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 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 \textit{stack} (placement of multiple volumes at regular intervals from each other along an axis) or \textit{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 \textit{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 of 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.