



Status of the CMS Forward Pixel Detector

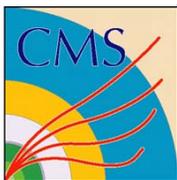
Simon Kwan

Fermilab

On behalf of the CMS Fpix Collaboration

Fermilab All Experimenters Meeting

Nov 26, 2007



FPIX Collaborators/Participants

Sept 2007

- U of Colorado:** J. Cumalat, B. Drell, M. DiNardo, E. Erdos, B. Heyburn, K. Stenson, S. Wagner
- Cornell U:** J. Alexander, S. Das, F. Blekman, J. Hunt, H. Li, A. Ryd, J. Thom, J. Vaughan, J.V. Veszpremi, S. Stroiney
- UC Davis:** J. Conway, R. Lander, D. Pellett, M. Searle, H. Powell, C. Veelken, R. Vasquez, E. Friis
- FNAL:** M. Atac, B. Baldin, D. Butler, J. Butler, B. Gonzalez, A. Hahn, J. Howell, U. Joshi, J. Krider, S. Kwan, S. Los, P. Tan, L. Uplegger, J.C. Yun
- U of Iowa:** C. Newsom, L. Perera
- JHU:** B. Barnett, C.Y. Chien, A. Gritsan, C. Lae, P. Maksimovic, M. Mathis, M. Swartz, N. Tran
- Kansas S.:** T. Bolton, Y. Maravin, D. Bandurin, D. Onoprienko, Z. Wan, K. Ketino, R. Taylor, D. Huddleston
- Milano:** P. D'Angelo, S. Erba, S. Magni, S. Malvezzi, D. Menasce, L. Moroni, D. Pedrini, M. Rovere, S. Sala, G. Cerati
- Mississippi:** L. Cremaldi, D. Sanders, D. Summers, M. Reep
- U of Nebraska:** K. Bloom, D. Claes, A. Dominguez, M. Eads, S. Malik
- Northwestern:** B. Gobbi, M. Kubantsev, R.N. Tilden, F. Valsechi
- Puerto Rico:** A. Lopez, H. Mendez, E. Ramirez, A. Zatserklyan
- Purdue:** A. Apresyan, K. Arndt, D. Bortoletto, G. Bolla, A. Garfinkel, D. Graves, M. Jones, P. Merkel, D. Miller, I. Shipsey, S. Son, B. Xin
- Purdue/Calumet:** N. Parashar, V. Cuplov
- Rutgers U:** E. Bartz, J. Doroshenko, E. Halkiadakis, A. Macpherson, S. Schnetzer, R. Stone, Y. Streltsov
- SUNY/ Buffalo:** K. Ecklund, I. Iashvili, A. Kharchilava, A. Kumar, M. Strang
- Tennessee:** G. Cerizza, L. Flores, T. Handler, G. Ragghianti, S. Spanier, A. York
- Vanderbilt U:** W. Johns, C.A. Florez, E. Luiggi

18 institutes



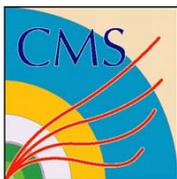
Graduate student



Ph.D. Physicist



Engineering/technical



Deliverables and Overview of the CMS Pixel Disks

FPix (baseline):

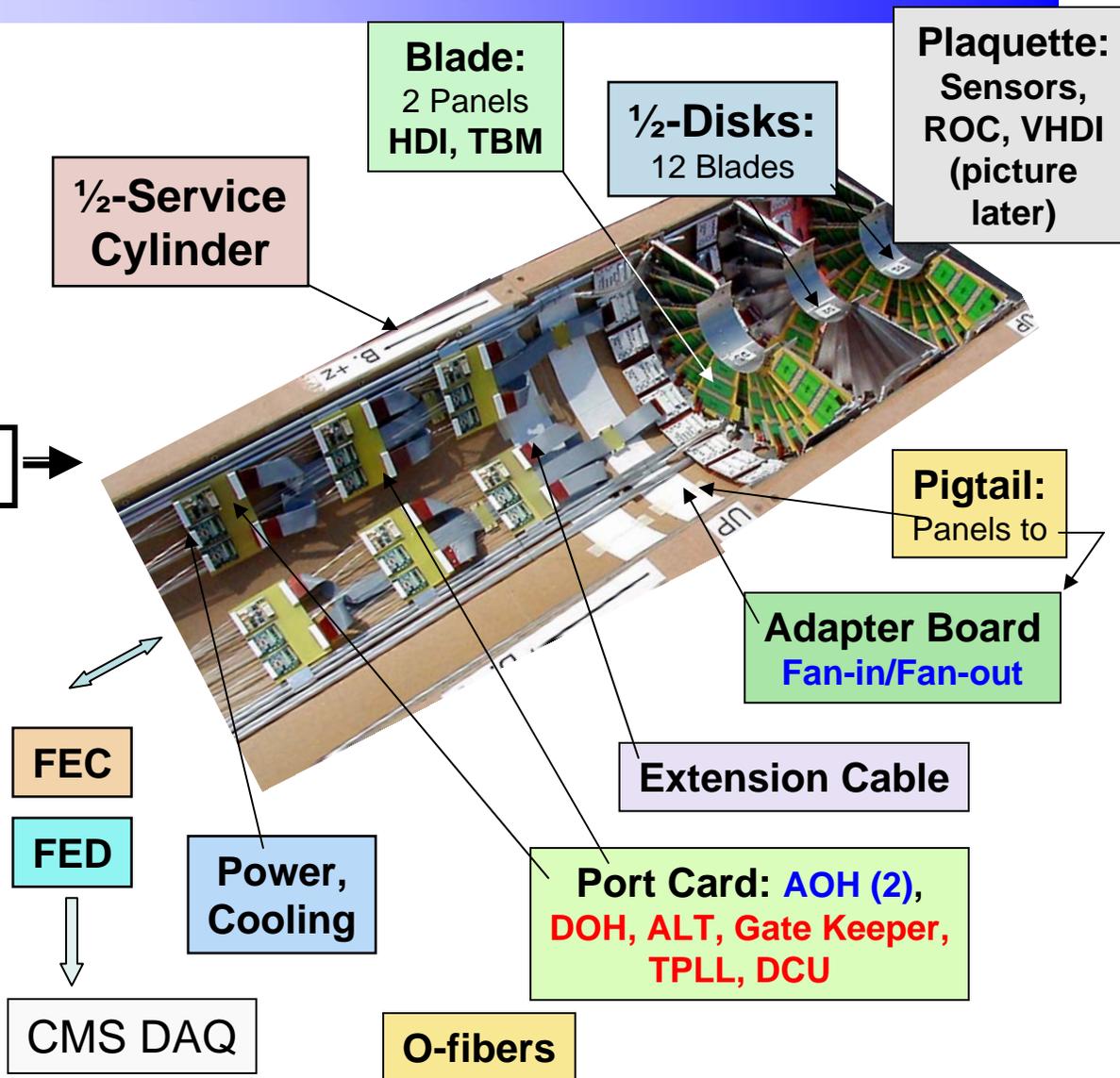
US delivers:

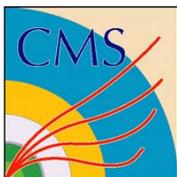
4 disks (18M pixels)

TBM (for CMS Pixels)

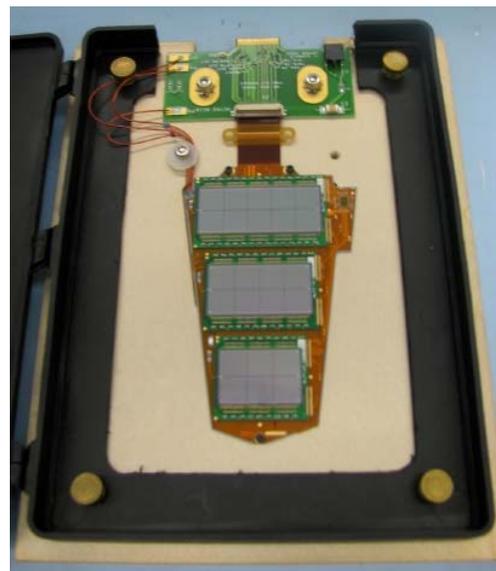
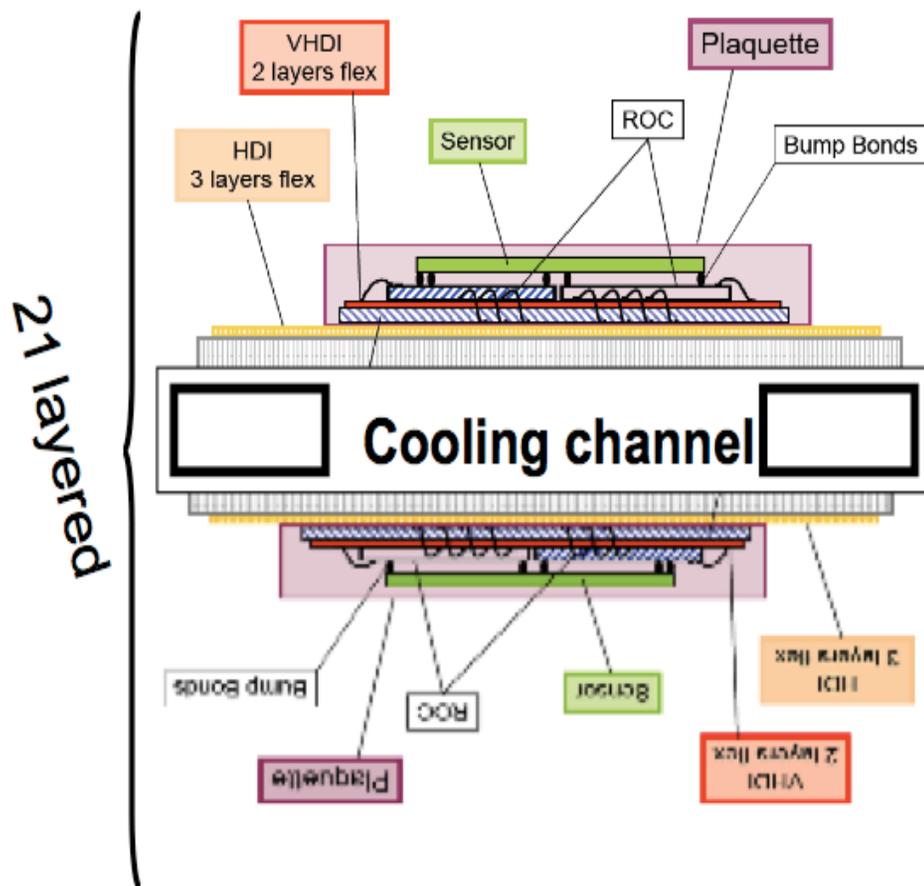
Full size Model

- Mechanical support and cooling
- Pixel Sensors
- Assembled pixel detectors
- The required electronics (adapter board, port card) except the: ROC, FEC, FED and OL





FPix Primer

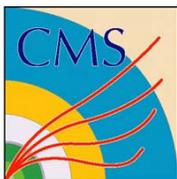


192 panels are needed



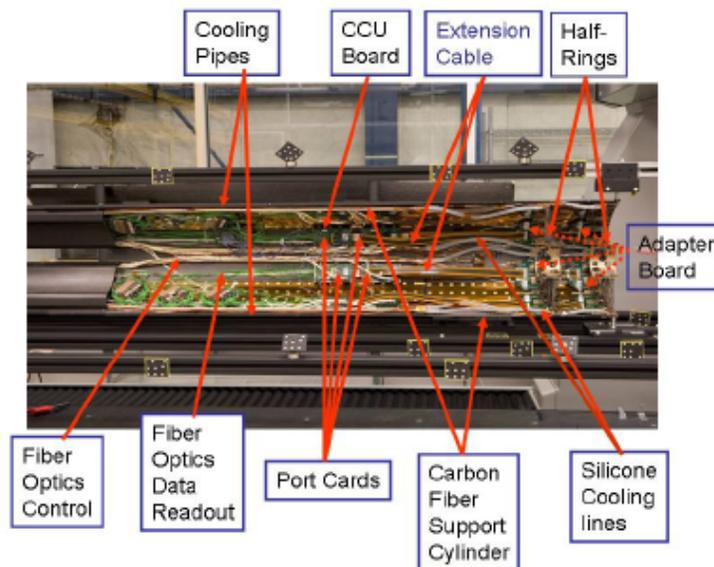
Half disks

Experiment needs 672 plaquettes (7 types) assembled on 192 panels (4 types). Two panels placed back-to-back on Al cooling channel to form a blade



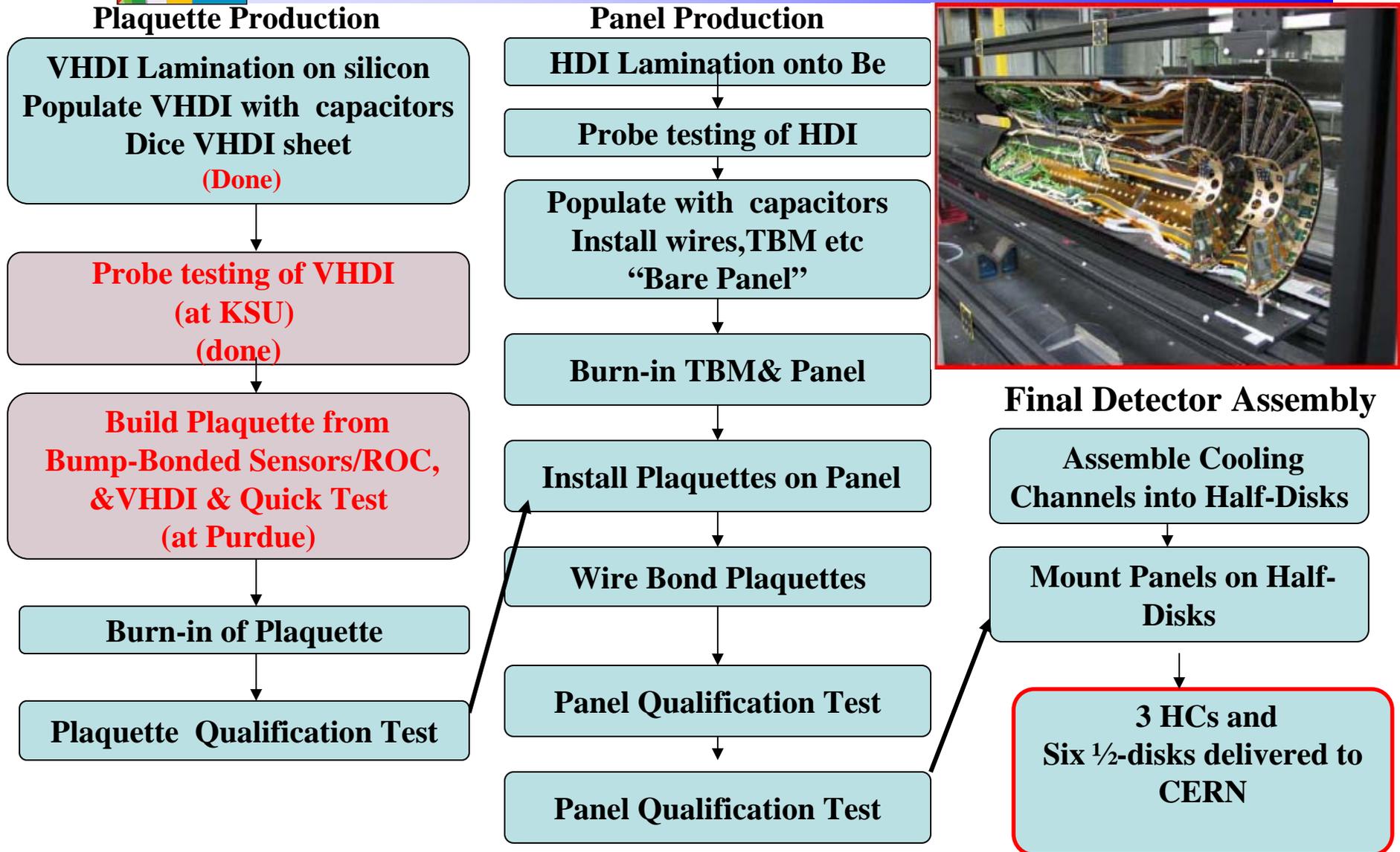
FPIX Numerology

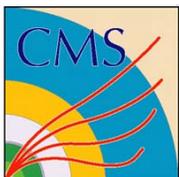
- Two disks on either side of IR
- Four half-cylinders
 - HC-Z1, HC-Z2, HC+Z1, HC+Z2
 - HC-Z1 (delivered to CERN April 07)
 - HC-Z2 (delivered to CERN Jun 07)
 - HC+Z1 (Sept 07)
 - HC+Z2 ??
- Each half-cylinder has 2 half-disks
 - Six out of 8 half-disks have been reinstalled at CERN and tested
- Each half-disk has 24 panels arranged in 12 blades
 - 96 each of 3-plaquette panel & 4-plaquette panel
- Total number of plaquettes = 672
 - 7 types (1x2 L/R, 1x5 L/R, 2x3, 2x4, 2x5)
- Total number of pixel readout chips: 4320



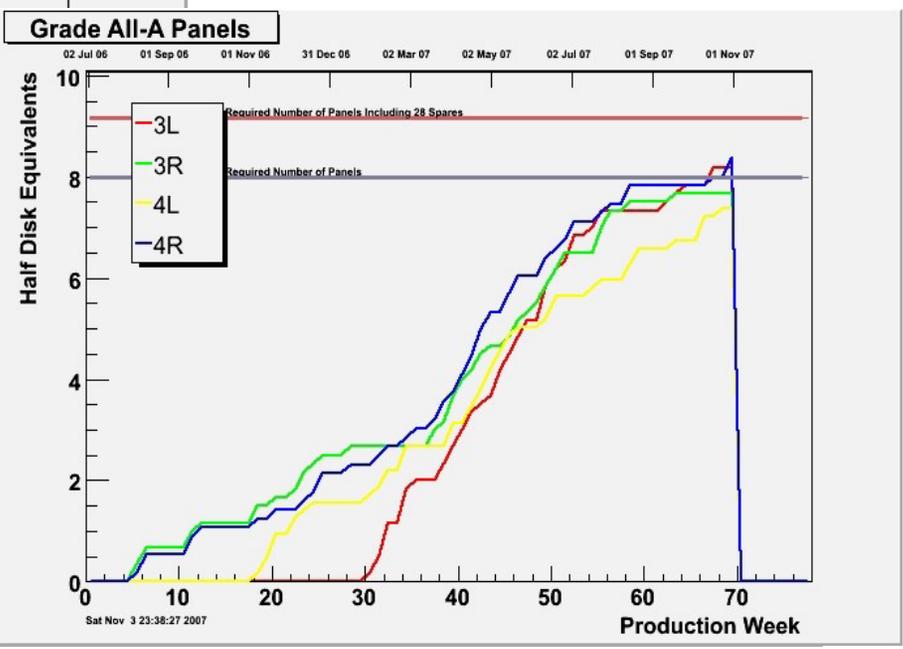
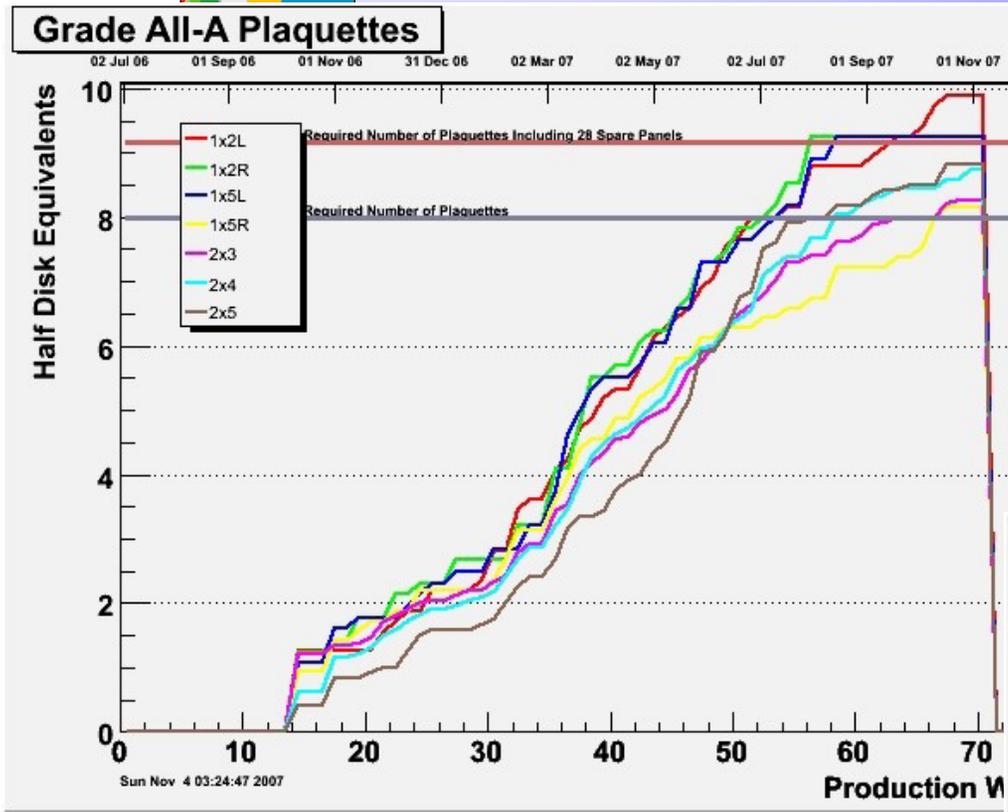


Flow Chart of Production Assembly



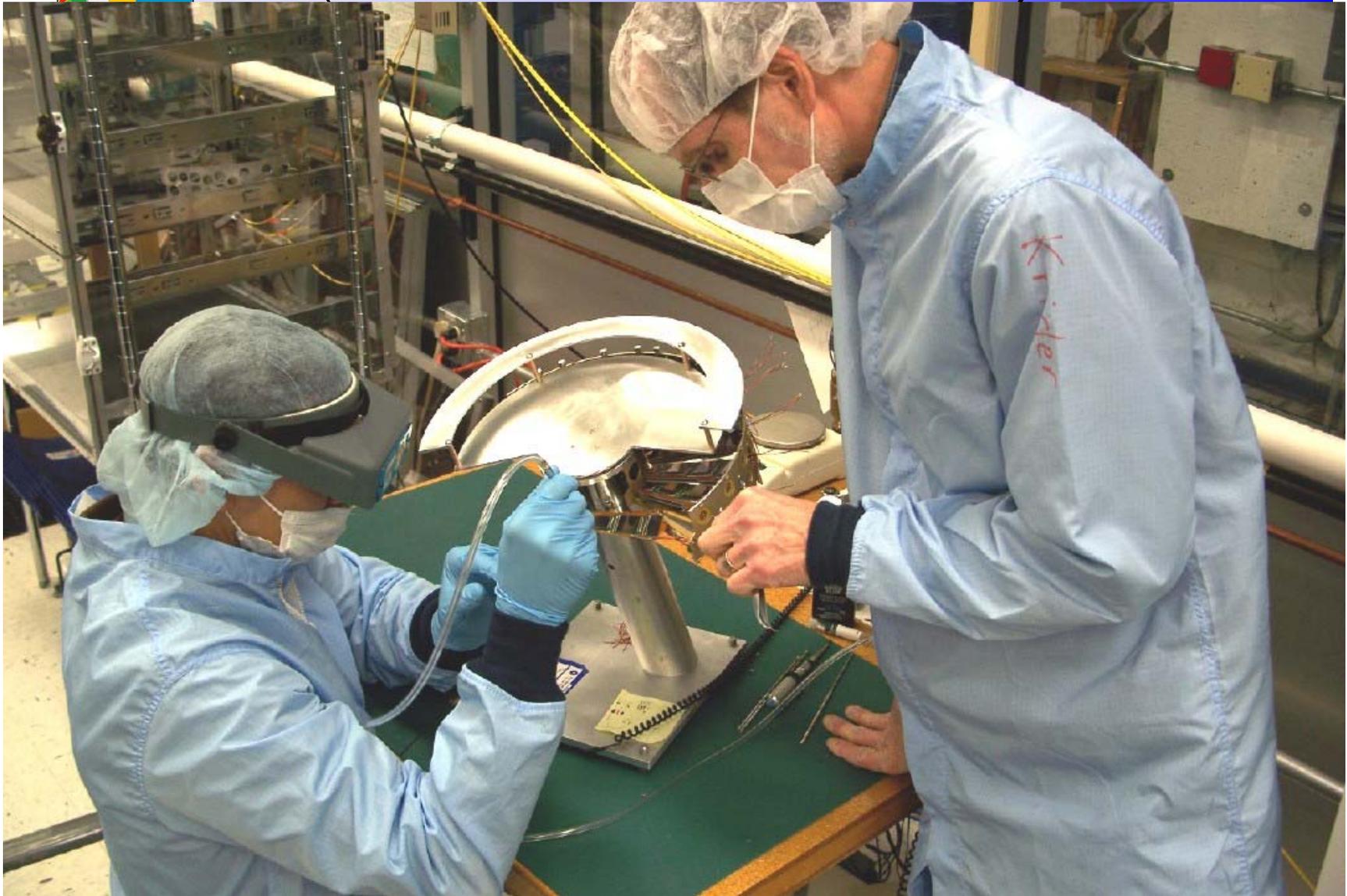


Plaquette & Panel Production





Last Panel Being Installed (Nov 12, 2007) (John Krider and Bert Gonzalez)





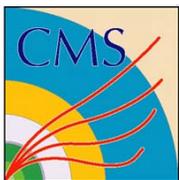
HC+Z2 Schedule

LAST Half-cylinder completely assembled and tested at SIDET

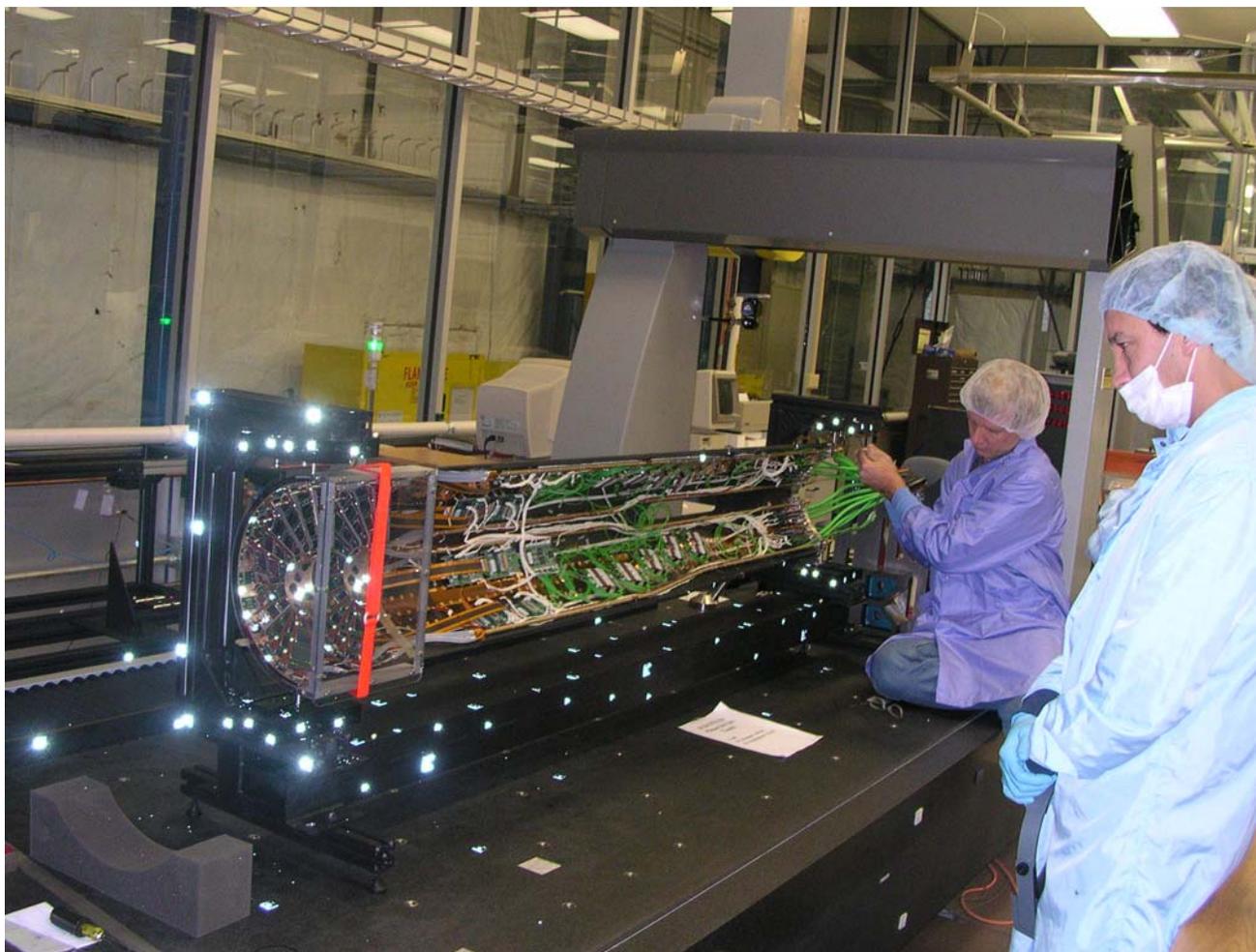
Sun	Mon	Tues	Wed	Thurs	Fri	Sat
18	19 INSERT HD+Z4	20 TESTS	21 TESTS	22 THANKS GIVING	23 Tests	24 ----->
25 ----->	26 HC SURVEY	27 Picture DAY!	28 ----->	29 SHIP HC	30 ----->	Dec 1
2	3	4 HALFDISK SHIPPING	5	6	7	8

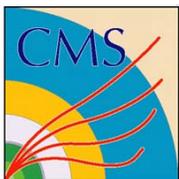
The two half-disks will be re-mounted to HC+Z2 at CERN ~ Dec 12. Successful Completion of the Construction project

We will then fully commission the detector at the Tracker Integration Facility at CERN before shipping it to P5 spring '08.



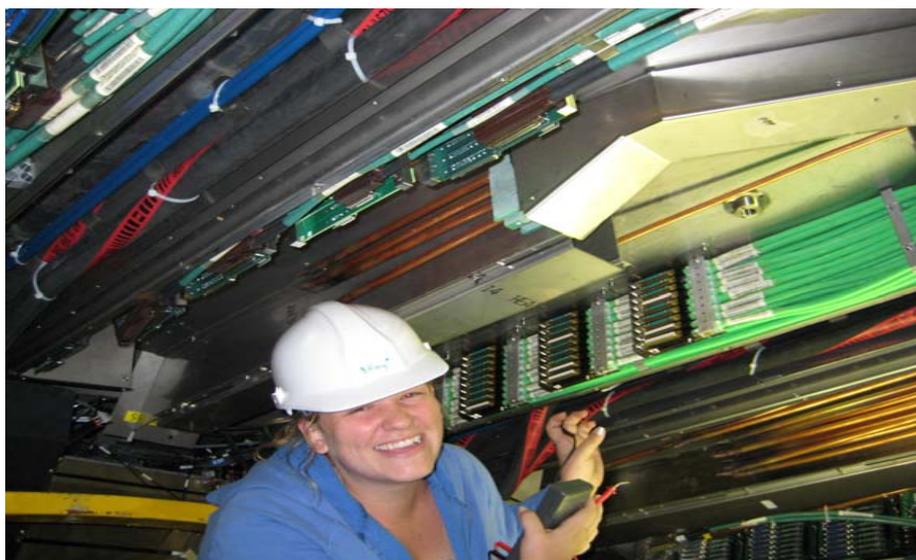
HC+Z2 (Nov 26, 2007)





Installation at P5

- All pixel PP1s have been installed
- We have cables in 4 sectors (two each on +z and -z end) and all cables have been installed and tested
- Cooling pipes have been installed and tested from the cooling plant to PP1
- Fiber installation for pixel will start this week
- Two VME crates with FED installed; will install another this week
- PLC and slow control system installed and tested
- Power supply crates installed with some modules
- Pixel system will participate in the CMS Global run (GREN) this week!

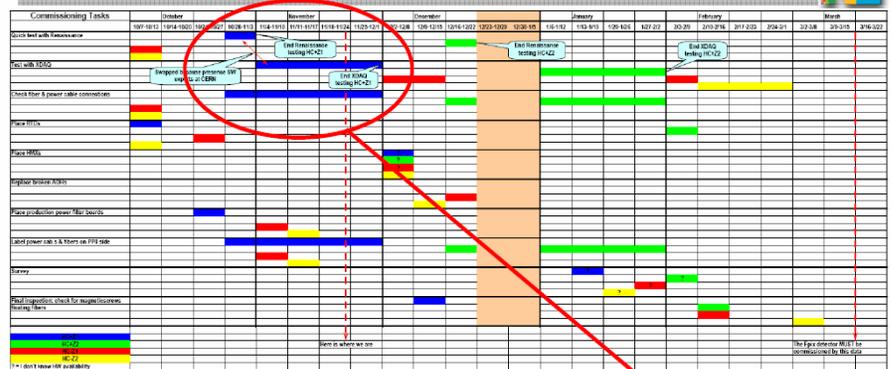




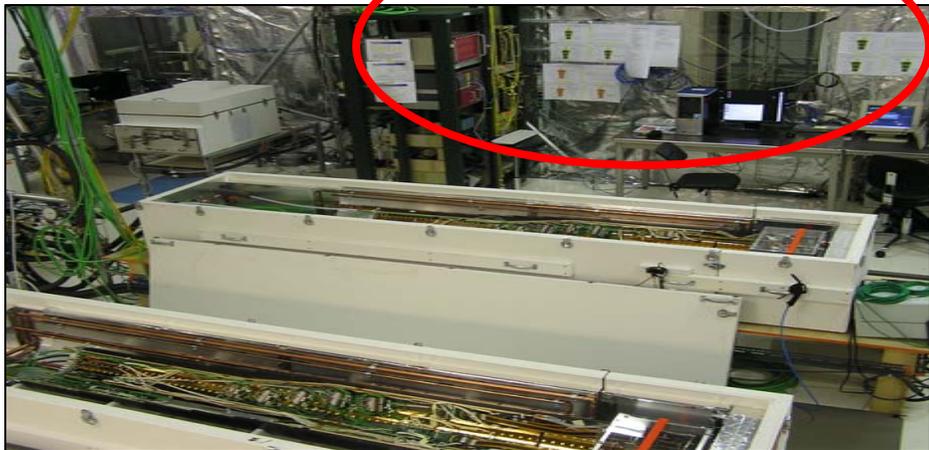
Commissioning at CERN

- Full Readout system: VME crate, FECs, FEDs, TTCci, etc...
- Full Power System: CAEN main frame, modules 4602, 4603
- Full DCS system

Schedule & work plan



Commissioning Tasks	October			November		
	10/7-10/13	10/14-10/20	10/21-10/27	10/28-11/3	11/4-11/10	11/11-11/17
Quick test with Renaissance	█	█	█	█	█	█
Test with XDAQ		█	█	█	█	█
Check fiber & power cable connections		█	█	█	█	█



HC+Z1 will be fully commissioned by the end of this week. We are on schedule to fully commission all four HCs by the end of February '08 and ready for installation at P5. Detailed installation schedule still to be determined.



Summary

- The full FPIX detector has been completely assembled and tested at SIDET -> **COMPLETION of the FPIX CONSTRUCTION PROJECT**
- Shipping of the last HC and half disks to CERN will happen in the next few days
- We expect to have the detector ready for installation by the end of February and ready for data-taking ~ summer 2008
- **Looking further into the future: CMS Tracker Upgrade Workshop for the SLHC – Nov 27 & 28 (1 West, Wilson Hall)**