SDD offline status + few general issues

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Open tasks at Jan09 offline review (Raw + ONLINE)

- Raw data format (task #2593)
  - ⇨ See next slides
    - ✓ ***Involves also minor modifications in preprocessor and OCDB***
- Retrieve the ADC sampling frequency from JTAG configuration in the DAs
  - ⇨ Solution proposed by Sylvain has been implemented
    - ✓ ***The JTAG configuration writes a file on the LDC and the DAs read this file***
  - ⇨ DA code is ready, being tested on raw data collected last week, then (after validation by Date team) installed at P2
- New DA for Injector events in Physics runs (task #2600)
  - ⇨ At the moment the firmware of the acquisition cards does not foresee this triggers (which require special timing via pre-pulse)
  - ⇨ If needed we will implement a dedicated DA
    - ✓ ***Most of the code in common with the existing one for INJECTOR runs***

Open tasks at Jan09 offline review (OCDB)

- ResponseSDD object in OCDB (stores parameters from offline calibration)
  - ⇨ Added containers for TimeZero (task #2598) and Vdrift (task #2624) correction (parameters extracted from alignment procedures)
    - ✓ ***2 arrays of 260 Float_t (one element per module)***
  - ⇨ Added correction for charge dependence on drift time (also from offline calibration, more details in next slide)
    - ✓ ***1 Float_t added in the object (charge vs. time slope in keV/ns)***
- MapsTimeSDD object in OCDB (stores corrections for non-uniformities of drift field)
  - ⇨ Size of the object reduced from 14 MB to 200 kB by introducing new object which treates differently 1D and 2D correction maps

Open tasks at Jan09 offline review (Simu+Reco)

- Implemented in simulation the use of time of flight from the hit to shift the drift time (task #2586)
  - ⇨ SDD ready for pileup simulation
- Correction of charge dependence on drift distance implemented in the cluster finder (trunk rev 32974)
  - ⇨ Due to the effect of zero suppression on the cluster tails: the larger the drift distance, the larger the charge diffusion, the larger the fraction of charge in the tails killed by the zero suppression
  - ⇨ The keV/ns correction factor from in OCDB (see previous slide)
  - ⇨ Crucial for PID performance

Raw data format (I)

- Implemented (by Davide Falchieri) on the FPGAs of the DAQ cards a firmware which writes the raw data in the format which reduces the data size (similar to the one developed for the HLT solution)
  - ⇨ New firmware installed and validated at Point2 on June 16-18
  - ⇨ Cosmic 2009 and proton data will be collected with the new format
- RawStream decoder for new format already implemented and tested
- Open point: how to handle the different raw data formats preserving backward compatibility?
  - ⇨ For the DAs the following solution was implemented:
    - ✓ ***The JTAG program writes the version of the DAQ cards firmware on a file on the LDC***
    - ✓ ***the DA reads this file and instantiates the proper raw stream class***

Raw data format (II)

- Proposed solution for the simulation and reconstruction
  - ⇨ Store the version of the raw data format in the AliITSCalibrationSDD objects (OCDB/ITS/Calib/CalibSDD)
    - ✓ ***AliITSCalibrationSDD are read both in simulation and in reconstruction and thus guarantee coherent treatment of the format in case of writing raws from simulated digits***
    - ✓ ***The default value will be set to the old format in order to assure the possibility to reconstruct the 2008 data with new versions of aliroot***
- Data flow:
  - ⇨ JTAG program writes raw data format variable (+ the ADC sampling frequency) on an ASCII file on the LDC
  - ⇨ The DA of PULSER run stores this ASCII file on FXS
  - ⇨ The Preprocessor in case of PULSER runs gets this file from OCDB and properly sets the raw data format (and the ADC sampling frequency) when building the AliITSCalibrationSDD objects

Summary

- Online Calibration:
  - ⇨ Any news/updates on the procedures?
    - ✓ ***Yes, minor modifications to handle ADC sampling frequency and raw data format (if we agree on the solution proposed in previous slide)***
  - ⇨ Is everything properly integrated in the Shuttle framework? Are any updates necessary in the Shuttle code running at P2?
    - ✓ ***Minor modifications needed in the preprocessor to treat ADC sampling frequency and raw data format***
- Online Calibration Objects:
  - ⇨ What is the status of your calibration objects? Any new objects needed?
    - ✓ ***New information for raw data format to be added to AliITSCalibrationSDD***
    - ✓ ***No need for new objects***
    - ✓ ***HLTforSDD no longer needed. Should we remove it? Or keep it for backward compatibility?***
- Performance issues
  - ⇨ Is your detector affecting the overall CPU and memory (resident and virtual) consumption in the reconstruction
    - ✓ ***The size of the SDD correction maps in the OCDB (the largest object in OCDB) has been reduced***

Other general issues

Vertexer3D and pileup

- New tuning of the parameters of the 3D VertexerSPD after the developments for pileup treatment
  - ⇨ Improved method to search for the maximum density of tracks
    - ✓ ***New histogram binning + new treatment of double peaks***
    - ✓ ***New values for cluster selection to form tracklets***
  - ⇨ Allowed to release the cut on $\Delta\phi$ between associated clusters on layer 1 and 2 and remove the artifact observed in SPD multiplicity studies and reported in savannah bug #46278
  - ⇨ Performance after re-tuning: increases efficiency preserving the same resolution.
- Pileup (savannah bug #46372)
  - ⇨ Two pileup algorithm (one based on Z vertexer, the other on 3D vertexer) implemented, and tested.
  - ⇨ Performance studies ongoing
  - ⇨ A third algorithm which does in 1 shot 3D vertex calculation and pileup tagging is implemented and presently being optimized for efficiency+resolution

PID

- After discussion within PWG1/2 (savannah bugs #50855, 50931)
  - ⇨ The 4 charge signal from the 4 ITS layers have been added to the ESD track (thanks to Yura)
  - ⇨ The ITS trackers store 4 dE/dx (corrected for track length in the sensor) + the truncated mean in the ESD
    - ✓ ***One (minor) issue with the inclination in the transverse plane presently under debug, more news at the Alice week***
- Modification implemented, tested and committed to trunk (rev 32870)
  - ⇨ Allow to run PID2 (potentially more powerful) also starting from ESD without the need of accessing the ITS.RecPoints
- Ongoing:
  - ⇨ Re-tuning of the response functions for PID2 algorithm
  - ⇨ Performance studies (task #2597)