

# Summary of discussions with calo calibration people, and plans for future joint tests

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# Overview

- L1 Calo Trigger people involved (so far):  
Norman Gee, Murrough Landon, Thomas
- Tilecal people:  
Kerstin Jon-And, Rupert Leitner, Oleg Solovianov, Bob Stanek
- Liquid Argon people:  
Pascal Perrodo, Isabel Wingerter

Last meeting begin of october at CERN

# MAIN CALIBRATION PARAMETERS

- Clocks: delays for the TTCrx output clock(s), possibly also some other TTCrx parameters.
- Readout: the Level-1 Accept latency for each readout pipeline memory.
- Energy calibration: the lookup tables in the Pre-Processor Modules (PPMs).
- Bunch-crossing identification (BCID): the matched filter coefficients and saturated BCID thresholds.
- Pedestals: the FADC zero level and external BCID discriminator thresholds.
- Input timing: the FADC strobe phase and synchronisation delays.
- Internal timing: clock and strobe phases for all internal links.

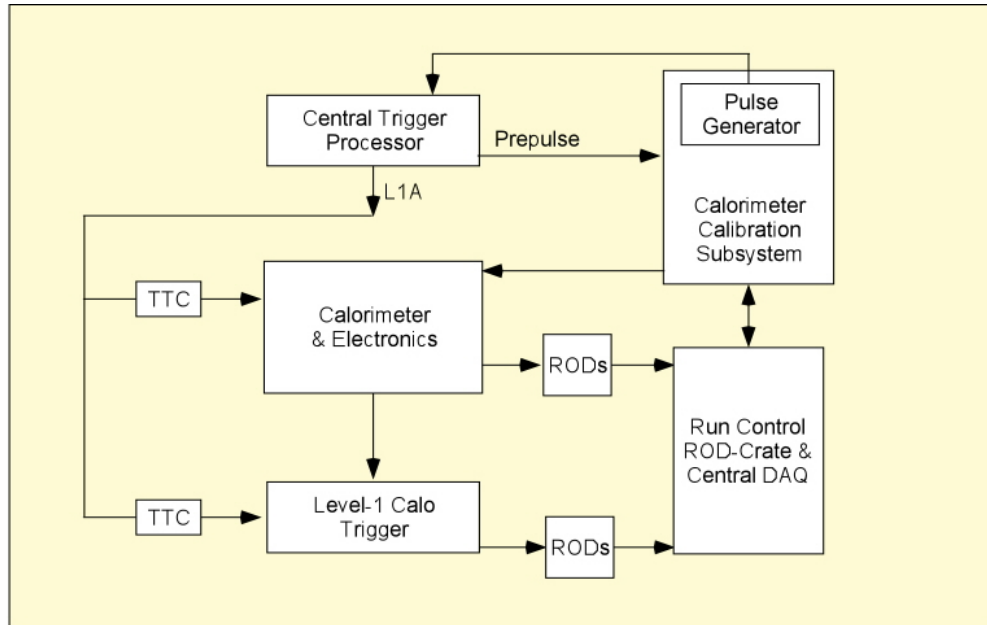
# Our requirements

- GRANULARITY: Pulse each trigger tower separately. Effectively pulse each component cell forming a trigger tower. This may be done either by the calibration system itself or by disabling inputs to the trigger tower sums.
- ENERGY: Receive pulses with a range of different energies both within our dynamic range (0–255 GeV) and beyond it (to study generated pulses).
- TIMING: The relative timing of the calibration pulses must be the same timing - within a tolerance (about 1 ns) - as from the beam.
- SYNCHRONOUS: Simultaneously pulse different areas of the calorimeter (which may be in different TTC partitions). E.g. to see signals summed across the barrel/endcap transition, etc.

# AVAILABLE CALIBRATION MECHANISMS

- Tilecal:
  - Mobile caesium source
  - Laser system
  - Charge injection
- LAr:
  - Charge injection system
  - Calibrates standalone, running independently in parallel EM, FCAL, HEC
  - Pulser rate 10 kHz, 300K Triggers, 10 min.

# L1/CALORIMETER CALIBRATION RUNS



All four Tile and all eight LAr TTC partitions would need to run synchronously.

Disadvantage in using the CTP: no other multi-detector run possible.

# L1/CALORIMETER CALIBRATION RUNS

## SETUP STEPS

- Create an appropriate run partition (TTCs, CTP, ROD)
- Set up the run controller hierarchy
- Define the detailed calibration sequences

# L1/CALORIMETER CALIBRATION RUNS

## STEPS NEEDED FOR EACH CALIBRATION RUN

- Start the ATLAS DAQ system for the DAQ partition
- Load and Configure:  
Read calibration sequence definition (cell patterns, DAQ values). DCS has to be used.
- Start:  
Initiate the sequence of calibration steps, generate trigger
- Each trigger is preceded by a pre-pulse signal. The ROD is used to limit the rate.
- For each trigger monitor and histogram the pulse height and pulse time.
- After the set number of triggers, initiate end-of-stop actions.
- Collect data, start new iteration
- Calculated values should be compared to a known calibration reference.



# L1 INTEGRATION RUNS WITH THE TILE AND LAR

- ATLAS is discussing a Detector/DAQ integration test for autumn 2004.
- Should include LAr, Tile calorimeters, L1 trigger (CAL, Muon, CTP), TTC partitions, DAQ and higher level triggers.
- Cannot be later: No SPS running in 2005.
- Cannot be earlier: No completion of slice tests.

# L1 INTEGRATION RUNS WITH THE TILE AND LAR

- Run L1 Calorimeter and L1 Muon together into the Central Trigger Processor, measure the latencies, etc.
- Confirm that the detectors can read out correct data from L1
- Send ROIs through ROIboards to L2 and slice data to ROS
- Manage threshold via common trigger menu, runs from central run control, combined databases, etc.
- Test calibration procedures with calorimeters and check results
- Exercise timing-in procedure between ATLAS subsystems

# DISCUSSION

- Proposal of a Local Trigger Processor
- L1calo needs a L1 accept to read out slices from PPr, so we need a combined run with a common trigger
- Agreement so far: Central Trigger Processor
- L1 will be used to provide the prepulse for the Calorimeter systems and to start readout
- Next step: Collect L1 Calorimeter comments, discuss during next meeting at CERN detailed calibration steps,...