CAL-TKR Combined Recon

GLAST Ground Software Workshop
Wednesday, November 14, 2001

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The Problem

- In the dim past, TkrRecon would ask the calorimeter for an estimate of the energy deposited and position of the energy centroid, so that it could start the Kalman filter with the proper parameters.

- At some point, this connection got severed; the estimated energy was set to a low value, and the estimated direction was taken to be straight down.

- CalRecon uses the photon vertex and direction from TkrRecon to monitor the agreement between the projection of the reconstructed photon and the position of the energy centroid, so it needs to be called after TkrRecon.
The Fix

CalRecon is now called twice, once before and once after TkrRecon.

In the first pass, a simple centroid is calculated. This information is used to set the initial energy in the Kalman filter, and to point the hit search in the right general direction. When the deposited energy is very low in the calorimeter, the Kalman filter estimate is set to a minimum value (30 MeV).

The remainder of the calculation is performed the during the second call.
Possible Refinements and Questions

Eric has suggested some refinements:

- Currently, if a diode suffers a direct hit (or for other reasons), it’s possible to reconstruct the CAL hit position outside of the log. Information from the overall energy centroid (in the first call) or from the projected TKR particles (in the second call) might be useful to correct this problem.

- There may be some cases where the calorimeter information might improve the track parameters, such as in a conversion at the bottom of the tracker.

Some questions:

- Is it a good idea to intertwine CAL and TKR?
- How do we accommodate interaction among the algorithms, in general?