Muon HIP Alignment: mid-S156 update

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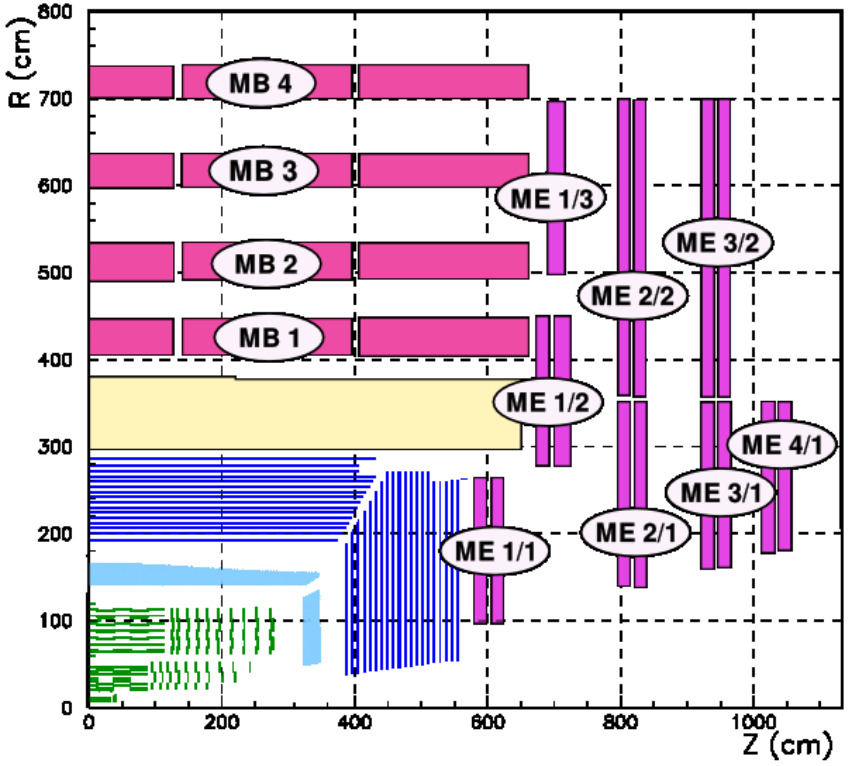
At a glance

- Full baseline-HIP procedure runs in S156
- Results depend greatly on tracker misalignment (as expected)
- We can identify good and bad alignments with data
- Karoly solved his event-filtering problem and he is skimming the MuonBeamHalo sample for CSC overlaps studies

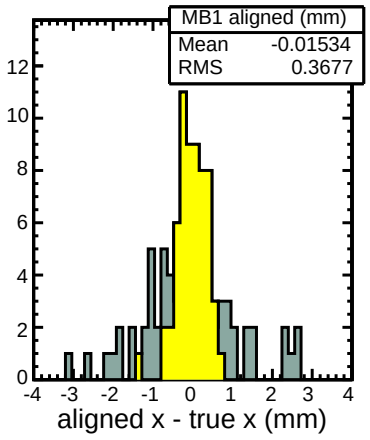
Parameters of alignment test

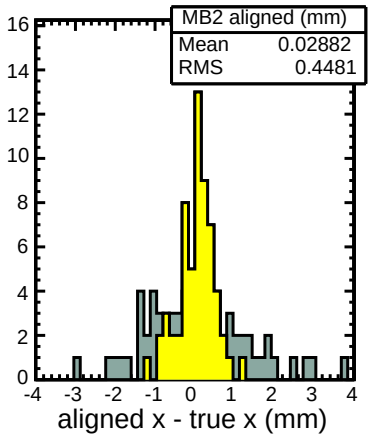
For reference:

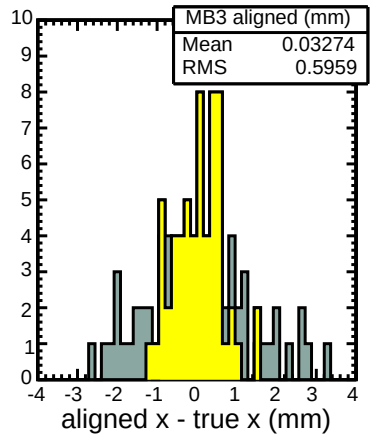


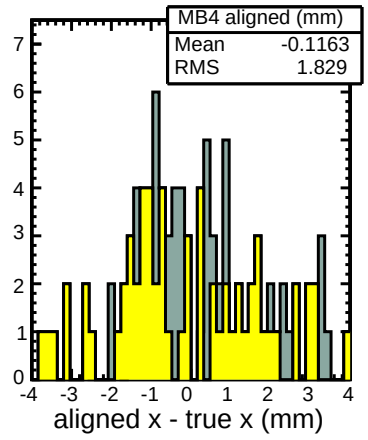
- Using $Z \to \mu\mu$, $W \to \mu\nu$, $\Upsilon \to \mu\mu$, $J/\psi \to \mu\mu$, MuonPT5, and MuonPT10
- 17 jobs $\times$ 2 hours, merged with HIP's collector mode
- Align to (a) ideal tracker and (b) results of S43 exercise

Ideal tracker

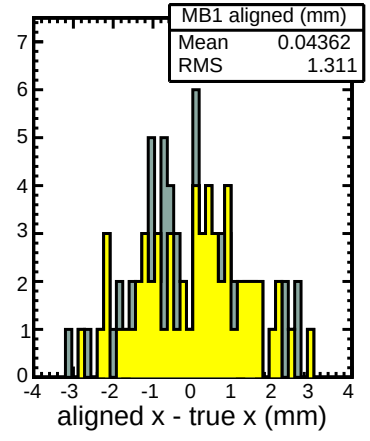


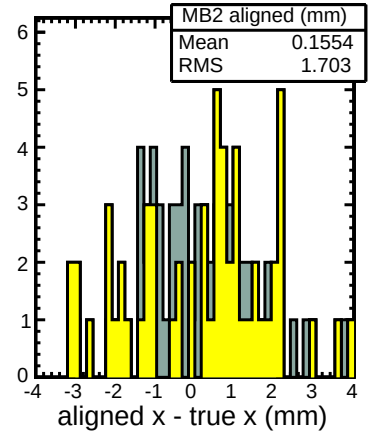


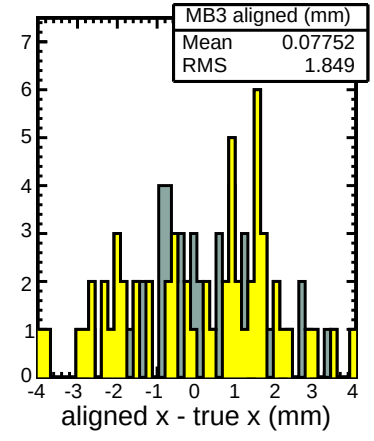


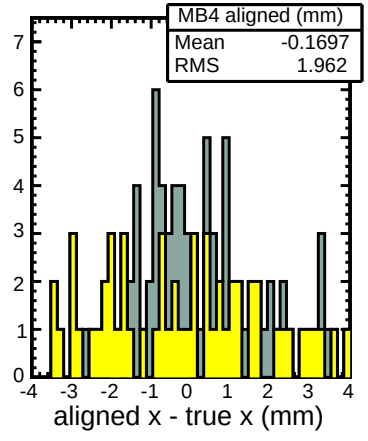


Misaligned tracker

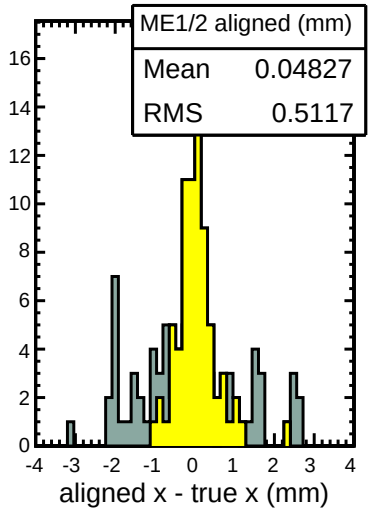


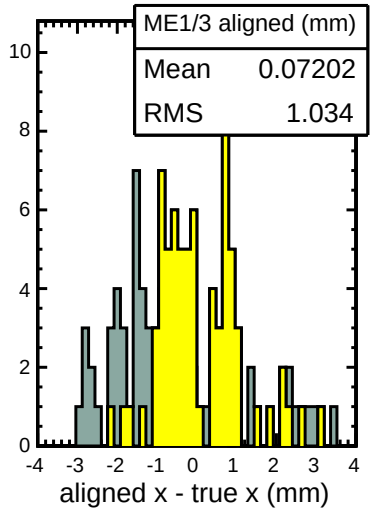


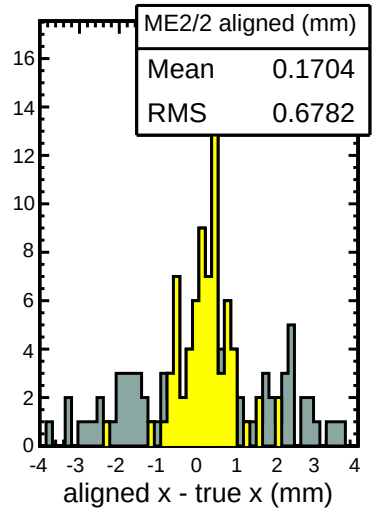


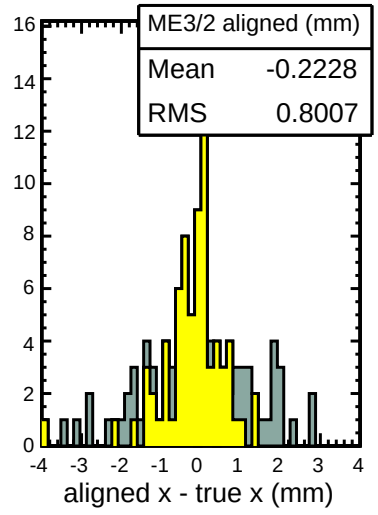


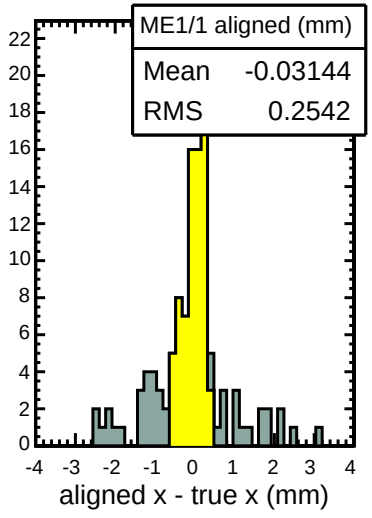
Ideal tracker

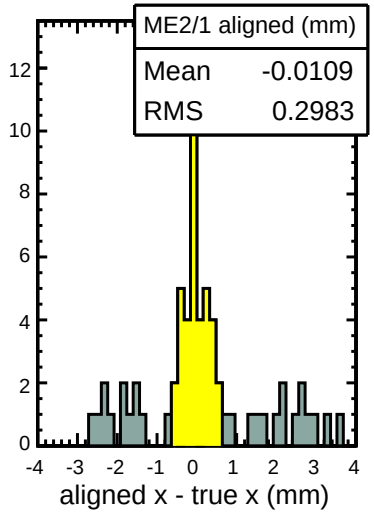


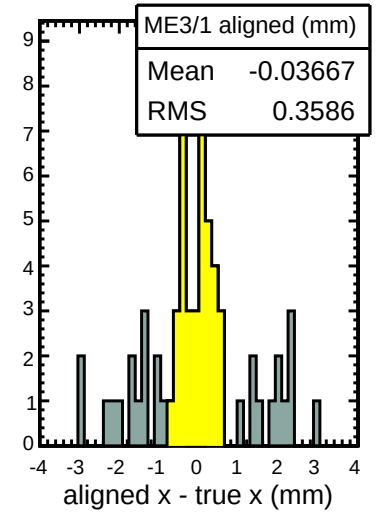


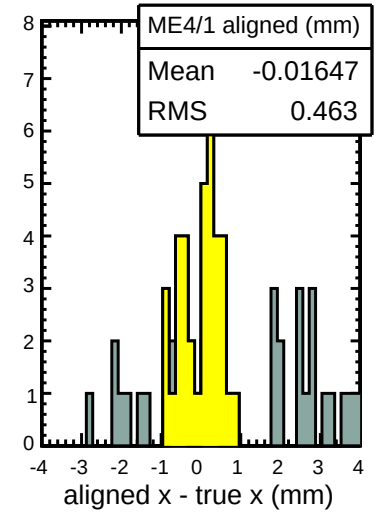




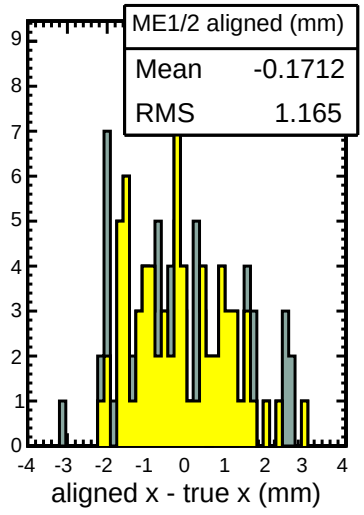


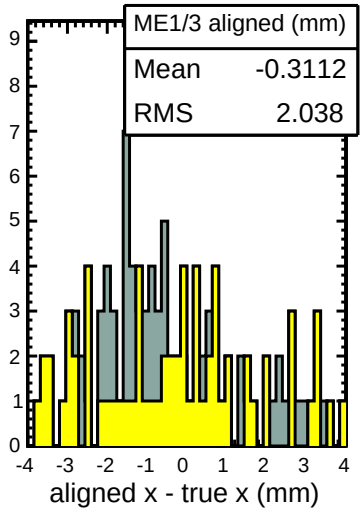


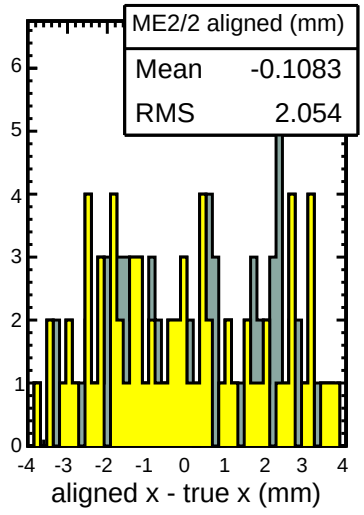


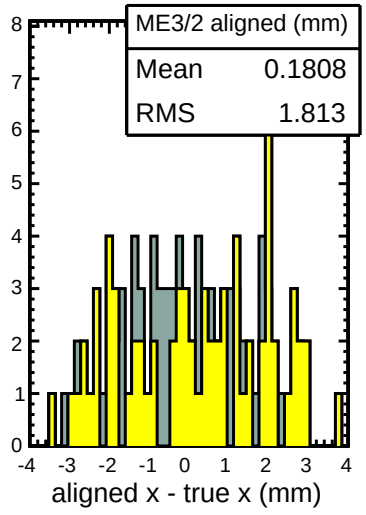


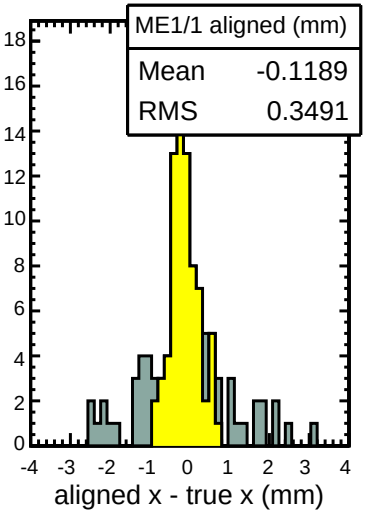
Misaligned tracker

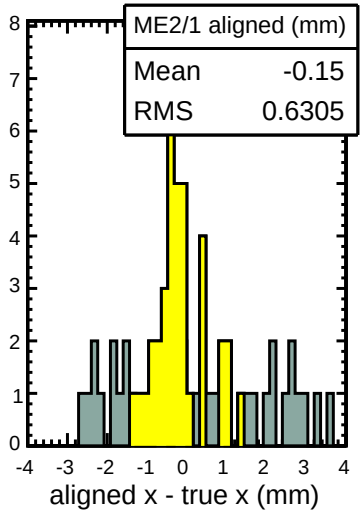


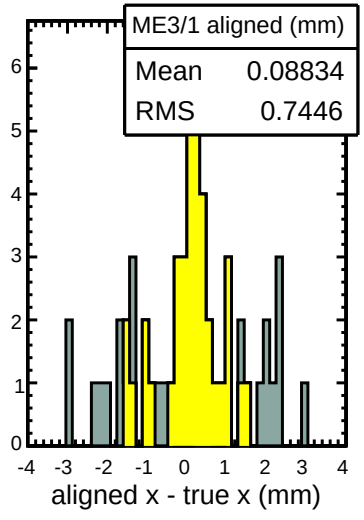


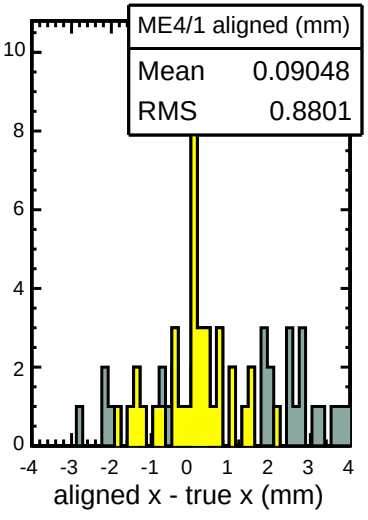






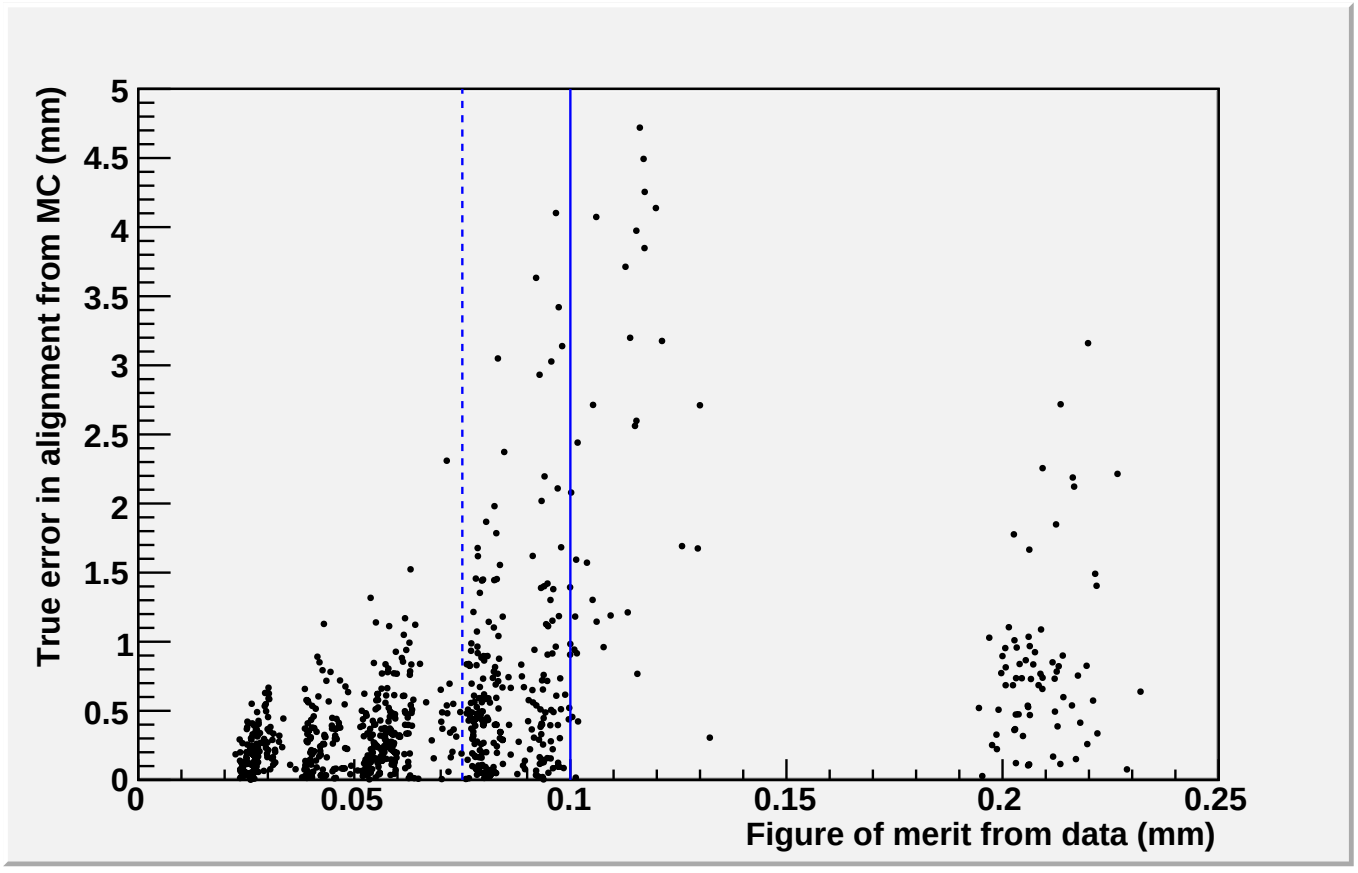






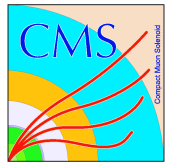
Selections from data

- "Figure of merit" for a well-aligned chamber is stdev/$\sqrt{N}$
- We can set a threshold for alignment based on this quantity: chambers which do not meet it can be left untouched



- Blobs correspond to stations (ME1/3 on right)

Next two days



- Try to determine whether muon alignment with a misaligned tracker would improve with statistics
- Align muon system with tracker S156 geometry
- . . . and DT calibration (this is possible)
- Take only the good chambers, produce an alignment, and validate it!