EMCAL Raw Data Status

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EMCAL Construction Schedule

Rough estimate from US-DOE CD-1 Review in September:

• 2005/2006: First testbeam at FNAL with prototype EMCal, design iteration, CDR written

• 2007: First modules produced, new testbeam with final design (Summer)

• 2007/2008: First supermodules (SM) assembled and tested with cosmics(Fall '07), installed in ALICE (Mar/Sep '08)

• 2009: Commissioning of first SMs with data, installation of next SMs (Apr/Aug)

• 2010: Installation of next SMs (Feb/Jul/Dec), first data with large acceptance

• 2011: Last SMs installed (May)

Raw Data Volume

EMCal has 12,672 towers x 2 gains x 25 time samples x 10 bit ADC word / 8 bits = 792 kBytes/event (maximum)

Expect ~40% EMCal occupancy in Pb+Pb at 8 kHz

Average size = 317 kByte/event

Each SM has 1152 towers x 2 gains connected to
3 Crates → DDLs (in 2 RCUs) → LDC

(768 channels per Crate)

Currently no realistic/physical mapping exists

EMCal readout geometry

- EMCal transition card groups 2x8 towers from a group of four modules adjacent in ϕ (within strip-module),
- These are mapped to FEEs preserving 2x2 geometrical groupings for primitive trigger sums,
- Three FEE crates per SM, with 12 cards each + TRU,
- Each FEE crate will read out a group of 24x16(ϕxZ) towers with each FEE card connected to 2x16 (ϕxZ) towers.

4 towers per module

24 strip-modules per Supermodule

12 modules per strip-module

ϕ

ϕ

η=0

FEE crates η=0.7

Z
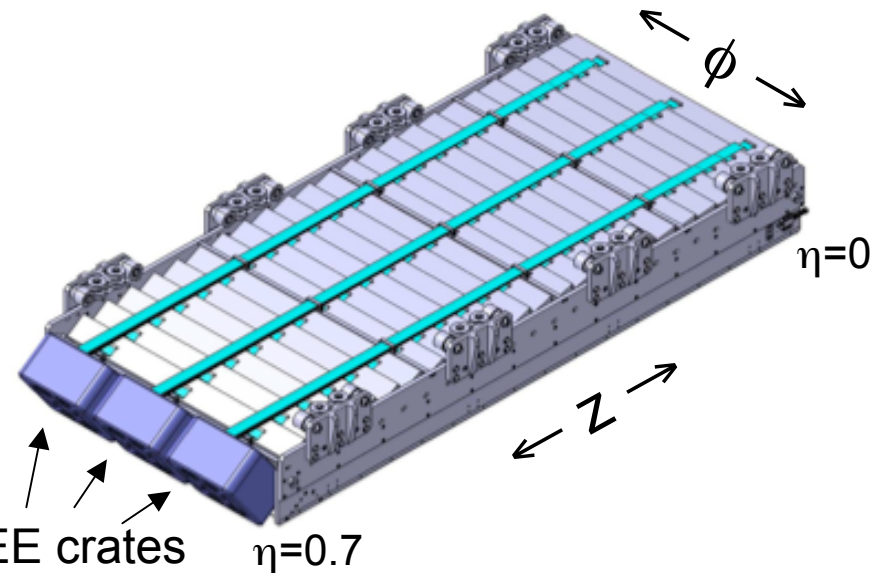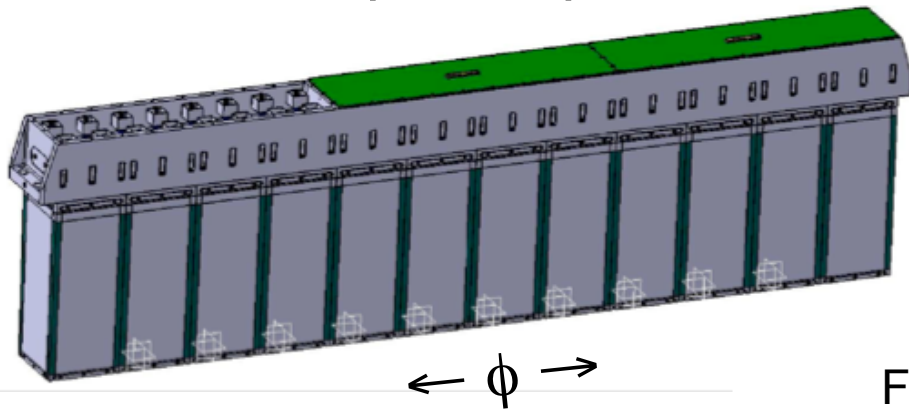
Milestone questions

1. Detailed schedule of the detector commissioning - test-beam, cosmic, calibration data taking. List of the persons who are responsible for the DAQ and analysis of the data.

First test-beam with prototype modules in Nov 2005.
Second testbeam with final-design modules is planned for the summer of 2007. The testbeam uses PHOS electronics/DATE; some online code will be adapted from this work. The analysis of the testbeam data was done in collaboration by about 10 different persons from different institutions in the US.

D. Silvermyr is the EMCAL online representative/DAQ contact person. He will be stationed at CERN from December 2006.

Cosmic calibrations will be done at Yale as each SM is assembled. Richard Witt will be leading the cosmic calibration effort.

LED Calibration system is planned for relative APD gains; first implementation was done with testbeam run, will be integrated into AliRoot after next testbeam.

Milestone questions

2. DDL/EquipmentID mapping - I would like to remind the detectors, which didn't send me yet this information, to do so and/or to present it in their talks.

The EMCAL design and mapping is not finalized so we have not prepared the DDL mapping yet. A simple 1:1 is currently implemented in Raw2Digits. Estimated date for real numbers to be completed is when the first SM is installed in March 2008.

3. Geometrical mapping (inside a DDL) - please make sure that you contacted the corresponding hardware experts and report what is already implemented in AliRoot, what is to be implemented and the time needed to finalize this task.

At the moment, simple mapping (1:1) is implemented in Digits2Raw method - take list of EMCal digits and assign them a number from 0:767 within each DDL. Expect the geometrical map within the DDL to be available prior to cosmic testing of the first SM in October 2007.

Milestone questions

4. Status of raw-data reconstruction. Please report also if the 'real' raw-data would necessitate some additional preprocessing and the time needed to develop the corresponding algorithms.

The EMCAL will be similar to PHOS and we will adapt algorithms/strategies from them. Some are in place already from first testbeam (signal integration, peak fitting for ADC at each gain setting). Final algorithms probably ready around October 2007.

5. Removal of all the dependencies on gAlice in raw data reconstruction - as you know in case of 'real' raw data reconstruction, there is no gAlice available, so all the detector configuration parameters should be either fixed (if they will never be changed in the future) or read from Conditions DB. The easiest way to check for gAlice dependencies is to remove galice.root and start the reconstruction using just the raw-data file as an input.

This has not yet been tested but will be checked soon (JLK). Estimated completion Nov 1.

Milestone questions

6. Status of raw-data simulation

Raw2Digits and Digits2Raw are committed (based on PHOS) in AliEMCal.cxx. Final electronics response/noise parameters to be implemented after next testbeam analysis is complete. Est.: December 2007.

7. Raw-data visualization - your plans for development for raw-data visualization within the aliroot event display (EVE).

No discussion has been started on this topic yet. We will identify manpower and decide on priority with respect to other tasks and report back later…

8. Raw2(S)Digits method needed for event embedding - this item concerns only the detectors which doesn't have it implemented.

We need to investigate how our existing Raw2Digits method should be modified for creating "S-like" digits from raw data; will be similar to PHOS.