Scope of the "Alignment with Muon Tracks" project

- Many muon chambers don't have optical alignment sensors —
  no absolute chamber position measurement for them
- The list includes small barrel chambers, BEE chambers, BIS8
- Tracks passing through overlaps (of these chambers with optically
  aligned chambers) must be used to obtain their absolute positions —
  a dedicated alignment service is needed
- Input to AlignSrv: dedicated "muon calibration" data stream from LVL2
  trigger (muon digits within LVL1 RoI)
- Output of AlignSrv: alignment constants for the DetDescr service
  (GeoModel/AMDB)
- There're strong interconnections between muon calibration and muon
  alignment services

Software implementation of "Alignment with Muon Tracks"

- It should be an algorithm within ATHENA framework
- This algorithm should fully use new tracking EDM (be independent of Mounboy or MOORE)
  - operate with TrackSegments data objects
  - use TrackFitters, TrackPropagaters and other common tracking tools
- In principle, it can be expandable for later inclusion of the alignment of Muon Spectrometer with respect to Inner Detector
- It must have direct access to optical alignment data and calibration data (if not in the Conditions Database)

Main tasks of "Alignment with Muon Tracks"

- Setting up requirements to TDAQ group concerning the muon calibration and alignment data stream
  - selecting tracks with at least one overlap
  - which p_t trigger threshold should be used for such tracks
  - prescalers in LVL2 to increase the fraction of these tracks in the calibration stream (if needed)
  - running some trigger simulation
- Code development of the alignment algorithm in ATHENA
  - design of alignment EDM within tracking EDM (data objects, data flow)
  - main alignment algorithm development with common tracking tools
  - developing converter for putting calculated alignment constants into DetDescr (GeoModel/AMDB)
- Automated calibration data stream transfer from Tier-0 at CERN to Tier-2 at Munich (part of the calibration service)
- Tools for monitoring and validation of alignment constants, visualisation tools
- Automated procedures for running alignment service on the day-by-day basis