

SHMS DC construction update

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Hall C Summer Workshop – June 23, 2012

Recall that construction has been delayed by production and delivery of large PCBs.

→ Original issue was machining to such a large width (~40")

New machine was purchased and delivered in January to address

→ However, new production issues have arose:

1. Incomplete plating on through-holes

- *such large boards have to be hand agitated in plating tanks*
- *partially resolved by drilling slightly larger holes*

2. difficulty in aligning screening for artwork at board edge

- *new lamination machine purchased by vendor*

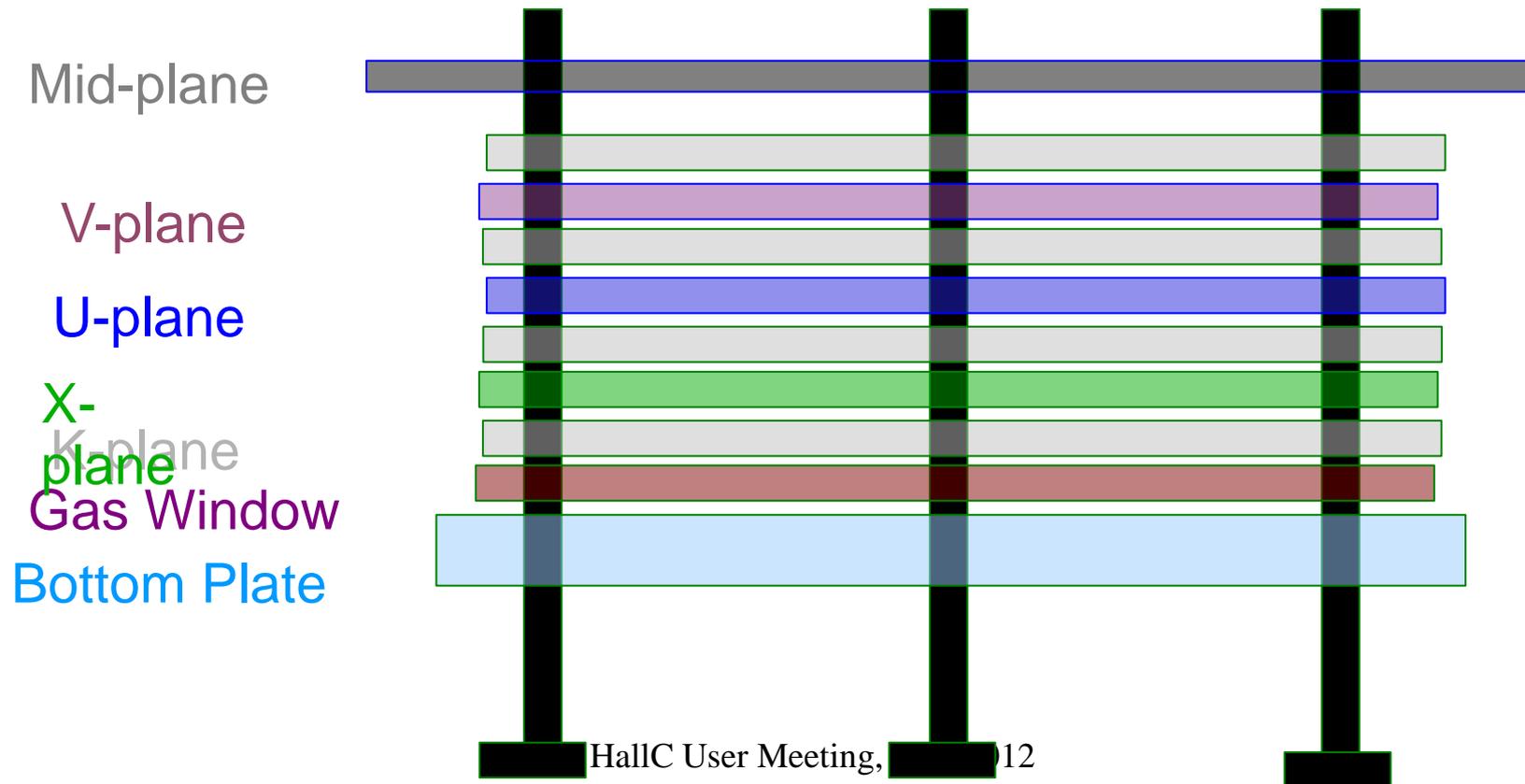
Progress since last update:

- Received first samples of K, X, and U planes in March 2012.
- Planes looked good, however not all through-holes fully plated.
- Repaired through holes and finished QA of boards.
- Completed jigs.
- Tensioned and glued first cathode foil
- Started stringing first U-plane.
- Aluminum base plates, gas windows, and midplanes being machined

General steps in assembly

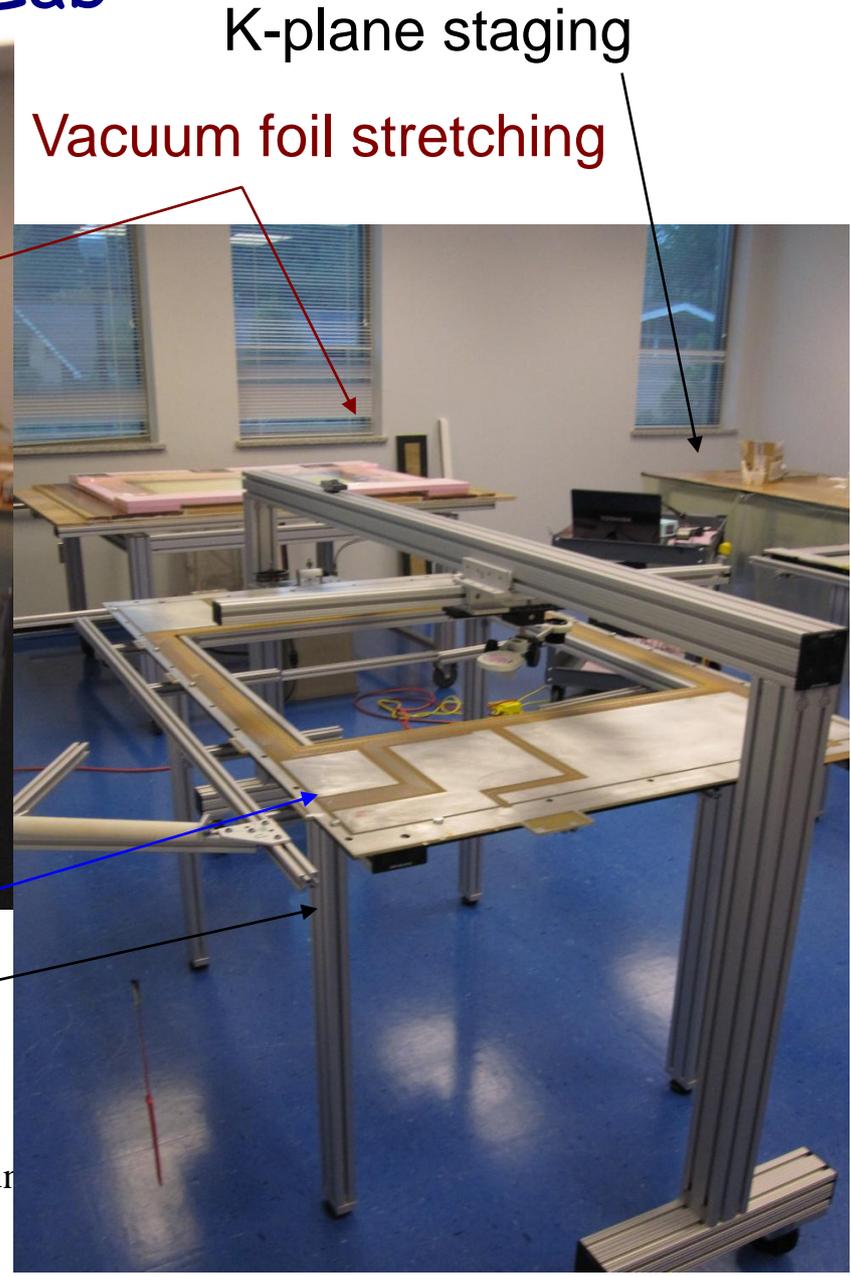
1. **Lay bottom plate on assembly station** and run up all but 8 bolts to ~1" above surface.
2. **String wire planes (U and X in parallel on 2 stations) and stretch and mount cathode foils.**
3. **Transfer gas window and then first cathode plane to assembly station** and run up bolts and alignment pins.
4. **Transport wire plane to assembly station** from stringing jig (transport frame requires attachment using fraction of existing bolt holes in PCB).
5. **Align plane and run up bolts** to 2 cm above surface for all but 6 transport bolts. Run 8 transport bolts to flush with surface.
6. **After mid-plane, flip all planes and repeat 1-5.** This requires transfer of wire planes from one transport frame to another so that the transport frame bolts are always removed from the top.
7. **Install top plate.**

- Each chamber consists of basically 2 mini-chambers separated by a mid-plane to which the amplifier carrier cards mount.
- The 'bottom' ½ consists of all wire planes with mounting surface on top. (**V** is a **U** rotated by 180 deg. in-plane). **X-U-V**.
- The 'top' ½ consists of all wire planes with mounting surface down. (**X** → **X'**, **U** → **U'**, **V** → **V'**).



Hampton DC construction lab

DC assembly Lab



K-plane staging

Vacuum foil stretching

First U Plane

Stringing station

HallC User Meeting, Jun

Hampton DC construction lab

DC assembly Lab - 2

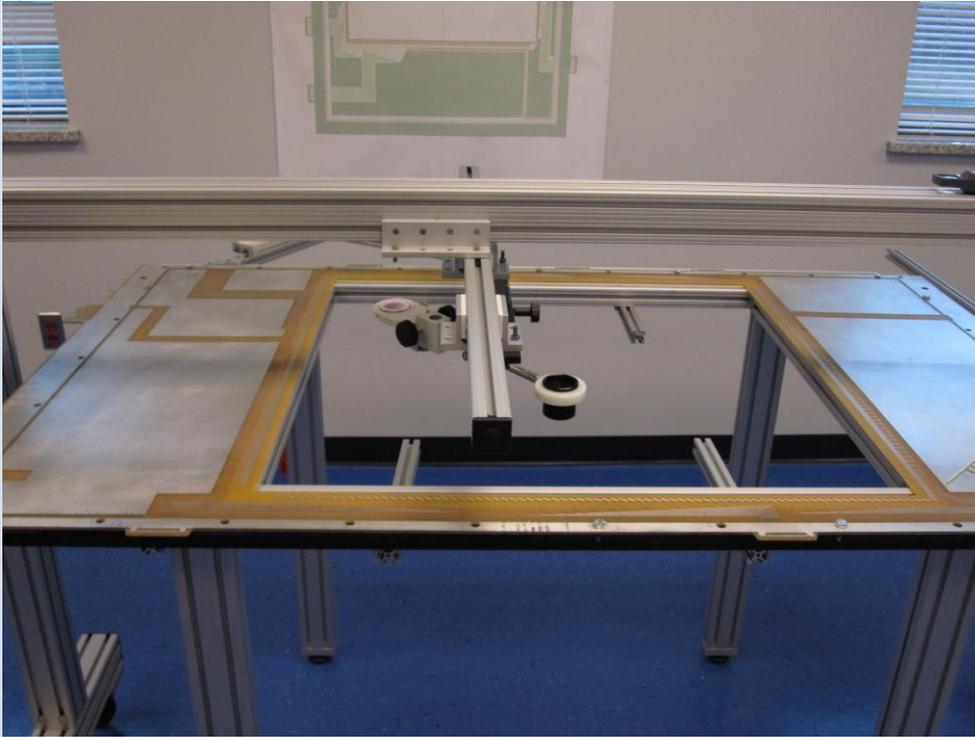
Assembly stack cart
(1 of 2 shown)



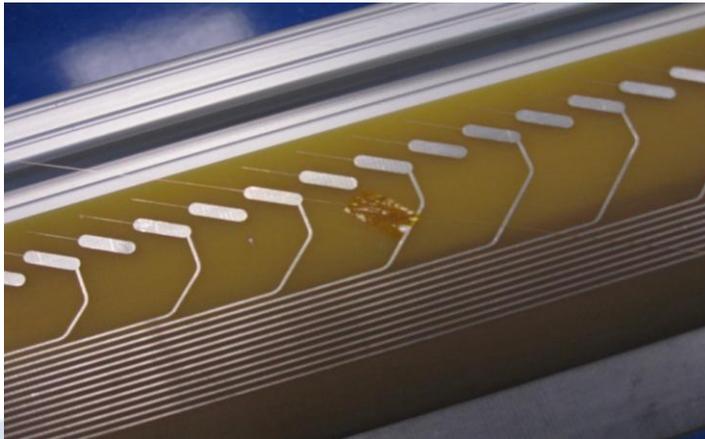
K-plane staging

HallC User Meeting, June 2012

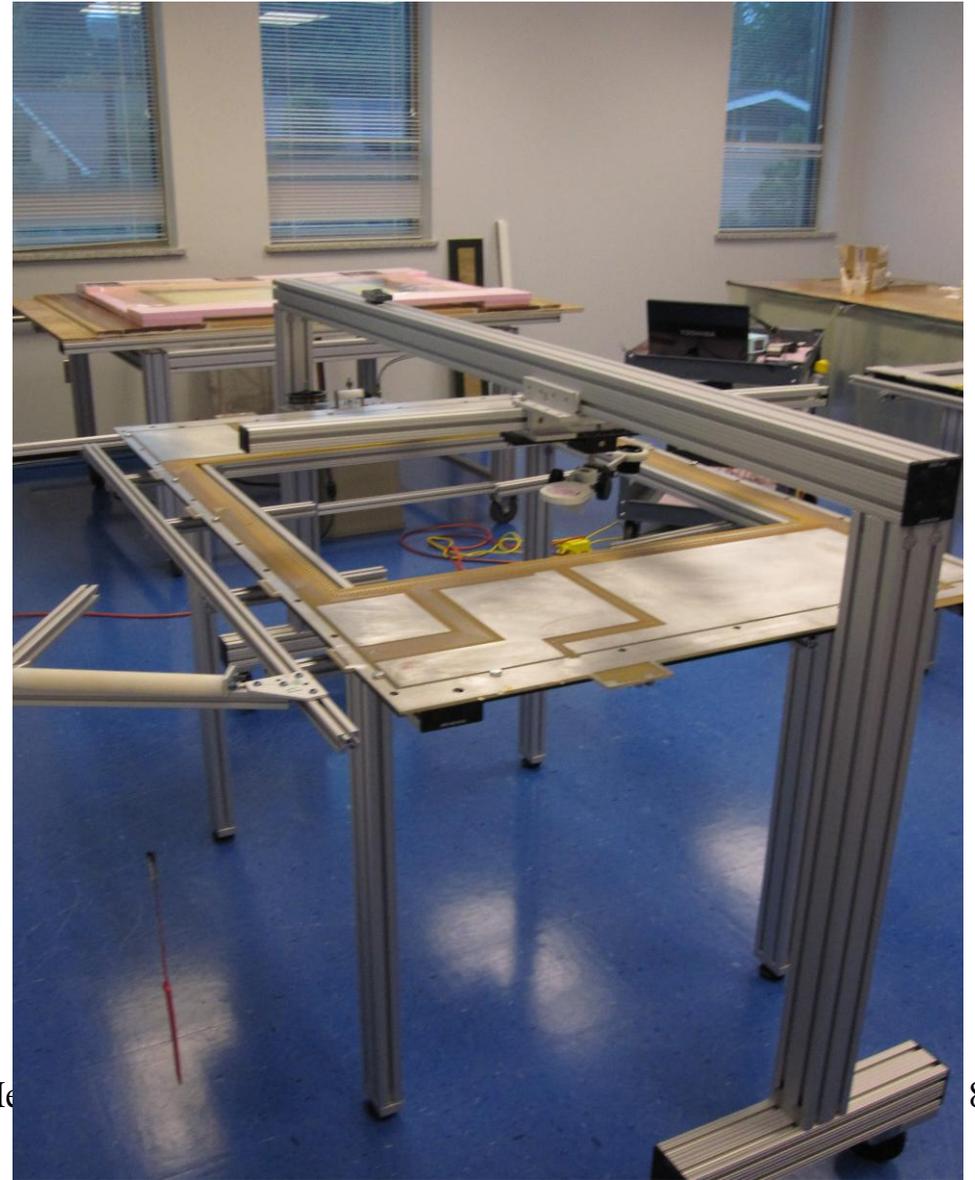
Wire stringing



Alignment of first
U-plane field wire

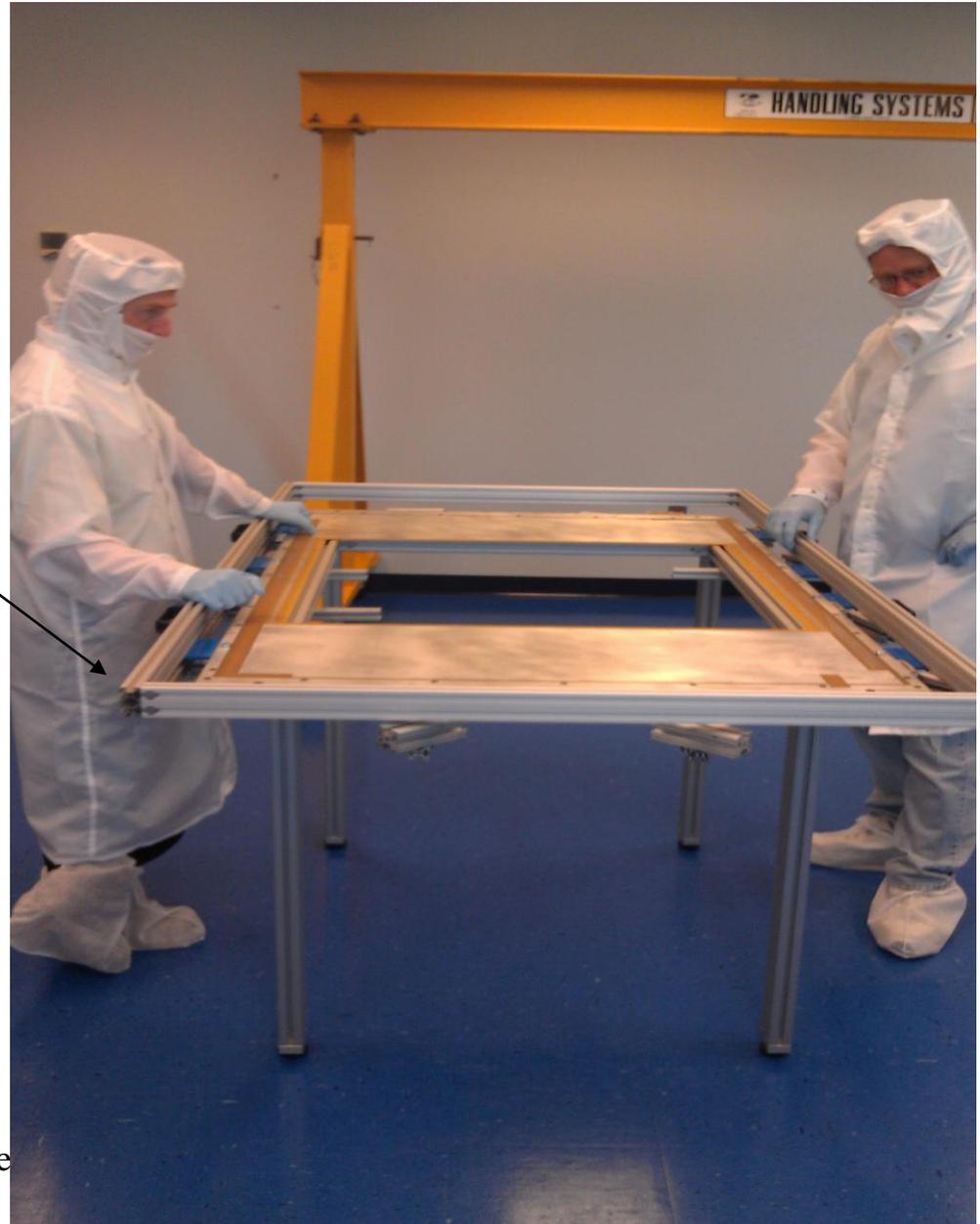


First U-plane field wire under tension



Wire Plane Transport

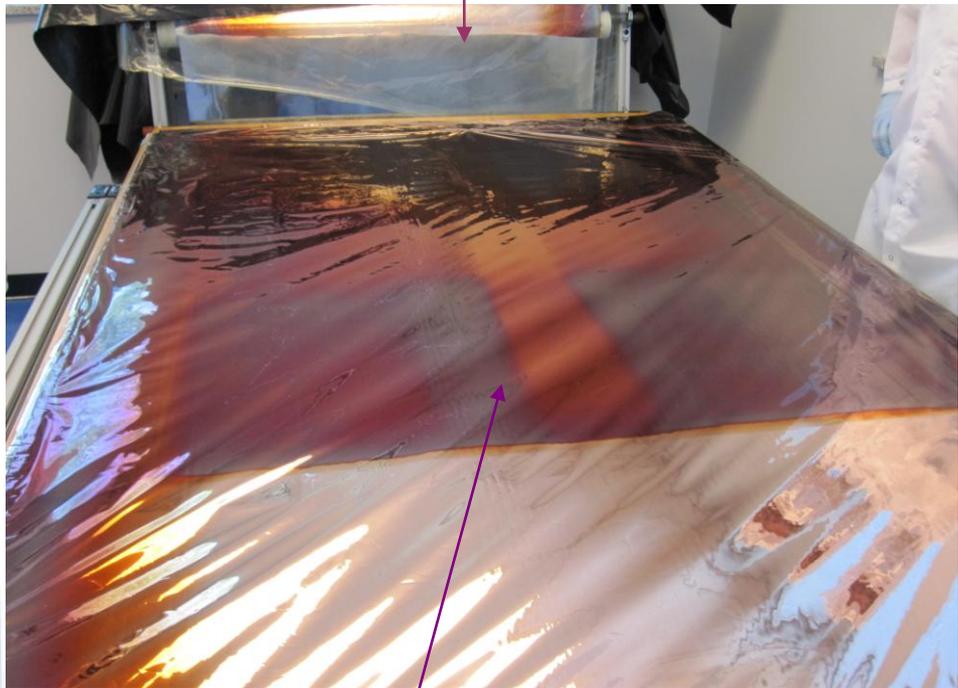
- Wire planes are in unstable equilibrium after stringing. (tend to 'potato chip' during Transport.
- transport frame built and integrated into wire stringing jig.
- transport frame is assembled on stringing jig support rails so that it is **never** moved over completed wire plane.
- attaches to plane utilizing Subset of bolt holes.



Cathode Construction

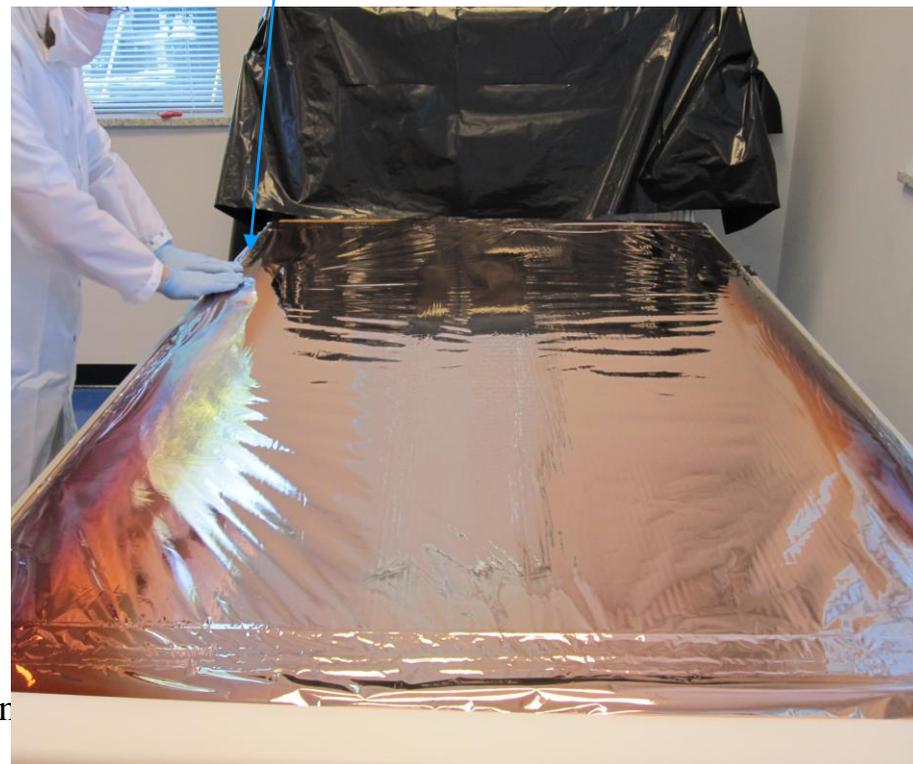
Foil placement

Foil reel rack



Nylon block

Seal vacuum tape



Cathode Construction

Vacuum foil stretching



Vacuum gap

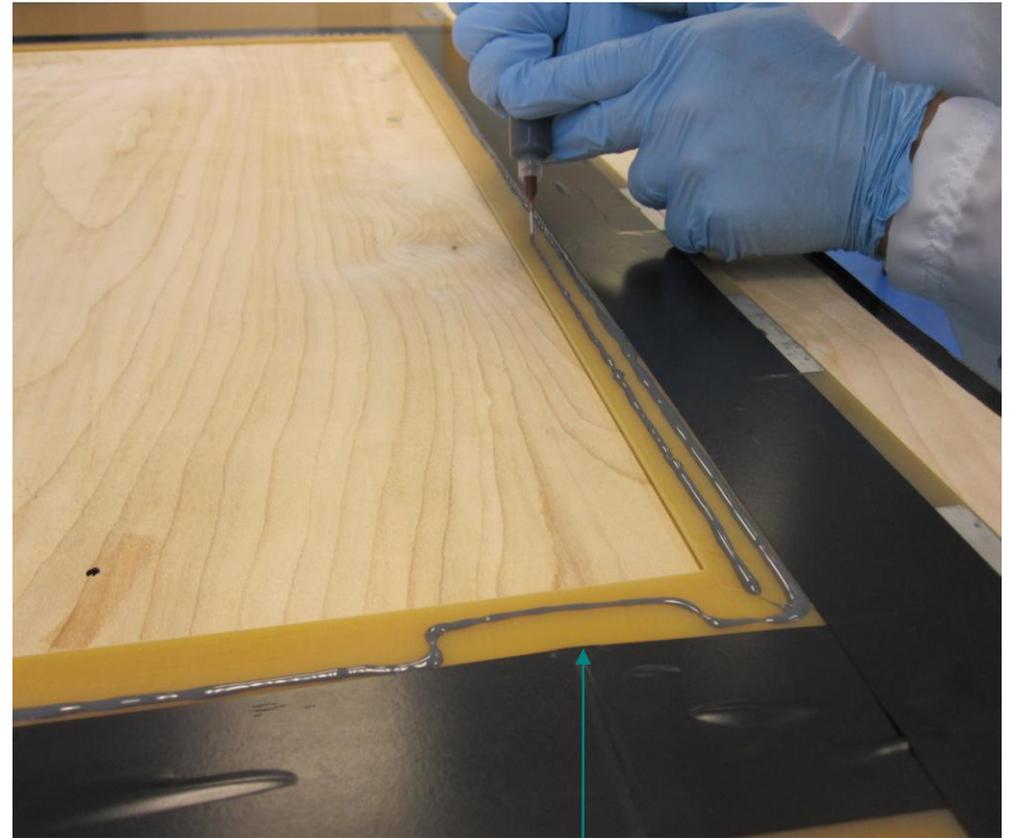
Cathode Construction

Epoxy application

Tape glue stop



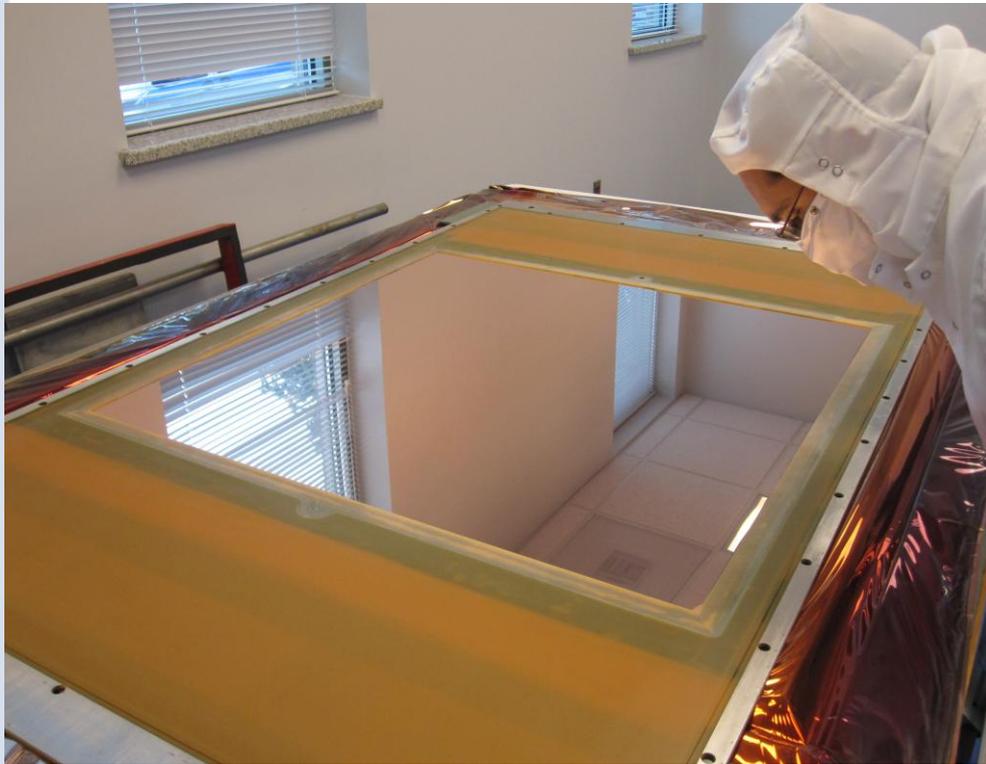
Applying glue



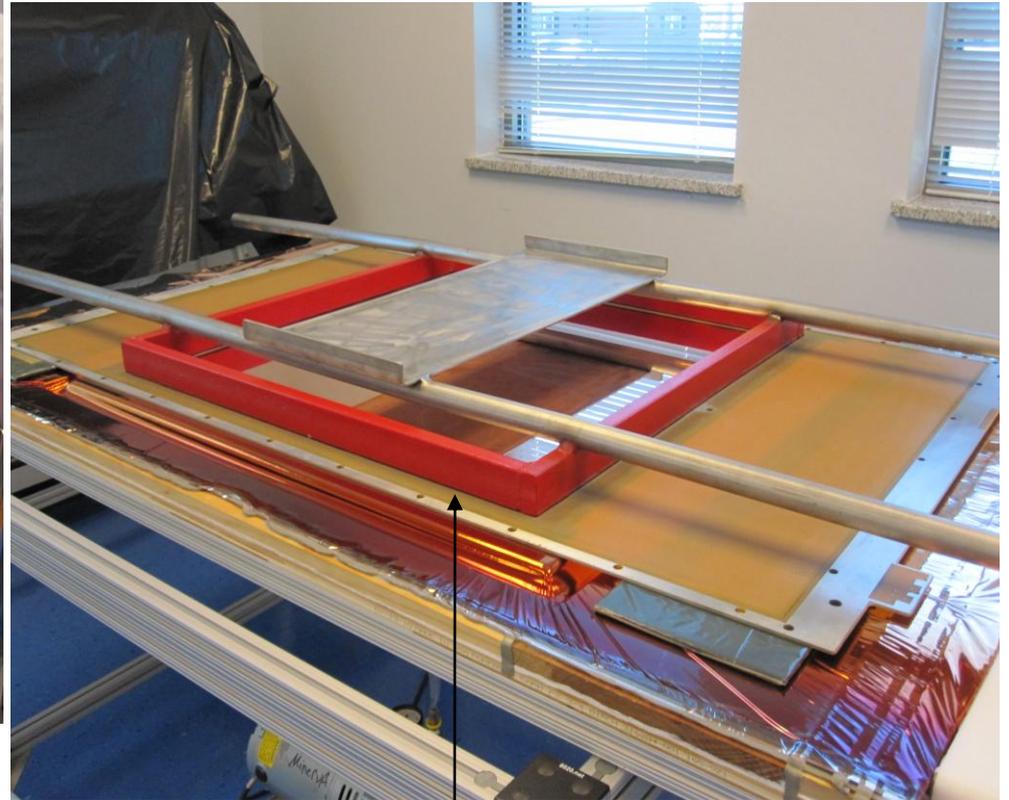
Glue gap for
HV tab

Cathode Construction

Place epoxied plane on stretched foil



Weight plane and cure overnight

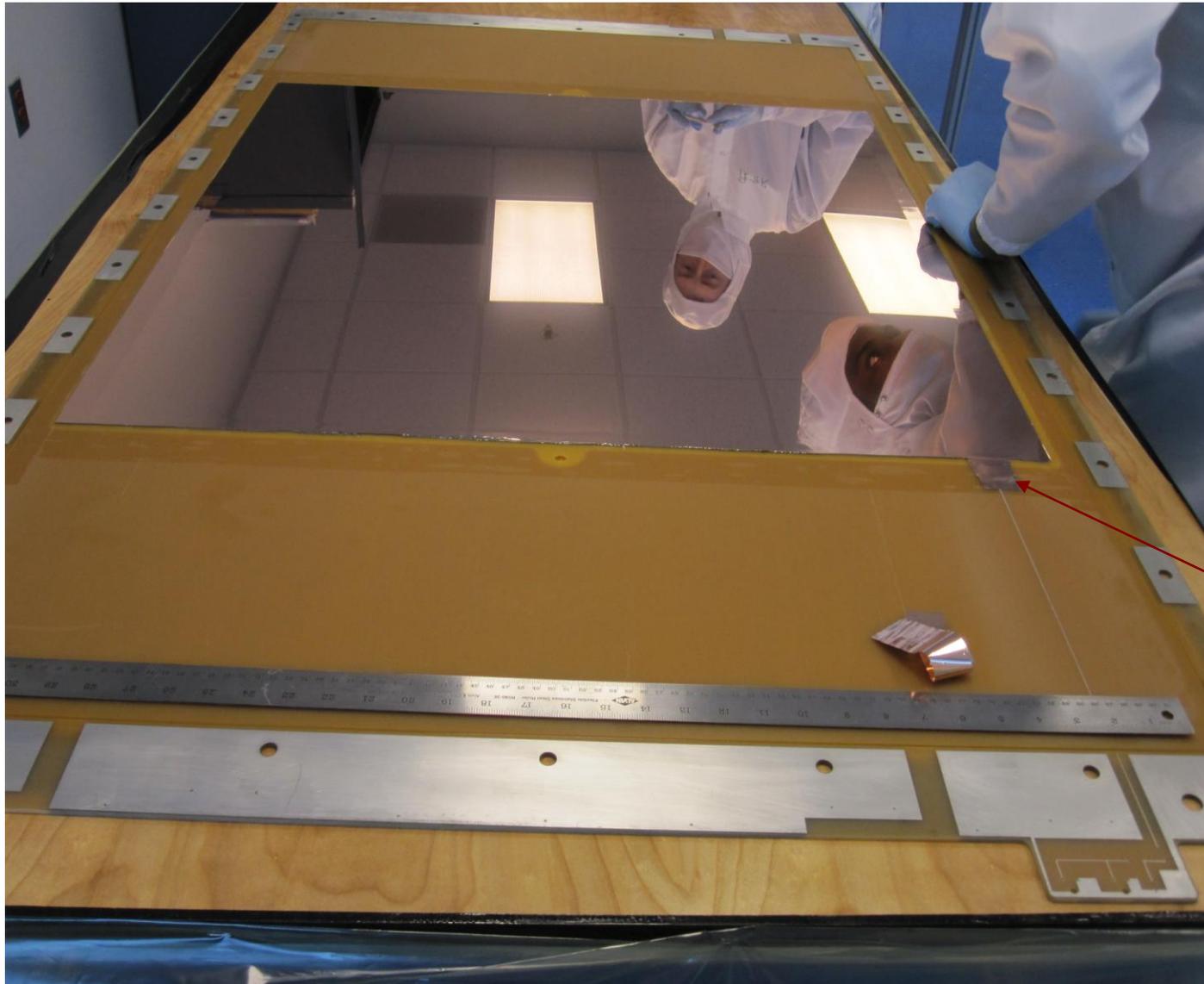


Weighted frame provided by Hall C

HallC User Meeting, June 2012

Cathode (K-plane) Construction

Trim foil, fold and epoxy HV tab



HV Tab
(folded to provide
HV to both sides)

Status and plans

- Stringing of first U plane underway. 1st X and 2nd U (V) ready for stringing.
- First K-plane finished. 2 more shipped this week. (foil stretched and glued next week).
- Aluminum plates, gas windows, and midplanes being machined... delivered soon.
- Another X (#2) and U (#3) being finalized by vendor. (expect shipment by 1st week in July)
- Expect remaining boards for 1st chamber by end of July