DSG NPS Collaborators' Update

Aaron Brown and the Detector Support Group

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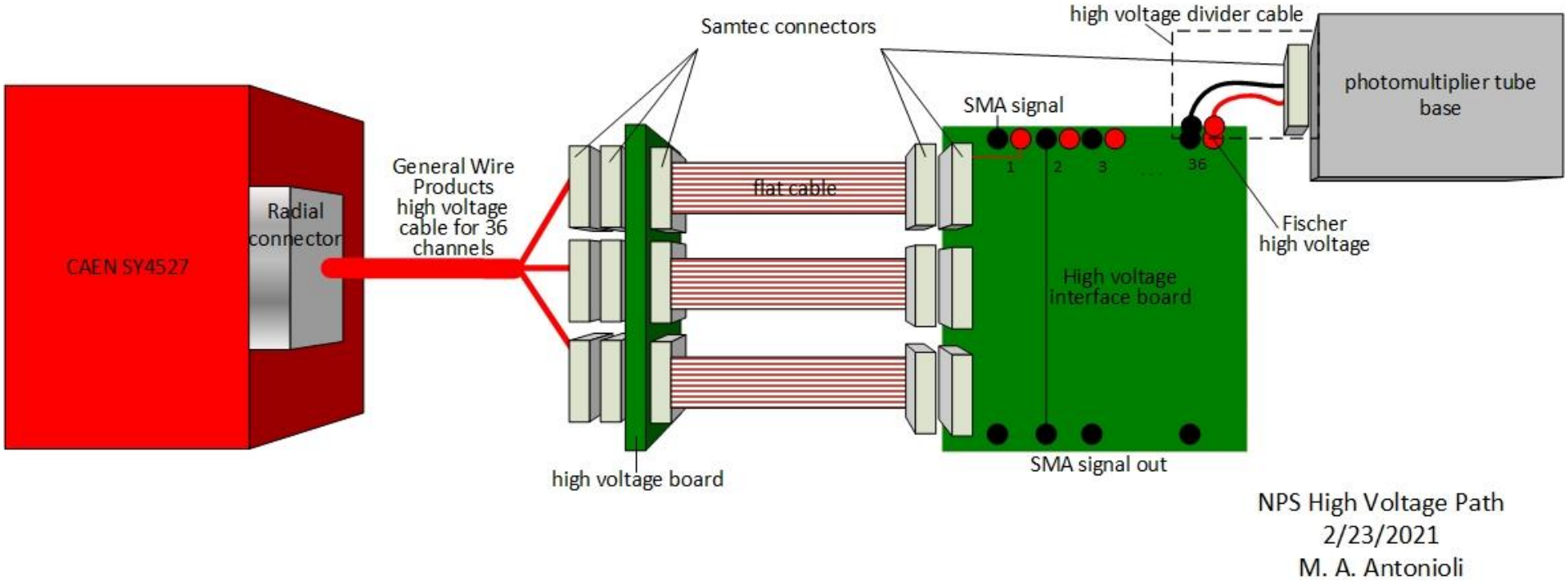
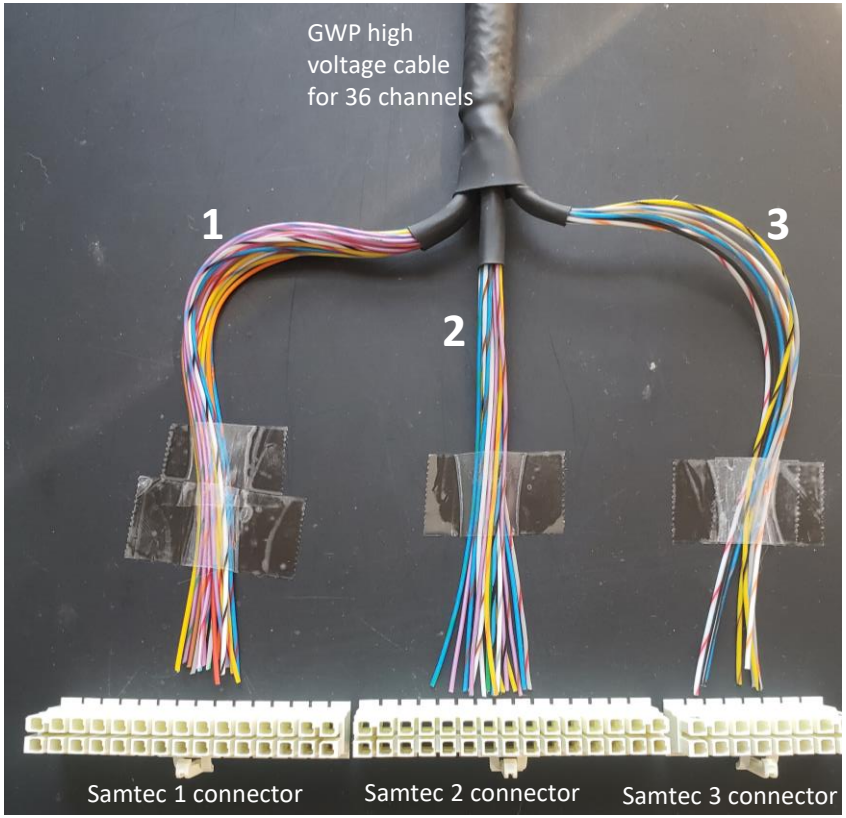
NPS HV Schematic



- Mindy Leffel is fabricating the 36-channel high voltage cables

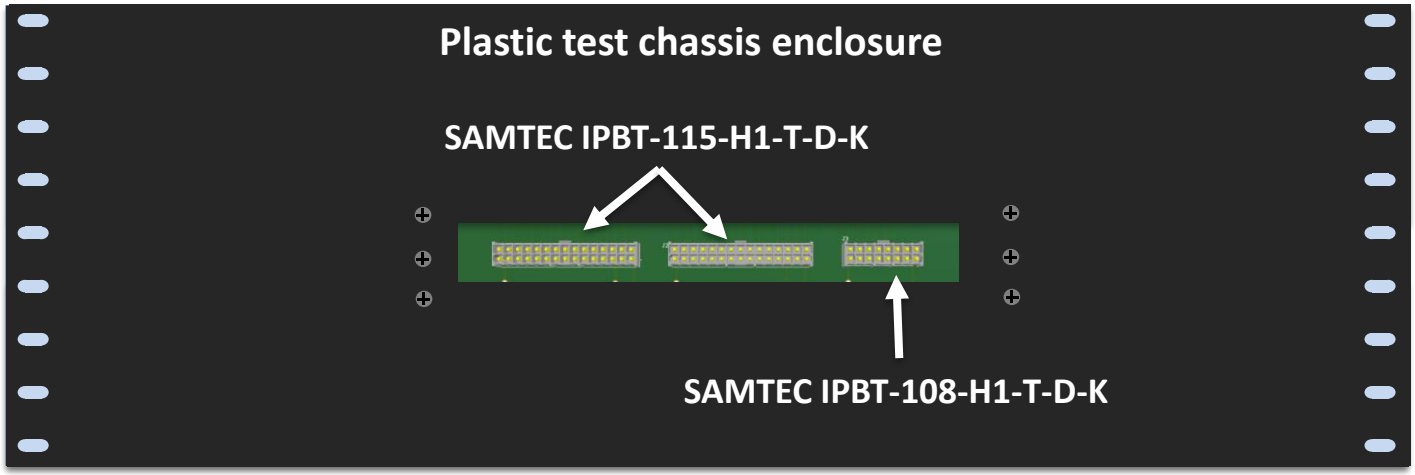
HV Supply Cable: Fabrication

- Mindy Leffel completed fabrication of five of 40 cables
- Grounding wire connected to each braided shield at Radiall connector end
- SAMTEC connectors (labeled 1, 2, and 3) have 15, 15, and 6 HV channels, respectively



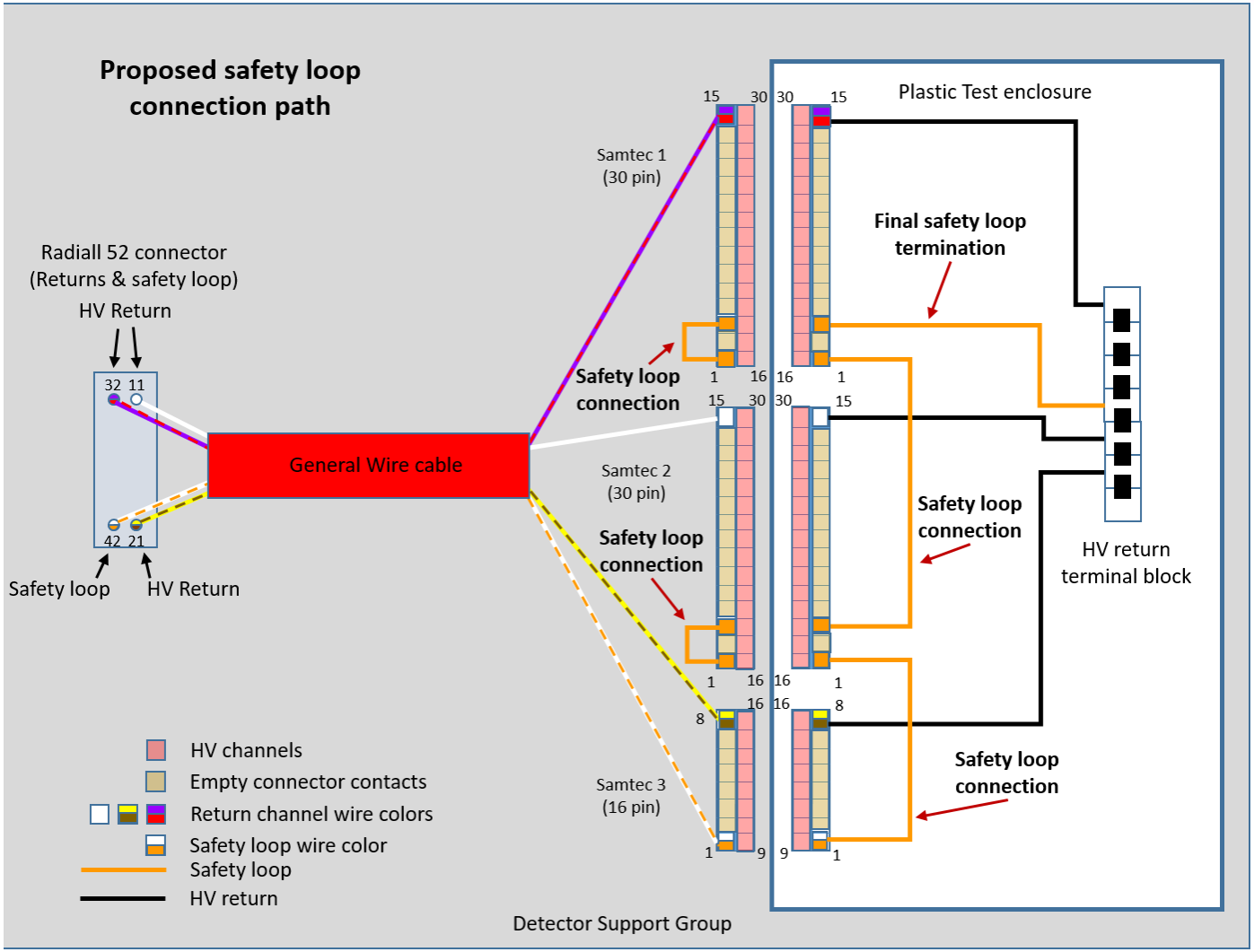
HV Supply Cable: Testing

- Two 30-pin and one 16-pin SAMTEC connectors mounted on test chassis PCB
- Populated with thirty-six 2-MΩ resistors
- HV supply cable connects to CAEN A7030TN module with a Radiall 52-pin connector and test chassis with three SAMTEC connectors



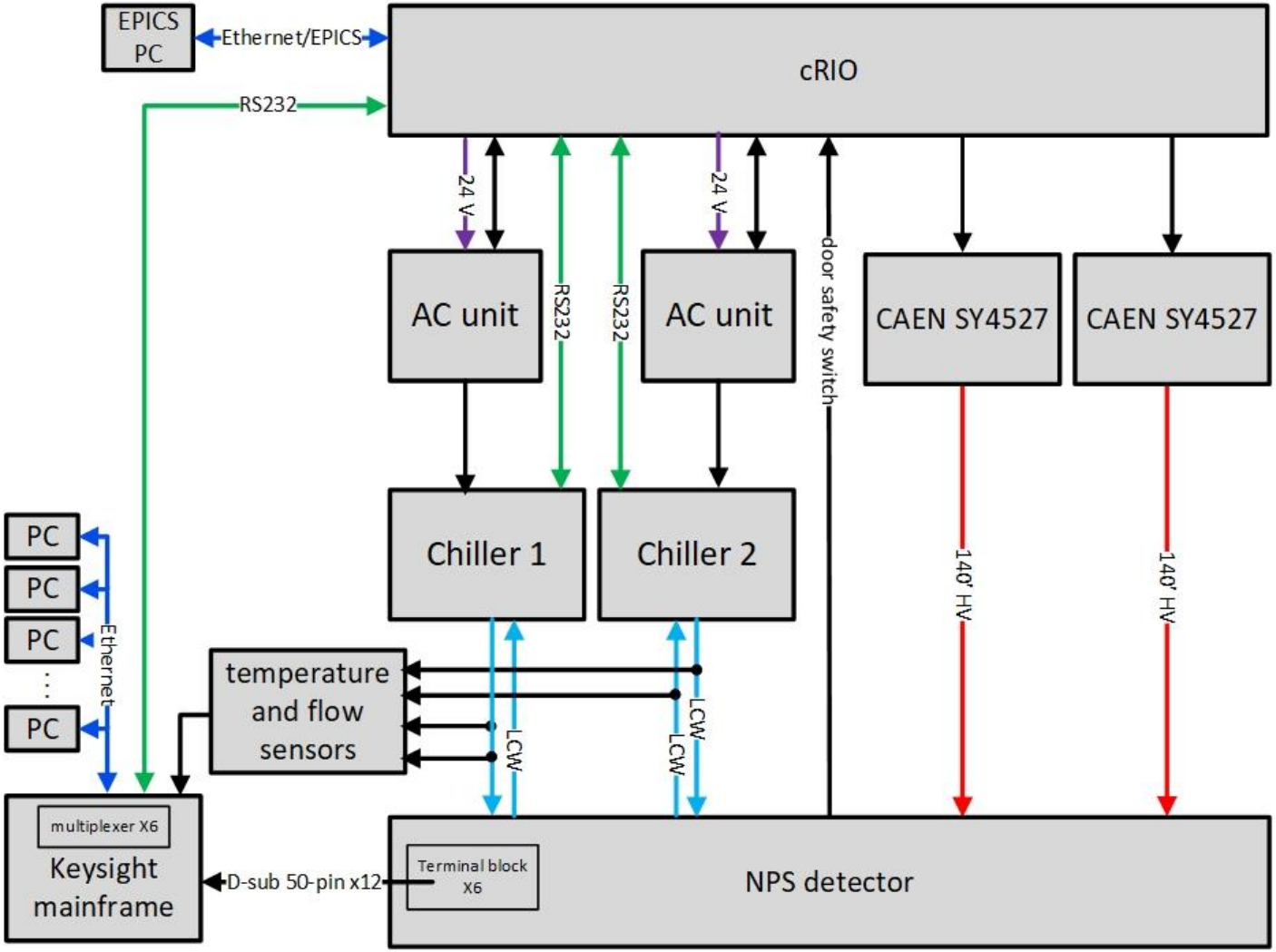
HV Supply Cable test chassis being designed by Marc McMullen

HV Supply Cable: Testing



Safety loop routed through all three SAMTEC connectors to ensure HV turns off on disconnection of any connector from test chassis

Hardware Interlock System – Block Diagram



NPS Hardware Interlock System
M. A. Antonioli
02/26/21, rev. 3/8/21

Hardware Interlock System Development

- Uses NI cRIO-9045, 8-slot controller located in detector hut

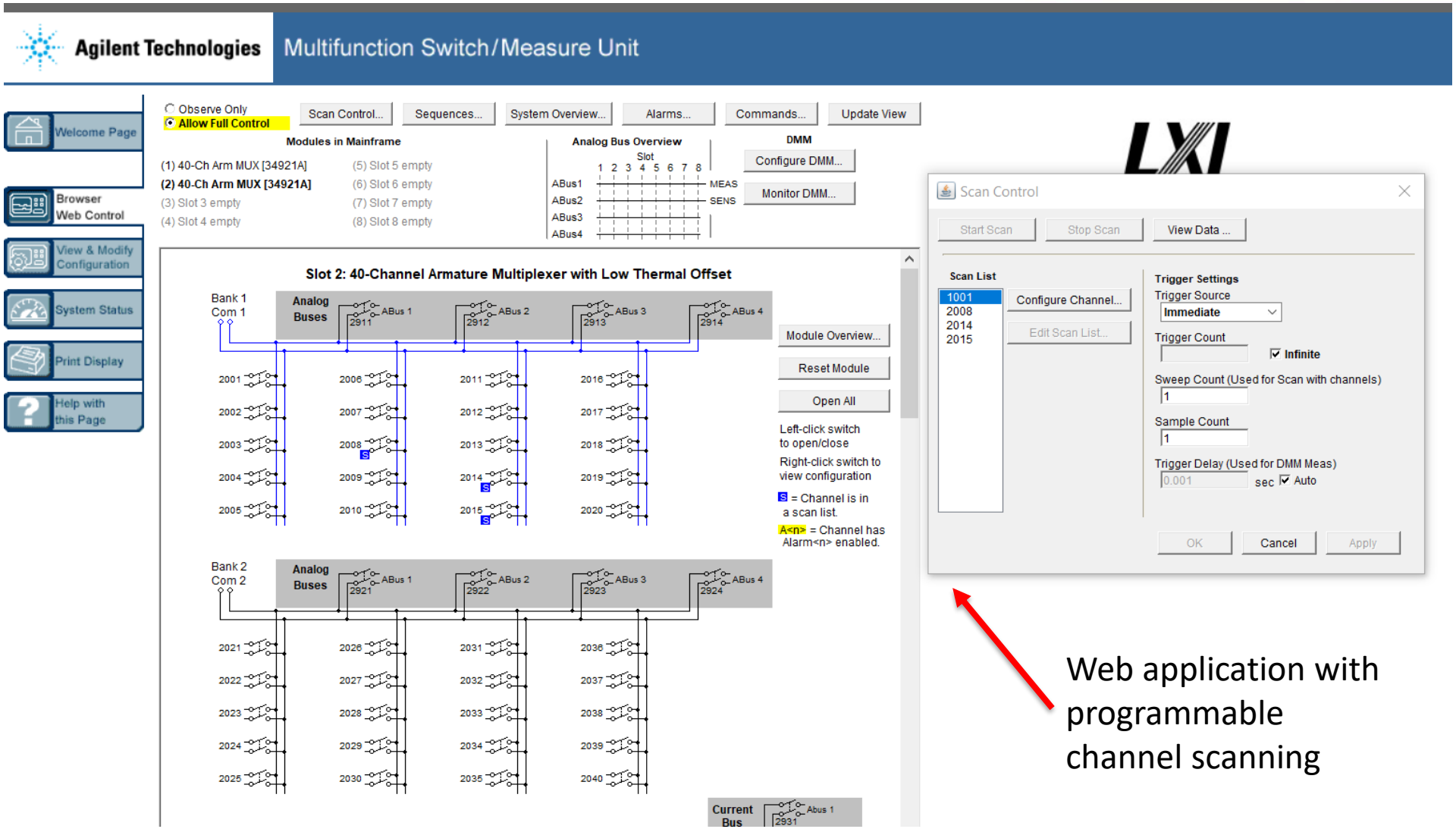
- LabVIEW-based interlock program with subroutines common to all DSG interlock systems
  - SVT, FT, RICH-I, RICH-II

- Subroutines have run reliably since 2015 with +10K hours between software updates
  - Two subroutines unique to NPS
    - Keysight measurement unit initialization and scanning
    - Chiller communication

Keysight Sensor Scanning System

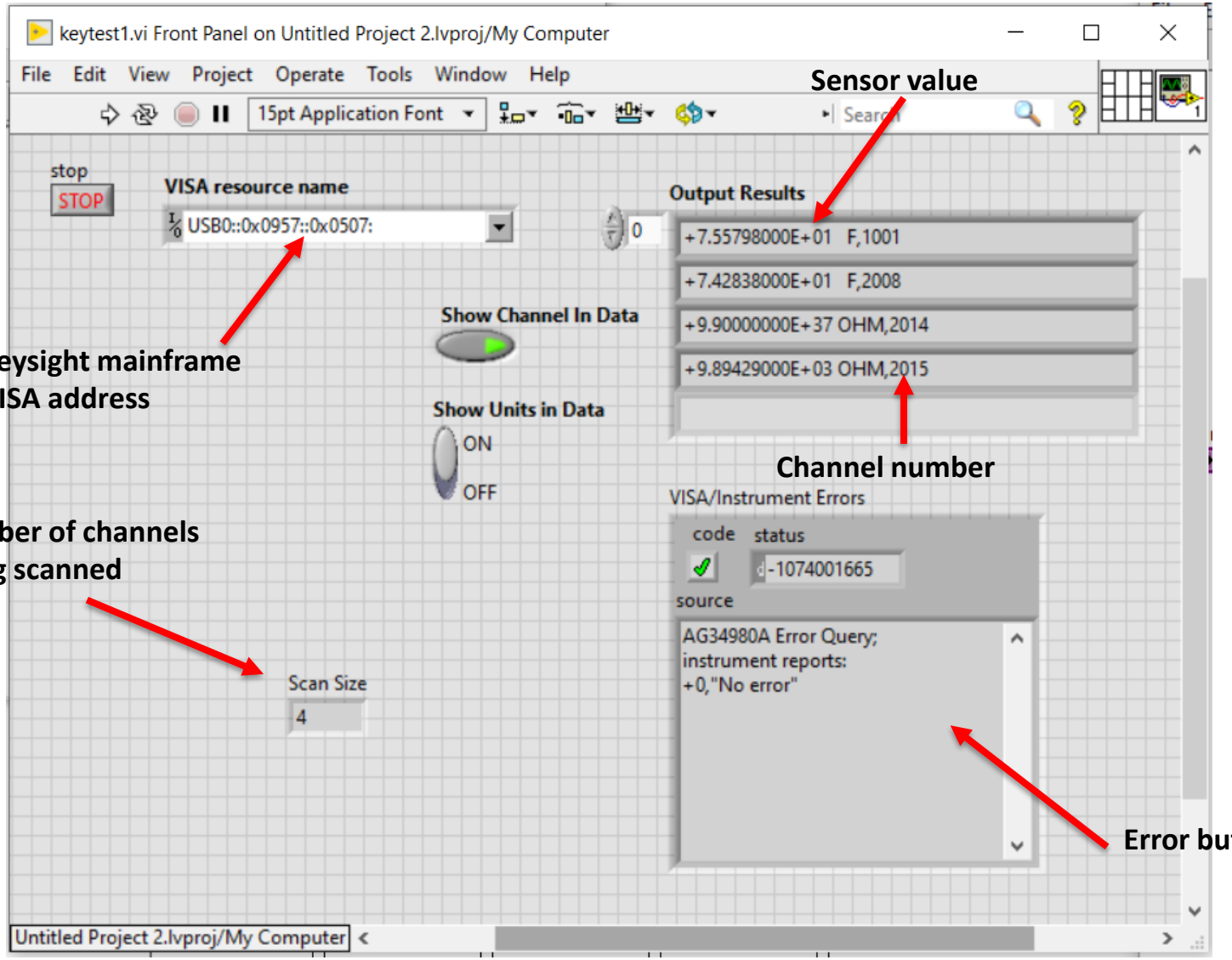
- Two communication modes
  - LabVIEW (RS232)
  - Web application
- Programmable scanning sequence
- Ability to scan channels across multiplexers and different sensor types

Keysight Sensor Scanning System

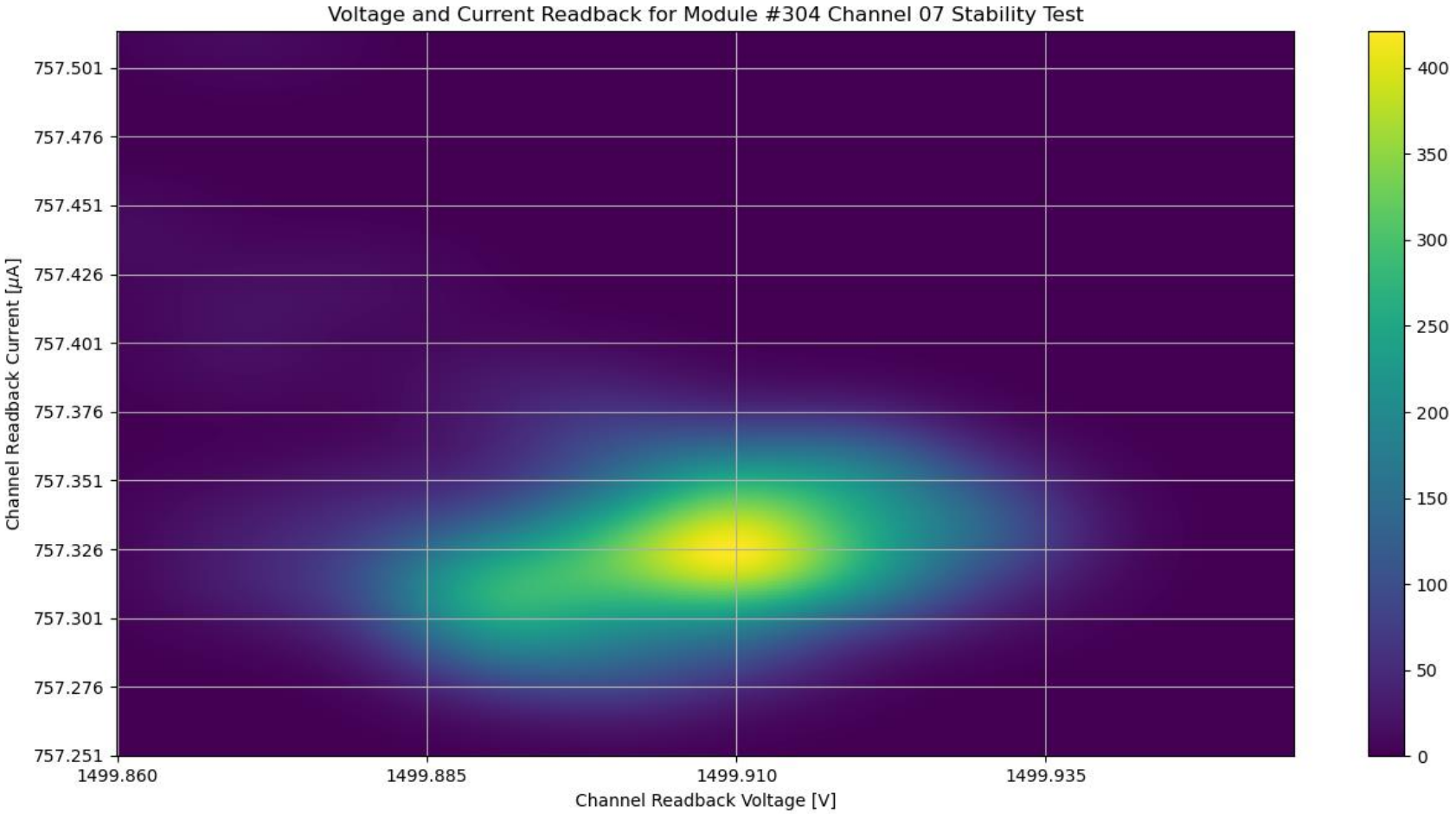


Web application with programmable channel scanning

Front Panel for Sensor Scanning



Density Plot



- Generated with voltage and current stability test data for each channel

CSS-BOY Screen

				All Channels On		All Channels Off					
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10-35	11-35	12-35	13-35	14-35	15-35	16-35	17-35	18-35	19-35	20-35	21-35
10-34	11-34	12-34	13-34	14-34	15-34	16-34	17-34	18-34	19-34	20-34	21-34
10-33	11-33	12-33	13-33	14-33	15-33	16-33	17-33	18-33	19-33	20-33	21-33
10-32	11-32	12-32	13-32	14-32	15-32	16-32	17-32	18-32	19-32	20-32	21-32
10-31	11-31	12-31	13-31	14-31	15-31	16-31	17-31	18-31	19-31	20-31	21-31
10-30	11-30	12-30	13-30	14-30	15-30	16-30	17-30	18-30	19-30	20-30	21-30
10-29	11-29	12-29	13-29	14-29	15-29	16-29	17-29	18-29	19-29	20-29	21-29
10-28	11-28	12-28	13-28	14-28	15-28	16-28	17-28	18-28	19-28	20-28	21-28

- Buttons to turn ON/OFF all channels in both crates
- Buttons to turn ON/OFF all channels in a slot
- Buttons to turn ON/OFF individual channels

Conclusion

- Good progress

THANK YOU!