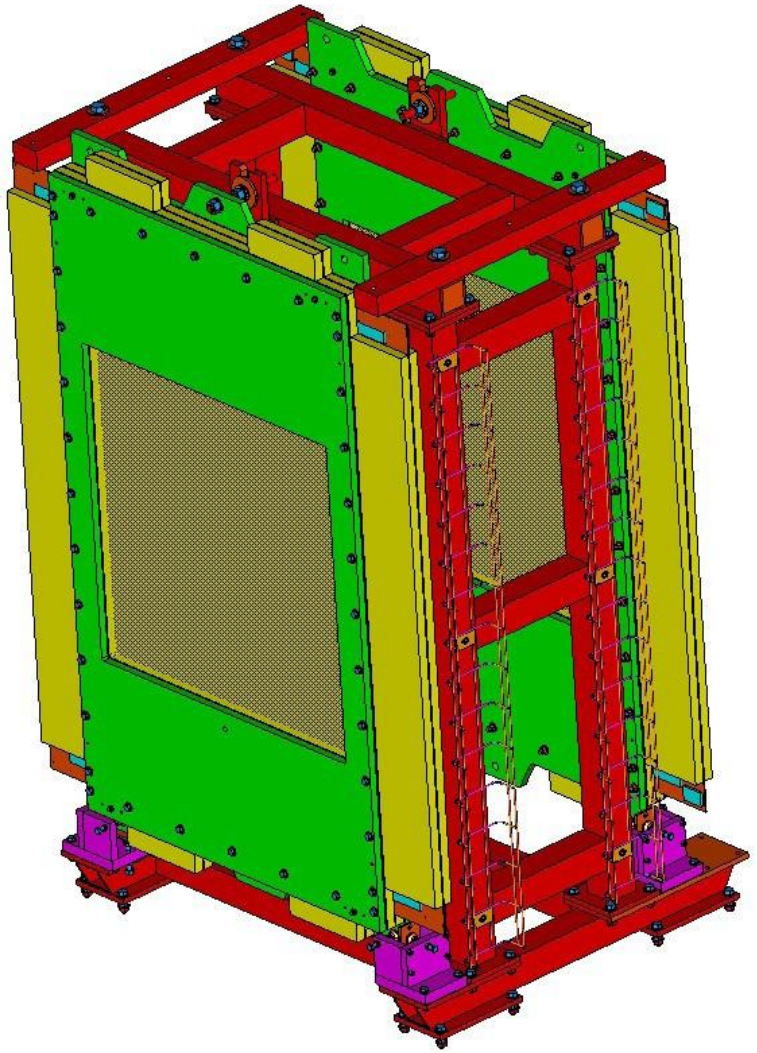
SHMS Drift Chamber Update

- Current Status/Progress
- Construction Process
- Schedule and Plan



Current State of DC's

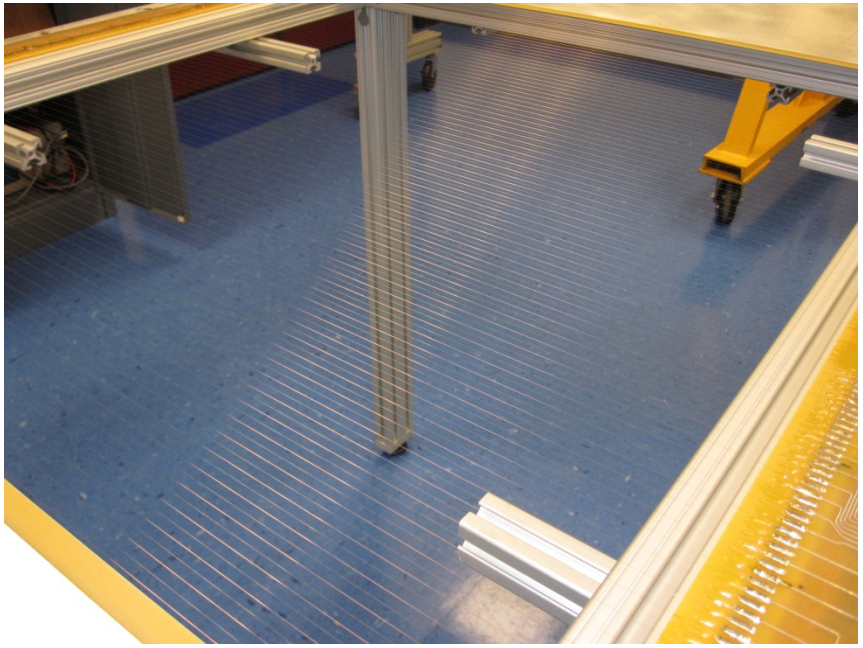
- Testing and Conditioning of 2 DC's moving along.
- Improved stringing jigs and procedure(also to be used for HMS DC's)
- 1st ½ of spare chamber to be done next week.
- Completed ~ 67% of amplifier carrier card assembly.
- Completed ~ 50% of HV & LV distribution cables.
- Have all the planes for 3 chambers.

Strung Planes

U-Plane:

- ~220 wires
- Angled

X-Plane:



- ~160 wires
- Horizontal

2 Chambers Undergoing Testing/Conditioning

$ArCO_2$ (test)

^7N (drying)

HV

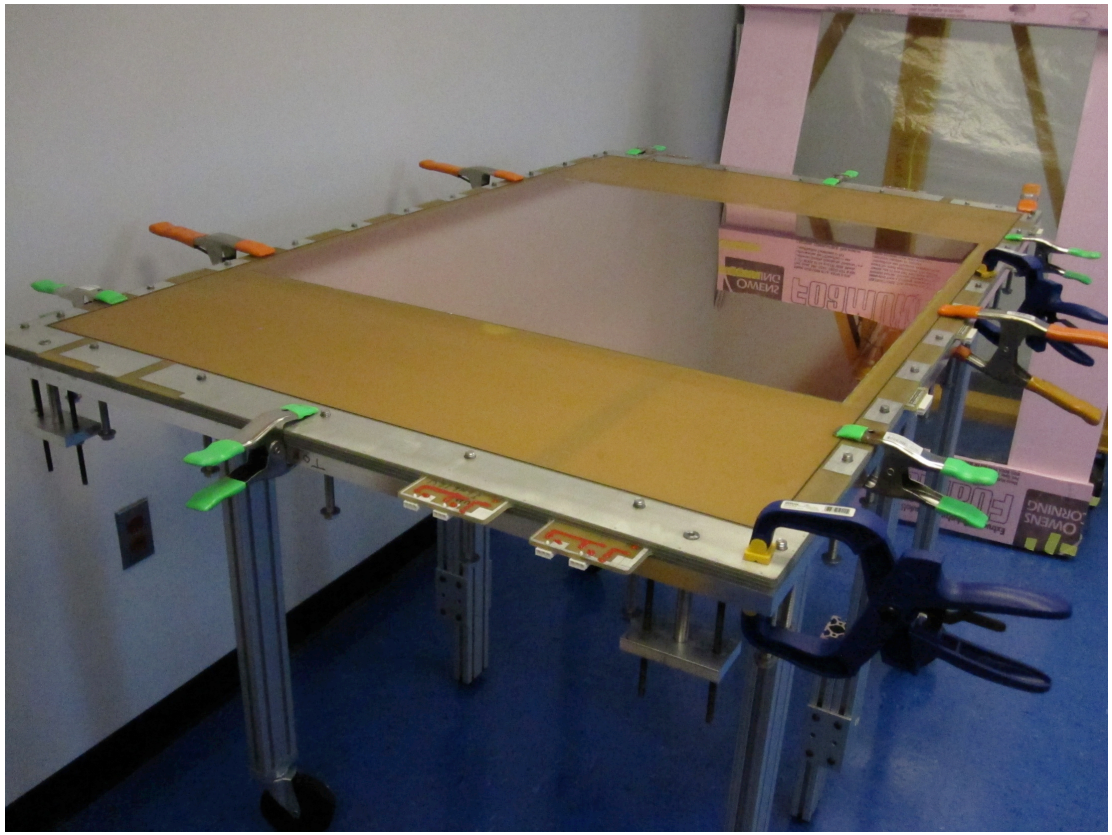
~ -1500+ V

Read-out

I_{draw} [nA]

- DC's give response to (^{137}Cs) source; ~ 5-10 %
- Most sectors can operate at -1700 V with 80/20 ArCO2.
- 3 Sectors of DC B have noisy wires ($I_{draw} > 30\ nA$); identified, continue to condition.

Spare Chamber



- U, U' (+ accompanying K's) stacked. ** U' to be stacked Monday*
- X almost done stringing -> ½-chamber

Stringing Process

Morning

- Places wires on jig, tape down.
- Align wire ends along traces.
- Solder spooled ends, check. clean.

…Towards end of day

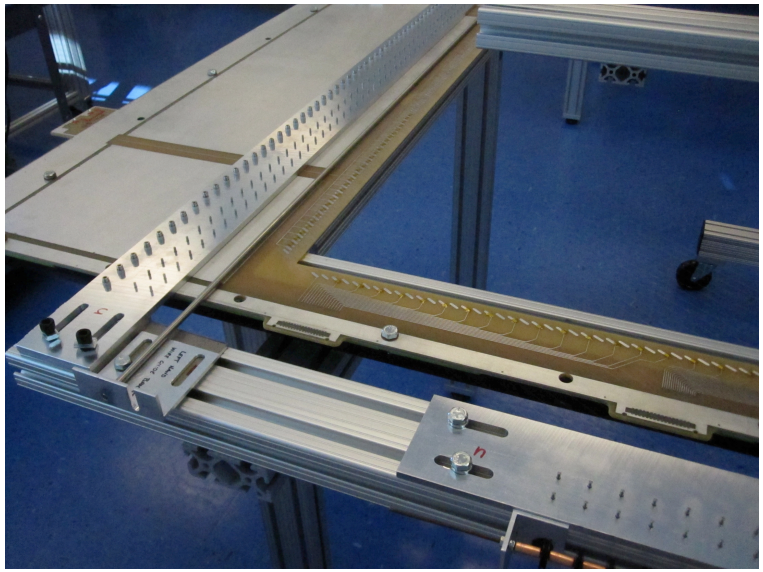
- Check alignments, solder tensioned ends, check, clean.
- Epoxy (along trace), check alignments.

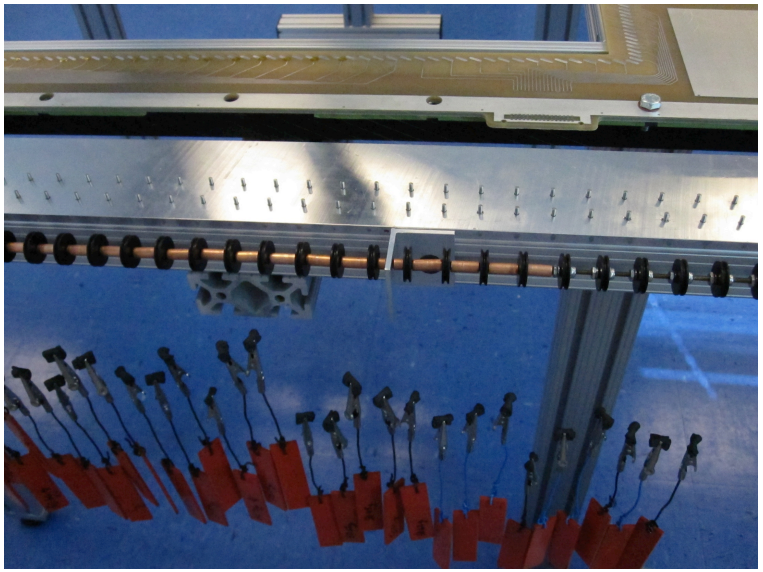
Next morning

- Cut excess wire, repeat stringing.
- Finish soldering at end of week

* Double production rate of older method

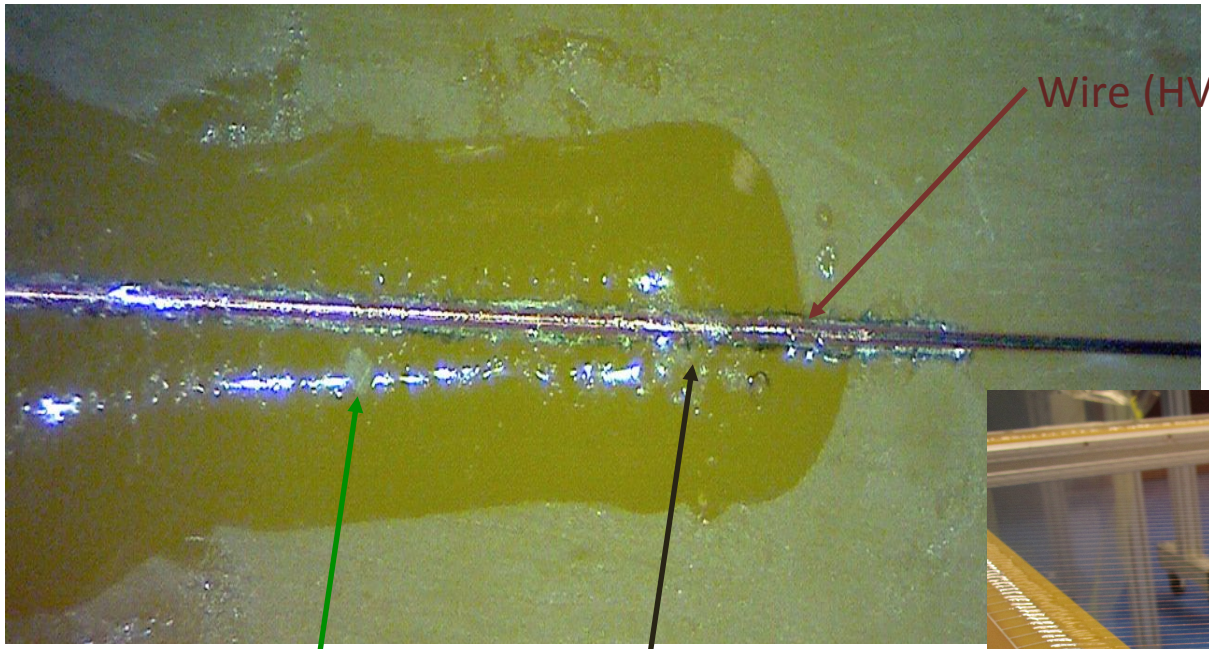
New Stringing Jigs

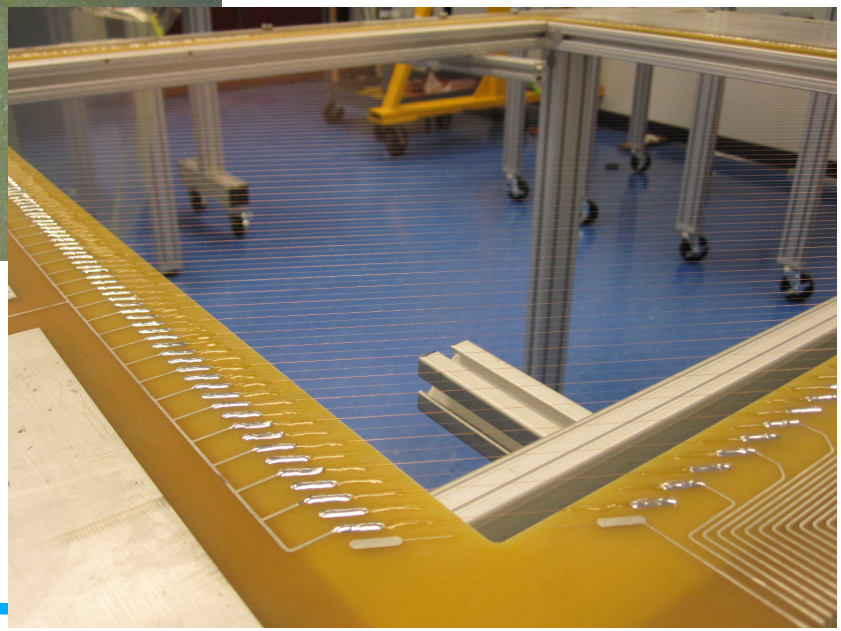




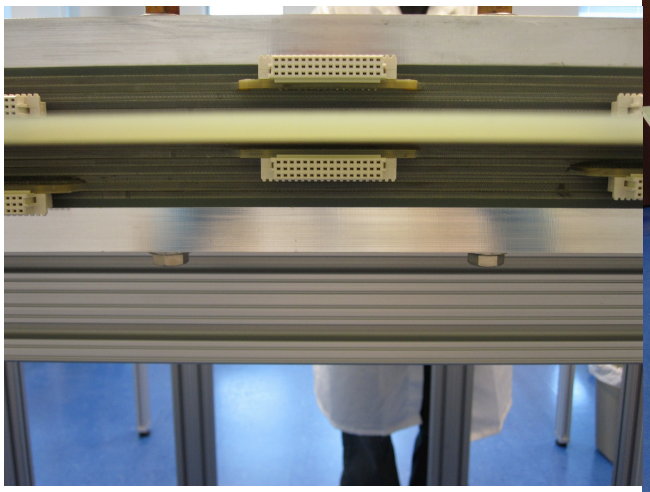
- 2 Precision machined pieces: Spooling, Tensioning.
- 1 jig (spool + tension pieces) for U-planes, 1 jig for X-planes.
- Pegs spaced for stringing either HV or Signal wires/session.
- Similar spacing, angles to be done for (new) HMS DC's.

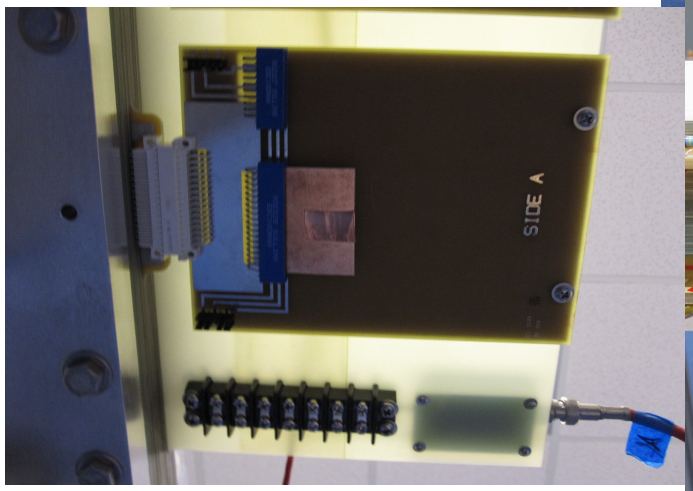
Alignment w/ Microscope

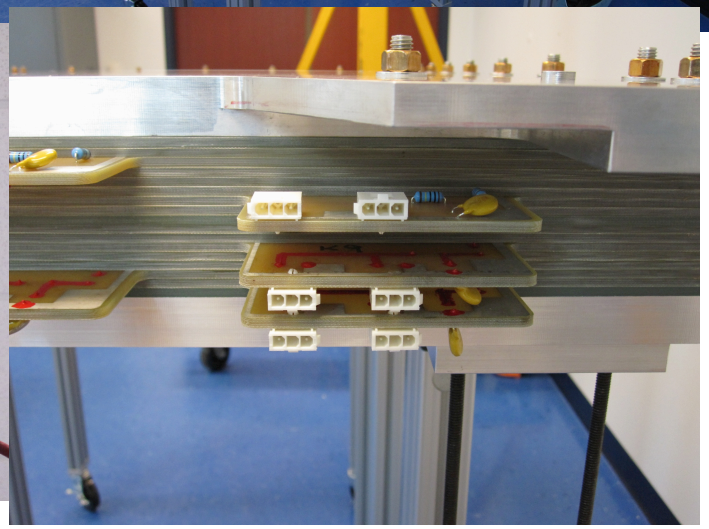




Electronics Work







- Amp-cards connect to side tabs
- Cables connect to top/bott tabs
- Done ~ 50% of production.
- Have all the Nanometric cards.

Quality Assurance (QA) for Planes

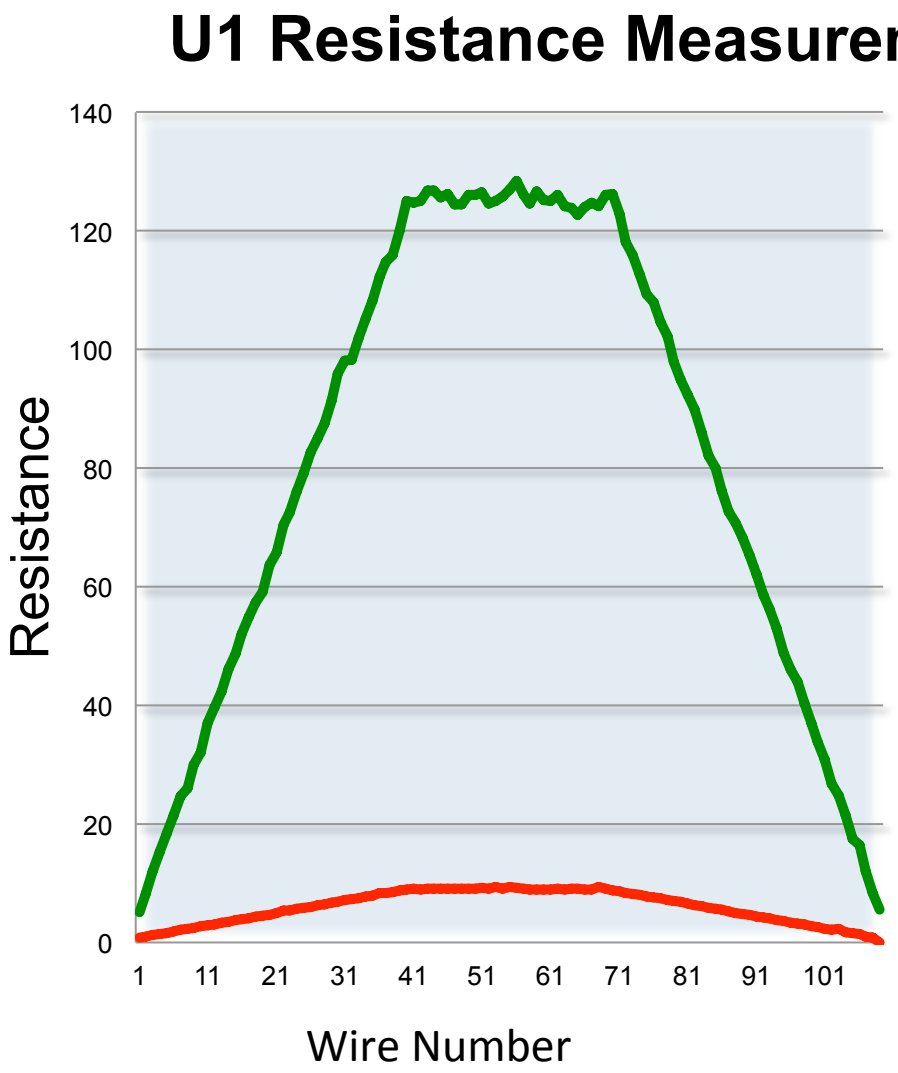
Before Stringing

- Check electrical connections and artwork.
- Seal signal through-holes inside O-ring perimeter (gas tightness).

After Stringing

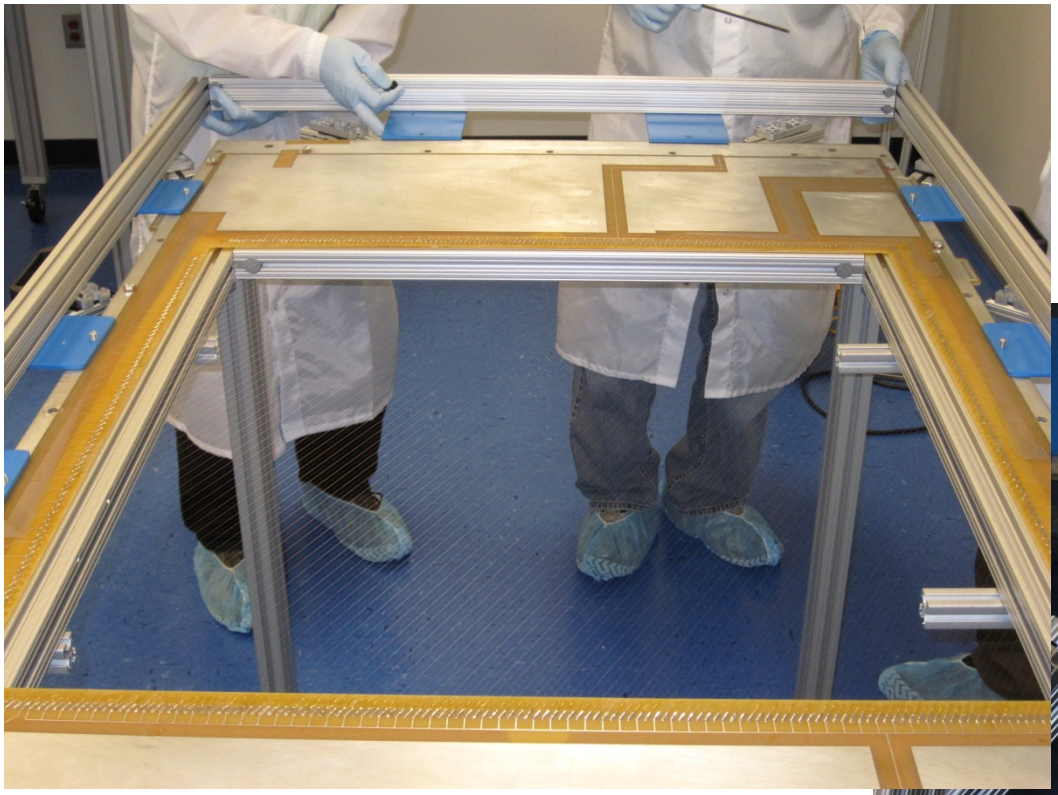
- Check wires are aligned; 2+ people for verification.
- Check solder joints, for connectivity.
- Measure resistance; wire-by-wire.
- Visual inspection (debris on board and/or wires, loose wires).

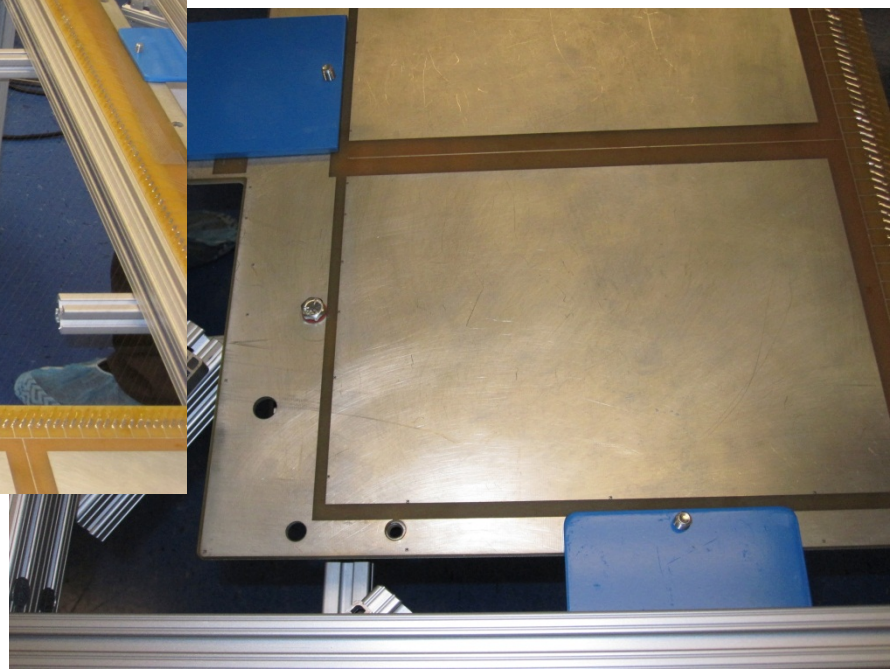
Check Electrical Connections (across wire to trace)



Signal wire dia. ~ 20 u
HV wire dia. ~ 100 u

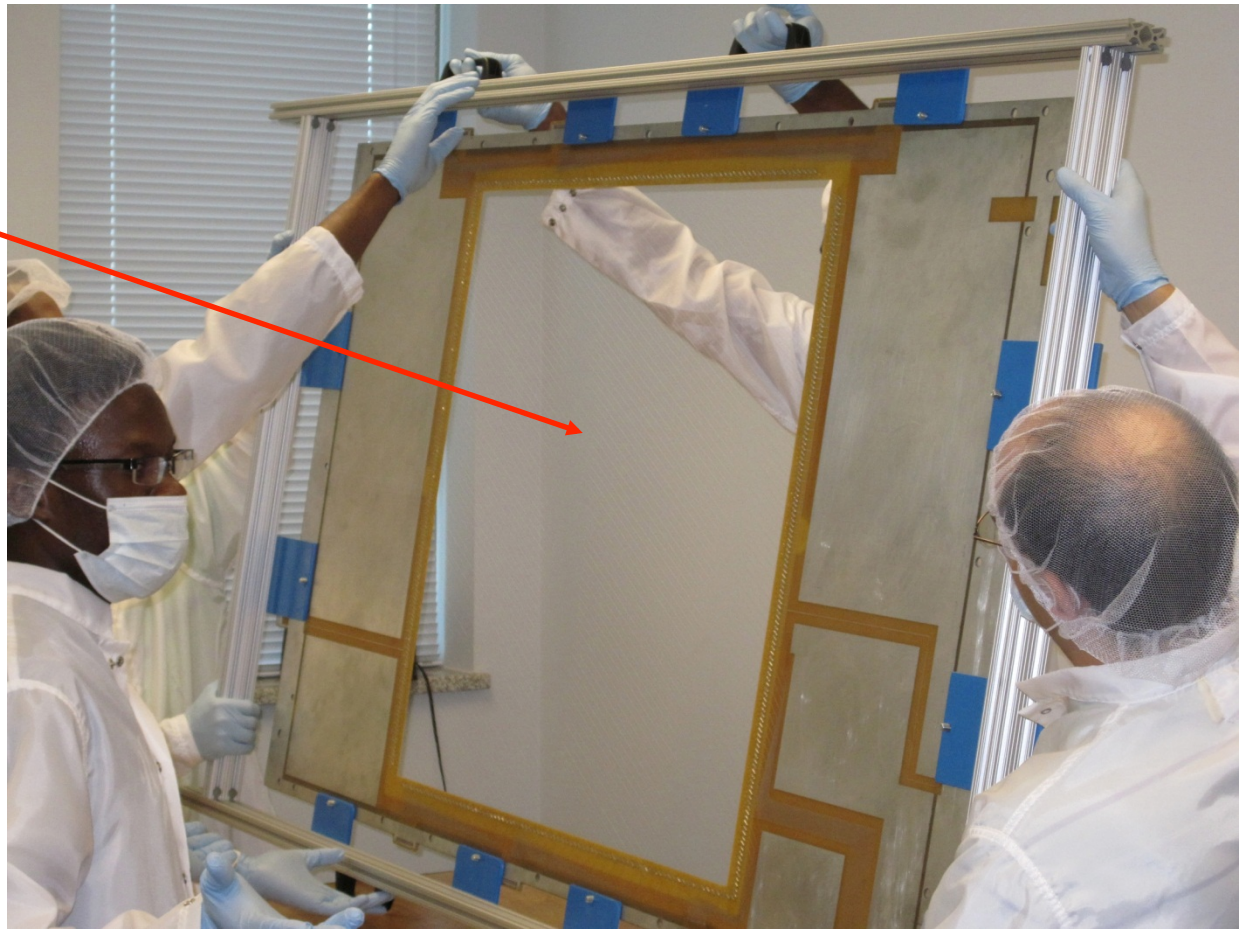
Attach Transport-frame to U-plane





Test Rigidity while Flipping (Works!)

Wires, in-plane.



Moving U-plane

U+K on Stack

- Used to pair K + U/X. Now compress O-ring on K.

Anticipated Schedule*

- Final week of February: Finish 1st ½ of spare chamber
- Mid-Late April: Close up spare DC.
- May: 3 DC's undergoing testing and (further) conditioning.

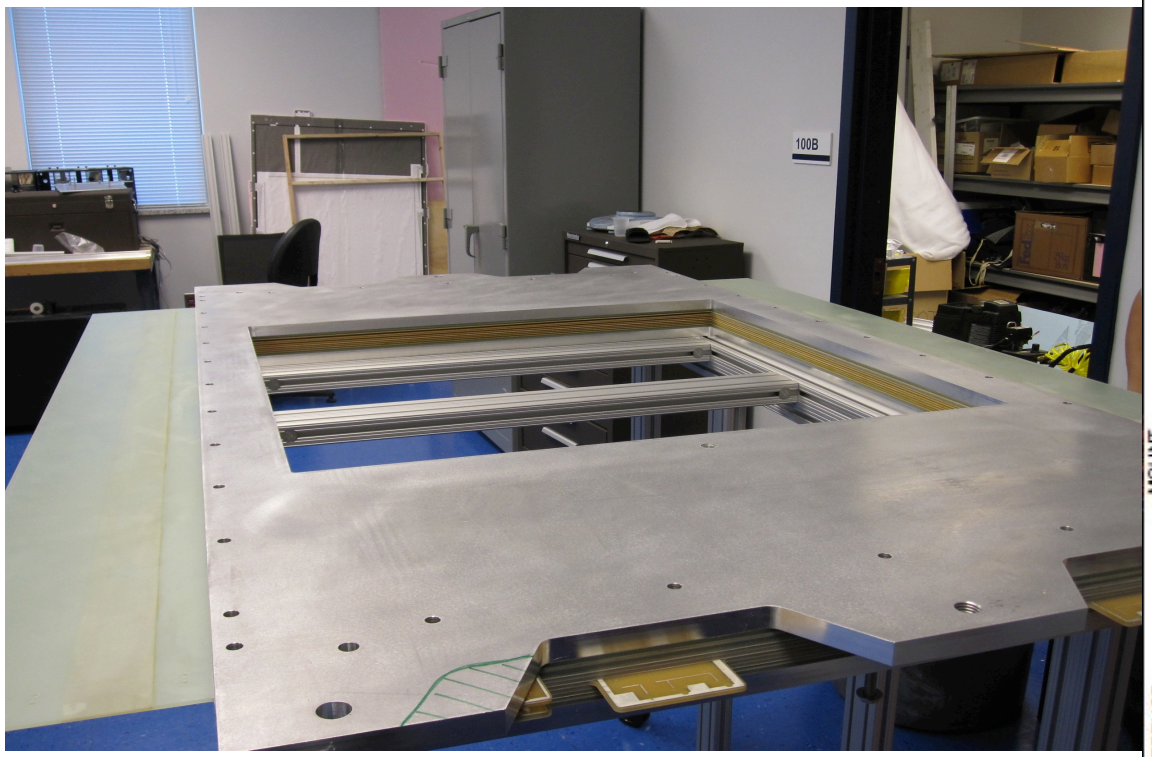
*Assuming no major set-back(s).
Can expect ~2-3 days before stacking a plane.

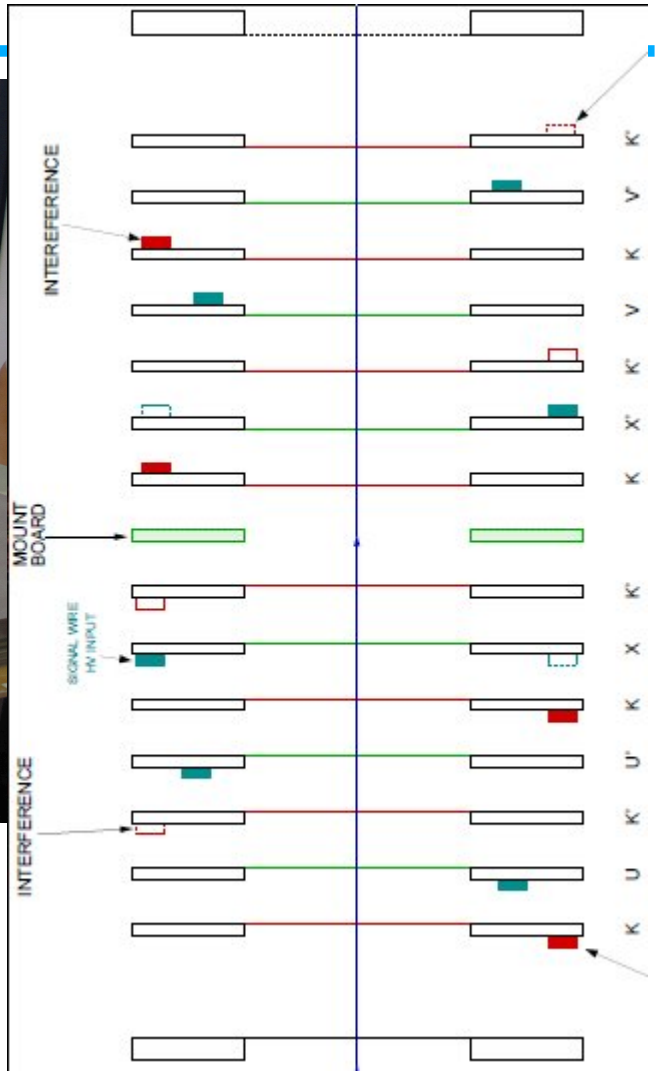
Summary

- 2 DC's closed, testing and conditioning progressing.
- Spare DC in progress.
- Improved stringing procedure, expediting process. Also to be used for HMS DC's
- Electronics (cables & cards) assembly ~ ½-way done.
- Should have spare chamber closed up around Mid-April.

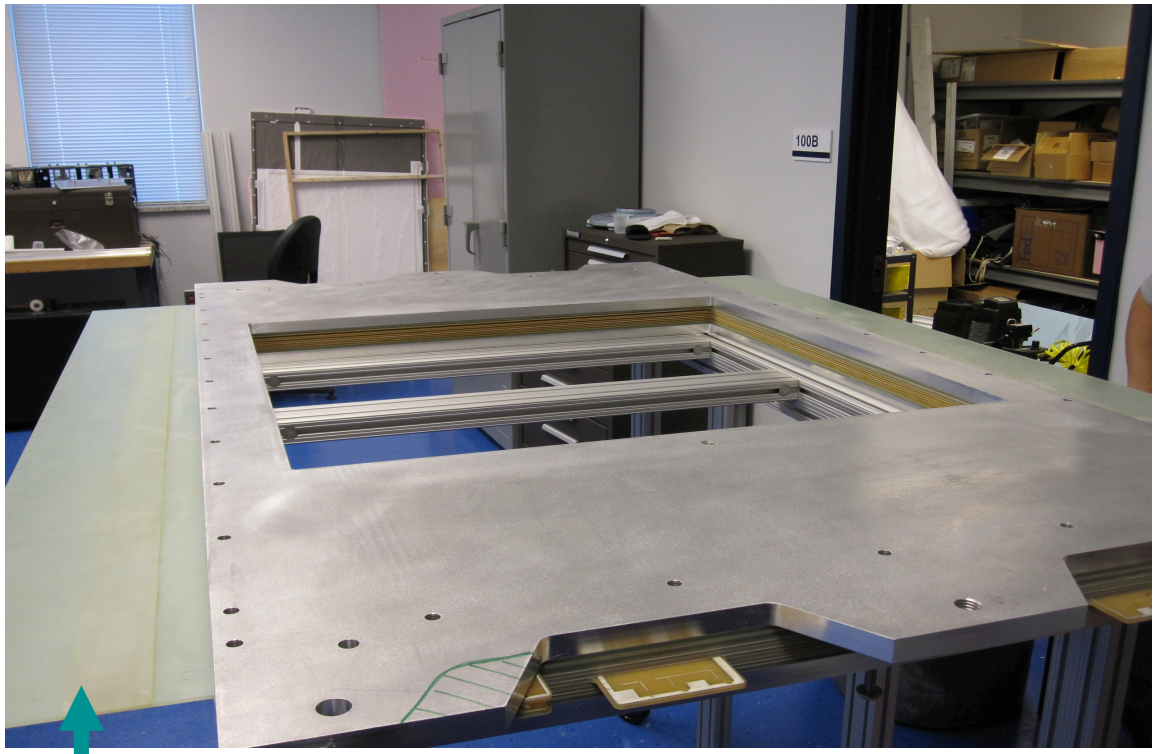
Team:
M.E. Christy, J. Taylor, T. Gautam, D. Biswas, *B. Jones*
N.K.
+ Support from P. Monaghan, B. Dongwi
*Students, *undergrad*.

Dry-Stacking (1/2+ Chamber)





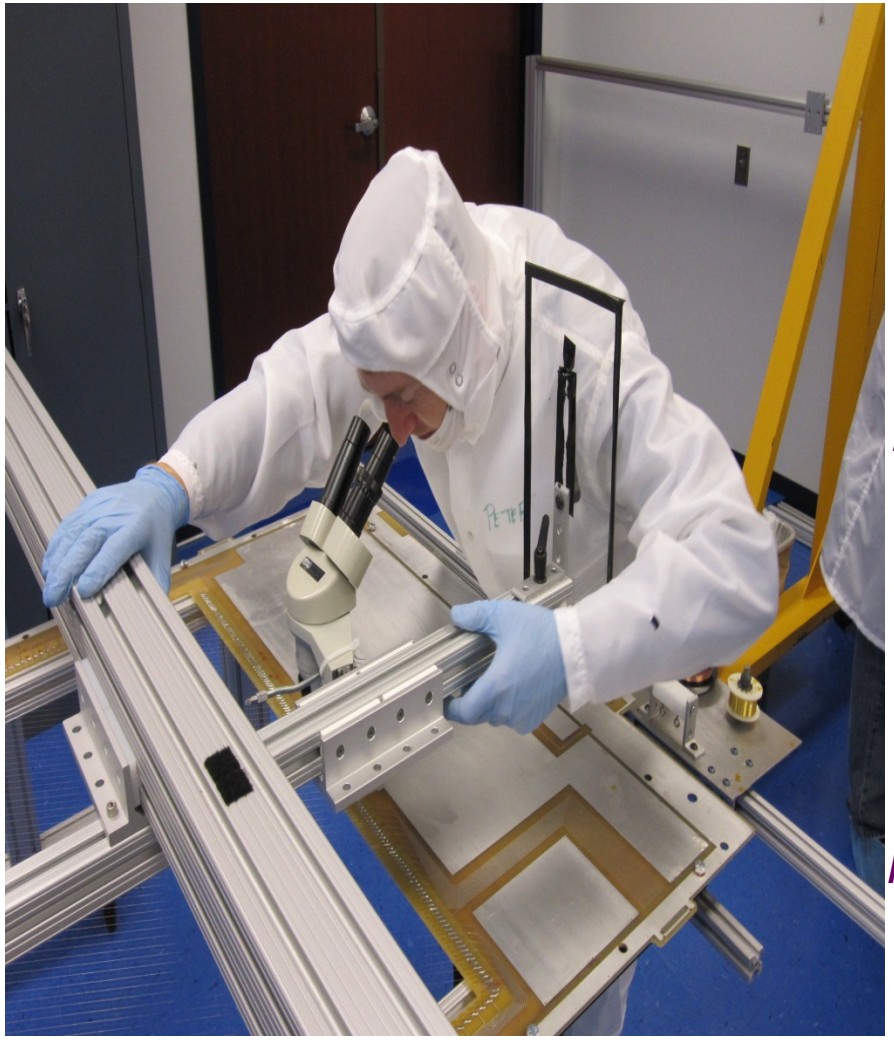
Dry-Stacking (1/2+ Chamber)



Mid-plane: provides mounting for Amp-disc card carries

- Provide guide for assembly.
- Check for any interferences.
- 2nd half of chamber is same, but flipped about mid-plane.
- *Only need to check ½ plane.*

Stringing Process: Old



Morning

- Align wire, tension, apply tape for aligning, verify, adjust as needed.
- Solder spooled end, check, cut from spooled end.
- Repeat, as often as possible …

…Towards end of day

- Check alignments, solder tensioned end, clean.
- Epoxy (along trace), check alignments.

Next morning

- Cut excess wire, solder, clean.
- Go back to '*Morning*'