



CSC Slides for the DT/CSC Joint Alignment Meeting

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Proposed Division of Labor

Split workload between two tasks of common interest,
rather than $A\&M \rightarrow CSC$, $Santander \rightarrow DT$

- ▶ Definition of Data Stream (AlCaReco):

largely Santander group, accepting requests from A&M
(next slide)

- ▶ Monitoring Alignment Quality:

largely A&M, accepting requests from Santander group
(e.g. requests for plots)



Our Requests for Muon AICaReco Stream

ROOT branches:

edmHepMCProduct_VtxSmeared

Monte Carlo truth

CSCDetIdCSCRecHit2DsOwnedRangeMap_csc2DRecHits

CSC “2D hits”

CSCDetIdCSCSegmentsOwnedRangeMap_cscSegments

CSC segments

DTLayerIdDTRecHit1DPairsOwnedRangeMap_dt1DRecHits

DT 1D hits

DTSuperLayerIdDTSLRecSegment2DsOwnedRangeMap_dt2DSegments

DT 2D segments

DTChamberIdDTRecSegment4DsOwnedRangeMap_dt4DSegments

DT 4D segments

recoTracks_ctfWithMaterialTracks

tracker tracks

recoTrackExtras_ctfWithMaterialTracks

... with all associated info

TrackingRecHitsOwned_ctfWithMaterialTracks

... including the associated hits

recoTracks_standAloneMuons

standAloneMuon tracks

recoTrackExtras_standAloneMuons

... with all associated info

TrackingRecHitsOwned_standAloneMuons

... including the associated hits

recoMuons_globalMuons

globalMuon reconstructed objects

recoTracks_globalMuons

globalMuon tracks

recoTrackExtras_globalMuons

... with all associated info

TrackingRecHitsOwned_globalMuons

... including the associated hits

SiPixelClusteredmDetSetVector_siPixelClusters

tracker clusters needed for TrackRefitter

SiStripClusteredmDetSetVector_siStripClusters

... when refitting globalMuons

Select Z , W , J/ψ , $b \rightarrow \mu X$, “good muon” events and tracks,
loose in AICaReco, tight in alignment, same modules



Monitoring Alignment Quality

Two kinds of monitoring:

- ▶ Sanity checks in AlignmentProducer, checks correctness of AlignmentProducer algorithms
- ▶ Global monitoring: independent module which compares geometries read from database (or SQLite file)
 - ▶ Alignment versus time
 - ▶ Survey, photogrammetry, hardware alignment, track-based
 - ▶ $Z \rightarrow \mu\mu$, $J/\psi \rightarrow \mu\mu$ resolution



Global Monitoring

Dmitry Yakorev (grad student) and Jim Pivarski are working on:

1. ROOT-based tool which reads database/SQLite files twice (runs cmsRun twice, makes plots) ~ 1 month
2. Formal development in DQM framework ~ 2 months

Study of HIP procedure will drive development of plots, but it will include at least the following:

- ▶ Alignment differences versus ring, disk, station (no tracks)
- ▶ Residuals versus x , y , z
- ▶ “Overlap plots” local alignment differences between overlapping chambers in the same station (tracks are only locally propagated)
- ▶ Z , J/ψ reconstructed with standalone muons



Related A&M Activities

CSC hardware alignments → the database (also Dmitry and Jim)

- ▶ Layer-by-layer corrections measured at CSC assembly sites (offsets were rediscovered by Karoly Banicz in MTCC data)
 1. Compare two SQLite alignments this week
 2. Write a dummy layer-by-layer into SQLite +a few days
 3. Get and understand layer-by-layer measurements from Andrey Korytov +several weeks
 4. Test layer-by-layer SQLite file in Karoly's MTCC procedure +a week
- ▶ Interface between COCOA CSC output and database
 1. Communicate with Marcus Hohlmann about COCOA output
 2. Collaborate on software development

Monitoring tools are tightly coupled to these efforts