

## Hall A SoLID Solenoid

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Contributions that are currently planned to be or are being made by the Detector Support Group (DSG) to the Hall A Solenoidal Large Intensity Device (SoLID) solenoid are presented in this note.

For Hall A's SoLID experiment, the CLEO-II solenoid has been acquired, Fig. 1.



FIG. 1. CLEO-II Solenoid at Jefferson Lab.

Initial engineering tests on the solenoid, up to 100 A, are scheduled to be performed during 2020. Upon successful completion of the tests in the test lab, the solenoid will be moved to Hall A and commissioned at full current, 3300 A.

For the operation of the solenoid, DSG is designing instrumentation and developing the control and monitoring system, which will be based on the Allen Bradley 1756-L72 PLCs. Basic PLC functions will control and monitor instrumentation. Interlocks will be developed to ensure safe operations.

For the remote control and monitoring of the solenoid, HMI screens will be implemented. Figure 2 shows the HMI screen that has been developed to monitor the temperatures on the thermal radiation shields.

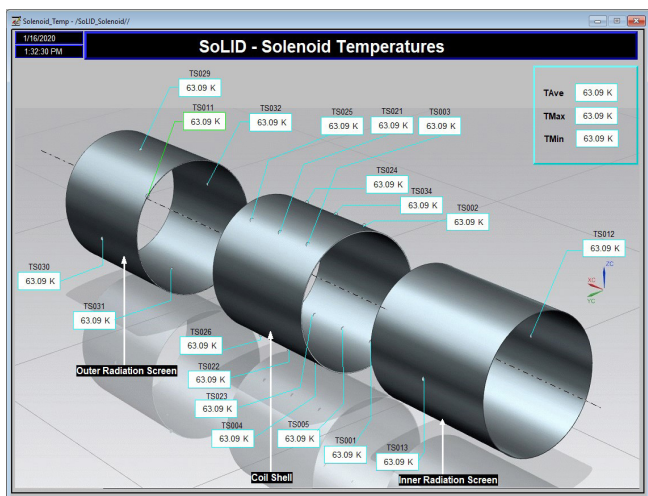


FIG. 2. HMI screen for monitoring radiation shield temperatures.

A data logging system based on FactoryTalk View and EP-ICS will be implemented as well, to allow off-line analysis of the solenoid's performance.

DSG plans to contribute to the installation and wiring of the instrumentation and to the design and fabrication of the printed circuit boards. Two such boards are the motor driver boards, which control the Joule Thompson valves, and the constant current source (CCS) boards, Fig. 3, which supply excitation current to the temperature sensors.

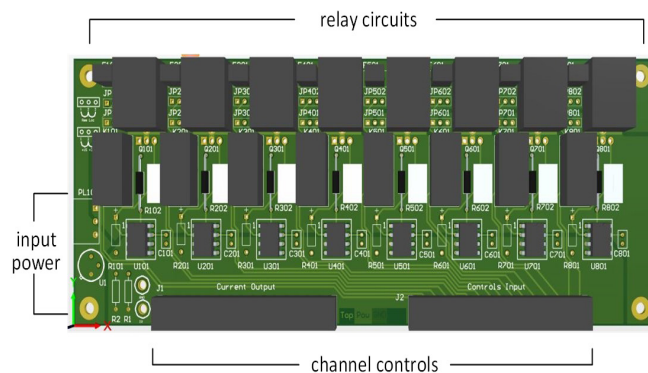


FIG. 3. 3D rendering in Altium of the designed CCS board.

With regards to documentation, DSG will generate electrical, piping, instrumentation, and communication diagrams, as well as instrumentation location layouts, and instrumentation parts lists.

DSG has started contributing to the project. The HMI screen for the radiation shields and the CCS board have been designed.