Plans to provide distortion correction in tracking chain

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Context

Presently clusters store only 2D coordinates and detector surface ID.

This is not enough to store fully distorted (or corrected) cluster information, in 3D, since corrected clusters might not be on a detector surface any more.

This breaks current distortion correction implementation (offline/packages/tpc/TpcSpaceChargeCorrection), which just loops over TPC clusters, applies the correction (now broken), and pass the corrected clusters to tracking.

Once we know on which track a given cluster is, one can *move back* distorted clusters to an existing surface using local track direction (offline/packages/trackreco/PHTpcClusterMover).

But this does not work before that, e.g in PHCASeeding.

For the CA seeding we need to apply the correction *on the fly*, before filling relevant structures

→ there are at least two places where distortion corrections are needed. Need some code to *distribute the information*

Plans

Would like to follow the same strategy as what is used for ACTS sufaces and local ↔ global transformations (from Joe):

- offline/packages/trackreco/MakeActsGeom a subsysreco that maps ACT surfaces to hitsetid + subsurfaceId, put the map on the node tree, in InitRun. Does nothing after that.

- offline/packages/trackbase/ActsSurfaceMap (in offline/packages/trackbase) contains the map, and is stored on the node tree, thus available from anywhere

- offline/packages/trackbase_historic/ActsTransformations is essentially static, can be use anywhere, does the local ↔ global transformation, using the ActsSurfaceMap retrieved from node tree

Proposal:

- offline/packages/tpc/LoadTpcDistortionCorrection loads the relevant set of corrections into histograms (or whatever more efficient structure), and store them on the node tree at InitRun. Note that there can be multiple instances of these if we want to have several set of incremental corrections

- offline/packages/trackbase/TpcDistortionCorrectionHistograms, contains the histograms (or whatever structure) and is stored on the note tree. (you can have several of them, with different names)

- offline/packages/trackreco/TpcDistortionCorrection, can lookup correction for a given cluster, based on the histograms/objects retrieved from node tree. Can be used anywhere.

If acceptable, could implement that ~ this week, and hook it into e.g. PHCASeeder. Could also be used in modified ClusterMover from Tony