

# ***ITS offline general issues***

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# Outline

- ITS general issues → this presentation
  - ⇒ Planning tool: outstanding tasks (overview)
  - ⇒ Alignment: needs (A. Dainese)
  - ⇒ Savannah bugs concerning ITS
- SPD status
  - ⇒ Domenico Elia
- SDD status (+pileup and PID)
  - ⇒ Francesco Prino
- SSD status
  - ⇒ Enrico Fragiacommo

# Planning tool / 1

!	ITS (1645)	massimo.masera	-	01/01/2006	-	30/09/2009
✓	Raw Data (2393)	massimo.masera	-	-	13/04/2009	21/06/2009
!	Optimization of V0 finder (2079)	massimo.masera	massimo.masera (100%) (+1)	22/10/2007	-	15/06/2009
✓	Patch panel and cable trays (2200)	massimo.masera	Bjorn.Nilsen (100%)	01/02/2008	23/03/2009	30/06/2008
!	Alignable objects from survey used in sim/rec (2296)	massimo.masera	raffaele.grosso (50%) (+1)	18/05/2008	-	15/10/2008
✓	Planning of AliRecoParam (2333)	massimo.masera	andrea.dainese (100%)	11/06/2008	25/06/2008	25/06/2008
✓	Check overlaps in ITS geometry (2335)	massimo.masera	mario.sitta (100%)	07/07/2008	18/02/2009	11/07/2008
!	Geometry (2391)	massimo.masera	-	15/03/2009	-	30/05/2009
✓	SPD with residual misalignment. Validation of the proposed solution (2625)	massimo.masera	Domenico.Elia (50%) (+1)	15/03/2009	07/04/2009	15/04/2009
✓	Finalization of the detector geometry with reference to FMD (2580)	massimo.masera	mario.sitta (100%)	16/03/2009	18/02/2009	30/05/2009
!	Implementation of a detailed description of the cables and services outside the ITS cones (2581)	massimo.masera	mario.sitta (100%)	16/03/2009	-	30/05/2009
!	Improvement of the description of the forward services (2582)	massimo.masera	mario.sitta (100%)	16/03/2009	-	30/05/2009
!	Implementation of full misalignment without overlaps (2583)	massimo.masera	raffaele.grosso (35%) (+2)	16/03/2009	-	30/05/2009
✓	Material Budget (2350)	massimo.masera	massimo.masera (100%)	16/03/2009	31/03/2009	30/05/2009
!	Simulation (2392)	massimo.masera	-	16/03/2009	-	30/05/2009
✓	Handling of the time information from hits during digitization (2586)	massimo.masera	Enrico.Fragiacomo (35%) (+2)	16/03/2009	29/05/2009	30/05/2009
✓	Account for detector response in the time information stored in digits (2587)	massimo.masera	Enrico.Fragiacomo (35%) (+2)	16/03/2009	29/05/2009	30/05/2009
!	Verification of memory use during simulation for Hits, Sdigits, Digits (2588)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/05/2009
!	Verification of CPU use during simulation for Hits, Sdigits, Digits (2589)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/05/2009
!	Verification of the event merging procedures (2590)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/05/2009
✓	Correct treatment of the detector signal in the sdigits for event merging (2591)	massimo.masera	Enrico.Fragiacomo (35%) (+2)	16/03/2009	29/05/2009	30/05/2009
!	Verification of the embedding procedures (2592)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/05/2009

# Planning tool / 2

▶	📁 <b>Reconstruction</b> (2394)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/09/2009
✓	📄 Definition of the GRP parameters to be used in reconstruction (2594)	massimo.masera	massimo.masera (100%)	16/03/2009	30/05/2009	30/05/2009
✓	📄 Verification of Reco Params for cosmic, high flux, low flux and calibration (2595)	massimo.masera	massimo.masera (50%) (+1)	16/03/2009	27/05/2009	30/05/2009
✓	📄 Finalization of the V0 finder: move from AliITSTrackerMI to a new dedicated class (2596)	massimo.masera	andrea.dainese (100%)	16/03/2009	15/04/2009	30/05/2009
▶	📄 Verification of the PID performance: for efficiency as a function of pseudorapidity (2597)	massimo.masera	emanuele.biolcati (50%) (+1)	16/03/2009	-	30/09/2009
▶	📁 <b>Calibration</b> (2395)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/09/2009
✓	📄 Implementation of the methods for the Time0 definition in the RespSDD object (2598)	massimo.masera	Francesco.Prino (100%)	16/03/2009	19/11/2008	30/05/2009
▶	📄 Finalization of SPD DAs (2599)	massimo.masera	Domenico.Elia (50%) (+1)	16/03/2009	-	30/09/2009
▶	📄 Implementation of SDD DA (2600)	massimo.masera	Francesco.Prino (100%)	16/03/2009	-	30/09/2009
✓	📄 Delta Vdrift from Millipede2 (2624)	massimo.masera	Francesco.Prino (100%)	16/03/2009	27/03/2009	24/04/2009
!	📁 <b>Quality Assurance</b> (2396)	massimo.masera	massimo.masera (100%)	16/03/2009	-	30/05/2009
!	📄 Implementation of reconstruction in QA DataMaker (2602)	massimo.masera	panos.christakoglou (35%) (+2)	16/03/2009	-	30/05/2009
!	📄 Implementation of run type (2603)	massimo.masera	panos.christakoglou (35%) (+2)	16/03/2009	-	30/05/2009
!	📄 Implementation of simulation in QA checker (2604)	massimo.masera	panos.christakoglou (35%) (+2)	16/03/2009	-	30/05/2009
!	📄 Implementation of reconstruction in QA checker (2605)	massimo.masera	panos.christakoglou (35%) (+2)	16/03/2009	-	30/05/2009
!	📄 Implementation of reference data (2606)	massimo.masera	panos.christakoglou (35%) (+2)	16/03/2009	-	30/05/2009
✓	📄 Verification of the memory use for the SDD QA (2607)	massimo.masera	melinda.siciliano (100%)	16/03/2009	29/05/2009	30/05/2009
✓	📁 <b>Trigger</b> (2366)	massimo.masera	massimo.masera (100%)	16/03/2009	29/05/2009	30/06/2009

QA: modifications to give a non void output after recent changes in the framework are ready to be committed

# Open tasks

<b>Task</b>	<b>Name</b>	<b>Assigned to</b>	<b>New due date</b>
2079	ITS/Optimization of (cuts on on the flight V0 finder)	Ana Marin	31/08/2009
2296	ITS/Alignable obj from survey used in sim/rec	Grosso/Dainese	30/09/2009
2588	ITS/Simulation/Verification of memory use	Masera	31/07/2009
2589	ITS/Simulation/Verification of CPU use	Masera	31/07/2009
2590	ITS/Simulation/Verification of the event merging procedure	Masera	?
2592	ITS/Simulation/Verification of the embedding procedures	Masera	?
2581	ITS/Geometry/cables outside cones	Sitta	30/09/2009
2582	ITS/Geometry/Forward services	Sitta	30/09/2009
2583	ITS/Geometry/Full Misalignment	Sitta/Grosso/Dainese	end 2009 (*)
2597	ITS/Reconstruction/Verification of the PID performance	Biolcati/Chojnacki	30/09/2009
2599	ITS/Calibration/Finalization of SPD DA	Mastroserio	30/09/2009
2600	ITS/Calibration/Implementation of SDD DA	Prino	30/09/2009
2602	ITS/Quality Assurance/Reco QA data maker	Mariella/Panos/Melinda	30/09/2009
2603	ITS/Quality Assurance/Implementation of run types	Mariella/Panos/Melinda	30/09/2009
2604	ITS/Quality Assurance/Implementation of simulation in QA checker	Mariella/Panos/Melinda	30/09/2009
2605	ITS/Quality Assurance/Implementation of reconstruction in QA checker	Mariella/Panos/Melinda	30/09/2009
2606	ITS/Quality Assurance/Implementation of reference data	Mariella/Panos/Melinda	30/09/2009

(\*) p-p data are needed to evaluate full misalignment for regions which cannot be aligned with cosmics

# ***Alignment procedures***

Slides presented by A.Dainese at the last  
ITS offline-alignment meeting

# *Input data for ITS alignment*

- Alignment data: AliTrackPointArrays, extracted from tracks, currently stored in ESD friend

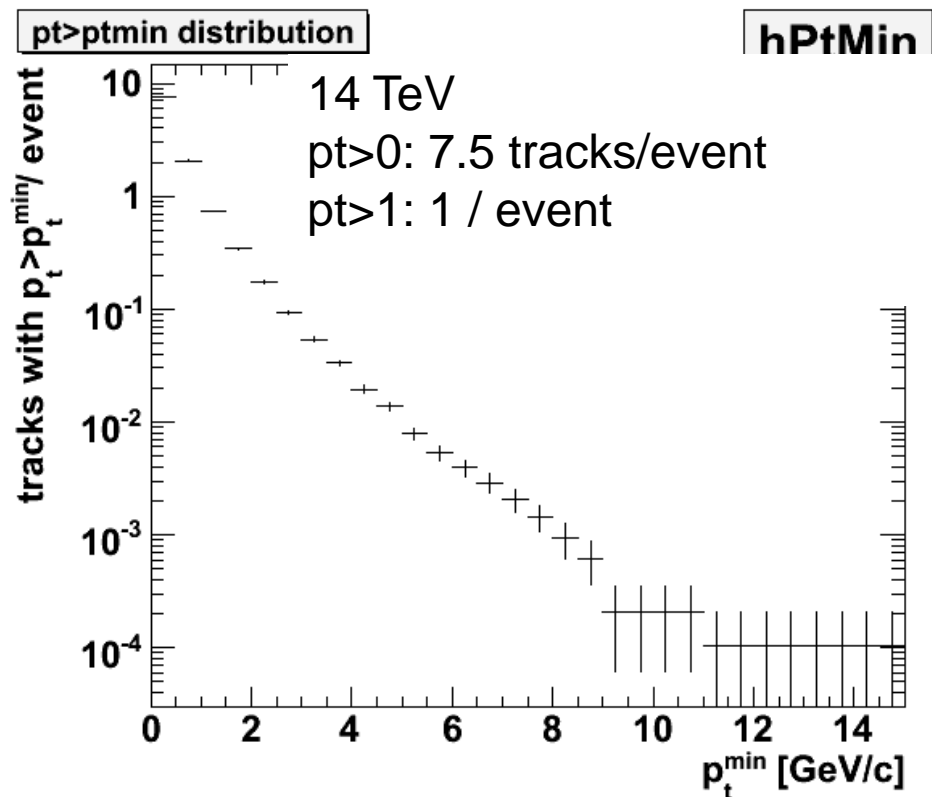
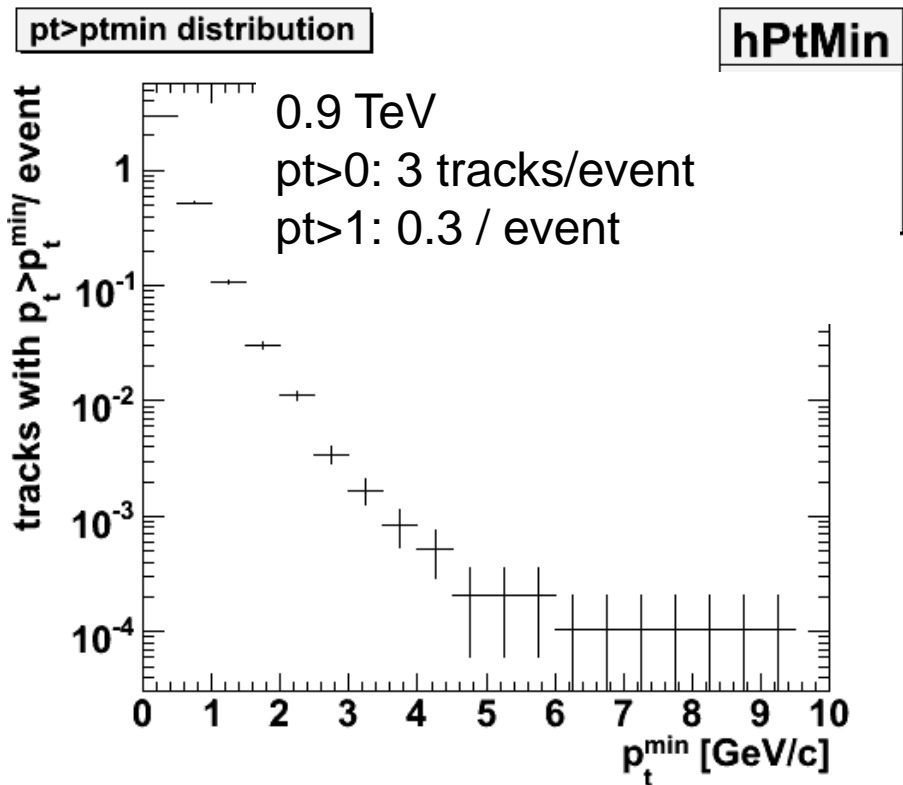
- AliTrackPoint: 60 bytes

```
Float_t  fX;           // X coordinate
Float_t  fY;           // Y coordinate
Float_t  fZ;           // Z coordinate
Float_t  fCharge;     // Cluster charge in arbitrary units
Float_t  fDriftTime; // Drift time in SDD (in ns)
Float_t  fCov[6];    // Cov matrix
Bool_t   fIsExtra;   // attached by tracker but not used in fit
UShort_t fVolumeID; // Volume ID
```

- → 360 bytes for a 6-cls ITS track
- Not all tracks can be used for alignment → filtering (number of ITS points, pt cut)

# First look at statistics in pp

- Exercise with 10k pp events at 0.9 and 14 TeV  $B=0.5T$
- Number of tracks, with  $\geq 5$  ITS points, per event above  $p_t^{\min}$



First Physics sample  $\rightarrow \sim 10^5$  tracks



# *First look at data size in pp*

	bytes/event	fraction of current ESD size (LHC09a4)	fraction of current ESDfriend size
0.9 TeV	1080	2%	1%
0.9 TeV, pt>1	108	0.2%	0.1%
14 TeV	2700	8%	4%
14 TeV, pt>1	360	1%	0.5%

# *Proposal submitted to core offline*

- Cosmics: keep ITS AliTrackPoints for all events (ITS alignment is one of the main motivations to take cosmics)
    - ⇒ data volume: 4 weeks →  $\sim 10^5$  events with SPD FastOR →  $\sim 12 \times 60 \times 10^5$  bytes  $\sim 100$  MB
  - pp B=0: keep ITS AliTrackPoints for all events and all tracks with  $\geq 5$  cls
    - ⇒ data volume:  $\sim 3$  GB / million events
  - pp B on: keep ITS AliTrackPoints for first  $\sim 10^6$  events and all tracks with  $\geq 5$  cls (→ few  $10^6$  tracks for alignment);
    - ⇒ data volume: 8% of ESD size
- then, keep points for all events and tracks with  $\geq 5$  cls and  $pt > 1$  GeV
- ⇒ data volume: 1% of ESD size

# ***Production of ITS alignment data***

- AliAnalysisTask to filter alignment data from each ESDtrack (+ESDfriendTrack)
  - ⇒ committed: PWG1/AliAlignmentDataFilterITS.\*
  - ⇒ keep tree with AliTrackPointArray (only the ITS points) for selected tracks
    - ✓ *write also the track curvature with error (in another branch of the tree) fitted by ITS+TPC, because the curvature resolution with only ITS points is poor*
  - ⇒ to be run as "Step 2" (Chiara's nomenclature) in a Analysis train
  - ⇒ this tree written to new-format ESD friend file (to be done, Cvetan?)
  - ⇒ optionally, perform alignment QA and write a set of histos
    - ✓ *to be implemented soon*
  - ⇒ then, automatic merging for a given range of runs
  - ⇒ these data used by experts -locally, at least for a while-- for:
    - ✓ *validation of current alignment*
    - ✓ *re-alignment (Millepede) → new OCDB object*
- We would like to test this procedure on Sum08 cosmics during July (before new cosmics come)

# Charge Calibration

- Starting point: same ESDtrack (+ESDfriendTrack) used for alignment
  - ⇒ Charge calibration for the 4 analogue layers (SDD, SSD)
    - ✓ *Only ITS points associated to tracks are used*
    - ✓ *Possibility of selecting tracks (m.i.p.)*
  - ⇒ Evaluation of response functions for particle identification
- Relevant code in the AnalysisTask is still missing
  - ⇒ To be discussed during PID kick-off meeting next week

# Savannah bugs concerning ITS

Bug #	Description	comment
46372	Primary vertex reconstruction: events with multiple primary vertices	See F. Prino's report
47410	Improvements in the stand-alone ITS tracker: taking into account the energy losses, possibility to start from the outer.	Possibility to start from the outer: implemented. Energy losses: to be implemented.
47413	Correct treatment (in both cluster- and track finders) of the SSD modules that are dead on one side	Still some change in the tracker is needed. It should be ready soon.
50411	Segmentation violation in ITS/AliITSClusterFinderV2SPD.cxx	Presently patched (Peter). See D. Elia's report
50855	Correction for the track segment length in AliITSpidESD2	Mostly done. See F.Prino's report
52098	ITSVertex Reconstruction in LHC09a3	Submitted yesterday. It concerns SPD vertex in Jet-Jet events