Report on DAQ & CAM

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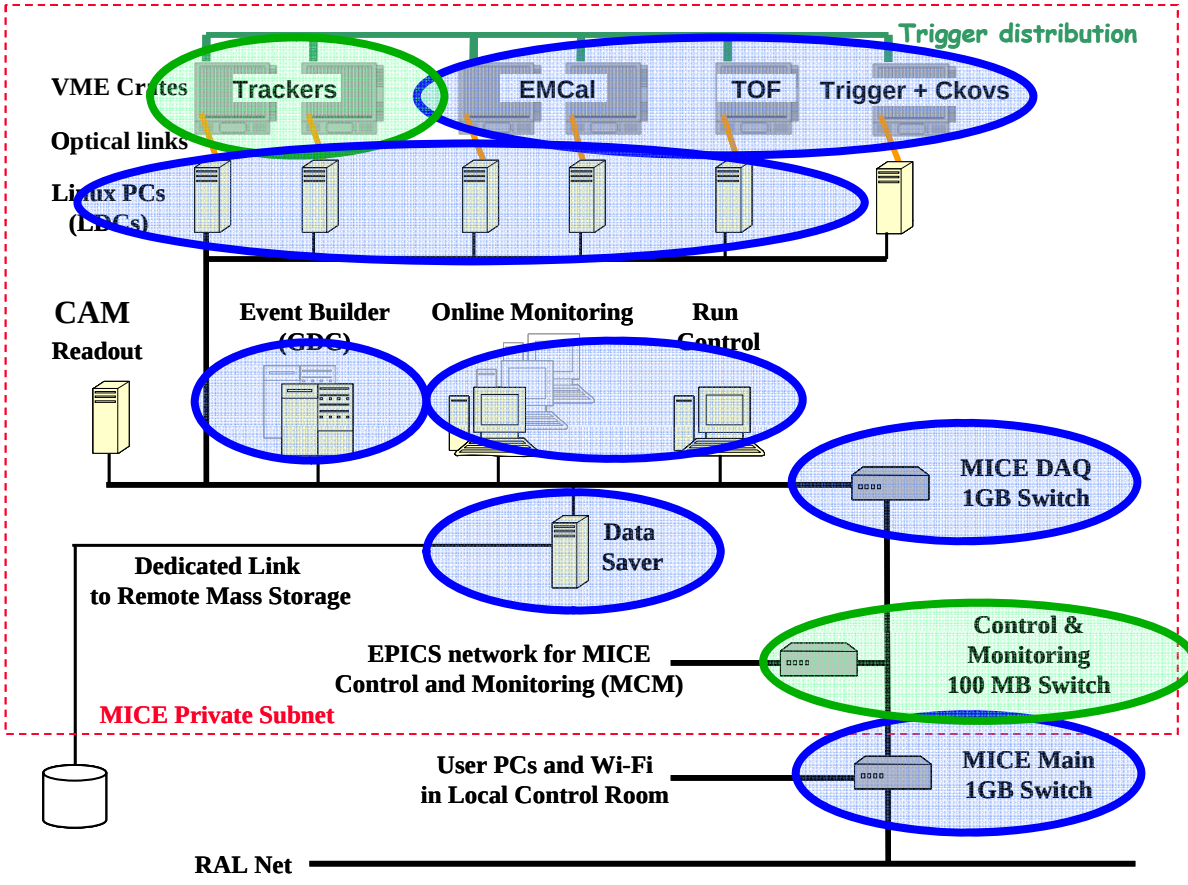
- **Detector DAQ Status**
  - **Hardware**
  - **Trigger**
  - **Software**
- **Controls and Monitoring (CAM)**
- **Schedule Milestones**
- **Summary**

D-DAQ Hardware Overview

- **Everything in hand for stage 1 (and beyond)**

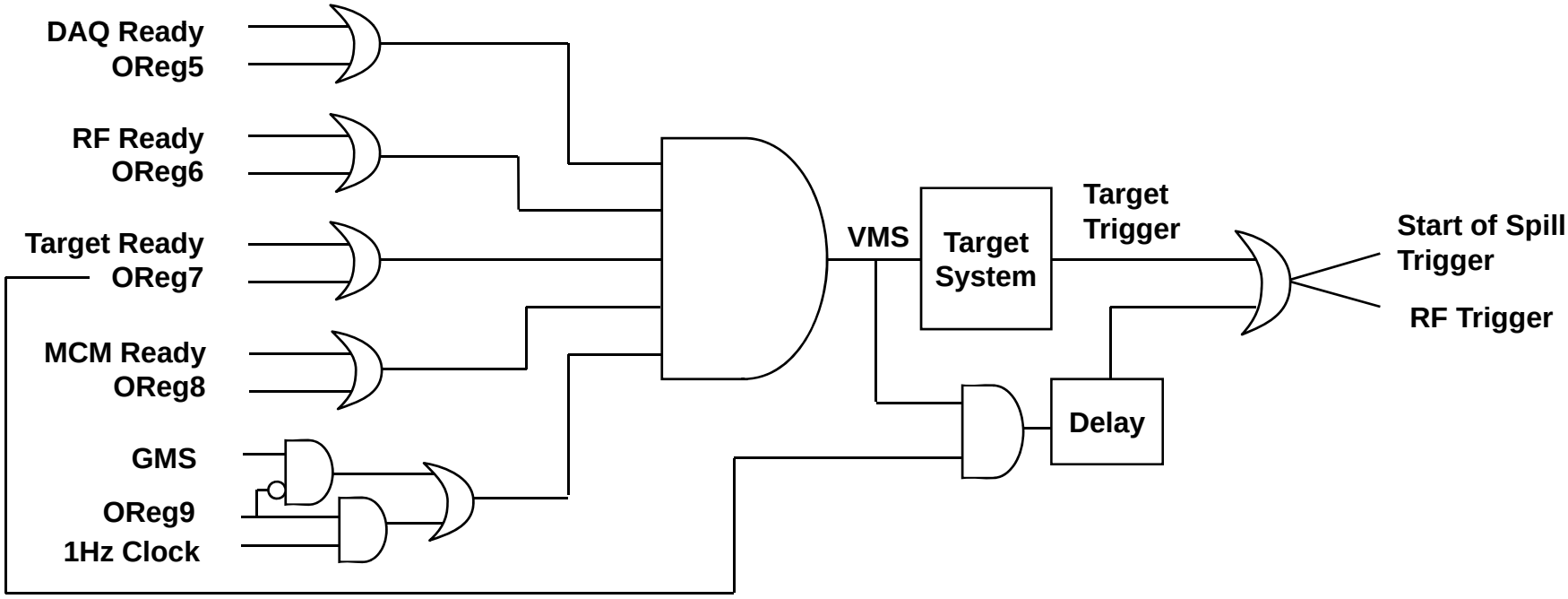


- Network switches
  - all @ RAL
- VME Crates
  - 2 @ RAL
  - 2 being shipped
- LDC PCs
  - 4 @ Uni Geneva
  - 1 being shipped
- VME-PCi Interfaces
  - 2 @ RAL
  - 4 @ Uni Geneva
- GDC PCs
  - 1 @ RAL
  - 1 @ Uni Geneva
- Data Saver
- Workstations
  - 2 @ RAL
  - 1 @ Uni Geneva

Trigger Hardware Overview

DAQ Trigger

- No design change since CM 18
- DAQ trigger is issued as soon as every system is ready
  - Question raised: Should we included ISIS ready ?



Trigger Hardware Overview

- **DAQ Trigger hardware**
  - Trigger receiver: CAEN V977 I/O Register
    - 1 unit per VME crate
    - 7 in hand, 2 @ RAL
  - Logic implemented with NIM units
    - 4 x Dual TIMER
    - 5 x Fan In/Fan Out
    - 1 x 5 fold Coincidence
    - 1 x Quad logic unit
    - 3 x Quad 8ch Fan-out
    - ALL @ RAL
  - Patch panels for DAQ trigger distribution
    - ALL @ RAL

Trigger Hardware Overview

Particle Trigger

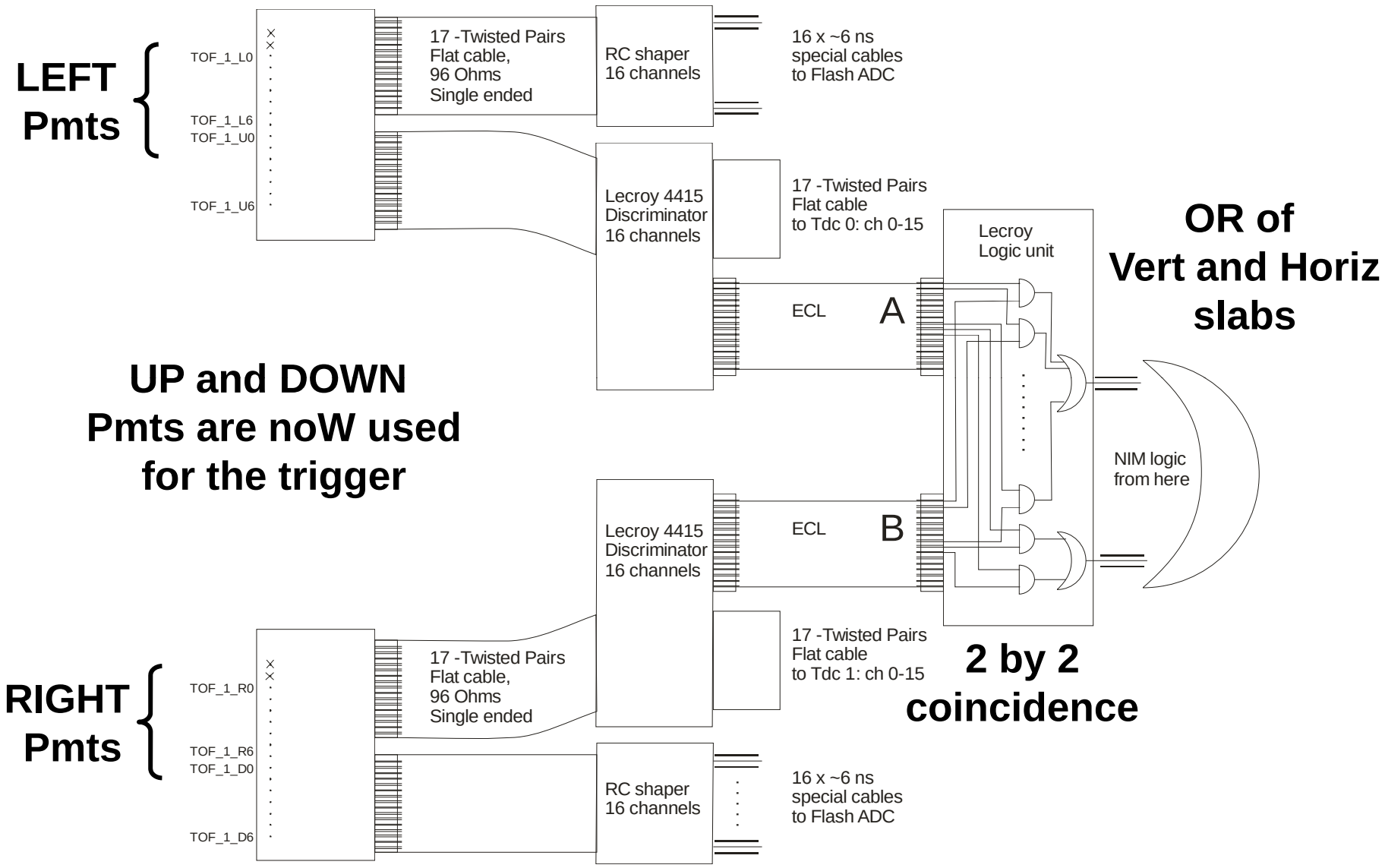
- Design updated since CM 18
  - TOF Horizontal and Vertical planes are used in OR
  - Downscaled TOF0 can be added in OR
  - Each trigger condition is sent into a dedicated TDC channel (additional TDC V1290N provided by Glasgow)

Burst Gate
TOF0 (= TOF0_H OR TOF0_V)
TOF1 (= TOF1_H OR TOF1_V)
TOF2 (= TOF2_H OR TOF2_V)

} Any AND Combination

Downscale TOF0
Downscale Burst Gate

} Any OR with previous

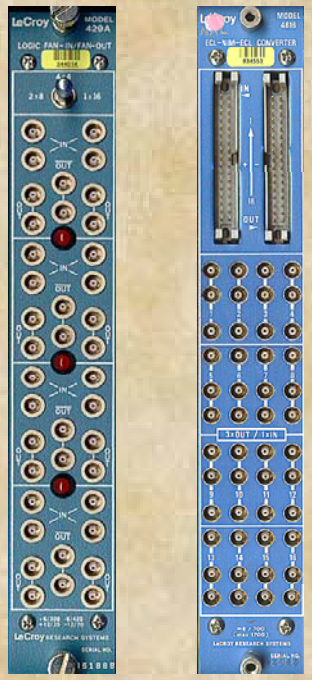

LEFT Pmts
TOF_1_L0
TOF_1_L6
TOF_1_U0
TOF_1_U6
17 -Twisted Pairs Flat cable, 96 Ohms Single ended
RC shaper 16 channels
16 x ~6 ns special cables to Flash ADC
Lecroy 4415 Discriminator 16 channels
17 -Twisted Pairs Flat cable to Tdc 0: ch 0-15
ECL
A
Lecroy Logic unit
OR of Vert and Horiz slabs
UP and DOWN Pmts are noW used for the trigger
NIM logic from here
Lecroy 4415 Discriminator 16 channels
ECL
B
17 -Twisted Pairs Flat cable to Tdc 1: ch 0-15
2 by 2 coincidence
RIGHT Pmts
TOF_1_R0
TOF_1_R6
TOF_1_D0
TOF_1_D6
17 -Twisted Pairs Flat cable, 96 Ohms Single ended
RC shaper 16 channels
16 x ~6 ns special cables to Flash ADC

Particle Trigger hardware

- CAMAC Discriminators and Logic Unit
  - Being shipped
- Logic implemented with NIM units
  - 4 x Fan In/Fan Out
  - 1 x 5 fold Coincidence
  - 1 x triple logic unit
  - 1 x Quad logic unit
  - 2 x ECL-NIM-ECL
  - 2 Downscale units (vanished in Geneva)
- Cables and patch panels
  - Collecting…(should be OK)

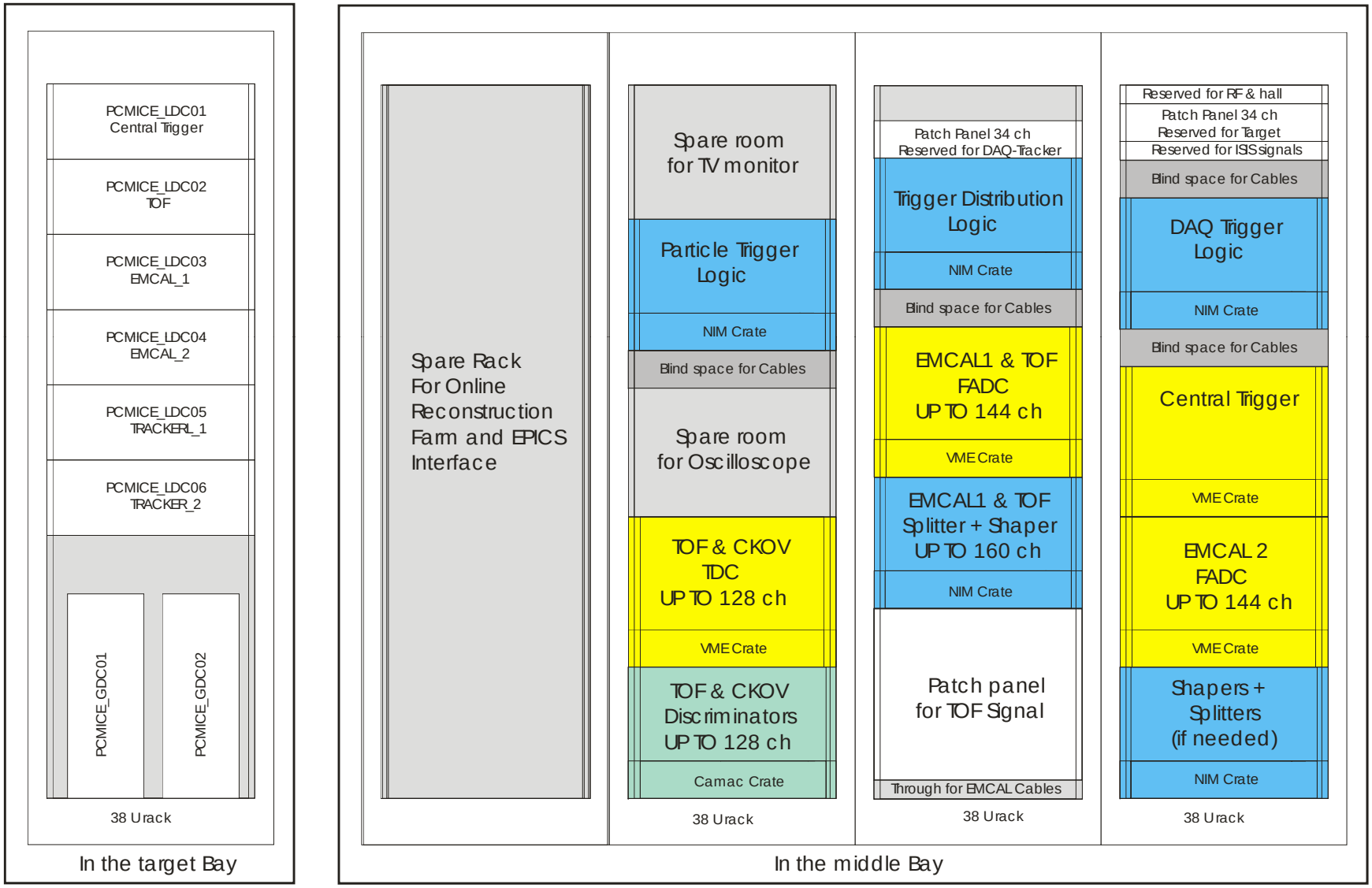
WANTED

DEAD OR ALIVE



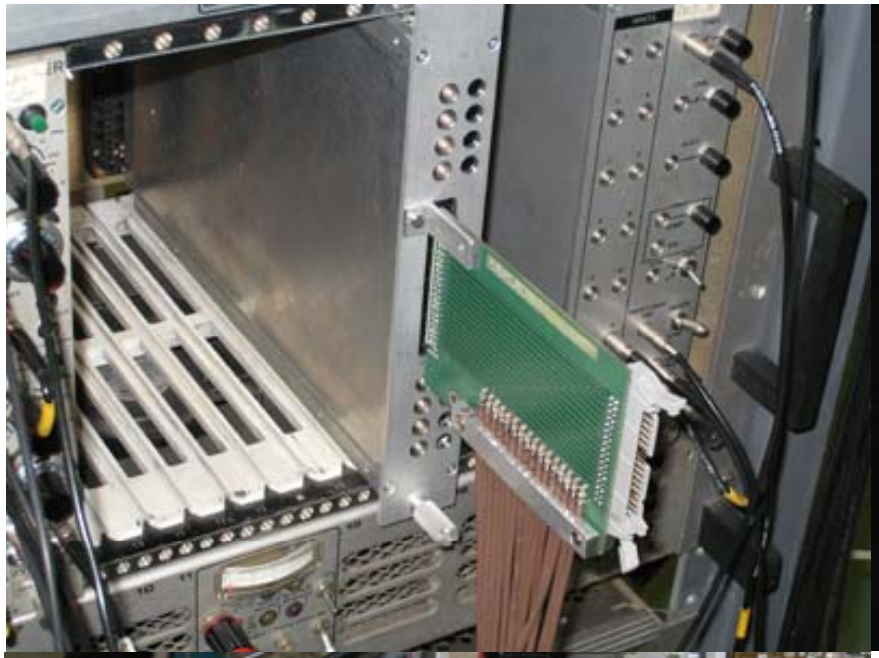
μ2,000

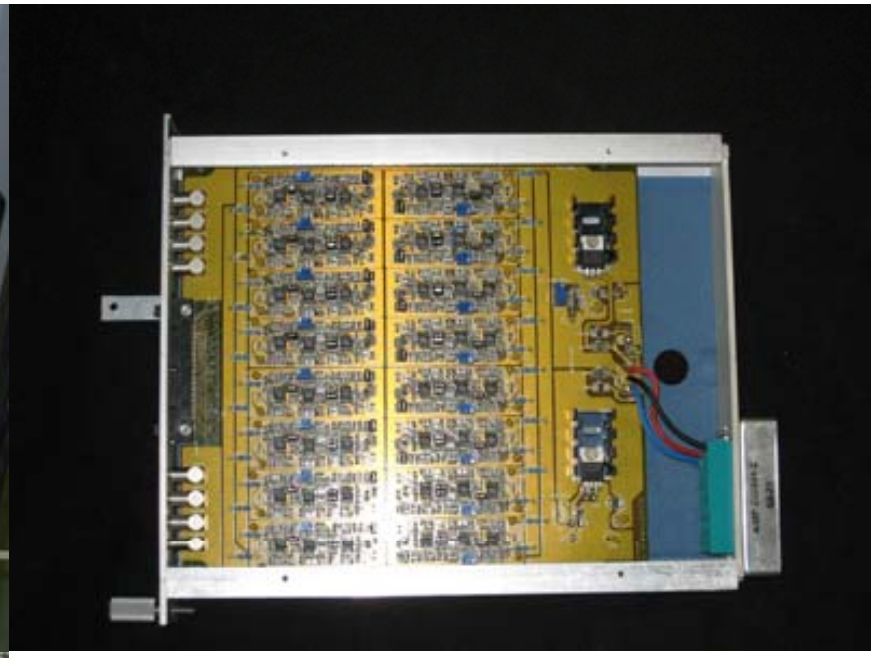
REWARD

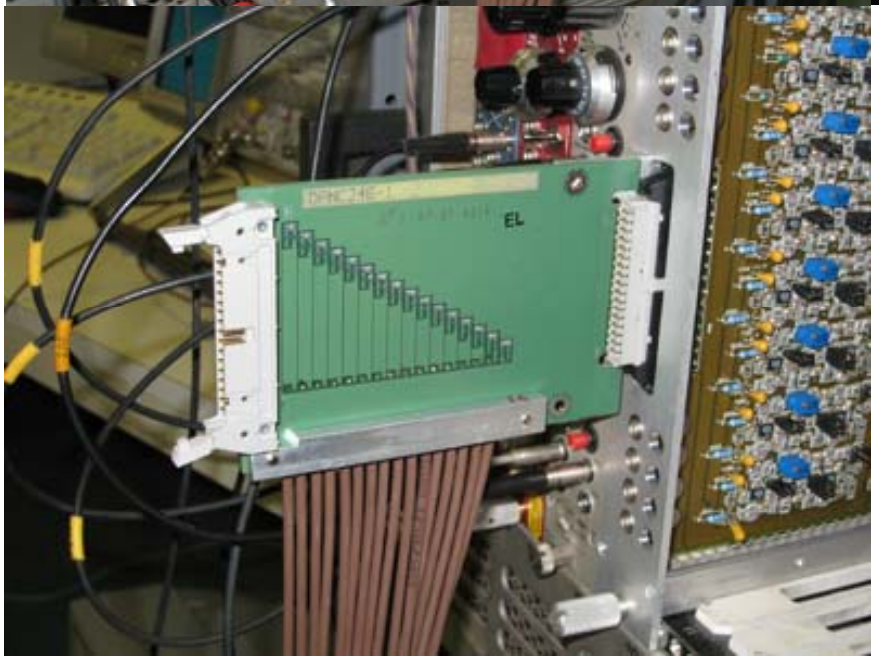

PCMICE_LDC01
Central Trigger
PCMICE_LDC02
TOF
PCMICE_LDC03
EMCAL_1
PCMICE_LDC04
EMCAL_2
PCMICE_LDC05
TRACKERL_1
PCMICE_LDC06
TRACKER_2
PCMICE_GDC01
PCMICE_GDC02
38 Urack
In the target Bay
Spare Rack
For Online
Reconstruction
Farm and EPICS
Interface
Spare room
for TV monitor
Particle Trigger
Logic
NIM Crate
Blind space for Cables
Spare room
for Oscilloscope
TOF & CKOV
TDC
UP TO 128 ch
VME Crate
TOF & CKOV
Discriminators
UP TO 128 ch
Camac Crate
38 Urack
Patch Panel 34 ch
Reserved for DAQ-Tracker
Trigger Distribution
Logic
NIM Crate
Blind space for Cables
EMCAL1 & TOF
FADC
UP TO 144 ch
VME Crate
EMCAL1 & TOF
Splitter + Shaper
UP TO 160 ch
NIM Crate
Patch panel
for TOF Signal
Through for EMCAL Cables
38 Urack
Reserved for RF & hall
Patch Panel 34 ch
Reserved for Target
Reserved for ISIS signals
Blind space for Cables
DAQ Trigger
Logic
NIM Crate
Blind space for Cables
Central Trigger
VME Crate
EMCAL 2
FADC
UP TO 144 ch
VME Crate
Shapers +
Splitters
(if needed)
NIM Crate
38 Urack
In the middle Bay

Acronyms

- DDAQ : Detector Data Acquisition
- CAM : Control And Monitoring
- PHET : PHysics Event Trigger
- CAET : Calibration Event Trigger
- SOST : Start Of Spill Trigger
- EOST : End Of Spill Trigger
- PHEB : PHysics Event Busy
- CAEB : Calibration Event Busy
- SOSB : Start Of Spill Busy
- EOSB : End Of Spill Busy
- TTRR : Target Trigger Request
- TTRA : Target Trigger Accepted
- PTRR : Particle Trigger Request
- PTRA : Particle Trigger Accepted
- DBG : Discriminated Burst Gate





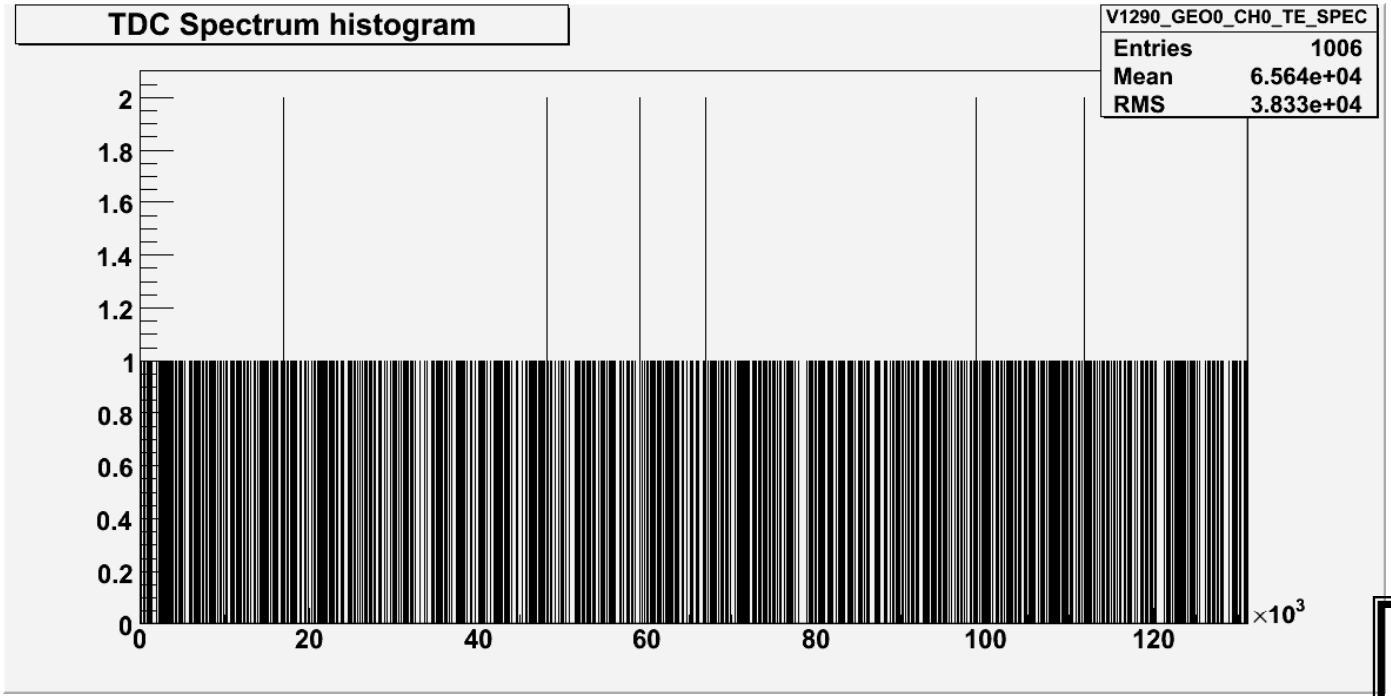


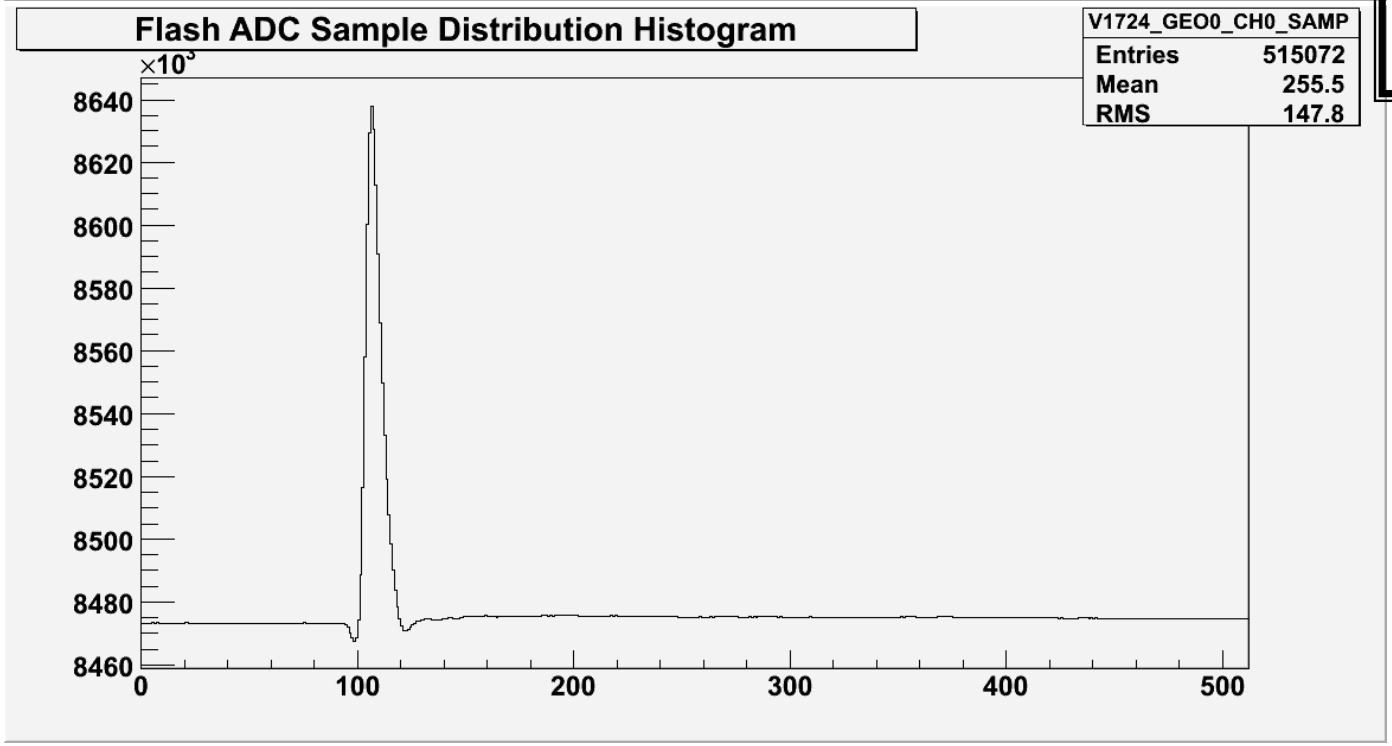
TOF & EMCAL FEE

- Splitters
  - 8 available (128 ch)
  - 1 at RAL
  - 4 being shipped
- Shapers
  - 10 units available (160 ch)
  - 1 at RAL from Sofia
  - 3 being shipped from Gva
- TOF Patch panel
  - Collecting…

DAQ Software

- Vassil Verguilov presented recent progress on the DAQ software
  - Bugs fixed in FADC readout
    - The code needs some cosmetics
  - Stand alone data unpacking code is available, decoding
    - DATE format
    - TDC V1290
    - FADC V1724
  - Stand alone "online" monitoring application is available
    - Histogram for a given channel is booked only if there is some data for this channel in the file
    - Histograms are not yet available online
- See his talk for details on the class structure

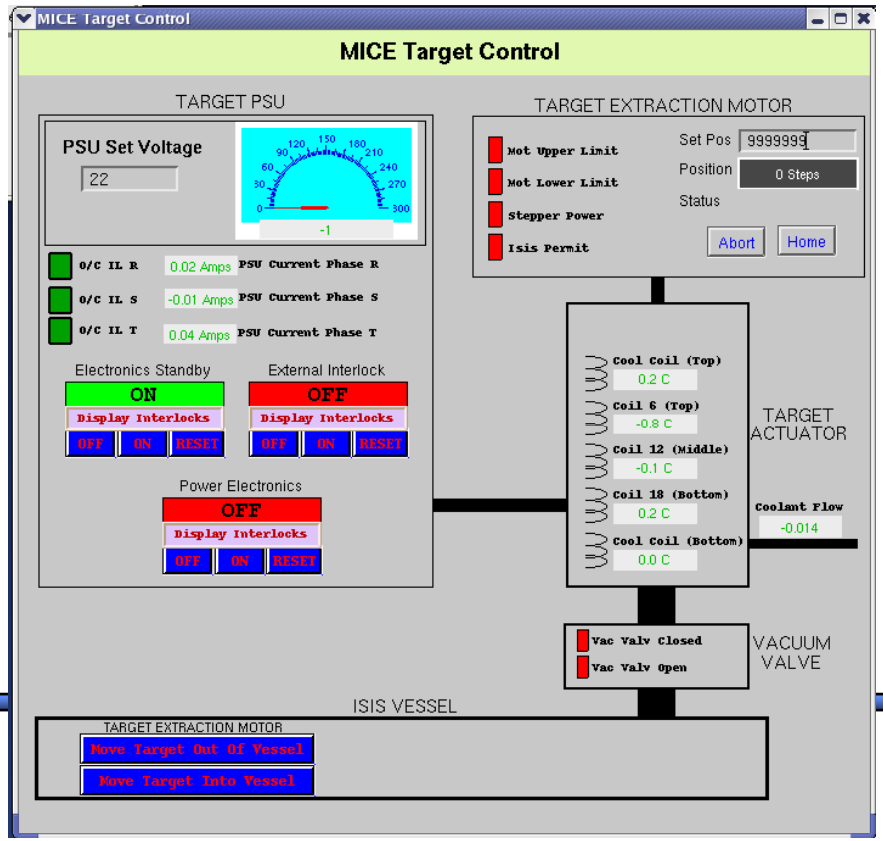




First histograms Produced from a DATE data file !!

Control and Monitoring

- **Brian Martlew presented significant progress on the control**
  - *"Offline target control system has been completed at DL and is being transported to RAL right now"*

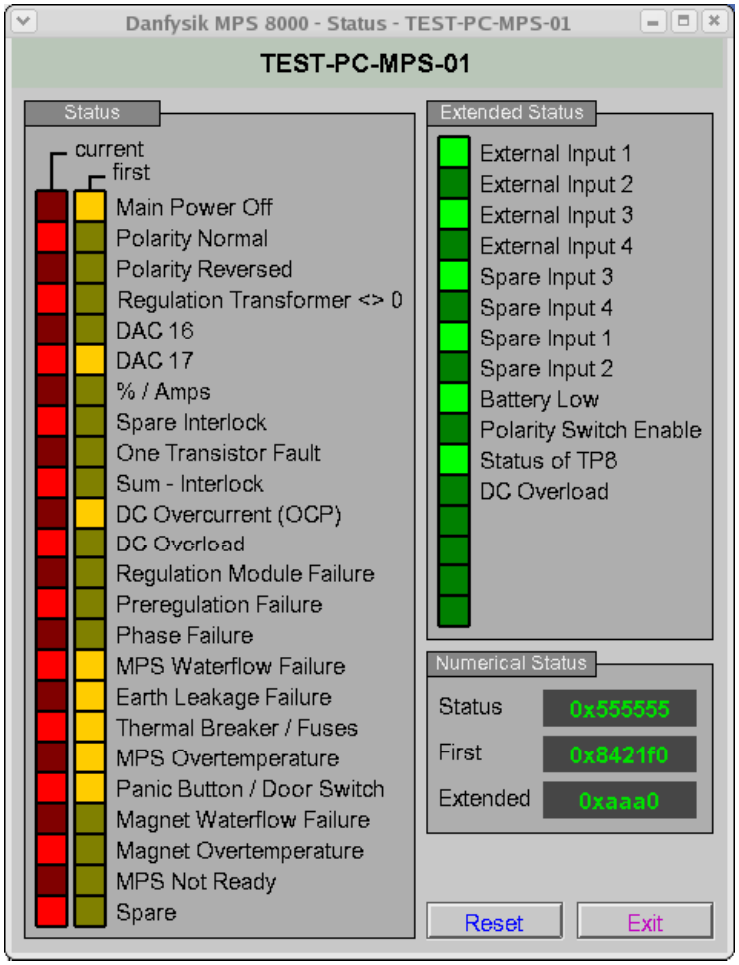


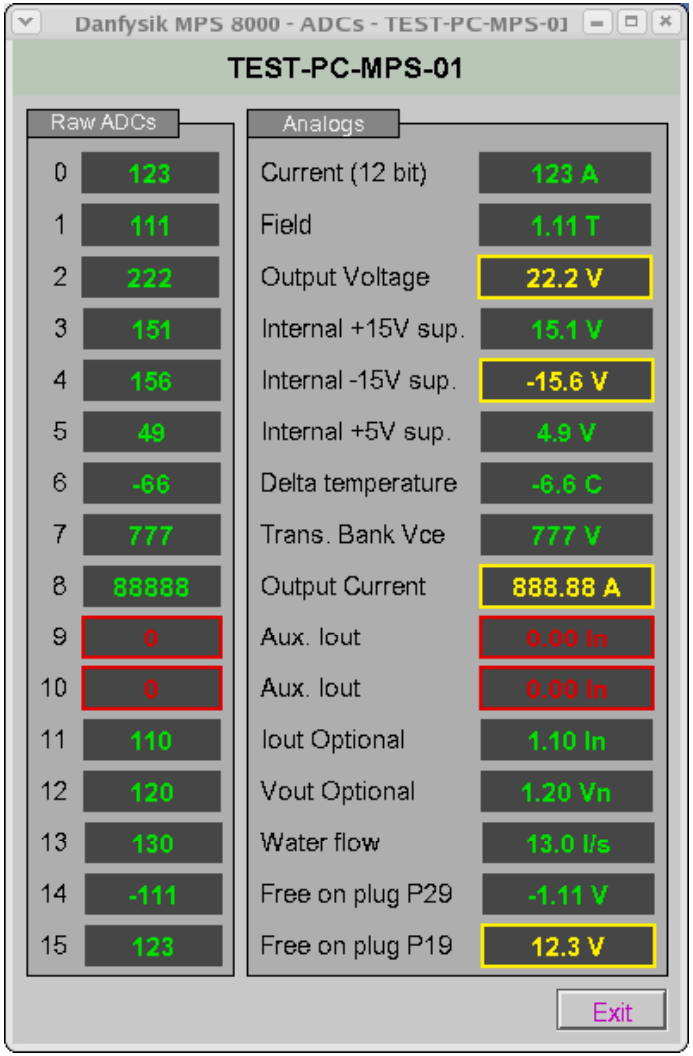
Science & Technology
Facilities Council

Beamline Power Supplies

- *Control interface software is complete*
- *Testing has only been possible with RS232 interface because of late delivery of RS422 modules.*
- *All hardware now available and full commissioning of the control system can take place in the next two weeks.*

EPICS


Danfysik MPS 8000 - Status - TEST-PC-MPS-01
TEST-PC-MPS-01
Status
current
first
Main Power Off
Polarity Normal
Polarity Reversed
Regulation Transformer <> 0
DAC 16
DAC 17
% / Amps
Spare Interlock
One Transistor Fault
Sum - Interlock
DC Overcurrent (OCP)
DC Overload
Regulation Module Failure
Preregulation Failure
Phase Failure
MPS Waterflow Failure
Earth Leakage Failure
Thermal Breaker / Fuses
MPS Overtemperature
Panic Button / Door Switch
Magnet Waterflow Failure
Magnet Overtemperature
MPS Not Ready
Spare
Extended Status
External Input 1
External Input 2
External Input 3
External Input 4
Spare Input 3
Spare Input 4
Spare Input 1
Spare Input 2
Battery Low
Polarity Switch Enable
Status of TP8
DC Overload
Numerical Status
Status 0x555555
First 0x8421f0
Extended 0xaaa0
Reset
Exit


Danfysik MPS 8000 - ADCs - TEST-PC-MPS-01
TEST-PC-MPS-01
Raw ADCs
0 123
1 111
2 222
3 151
4 156
5 49
6 -66
7 777
8 88888
9 0
10 0
11 110
12 120
13 130
14 -111
15 123
Analogs
Current (12 bit) 123 A
Field 1.11 T
Output Voltage 22.2 V
Internal +15V sup. 15.1 V
Internal -15V sup. -15.6 V
Internal +5V sup. 4.9 V
Delta temperature -6.6 C
Trans. Bank Vce 777 V
Output Current 888.88 A
Aux. Iout 0.00 In
Aux. Iout 0.00 In
Iout Optional 1.10 In
Vout Optional 1.20 Vn
Water flow 13.0 l/s
Free on plug P29 -1.11 V
Free on plug P19 12.3 V
Exit

Discussion on Parameter List

- **Identify 3 data streams with 3 different rates**
  - Changing on a Run by Run basis
    - == MICE CONFIGURATION
    - -> "Mythical" Data Base
  - Changing continuously but relevant at about 1 Hz (Spill basis)
    - == MICE CONDITION
    - -> CAM EPICS Archive
  - Changing on a muon per muon basis
    - == ONLINE DATA STREAM
    - -> DATE data file
  - Each contains data needed for offline analysis
- **Current model**
  - The subset of CAM data that is needed for offline analysis is copied to the Online data stream
  - No need to query the EPICS archive during analysis
- **To be done**
  - Identify the list of parameters potentially relevant
  - Need inputs from subsystems
- **Decision**
  - Brian Martlew and me will start implementation for DAQ and PID

Discussion on Log book

- Logbook is a forth "data stream"
  - Filled by human -> CAN NOT be decoded by a machine !
  - Any formatted information that is meant to be used for analysis should go to the "Mythical" Data Base
- Start collecting requirements
  - Should time stamp entries
  - Entries could be files and pictures
  - Should not permit erasures or deletions.
  - Available on the web but password protected
  - Should contain Start of Run and End of Run stamp
    - Should be searchable for all entries during the run time
- Brian Martlew claimed he can provide a running logbook in a couple of weeks

Schedule Milestones

- DDAQ Cosmic test in R8: November 2007
- Shaper and Splitter Production + Tests: January 2008
- Trigger logic in VHDL: Postponed
- DAQ review: January 2008
  - Postponed due to lack of success of the cosmic test
  - External reviewer identified
  - Could happen in end of March
  - Discussing a joined review with the Software Project
- Single crate DAQ running in MLCR: This afternoon
- Decision on electronics logbook: End of next week
- All DAQ hardware in MLCR: March 15 2008
- Online Monitoring available: March 15 2008

- DAQ Trigger tested: Depending on target
- Particle Trigger tested: Depending on TOF

Summary

- Most of the DAQ hardware is in hand
- DAQ Rack layout is available
  - Detailed crate layout nearly finished
- FEE electronics for TOF and KL is ready
- DATE Readout software is nearly finished
  - Appart from the VLSB readout !
- Framework for data unpacking is available
- Significant progress on online monitoring software
  - First histograms produced
  - Will come really on line in mid march
- Significant progress on CAM
  - First sub system CAM produced
  - Global GUI still needed
- Electronics Log book available soon

Comments

- Shift sign in and off