DSG-GEM R&D Meeting Minutes

Date: November 16, 2020
Time: 11:00 – 12:00

Attendees: Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, George Jacobs, Tyler Lemon, Marc McMullen, and Amrit Yegneswaran

1. Reviewed changes to the Gas Flow Sensor chassis design
    1.1. The eight Gas Flow Sensor boards were shifted towards the front panel, creating a 2.1425" space for a 1" x 1.5" Panduit cable management channel between the Multiplexer board and gas flow sensor boards, Fig. 1
    1.2. Input RJ-11 connector on back panel was relocated to the right side
    1.3. Number of tube lengths was reduced from four to three—4.625" (x 4), 7.125" (x 8), and 9.625" (x 4) —by centering one row of Gas Flow Sensor boards between the back and front panels
    1.4. Tyler Lemon will produce fabrication drawings to be reviewed during next meeting; once approved, Marc McMullen will send the drawings to Pi-Metals to fabricate the production Gas Flow Sensor chassis

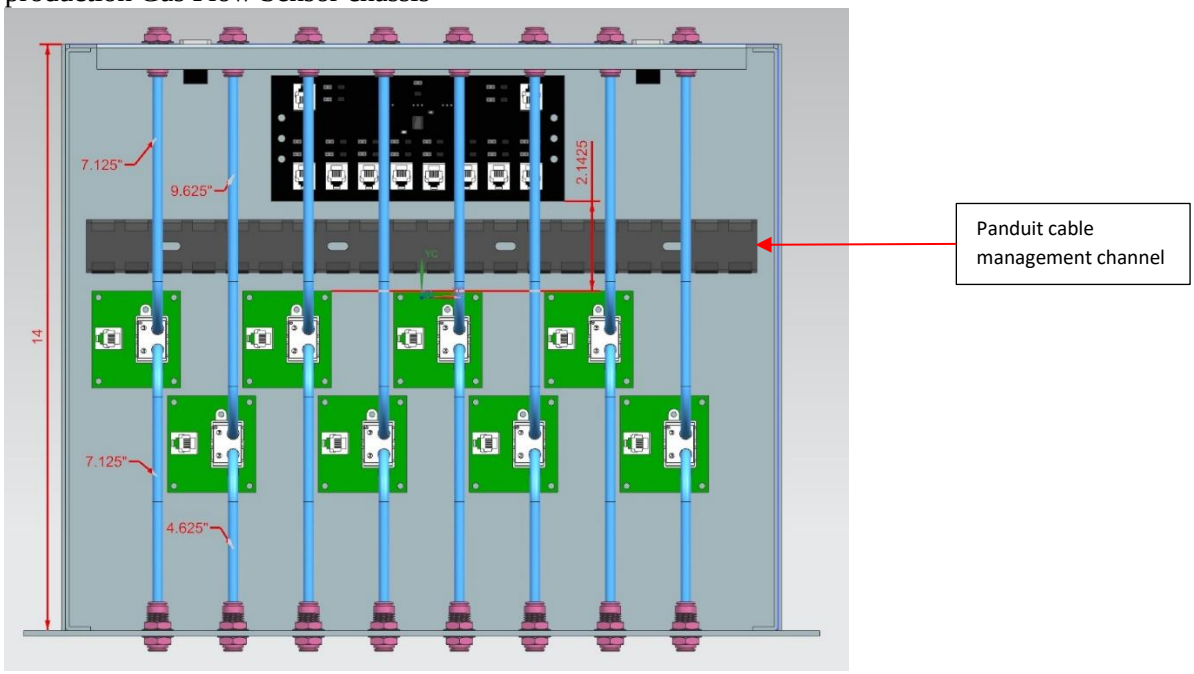

Figure 1. Gas Flow Sensor chassis final design model

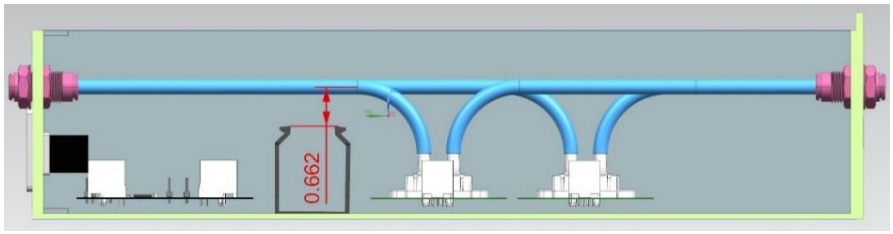

Figure 2. Profile view of the final version of the Gas Flow Sensor chassis

2. Once Cardinal Machine delivers the machined Bud enclosures for the exhaust Gas Flow Sensor and Multiplexer prototypes, Marc McMullen will fit test each type, then have two more Gas Flow Sensor enclosures and one more Multiplexer enclosure made for the prototype exhaust gas flow readback system

3. Tyler Lemon presented model of the Super BigBite rack with distribution components (regulator panel, four flow meter valve panels, four manifold panels, and six Gas Flow Sensor Chassis)
    3.1. Four din units (7") of available space remains after the regulator, flow meter valve panels, and manifold panels are assembled on the front of the rack
    3.2. George Jacobs suggested that the available 7" be distributed to provide spacing for the ½" gas lines to bend properly—1.75" between the regulator panel and top of the rack, and 5.25" distributed between flow meter valve panels
        3.2.1. Tyler Lemon will make these changes

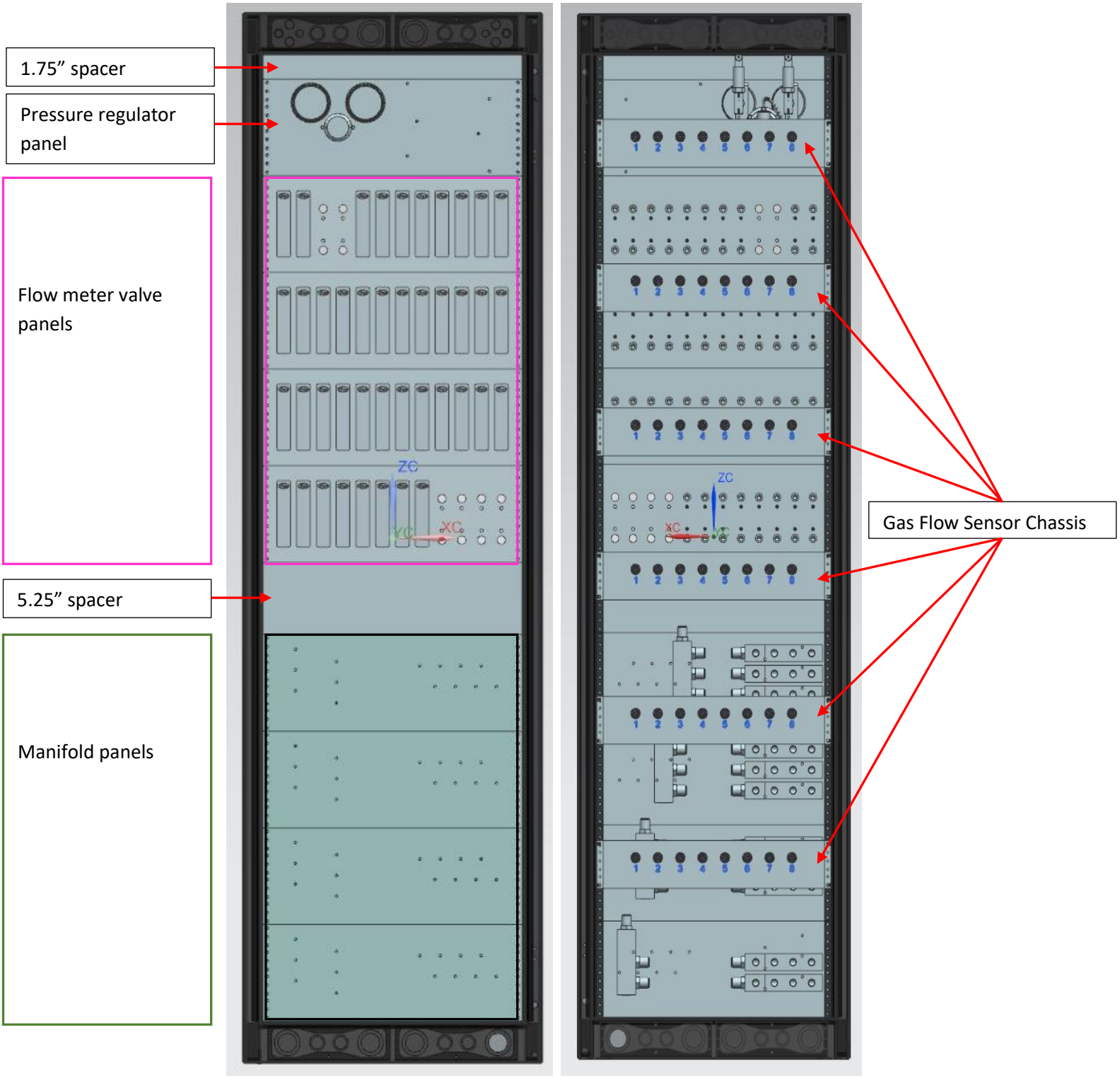

Figure 3. Super BigBite gas distribution and readback system rack (front view on left, rear view on right)

4. Marc McMullen modified the prototype Gas Flow Readback Python code to handle issues concerning the gas flow sensors
    4.1. If the code cannot communicate with a sensor, it updates a status process variable for that channel to “BAD”, does not read the flow value, and moves to read the next channel
    4.2. If a channel has been recorded as “BAD” and communication then re-established, the status will change to “OK” and the flow value will begin to update again
    4.3. Marc McMullen will modify the code to give a bad flow number (-500 sccm), in addition to the OK/BAD indicator

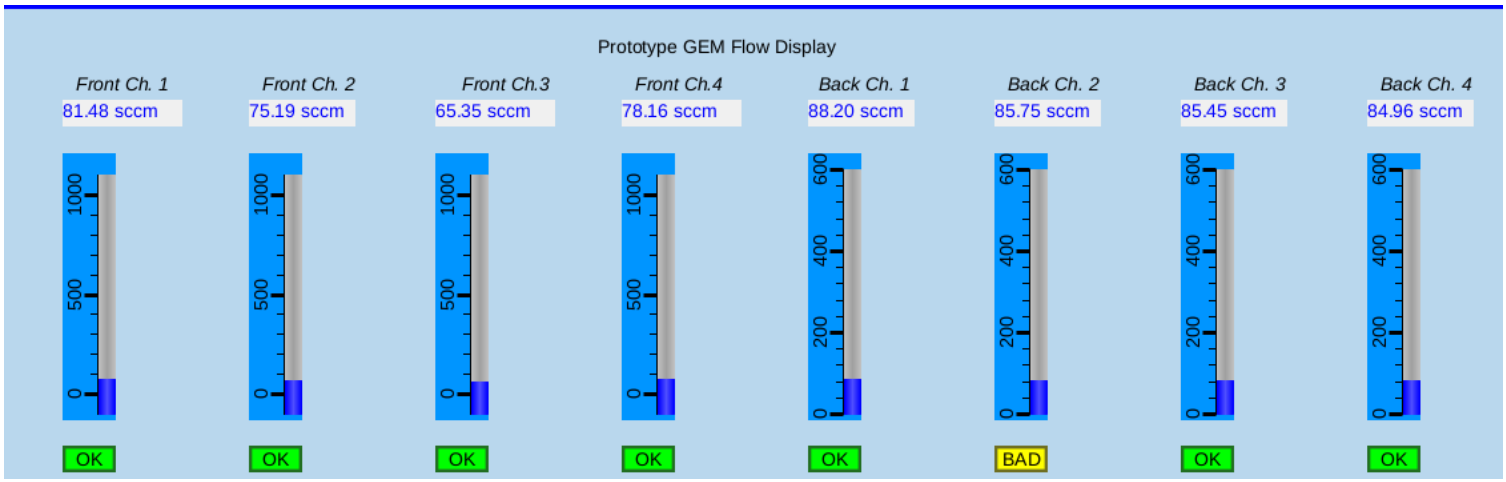

Figure 4. Prototype GEM flow display with "Back Ch. 2" bad

5. Hall A has not responded to George Jacobs request to leak test the prototype regulator panel
    5.1. DSG will enquire about the leak test in the next monthly meeting with Hall A (11/20)

6. Marc McMullen has updated the single line channel diagram with the function of each component
    6.1. A table of the diagram’s elements has been generated (Table I, page 4)

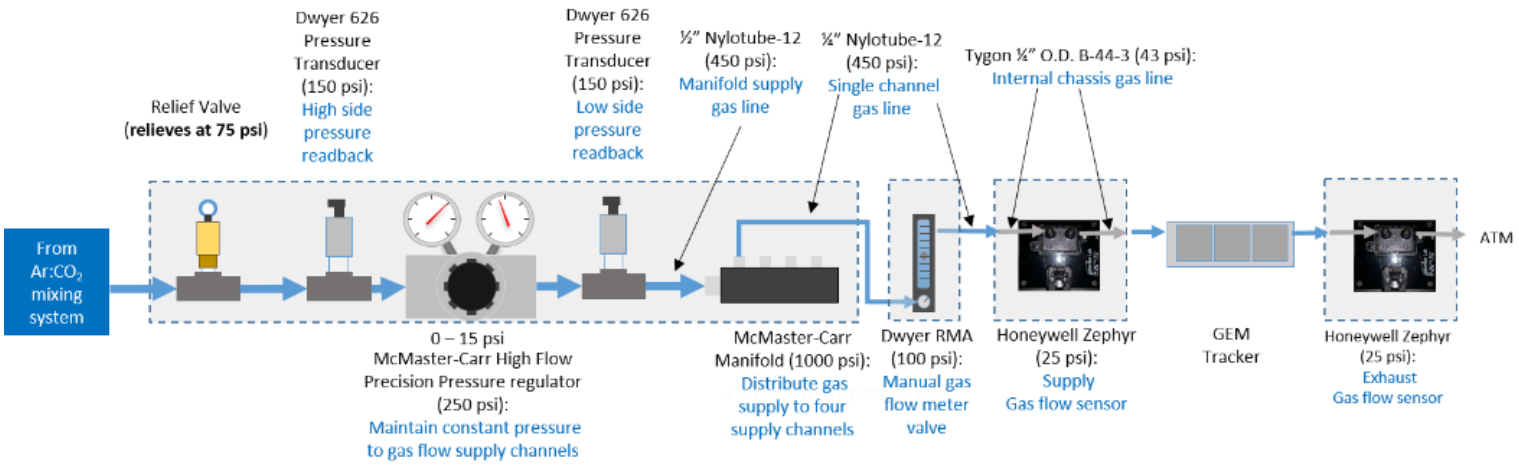

Figure 5. Single channel gas flow path for prototype GEM gas distribution system

Component	Description	Pressure Rating [psi]	Comment
Relief Valve	Relieves gas flow to atmosphere at 75 psi	n/a	
Dwyer 626 Pressure Transducer	Measures pressure and outputs an analog pressure value	150	One for high pressure side of regulator and one for low side of pressure regulator
McMaster-Carr High Flow Precision Regulator	Maintains constant pressure to downstream components	250	
Nylotube 12 (1/2”)	Main feed gas line	450	
Nylotube 12 (1/4”)	Channel gas line	450	
Dwyer RMA Flow Meter Valve	Sets gas flow to single channel	100	
Tygon ¼”	Flexible gas line tubing	43	Used inside Gas Flow Sensor Chassis
Honeywell Zephyr Mass Flow Sensor	Measures flow of single channel	25	One for supply to GEM detector and one for exhaust from GEM detector

Table I. Elements of the single line channel diagram