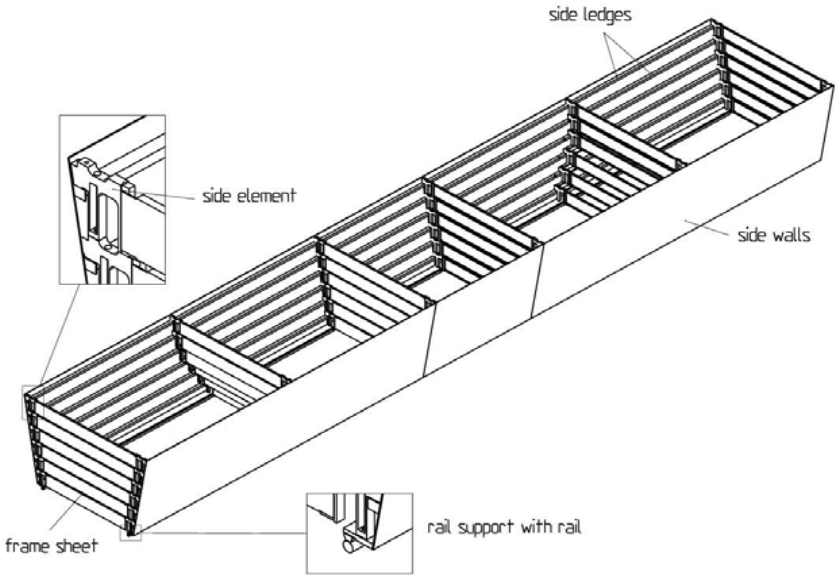
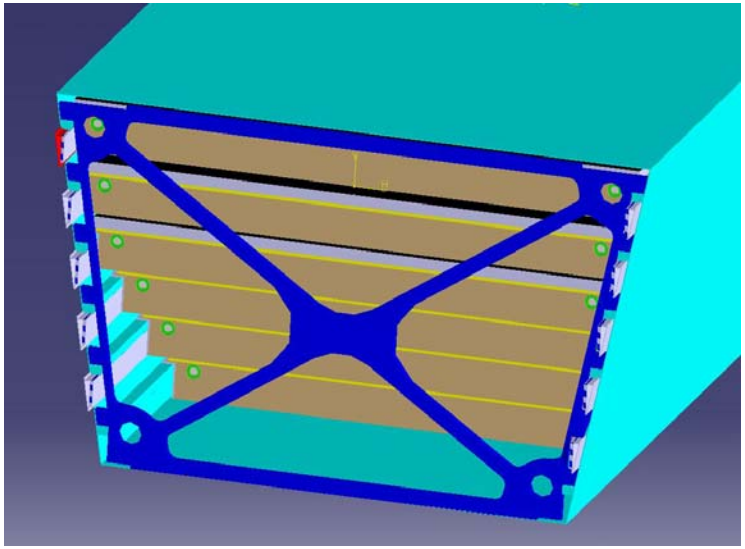
Alignment

- strategy: mechanical alignment within mm, rest with tracks
  (TRD is not expected to yield absolute coordinates)
- contribution of the survey team of CERN
- activities of the ALICE alignment group (Betev, Gruwe)
  software tools for shifting detectors and storing parameters
  pressure to test them
  goal: all ready for the January 2006 challenge
- how to proceed

alignment strategy

a) rough knowledge of geometry (nominal design values)
b) relative alignment of the 6 chambers within a stack by cosmics
c) relative alignment of the 6 chambers within a stack in a B=0 run
d) alignment of the stack in respect to the TPC in a B=0 run
e) alignment of the stack in respect to the TPC in a B>0 run





survey team

(Christian Lasseur, Antje Behrens, Vijendra Prasad)

meeting on October 7:

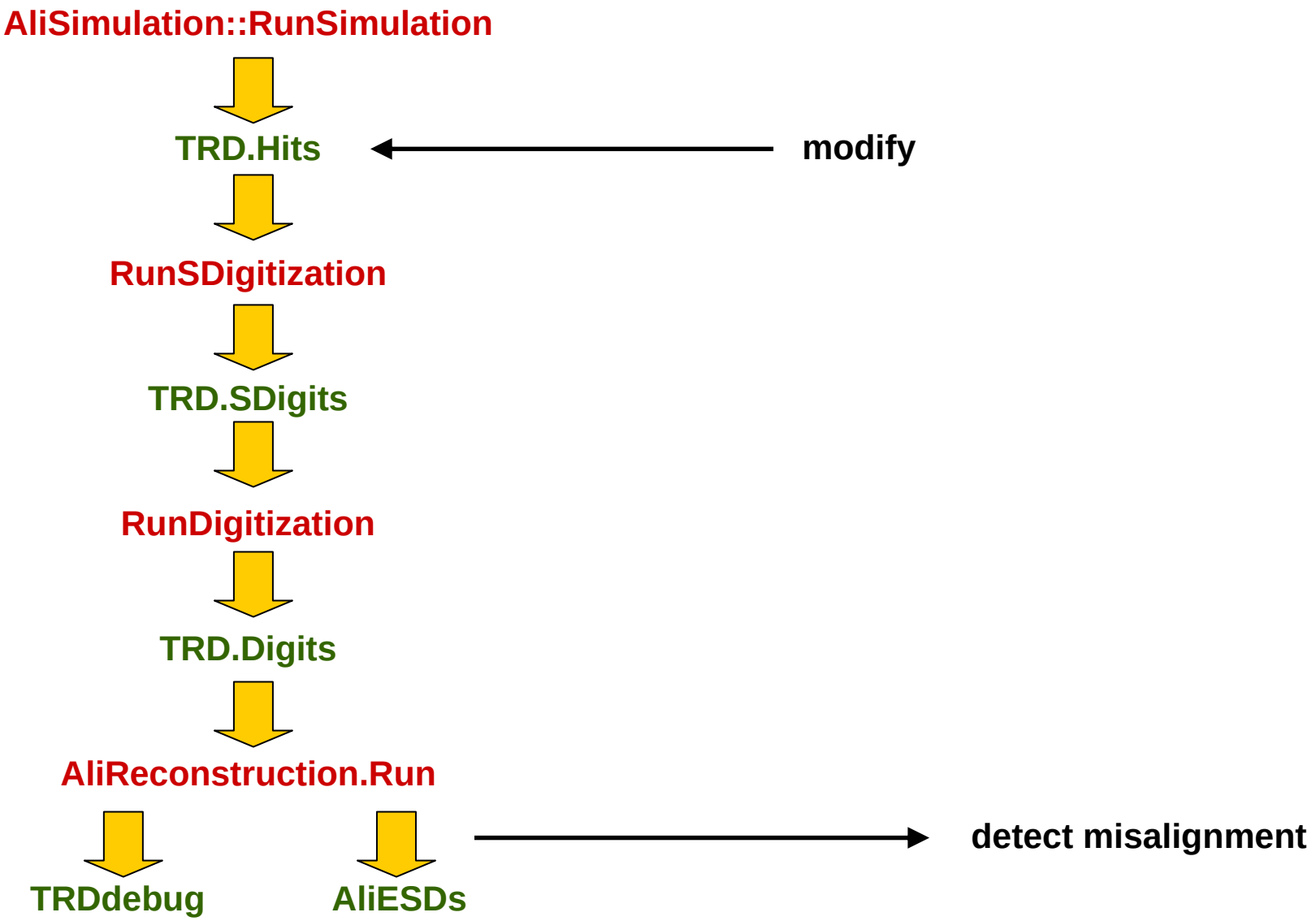
- **each end of each SM should have 4 survey marks, visible from a cone of 45 degrees**
- **they will measure positions of these marks to about 1 mm (absolute) and to about 0.3 mm relative to the TPC**
- **they want to know what we expect from them concerning the alignment of the rails**
- **the survey will be performed with B=0**
- **monitoring the changes caused by B will be done by BCAM**
- **during the water test in summer 2005 spaceframe distortions up to 0.5 cm, agreement between the survey and BCAM**

ALICE calibration/alignment group

(Latchezar Betev, Magali Gruwe)

- lead and coordinate efforts of all subdetectors
- classes for storing detector geometry
  modify the TRD simulation and reconstruction software
- database for storing parameters
  use it
- homework: demonstrate that it works
  shift in simulation → show difference
  shift in reconstruction → show difference
  shift in both → show no difference
  finding the shifts from the residuals
  use official software from the beginning (cosmics in Muenster)
- "shuttle" system for collecting run info needed for offline
  specify what is needed (and from where)
  (beam current, voltages, pedestals, thresholds,...)

alignment exercise (September 2005)



TRD calibration and alignment parameters

so far we specified:

90	stack x,y,z	cm	after each B change
90	stack dx,dy,dz	mrad	after each B change
540	chamber x,y,z	cm	month-year
540	chamber dx,dy,dz	mrad	month-year
1.2e6	pad drift velocity	relative	week-year
1.2e6	pad T0	timebin	week-year
1.2e6	pad gain	relative	day
1.2e6	pad ADC pedestal	ADC count	day
540	chamber drift velocity	cm / timebin	hour
540	chamber drift T0	timebin	hour

thresholds? pedestals by timebin? voltages?

how to proceed

- specify what we want from the survey group during rail installation (Bernd)
- specify what needs to be collected by the “shuttle”
- software modifications:
  - use the new classes for the detector positions in simulation and reconstruction (Jan Fiete)
  - use the database to store and retrieve the geometry parameters (Jan Fiete)
  - develop local TRD tracking (Frederick)
  - store additional variables: 6 residuals of local TRD track (Frederick)
  - store additional variables: 6 residuals of global track (DM from Marian)
- practice misalign-align (DM)
- develop alignment procedure using residuals (DM)