



Laboratoire d'Anney-le-Vieux
de Physique des Particules



Actual Micromegas USB DAQ ASU and DIF

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14th january 2010



Electronic LAPP team

- **Julie Prast:** DIF conception, DIF Link Study
- **Guillaume Vouters:** DIF firmware development, ASU test, integration
- **Sebastien Cap:** DIF CAO, interDIF Conception&CAO, integration
- **Renaud Gaglione:** Dirac conception(ASIC&ASU), R&D protection inside PCB
ASU test, integration
- **Alexandre Dalmaz:** ASUs CAO (Hardroc&Dirac), R&D protection inside PCB
- **Cyril Drancourt:** ASU Hardroc conception, ASU test, LabVIEW, integration

Electronic study at LAPP

- DIF Board (2007-2008)
- ASIC : Dirac2 (2009)
- ASU PCB with several ASIC
 - Hardroc1 (sept 2008)
 - Hardroc2 (fev 2009)
 - Dirac2 (sept 2009)
- Calibration Labview software (mai09-jan10)
- Detector test (beam, source) with Xdaq
- Acquisition Labview software (sept09-jan10)

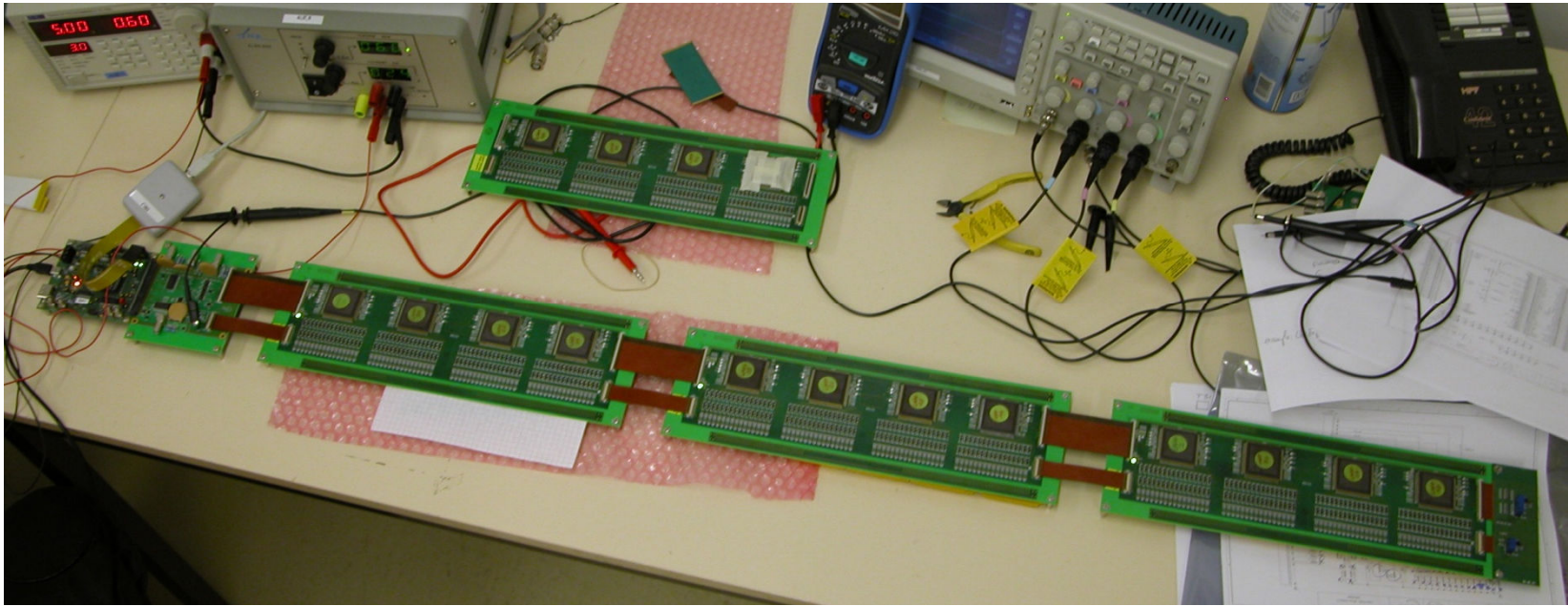
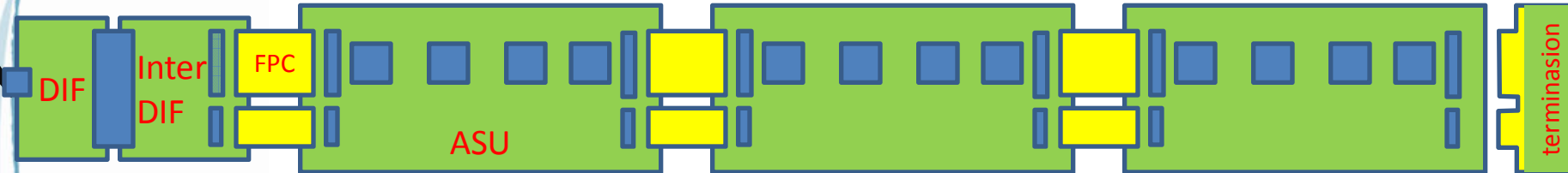
LAPP beam test

- august 2008: caractérisation prototypes analogiques (gassiplex) : CENTAURE DAQ
- novembre 2008: caractérisation prototypes analogiques + premiers test hardroc1 : CENTAURE DAQ + XDAQ
- mai 2009: mesures calorimétriques avec prototype analogiques + test hardroc1 : CENTAURE DAQ + XDAQ
- sept 2009 : mesures calorimétriques avec prototype analogiques + tests hardroc1 : CENTAURE DAQ + XDAQ
- nov 2009 : tests Dirac + hardroc2: **LabVIEW DAQ** + XDAQ

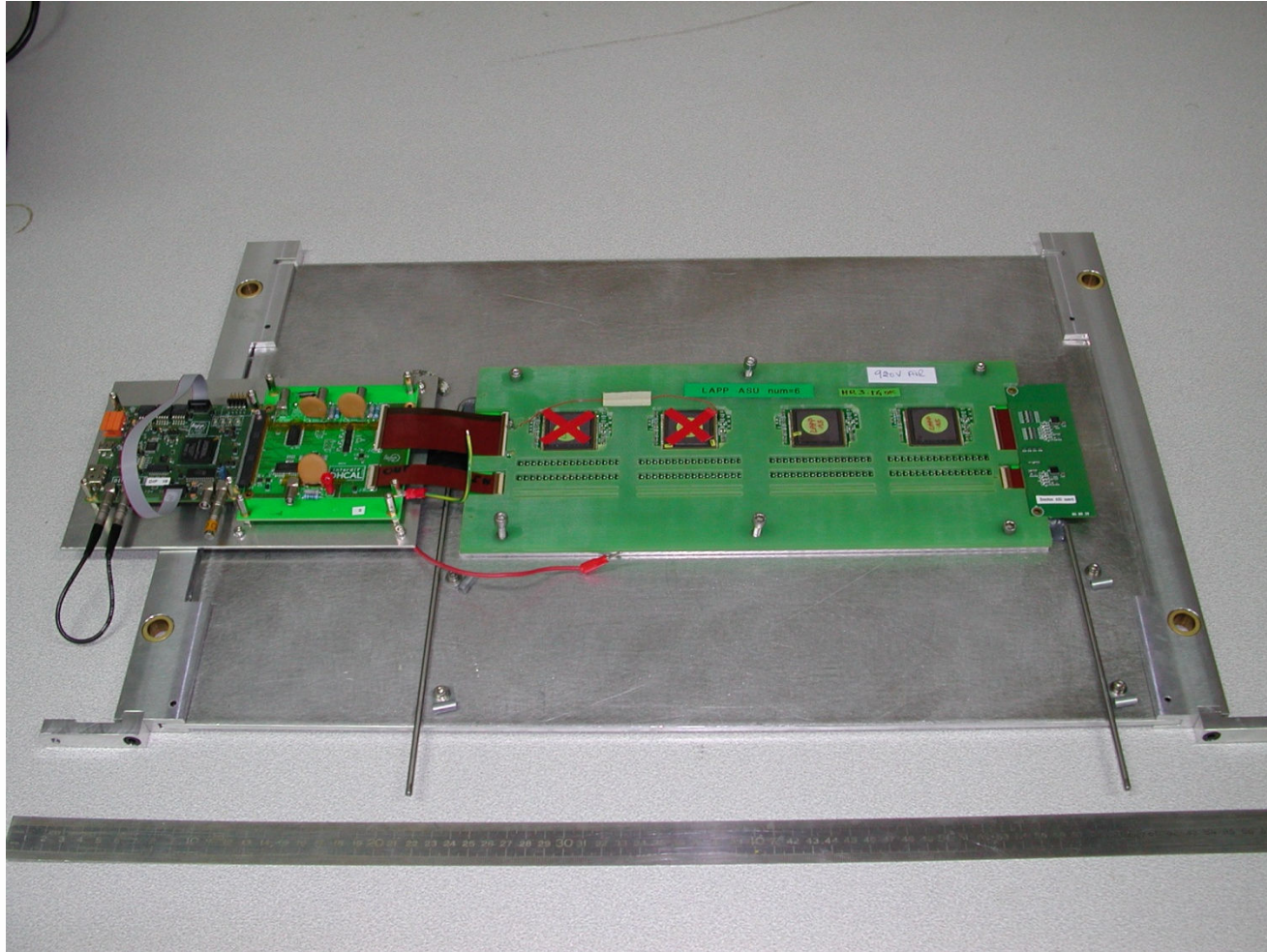


board with Hardroc1

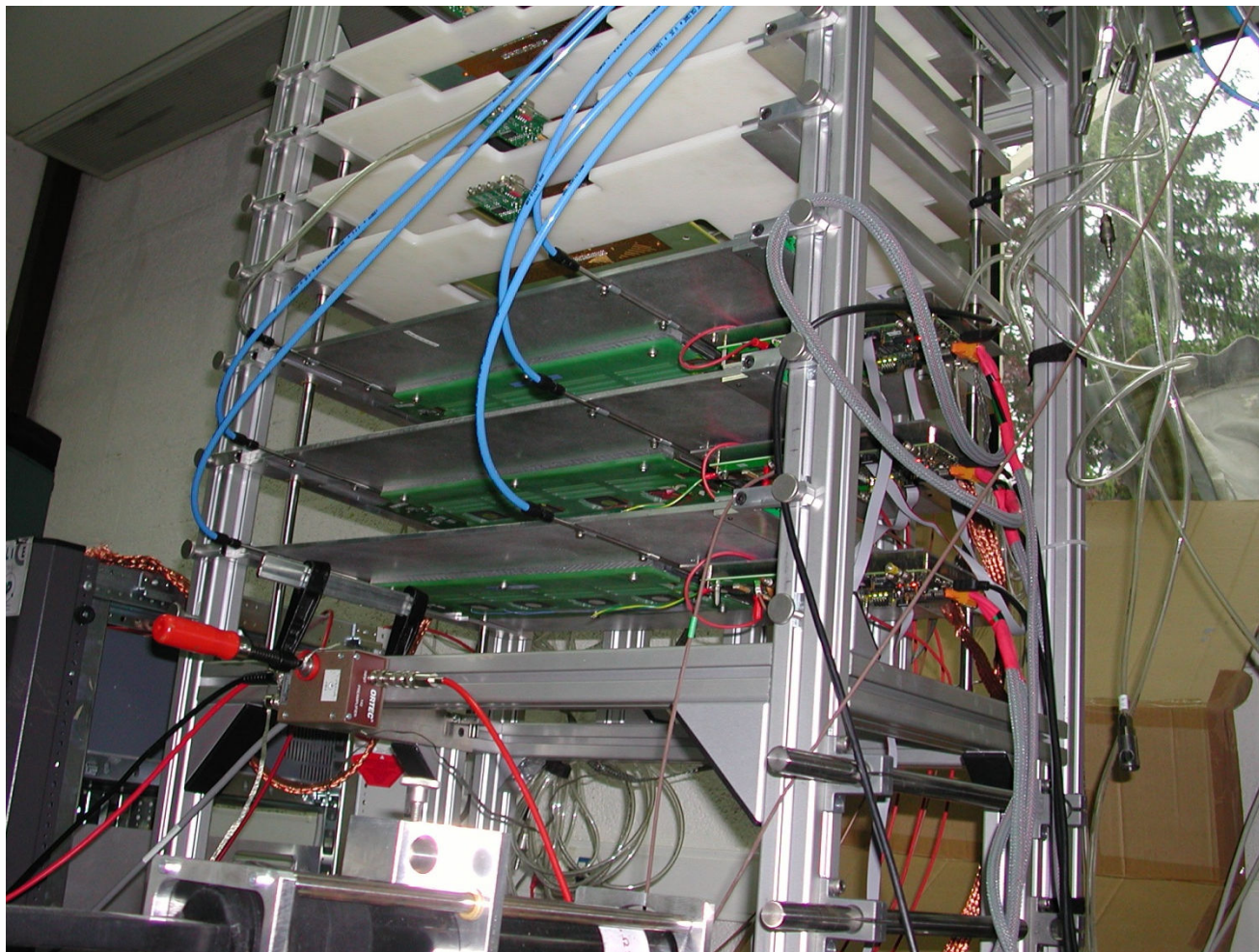
USB



detector with Hardroc1



detectors with Hardroc1

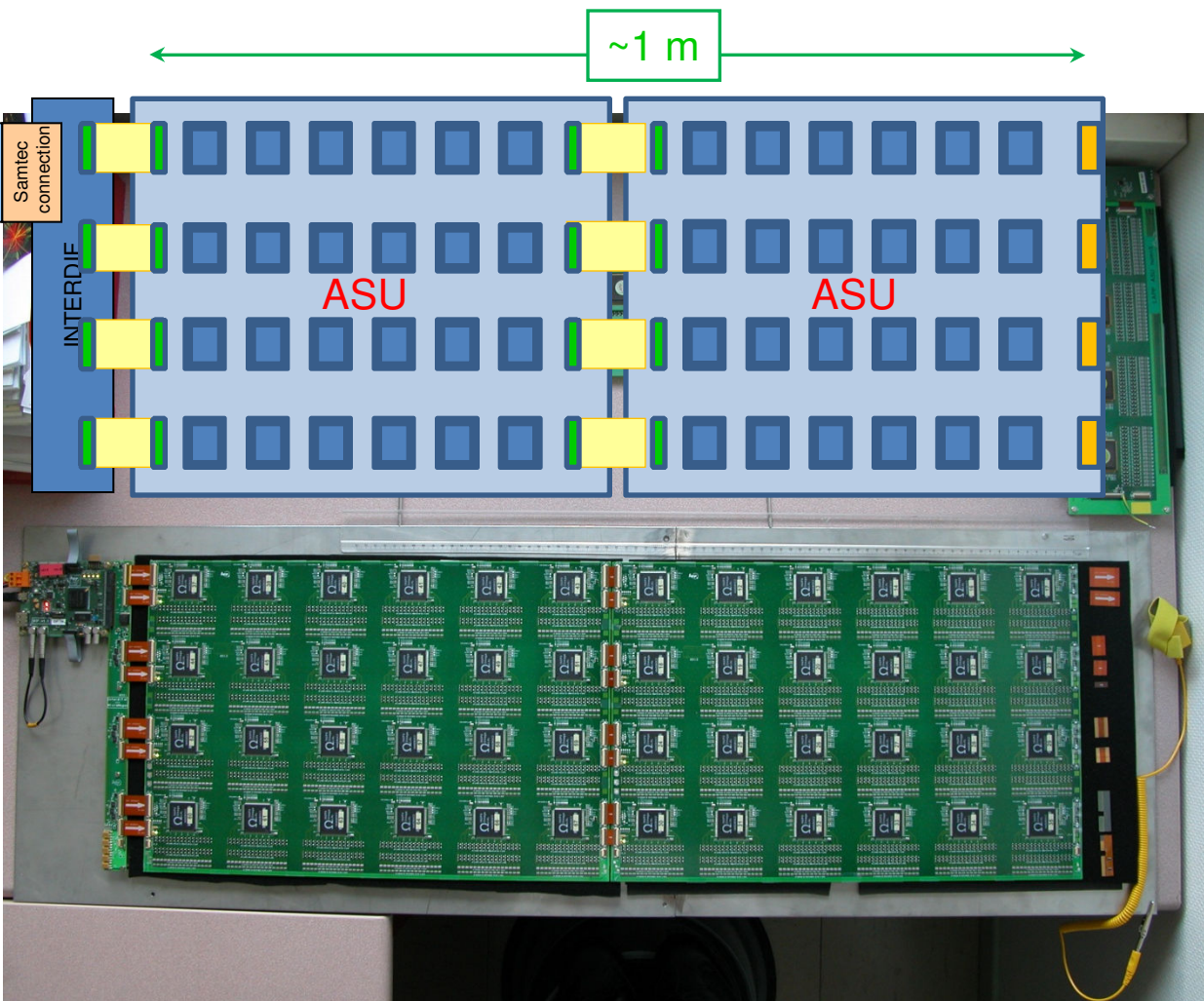


Boards with Hardroc2



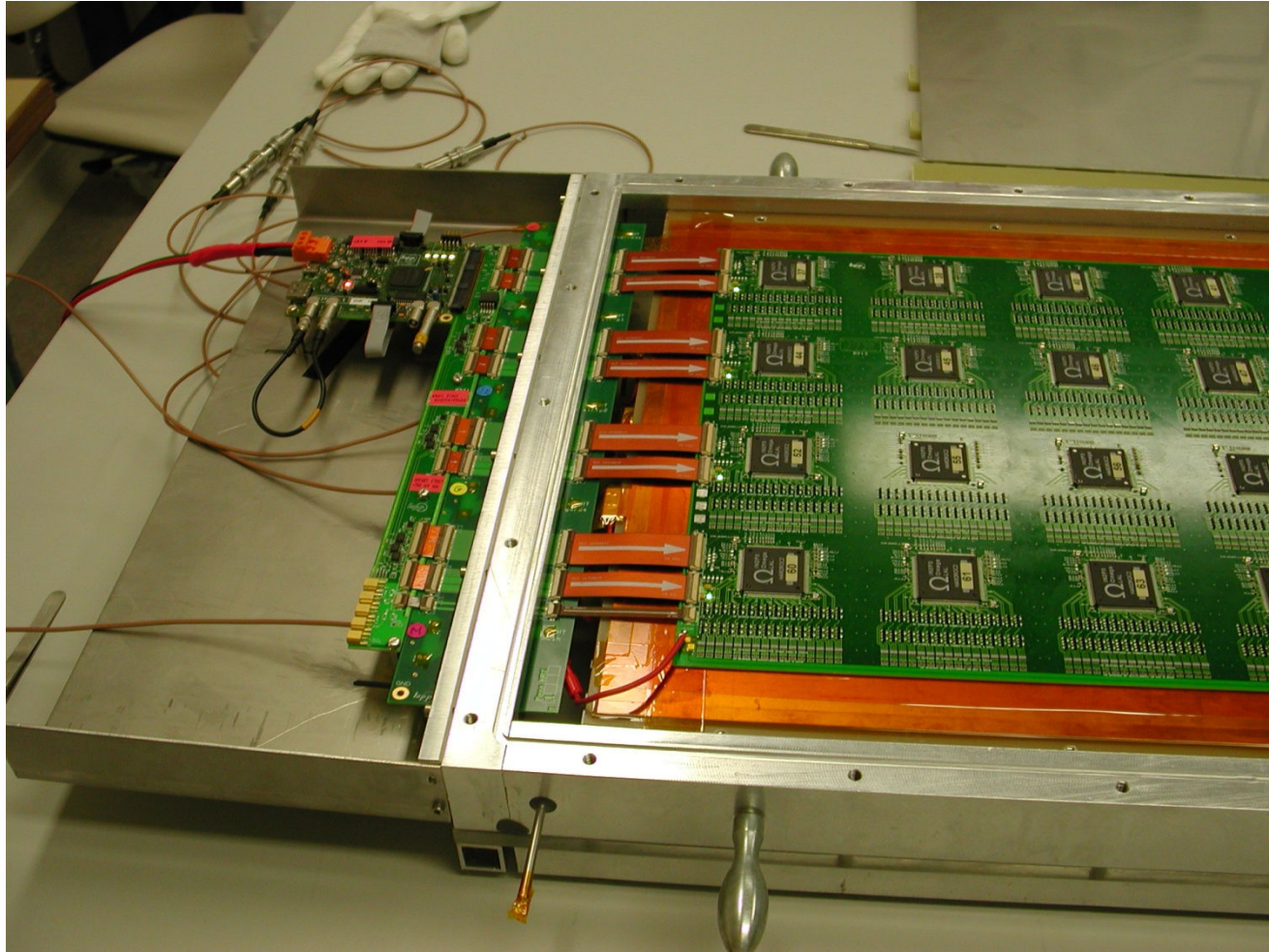
USB

DIF

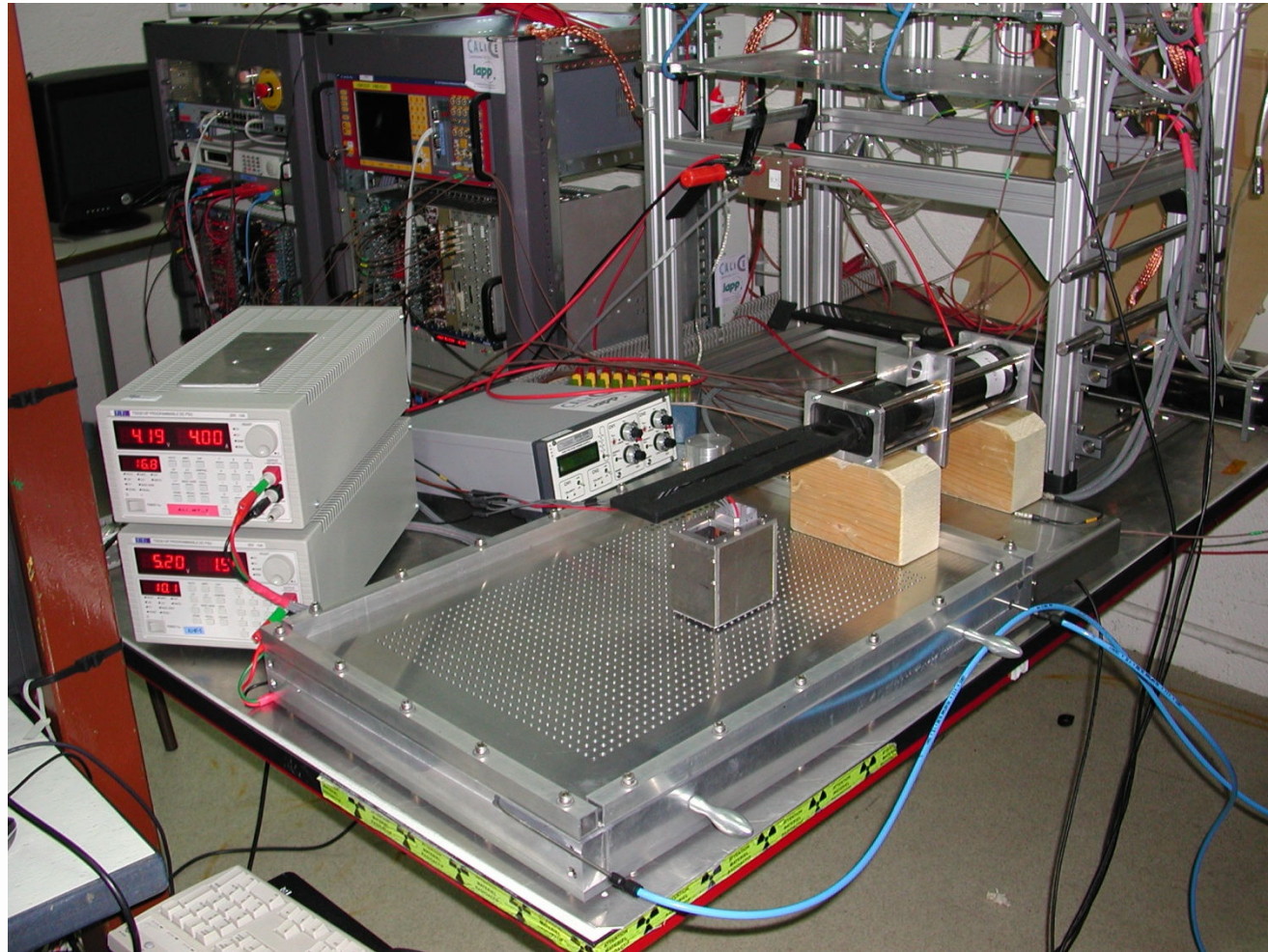


~0.33 m

Board in test box



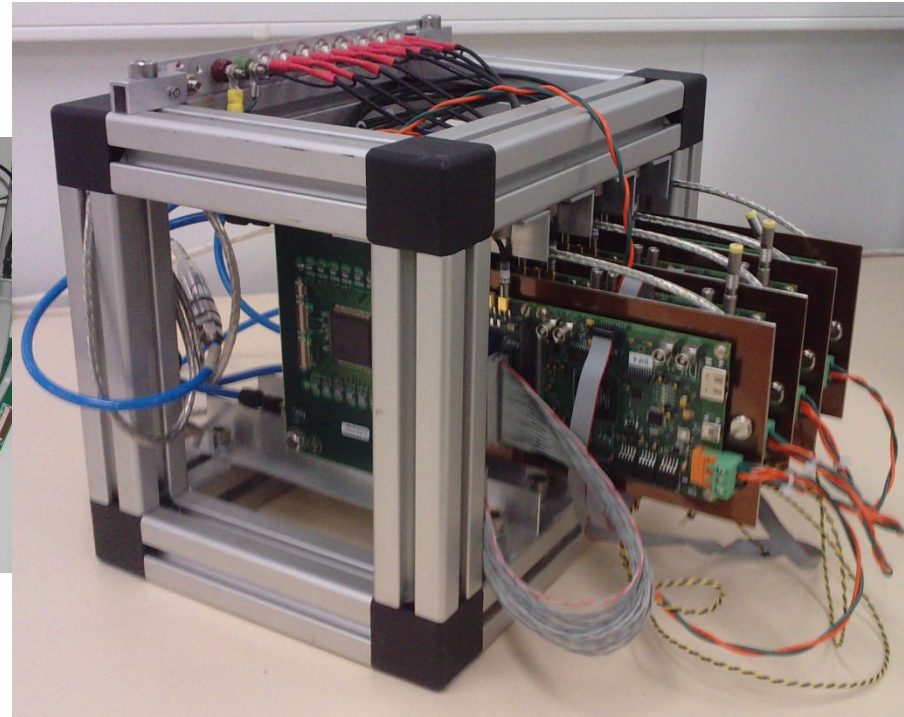
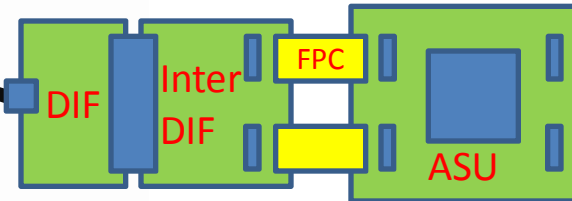
Board in test box





board with DIRAC2

USB



LAPP LabVIEW Hardroc1

Face-avant de Acquisition_4HR1_V1_7.vi

Fichier Édition Affichage Projet Exécution Outils Fenêtre Aide

Device Index: 1 Device Description: USBhardroc Handle: 0 FT_Status: 0

Configuration | R/W des registres | **Acquisition** | flags transmission | Calibration auto

Envoyez la Configuration + Registres

panneau user: expert

boucle si nbre de chip trouvés: 2 Cliquez ici pour le Lancement des signaux ACQUISITION

Acquisition Automatique avec Enregistrement

Nbre de lecture: 8763

données recues de l'ASU 4HR1

nb d'octects recus: 0

```

0001 0000 0000 0000 0000 0000 027C 0000 0000 2A0C 002A 0CB4 0300 391B 5555 5555 5555 5555 5555 5555 0300 3F0E 5555
5555 5555 5555 5555 5555 5555 5555 5555 0300 3051 5555 5555 5555 5555 5555 5555 5555 5555 5555 5555 5555
5555 5555 0300 09CA 5555 5555 5555 5555 5555 5555 5555 5555 5555 A3B4 0400 391B 5555 5555 5555 5555 5555 5555 0400 3F0E
5555 5555 5555 5555 5555 5555 5555 5555 0400 3051 5555 5555 5555 5555 5555 5555 5555 5555 5555 5555 0400 10D2 5555 5555 5555 5555
5555 5555 5555 0400 09CA 5555 5555 5555 5555 5555 5555 5555 5555 5555 A3A0 A99E
    
```

VISU decodage par HR pour controle

chip1: 0300 391B 5555 5555 5555 5555 5555 5555 5555 5555 0300 3F0E 5555 5555 5555 5555 5555 5555 5555 5555 0300 10D2 5555 5555 5555 5555 5555 5555 5555

chip2: 0400 391B 5555 5555 5555 5555 5555 5555 5555 5555 0400 3F0E 5555 5555 5555 5555 5555 5555 5555 5555 0400 3051 5555 5555 5555 5555 5555 5555 5555

chip3:

chip4:

lapp.
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LAPP LabVIEW Dirac2

Face-avant de Acquisition_nASU_1dirac2_V2_1.vi

Police de l'application 17pts

Device Description List: USB-dirac2, Handle List: 7FD2778

Configuration | RW des registres | Acq Test | Acquisition | repertoires | Acq File Viewer | flags transmission | Calibration auto

Envie de la Configuration + Registres : pour toutes les DIF et d'après fichiers

cliquez ICI pour demarrer les ACQUISITIONS avec Enregistrement (faire config+registre avant!!!)

envoi de la commande STOP en fin d'acquisition

nombre total d'octets recus: 9886920

Reception des données des DIFs

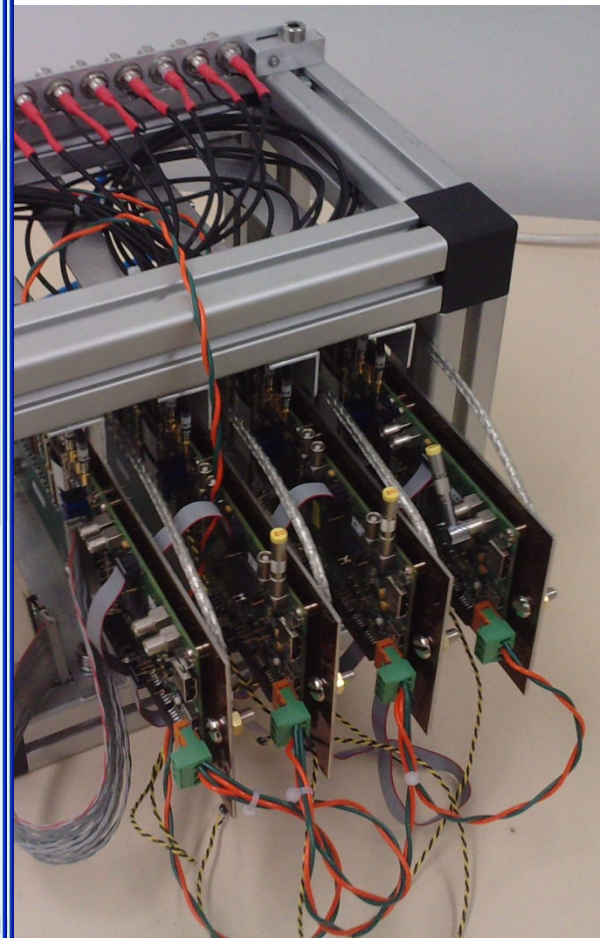
Config OK	B000 0000 0000 0000 028D 0010 0002 559B 46C0 0140 001F 0002 559B
	46DE 0140 002E 0002 559B 46FC 0140 003D 0002 559B 471A 0140 004C
	0002 559B 4738 0140 005B 0002 559B 4756 0140 006A 0002 559B 4774
	0140 0079 0002 559B 4792 0140 B400 0000 0000 0F33 D57F 7866 5500
Config OK	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
	B000 0000 0000 0000 028D 0010 0002 559B 46C0 0140 001F 0002 559B
	46DE 0140 002E 0002 559B 46FC 0140 003D 0002 559B 471A 0140 004C
Config OK	0002 559B 4738 0140 005B 0002 559B 4756 0140 006A 0002 559B 4774
	0140 0079 0002 559B 4792 0140 B400 0000 0000 0F33 D57F 7866 5500
	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
Config OK	B000 0000 0000 0000 028D 0010 0002 559B 46C0 0140 001F 0002 559B
	46DE 0140 002E 0002 559B 46FC 0140 003D 0002 559B 471A 0140 004C
	0002 559B 4738 0140 005B 0002 559B 4756 0140 006A 0002 559B 4774
	0140 0079 0002 559B 4792 0140 B400 0000 0000 0F33 D57F 7866 5500
Config OK	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
	B000 0000 0000 0000 028D 0010 0002 559B 46C0 0140 001F 0002 559B
	46DE 0140 002E 0002 559B 46FC 0140 003D 0002 559B 471A 0140 004C
Config OK	0002 559B 4738 0140 005B 0002 559B 4756 0140 006A 0002 559B 4774
	0140 0079 0002 559B 4792 0140 B400 0000 0000 0F33 D57F 7866 5500
	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

chambres vues tearbeam

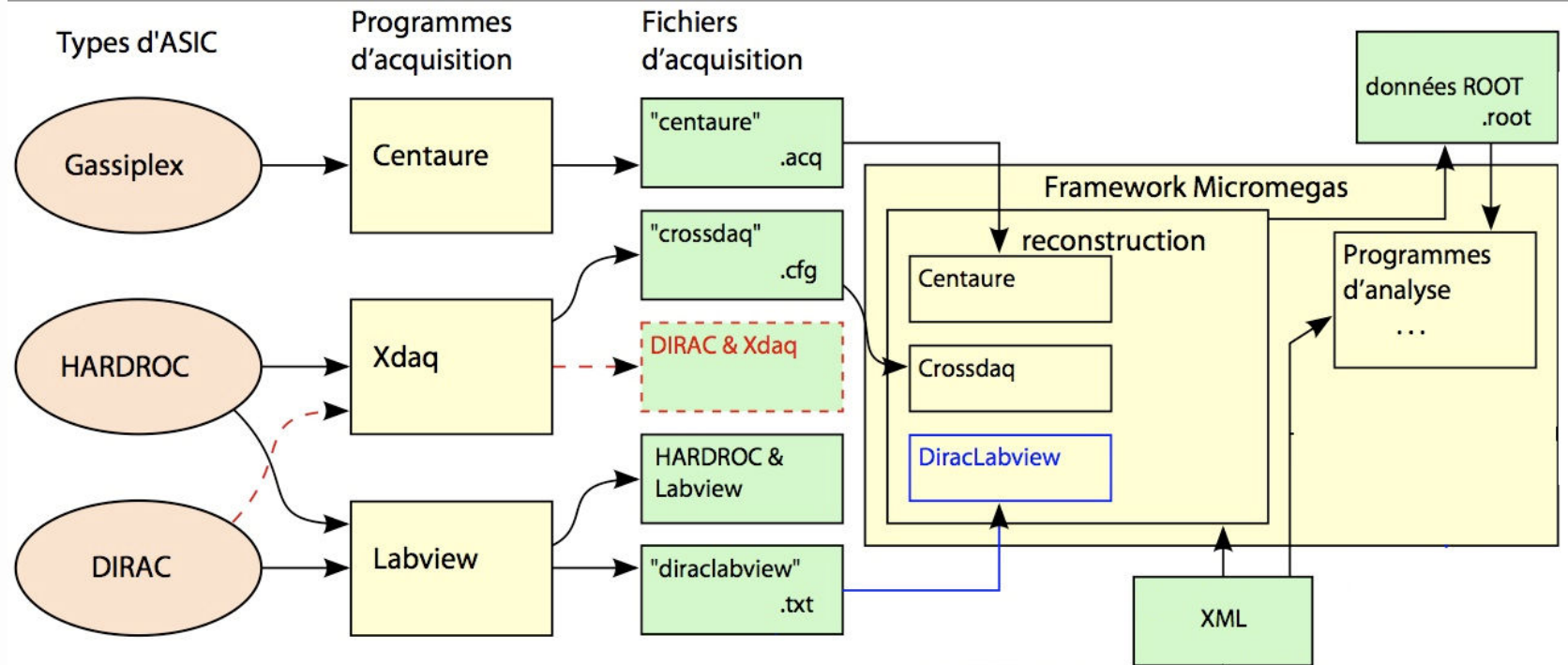
nbre de buffer vide pour fin et pour detection temps mort: 100 fin 100 460

tempo lecture(ms): 1 nb d'octets lu: 0

pas de décodage



Framework de reconstruction et d'analyse





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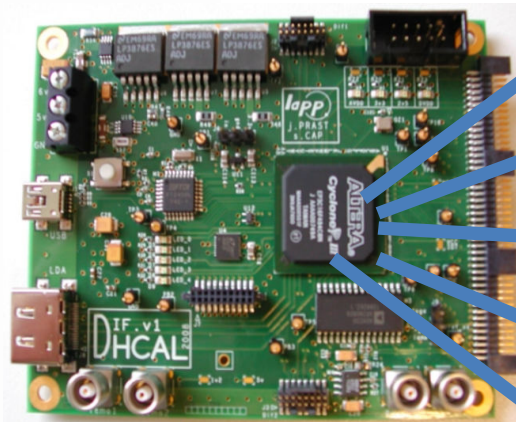
DHCAL DIF Production for the Cubic Meter

Sébastien Cap, Guillaume Vouters,
Julie Prast

14th january 2010



DIF



VHDL firmware1 for Hardroc1 Micromegas

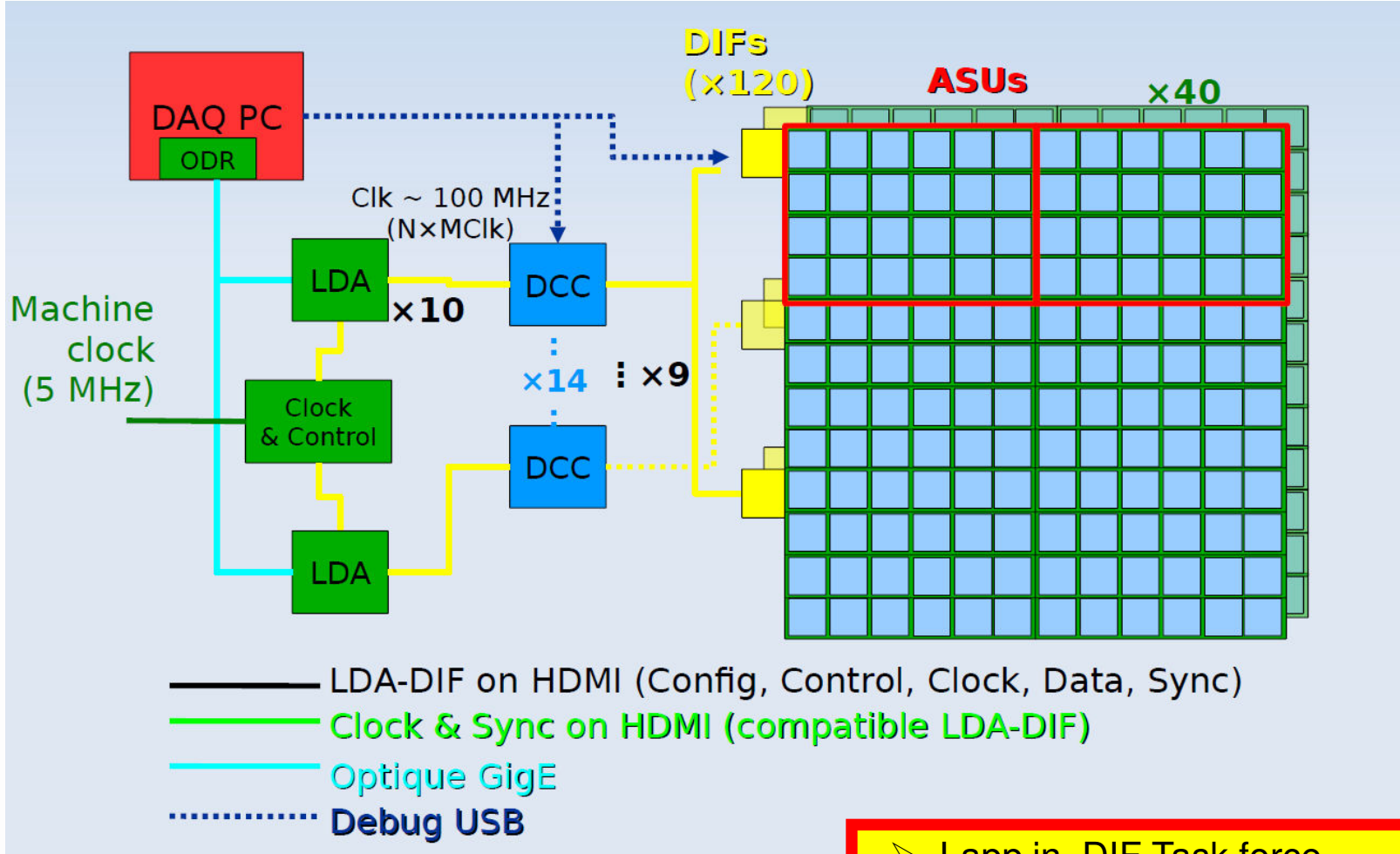
VHDL firmware2 for Hardroc1 RPC

VHDL firmware3 for Dirac2 Micromegas

VHDL firmware4 for Hardroc2 Micromegas

VHDL firmware5 for Calice DAQ Test

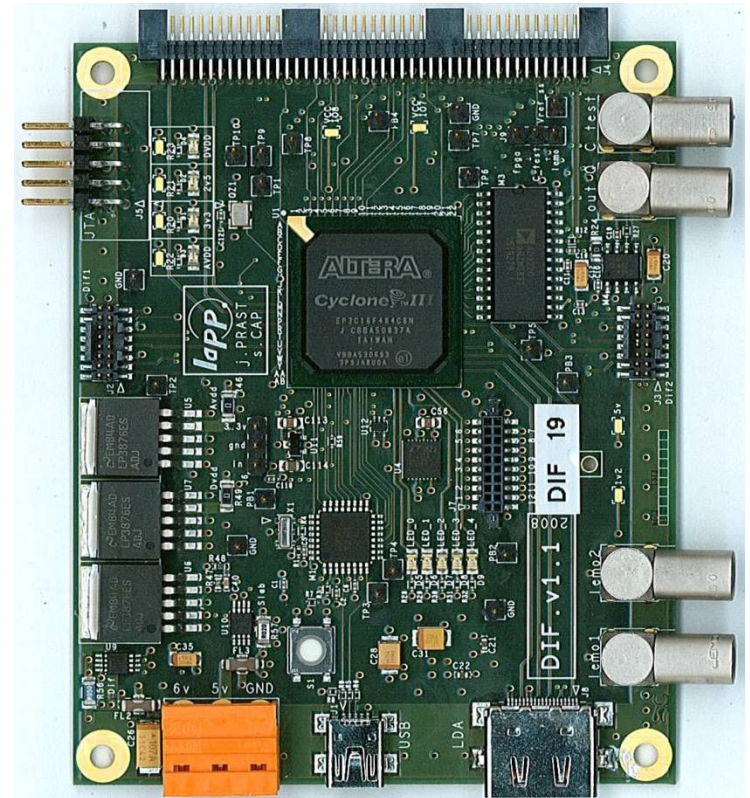
CALICE DAQ



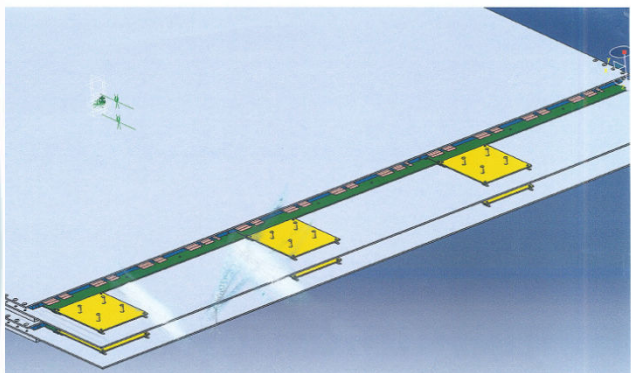
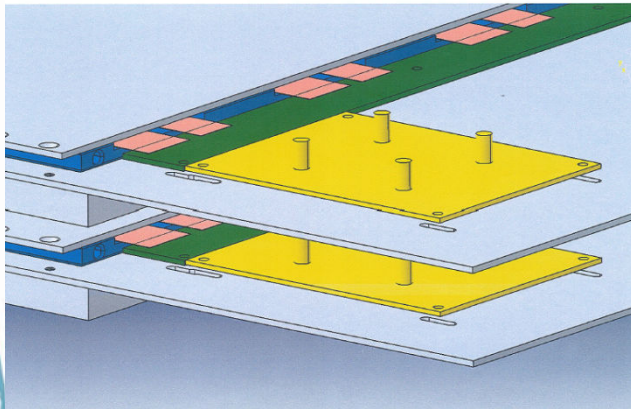
➤ Lapp in DIF Task force

DHCAL DIF Production

- 120 DIF have to be produced for the m³ (+ spares ie 140 ?).
- The DIF will be produced as they are currently.
 - The board works quite well.
 - We do not have time to make a new prototype (schedule + manpower).
- Boards will be produced and tested for beginning of fall 2010.
 - Some boards can be available before if required (> end of spring)



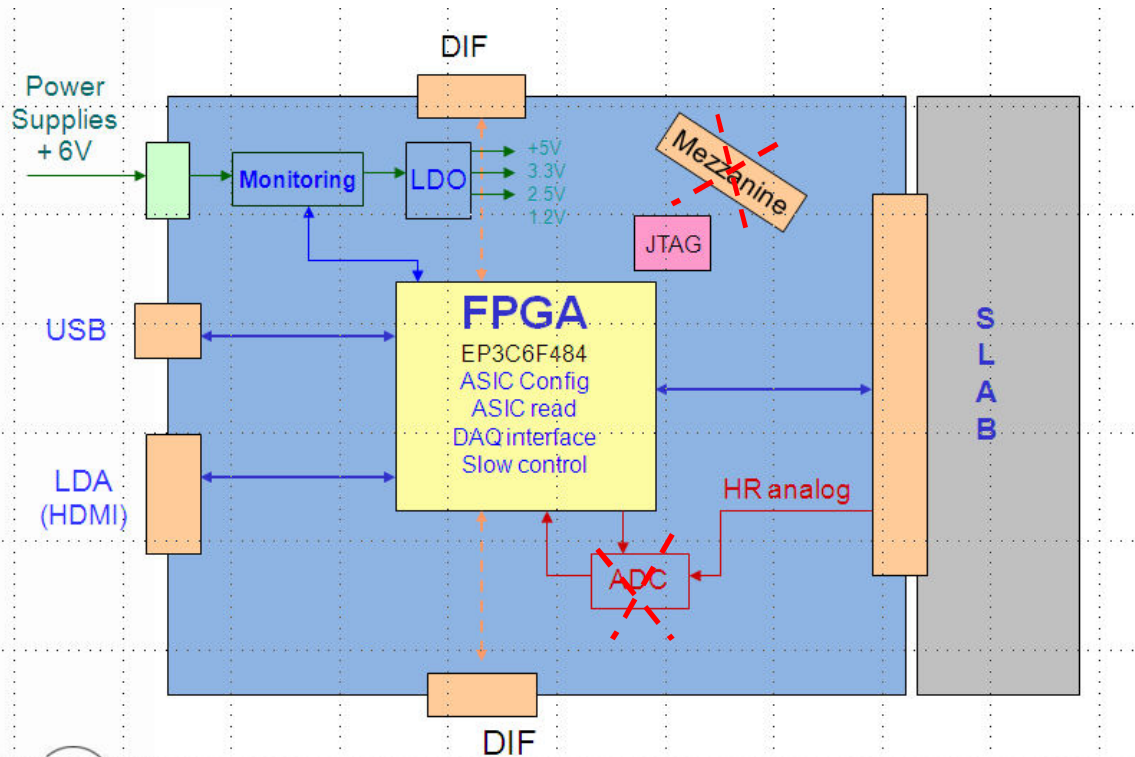
Answers for those who would like a new design



DIF integration in the m³

- Connector reliability
 - The 2 guide pins must absolutely be used !
- DIF dimensions (5 cm width)
 - Not be determining to assess the feasibility of the calorimeter ! Everyone knows it is feasible (see ECAL DIF).
- Connector places (Front End)
 - Not ideal but compatible with m³ mechanism.
- 8b/10b protocol implementation in Altera
 - HDMI DIF Module interface of Marc Kelly
 - Will be checked in February.

Production Costs



DIF cost (established for a production of 120) :

PCB : 20 + cabling : 30 + comp : 172 = 222 €

(187 € without ADC and mezzanine connector ; 166 € without lemo)

Interdif :

PCB : 20 + cabling : 30 + comp : 77 = 127 €



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Thank You
For Your Attention !

14th january 2010

