



Proposed Method of Producing a CRAFT-2009 Alignment

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23 October, 2009



- ▶ Here's what I propose for combined DT and CSC alignments, with a discussion of which parameters are well-determined and which are poorly-determined with tracks.
- ▶ Proposed DT construction:
 1. 2009 photogrammetry and internal layer alignments from Luca
 2. global adjustment of the whole barrel from tracks (in the transverse plane)
 3. track-based chamber alignments for accessible chambers, except ϕ_x corrections.
- ▶ Where each parameter comes from:
 - ▶ all layers/superlayer within chambers: internal alignment
 - ▶ all ϕ_x : photogrammetry
 - ▶ y , z , and ϕ_x of station 4 chambers: photogrammetry
 - ▶ low-statistics chambers: relative positions from photogrammetry with an overall global correction from tracks (barrel adjustment)
 - ▶ high-statistics chambers: tracks



- ▶ What track-based alignment determines well/poorly:
 - ▶ well: relative displacements between tracker and DT layers (as rigid groups within chambers)
 - ▶ well: local x , ϕ_y , ϕ_z , medium: y , z , poorly: ϕ_x
 - ▶ well: central chambers above and below tracker, poorly: horizontal chambers and chambers near the wheel ± 2 , station 1 corner of the barrel



► Proposed CSC construction:

1. 2007 photogrammetry-derived chambers relative to disks (Karoly)
2. 2009 link-derived chambers relative to disks or rings (Celso)
3. 2009 ϕ_x and z from endcap hardware (Jim B.)
4. global adjustment of whole rings from tracks (in the transverse plane)
5. track-based chamber alignments (x , ϕ_y , ϕ_z) for the few chambers that have enough statistics.

► Where each parameter comes from:

- chamber positions: track-based unless not available due to statistics, otherwise link-derived (with global adjustment) unless not available, otherwise photogrammetry (with global adjustment)
- z of disks, average ϕ_x of chambers: endcap hardware



- ▶ What the track-based alignment determines well/poorly:
 - ▶ well: relative displacements between tracker and CSC layers (as rigid groups within rings)
 - ▶ well: local x , ϕ_y , ϕ_z , poorly: y , z , ϕ_x
 - ▶ well: chambers on the top and bottom of rings, especially large-radius rings like ring-2 and ME1/3.



- ▶ Changes with respect to the presented alignment:
 - ▶ full 1st reprocessing dataset: the one I used for the study already shown was a test-sample of the reprocessing— that's why the statistics was a factor of 10 lower than the full sample.
 - ▶ any tracker geometry updates (I'm pretty sure an update is planned)
 - ▶ new input from endcap hardware and link
- ▶ Update: data sample is now available; waiting on the other items
- ▶ Tuesday's AICa meeting:
 - ▶ conflicts with CSC-DPG; I will be busy presenting an endcap update there.
 - ▶ will someone else be available to present at AICa?
 - ▶ and ask about status of tracker alignment?