

ACD Geometry Review

A year late and a dollar short...

Update to ACD Geometry

- Ken Segal is our contact in the ACD engineering team.
- The full ACD model is maintained in SFX files...down to the last nut.
- Ken has provided a simplified view of the ACD for us to start with: tiles, ribbons, support structure and the latest mass spreadsheet.

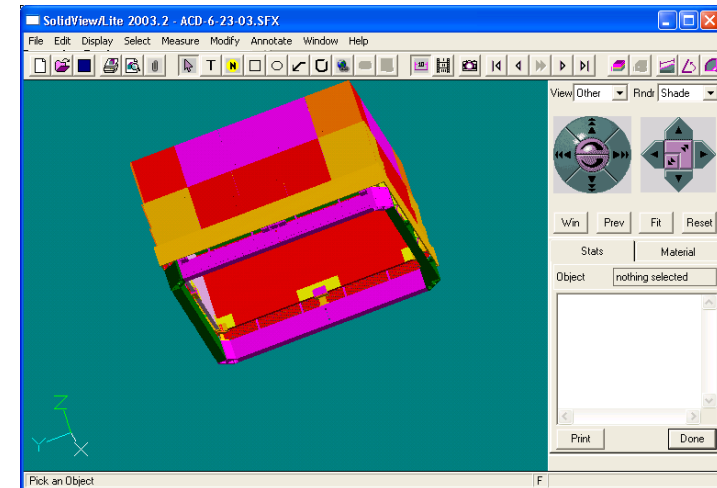
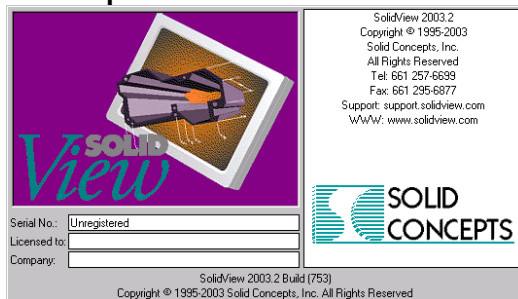
What has been updated?

- Tile dimensions and positions
- Support structure
- Ribbons

- *THANK YOU JOANNE!!!!*

Communicating

- The ACD engineering team maintains its database of geometry parameters in SFX files – readable using a program called SolidView.
- SolidView Lite is FREE
 - <http://www.solidview.com/>



Actual ACD Tile Mass

| Item | Qty | Estimated Mass (Kg) | Calculated Mass (Kg) | Actual Mass (Kg) | Total Mass without Margin (Kg) | Total Mass with Margin (Kg) * |
|---------------------------------|------------------------------------|---------------------|----------------------|---|--------------------------------|-------------------------------|
| Tiles | (25 Top + 60 Side + 4 Bottom = 89) | | | | | |
| Bottom Tiles (Row 1) | 4 | | 2.529 | | 10.116 | 11.128 |
| Bottom Tiles (Row 2) | 4 | | 2.658 | | 10.632 | 11.695 |
| Bottom Tiles (Row 3) | 4 | | 3.485 | | 13.940 | 15.334 |
| Bottom Tiles (Row 4) | 4 | | 5.936 | | 23.744 | 26.118 |
| Top Tiles (Center) | 1 | | 6.811 | | 6.811 | 7.492 |
| Top Tiles (Mid) | 1 | | 11.19 | | 11.190 | 12.309 |
| Top Tiles (Edge, Bent) | 1 | | 12.64 | | 12.640 | 13.904 |
| Tile Volume Changes | 1 | | | | | |
| Fibers in Tiles (Wave Shifting) | 1 | | | 4.473 | 4.473 | 4.473 |
| Fiber to Tile Adhesive | 1 | | | | | |
| | | | | Tile Subtotal | 93.546 | 102.454 |
| Tile Detector Wrapping | 1 | | 7.7700 | | 7.7700 | 8.5470 |
| | | | | Tile Detector without Pigtail Subtotal | 101.3163 | 111.0006 |

Top Tile Total: 30641g

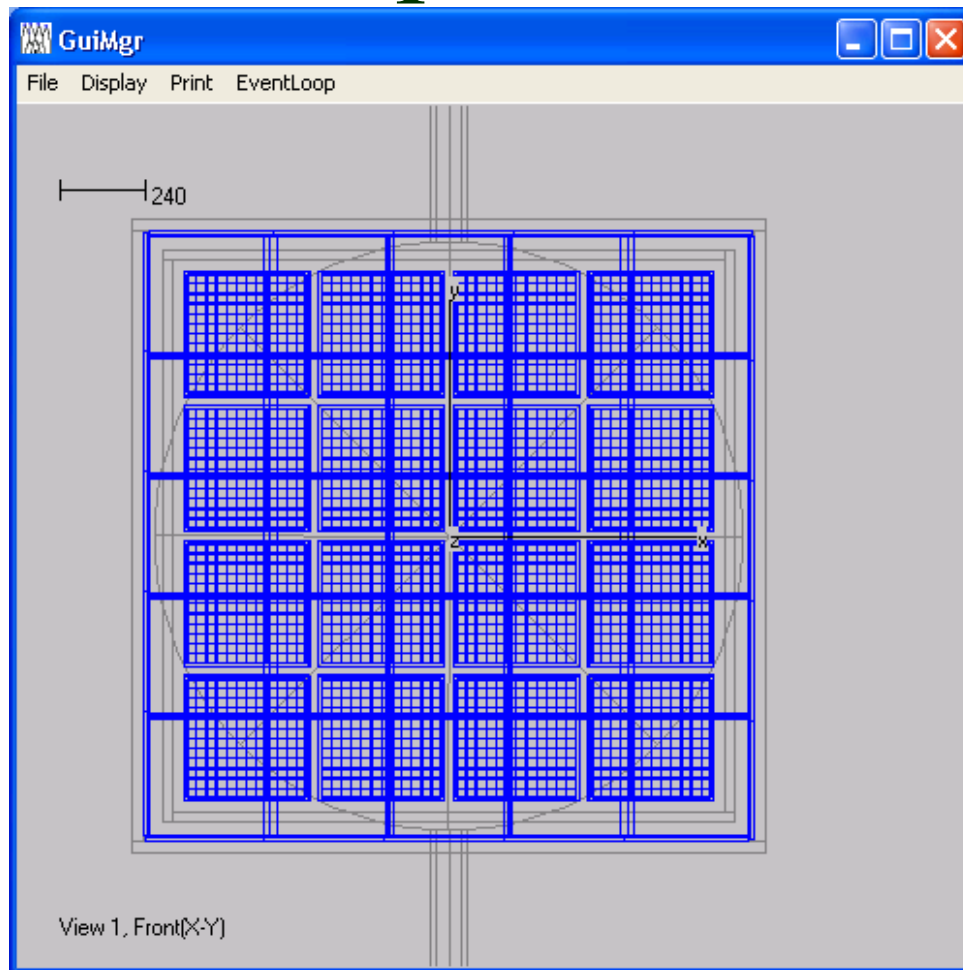
ACD Mass 7-21-2003 RevA1

Side Tile Total: 58432g

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Top Tiles



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Simulated Mass Top Tiles

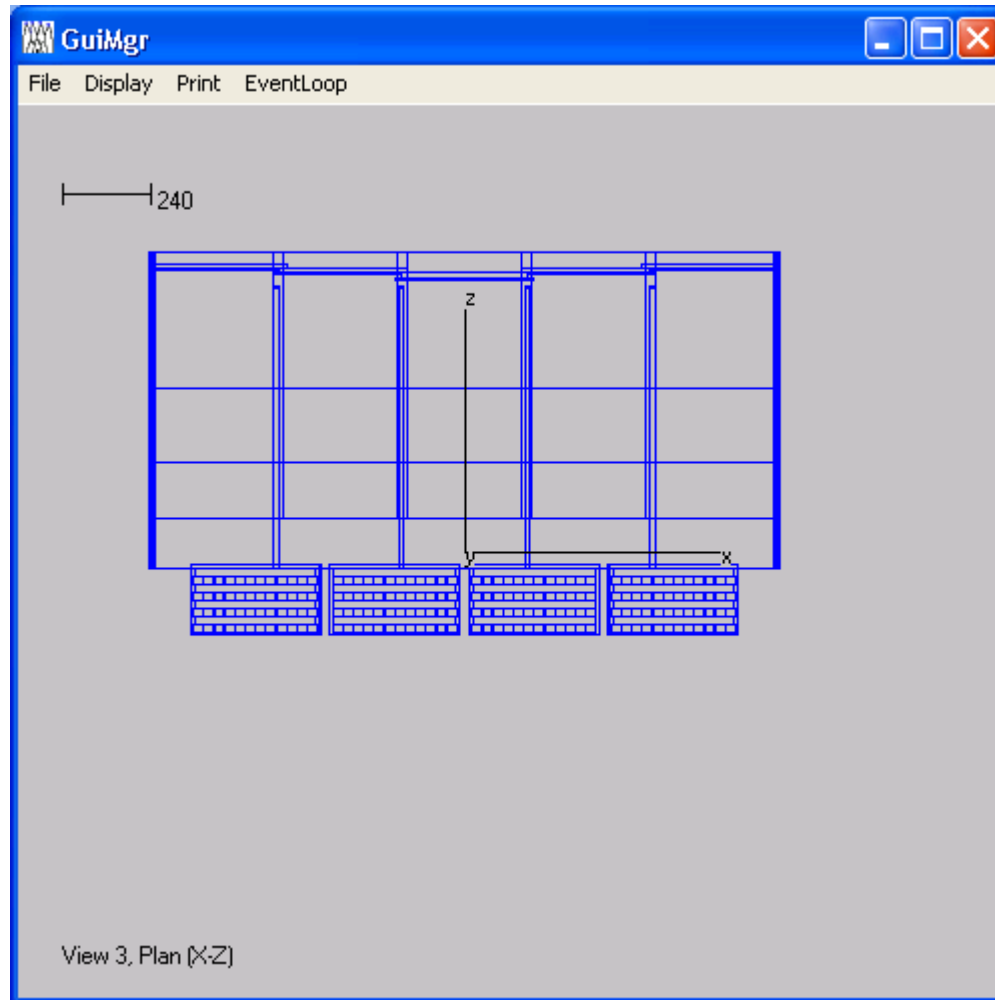
| Name | Vol (cu cm) | Convex Vol | # Phys | Total Vol | Material | Mass (grams) |
|-------------------|----------------|---------------|-----------|--------------|-------------|-----------------|
| topTileRcentCcent | 1370 | 1370 | 1 | 1370 | Polystyrene | 1414 |
| topTileRcentCedge | 1178 | 1178 | 2 | 2357 | Polystyrene | 2432 |
| topTileRcentCmid | 1142 | 1142 | 2 | 2284 | Polystyrene | 2357 |
| topTileRdefCcent | 1360 | 1360 | 4 | 5443 | Polystyrene | 5617 |
| topTileRdefCedge | 1170 | 1170 | 8 | 9362 | Polystyrene | 9662 |
| topTileRdefCmid | 1134 | 1134 | 8 | 9072 | Polystyrene | 9362 |

Top Tile Total: 30641g

Simulated Total: 30844g

<http://www.slac.stanford.edu/exp/glast/ground/software/geometry/data/RELEASED/materialsSummary.html>

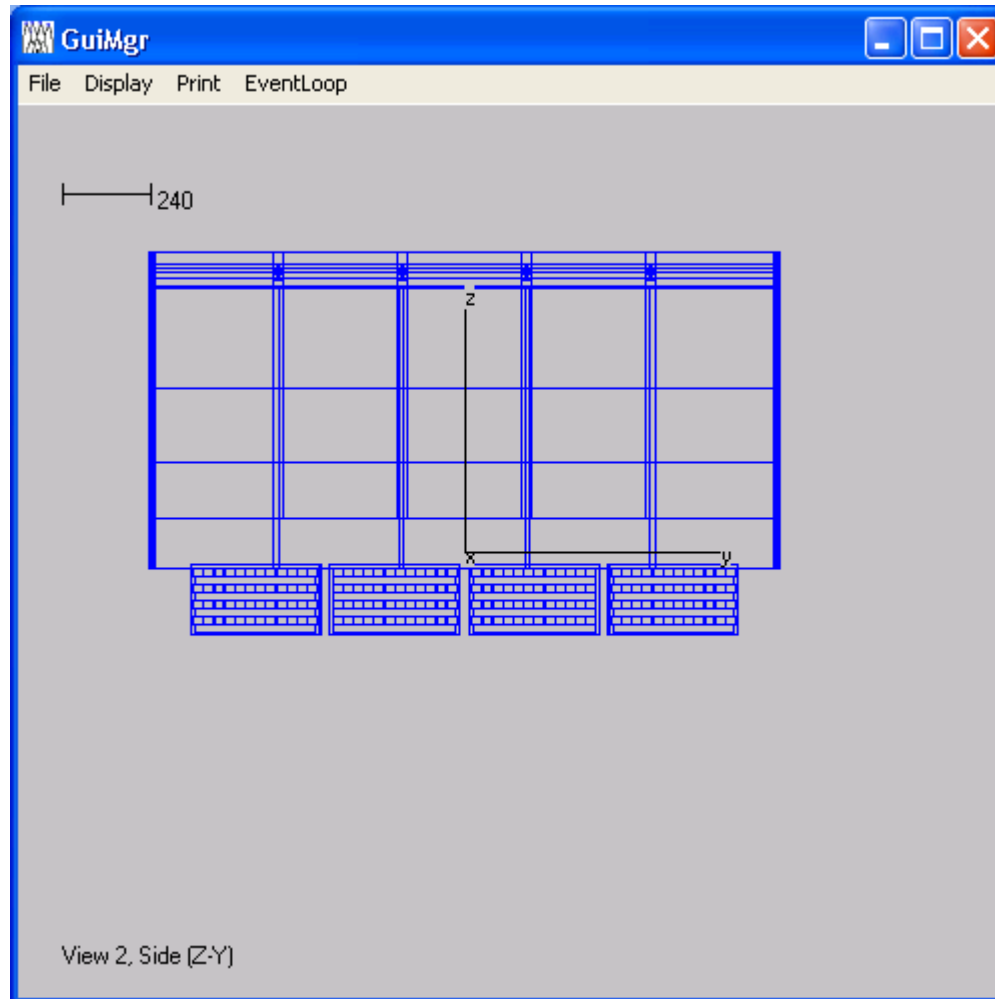
Side Tiles



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Side tiles



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Simulated Mass: Side Tiles

| Name | Vol (cu cm) | Convex Vol | # Phys | Total Vol | Material | Mass (grams) |
|-----------------------|----------------|---------------|-----------|--------------|-------------|-----------------|
| sideTileR0EdgeGreater | 1255 | 1255 | 4 | 5021 | Polystyrene | 5181 |
| sideTileR0EdgeLesser | 1206 | 1206 | 4 | 4826 | Polystyrene | 4980 |
| sideTileR0Mid | 1215 | 1215 | 12 | 14581 | Polystyrene | 15048 |
| sideTileR1EdgeGreater | 684 | 684 | 4 | 2736 | Polystyrene | 2823 |
| sideTileR1EdgeLesser | 657 | 657 | 4 | 2630 | Polystyrene | 2714 |
| sideTileR1Mid | 662 | 662 | 12 | 7946 | Polystyrene | 8200 |

Row 0 Total: 25209g

Row 1 Total: 13737g

Actual Total: 23744g

Actual Total: 13940g

(Row 4 in engineering spreadsheet?)

Simulated Mass: Side Tiles

| Name | Vol (cu cm) | Convex Vol | # Phys | Total Vol | Material | Mass (grams) |
|-----------------------|----------------|---------------|-----------|--------------|-------------|-----------------|
| sideTileR2EdgeGreater | 514 | 514 | 4 | 2057 | Polystyrene | 2123 |
| sideTileR2EdgeLesser | 494 | 494 | 4 | 1978 | Polystyrene | 2041 |
| sideTileR2Mid | 498 | 498 | 12 | 5976 | Polystyrene | 6167 |
| sideTileR3 | 2269 | 2269 | 4 | 9077 | Polystyrene | 9367 |

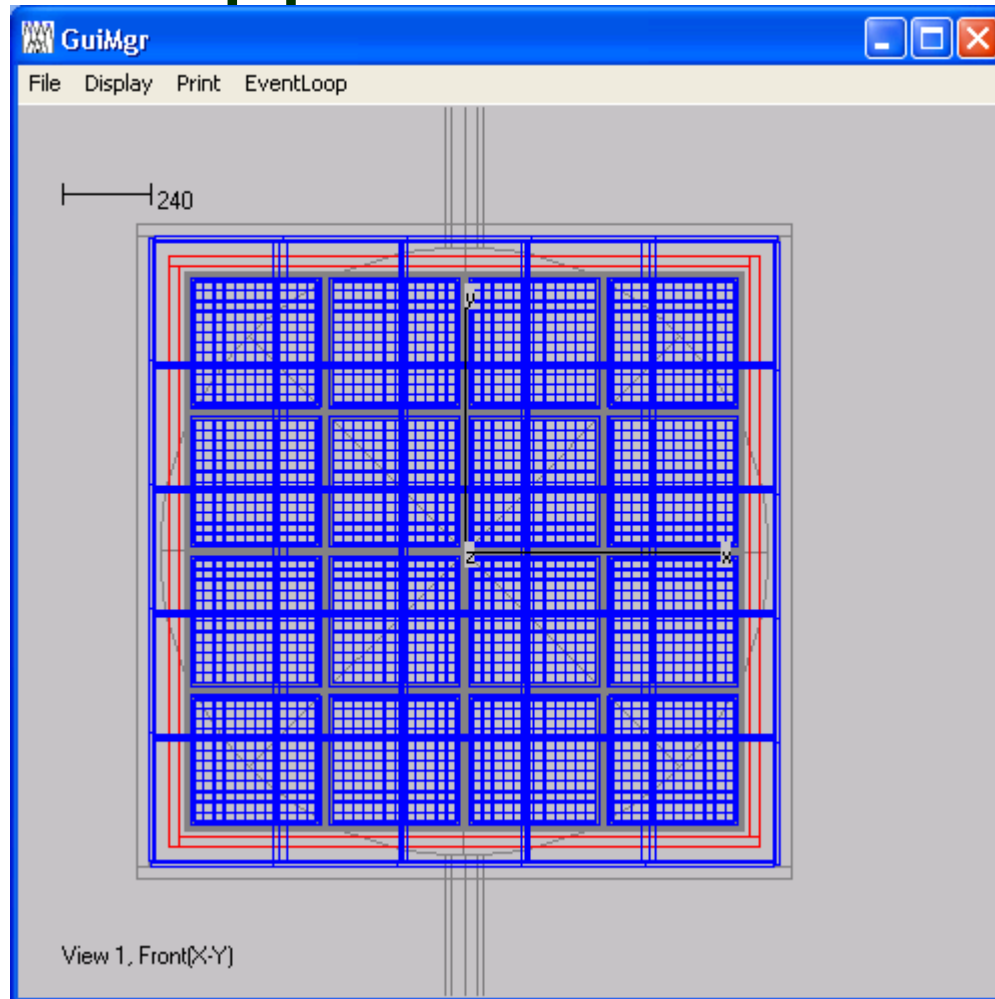
Row 2 Total: 10331g

Row 3 Total: 9367g

Actual Total: 10632g

Actual Total: 10116g

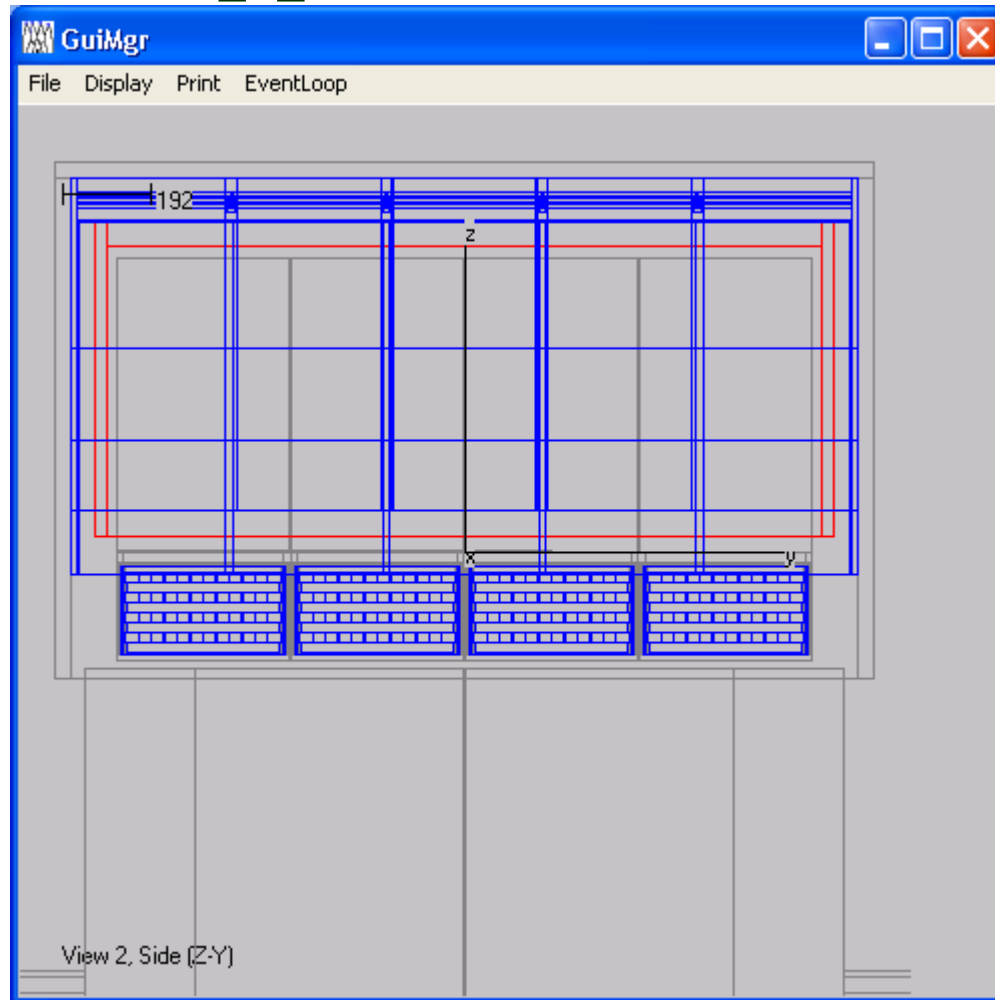
Support Structure



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Support Structure



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Support Structure Mass

| Item | Qty | Estimated Mass (Kg) | Calculated Mass (Kg) | Actual Mass (Kg) | Total Mass without Margin (Kg) | Total Mass with Margin (Kg) * |
|----------------------------------|-----|---------------------|--|------------------|--------------------------------|-------------------------------|
| Shell | | | | | | |
| Long Side Core | 1 | | 1.1770 | | 1.1770 | 1.2947 |
| Long Side Facesheet - Long | 1 | | 0.7873 | | 0.7873 | 0.8660 |
| Long Side Facesheet - Short | 1 | | 0.7747 | | 0.7747 | 0.8522 |
| Long Side Film Adhesive | 2 | | 0.2734 | | 0.5468 | 0.6015 |
| Long Side Edge Fill, Top & Sides | 1 | | 0.2120 | | 0.2120 | 0.2332 |
| | | | Side Panel Subtotal (total for 1) | | 3.4978 | 3.8476 |
| | | | Side Panel Subtotal (total for 2) | | 6.9956 | 7.6952 |
| | | | | | | |
| Short Side (2) Core | 1 | | 1.1367 | | 1.1367 | 1.2504 |
| Short Side (2) Facesheet - Long | 1 | | 0.7613 | | 0.7613 | 0.8374 |
| Short Side (2) Facesheet - Short | 1 | | 0.7487 | | 0.7487 | 0.8236 |
| Short Side (2) Film Adhesive | 2 | | 0.2641 | | 0.5282 | 0.5810 |
| Short Side (2) Edge Fill, Top & | 1 | | 0.2080 | | 0.2080 | 0.2288 |
| | | | Side 2 Panel Subtotal (total for 1) | | 3.3829 | 3.7212 |
| | | | Side 2 Panel Subtotal (total for 2) | | 6.7658 | 7.4424 |
| | | | | | | |
| Top Core | 1 | | 6.3490 | | 6.3490 | 6.9839 |
| Top Facesheets | 2 | | 2.0901 | | 4.1802 | 4.5982 |
| Top Film Adhesive | 2 | | 0.7374 | | 1.4748 | 1.6223 |
| Top Edge Fill, 4 Sides | 1 | | 0.9498 | | 0.9498 | 1.0448 |
| | | | Top Panel Subtotal (total for 1) | | 12.9538 | 14.2492 |

Side core and
facesheet Total:
5385.7g
Simulated:
13238g

Top core and
facesheet total:
10529.2g
Simulated:
10381g

ACD Engineering Mass: Ribbons

| Item | Qty | Estimated Mass (Kg) | Calculated Mass (Kg) | Actual Mass (Kg) | Total Mass without Margin (Kg) | Total Mass with Margin (Kg) * |
|-------------------------|-----|---------------------|-------------------------------|------------------|--------------------------------|-------------------------------|
| Fiber Ribbons | | | | | | |
| Fiber Ribbons, X Side | 4 | | 0.1768 | | 0.7070 | 0.7778 |
| Fiber Ribbons, Y Side | 4 | | 0.1714 | | 0.6855 | 0.7541 |
| Fiber Ribbon Wrapping | 8 | | 0.0434 | | 0.3472 | 0.3819 |
| Fibers to PMT Connector | 16 | 0.0100 | | | 0.1600 | 0.1920 |
| Fiber/PMT Connectors | 16 | | 0.0075 | | 0.1200 | 0.1320 |
| Spring | 16 | | | 0.0012 | 0.0192 | 0.0192 |
| Cap, PMT | 16 | | | 0.0095 | 0.1520 | 0.1520 |
| | | | Fiber Ribbons Subtotal | | 2.1910 | 2.4090 |

→ 1531.9g

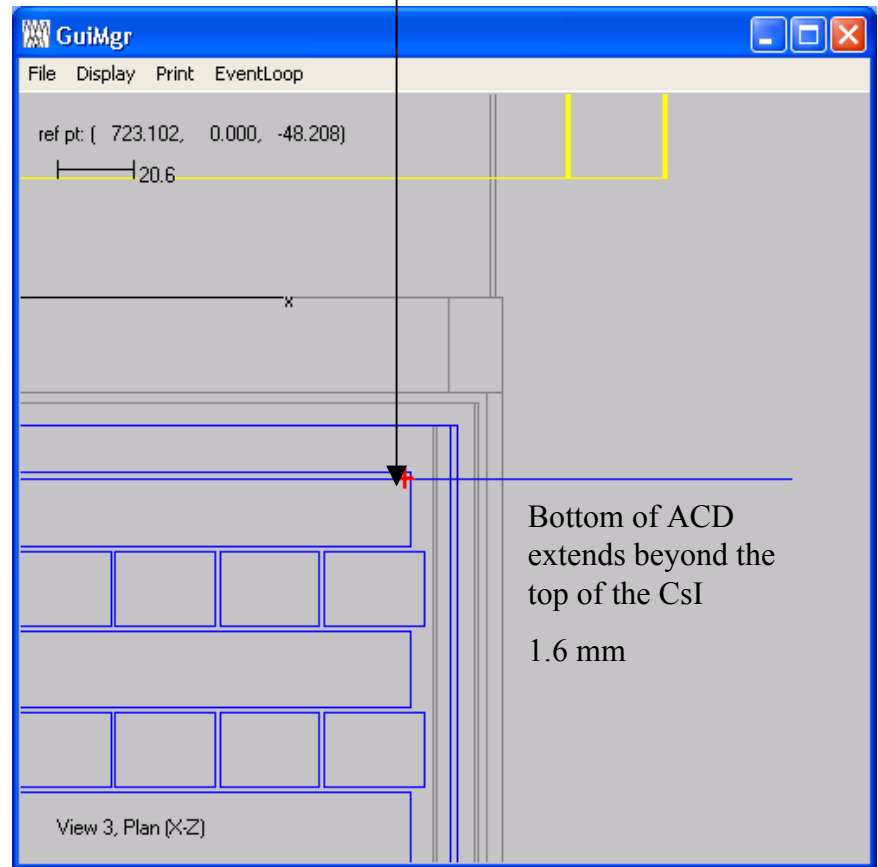
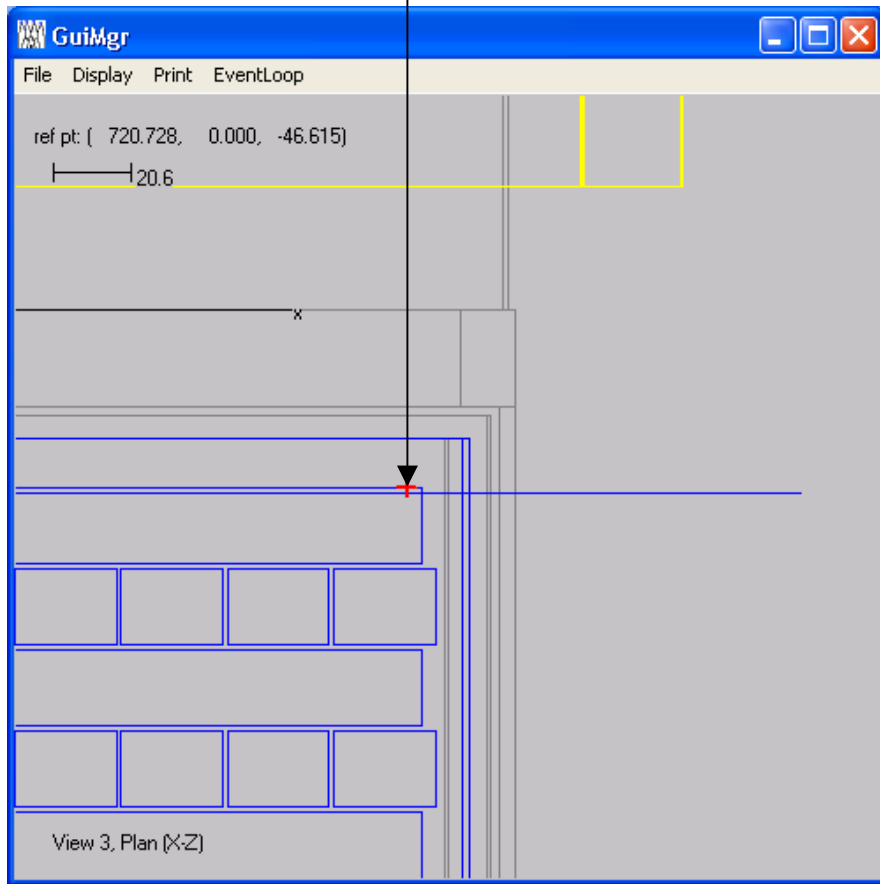
| | | | | | | |
|----------------|-----|-----|----|-----|-------------|-----|
| sideRibbon | 52 | 52 | 16 | 845 | Polystyrene | 872 |
| yRibbonTopCent | 26 | 26 | 4 | 104 | Polystyrene | 108 |
| yRibbonTopEdge | 23 | 23 | 8 | 187 | Polystyrene | 193 |
| yRibbonTopMid | 23 | 23 | 8 | 189 | Polystyrene | 195 |
| xRibbonTop | 116 | 116 | 4 | 465 | Polystyrene | 480 |

Simulated
1848g

ACD and CAL

Top of CsI

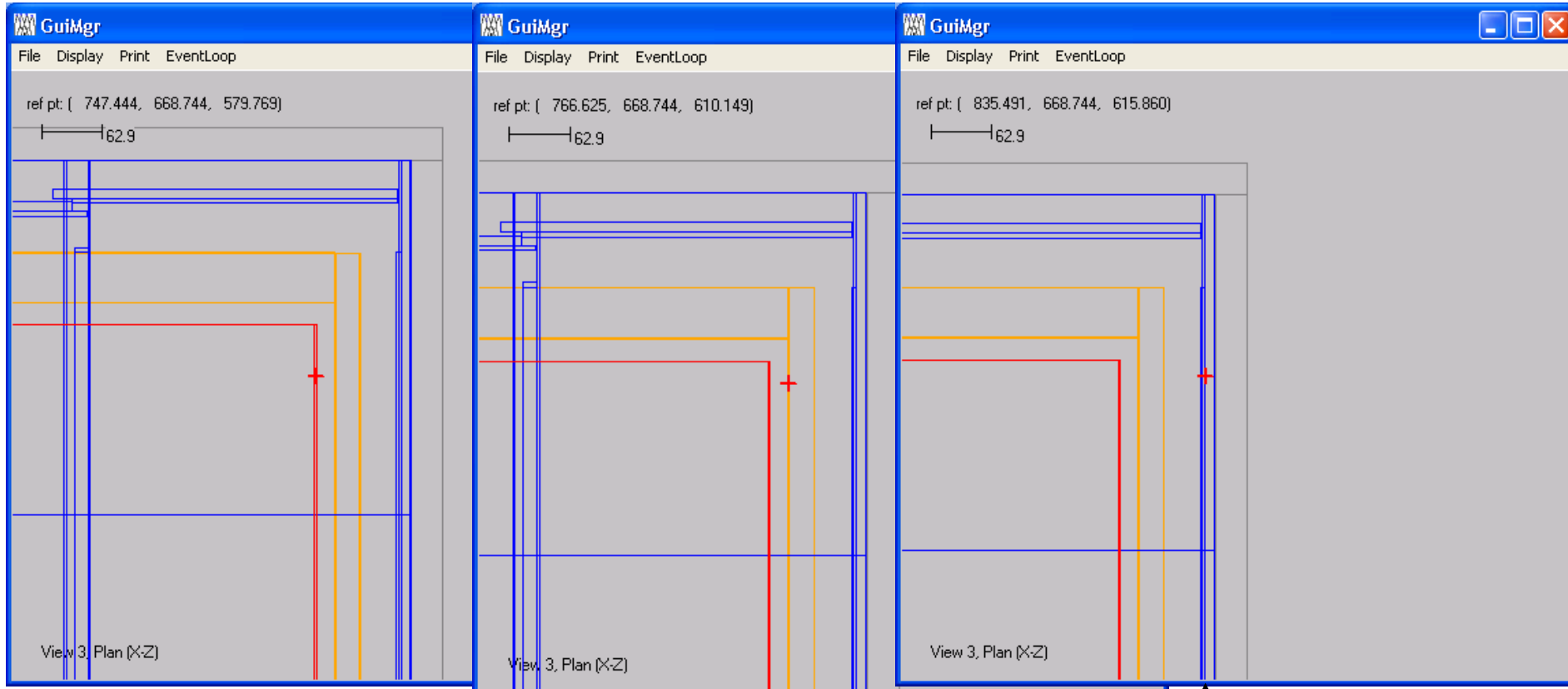
Bottom of ACD



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TKR & ACD



TKR Wall

Acd Support Structure

ACD Side Tile

*Approx 19.2 mm
between TKR and Support*

*Approx 5.1 mm
between Support and Tile*

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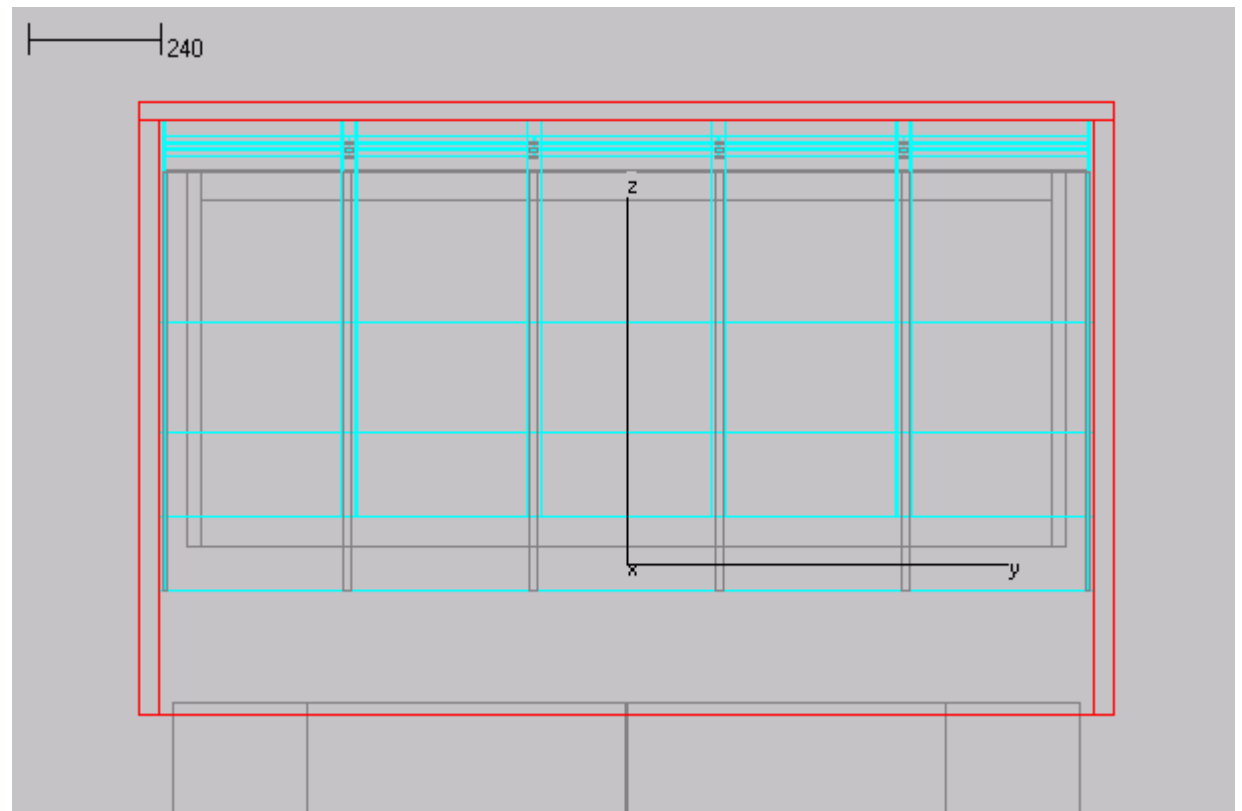
ACD Geometry Review

Thermal Blanket

Still working with the original model of the blanket from PDR.

1 Layer of magic material

Need updated information from ACD engineering team



To Do

- BEA (Base Electronics Assembly)
- Account for mass of cables, electronics, and ancillary structures
- Thermal Blanket
- What (if anything) must be done for DC1?