New calibration services for I&T

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TkrSplitsSvc (in TkrUtil)

- Ordinarily, half the strips are read out from each side of the plane, but this may be changed individually for each plane, for a variety of reasons.
- TkrSplitsSvc can read in an xml file (currently in 'IFile' format) which assigns a split to each plane.
- TkrDigi (tagged) uses this assignment when generating the two ToT's for each digi.
 - Once created, the digi carries the information about the split.
- Eventually, split information may be read in as part of the run, or kept in the calibration database.

TkrToTSvc (in TkrUtil)

- This service handles assigning individual ToT thresholds and gains to each strip (884736 in all!).
- TkrToTSvc will read in an xml or root file, generated online, containing the information for each strip.
- 'Simple' TkrDigi (tagged) uses this assigment when generating the strip ToT's. 'Bari' not yet interfaced.
 - How this information will be used at the Recon stage is not yet determined. It will probably depend on the analysis being done.
- For now, there are two modes:
 - All thresholds and gains are set to the same value, and to reproduce the previous results. (Checks for problems)
 - More realistic constants, based on EM measurements.
- Eventually, data for the ToT calibration will be taken onboard and sent to the ground for processing, and will most likely end up in the calibration database.

Why bother? Here's why!



Gains (µsec/fC) as measured in EM1, fit to two Gaussians

And some more!



Thresholds (µsec) as measured in EM1, fit to two Gaussians

And now together...



Thresholds and Gains are correlated. (Maybe not real...)

Now look at chip gain (average of 64 strips)



If all strips were uncorrelated, chip RMS would be ~0.456/ $\sqrt{64}$, or 0.057. Instead, it's 0.289

...and deviations within each chip.



As a check, $\sqrt{(.353^2 + .289^2)} = 0.456$

"EM" mode

Based on calibration data from EM.

- Constants are generated internally from fits to the distributions of:
 - gains and thresholds of the chips (including the correlation).
 - gains and thresholds of the strips, relative to their chips (including the correlation).
- Constants are assigned randomly to each strip, but the random sequence is started with a fixed seed so that the results are repeatable from one run to the next. (Not part of the GlastRandomSvc.)

Results: Thresholds



Results: Gains



Not quite as good...

Results: Correlation

