEC connectors in question.

Carlos is going to check the safety specs of the connectors we are actually asking about and get back to us. Carlos states that all pcbs have been fabricated already, but if something is rated too lowly they will absolutely reconsider the design.

As far as the CAD models go, he sent a link to give more insight to how the PMTs are connected and how power goes to the patch panel on the interior roof of the NPS structure until the main engineer comes back from vacation and can send us actual CAD drawings.