



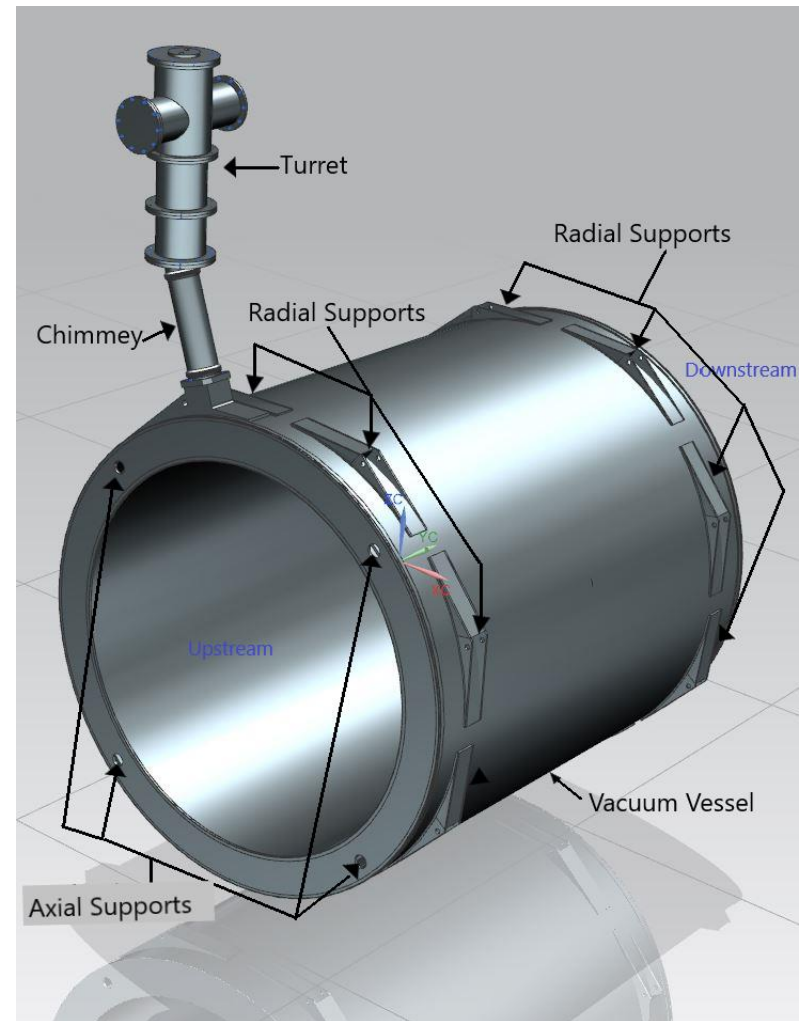
Hall A SoLID Magnet Instrumentation and Controls and Monitoring System Status

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February 19, 2020

Content

- Project Scope – Overview
- Hardware Tasks
- Software Tasks
- Documentation Tasks
- Status
- Conclusions



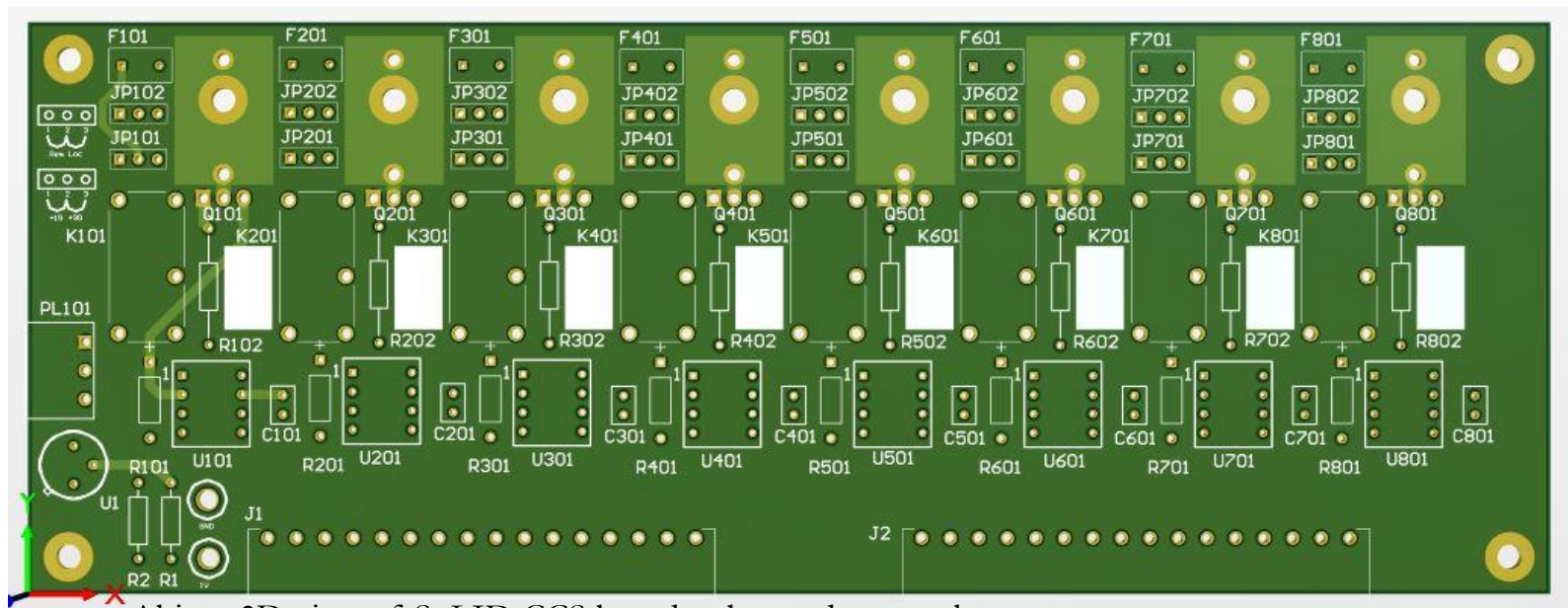
Developed NX-12 3D view shows main components of SoLID magnet

Project Scope

- DSG contributes to three main areas
- Hardware
 - Assemble and wire instrumentation and controls racks
 - Install, calibrate, and test instrumentation
 - Design printed circuit boards (PCBs)
- Software
 - PLC programming
 - HMI screens development
 - Data archiving (FactoryTalk View and EPICS)
- Documentation
 - Electrical drawings
 - PLC layouts
 - Control systems communication diagrams

Hardware Task Status

- Design of Constant Current Source (CCS) board
 - Based on Hall C-SHMS CCS board
 - Improvements to original design
 - Increased trace widths, improved routing symmetry, and added labels for debugging
 - Changed unnecessary 30 V and 15 V input lines to a single 24 V input line
 - Added replaceable fuse for protection
- PCB design and layout completed



Altium 3D view of SoLID CCS board to be used to supply constant current to temperature sensors

Software Task Status

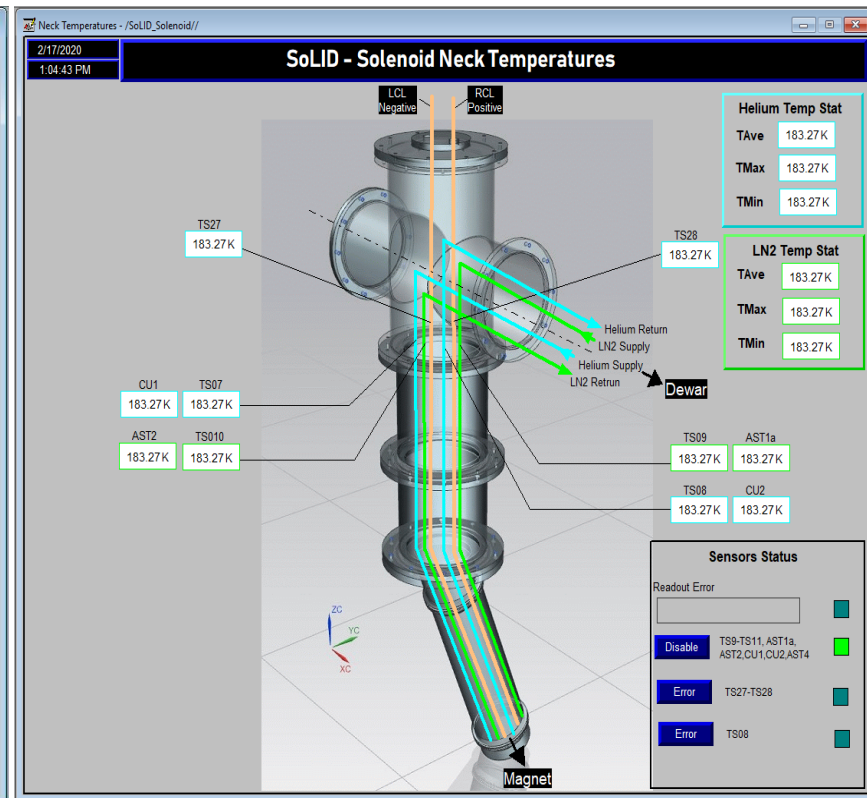
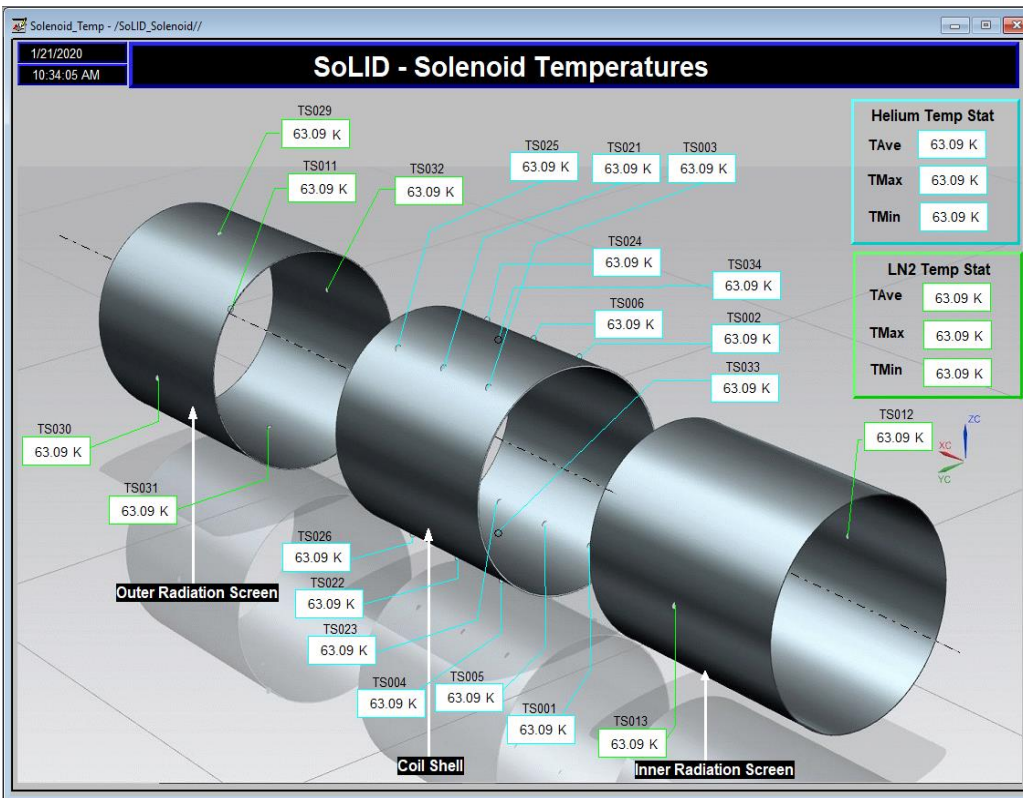
PLC Programming

- About 8 PLC routines and 48 subroutines required
 - Sensor and instrumentation readout
 - Instrumentation control
 - Power supply control and monitoring
 - Cooldown operations and interlocks
 - Magnet power up/down operations and interlocks
- PLC routine to monitor and control magnet temperature sensors completed
- PLC routine to read out load cells and strain gauges in progress
- PLC routine to monitor Cryo control instrumentation in progress

Software Tasks Status (Cont'd)

HMI programming

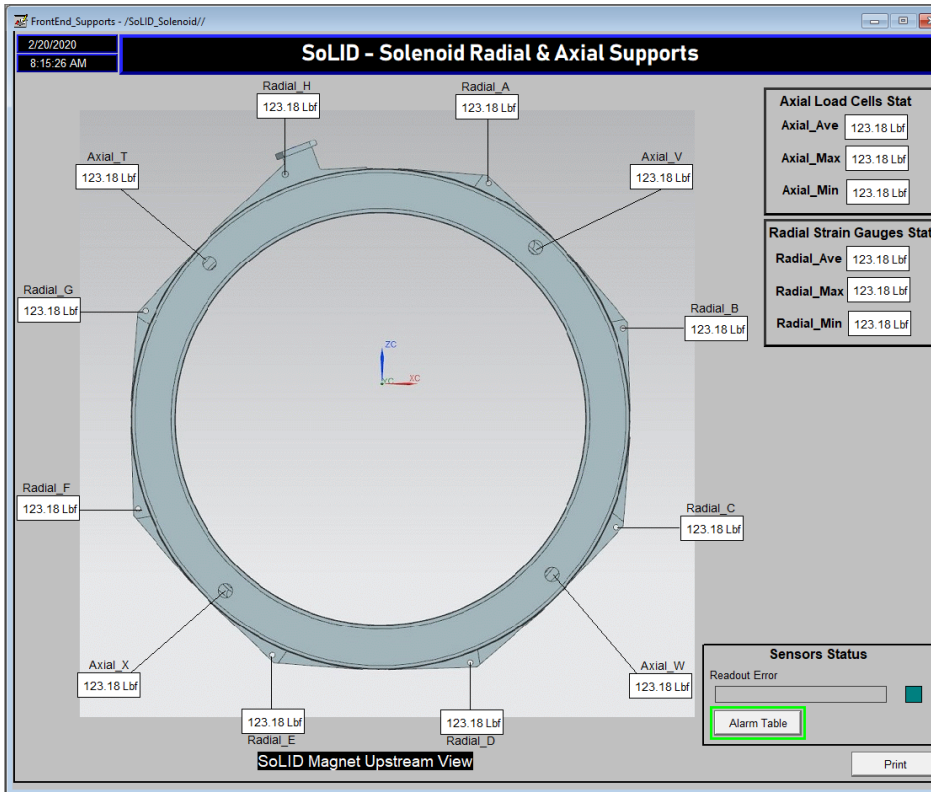
- About 30 HMI screens need to be developed
 - Four HMI screens to monitor temperatures, strain gauges, and load cells completed
- NX12 3D drawings developed to show sensor locations
- Additional features for developed screens are in process of being added



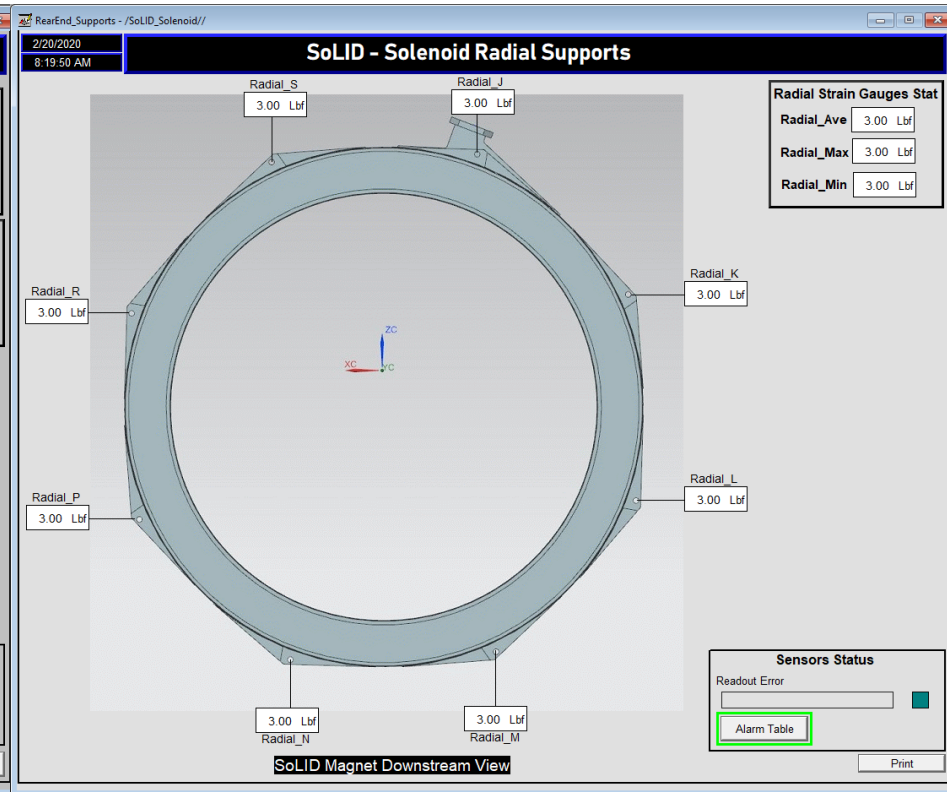
Radiation screens and coil shell temperatures HMI screen

Neck temperatures HMI screen

Software Tasks Status (Cont'd)



Radial and axial supports
Upstream HMI screen



Radial supports
Downstream HMI screen

Software Tasks Status (Cont'd)

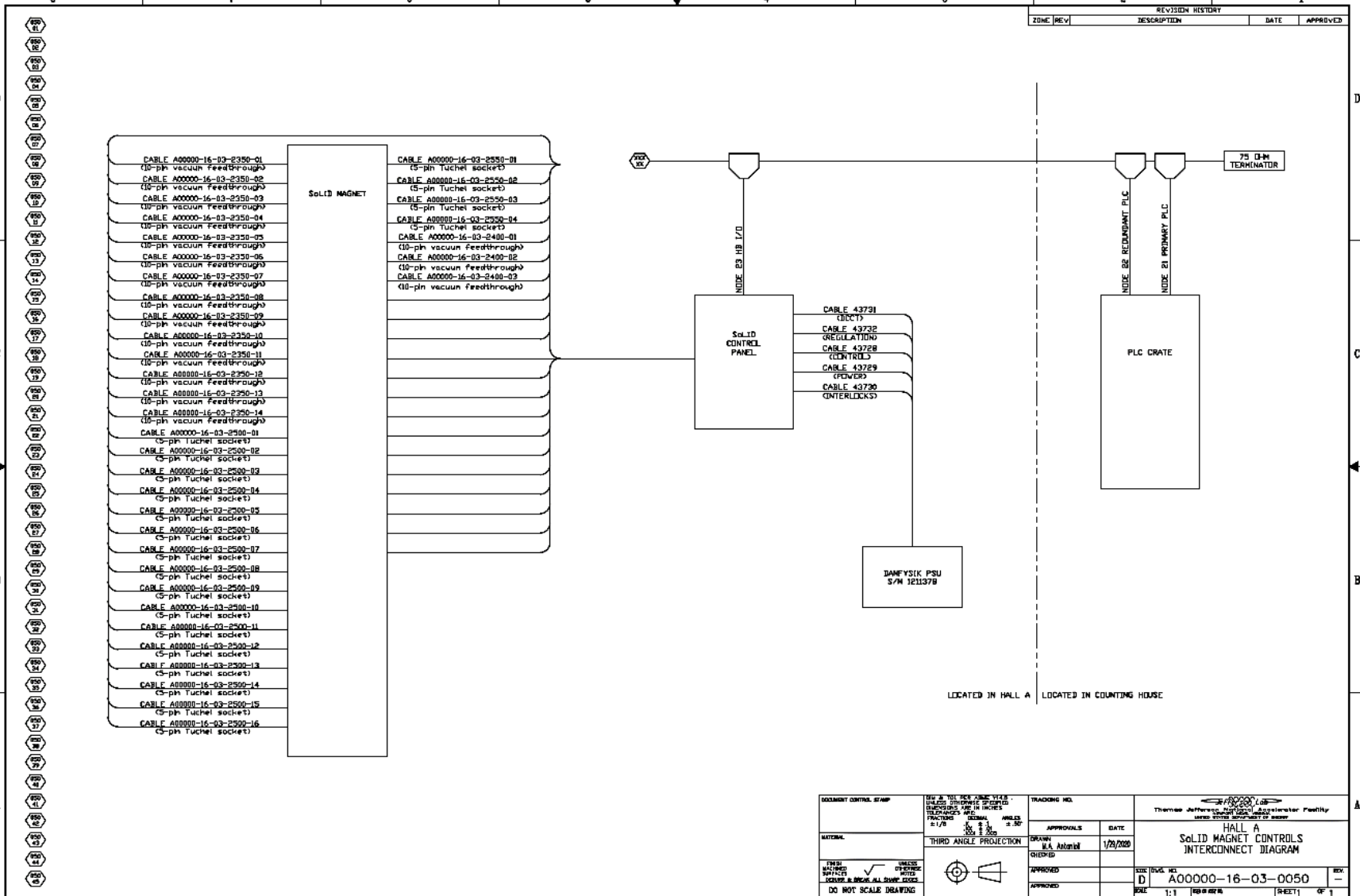
Archiving

- Developed FactoryTalk View data logger
 - Executed and tested data logger in ODBC archiving mode in DSG test station
 - PLC tags will be added as needed

Documentation Task Status

- About 68 instrumentation and controls drawings needed
 - Drawings in Autocad
 - Four drawings in progress
 - Three require connectors and pin number information to be defined
 - Fourth needs power supply specifications

Documentation Task Status



Magnet Controls Interconnect Diagram



Conclusions

- **DSG has made progress in all three areas**
 - Software
 - Hardware
 - Documentation