M5 Summary

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27 November 2007

(with special thanks to Norman's run reports)

- L1Calo Setup
- Aims
- Reality
- Operation
- Problems
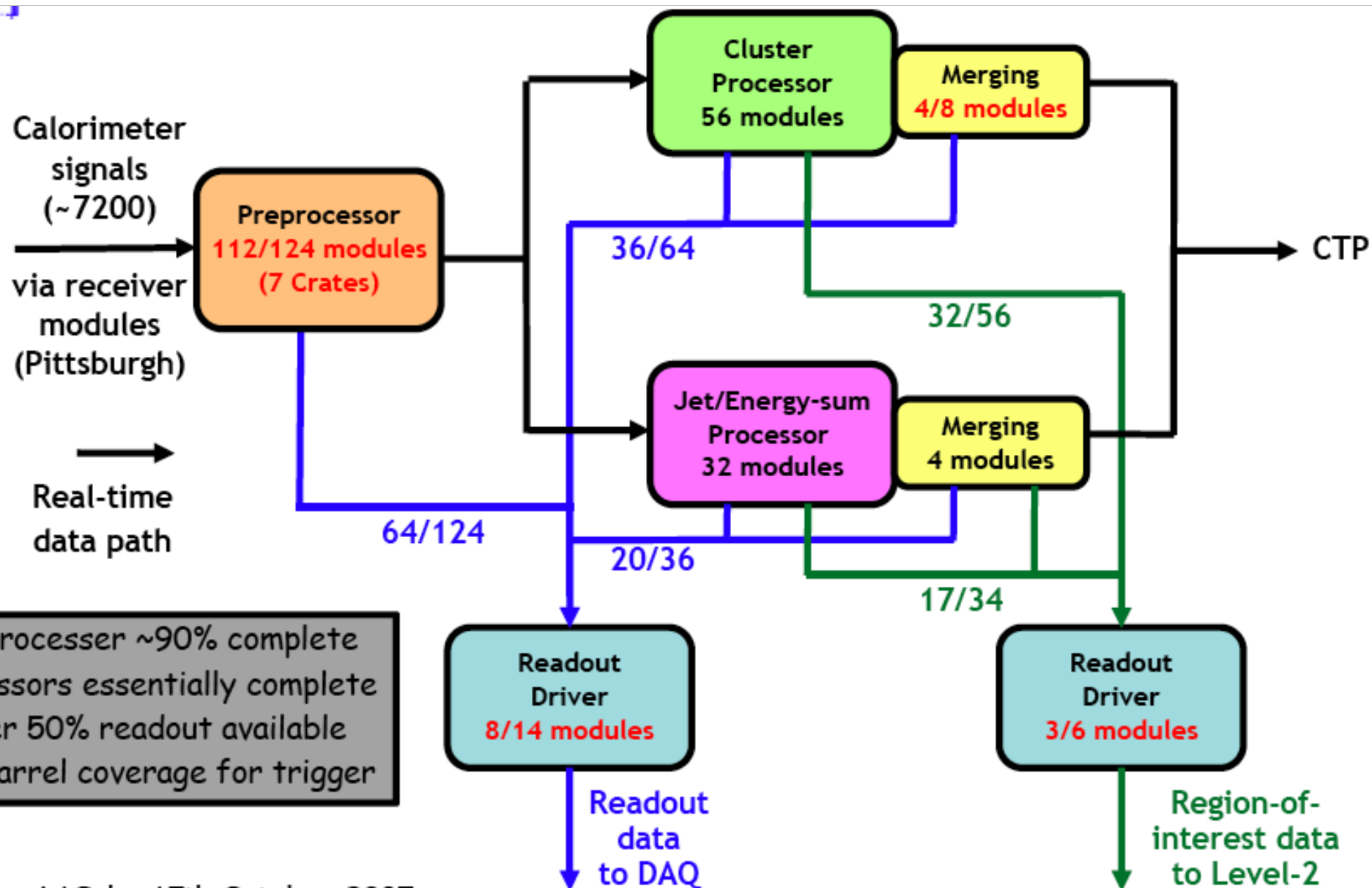- Summary

L1Calo Setup in M5

- **Preprocessor Barrel (4 crates)**
  - Three endcap crates available, but not read out
- **Nearly complete CP system (but only barrel read out)**
  - Only one CMM per crate ("tau" thresholds)
- **Complete JEP system (but only barrel read out)**
- **Roughly half the final readout (11/20 RODs)**
  - Three links to RoIB
- **Non-standard arrangement of readout**
  - Some ROD source IDs wrong
    - Need special fixup in bytestream decoders

L1Calo Setup in M5

Calorimeter signals (~7200) via receiver modules (Pittsburgh)

Real-time data path

Preprocessor 112/124 modules (7 Crates)

64/124

Cluster Processor 56 modules

36/64

Merging 4/8 modules

32/56

Jet/Energy-sum Processor 32 modules

Merging 4 modules

20/36

17/34

CTP

Preprocesser ~90% complete
Processors essentially complete
Over 50% readout available
Full barrel coverage for trigger

Readout Driver 8/14 modules

Readout data to DAQ

Readout Driver 3/6 modules

Region-of-interest data to Level-2

L1Calo, 17th October, 2007

Aims

- Tune preprocessor for a good cosmic trigger
  - DAC scan, pedestal at 40 ADC counts
  - Simple lookup table (straight line, with pedestal subtraction)
  - Use LUT to zero any problem channels
  - Adjust tower to tower timing using Tile laser calibration
    - Also add top/bottom correction for cosmic timing
  - If possible, do the same with LAr pulser
- Prepare suitable trigger menu
  - Tau and jet triggers at various thresholds
- Time in trigger through the system to the CTP
  - Using Tile laser pulses
- Trigger ATLAS from L1Calo
  - First with laser, then see if we can trigger on cosmics

Week 1: Integration Tests

- ## Friday afternoon before M5 (after L1Calo meeting)
  - Hasty move to tdaq-01-08-03, just in time for weekend run
- ## Weekend before M5
  - Smooth cosmic data taking with calorimeters
- ## First week reserved for integration tests
  - L1Calo integration on Monday afternoon
    - Test run states, high rates with ECRs - OK
      - L1Calo limited to 25kHz with 5 slices in neutral mode
  - Joint LAr+Tile+L1Calo integration tests Wednesday pm
  - Rest of the week free for last minute work!
- ## Weekend run
  - Pixels, LAr, Tile, L1Calo, MDT, RPC, TGC, HLT

- ## New PPr DAC scan
  - Applied limits to DAC slope and offset
    - Set "success" flag to false if outside limits
    - Failing channels have their LUT zeroed
    - MCMs 12&13 disabled in SW (DAC setting problem area)
- ## Tried to set CMM timing
  - Crate timing OK, but couldnt set time to capture remote cable data in System CMM
    - SW feature fixed after M5 (but still have this problem in CP?)

- ## Monday: integrated high rate test (all detectors)
  - Reached 50kHz with L1Calo included
    - RODs in native mode with zero suppression and some PPMs disabled
      - L1Calo was about 2% BUSY – but then one ROD stuck BUSY after 20 minutes

- **Tuesday: dedicated to L1Calo**
  - Checked CMM-CTP connection with ramps: all OK
  - Tried to time in four CMM-CTP cables (tau,2*jet,energy)
    - All OK, but our different cables have widely differing phases
    - CTP cannot easily handle this, so we only used the main jet triggers
  - Tile laser activated with TileCal cosmic trigger
    - Found L1Calo jet triggers in CTP
      - Timing scattered, so disabled all except one JEM
    - With PPr tower timing adjusted for the barrel, L1Calo trigger was two ticks ahead of (much delayed) TileCal cosmic trigger
      - With additional PPr delay to cope with endcaps, we will be later...
      - But for M5 we added an extra two ticks delay at the CTP
  - L1Calo trigger enabled (and TileCal trigger disabled)
    - Triggered ATLAS (actually just TileCal) with L1Calo trigger
    - Check that TileCal see their pulses at the same time
    - Success!

Week 2: L1Calo Trigger (2)

- ## Wednesday: also dedicated to L1Calo
  - Tried to equalise PPr tower timings with TileCal laser run
    - Failed to see pulses in large areas of the TileCal
    - Eventually gave up
      - System handed over to LAr and RPC to investigate their own problems
      - In return we got more dedicated L1Calo time on Thursday
  - But level 2 reported that yesterdays RoIs make sense
- ## Thursday: retry Wednesday
  - Really no TileCal signals seen on the cables with a scope
    - Abandoned our dedicated time
    - Later Monica diagnosed a TileCal TTC problem
      - Understood but needs power cycle to recover TTCrx for adder boards
- ## Weekend
  - Standard cosmic run (with L1Calo trigger)

Operation

- ## DCS
  - Worked very smoothly

- ## Online Monitoring (AthenaPT and GNAM)
  - Very useful plots from all monitoring programs
    - Especially when hunting for problems

- ## Offline Tools
  - Analysis of CBNT also very helpful
    - See talk by Damien earlier today

- ## Shift crew
  - More to look at, but apologies that experts were still running around, either too busy to explain what was going on or in complete ignorance themselves
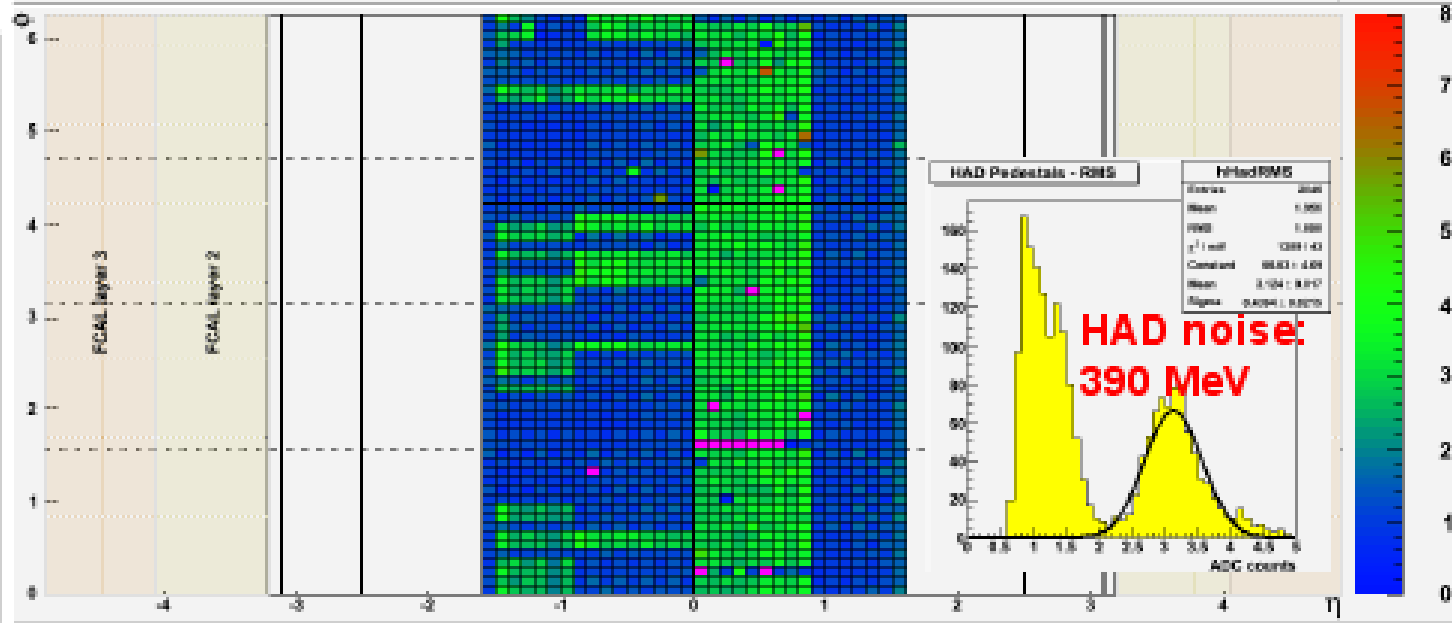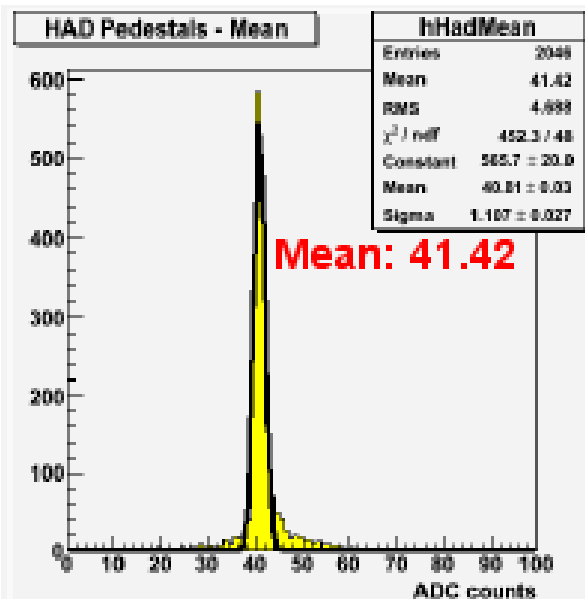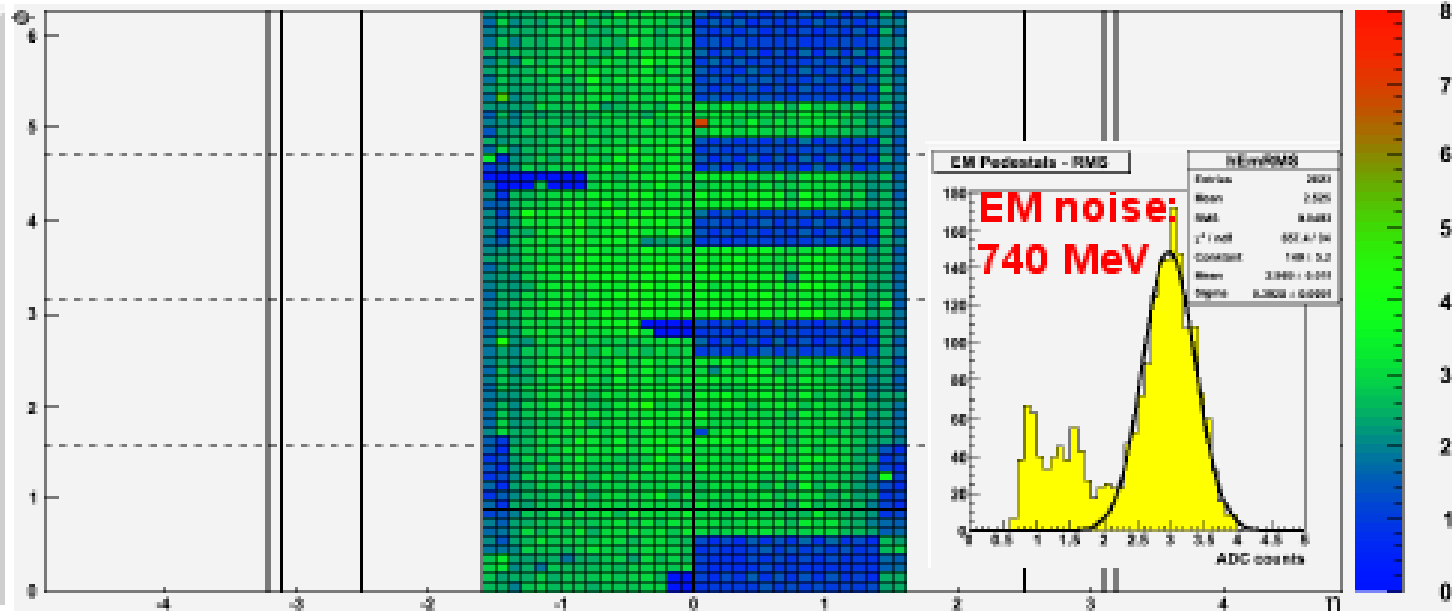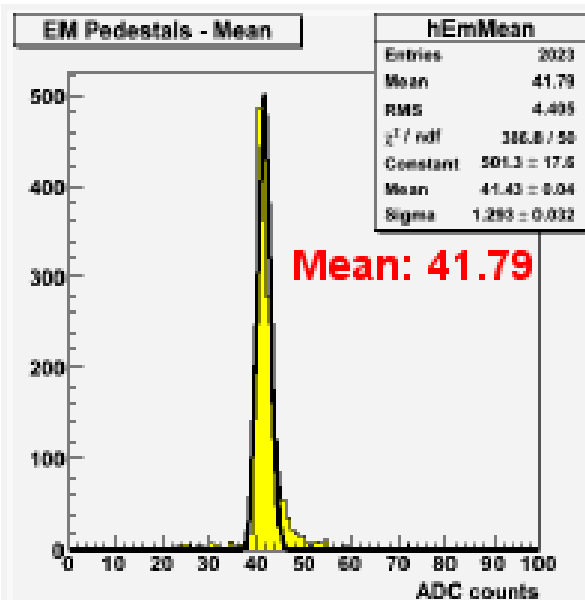   - We need to sort out shifter duties, training and documentation

TimeSlice FADC-Max
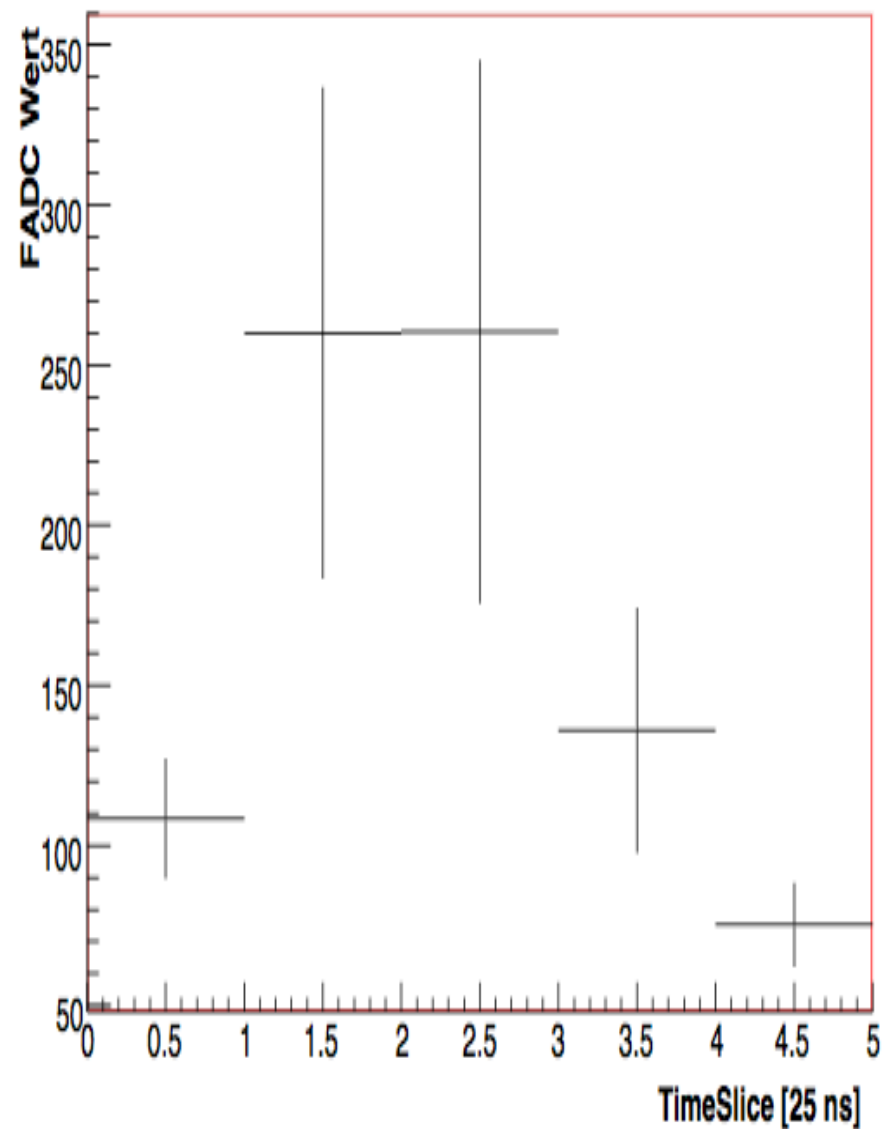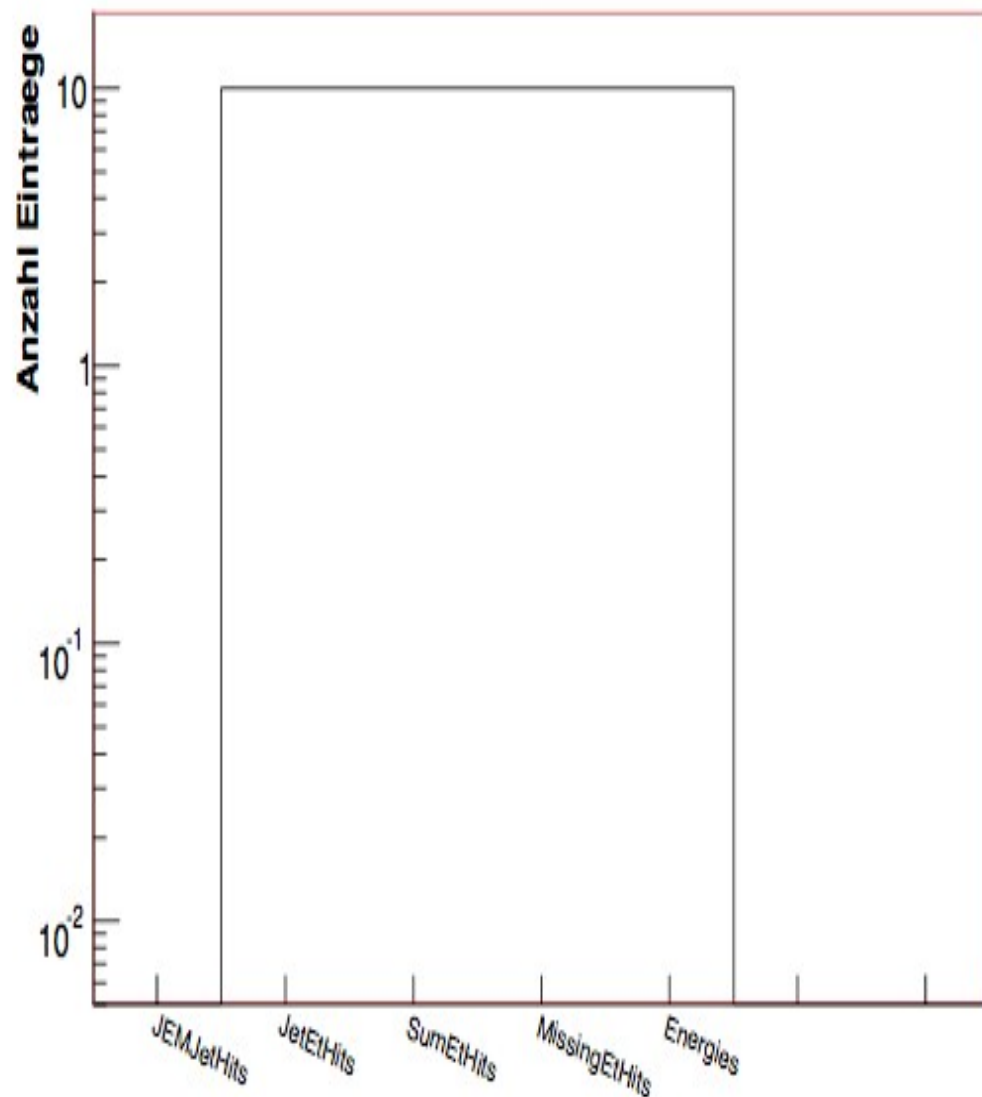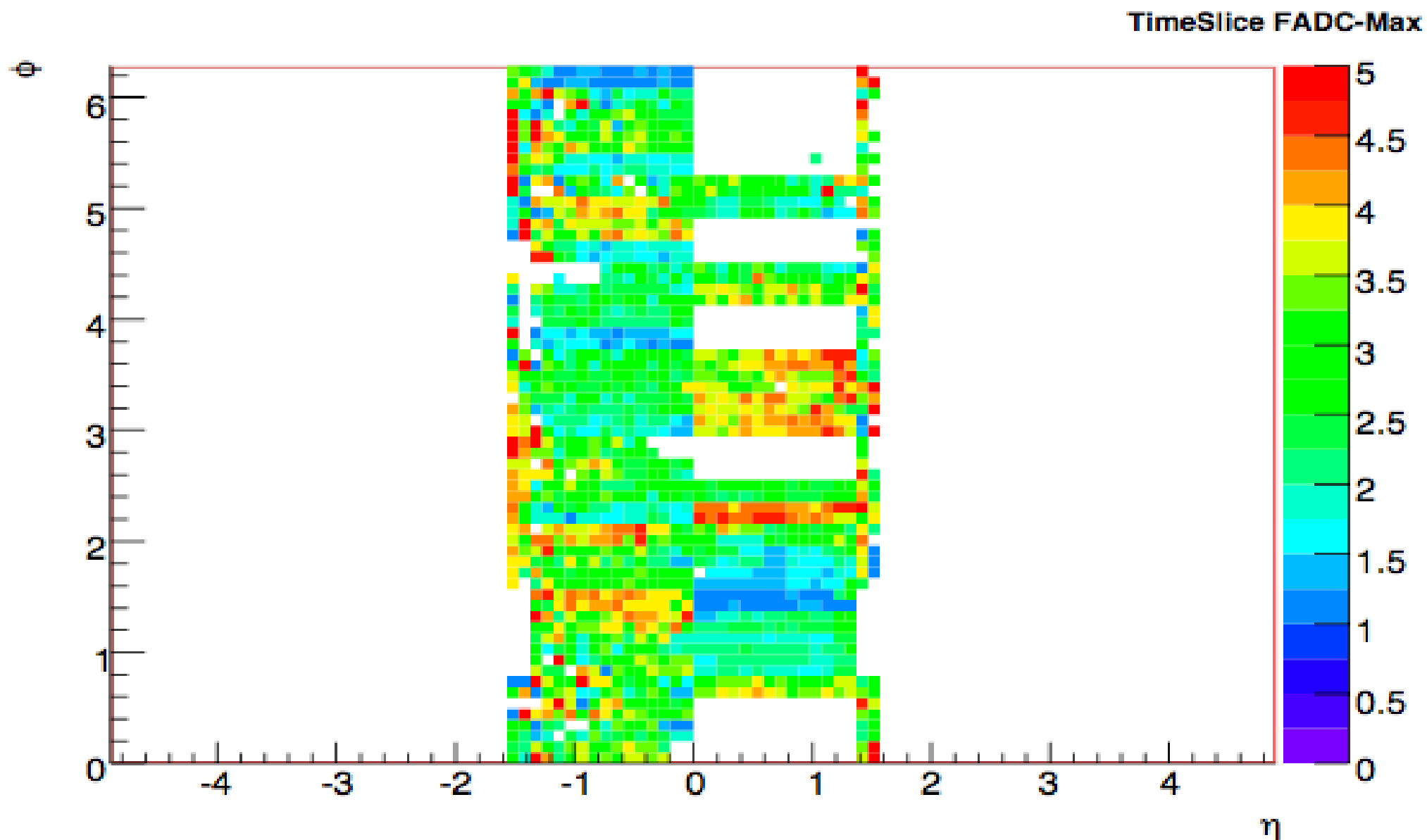
Offline Analysis

Problems

- ## ROD BUSY
  - One ROD stuck in BUSY state two or three times
    - Much better than M4 but still needs fixing
    - NB many other detectors also had BUSY problems
- ## Monitoring
  - Problem of monitoring programs dying
    - Later diagnosed as a TDAQ bug, now fixed
  - AthenaPT: slow to start and fails reconfigure
    - Try to analyse LAr+Tile+L1Calo
    - Initialisation will move to first event in the future
- ## DAC scan issues
  - Still have problem with first point in the scan
  - Some channels have poorly measured slope
    - Now understood – need more points in the scan

Summary

- ## We did provide a trigger to ATLAS
  - And have done better in subsequent cosmic runs
- ## We do have some useful monitoring and analysis tools
  - But always room for improvement...
- ## But we still have:
  - many problems to fix
  - many tools to improve
  - many tools to implement!

- ## Thanks to all who took part