

# ACD Geometry Updates

The Good, The Bad, and The Ugly

# What's New?

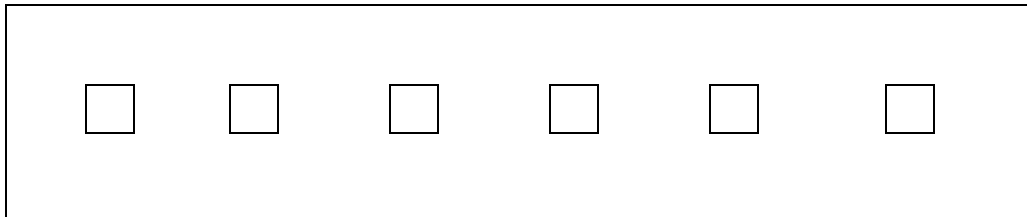
- Shrink tile dimensions from ambient to operating temperature
  - Conversion factor 0.9968 for each dimension

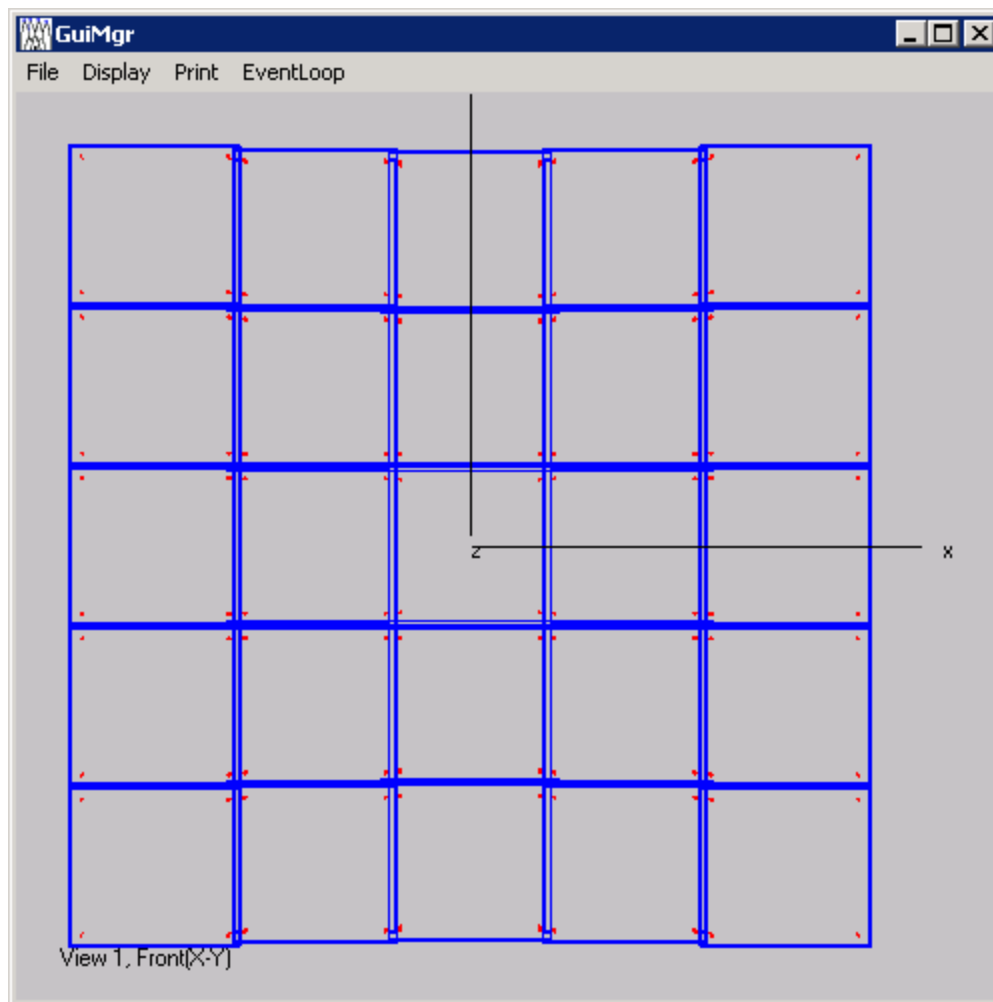
# What's New?

- Iron screws in each corner of every tile.

## Screw Holes:

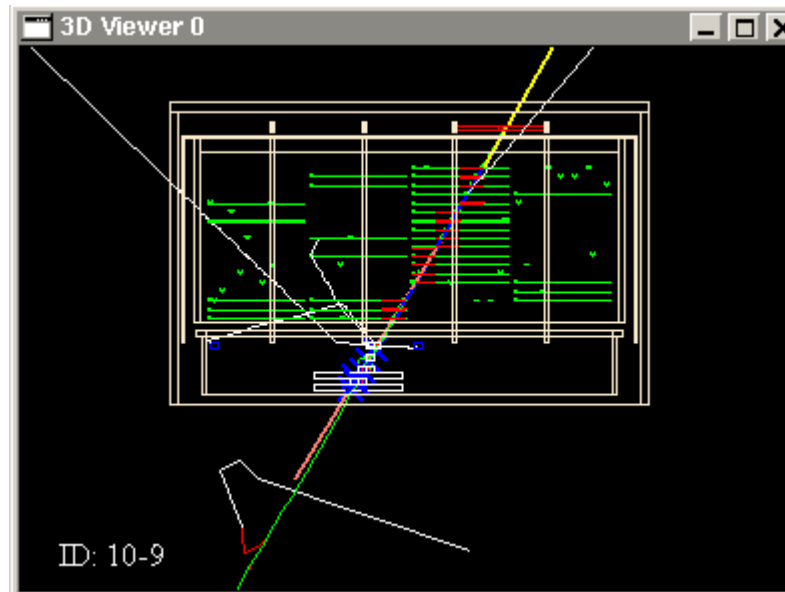
- 2.8 mm diameter
- Material: Iron, density  $7.87 \text{ g/cm}^3$
- 4 holes per tile, each hole is located 5 cm from both edges...except big bottom side tiles, which have 24 screws.





# Slight Simplification and Modifications required

- Only that portion of the screws embedded in the tiles are present in the geometry.
- Initially FRED was unable to recognize hit tiles once the screws were added.



# Various headaches

- When it is necessary to place volumes relative to other volumes, it's done either with a *stack* (placement of multiple volumes at regular intervals from each other along an axis) or *composition* (arbitrary placement).

In the case of a composition, child volumes are placed inside a mother volume and their positions are specified relative to the center of the mother volume. The mother volume is the *envelope* for the composition.

Up to now, we've made hardly any use of envelopes of material other than vacuum but, when placing screws inside a tile, the tile is the envelope. Not only is it not vacuum - it's also sensitive. Various parts of the code, most notably the IGeometry interface in GlastSvc, were not designed to handle sensitive envelopes. Ultimately, about 9 packages other than xmlGeoDBs had to be modified, with changes ranging from modest to trivial.

- As it stands, FRED does not display the screws – unclear whether this is due to a lack of an id per screw or if tubes are not supported.

# Where are we now?

- Some HEAD builds show an increase in AcdDigis and number of ACD HI triggers
- Not unexpected, as the main consequence of inserting iron screws in the tiles would be gamma conversion within the screws themselves.
- Some changes in CalColumn and CalDigiFace histos as well.
- This needs to be fully understood before the geometry is officially added to the DC2 version of GlastRelease.