

CMS WEEK OPENING SESSION DEC 05

BARREL MU

Status of sites / ISR / SX5

Status of MC

First results from Commissioning and Sector test

RPC Barrel

Alignment

Status of installation and plans

below a picture of the gluing table for the last DT Superlayer in Legnaro
(Paolo Checchia 21/10/05)



In Aachen
214SL/214 assembled 9/6/05
68/75 chambers assembled
Chambers for install. 70
(Kerstin Hoepfner 2/12/05)

we have made yesterday, at CIEMAT,
our last gluing operation at the
superlayer level.
This was the last plate of the last
superlayer which
corresponded to the spare MB4/10.
(Marcos Cerrada 25/10/05)

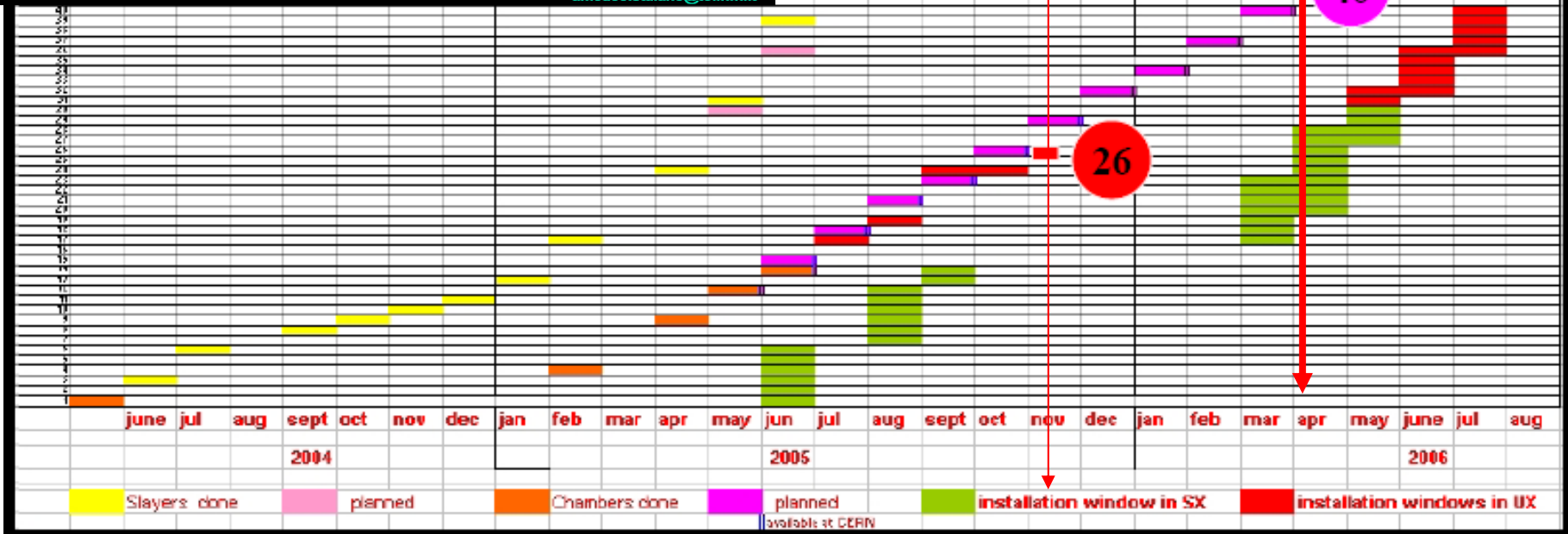


Status of MB4 Production



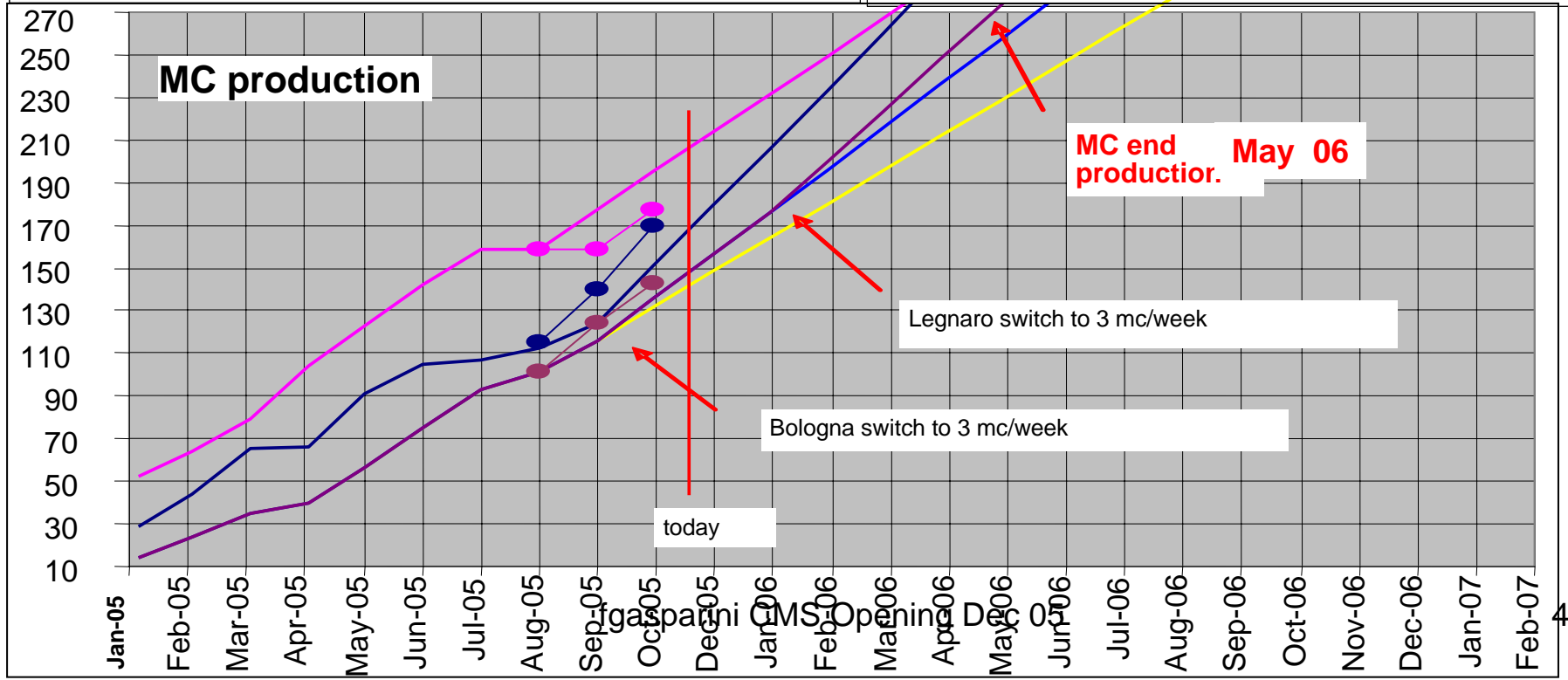
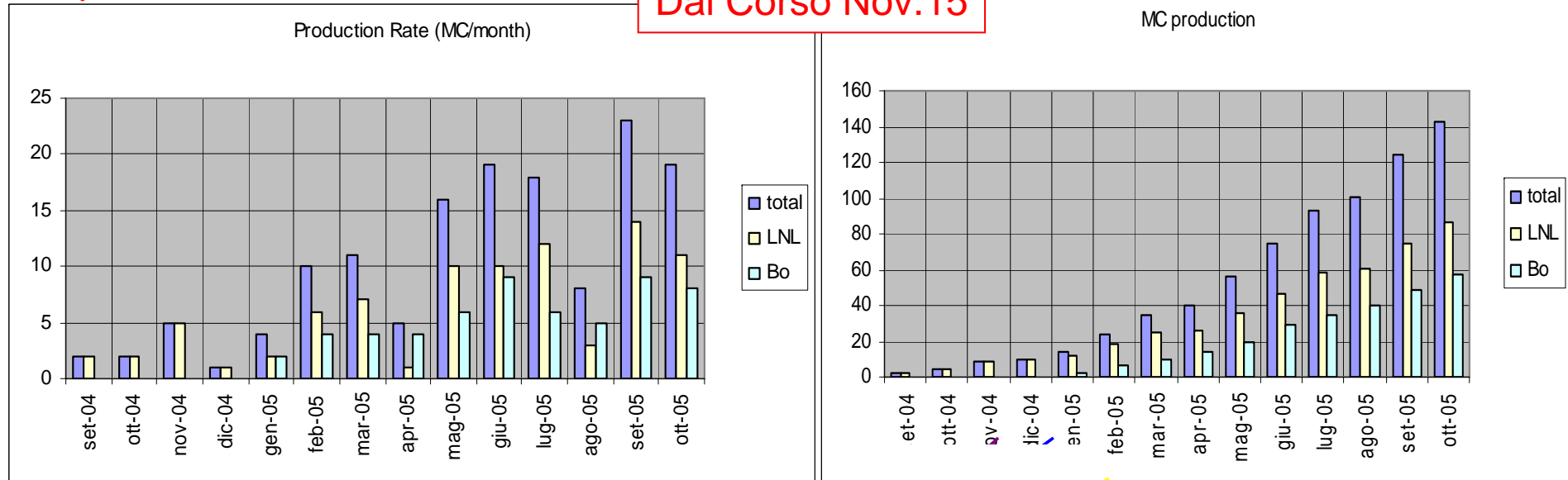
SL Mechanically assembled	65 (82%)
SL Tested	60(75%)
Chambers assembled	26 (65%)
Chambers tested	24
Chambers at CERN	23

amedeo.staiano@to.infn.it



MC produced & Production Rate

Dal Corso Nov.15



ISR DT status (15/Nov/05)

Jesús Puerta-Pelayo

CHAMBER STATUS

130 DT chambers at the ISR, from them:

(+82 already at SX5)

- 11 coupled to RPCs, ready to install (YB0, bottom part)
- 19 more certified (chamber + MC)
- 29 under tests for all installation rounds foreseen before magnet test (certification well advanced in most of them)
- Only 9 MB2 still with old HVBs to be replaced.
- All them already aligned and under gas, being dressed.

TESTS STATUS

Chamber to be installed before the magnet test are the priorities:

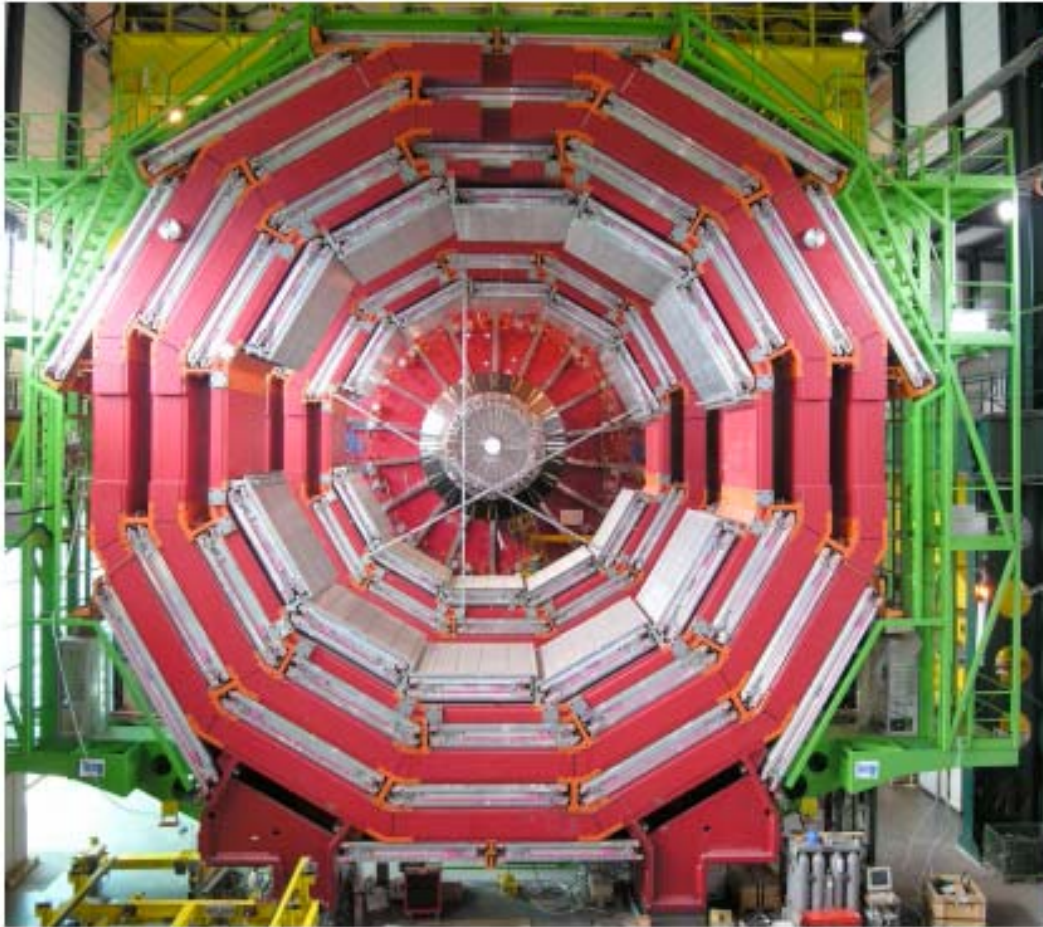
1. YB0, lower sectors
2. YB-1, YB-2, sectors 10 and 11
3. Feet chambers for YB+2, YB+1
4. YB0, upper positive sectors
5. Several Torino MB4s already at the ISR (negative wheels).

PLANS

We can have all chambers ready to install before the magnet test on time. It will require the whole ISR team full time devoted to tests from now until the end of the year. Unfortunately we are very sensitive to unexpected delays (crane maintenance delayed cosmic rays tests for almost a week, as an example). But especially high voltage problems and the time to identify and fix them are the main source of unexpected delays. Yet, this goal is achievable, and I'm pretty sure most of the chambers (if not all) will be ready on time.

For further installations after the magnet test the schedule gets tighter. With the current rate of chamber certification (2 chambers/week according to Alberto's estimation) we would not have the expected amount of chambers to be installed after magnet opening...

We are currently analyzing the time spent in the various steps to certify a chamber with the aim to improve the rate, parallelize the tests and minimize the time needed to certify a chamber.



YB+2 is complete 42 chambers installed
YB+1 has 40 chambers installed ,feet chambers missing
(A.Benvenuti,M,Benettoni and crew)

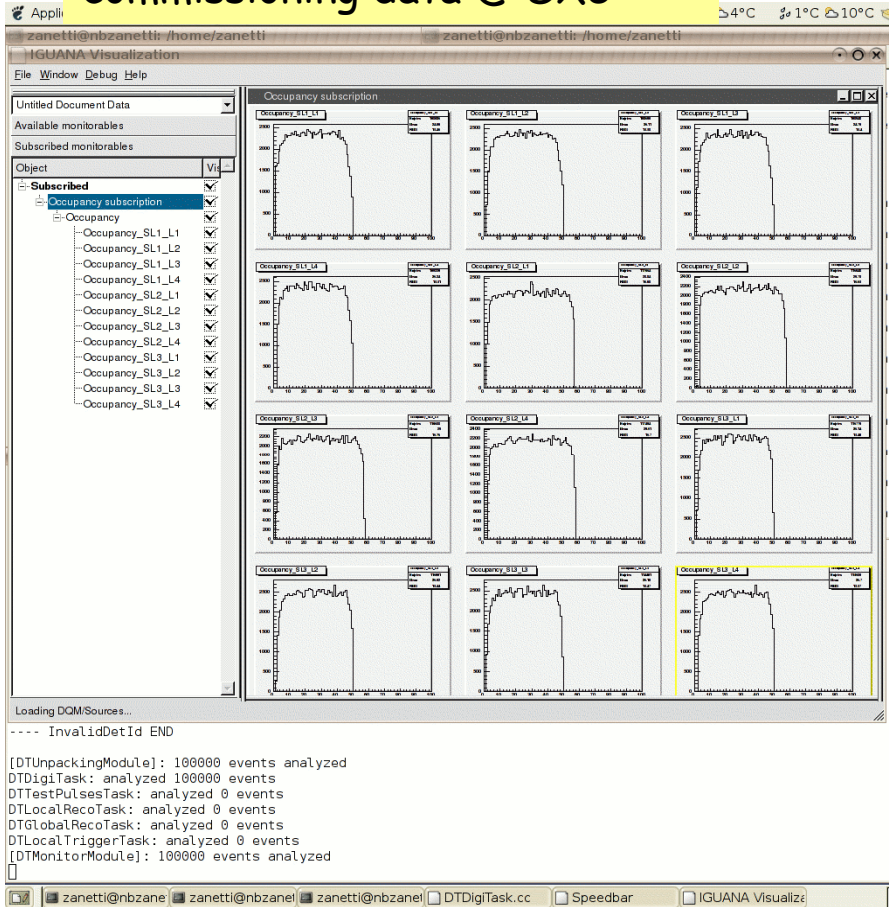
All commissioned before Xmas (with MCrates) (E.Conti.M.Zanetti,K.Hoepfner +...)

From U.Gasparini

Towards software integration:

DTdigi in CMSSW

IGUANA screenshot of DT-DQM application: occupancy plots from chamber commissioning data @ SX5



Objects

- CMS Detector
 - Event
 - Muon Event
 - DT Digis

Total 12 DT digis from Cosmic run: Run # 3820, event # 2

Number	wire	number	countsTDC
0	38	0	2494
1	39	0	2667
2	39	0	2820
3	39	0	2762
4	2	0	2856
5	3	0	2544
6	2	0	2708
7	3	0	2698
8	44	0	2774
9	45	0	2633
10	45	0	2470
11	46	0	2473

Run # 3820, event # 2

Analysis of Commissioning data:

F.Cavallo,M.C.Fouz, K.Hoepfner,A.Meneguzzo,M.Zanetti,+ Torino +....

D.Reato & A.Meneguzzo

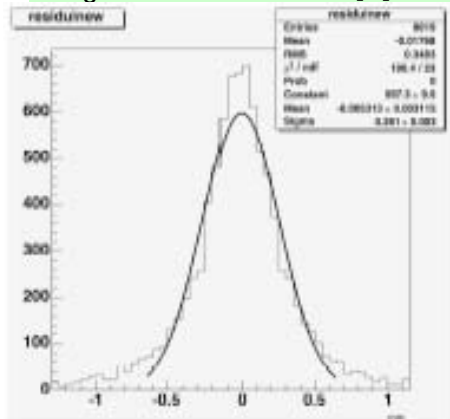
Goal :

Find the resolution of DT chambers on autotriggered cosmic ray tracks.

On autotriggered cosmic ray data the time of the cosmic ray track can vary with an almost flat distribution of 25 ns so the normal fit procedure, which uses a constant T_0 , yields $\sim 450\mu\text{m}$ resolution/layer.

But in each event all points (drift time of different layers) have the same time displacement in the range of 25 ns.

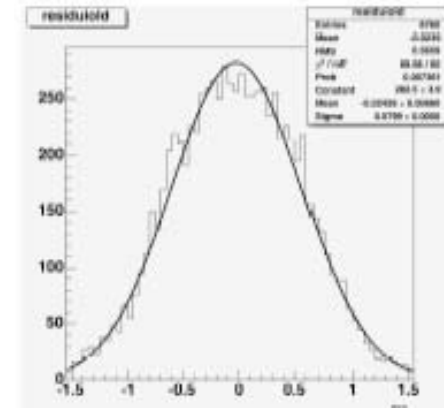
Residuals : event
 δt_0 correction applied



layer	mean [μm]	sigma [μm]
1	-2±3	221±3
2	-16±3	220±3
3	7±3	227±3
4	9±3	239±3
5	-9±3	247±3
6	25±3	235±3
7	-18±3	222±3
8	3±3	244±3

$$\sigma_{media_{new}} = 232 \pm 2 \mu\text{m}$$

Residuals:
no δt_0 correction



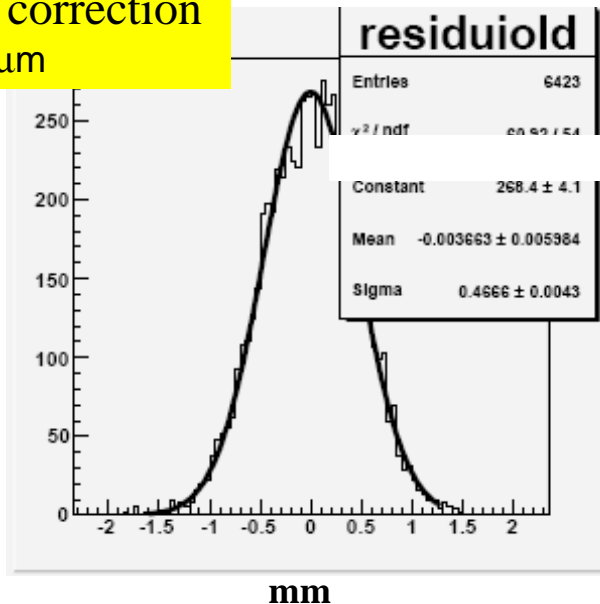
layer	mean [μm]	sigma [μm]
1	-8±15	518±7
2	-12±7	546±6
3	-14±7	552±5
4	14±7	537±6
5	-14±6	547±5
6	28±7	559±6
7	-22±7	556±5
8	15±6	526±5

$$\sigma_{media_{old}} = 543 \pm 2 \mu\text{m}$$

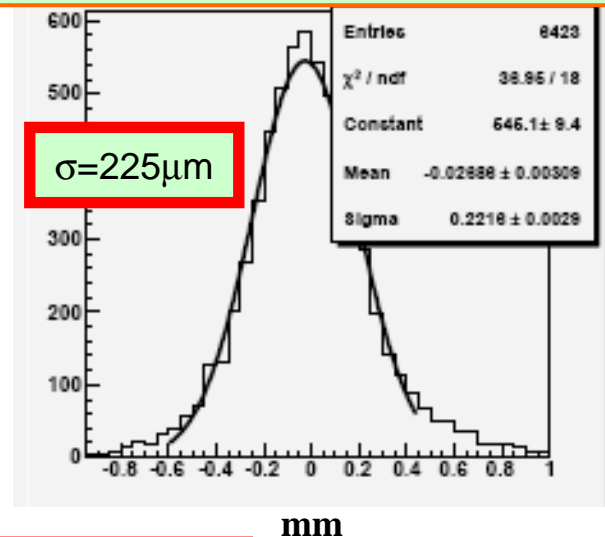
Application of the method to commissioning data. Run 3633 MB3-c34, settore 9 Autotrigger H+anyTheta

This MB3 chamber is in sector 9, not horizontal. Apparent drift velocity depends on angle Use a drift velocity as a function of the angle $V_{drif} = V_{drif}(\text{angle})$.
Add selection: angle < 30 degrees (No correction for wires and SL relative position)

No t_0 correction
 $\sigma = 470 \mu\text{m}$

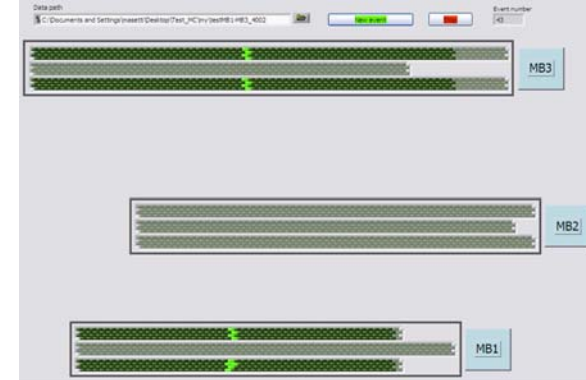
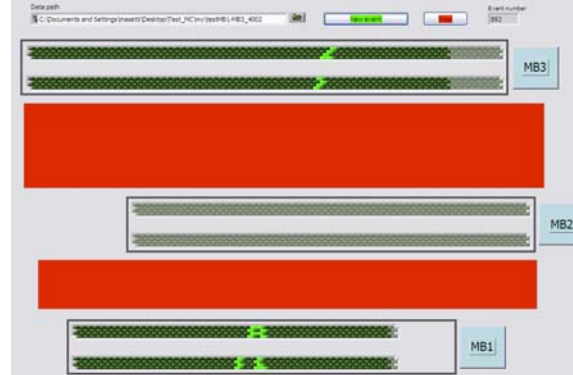
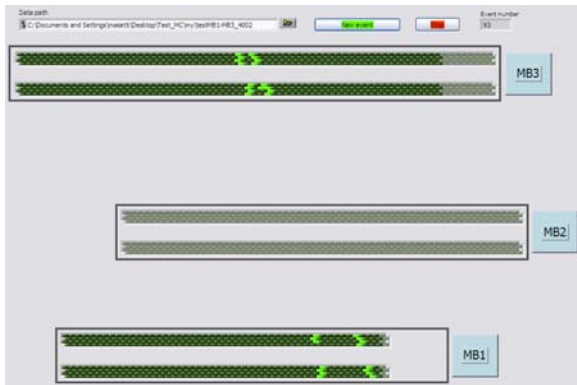


Residuals : $V_{drif}(\text{angle})$ & event
 δt_0 correction aplid



All YB+2 chambers analysed : resolution 200 ~ 230 μm , very few little irregularities to be understood.

D.Reato & A.Meneguzzo



Event display (from G. Masetti)

November 14 DONE take cosmic muon data with MB1 and MB3 of YB+1 Sector 4

week of December 12
take cosmic muon data with MB1,MB2,MB3,MB4 in Sector 10 of YB+1 (or YB+2)
now until Xmas validate functionality of Sector 10 and 11 of YB+2

M.Dallavalle.E.Conti (K.Hepfner) +.....

DT MTCC project ramp-up in steps:

Sector Commissioning

- goal: autotrigger on one chamber and acquire data from 4 chambers, DAQ synchronisation, first look at cosmics traversing a sector
- note: chamber commissioning electronics



•Sector Test –local mode

- goal: final tower electronics, local autotrigger logic with 4(5) chambers, read ROS25 with local DAQ (no FED)
- note: TTC system as in commissioning set-up

•Sector Test –regional mode

- goal: provide trigger to CMS, integrate regional trigger, use final TTC system

•3-Sector Test

- goal: cosmics trigger with three sectors

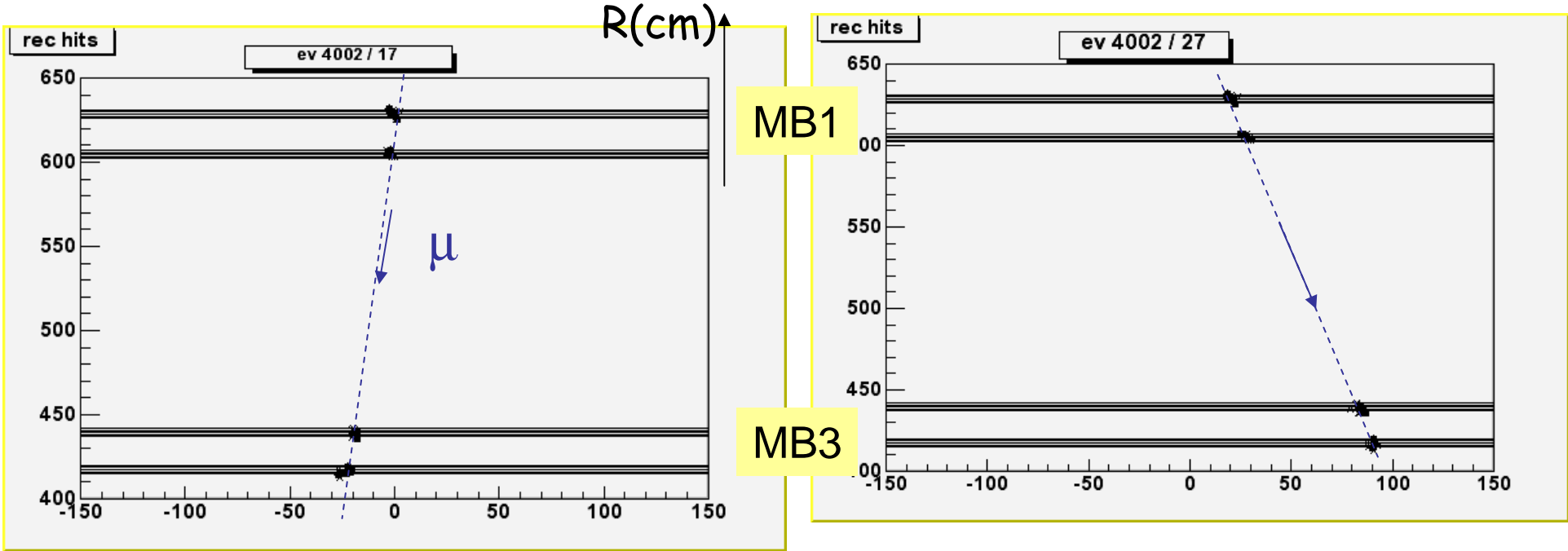
•FED Integration

- goal: data flow from ROS through DDU to global DAQ



SX5 data, cosmic run 4002

(U.Gasparini,A.Meneguzzo,P.Ronchese)



Events collected with
MB1 autotrigger

MB1 (3 Robs, r-φ view only) and
MB3 (4 Robs) equipped for DAQ

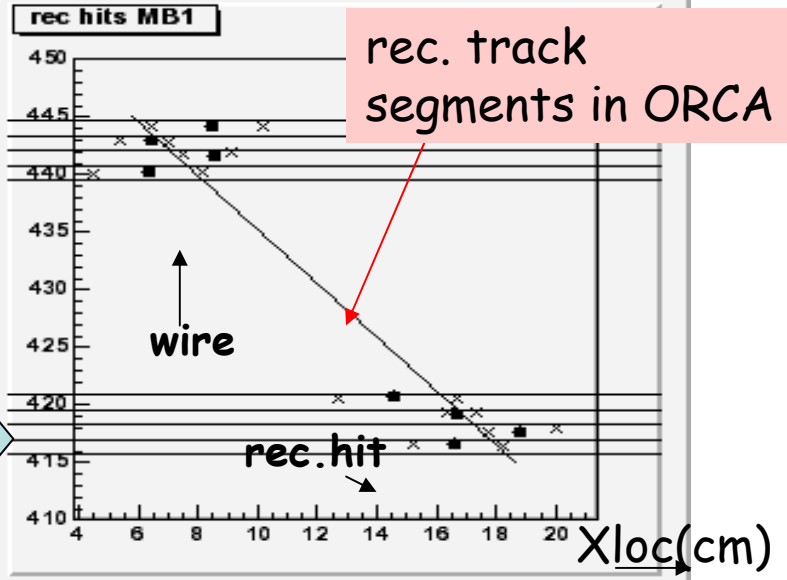
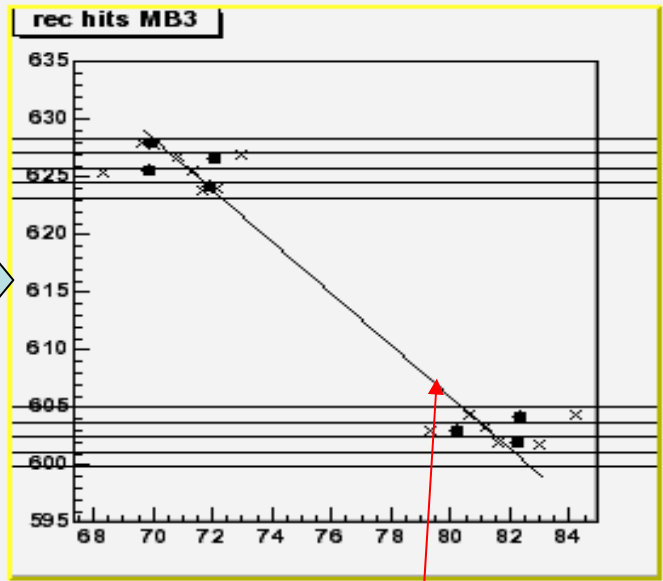
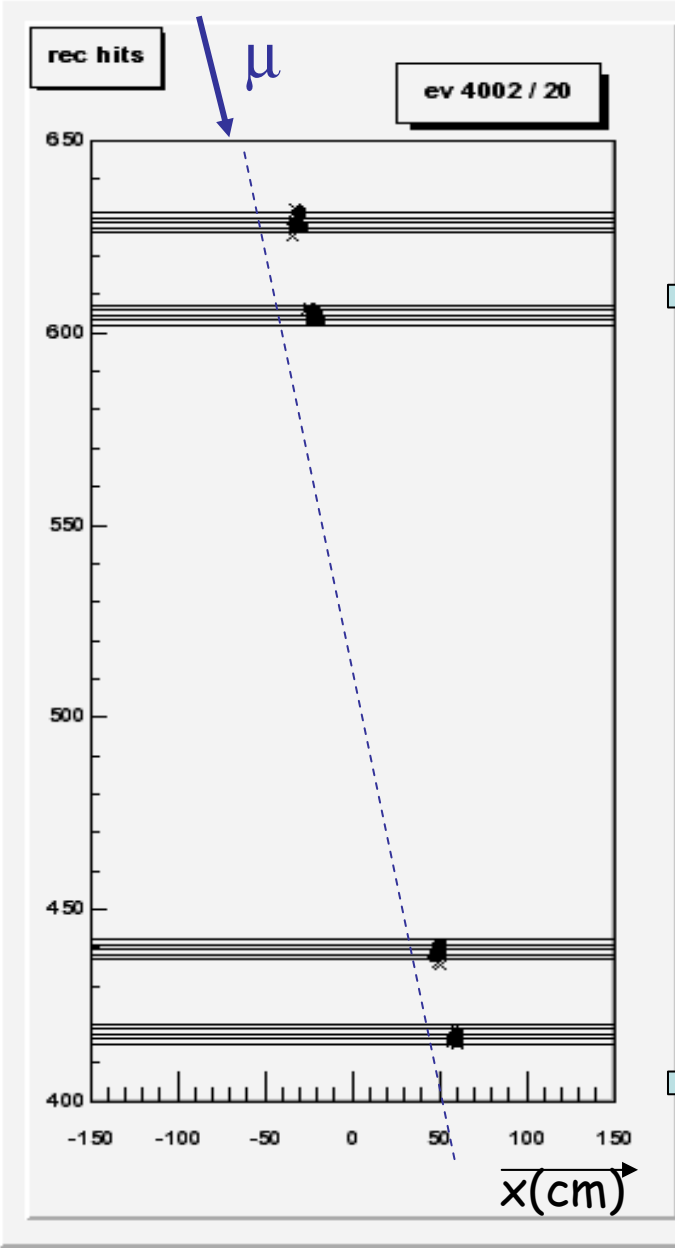
1 event in more detail... →

Sector 4
Wheel +1

MB3

R (cm) ↑

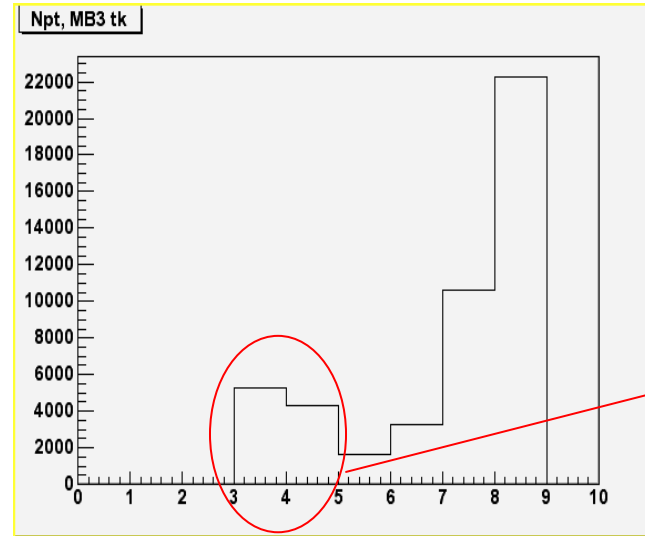
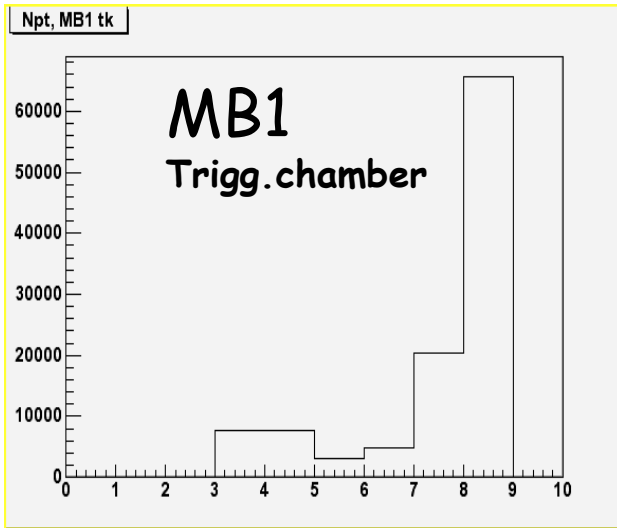
MB1



rec. track
segments in ORCA

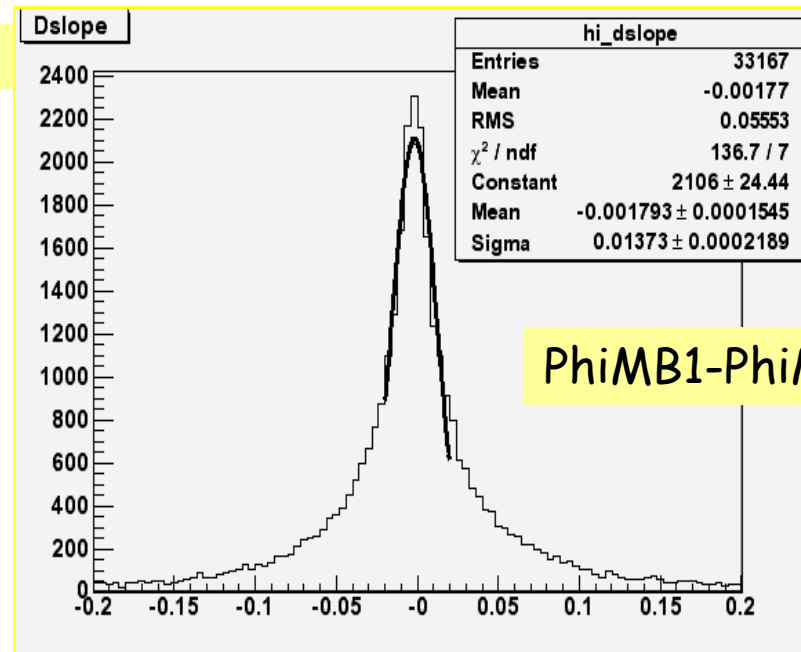
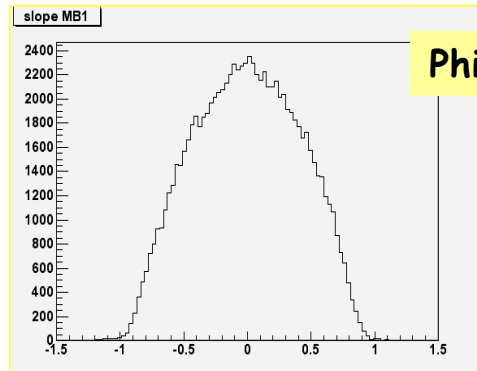
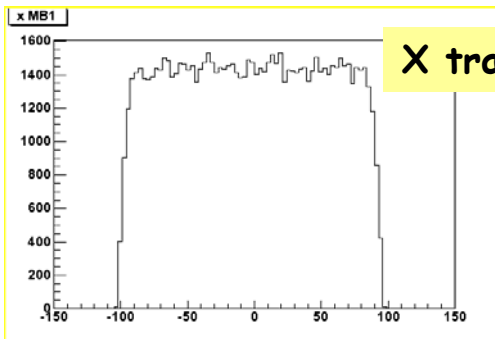
Rechits in track fit

(U.Gasparini,A.Meneguzzo,P.Ronchese)



MB3

Events in 1 SL
(memo: MB3 is the non triggering chamber)





Overview of Chamber Production

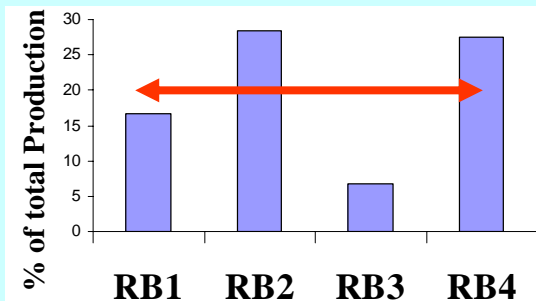
Single Gaps: 2900 SG produced (~ 83 % accepted) → **180 SG** to be built (~10 % of total).

Finish production January 06

Double Gaps: 1040 DG produced (~ 96 % accepted) → **160 DG** to be built.

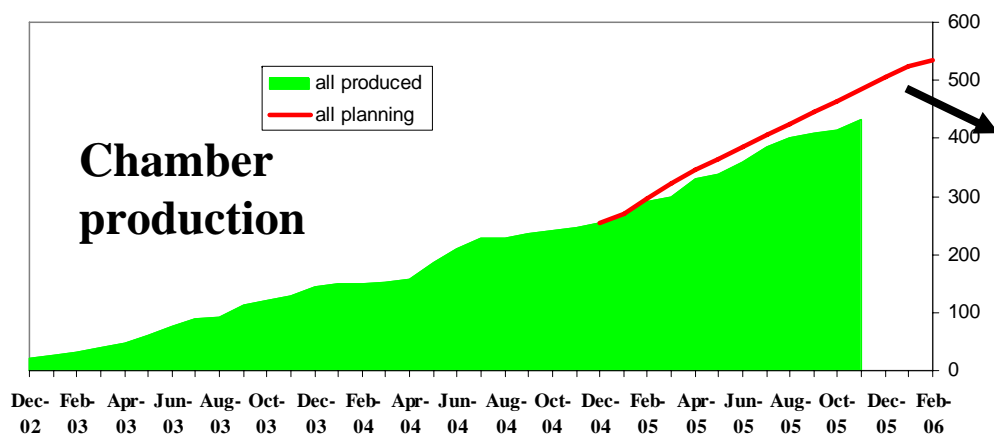
Finish production: February 06.

432 Chambers have been assembled → **20 % of total production to be built**



350 Chamber accepted at cosmics test

max efficiency = 97.3 %
 noise rate = 1.7 Hz/cm²
 cluster size = 2.2 strips
 current = 3.6 μA



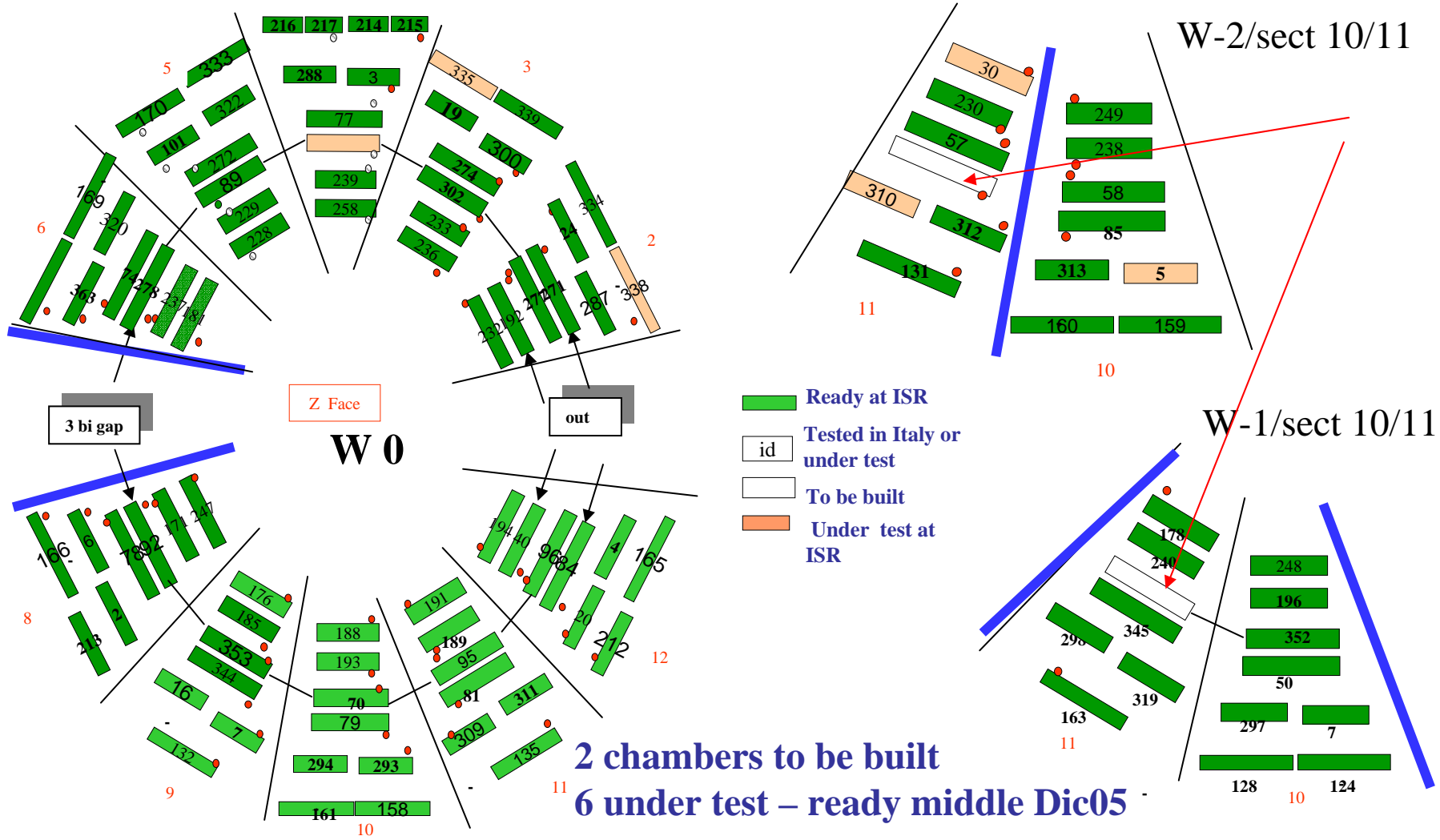
Finish production: April 06
All Chamber tested end accepted in June/July 06



Installation

A. Colaleo
CMS RPC group

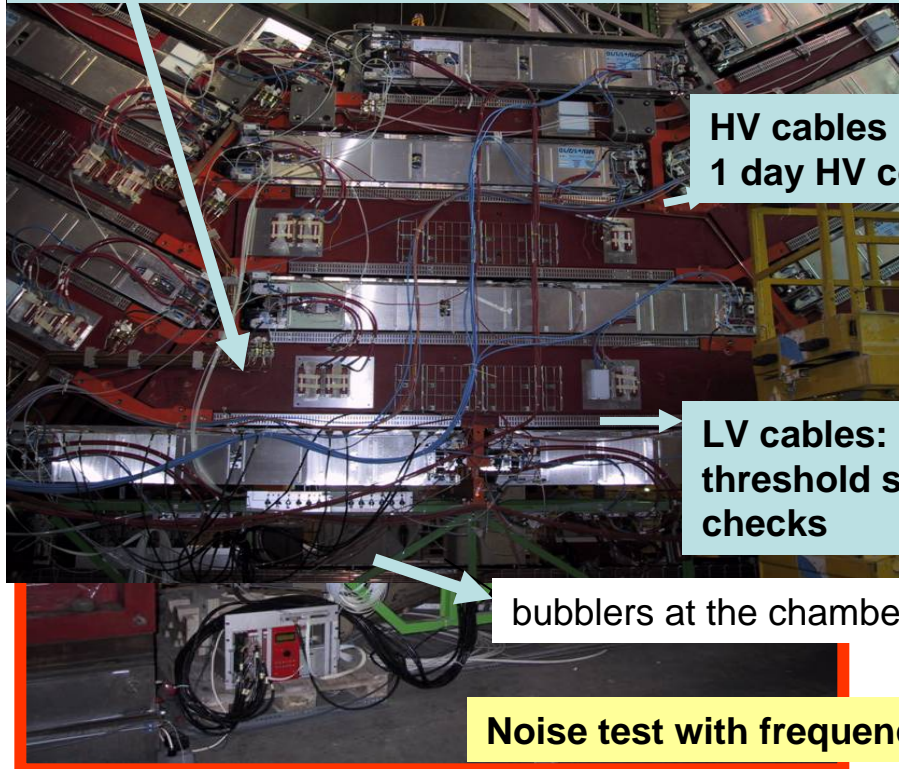
W+1/W+2 installed but RB4 sect 9/11 W+1
Next installation end Jan06 : W0 - W-1/W-2 sect 10/11



2 chambers to be built
6 under test – ready middle Dic05

Commissioning on wheel

On flight gas pipes on the sector: 2 days flushing



HV cables :
1 day HV conditioning test

LV cables: 1 day
threshold setting/reading
checks

bubblers at the chamber outputs

Noise test with frequency-meter: 1 day

Gas System

- Final gas mixture
- Gas mixture monitor done
- Interlock system done
- Final distributor under commissioning

Chamber test

6 sector/10 sectors tested
Conditioning under HV
Connectivity check
Noise test
1 sector/week will be improved next week using the final gas distributor

Preliminary Sector Tests **under way**

W+1 Sect 03,04,05,06,09,10 done

Gas Distributors require better understanding

Sector Commissioning Schedule **depends on the arrival of essential components (LV, HV and LBB)**

Cosmic Challenge **defined**, but depends also on the Bld. 904 activity

Alignment (MTCC) readiness report

Conclusion:

- **Very tight for MT readiness in all aspects: hardware, electronics, DB and software.**

Counting with working on installation up to end of March, ***if unforeseen arrives, there is no contingency*** for the barrel and tracker part and very minor at the endcap.

- Thanks to the MT **we have made real progress** on finalizing all the parts of the system. But we will still need a big effort on assembly and calibrations after the MT
- A priori, **the installation needs** (access, tooling, personnel and time) **for the MT sound feasible**, since only a limited part of the system will be implemented (few components).

Most demanding in terms of installation are the endcap discs (it needs adjustments of almost all main components). Installation of mechanics, cables, PP and electronic-boxes is advanced. The installation and test of real full instrumented components could **start mid January/early February.**

In detail:

T.Rodrigo

Hardware

- All the parts (for the MT) are available. The assembly and calibration is a long process.

BUT it could happen that not all the components will be fully calibrated for the MT.

a) not able to make a complete analysis of the MT data;

b) need to dismount and calibrate for 2007.

- Basically all the subsystem parts are at similar stage of completion no really singularized problems

Electronics, Software DAC and DB

- The status on hardware electronics is good. Apart from LV supply!!

- A problem of manpower on Endcap integrated software DAC. It can be solved quickly if we get help from Muon Endcap community.

- We are moving geometry and calibration tables to Oracle DB format. Good progress, hope to have a preliminary structure, probably not with all the available information/measurements (SU, chamber construction, model deformations, etc..), for the MT.

This effort is well integrated inside the Alignment/Calibration DB software group and the corresponding PPS muon groups.

THE INSTALLATION / CABLING / COMMISSIONING CHALLENGE

Cabling is late : pilot test on YB+2 sect. 10 & 11 done , cabling continuing on the rest of the wheel

Plans:

Cabling

Complete YB+2 ,YB+1 before the Mag.Test (cutting lengths)

Installation

YB0 31	YB-1/-2	5 sect 10 + 3 sector 11(idem fro -2)	= 16
		+3 MB4 (To) in YB-1 2 in YB-2	= 5
		+ feet Ch in YB+1	2

BEFORE Mag Test

Install chambers in YB0 , sectors 10/11 of negative wheels in February / March

54 chambers SX

AFTER Mag Test

YB0,-1,-2 in SX

74 chambers SX

YB+1,+2,0,-1,-2 in UX

40 chambers UX

Total after Mag.Test

114

THE INSTALLATION / CABLING / COMMISSIONING CHALLENGE

Time needed for installation after Mag.Test : 26 ~ 30 Weeks

All taken into account:

installation,cabling preparation preparation,commissioning,cabling,test after cabling

**Crane availability from 8.00 to 20.00,
five w. days per week
(Saturday as contingency)**

Parallel commissioning/cabling in 2 different wheels and other parallel works

New transport frame and some extra tools in order/construction ready and operational during mag Test

No accident, all DT+RPC ready on time

No lack of Manpower

Alignment must be installed in the same time windows (to be understood)

MU Barrel Technical Board AGENDA

Tuesday December 6th

- | | | | |
|---|--|---------------------|-----|
| 1 | Installation Plan for 2006 | A. Benvenuti | 15' |
| 2 | RPC production/readiness plans for 2006. Tests on installed chambers | A. Colaleo | 15' |
| 3 | Manpower issues for 2006 | A. Benvenuti | 20' |
| 4 | Missing items for YB+2/YB+1 cabling | F.
Montecassiano | 15' |
| 5 | Integration Issues | D. Dattola | 20' |
| 6 | Missing Items for Magnet Test | M. DallaValle | 25' |
| 7 | Alignment Issues/plans up to MT | G. Bencze | 15' |
| 8 | AoB | | |