

ACD Geometry Review



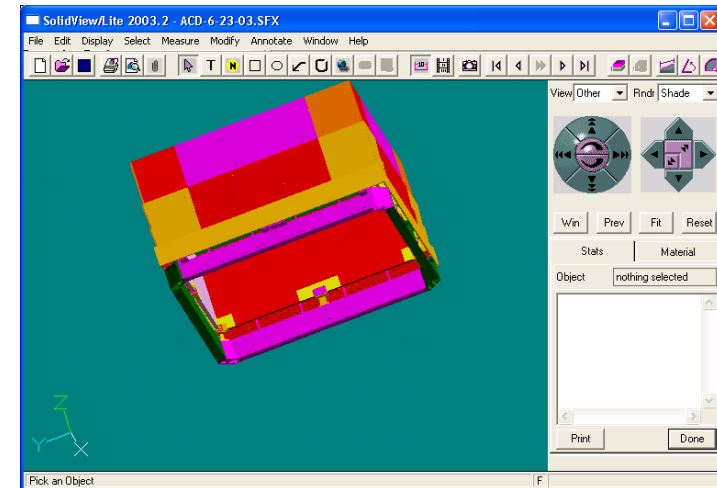
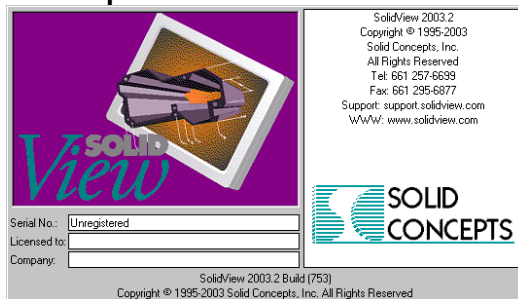
What has been updated?

- Tile dimensions and positions
- Ribbons
- Support structure

- *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

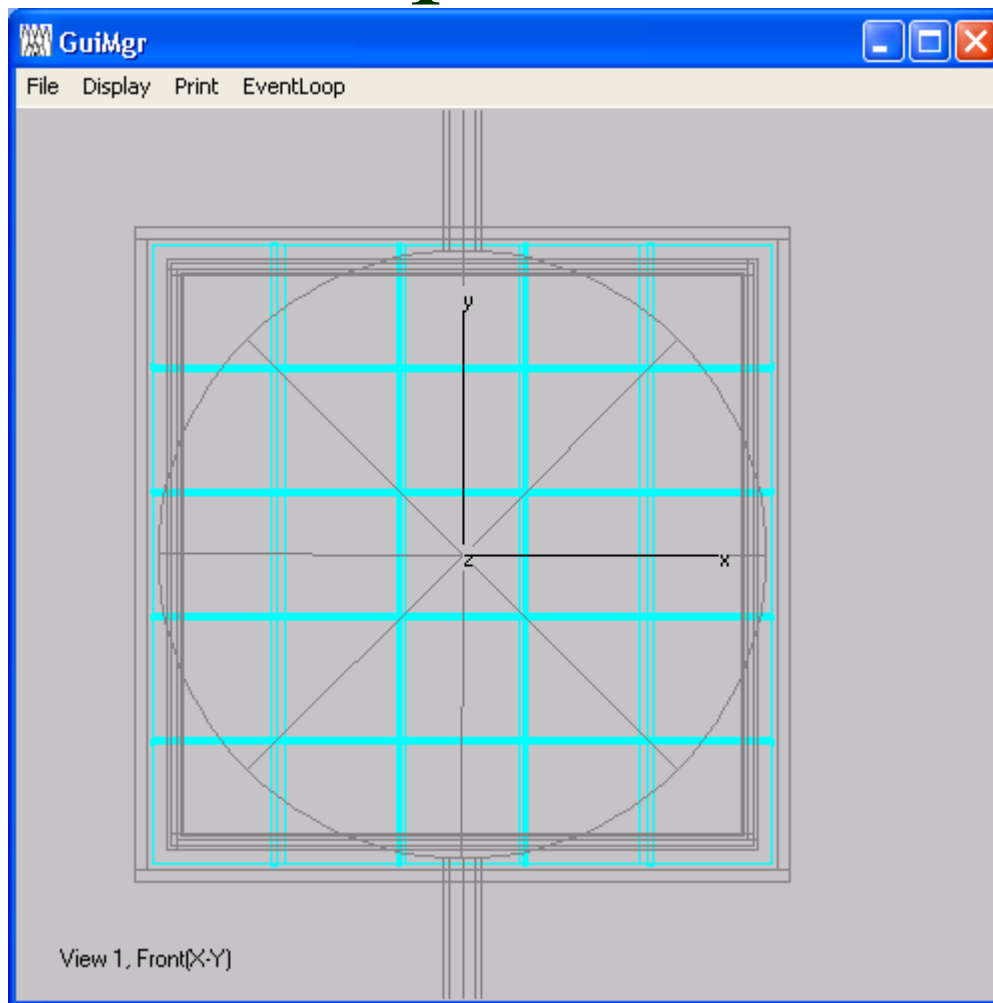
ACD Mass 7-21-2003 RevA1

Side Tile Total: 58432g

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Top Tiles



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Simulated Mass Top Tiles

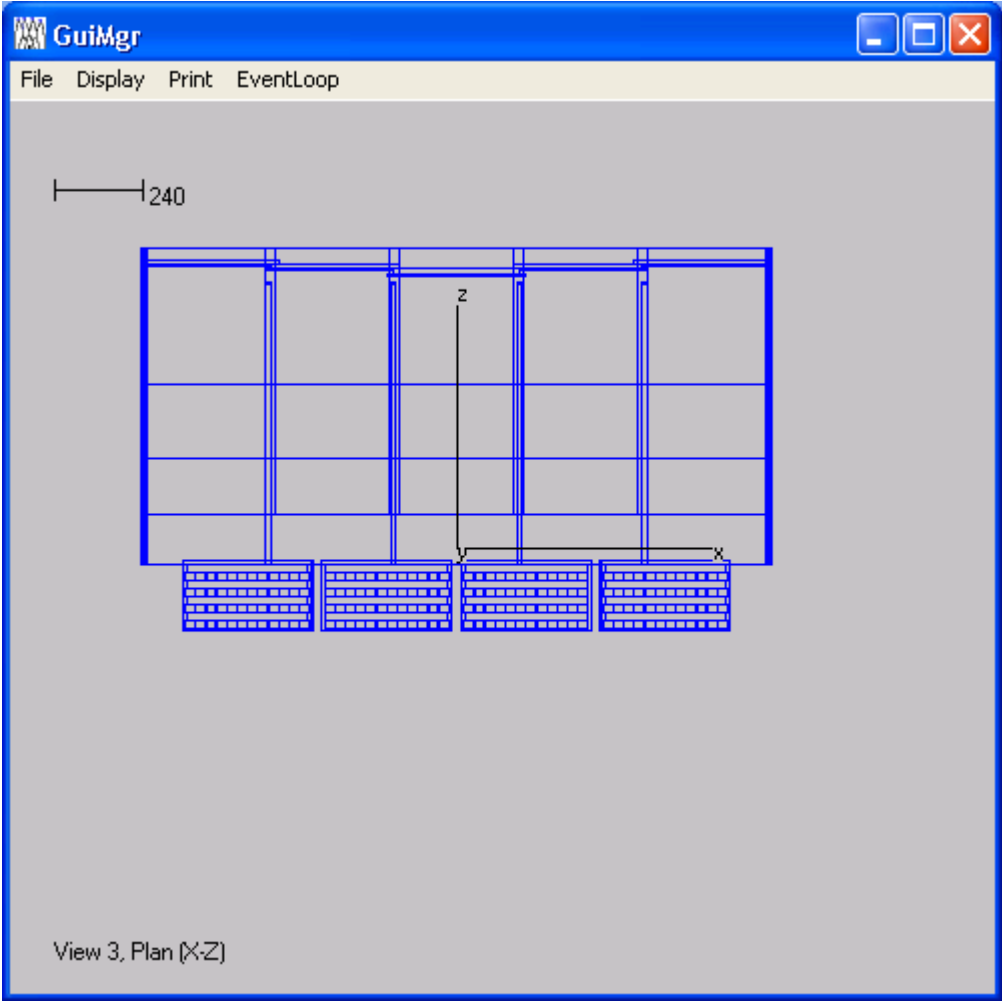
Name	Vol (cu cm)	Convex Vol	# Phys	Total Vol	Material	Mass (grams)
topTileRcentCcent	1370	1370	1	1370	Polystyrene	1414
topTileRcentCedge	1178	1178	2	2357	Polystyrene	2432
topTileRcentCmid	1142	1142	2	2284	Polystyrene	2357
topTileRdefCcent	1360	1360	4	5443	Polystyrene	5617
topTileRdefCedge	1170	1170	8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

Top Tile Total: 30641g

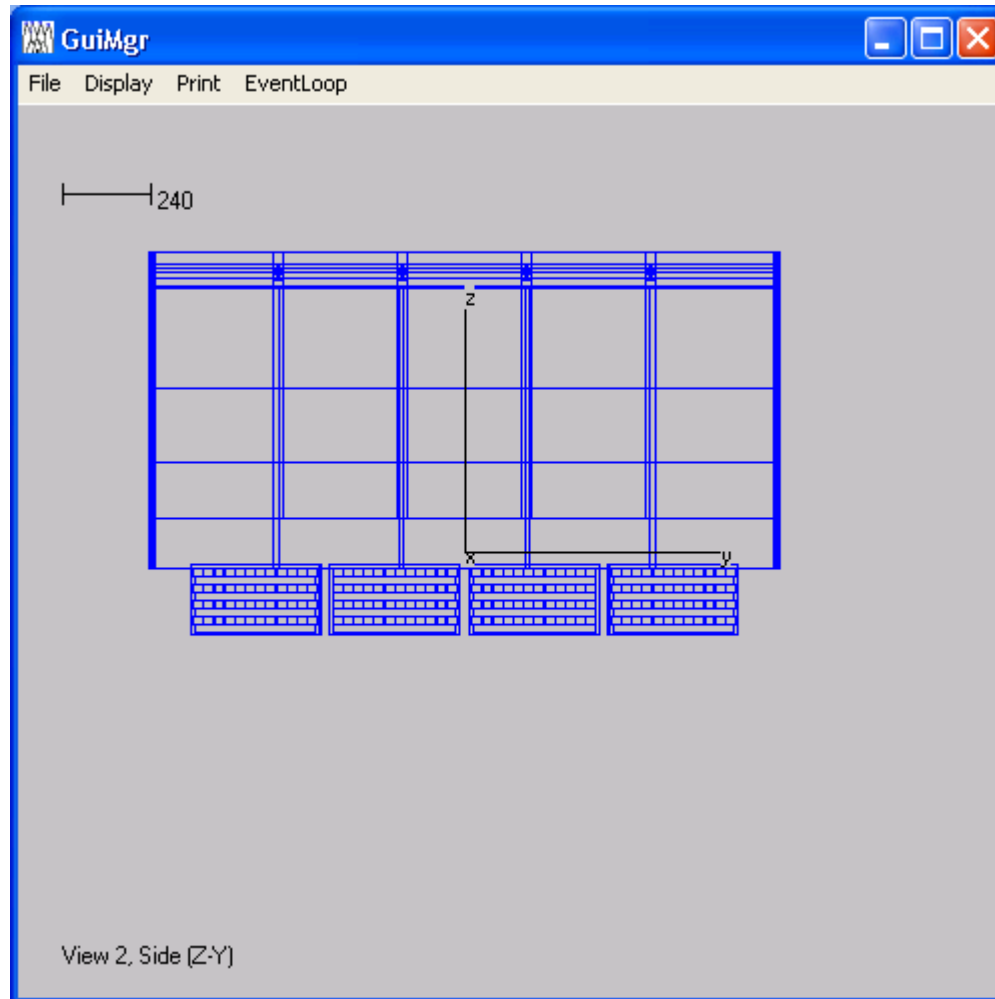
Simulated Total: 30844g

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

Side Tiles



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

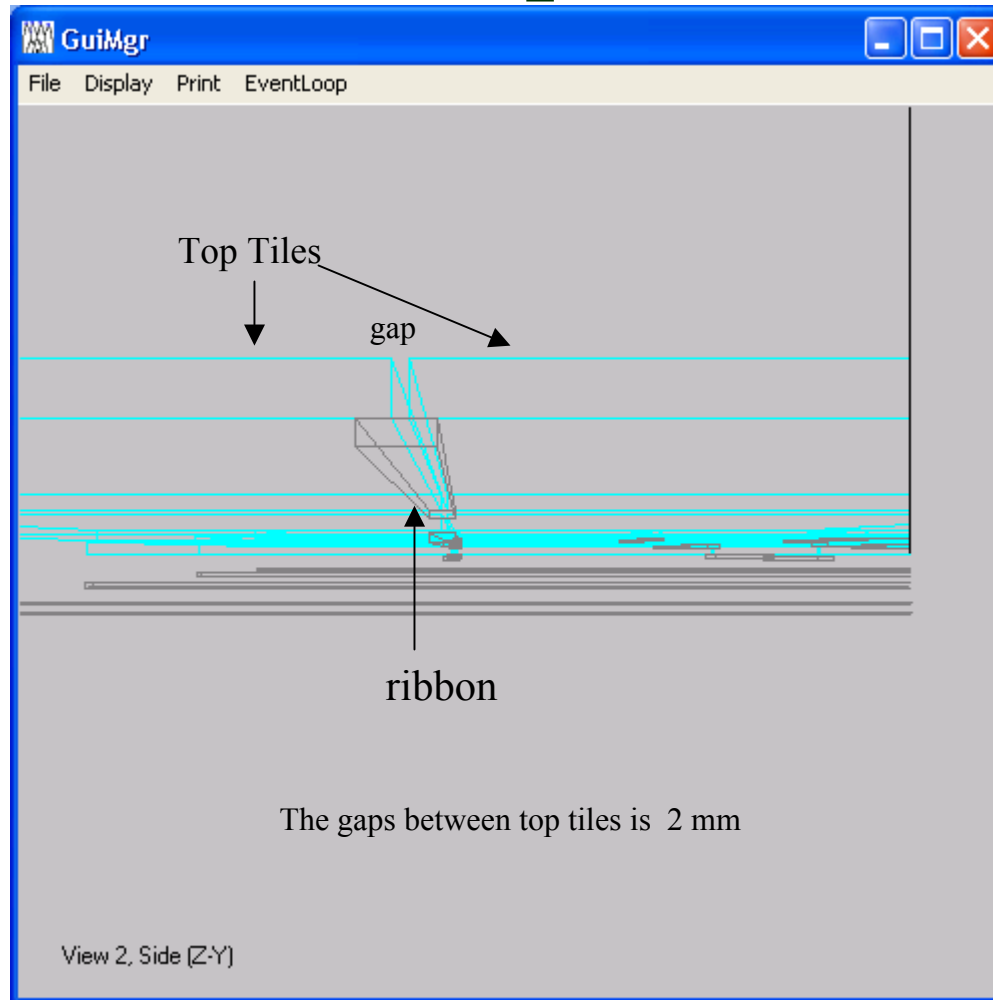
Row 2 Total: 10331g

Row 3 Total: 9367g

Actual Total: 10632g

Actual Total: 10116g

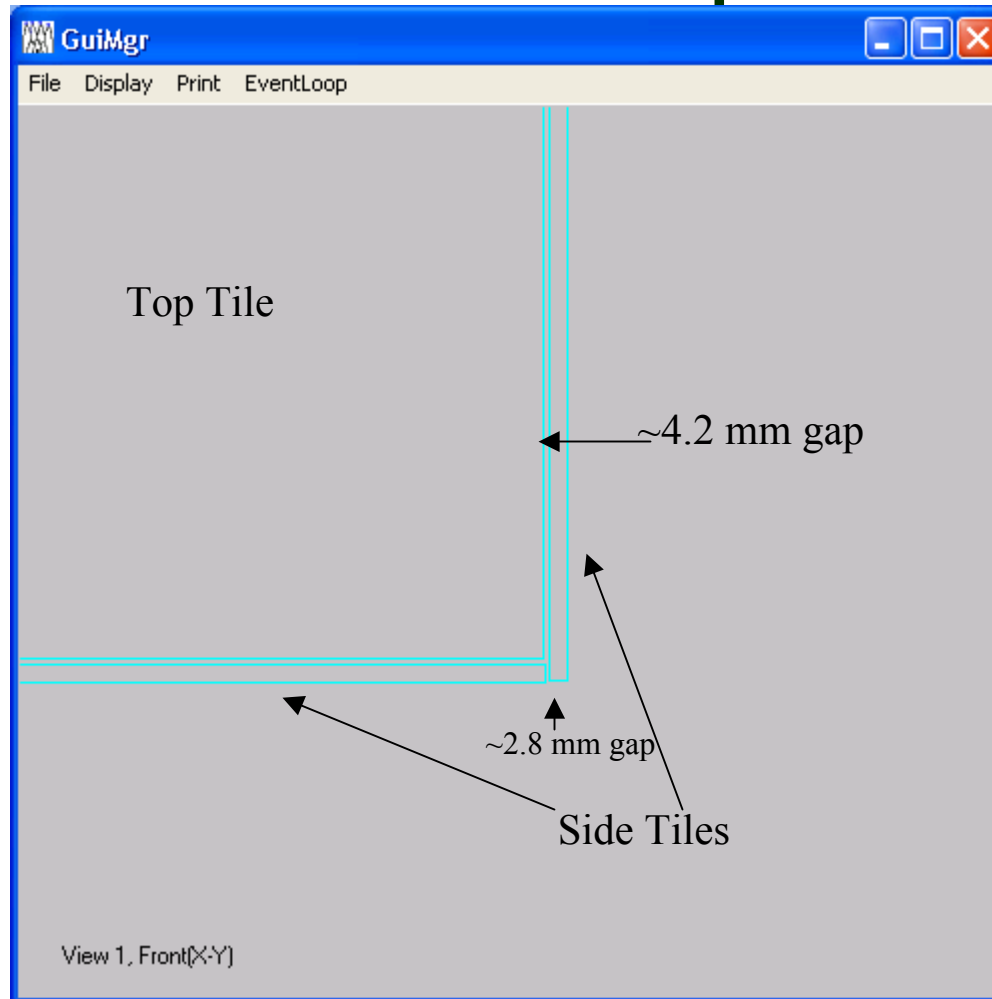
Gaps



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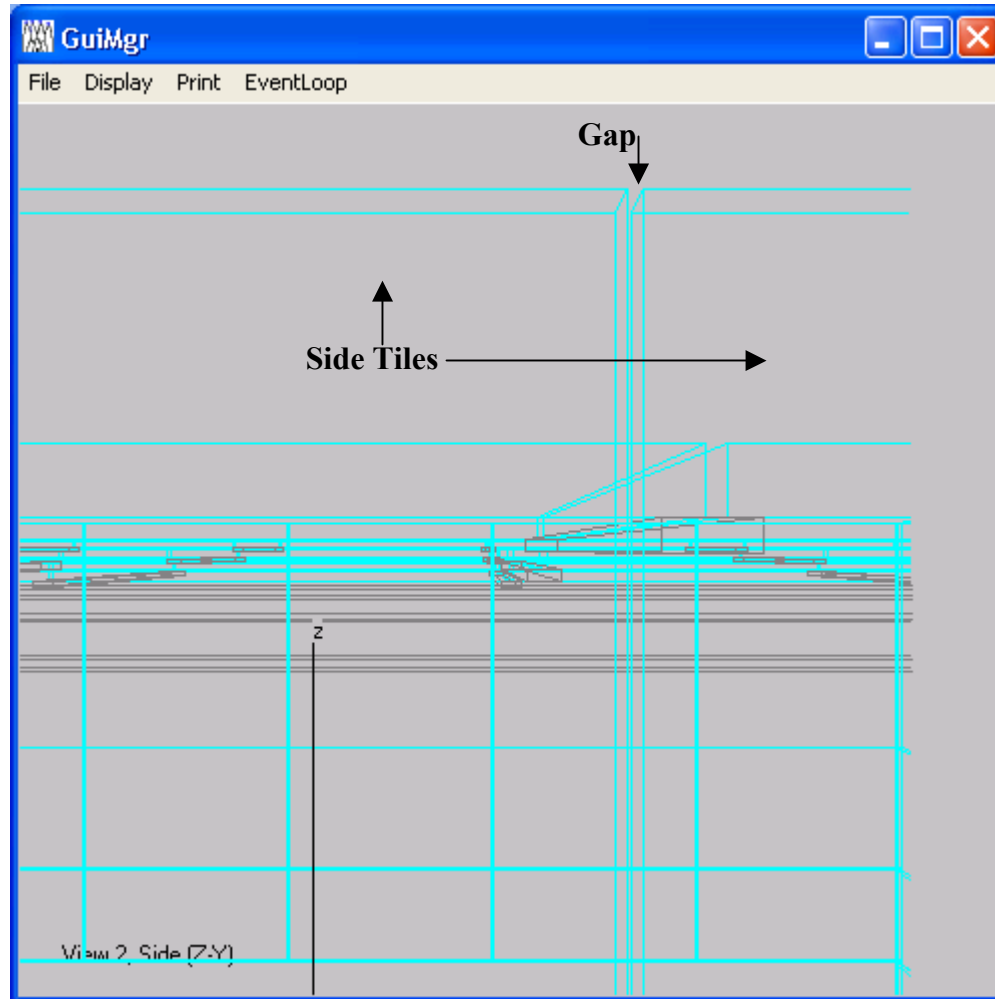
More on Gaps



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And a little more



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ACD Engineering Mass: Ribbons

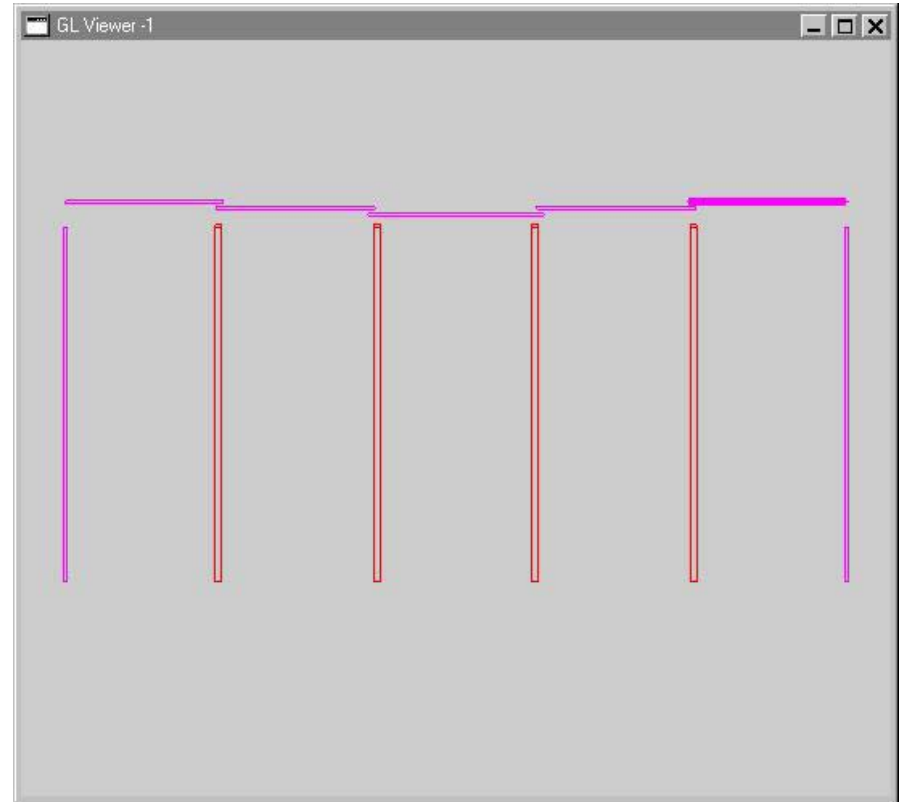
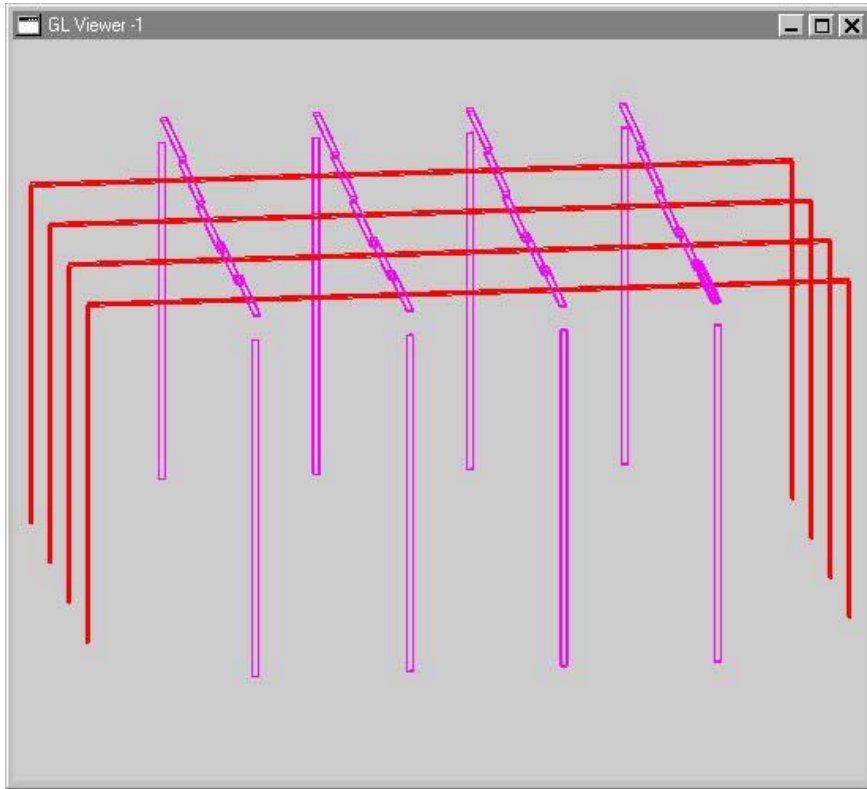
Item	Qty	Estimated Mass (Kg)	Calculated Mass (Kg)	Actual Mass (Kg)	Total Mass without Margin (Kg)	Total Mass with Margin (Kg) *
Fiber Ribbons						
Fiber Ribbons, X Side	4		0.1768		0.7070	0.7778
Fiber Ribbons, Y Side	4		0.1714		0.6855	0.7541
Fiber Ribbon Wrapping	8		0.0434		0.3472	0.3819
Fibers to PMT 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

Ribbons

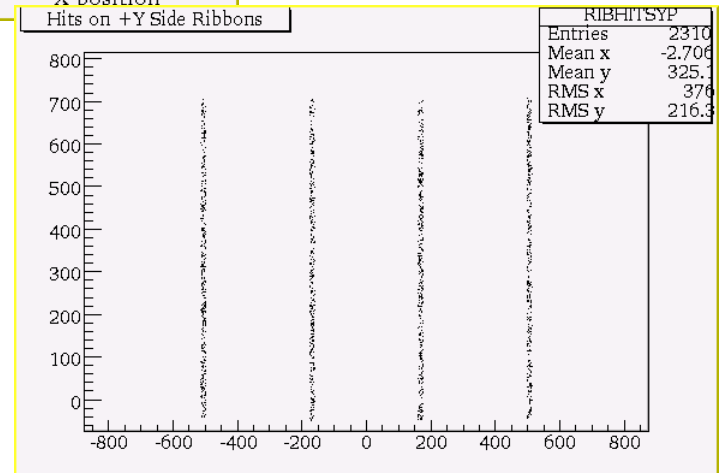
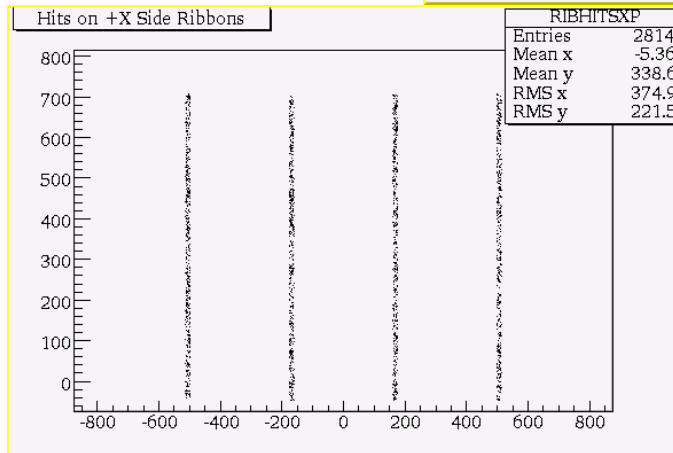
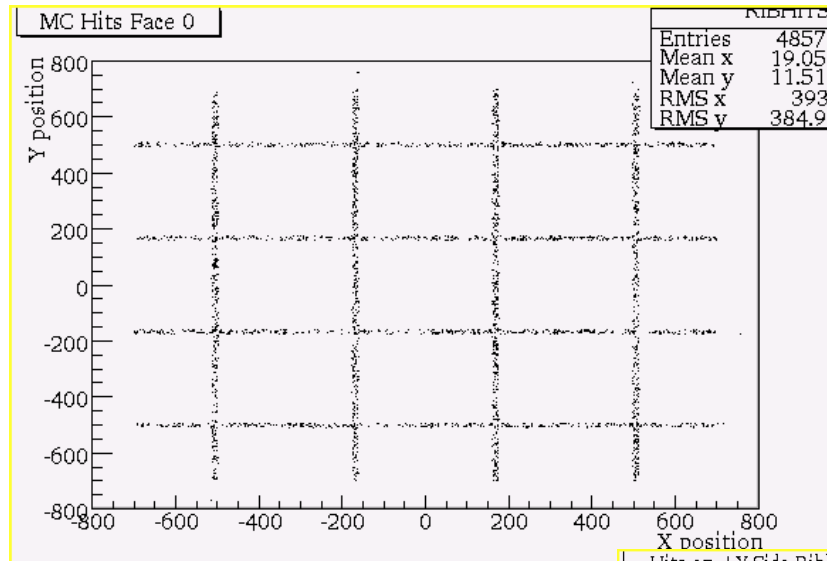


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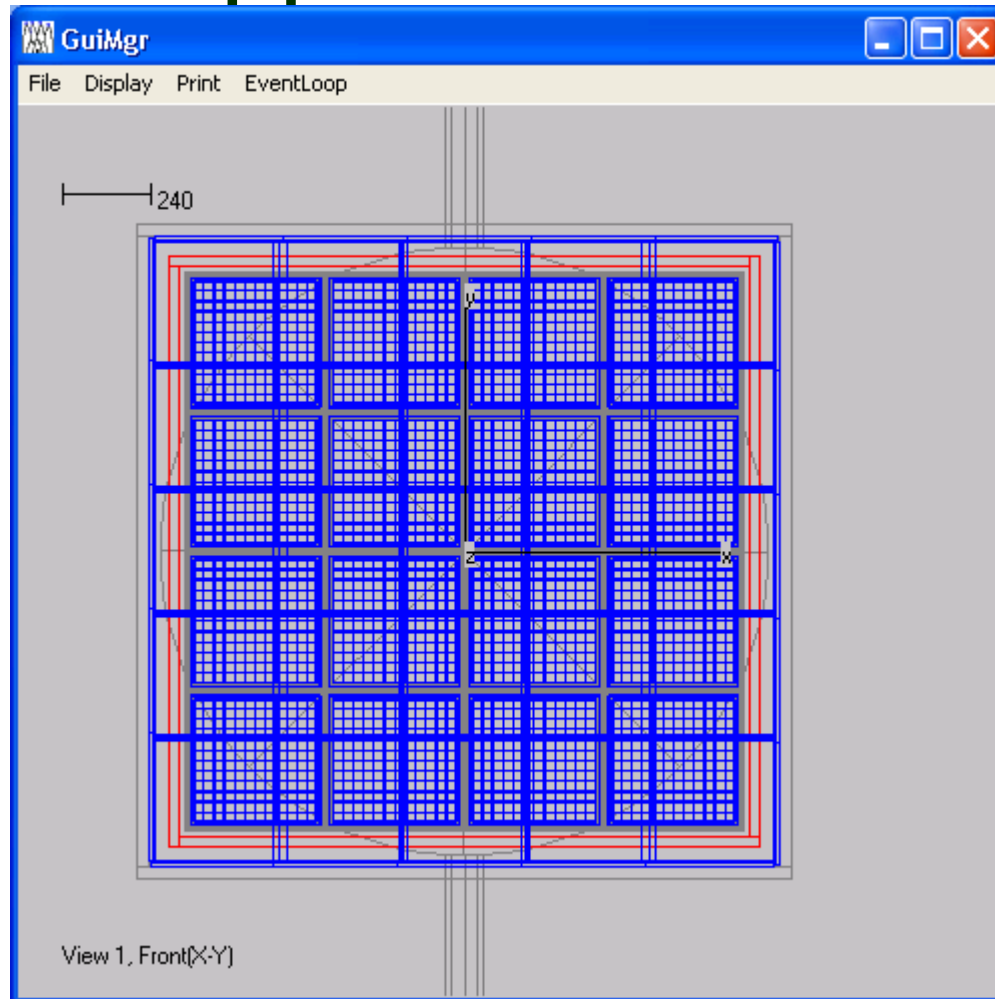
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Ribbons are now active detectors

Test runs using 2 GeV muons shot into the top and sides



Support Structure



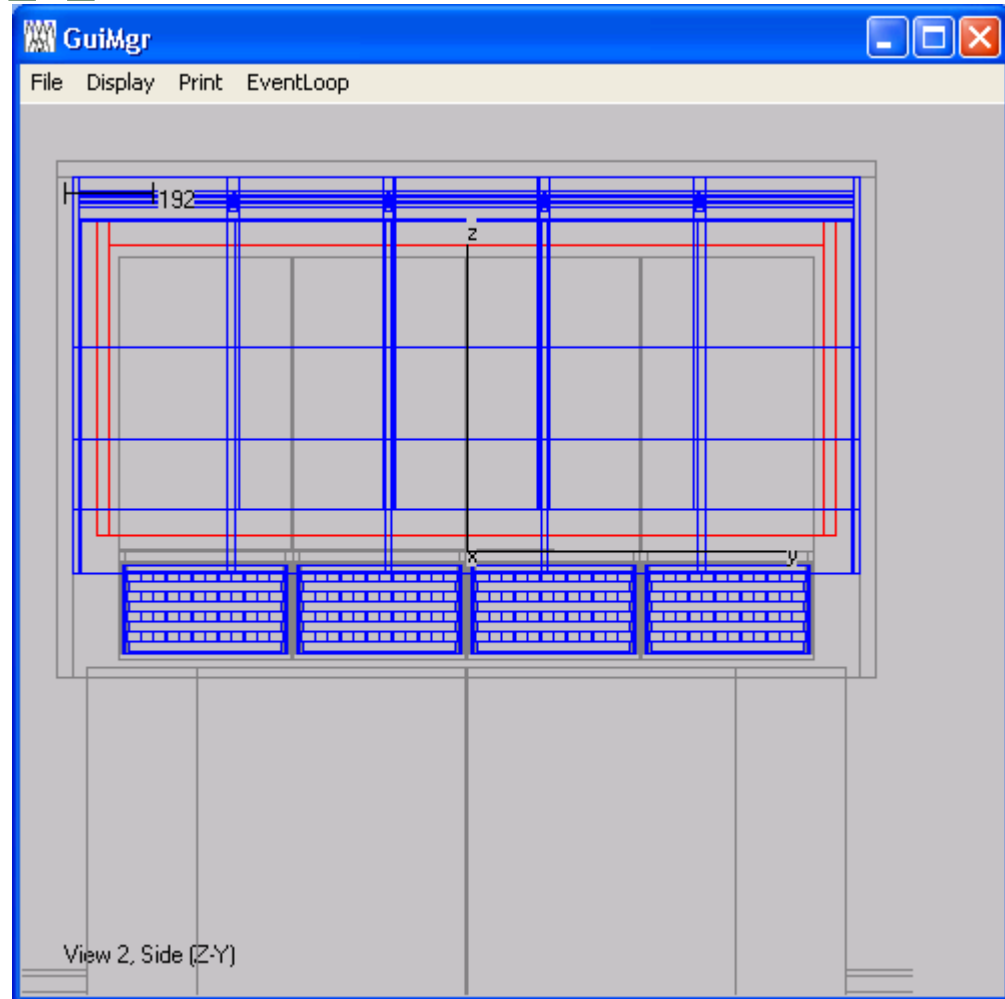
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Support Structure

Support structure appears here in red.

Model includes the core and the 2 face sheets.



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

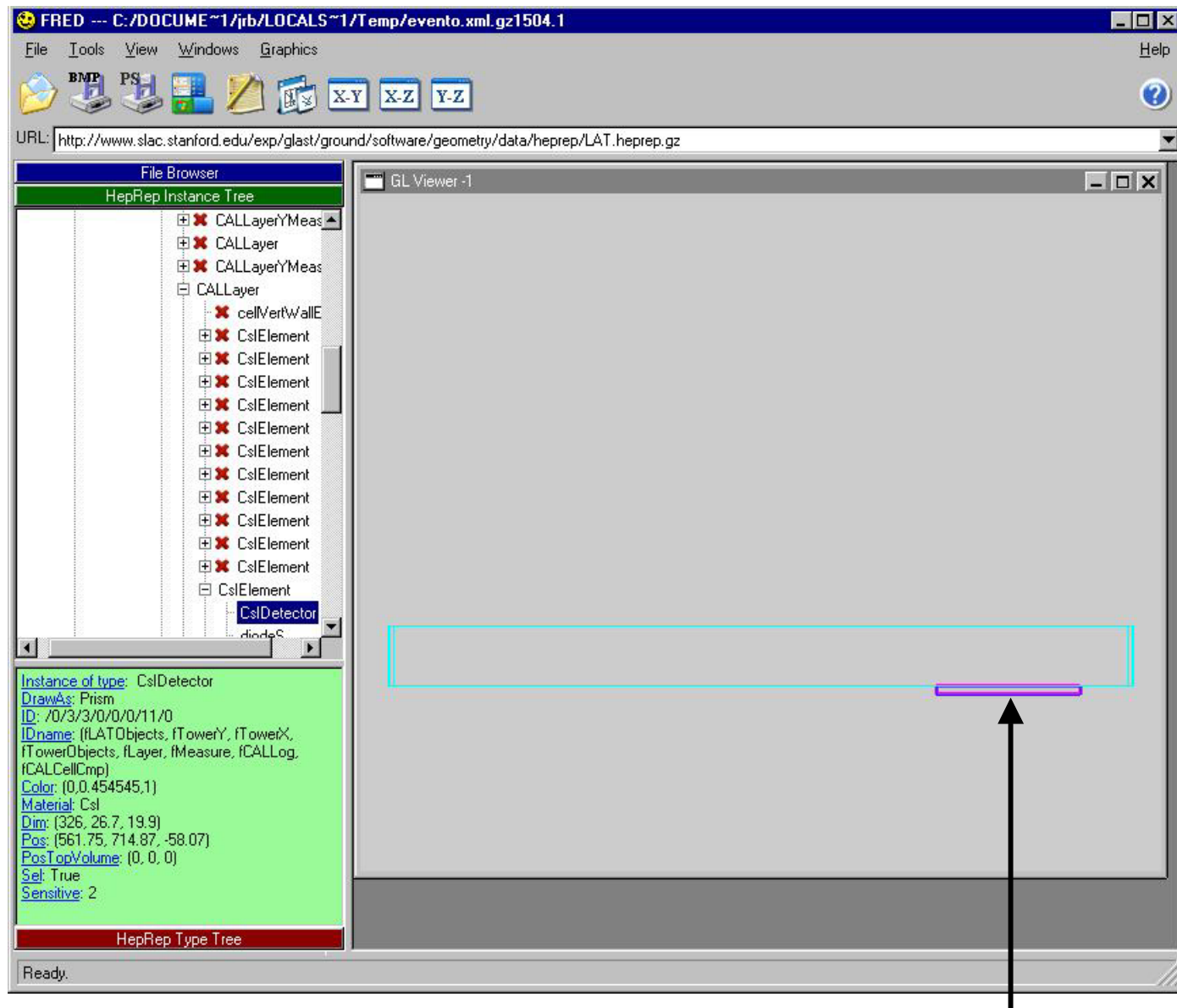
Side core and
facesheet Total:
? g

Simulated:
13238g

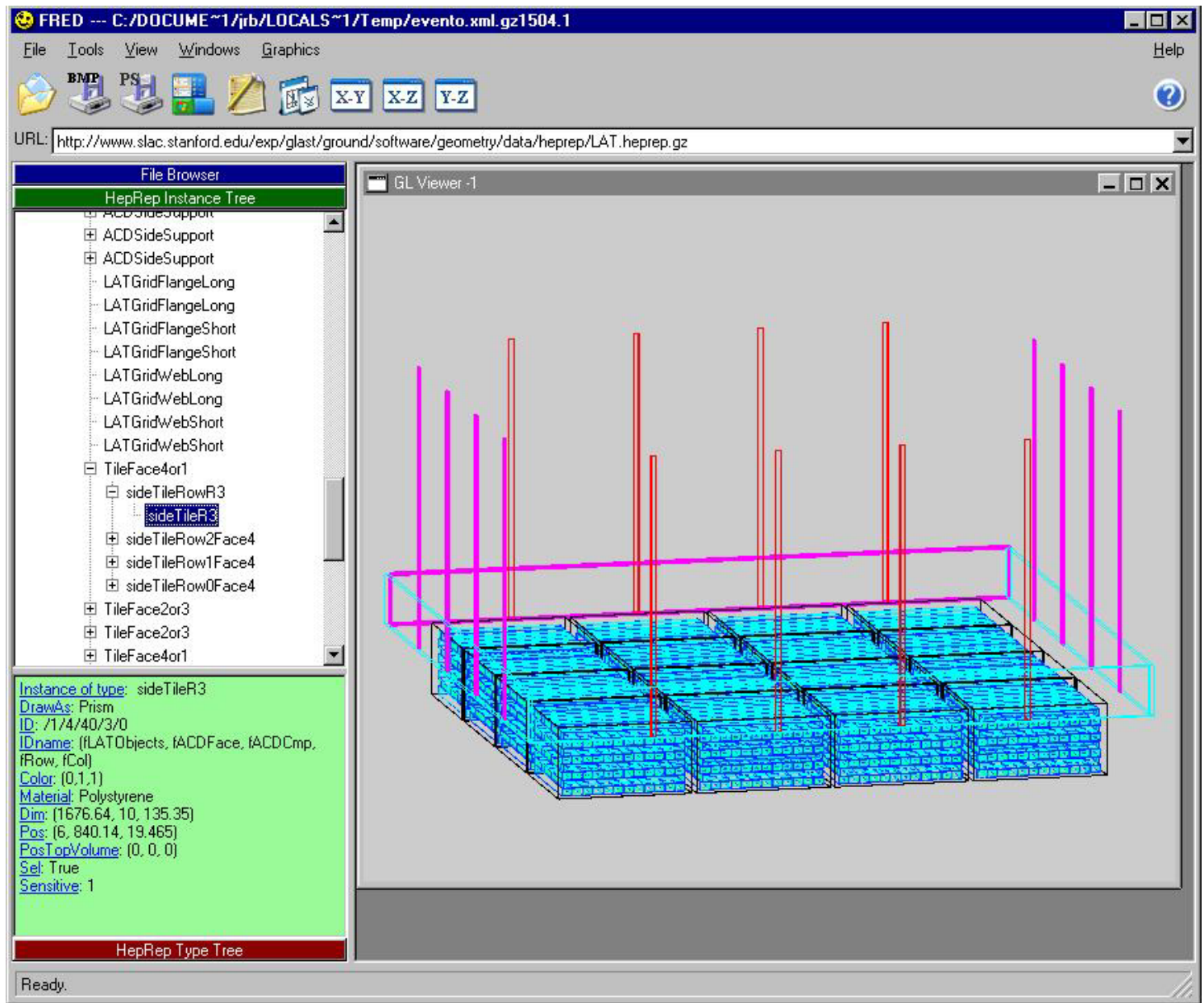
Top core and
facesheet total:
10529.2g

Simulated:
10381g

Questions have been raised concerning the position of the bottom most ACD side tile relative to the top face of the top CsI crystal.

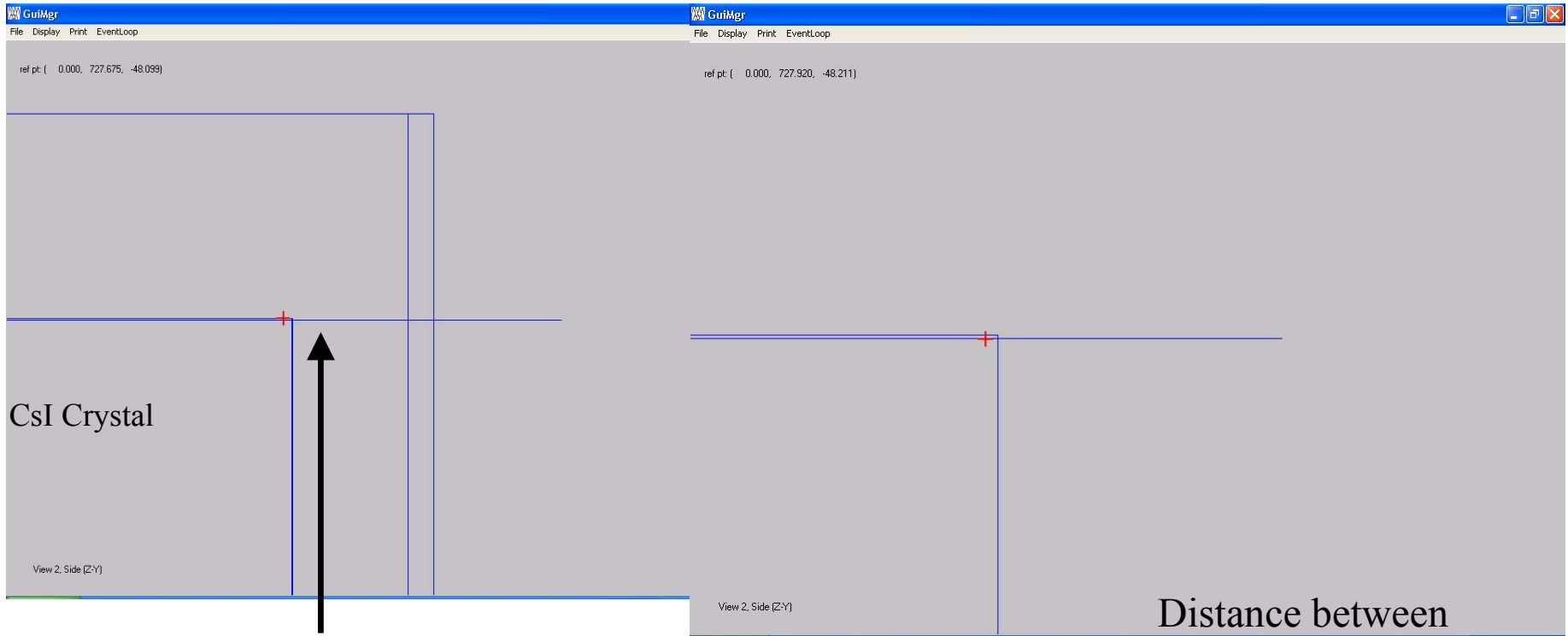


Top CsI crystal, Z position of front (top): -48.12 mm



Bottom of
bottom ACD
tile: -48.21 mm

Another look in the Gleam GUI

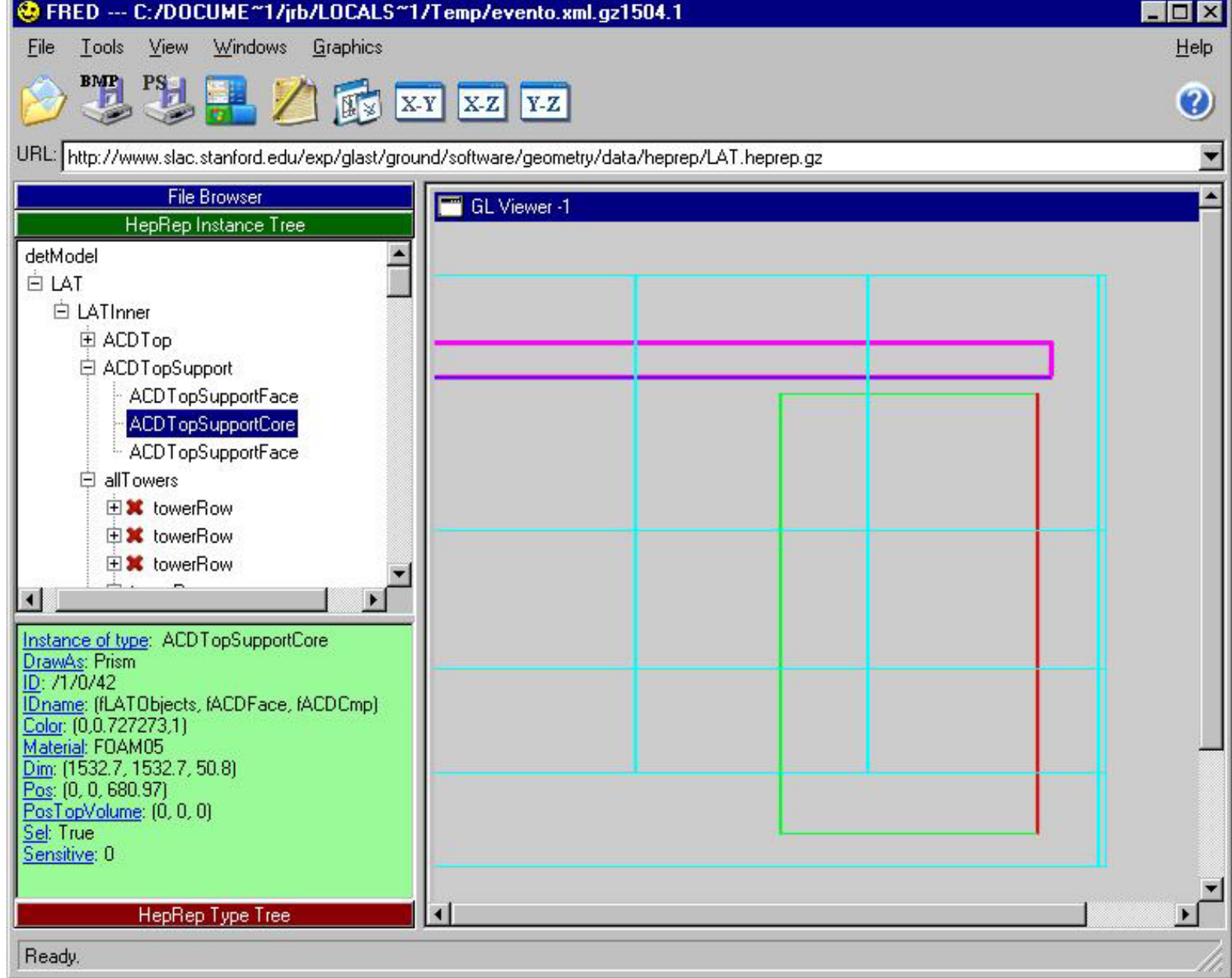


Bottom of bottom ACD tile

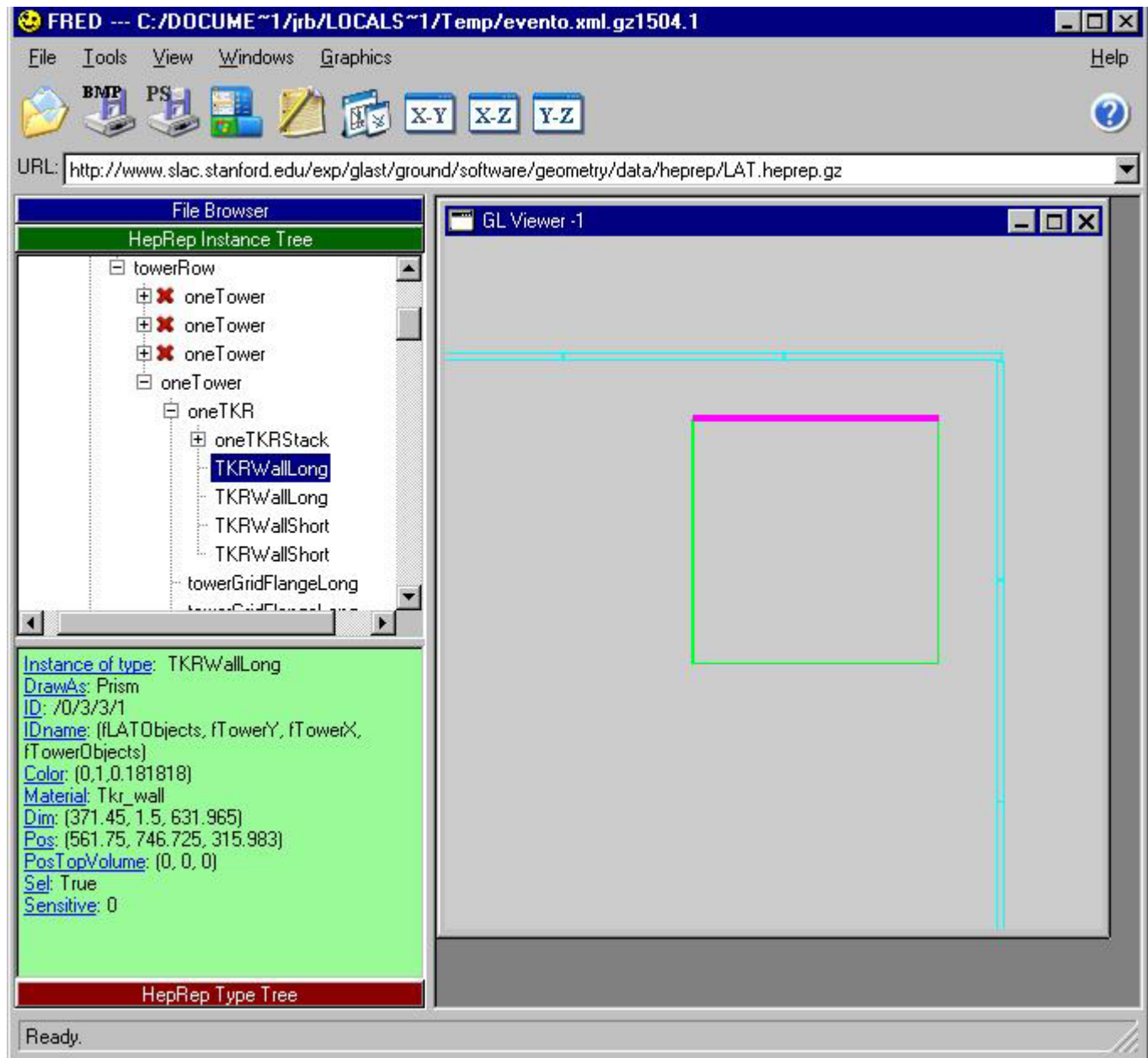
Distance between
top of CsI crystal
and bottom of ACD
side tile < 0.1 mm

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Z-position of
bottom of ACD
support
structure:
655.57 mm

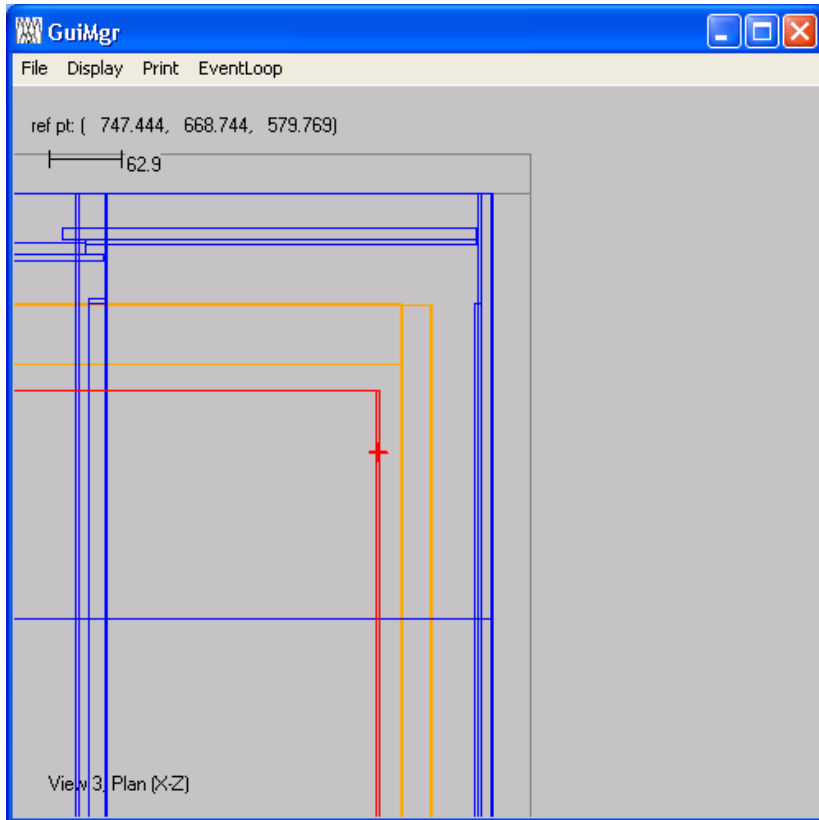


Z position of the top of the Tkr Wall: 631.97 mm

Distance between top ACD support structure and top of Tkr wall:

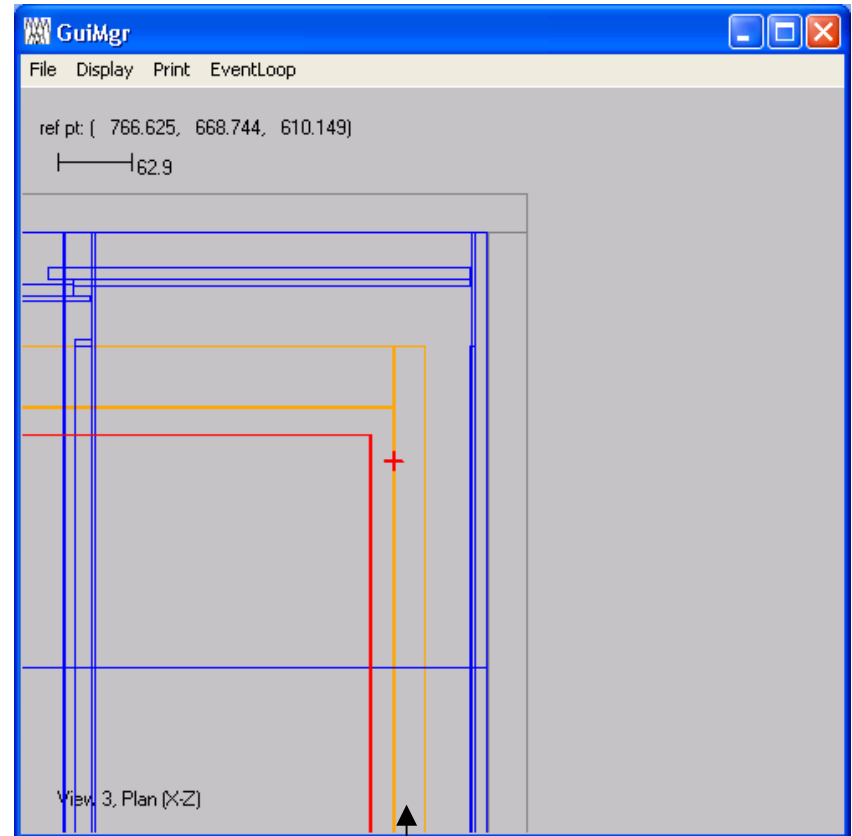
23.6 mm

TKR and ACD on Sides



TKR Wall

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Acd Support Structure

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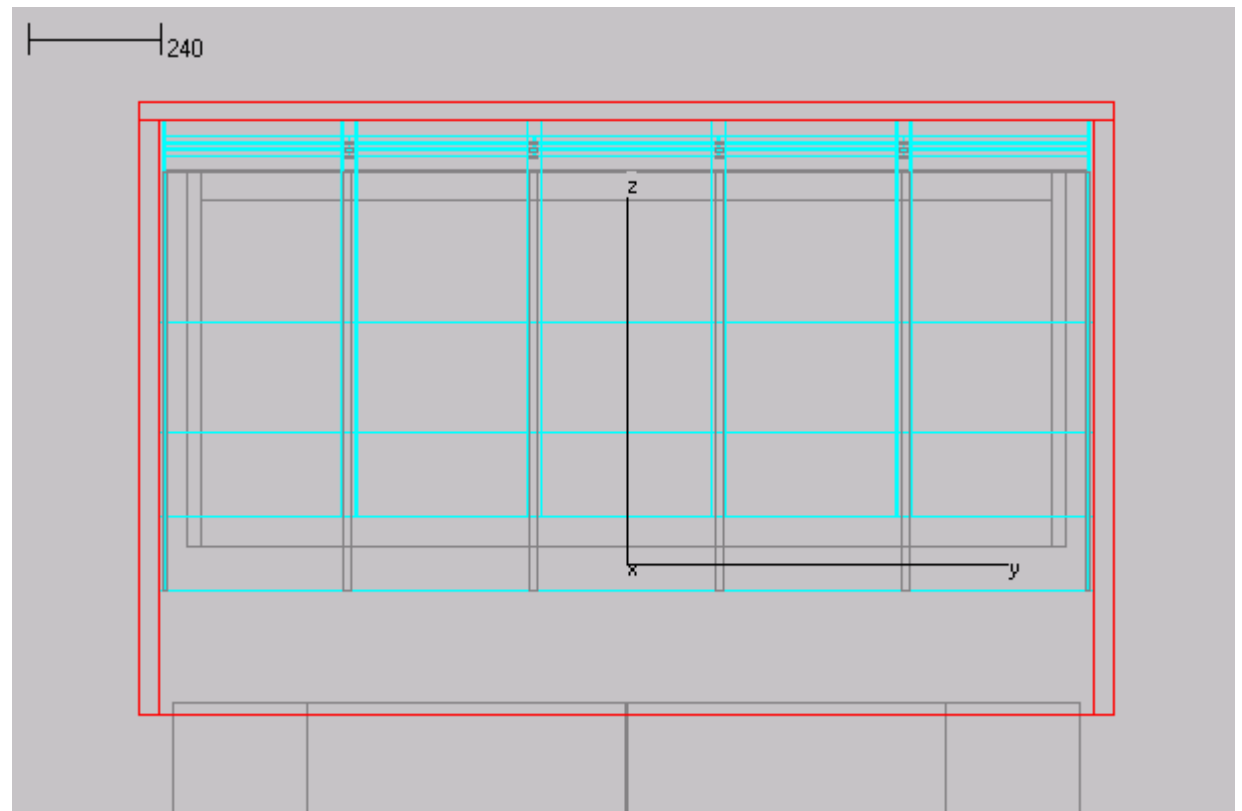
*Approx 19.2 mm
between TKR and Support*

Thermal Blanket

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

1 Layer of magic material

Need updated information



To Do

- BEA (Base Electronics Assembly)
- Account for mass of cables, electronics, and ancillary structures
- Thermal Blanket

Questions

- Mass spreadsheet under Shell for the sides, I want to make sure I am interpreting the numbers there correctly. For example, the Long Side shell - there is a line highlighted that says: "Side Panel Subtotal (Total for 2)" with a mass without margin of 6.99 kg. So that is the total mass of the side shell for 2 sides of the ACD?

b.) How far is the ACD from the TKR walls on the sides and top?

Questions contd.

- Review the overlap of the bottom ACD tiles and the topmost CsI crystal.
- Information concerning the thermal blanket would be helpful - we are still working from initial estimates used back for the PDR.