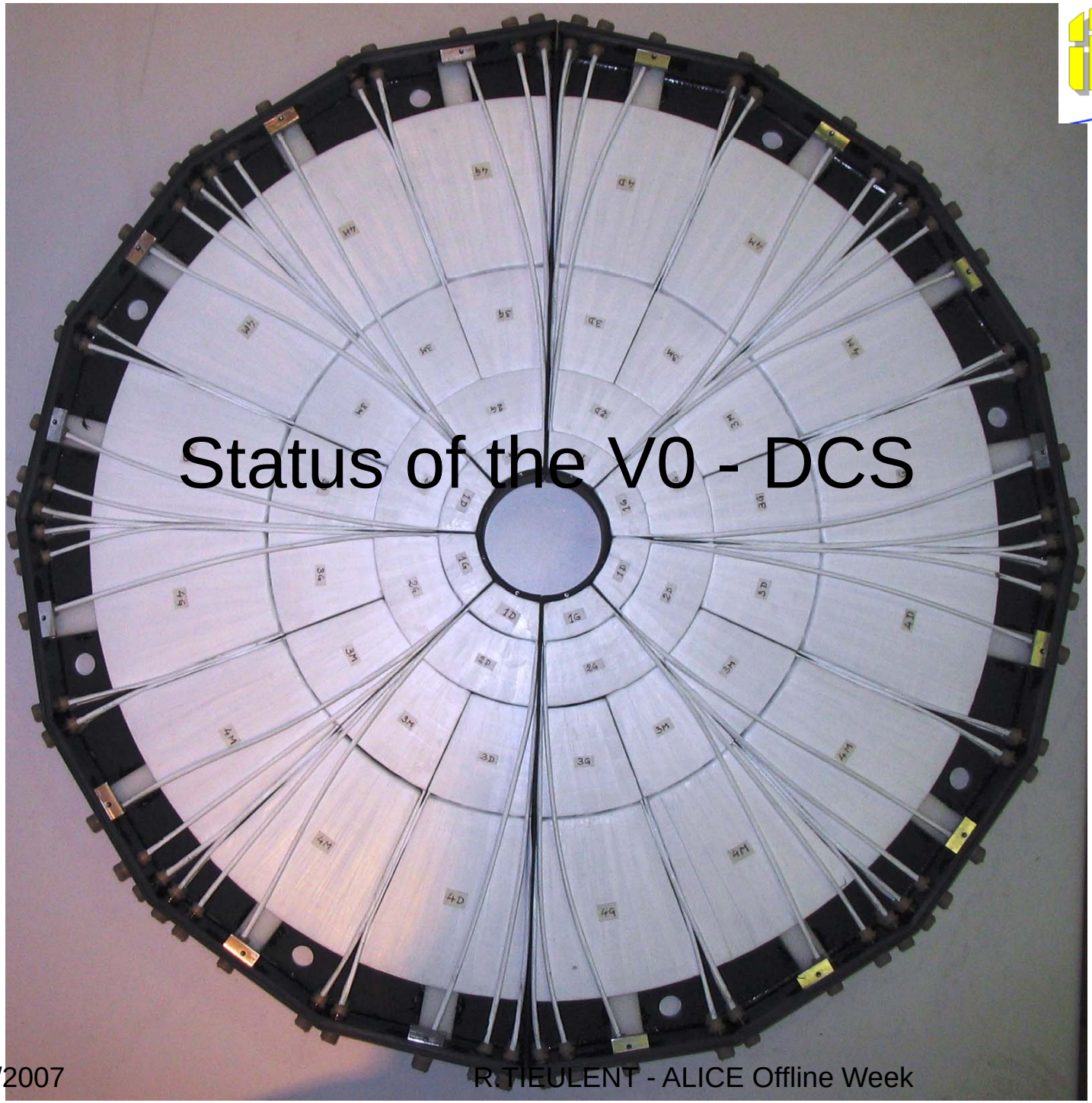
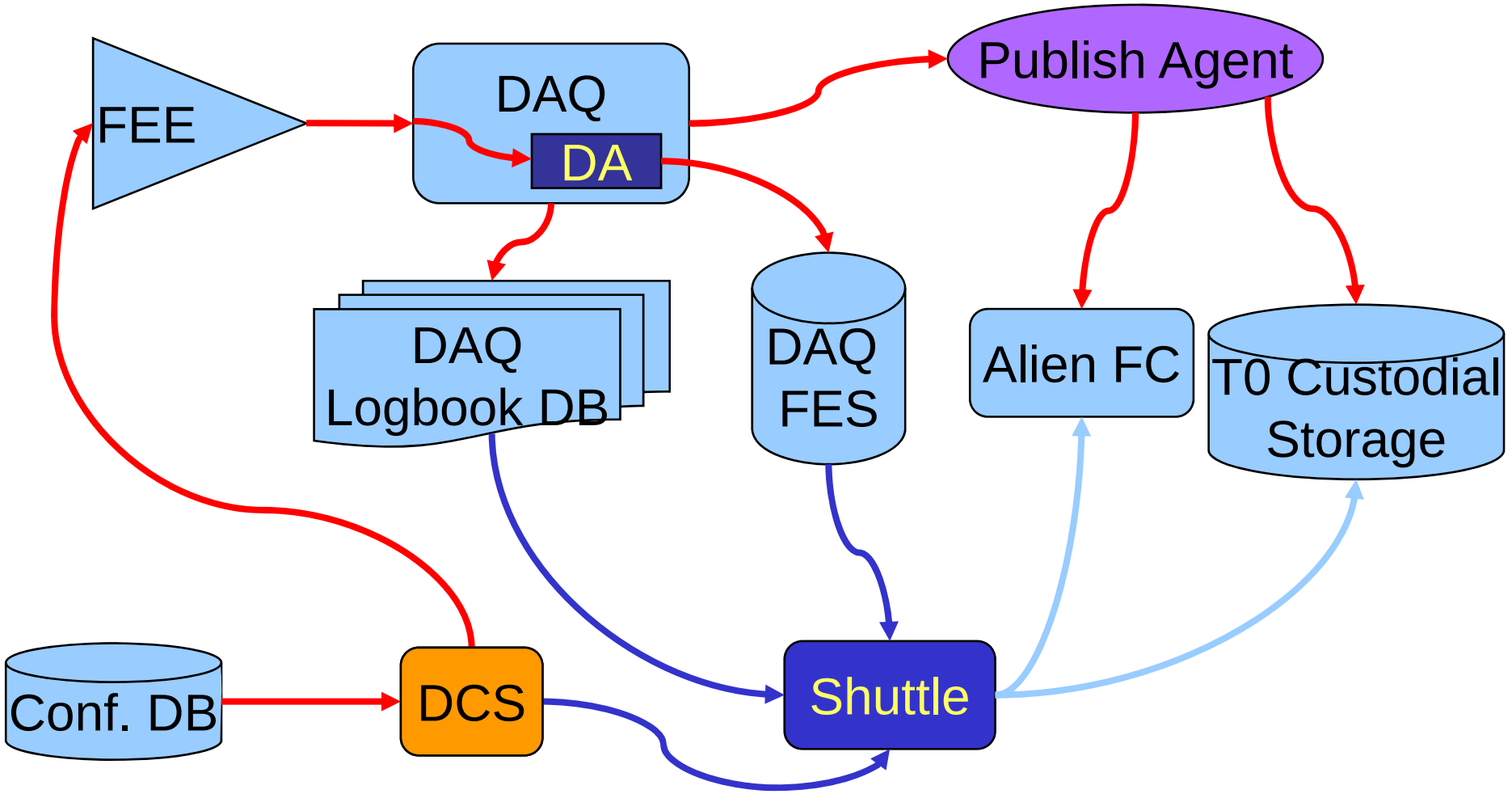
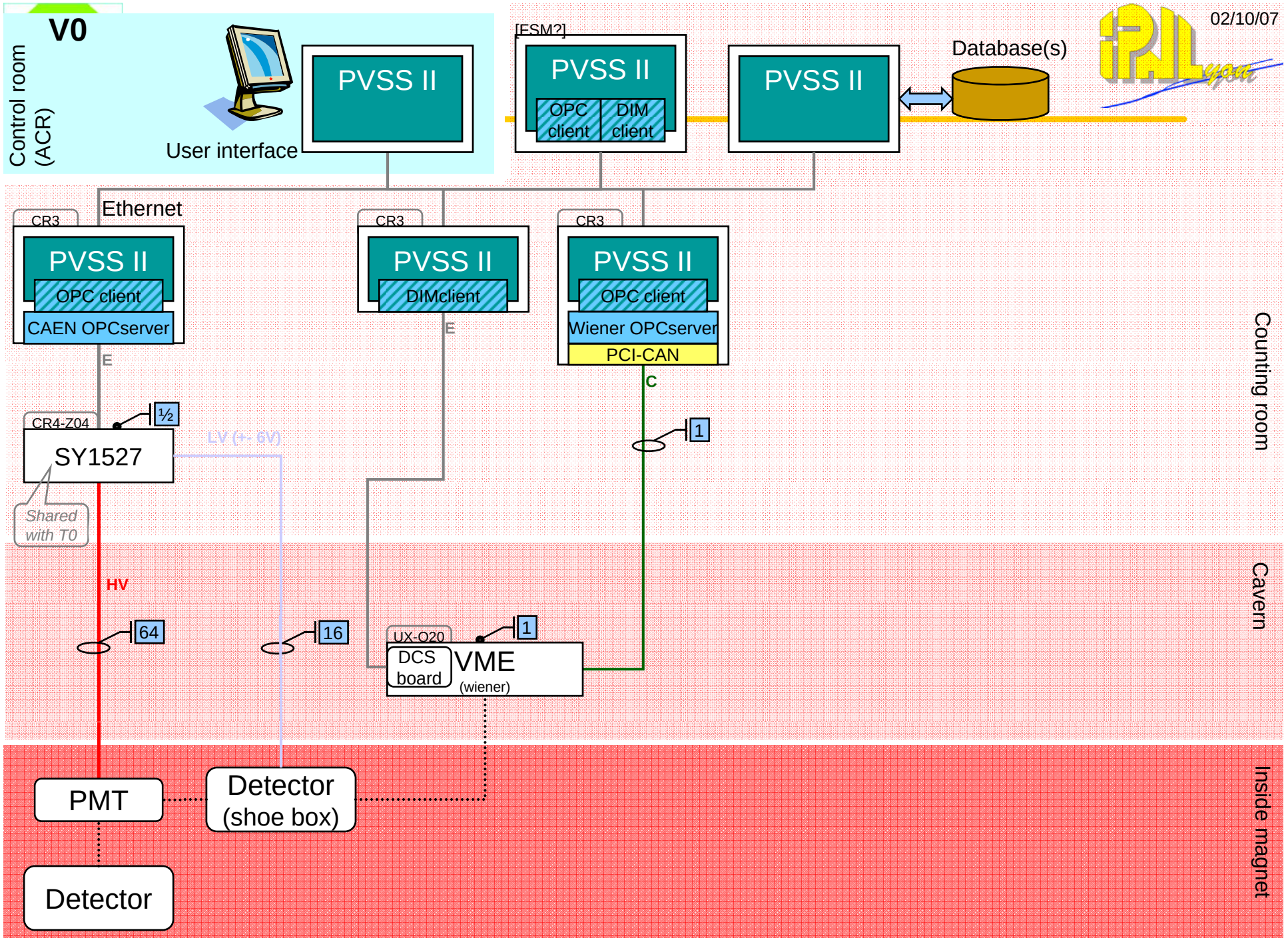


Status of the V0 - DCS

On-Offline connection diagram (Use case6)

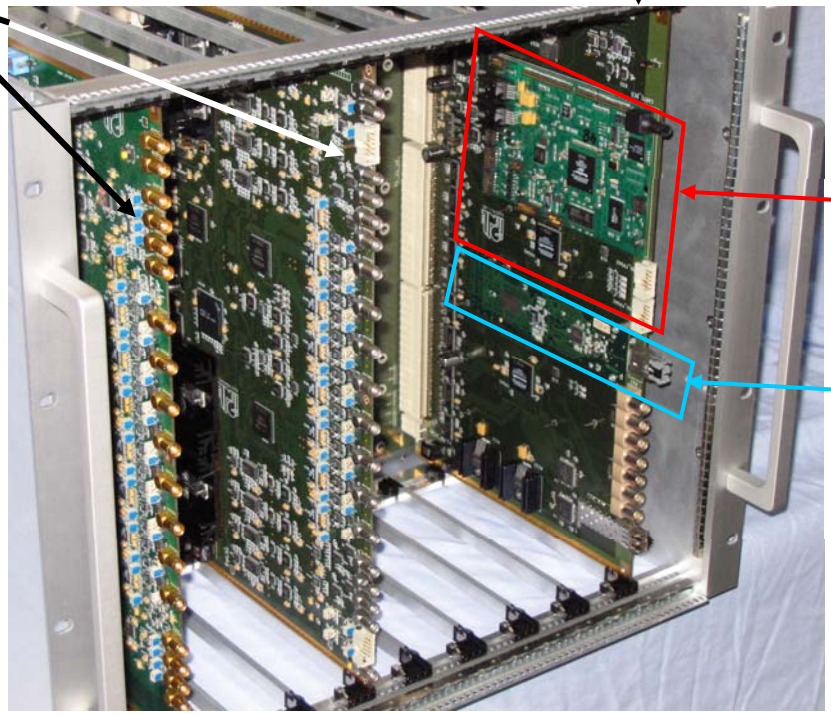



V0
Control room (ACR)
User interface
PVSS II
[ESM?]
PVSS II
OPC client
DIM client
PVSS II
Database(s)
02/10/07
Ethernet
CR3
PVSS II
OPC client
CAEN OPCserver
CR3
PVSS II
DIMclient
CR3
PVSS II
OPC client
Wiener OPCserver
PCI-CAN
E
E
C
CR4-Z04
½
SY1527
LV (+- 6V)
Shared with T0
1
HV
64
16
UX-O20
1
DCS board
VME
(wiener)
PMT
Detector (shoe box)
Detector
Counting room
Cavern
Inside magnet
High Voltage
Low Voltage
FEE
Crate Control

Front End Electronics

CCIU, pilot board
- collects the CIU data
- provides the final triggers
- interface with the DAQ
- interface with DCS

CIU, one board per ring
- charge integration
- time digitalization
- trigger pre-processing



DCS board

SIU Mezzanine

Installation and Commissioning Status

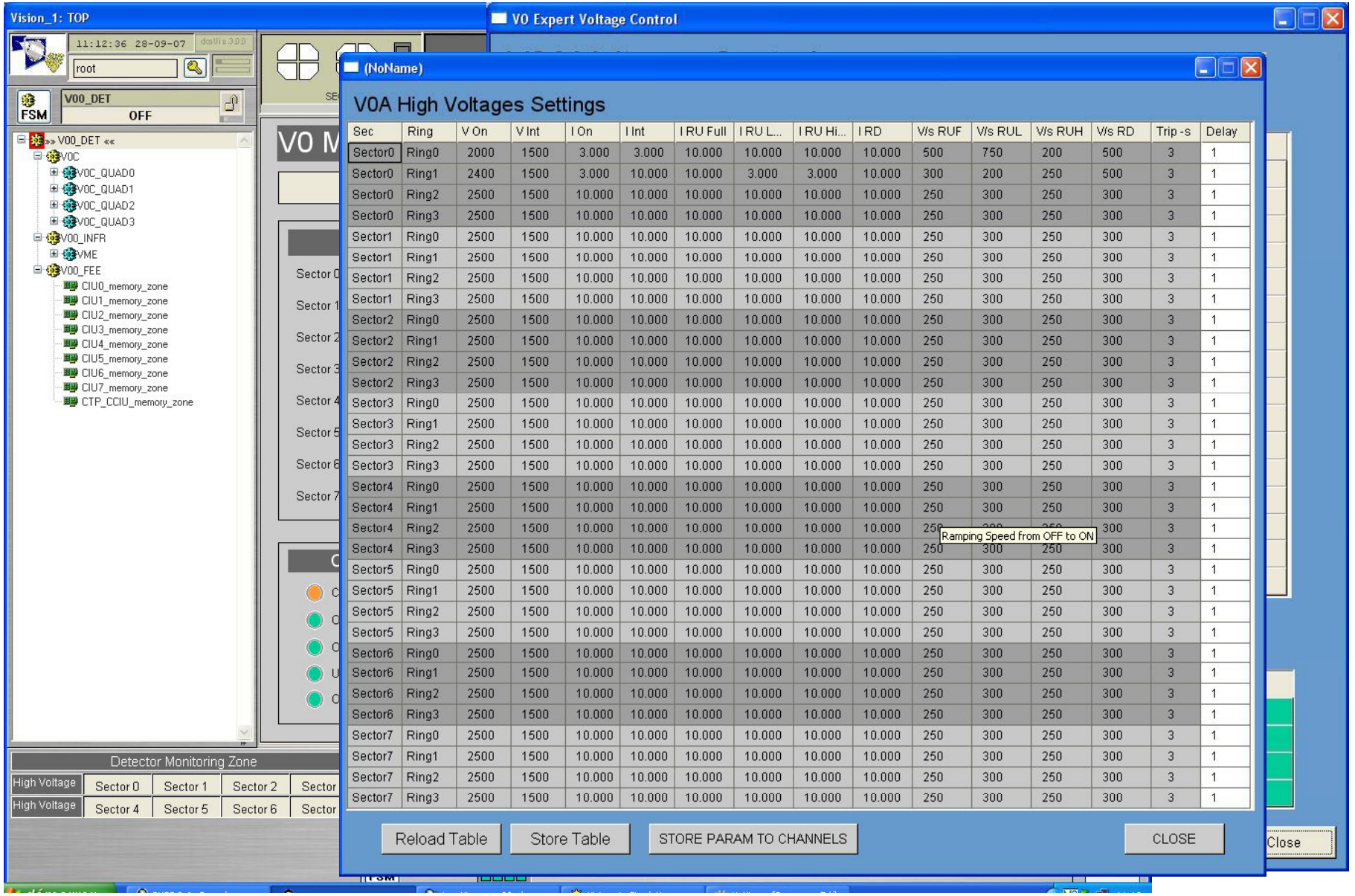
What has been done:

- **V0C Detector installed and tested** (using custom FEE) 2-6 April 2007
- **LV and HV accessible from DCS at point 2**
- **Test in lab with DCS, DAQ, TRG** June 2007
  - test made with only 1 CIU board (corresponding to 1 ring of V0)

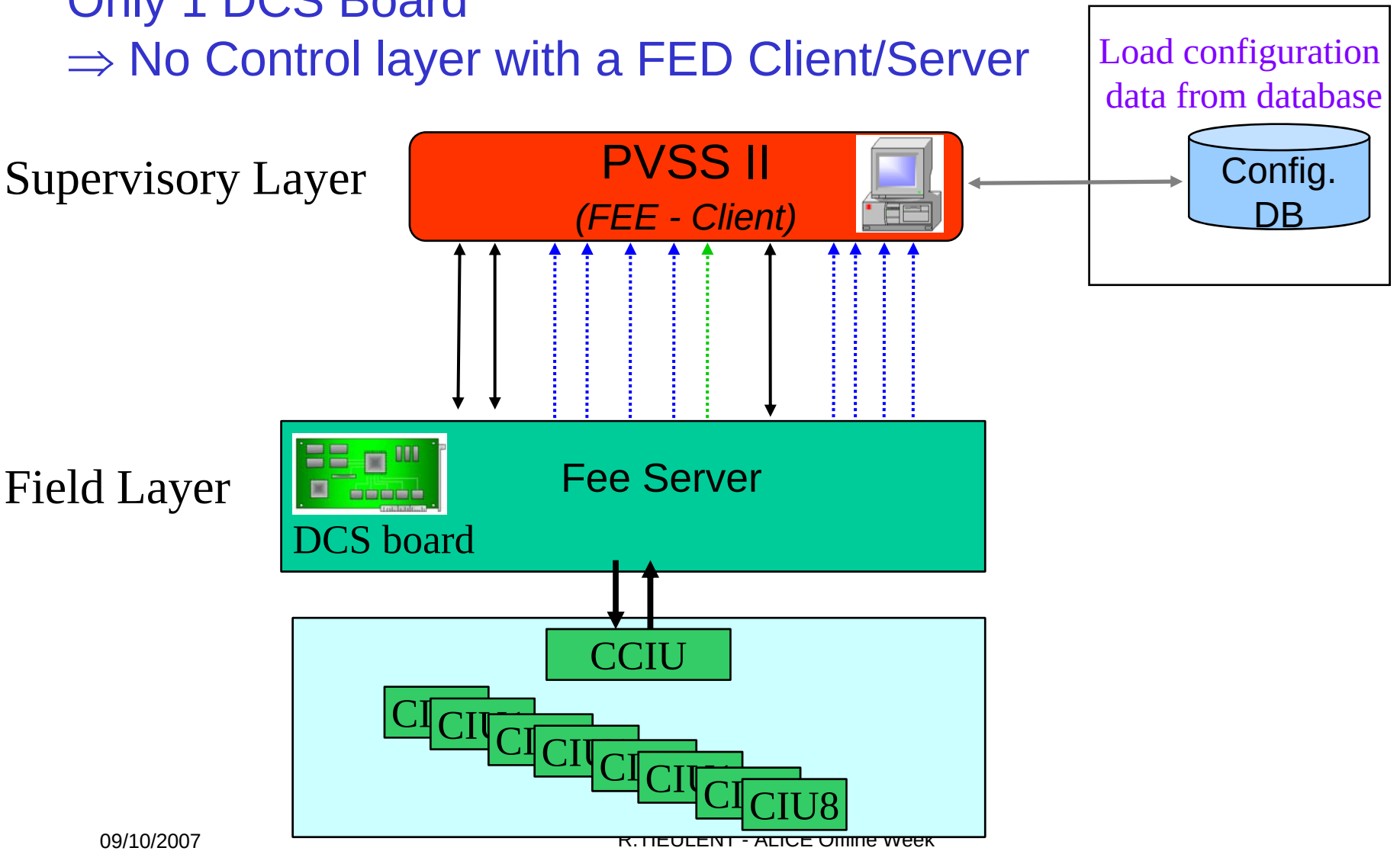
Remaining Key Dates:

- **End of test and calibration of electronics boards in lab:** End of October
- **Test in lab with DCS, DAQ, TRG with final FEE:** End of November
- **Installation of DCS at point 2:** Beginning-December
- **Installation and configuration of FEE at P2:** Mid-December
- **Installation of V0A:** January 2008

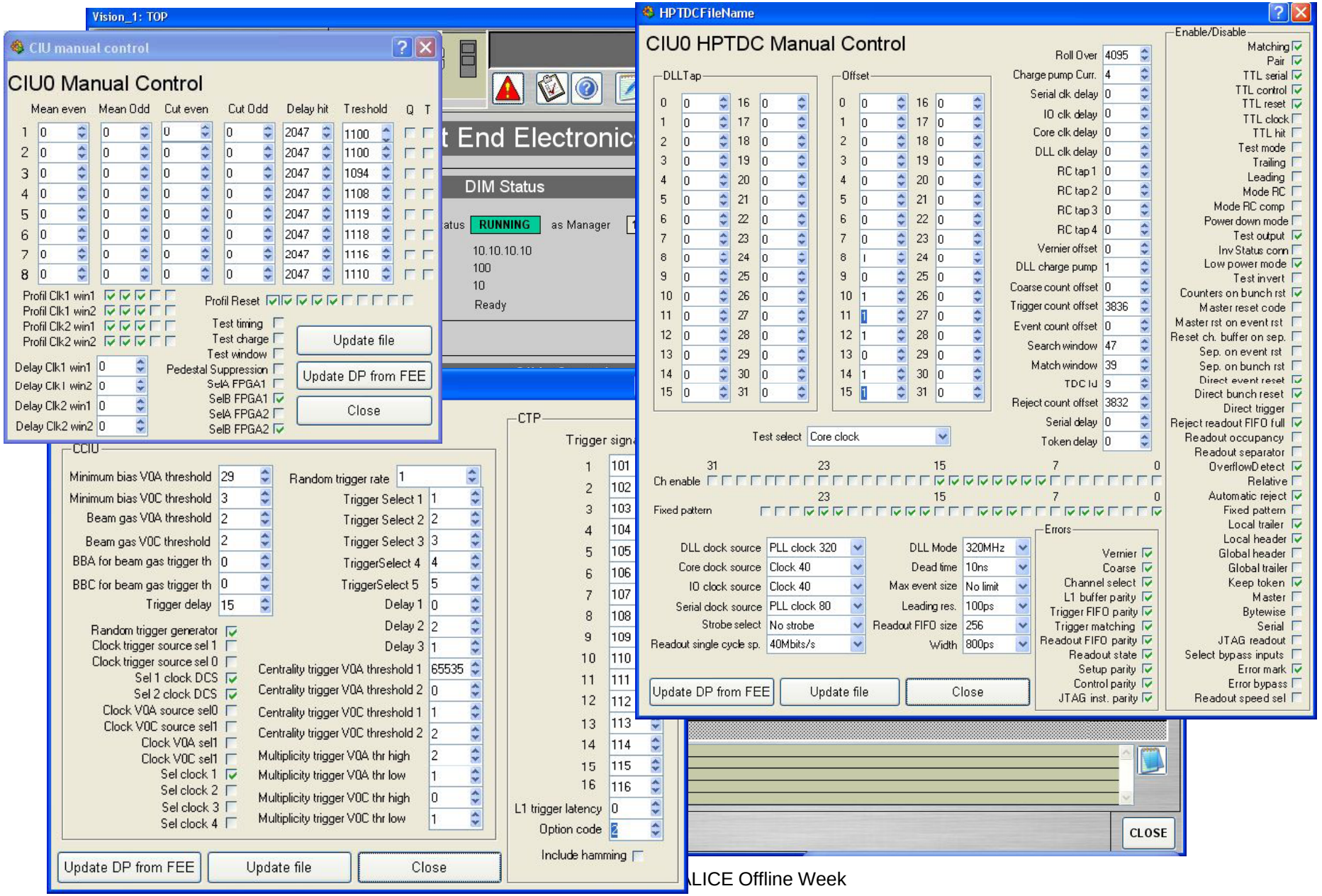
Development of the control



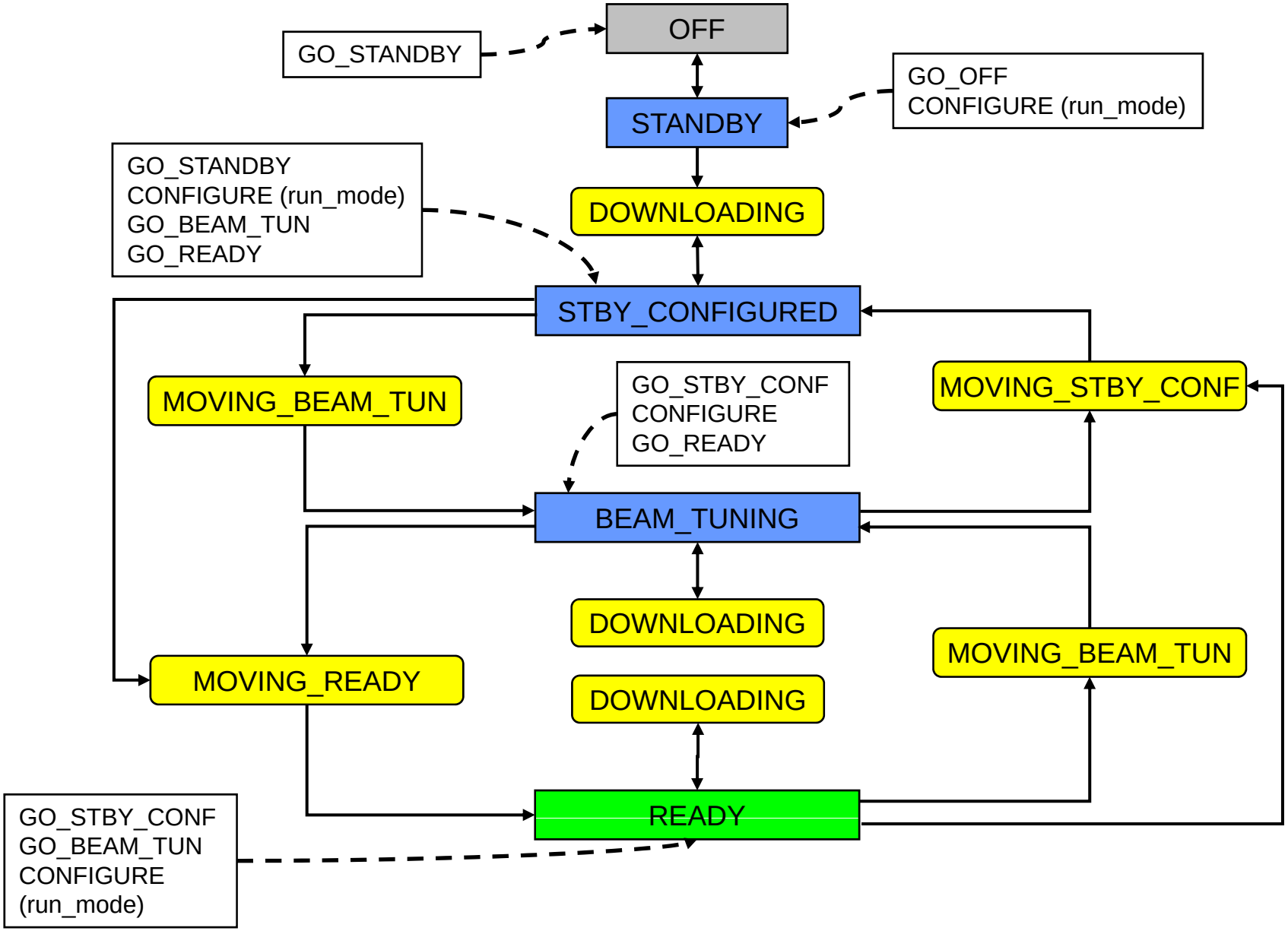
Only 1 DCS Board
⇒ No Control layer with a FED Client/Server



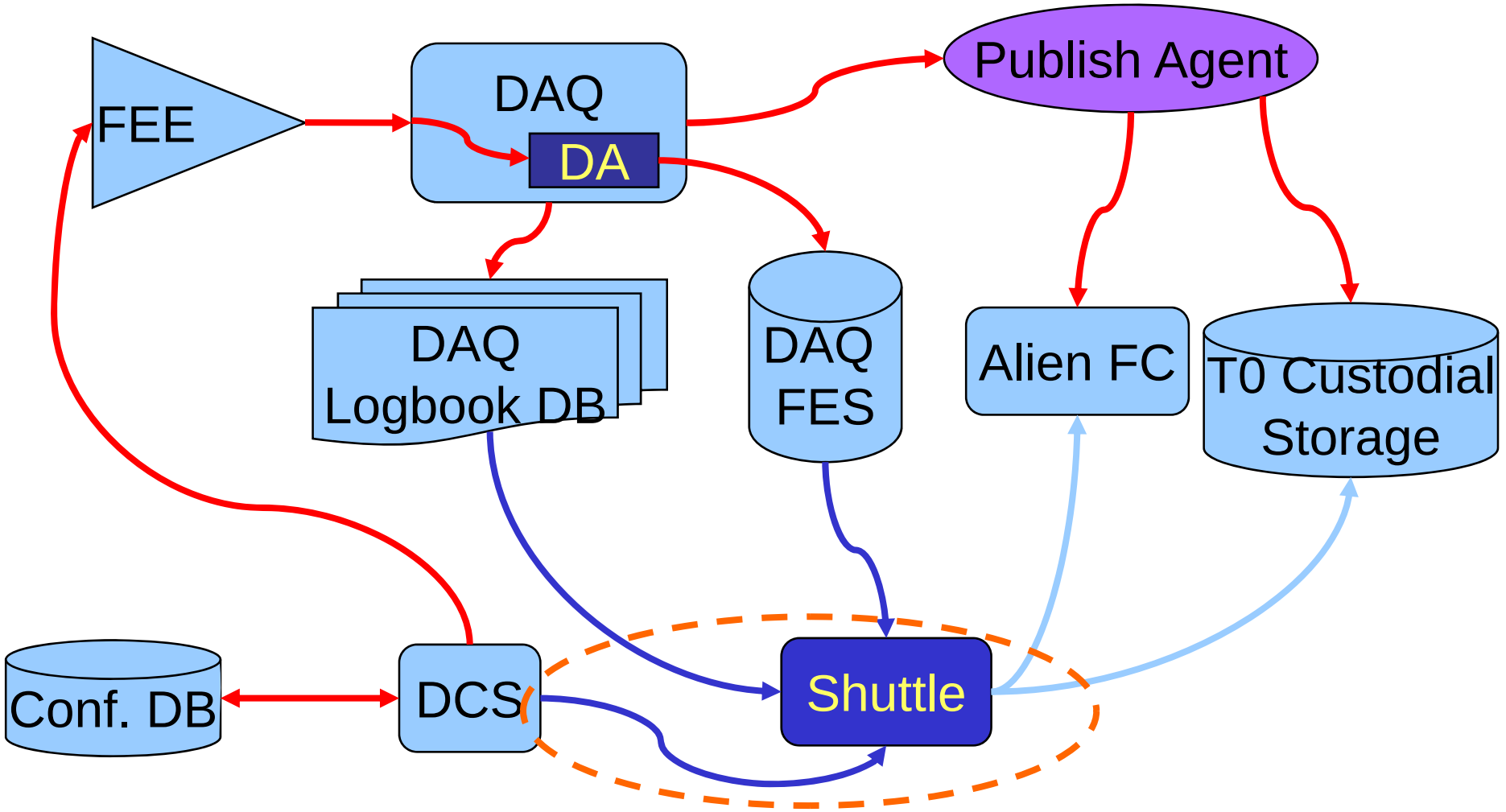
FEE Control panels



V0-DCS State Diagram



On-Offline connection diagram (Use case6)



V0 - DCS Preprocessor

Add AliVZERODataDCS class to process DCS Data

Extract the Means and Widths during a physics run

of the 64 HV Channels

Corresponding DCS Aliases:

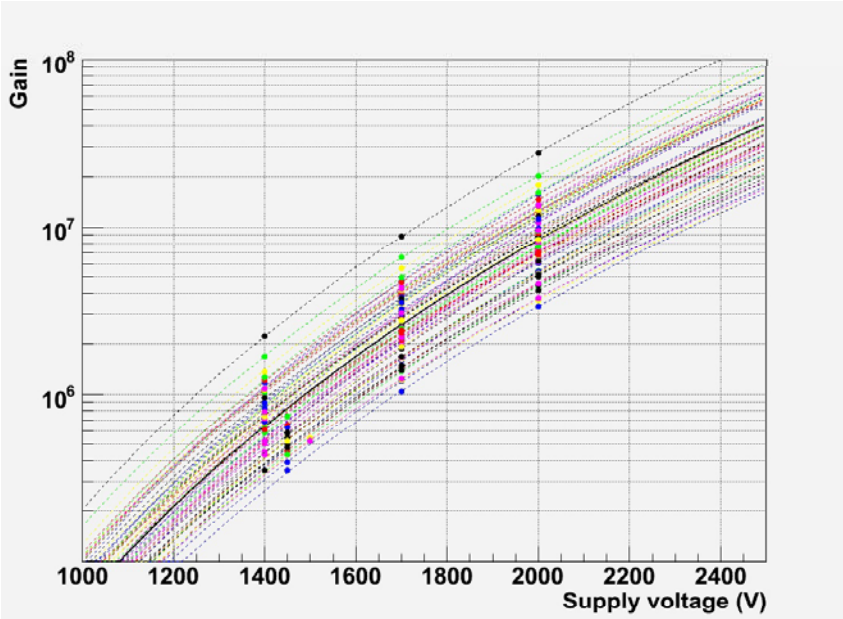
V00/HV/V0**[A-C]**/SECTOR**[0-7]**/RING**[0-3]**

DCS alias	N of channels	Data type	Unit	Value	% fluctuation	Update Frequency (s)
V00/HV/V0**[A-C]** /SECTOR**[0-7]** /RING**[0-3]**	64	float	V	1800	1	10

Gain adjustment

V0 detector should run with a common gain on all channels

- DA will calculate from data gain, sigmas and pedestals
- All PMTs have been calibrated



V0Preprocessor will calculate the new voltages which should be apply via DCS panels

Conclusions

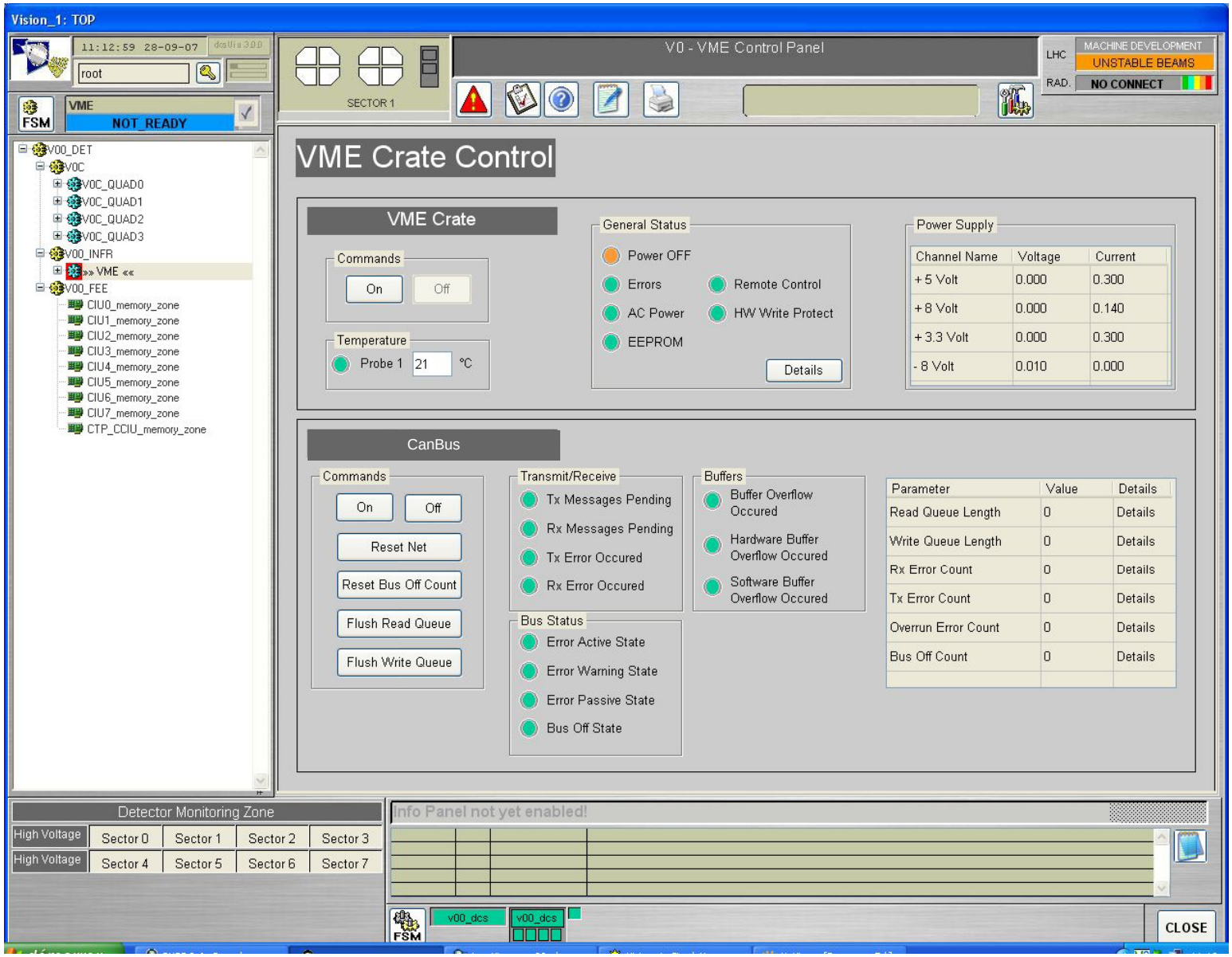
- DCS Control of the V0 is well advanced
- It is used daily in lab for the test of the FEE boards
- DCS Preprocessor developed, tested and committed

Backup

V0 Node Synchronization table

V00_DET	V0 MODULE (V0A/V0C)	FEE	VME Crate
OFF	OFF	OFF	OFF
STANDBY	OFF	OFF	ON
DOWNLOADING	DOWNLOADING	DOWNLOADING	ON
CALIBRATING		CALIBRATING	ON
STBY_CONFIGURED	STBY_CONFIGURED	READY	ON
MOVING_READY	MOVING_READY	READY	ON
MOVING_BEAM_TUN	MOVING_BEAM_TUNING	READY	ON
MOVING_STBY_CONF	MOVING_STBY_CONF	READY	ON
BEAM_TUNING	BEAM_TUNING	READY	ON
READY	READY	READY	ON
TRIPPED	TRIPPED		
NO_CONTROL	NO_CONTROL		
NO_CONTROL		NO_CONTROL	
NO_CONTROL			NO_CONTROL
SYS_FAULT	SYS_FAULT		
SYS_FAULT		SYS_FAULT	
SYS_FAULT			SYS_FAULT

VME Control panel



V0 Front-End-Electronics in DCS
Progress Status

- FEE server on DCS Board:
  - Driver for communication with CCIU: developed, tested and fully functional
  - FEE server: developed, tested, stable and fully functional
  - DIM server for CTP (to set CTP option code : developed, tested, stable and fully functional

- PVSS:
  - State machines defines and fully implemented
  - FEE Client (DIM) stable and fully functional
  - Front panels : completed

- VME Crate:
  - Control, FSM and panels completed using the work of Lionel Wallet.
- Remaining work:
  - Interface with the Configuration DB.

Résumé of HV/LV Sub-system

CAEN Crate:

- Crate installed in CR4 controlled by DCS
- Need to develop the operation of the crate by 2 operators (T0/V0)

PVSS:

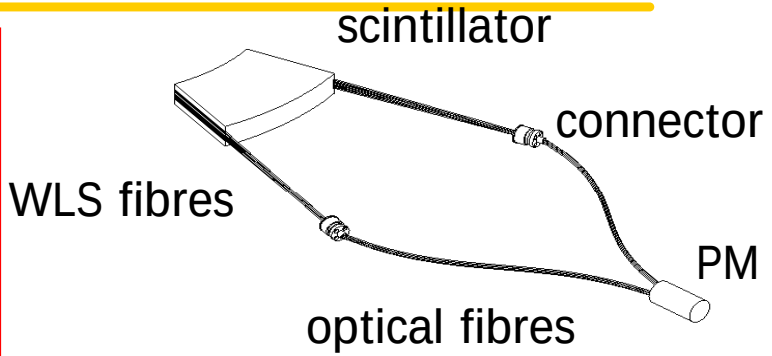
- All panels developed

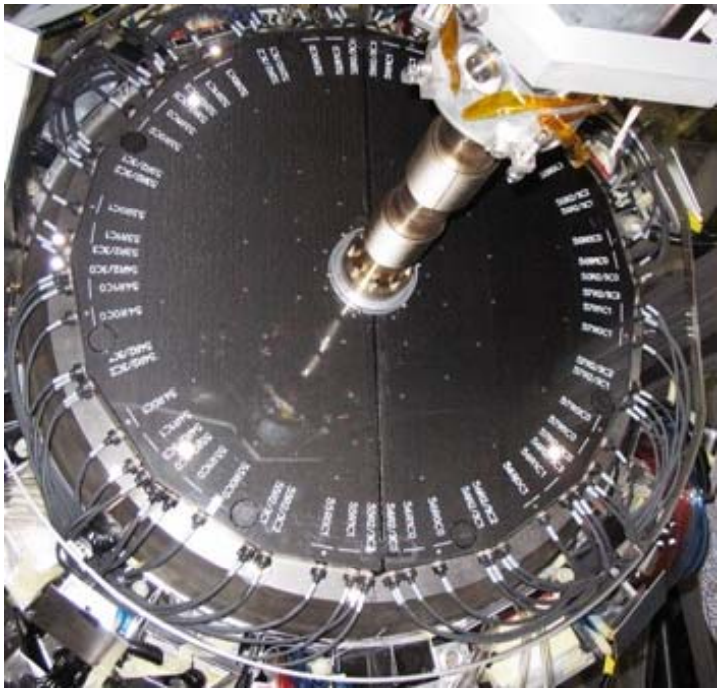
FSM:

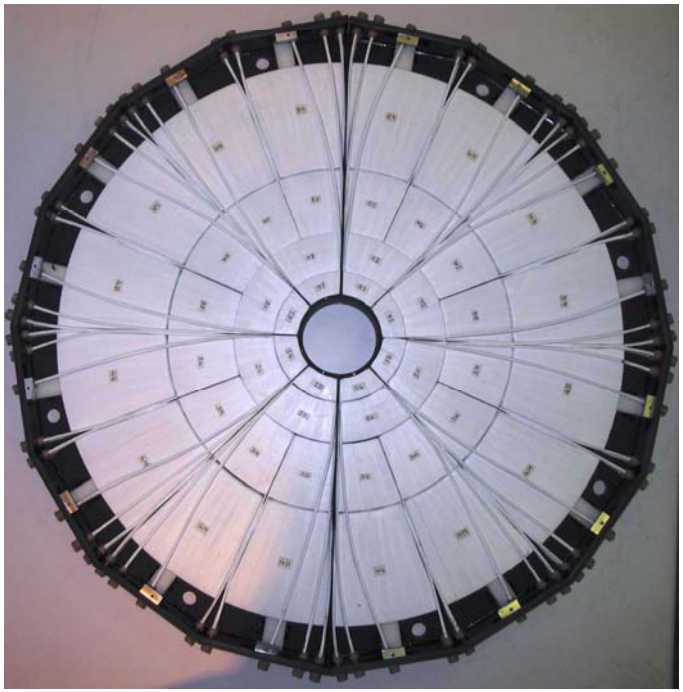
- FSM completed including the SW interlock between LV and HV.

The V0 detector

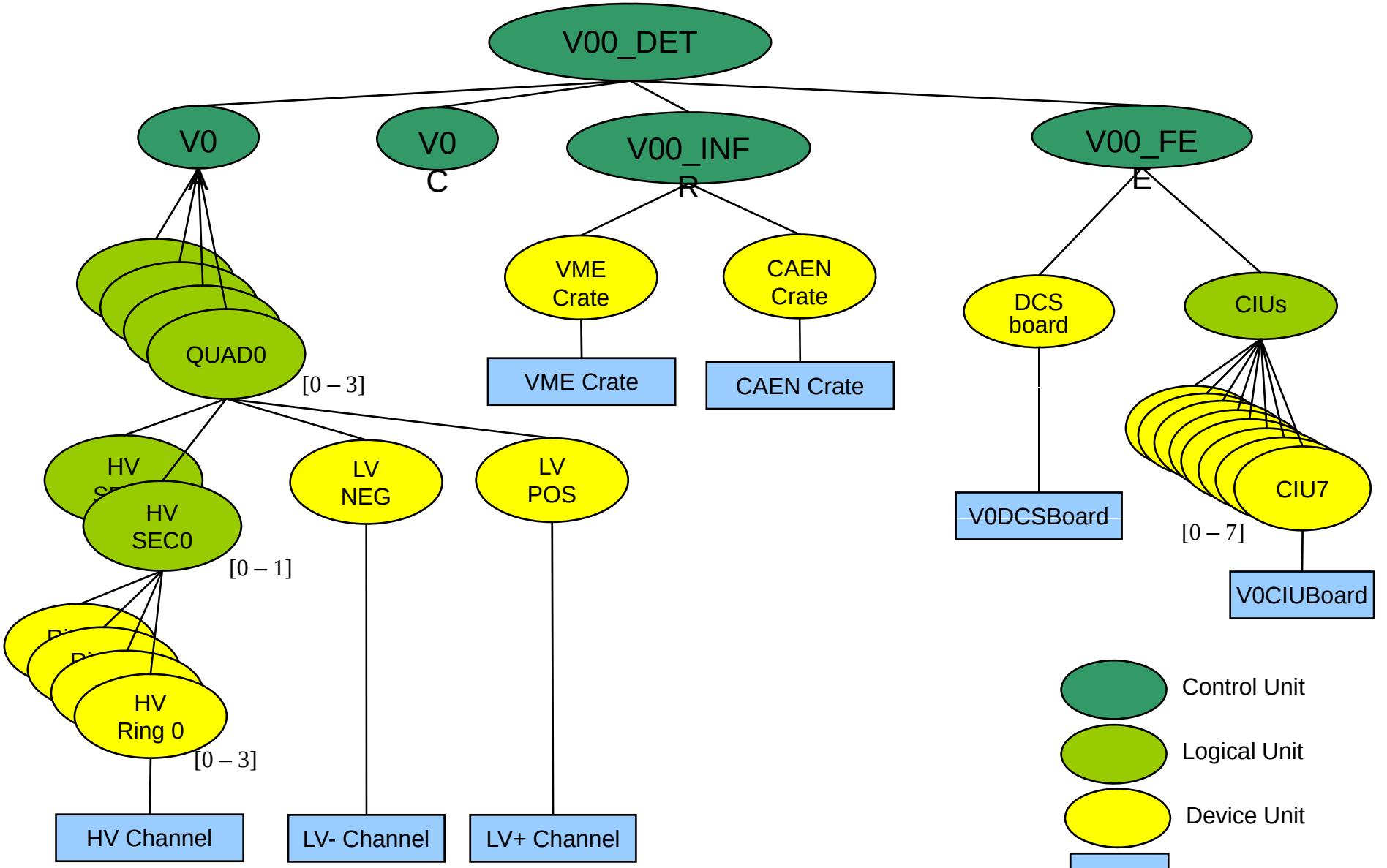
- Two scintillator hodoscopes at low angles
  - trigger for the central detectors
  - background filter for Muon
- 2 x 32 channels (V0A et V0C)
- 8 sectors of 4 channels per hodoscope



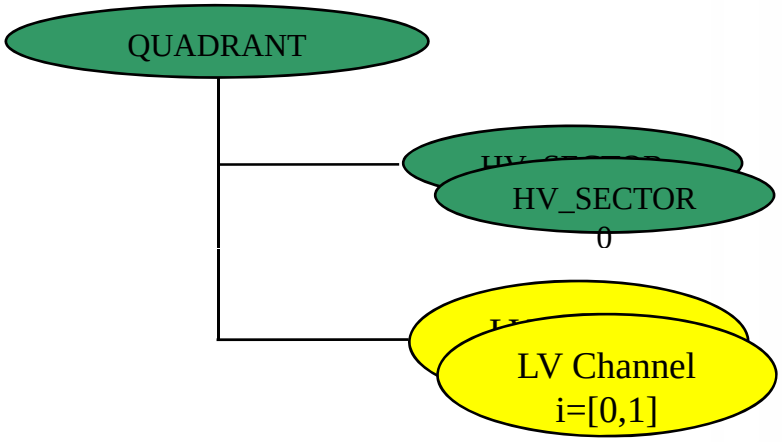


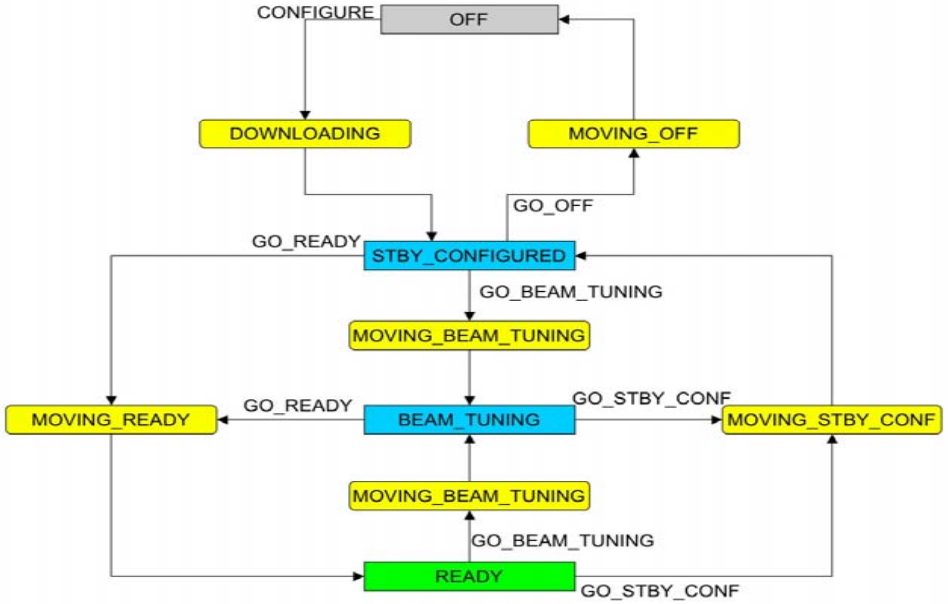


The V0-FSM Tree



Voltage Quadrant FSM

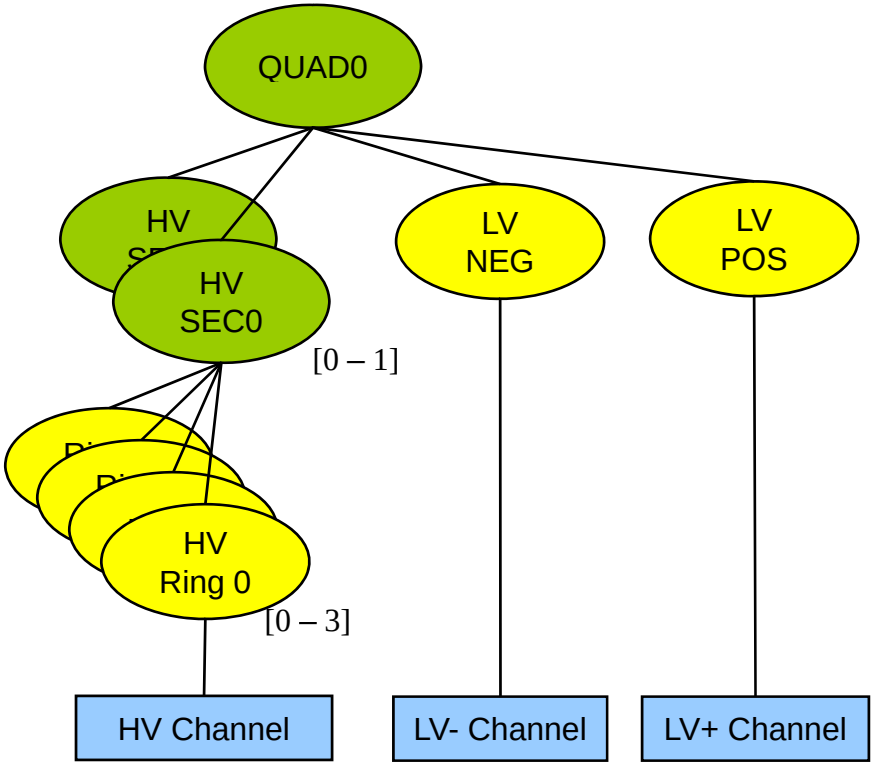




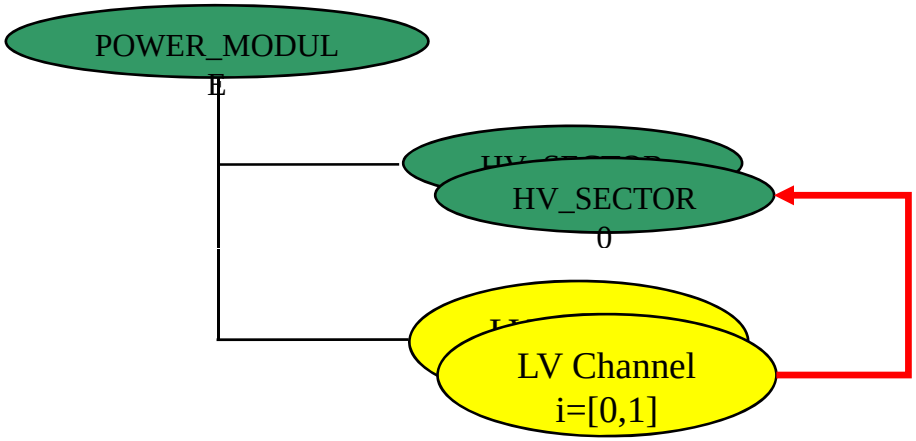
POWER MODULE	HV_SECTOR i^{th}	LV Channel i^{th}
OFF	OFF	OFF
DOWNLOADING	OFF	RAMP_UP
MOVING_OFF	OFF	RAMP_DW
STBY_CONFIGURED	OFF	ON
MOVING_READY	MOVING_READY	ON
MOVING_BEAM_TUNING	MOVING_BEAM_TUNING	ON
MOVING_STBY_CONF	MOVING_OFF	ON
BEAM_TUNING	BEAM_TUNING	ON
READY	READY	ON
NO_CONTROL	NO_CONTROL	
NO_CONTROL		NO_CONTROL
TRIPPED	TRIPPED	
TRIPPED		TRIPPED
SYS_FAULT	SYS_FAULT	
SYS_FAULT		CHAN_FAULT

HV/LV Sub-system

• Use the principle of Caen Channel Stock Settings developed by Antonio Franco for the HMPID. Will move to new FW component as soon as it becomes available.



Voltage Quadrant Interlock



If (Any LvChannel != ON) and (Any Hv Sector !=OFF)

Then SWITCH_OFF HVSectors

Working principle

- Control of the DCS board components :
  - TTCRx registers (example : TTC channel B data output for the CCIU board)
- Control of the FEE boards (CCIU and CIU) components
  - HPTDCs
  - Modes
  - Pedestals
  - …
- Collection and publication of monitoring data
  - DCS board
  - FEE

Control panels proposal

- Main panel with :
  - Configure (from configuration file or database configuration parameters?)
  - Reset
- Child panel with status of the different components of the system controlled by the DCS board
    - HPTDC on DCS board
    - CCIU registers
    - CIU registers
- Sub-child panels with individual access to registers and functions of the previous components

Summary of calibration procedure

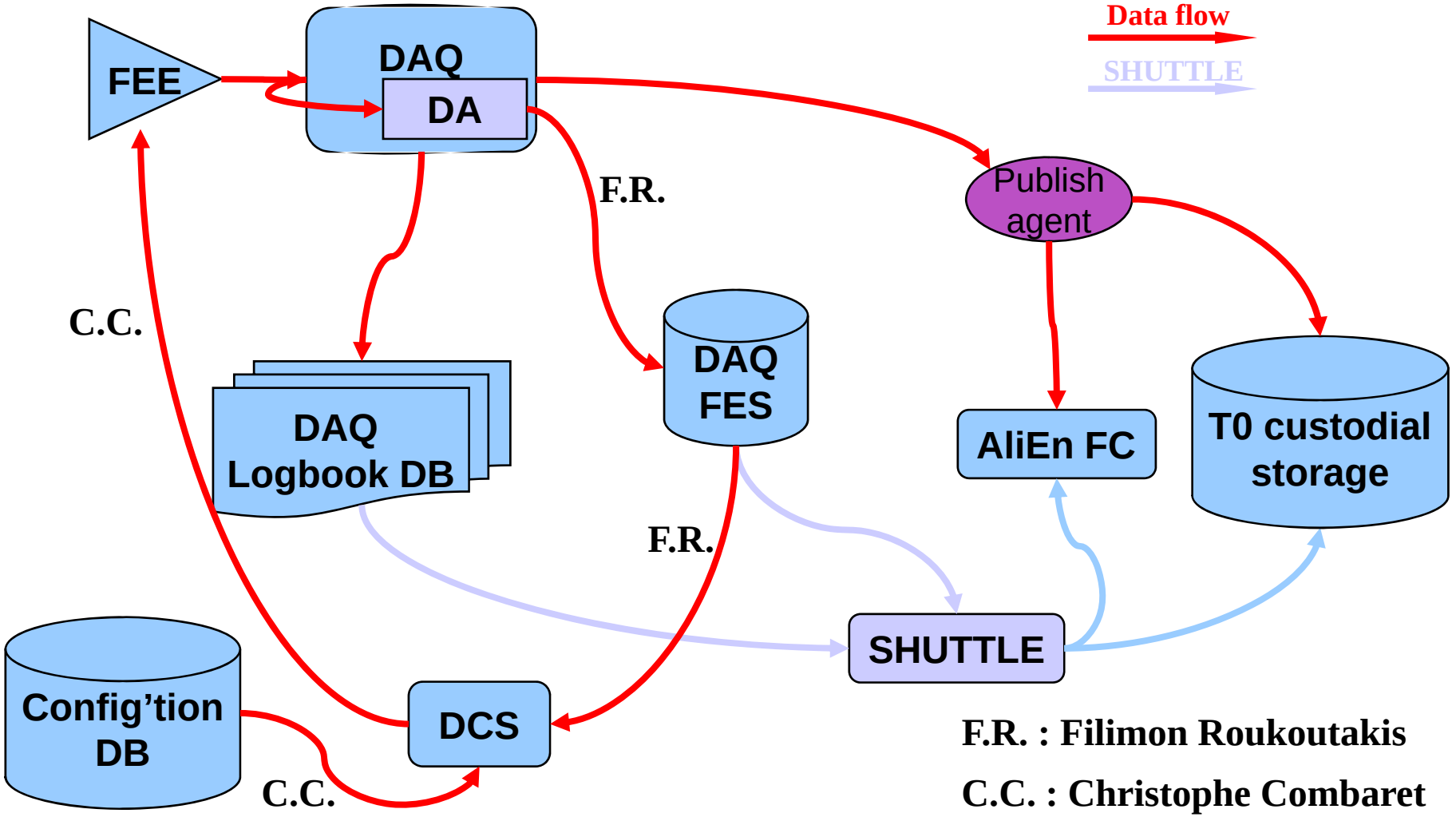
Gains and pedestals computed by Online Monitoring using dedicated data (minimum bias and +/- 10 around the event of interest mini-events respectively) stored in the FEE and sent to the DAQ with the events of interest.

Note that this procedure is achieved by the FEE independently of the Central Trigger Processor.

These values will be written in the Calibration Data Base for later use by offliners and updated at each run change.

Validity period will be run interval unless a hardware failure occurs.

Use case 6


Data flow
SHUTTLE
FEE
DAQ
DA
F.R.
Publish agent
C.C.
DAQ Logbook DB
DAQ FES
AliEn FC
T0 custodial storage
F.R.
SHUTTLE
Config'tion DB
DCS
C.C.
F.R. : Filimon Roukoutakis
C.C. : Christophe Combaret

Calibration excel file

Par #	Parameter	Data format/size per channel	Data size (Total) Bytes in OCDB	Data size (Total) Bytes reference	Update freq	Source	Confirmed
1	gains	32 bits (TBC)	512	0	Run	DAQ (on line data) *	yes
2	pedestal means	32 bits (TBC)	512	0	Run	DAQ (on line data) *	yes
3	pedestal sigmas	32 bits (TBC)	512	0	Run	DAQ (on line data) *	yes
4	time gains	32 bits (TBC)	256	0	Run	DAQ (on line data) *	yes
5	time offsets	32 bits (TBC)	256	0	Run	DAQ (on line data) *	yes

Run type / Trigger type	# of required events/sampling rate	Processing level: sub-event or event	Results: FEE/Archive	Accessible by offline	Calib. Procedure in AliRoot	use case #
physics data *	at least 2000 L2 (TBC)	event and sub-event	DAQ FES / OCDB	yes	fall 2006	6
physics data *	at least 1000 L2 (TBC)	event and sub-event	FEE and DAQ FES / OCDB	yes	fall 2006	6
physics data *	at least 1000 L2 (TBC)	event and sub-event	FEE and DAQ FES / OCDB	yes	fall 2006	6
physics data *	at least 10000 L2 (TBC)	event	DAQ FES / OCDB	yes	Unknown	1
physics data *	at least 10000 L2 (TBC)	event	possibly FEE and DAQ FES / OCDB	yes	Unknown	6

Online output data for DAQ and monitoring

An event as seen by the V0 Front End Electronics will be:

- Charges (64).
- Arrival times (64) and time response widths (64).
- Beam-Beam (BB) and Beam-Gas (BG) flags (64).
- States of the 5 triggers sent to the CTP (MinBias, BB, BG, Central,SemiCentral).

For each event triggered by a L2 signal coming from the CTP (called Event-Of-Interest), the following information will be sent to the DAQ:

1. The event of interest itself with **all** the parameters listed above, for physics analysis
2. The events between EoI-10 to EoI+10 (charges and BB/BG flags), for monitoring pedestals, pile-up…
3. The 10 last V0 Minimum Bias events (charges and BB/BG flags), for monitoring gains

Calibration procedure

• Calibration parameters are computed online in the DAQ LDC from sampling dedicated data

• Results are made available as ROOT files in the DAQ FES

• DCS accesses the Root file in the DAQ FES, compares the parameter values to reference values stored in the DCS Configuration DB and updates the FEE values if needed.

Calibration

Calibration CDB file has been created and CDB reading implemented.

Calibration parameters stored into CDB are :

- 128 gains, 128 pedestal means, 128 pedestal sigmas (2 QDC per channel)
- 64 time gains and 64 time offsets

i.e. 512 floats, 4 kB

All these parameters are accessible through class AliVZEROCalibData