Fermilab Mu2e update

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Outline

- CO_2 Leak testing
- Straw laser cutting
- Panel 1.5 status
- Panel 2.0 status

CO_2 Leak testing

The focus has been on calibration of the 5 chambers here.

Pedestals of the detectors have been roughly adjusted which allows us to make measurements right away. I have uploaded the technical document for the CO_2 detectors to the MN page.

CO_2 Tygon leak calibration

- Tygon tubing leaks and will reach equilibrium in ~12 hours.
- Measure value of tygon tubing.
- Fill it with CO_2 /Argon. Current method needs to leave room to crimp ends before plugging. Creates some uncertainty in measurement.
- Also difficult to ensure at atmospheric pressure without letting air in.

With rough volume estimate of chamber expected to see 648 ppm

	In PPM				
Chambers	0	1	2	3	4
Test 1	660 +- 10	640 +- 20	620 +- 10	700 +- 10	780 +- 10
Test 2	620 +- 10	640 +- 20	630 +- 10	720 +- 10	740 +- 10

Absolute leak testing calibration

Idea:

Find a “rubber” plug to put in the end with the ball valve.

Use a syringe to draw ~0.5 cc of CO_2 from sealed bag.

Inject through rubber plug, close the ball valve.

I’m looking into the equipment needed for this. Seems practical.

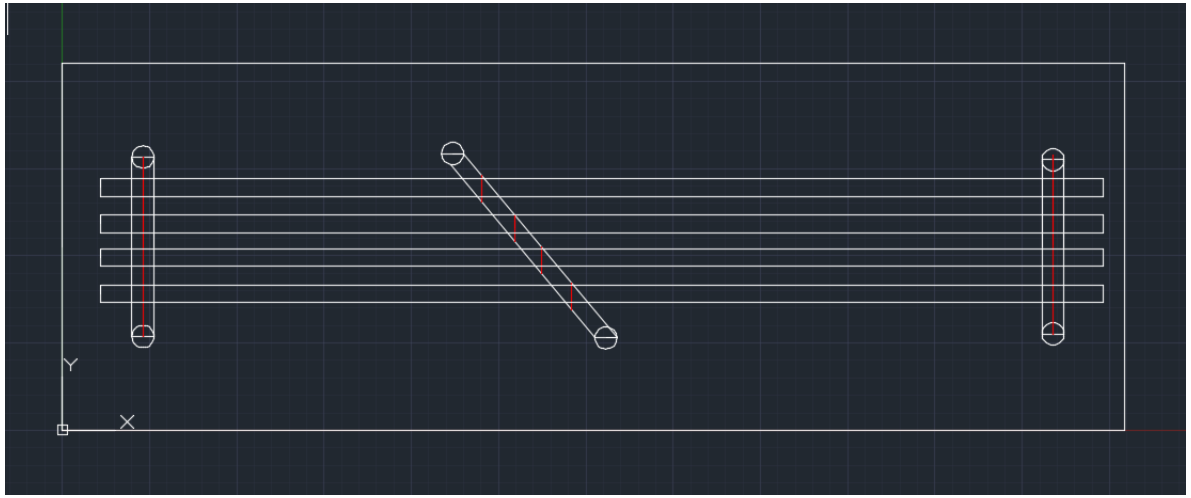
Straw laser cutting

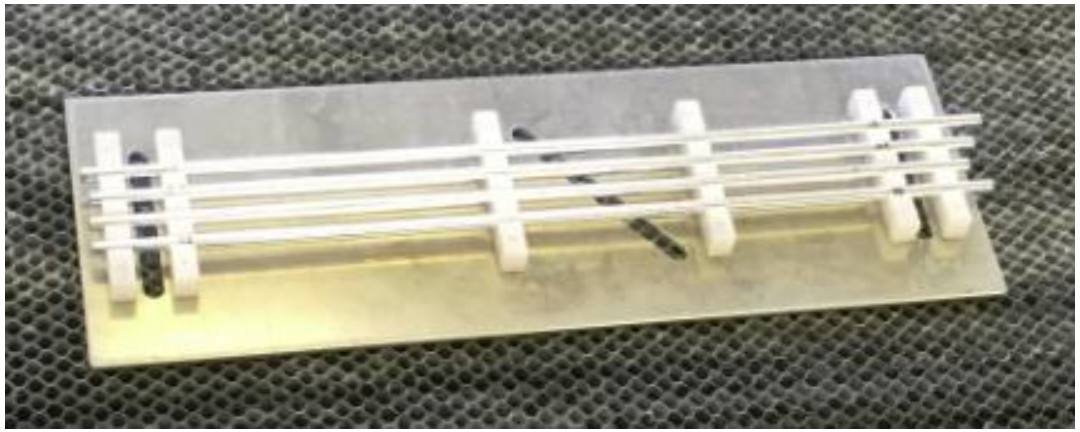
The plan is to laser cut the straws for Panel 2.0.

I have been doing R&D on this and designing an apparatus to hold the straws.

Did some test straw cutting on Monday. I hope to get the chance to do more and have some measurements for next week.

Below is a test apparatus to test some measurements.

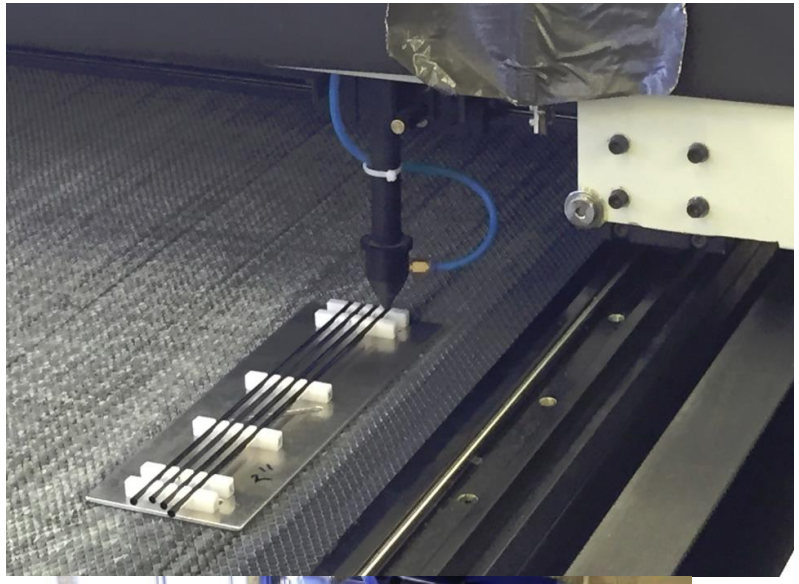




Fermilab Laser cutter

Model CJG 160370

- 10,640 nm wavelength
- 5 mm diameter
- 50.8 mm focal length lens
- 100 W
- 3700 mm x 1600 mm bed with built in exhaust
- ~$50,000 machine



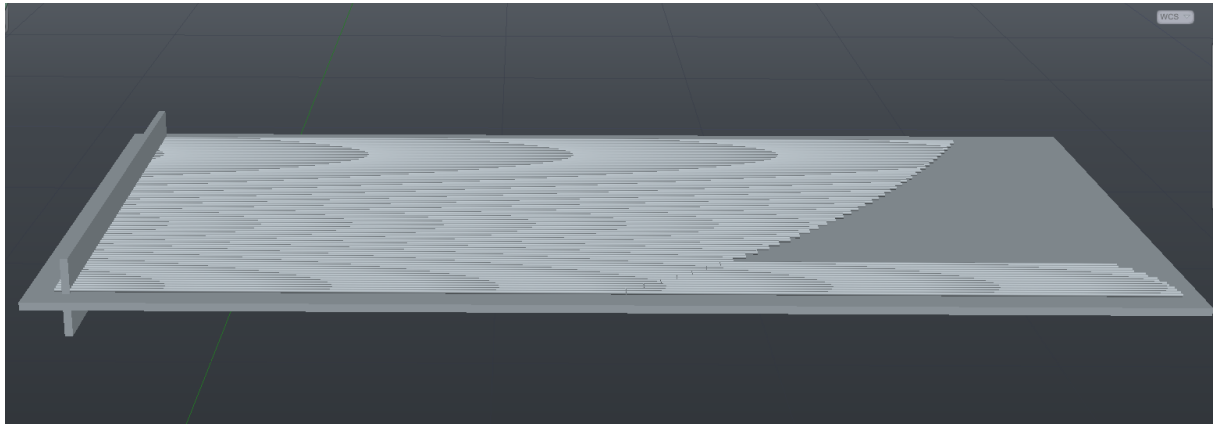
Full panel cutting

Advantages

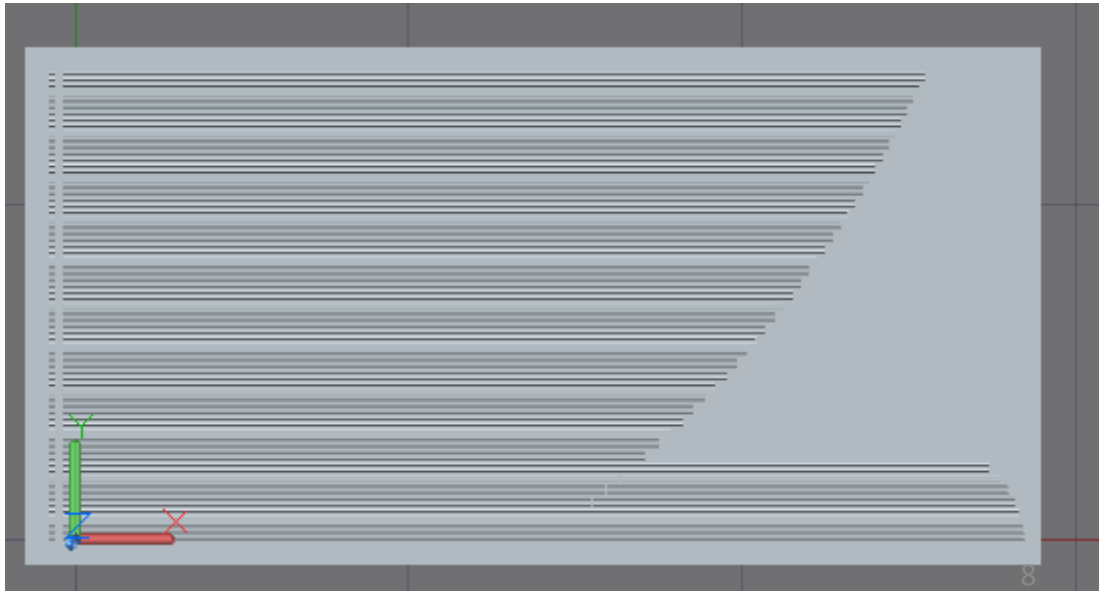
- Only 1 plate needed
- Only 1 cut program needed
- Straws remain unique for identification perposes

Disadvantages

- Harder to make many duplicates of the same size



140 cm x 70 cm

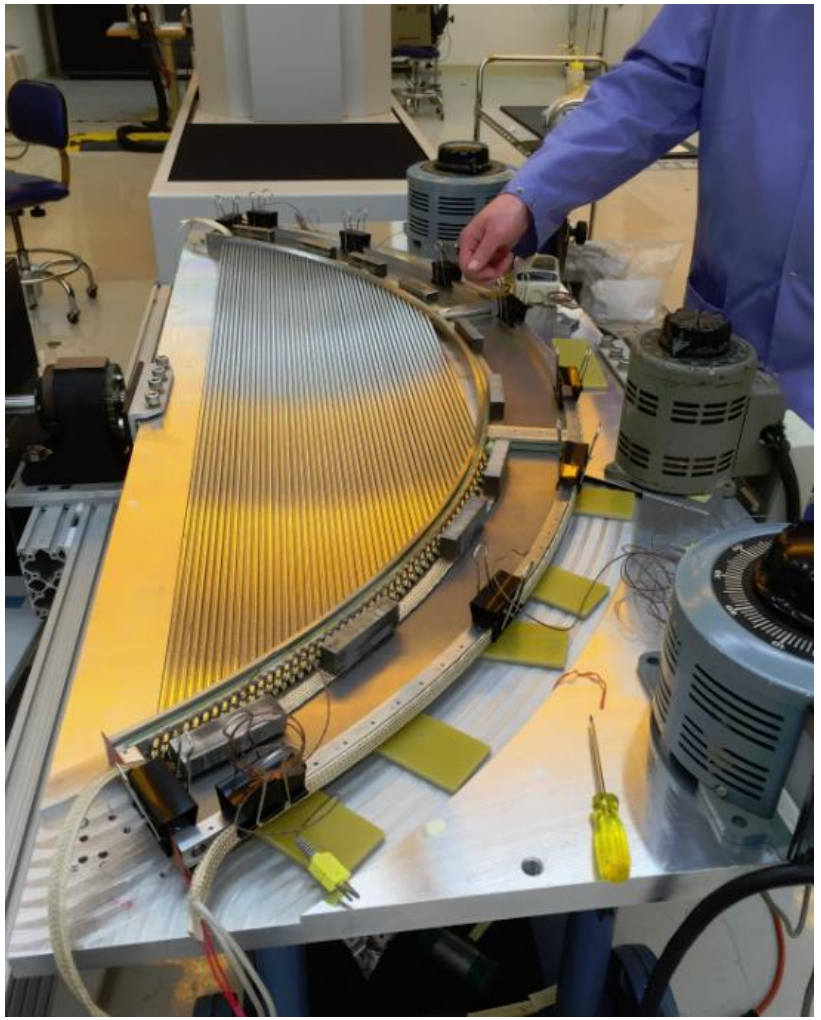


Panel 1.5 status

Having an issue with sufficiently heating the manifold during gluing.

Dry run of gluing and then gluing the manifold will hopefully happen this week.

Many electronics tests to be done.



Panel 2.0 status

- Hopefully leak testing. Might start by using old leak test ends as new ones won't arrive til April 28th.
- Will be laser cutting straws.
- Haven't seen the new end pieces(upper right).
- Motor installation of straws and tensioning(bottom right)
- New Panel plate is being made to fix heating issues and incorporate other changes. Panel never goes vertical.(opportunity for us to install leaders before shipment)
- Completion estimate: End of Summer 2015.