TPC status report. Reconstruction/calibration

Marian Ivanov

Outlook

- Planning tool
- Savannah bug report
- Code checker and warnings
- Reconstruction
- Calibration
- OCDB visualization

Planning tool

Pin	Log	P	Work	Task Name	Task Owner	Assigned Users	Start Date	Done Date	Expected Finish Date	Last Update
	Log		!	***TPC*** (118)	Peter.Braun-Munzinger	Marian.Ivanov (100%)	01/01/2006	-	20/02/2010	-
	Log		✓	***Calibration*** (971)	Marian.Ivanov	-	01/01/2006	01/09/2009	05/08/2009	-
	Log		✓	***Geometry*** (975)	Peter.Braun-Munzinger	-	01/01/2006	26/08/2009	30/05/2009	-
	Log		!	***Simulation*** (977)	Peter.Braun-Munzinger	-	01/01/2006	-	30/05/2009	-
	Log		!	Implementation of LHC clock phase in simulation (2456)	Peter.Braun-Munzinger	Marian.Ivanov (100%) (+1)	16/03/2009	-	30/05/2009	-
	Log		✓	Implementation of additional track references (2457)	Peter.Braun-Munzinger	Peter.Braun-Munzinger (100%)	16/03/2009	23/06/2009	30/05/2009	-
	Log		✓	Verification of the event merging procedures (2458)	Peter.Braun-Munzinger	Peter.Braun-Munzinger (100%)	16/03/2009	26/08/2009	30/05/2009	-
	⚠		✓	Verification of the embedding procedures (2459)	Peter.Braun-Munzinger	Peter.Braun-Munzinger (100%) (+1)	16/03/2009	02/09/2009	30/05/2009	-
	Log		✓	***Raw Data*** (1008)	Peter.Braun-Munzinger	-	01/01/2006	13/01/2010	31/12/2009	-
	Log		✓	***Reconstruction*** (1320)	Marian.Ivanov	-	01/01/2006	02/09/2009	30/05/2009	-
	Log		✓	***Quality Assurance*** (1351)	Peter.Braun-Munzinger	-	01/01/2006	26/02/2010	20/02/2010	-

- No open issue except of Implementation of LHC clock phase in simulation
- Depending on bug report:
- bug #53025: Request: Event time stamp missing in the simulation

Savannah bug reports

Submitted By Me

(-) **AliRoot** (4 items)

- Request: To port the TPC changes. Related to the bug report #63620 (bug #64135, None)
- Request: Memory monitoring in nightly builds (bug #55297, Assigned)
- Request: Combined tracking - matching problems (bug #53055, None)
- Request: Event time stamp missing in the simulation (bug #53025, None)

Assigned To Me

(-) **AliRoot** (7 items)

- Propagate function in AliITSV0Finder (bug #63966, Assigned)
- Pass0 TPC calibration (bug #63620, Assigned)
- Use physics masses from PDG and not constatns (bug #56612, Assigned)
- Elimination of "new AliMagF": PWG1/macros/taskComp.C, TPC/Cal/AliTPCCreateDummyCDB.C, TPC/CalibMacros/CalibExB.C (bug #56459, None)
- Number of foundable clusters in TPC needs refinement (bug #48748, None)
- TPC z shift (bug #46277, None)
- High memory consumption in the TPC reconstruction of PbPb events (bug #45933, None)

- 63966 – related to bug 53055 – to be discussed on Thursday
- 56459 – Elimination of AliMagF in macros
  - It is not bug, therefore I propose to close it.
    - Necessary for ExB calibration study.
    - Refit of the tracks in setup with B=0 field, assuming B non equal 0.
- 48748 – Number of findable clusters ..
  - ExB effect not taken into account calculating the “findable” clusters – 0.7 cm at the edge
  - To be fixed later – to be optimized for CPU consumption

Pass0/PassX reconstruction/calibration

- Framework part of the code – committed not yet in Release
  - Alien test ongoing
- Stress test suite to check the code before large AliEn production committed
  - $ALICE_ROOT/TPC/scripts/calibPassX
- Important features - Log files:
  - 1. Parsing of the log files
  - 2. Parsing of stack traces
  - The same scripts used to parse MC/REC/Calib/Analysis
  - Statistic and visualization - tree->Draw()
- Important feature:
  - 3. Extracting calibration
  - 4. QA of calibration

Reconstruction

- No major changes – Only minor fixes
  - Memory consumption
- Open issue : Disabling of outer detectors
  - Currently configurable from the AliTPCRecoParam
  - Configuration stored in the OCDB
  - To be changed into AliGlobalRecoParam
  - Should be easy to modify – without touching TPC OCDB
  - To be discussed on Thursday

Code checker and warnings

- I am committing changes of other developers within TPC group
  - Script cppViolator.sh to build TPC libraries and provide relevant warnings logs
  - Output of the script to be sent to me together with request
  - Similar approach for *.viol files once the codeChecker available for public usage

» Warnings - Modification of the default build/Makefile.linuxx8664gcc needed

- -CXXFLAGS = $(OPT) -W -Wall -Weffc++ -Woverloaded-virtual -fPIC -pipe -fmessage-length=0 -Wno-long-long -pedantic-errors -ansi -Dlinux
- -CXXFLAGSNO = $(NOOPT) -W -Wall -Weffc++ -fPIC -pipe -fmessage-length=0 -Wno-long-long -pedantic-errors -ansi
- +CXXFLAGS = $(OPT) -W -Wall -Weffc++ -Wshadow -Woverloaded-virtual -fPIC -pipe -fmessage-length=0 -Wno-long-long -pedantic-errors -ansi -Dlinux

Reconstruction QA

- PWG1/Performance train should be part of the PassX
  - Reconstruction
  - Calibration
  - PWG1 - QA using tracks

TPC/scripts local test suit will be modified accordingly

- Exporting of the standard characteristic e.g.:
  - DCA resolution parameterization
  - Matching resolution/efficiency parameterization
    - We will need it also as a Calibration entry (systematic errors)
  - ....
- Parameters to be exported
  - Trend visualization

Reconstruction QA

- The QA for high momenta tracks important
- Request to run the cosmic trigger continuously also during physic data taking
    - Proposal to be presented during trigger meeting

bug #63480: TPC time0 calibration for 2010 cosmic runs

- Laser time 0 changed in February ==> wrong drift velocity extracted from the DA
- To correct the Laser time 0/offset – new offline calibration using tracks needed
- Pass0/PassX (reconstruction/calibration) not yet working automatically
- To eliminate problems with laser Time0 new DA developed

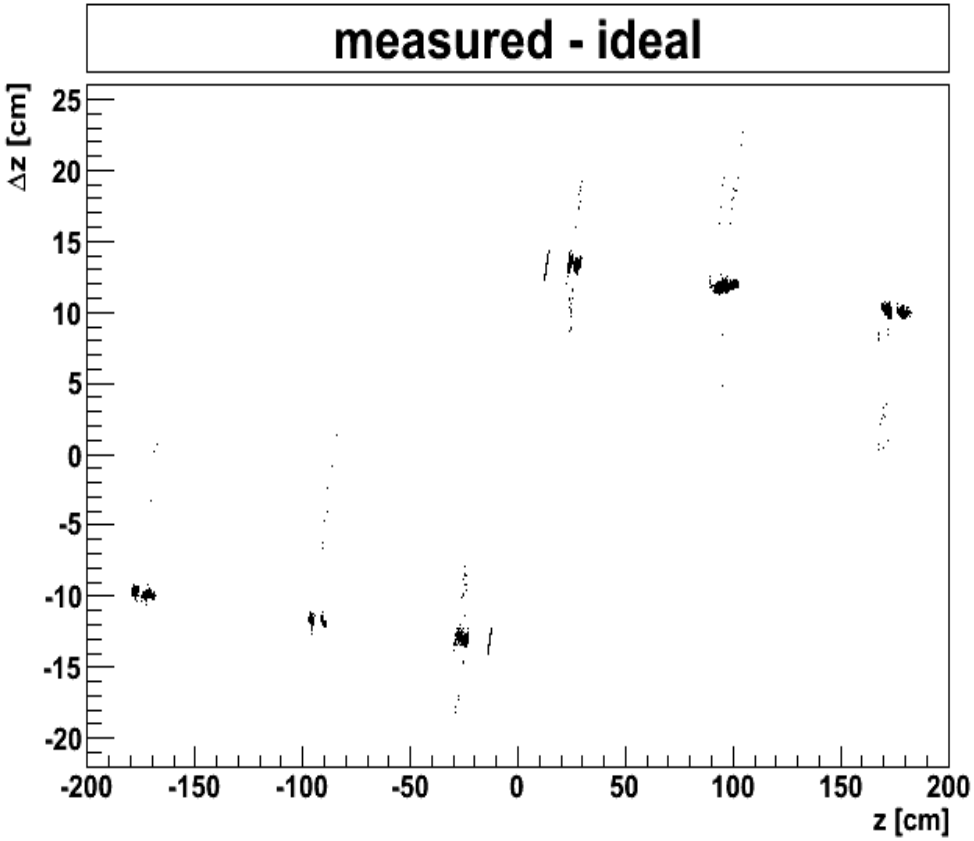
Online drift velocity calibration (Jens, Mesut)

- New drift velocity calibration algorithm based on the laser tracks (still in development)
- Old - using raw data from the CE
- New- using raw data from CE and laser tracks
  - No problem with trigger offset
- Algorithm
  - Use THnSparse to fill digits
  - Average over several triggers
  - Associate clusters with ideal laser tracks
  - Use Δz of ideal and measured tracks + CE plane to determine the drift velocity
  - Use same fit function and nomenclature in OCDB as in offline laser calibration: fully transparent

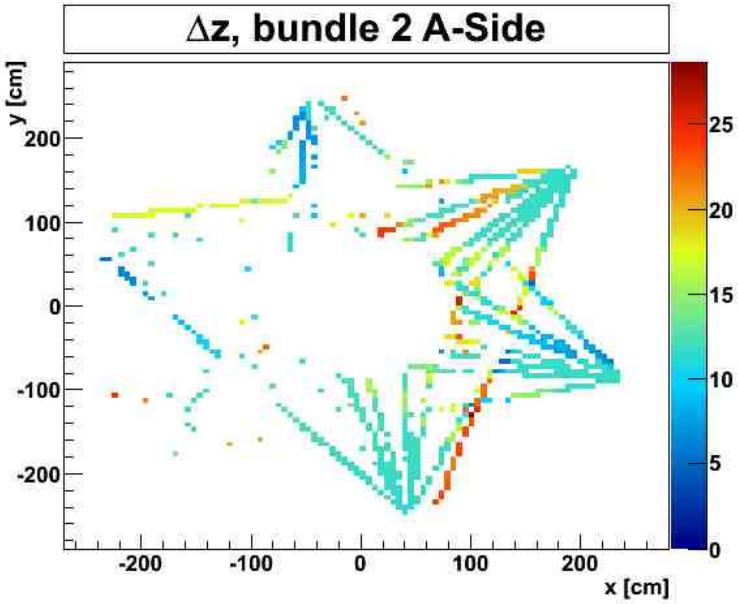
New algorithm complementary to old algorithm

First results

- Still improvements needed
- Better outlier filtering

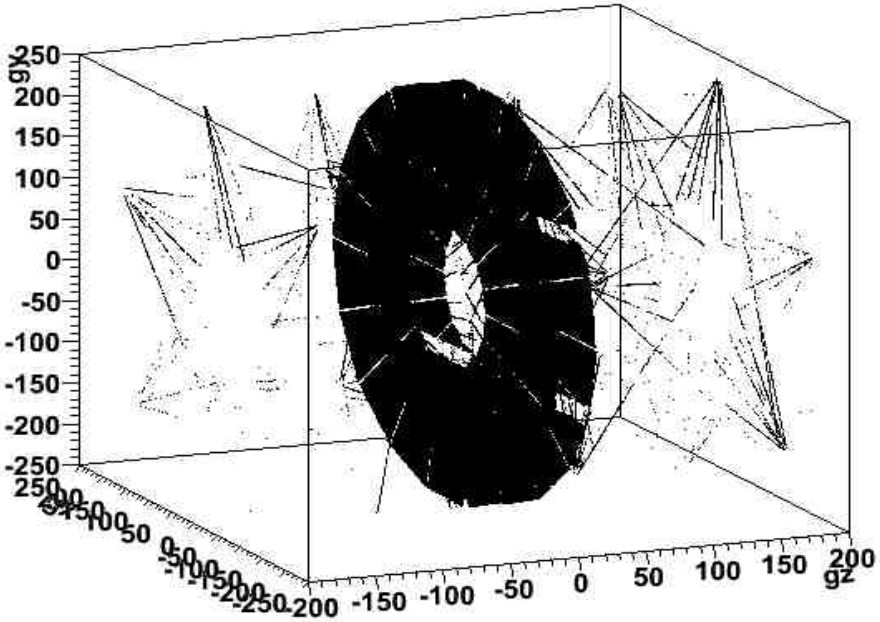


Wrongly associated clusters

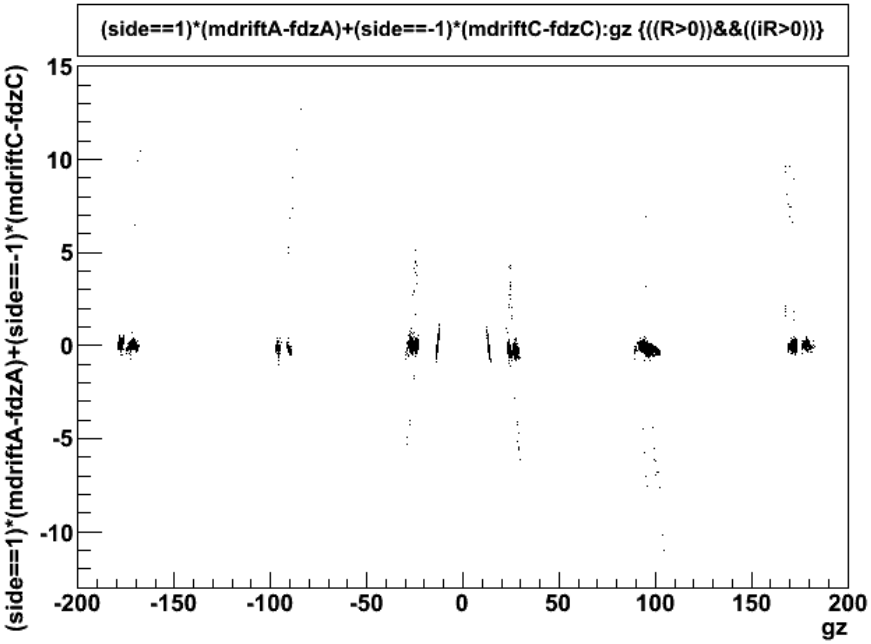


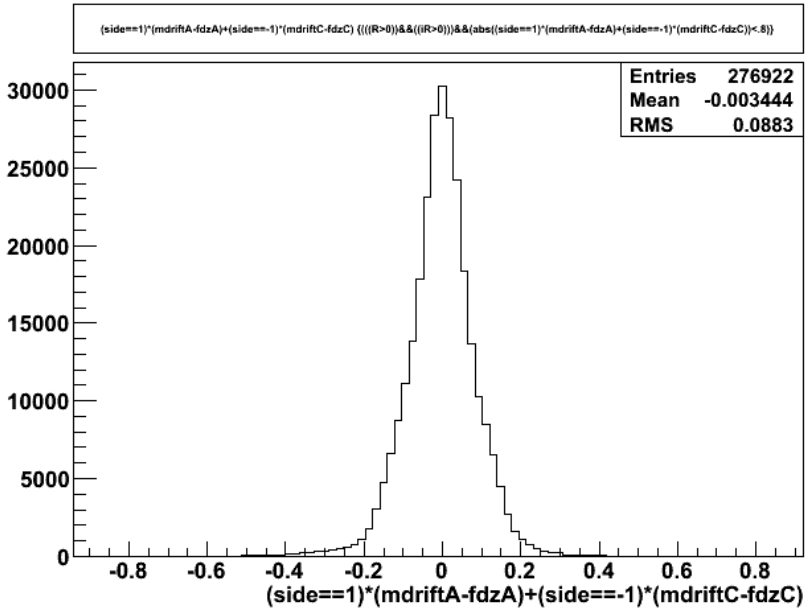
Drift velocity

- Missing laser tracks (hardware)
- Algorithm to be more robust
- Cluster association will improve with more tracks
- Stress test to be performed:
  - Calibration of february and december data
  - Exporting OCDB
  - Use new calibration entries



Residuals after fitting





ExB Calibration

- 2 bug reports related to the second order ExB correction
  - DCA shift
  - Pt shift
- Only ExB distortion due B field corrected for the moment ~ 7mm
- E distortion additional smearing ~ +-0.5 mm
  - Common mode – IFC (Inner field cage) shift, common ROC (readout chamber) and CE (Central electrode) shift/rotation
  - Non linear effects due to the z misalignment
    - +-0.3 mm
- Fitting model under development
  - Effective calibration working

OCDB visualization

- 2 application developed:
  - Generic time/run dependence of the OCDB parameters and derived values
  - Generic space dependence of calibration parameters
- Application - Tree draw based - Plenty of functionality for free e.g:
  - parameter correlation
  - Comparison of different calibration – subtraction, division …
  - Infinity amount of functionality in expert mode

OCDB visualization

- Automatic procedure of the tree creation on AliEn to be implemented
  - To be discussed on Thursday
- Common input for the calibration visualization
- Currently only local and batch implementation
- Configurable: OCDB AliFatal handling new switch (AliLog.cxx)
  - AliFatal produce just Stacktrace but not program exit
  - Logs to be monitored

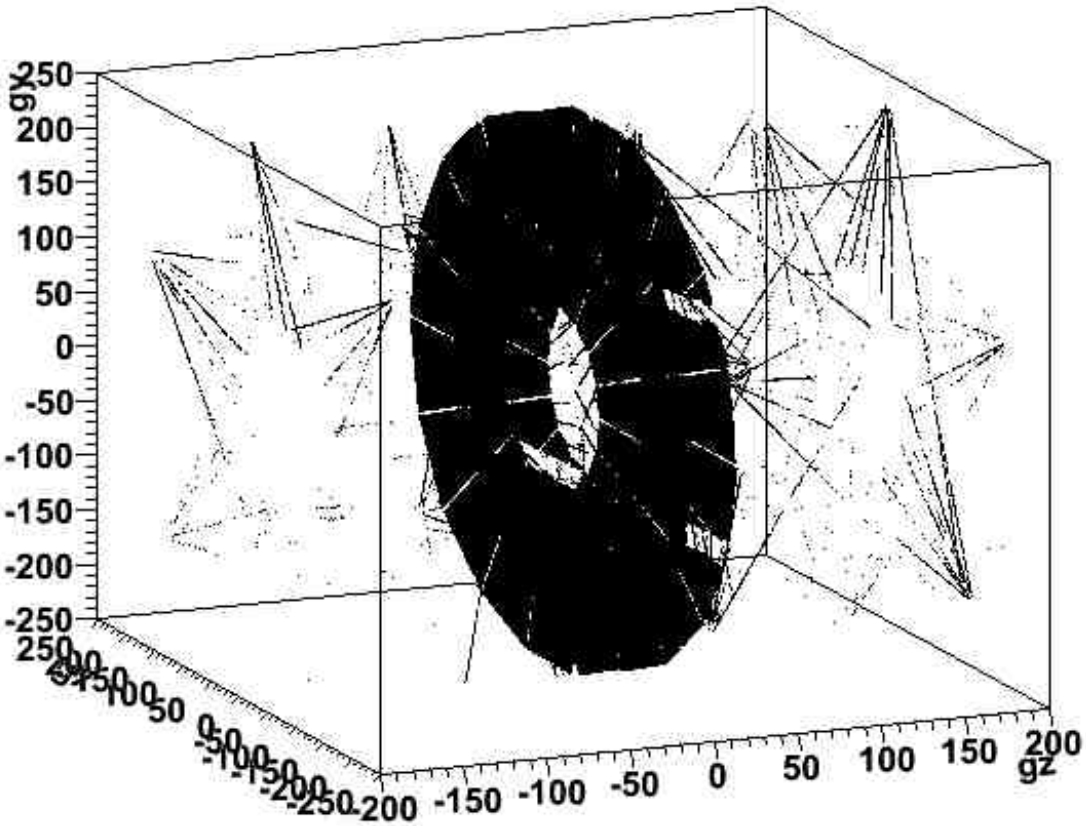
» This switch absolutely necessary also for the reconstruction debugging. Otherwise debugging of the system delayed by each subsystem failure

ConfigOCDB.C macro.

```
// To be used:
// 1. Before invocation of the calibration - in the calibration trains
// 2. To setup calibration viewer.
//
// ConfigOCDB  - setup default and specific data storage
// SetupCustom - user sepcific configuration
//             - Values in local cache of OCDB are overwritten


void SetupCustom(Int_t run);

void ConfigOCDB(Int_t crun=-1){
  //
  printf("SETUP OCBD for TPC\n");
  //
  AliCDBManager::Instance()->SetDefaultStorage("local:///lustre/alice/alien/alice/data/2010/OCDB/");
  //
  // custom calibration to test before committing
  //
//  AliCDBManager::Instance()-
>SetSpecificStorage("TPC/Calib/GainFactorDedx","local:///lustre/alice/akalweit/OCDB");
//  AliCDBManager::Instance()-
>SetSpecificStorage("TPC/Calib/ClusterParam","local:///lustre/alice/akalweit/OCDB");

//  AliCDBManager::Instance()-
>SetSpecificStorage("TPC/Calib/TimeGainKrypton","local:///lustre/alice/miranov/OCDB");
```

OCDB scan - Log example

- Processing /lustre/alice/miranov/calibPass0/OCDBscan/scripts/ConfigOCDB.C...
- SETUP OCBD for TPC
- I-AliCDBManager::Init: AliEn classes enabled in Root. AliCDBGrid factory registered.
- E-AliTPCcalibDB::GetCDBEntry: AliTPCcalibDB: Failed to get entry: TPC/Calib/TimeGain
- F-AliTPCcalibDB::Update: TPC - Missing calibration entry
    - #0 0x00002b1fb06d8715 in waitpid () from /lib/libc.so.6
    - #1 0x00002b1fb0681721 in do_system () from /lib/libc.so.6
    - #2 0x00002b1faeaa831f in TUnixSystem::Exec

Found clusters

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