DT , RPC and ALIGNMENT STATUS

March 05 CMS WEEK

fgasparini

BARREL DT organization AND COORDINATION

PM	**F.Gasparini**	**Deputy A.Benvenuti**	
RPC PM	**G.Iaselli**		
RM	**F.Navarria**	**for full barrel**	
			ALIGNMENT
TC construction	**H.Reithler**	**for full barrel**	**T.Rodrigo***
TC Install/commiss.	**A.Benvenuti**	**for full barrel**	**E.Calvo**
integration	**D.Dattola**		
inst.tools&Crew	**M.Benettoni**		
Chambers	**M.Cerrada + sites coord. (hoepfner,checchia,staiano)**		
Electronics	**C.Willmott**		
Minicrates	**F. Dalcorso**		
DCS HV/LV	**M.Bellato/P.Giacomelli**		**I.Vila**
(HV/LV test	**M.Giunta,Giacomelli,Borsato)**		
cables &balcony	**F.Montecassiano**	**for full barrel**	**E.Calvo**
HVB	**E.Borsato/Reithler**		
DAQ/DCS SW	**S.Ventura**		**I.Vila**
SW/PRS	**U.Gasparini**	**for full barrel**	**P.Arce**
Trigger	**Montanari,PL Zotto**		
Magnet Test	**A.Benvenuti**		**G.Bencze**

Coordinators for Test Beam and Test Beam analysis are not permanent,but appointed each time

•For Barrel Ali: G.Bencze, for Link TR,for EndCap D.Eartly, for Tracker A.Ostapchouk

DT MANAGEMENT

PM

DT Institution Committee

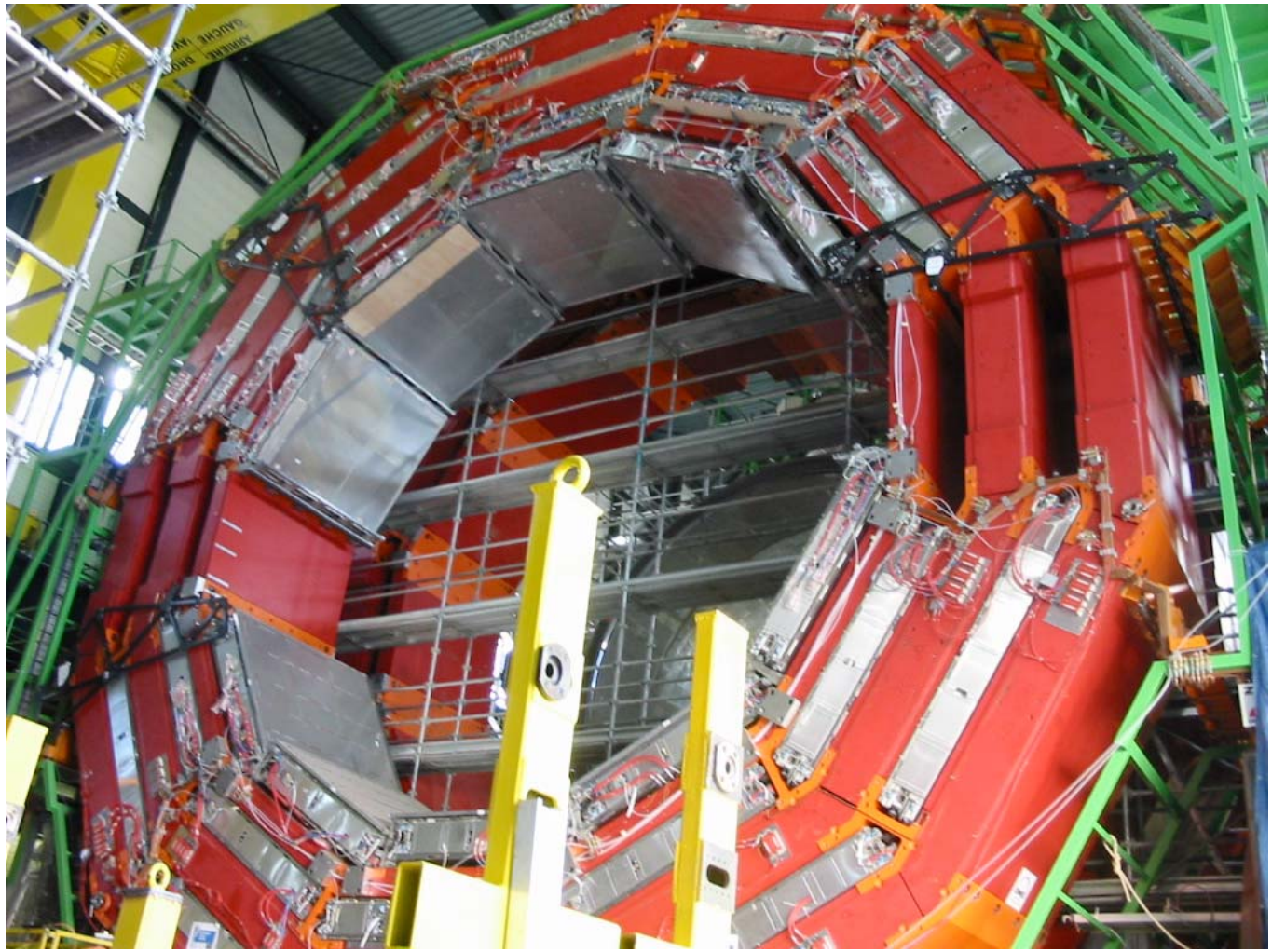
: Tech.Coordinators (HR,AB) elctr. Coord(CW) chamber coord (MC)
Integr.coord.(MD)Resource Mang. (FN), Country and sites repr.
(GZ,TH,MC,AS,MDV,PLZ) (13 people)

Decision making board Meets monthly

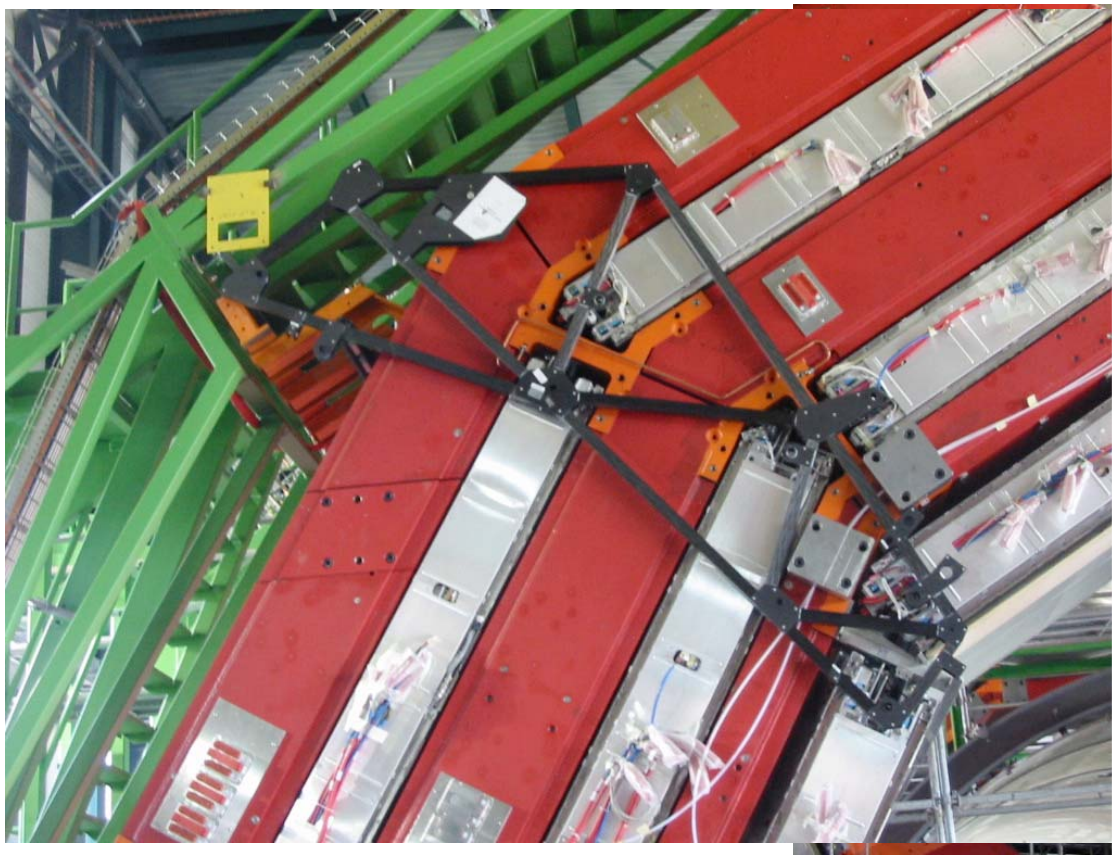
CMS Manag. + DT Board :

Virdee, Ball, Herve' + 5 DTIC members + RPC and Alignment
Plus experts. (10 people +……)
Update Barrel status and plans, **makes recommendations** Meets fortnightly

DT INSTALLATION IN YB+2 (withn HVB -3)
34 Chambers with Minicrates (last five first week of April)
6 MB4 from Torino missing : 3 are at ISR ,3 will be at ISR first week of April

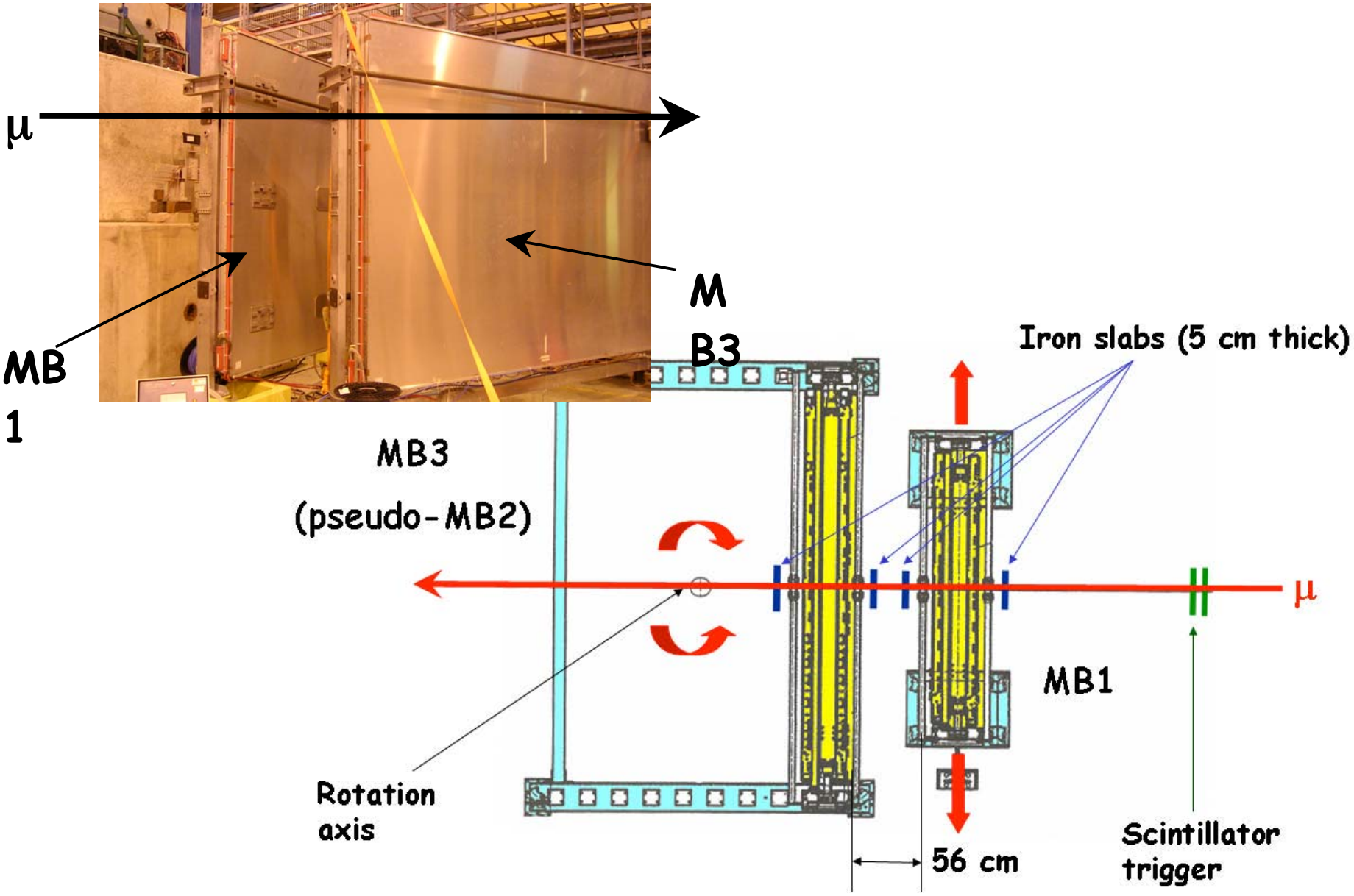


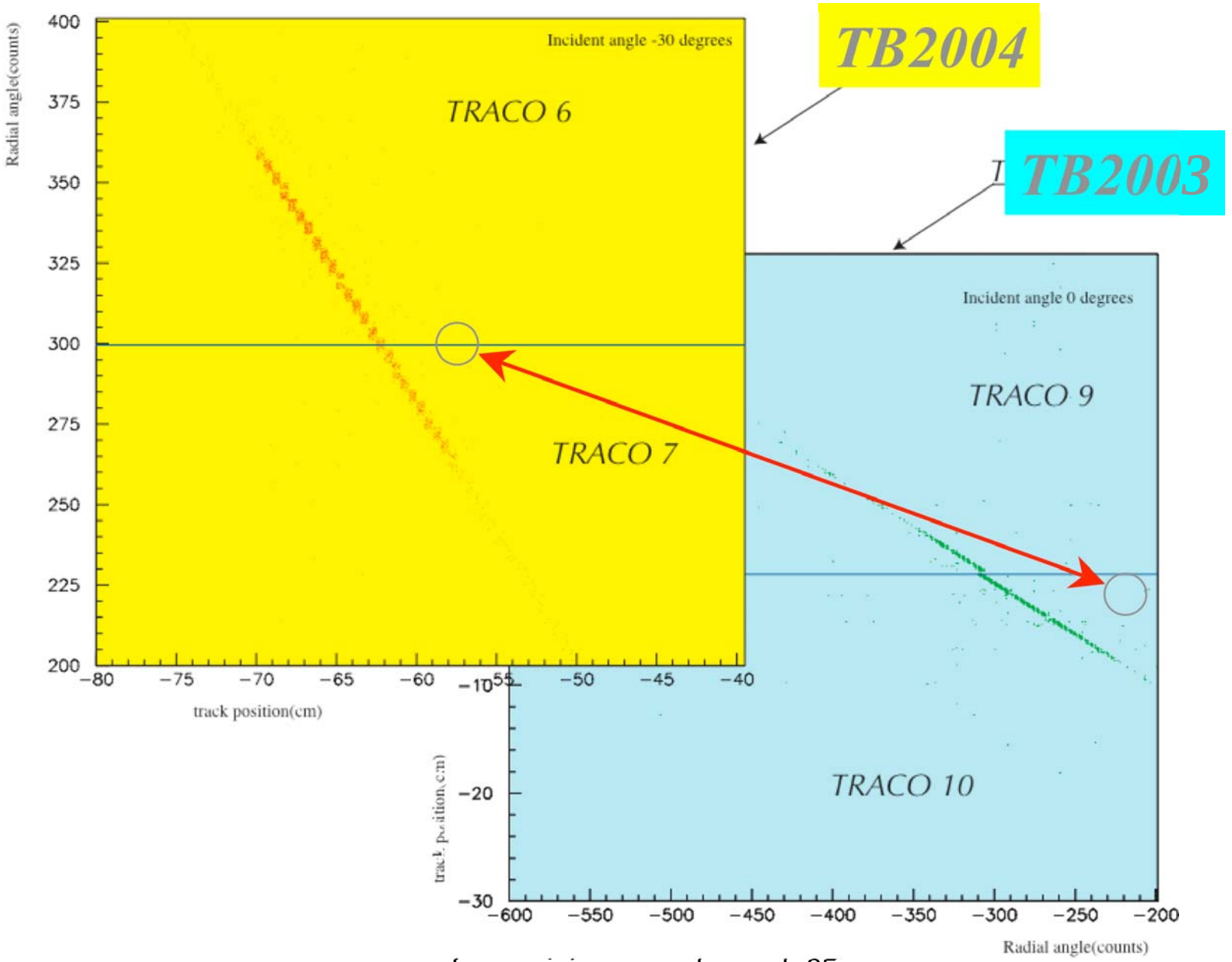
MABs installation test on YB+2



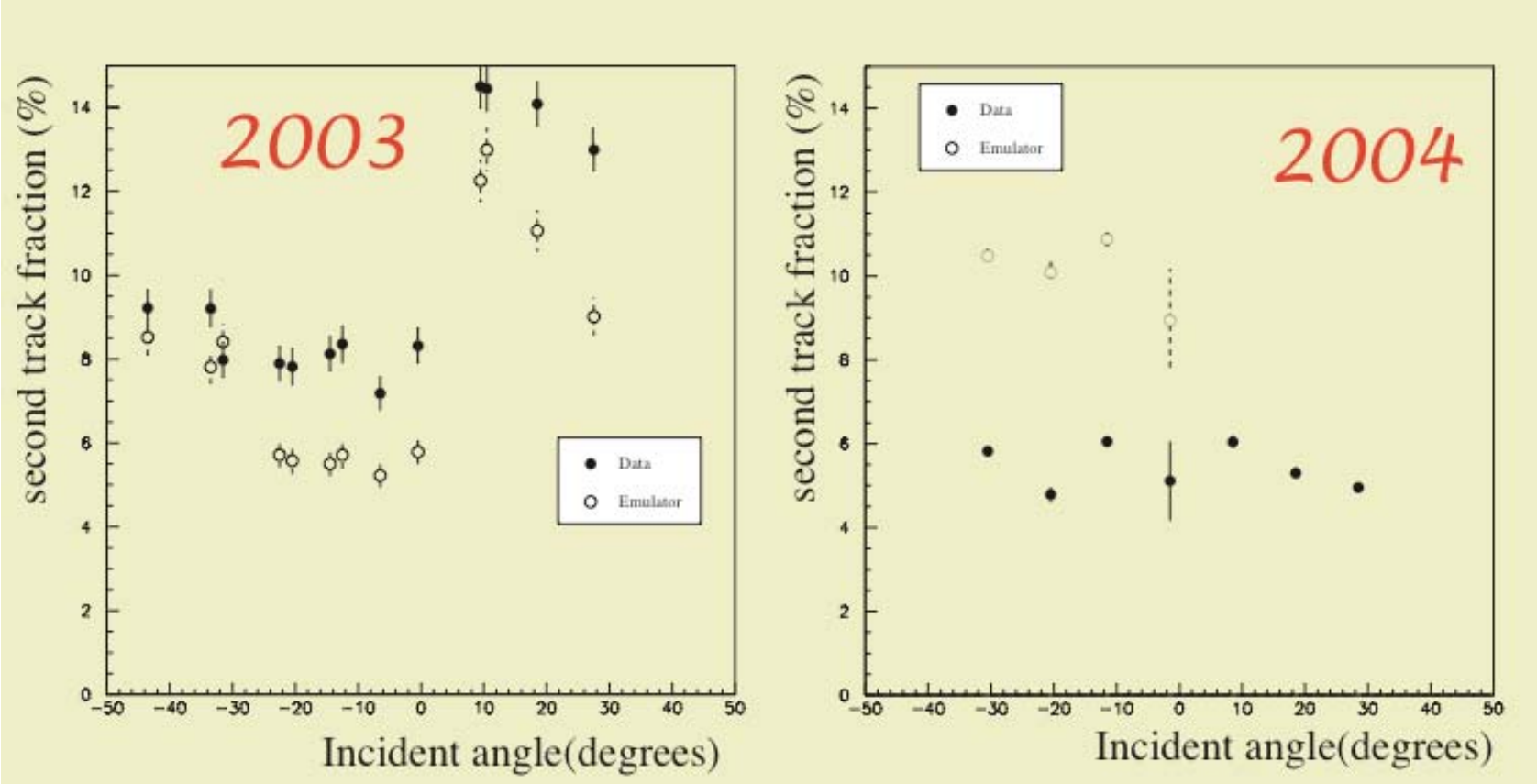
MABs army at ISR

RESULTS FROM OCTOBER TEST BEAM



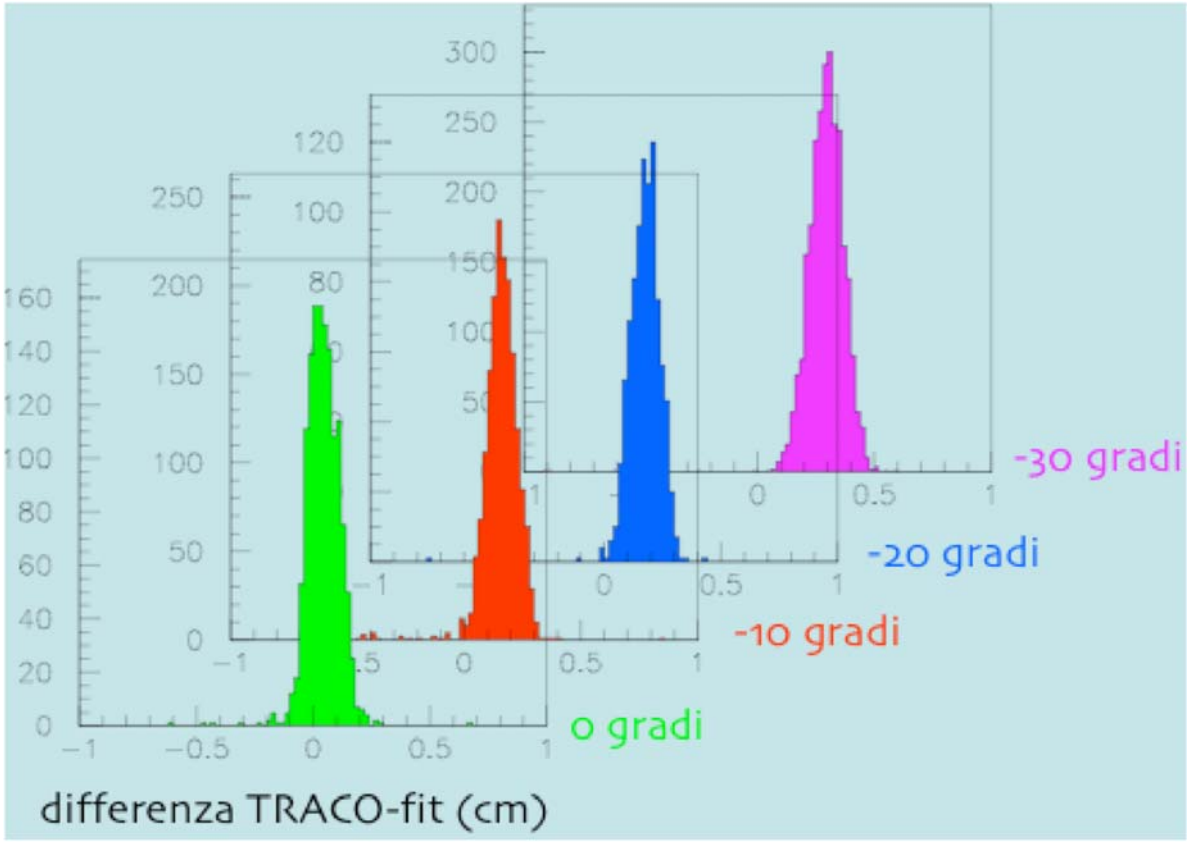

TB2004
TB2003
Incident angle -30 degrees
TRACO 6
TRACO 7
Incident angle 0 degrees
TRACO 9
TRACO 10
Radial angle(counts)
track position(cm)
Radial angle(counts)

Second tracks



- **Differently from TB2003 data, in TB2004 data the fraction of second tracks is symmetric => it was a wrong configuration.**
- **Difference between emulator and data still due to the missing Theta BTI infos (masked BTI inputs), since most missing triggers are uncorrelated L.**

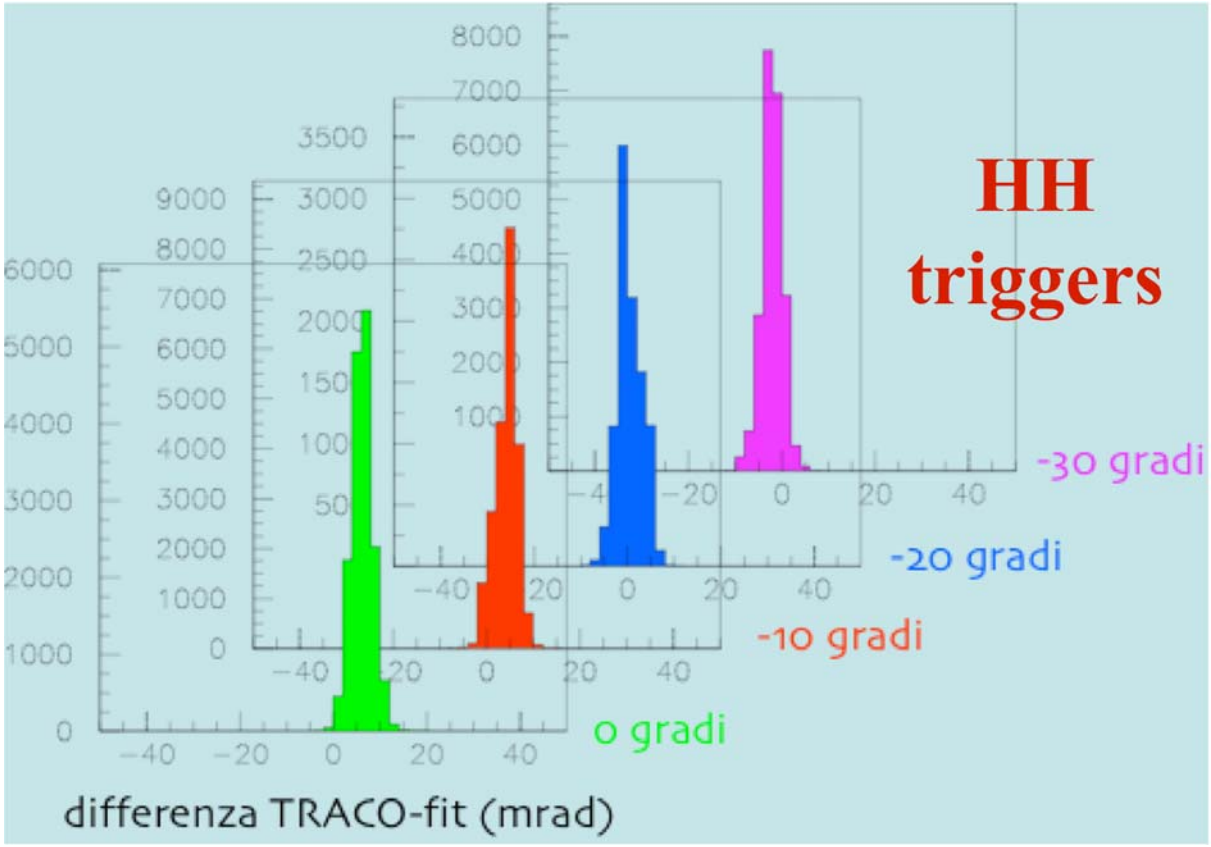
Radial angle resolution (= track position)



Distribution variance is between 800 and 650 μm

There is a systematic of about 700 μm every 10 deg

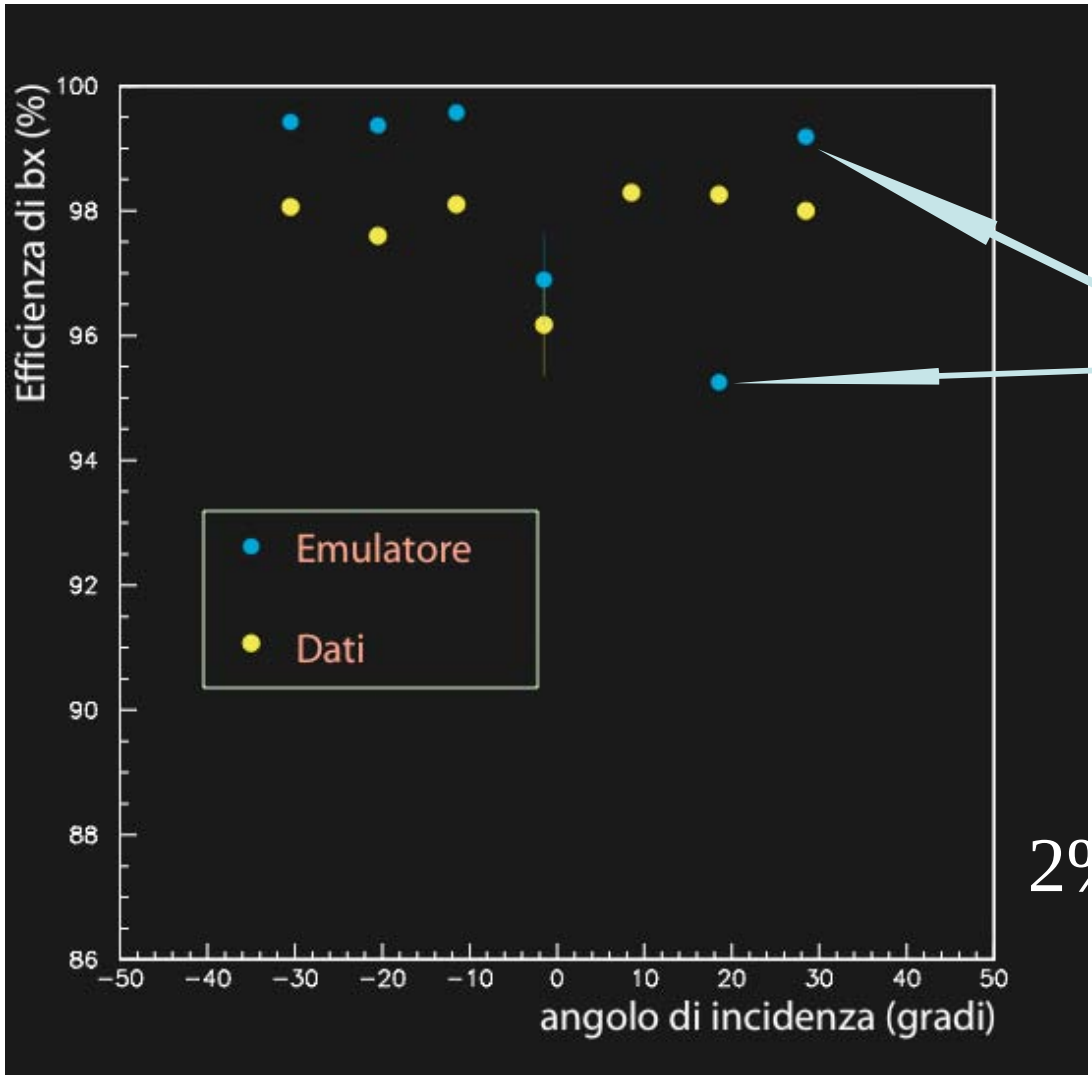
Bending angle resolution (= angle wrt the chamber plane)



Variance is about 2-3 mrad

For uncorrelated triggers, variance is 30 mrad

BX identification efficiency

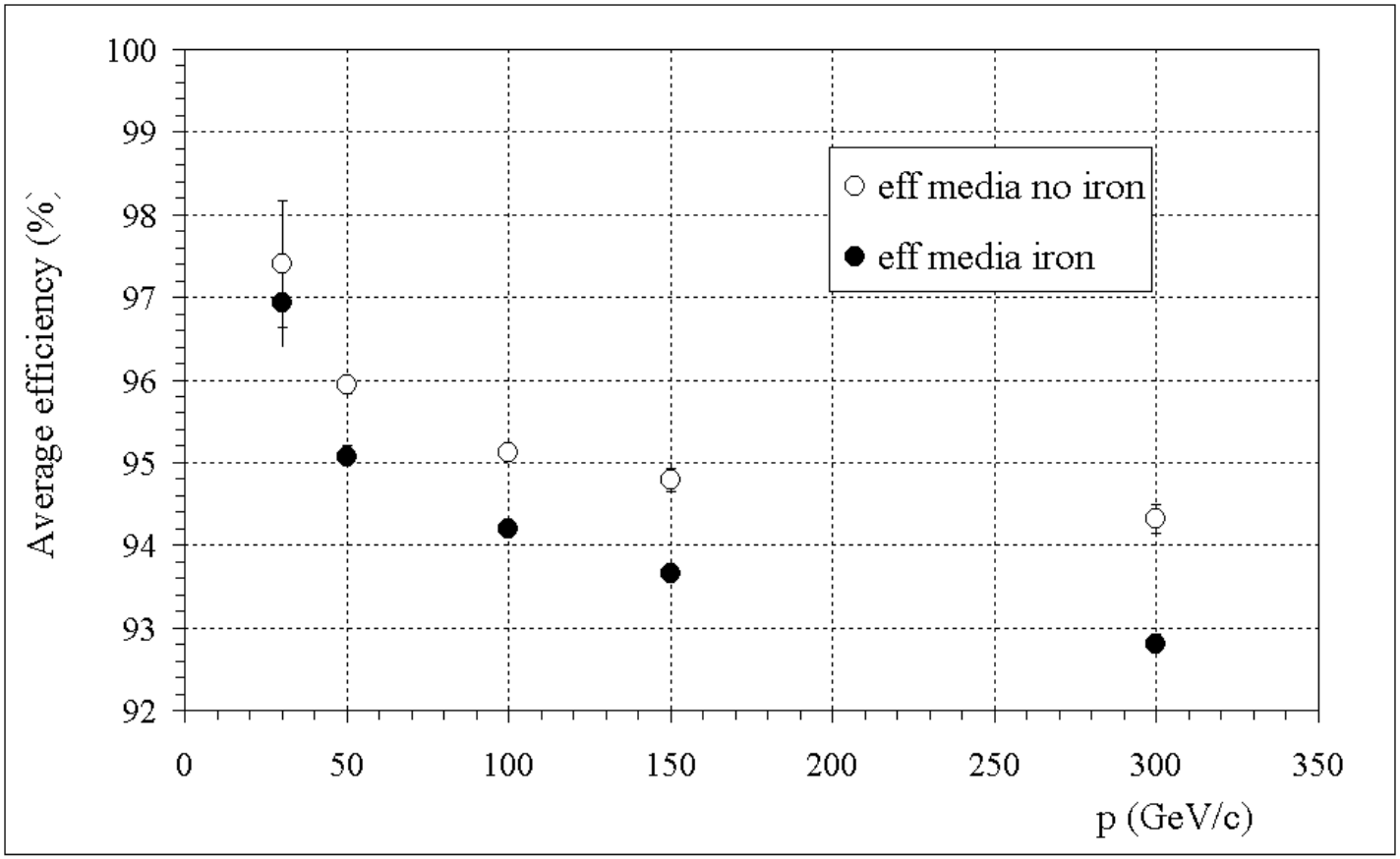


Wrong TDC configuration

Also results on dimuon events
Were presened: they are good
Eff. is flat versus the distance
Between the tracks and . 85%

2%

Efficiency – MB3 data in presence of iron



- **Also w/out iron there is a dependence on beam energy.**
- **Efficiency falls by about 2.5% from 50 to 300 GeV.**
- **Iron introduces another 1-1.5% loss.**

DATA ANALYSIS IS GOING ON

STATUS OF DT CHAMBER ASSEMBLY SITES

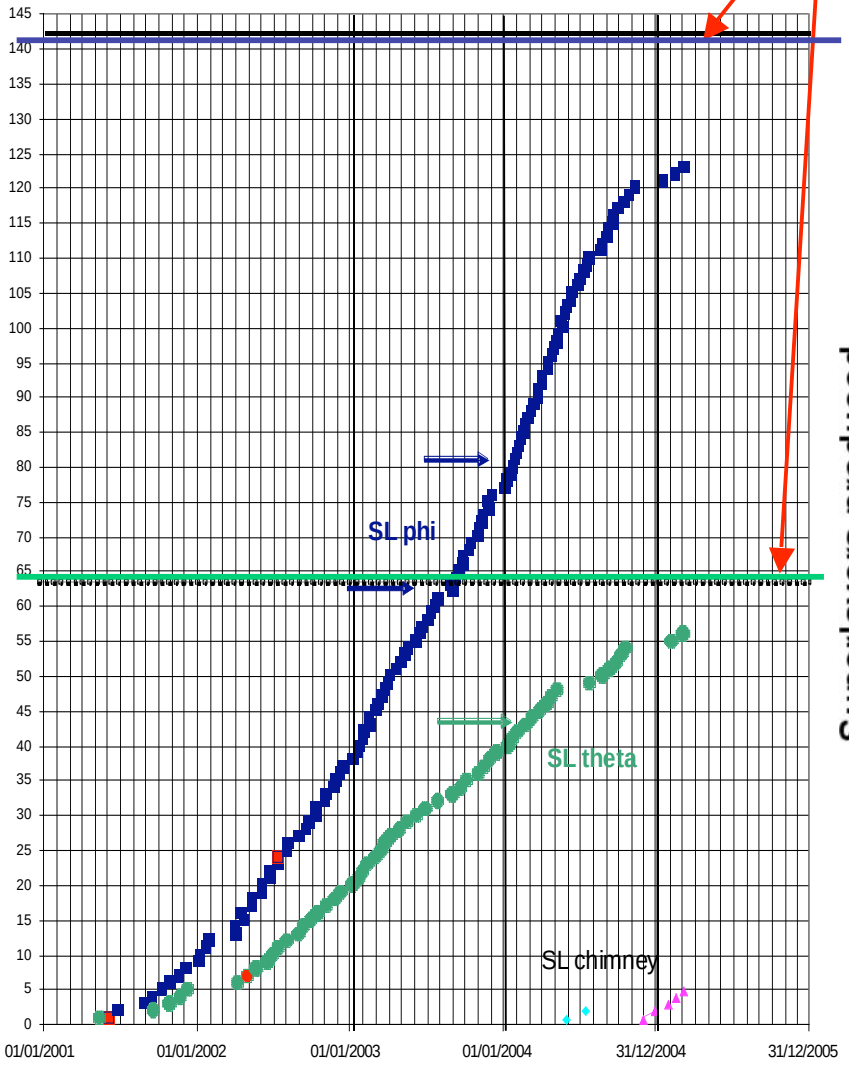
	Slayers	chambers	ch. at ISR	end prod.
AACHEN	204/214	59/70	52	aug/sept
CIEMAT		54/70	54	aug/sept
LEGNARO	186/214	56/70	50	dec.
TORINO	18/80	6/40	3 (14 planned june 1st)	march/apr. 06

Torino rate is now 2ch/month **attempting to reach 3 ch/m with more mp**

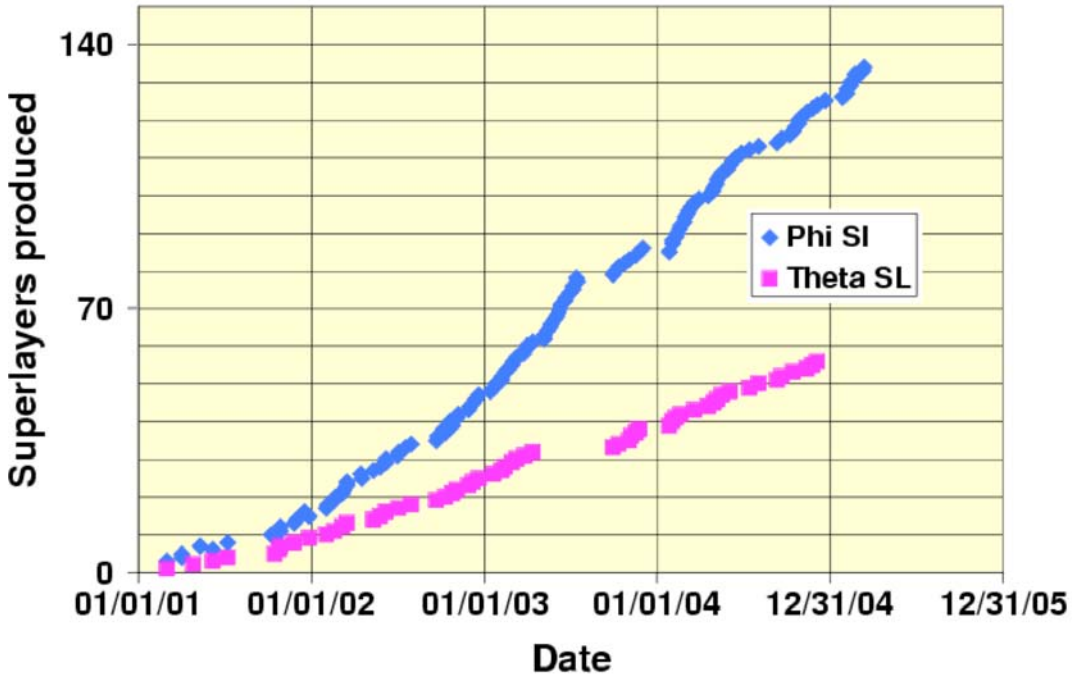
IN ALL SITES

Final assembly and test rate is currently limited by the availabilty of NEW HVB (as expected)

~full production



LEGNARO



CIEMAT

THE AVAILABILITY OF THREE INGREDIENTS WAS DELAYING THE DT INSTALLATION SCHEDULE:

1) AVAILABILITY (and SUBSTITUTION) AND OF HVB

2) ASSEMBLY OF MB4 CHAMBERS IN TORINO

3) AVAILABILITY OF MINCRATES

AFTER FEW CRISIS 1) AND 2) ARE NOW SOLVED

INSTALLATION IS NOW DRIVEN BY 3)

In Jan 04

8/1000 Old generation HVB showed discharges after 3 month under HV

Equip 34 chambers of YB+2 with ~ 1600 last generation boards

Redesign and produce 11300 NEW HVB for wheels YB+1/0/-1/-2

Delay installation on YB+2 from Jan 04 to July 04 to allow old HVB substitution

The full lot of new PCB is in hand (first PCB available in Sept.04)

3600 NEW HVB are available now and ~ 1600 equip the 36 chambers to be Installed In YB+1

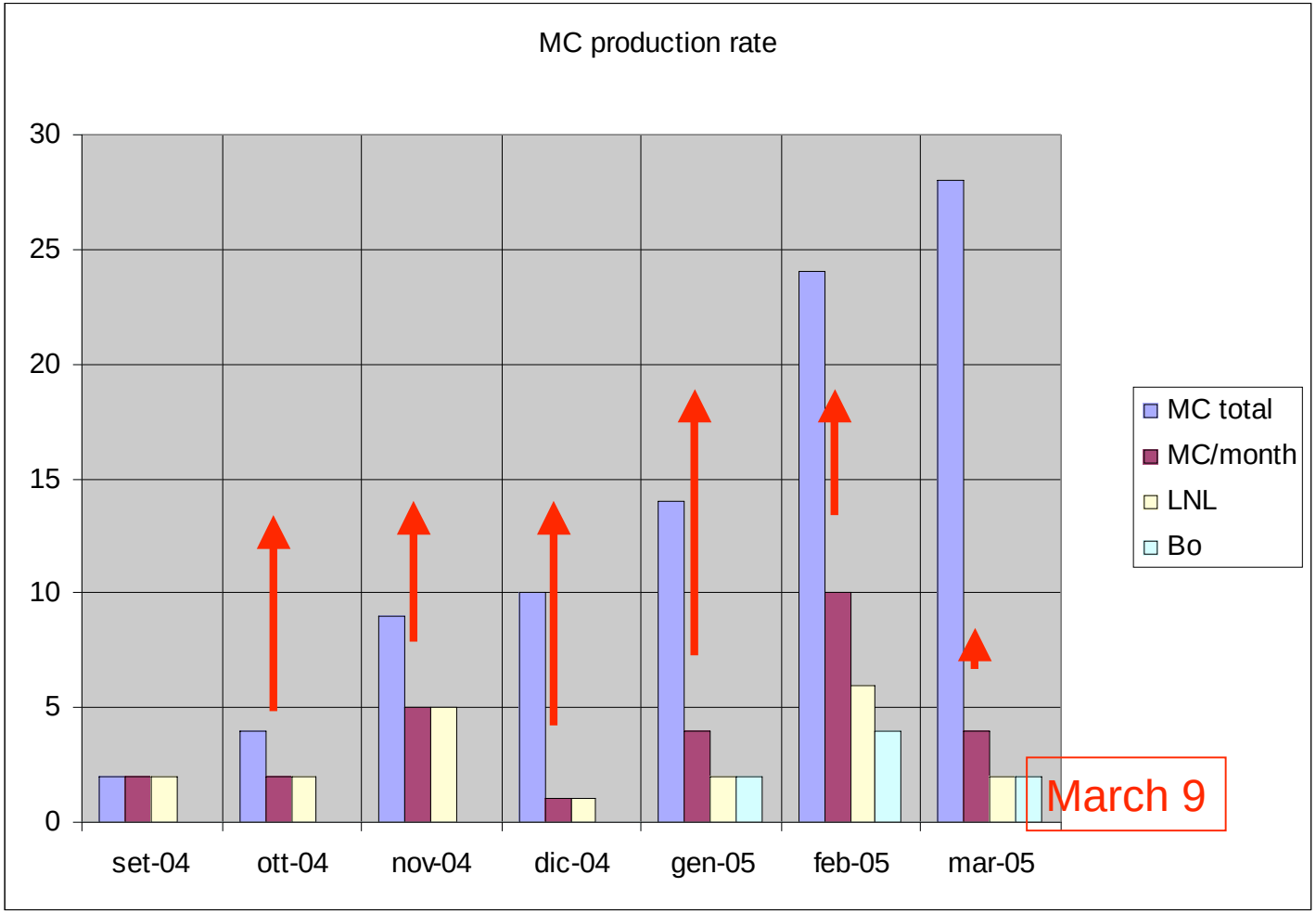
Production finished by Sept . 05 at a rate of 1300/month

HVB must be substituted in ~ 90 ch at ISR

Heavy work : 2 days/ch, one SL/ch reopened after subst.,0,1% dead channels

done

expected



More than MC 70 expected by march 9 , 27 available

Assembly rate limited by availability of trigger boards

And by a large fraction of defective boards

Low assembly rate is due to:

Availabilty of Trigger Boards : production had to be 50/week in December
And is only recently reaching 40/week

High fraction of defective boards (~ 15%) that escape the screening at the Assembly firm. They show up once the MC is assembled,on some configuration of the test vectors.
substitution demands to disassemble and uncable the MC.and restart the full procedure

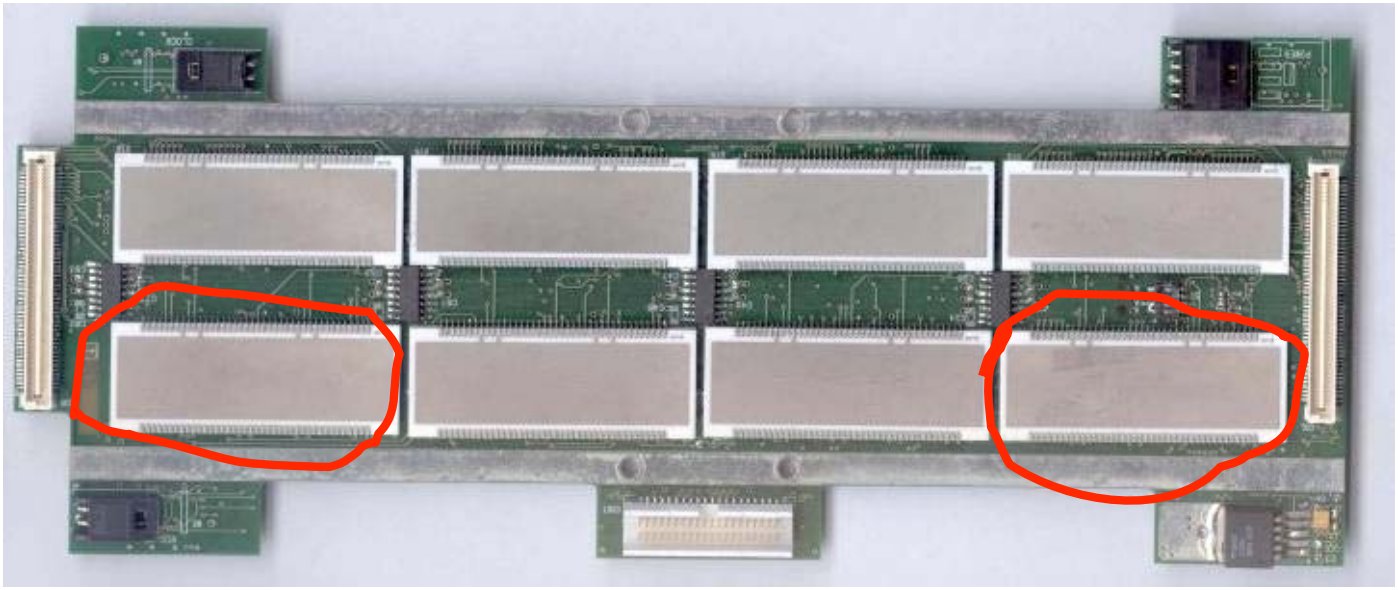
The origin of the defaults is still unknown

CURE:

Test and screen all the boards in Legnaro and Bologna before installation in the MC and put aside the defective ones: start after Easter.

Check that early screening allows 16MC/month in April, as expected

Mass screening should allow to pick up the origin of the defect and cure it.



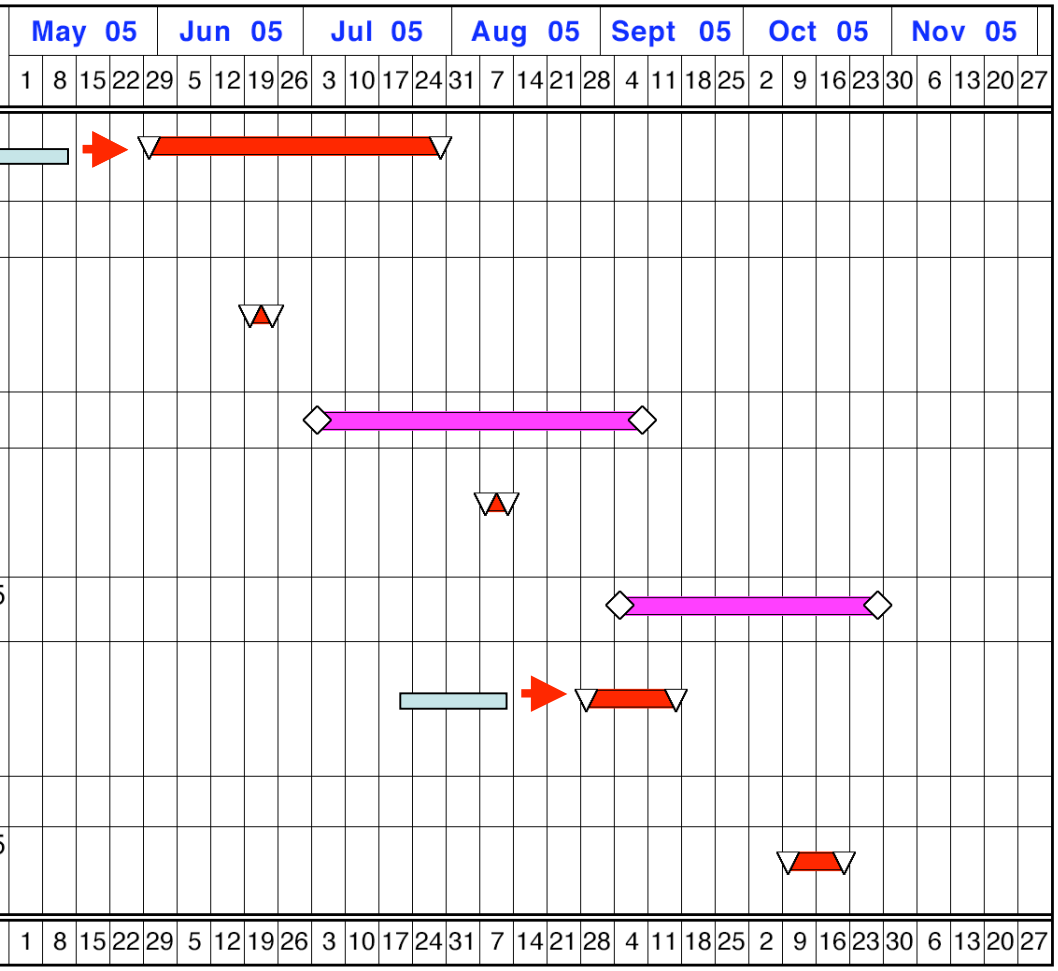
The statistics of failures is still poor but failures look to concentrate in two well defined geographical regions of the boards.

Delay of one month in the installation in YB+1, from April to MAy

possible delay of one month for YB0 : conflict with preparation for the Magnet Test in Spetember.

Revised Installation and Cabling Schedule

Activity Name	Start Date	Finish Date
YB+1 Installatio, 34 Chambers 68 MC	5/30/05	7/29/05
YB+2 Installation, 6 MB4 + MB4/9-11 76 MC	6/20/05	6/24/05
YB+2 Cabling	7/4/05	9/9/05
YB+1 Installation,6MB4 + MB4/9-11 84 MC	8/8/05	8/12/05
YB+1 Cabling	9/5/05	10/28/05
YB+0 Installation , 20 Chambers (with 3 MB4T) 104 MC	8/29/05	9/16/05
YB-1,YB-2 Sectors 10,11 122 MC	10/10/05	10/21/05



12 MC/month production rate up to end of June then 16 MC/month

Summer Vacations NOT considered

Possible conflicts with Magnet Test/Cosmic Challenge to be worked out

MY (PERSONAL) CONCLUSIONS:

Problems of HVB and MB4 assembly look solved	very good
Assembly in the sites is going smoothly	good
Installation is going well and is more or less on schedule	good
Concern for installation in YB0	concern

HVB design,production and substitution took lot of time and resources and contributed a lot to the late and slow start of MC production

URGENT ACTIONS

Full priority is now on the MC:
in order to recover a large fraction of the delay on YB0
and manage to assemble the 220 missing MC in the the next 12 months

A rate of 16 MC/month should be reached by May
and possibly increased to 18(possible) or 20(much harder) in June.

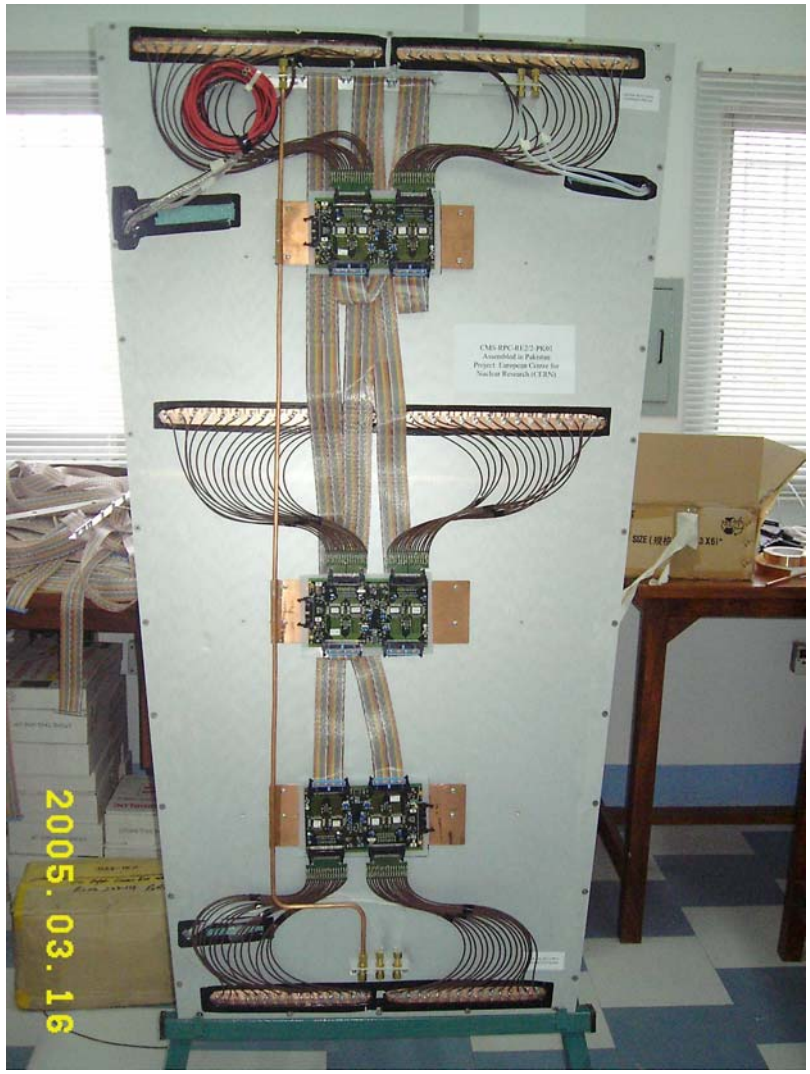
Find as soon as possible the origin of the faults in the Trigger Boards.
(15 % rejection could prevent the completion of the full lot of 250 MC)

RPC

RE

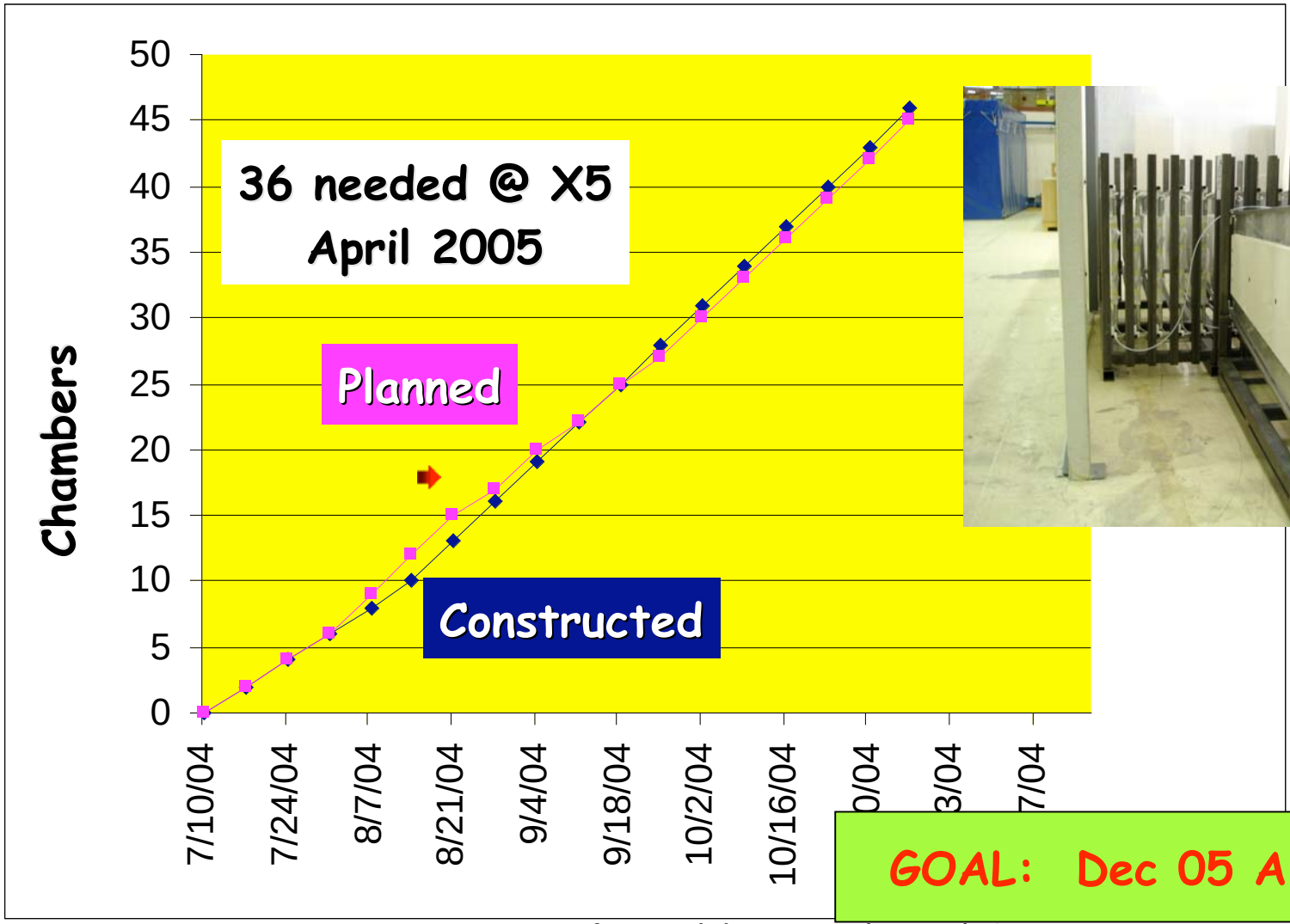
- Mass production gas gaps Korea full steam
- Assembly RE 1 ramped up @ ISR lab and has reached 5 chambers per week
- The final RE 1/2 RPC has been mated to ME 1/2
- RE1/3 installation exercise performed
- First 10 RE2/2 expected from Pakistan in two months

RE 1 production expects to meet the CMS master schedule for its installation and commissioning



RPC from PAKISTAN

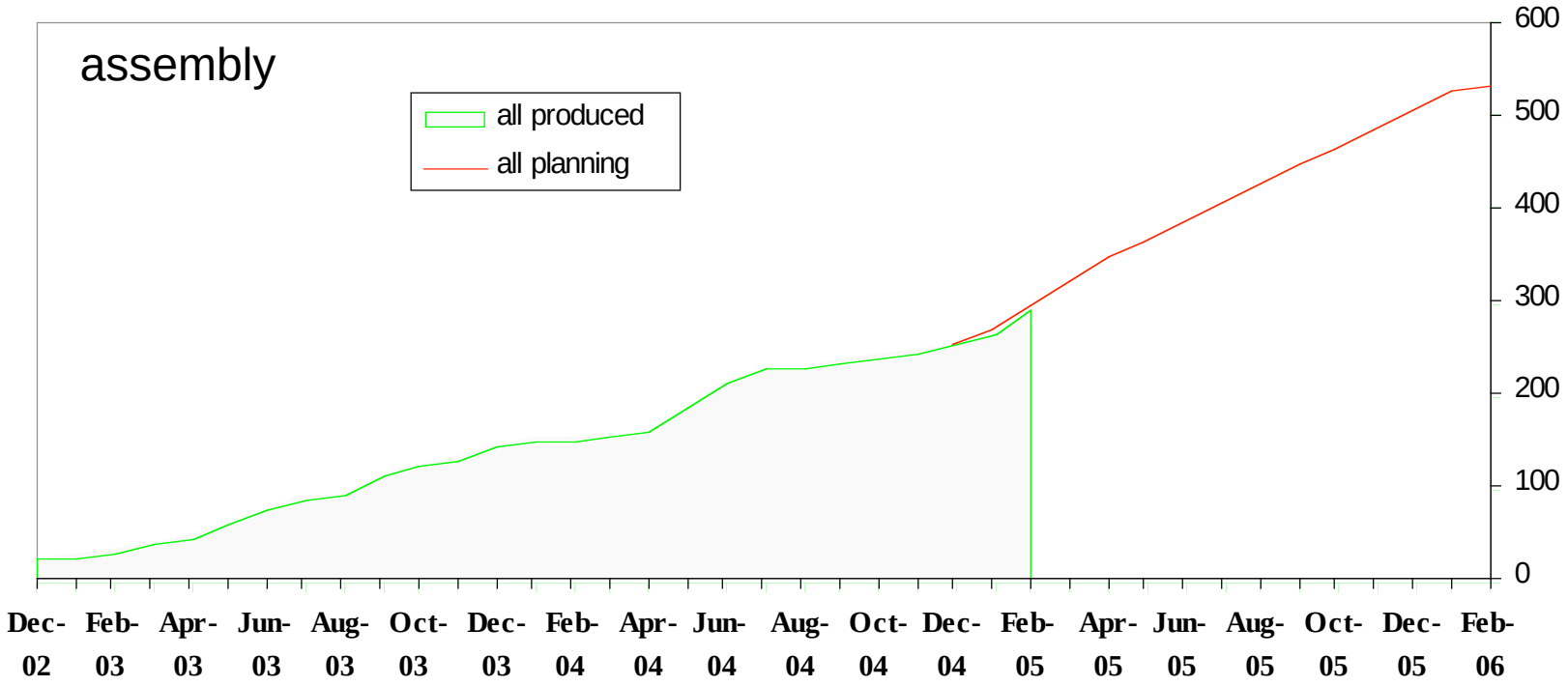
RE1 Production Status: 20 RE1/2 + 30 RE1/3 Assembled

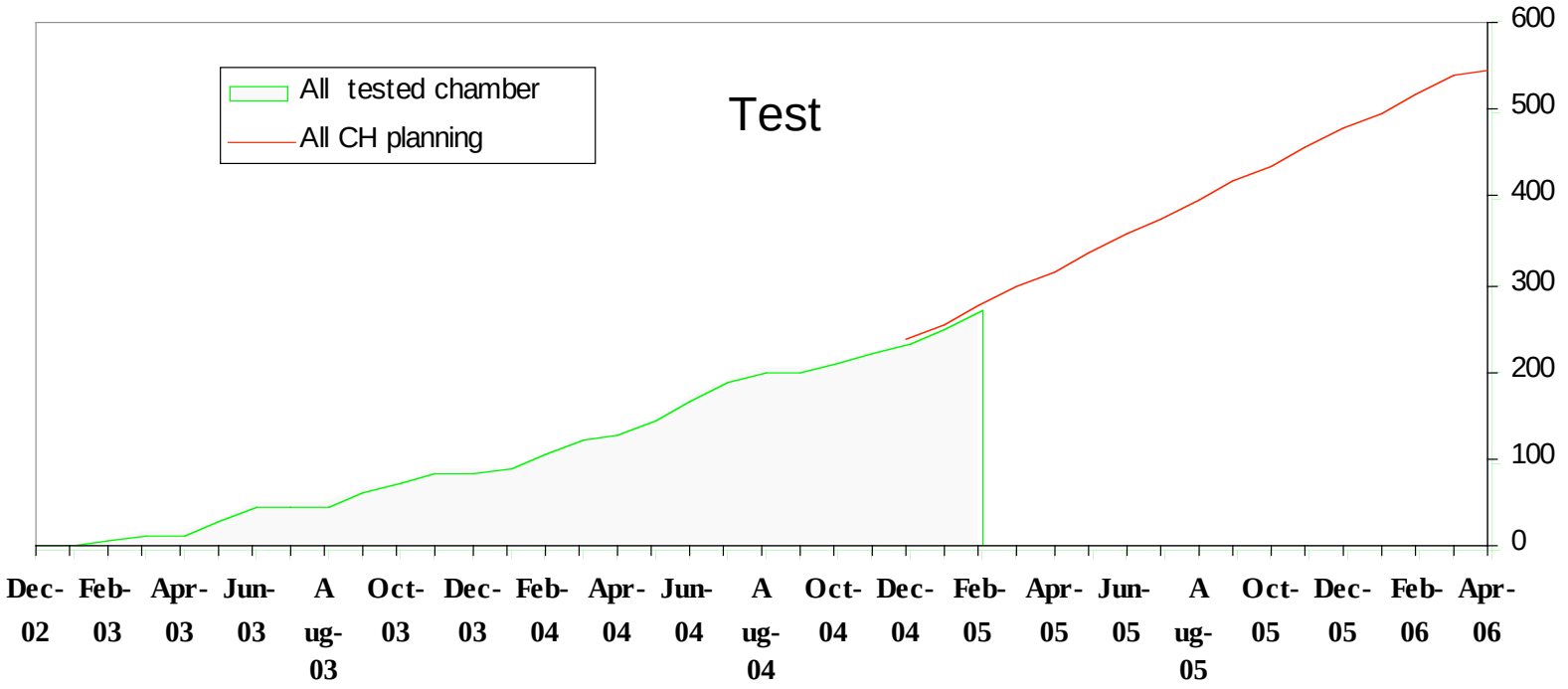


GOAL: Dec 05 All certified!

RB

- 66 chamber installed at SX5, 104 chamber at ISR ready to be installed
- 263 RB assembly and test according to schedule





	end production	**rate**
CH-prod.	January-February 06	20/month
CH-test	March – April 06	20/month

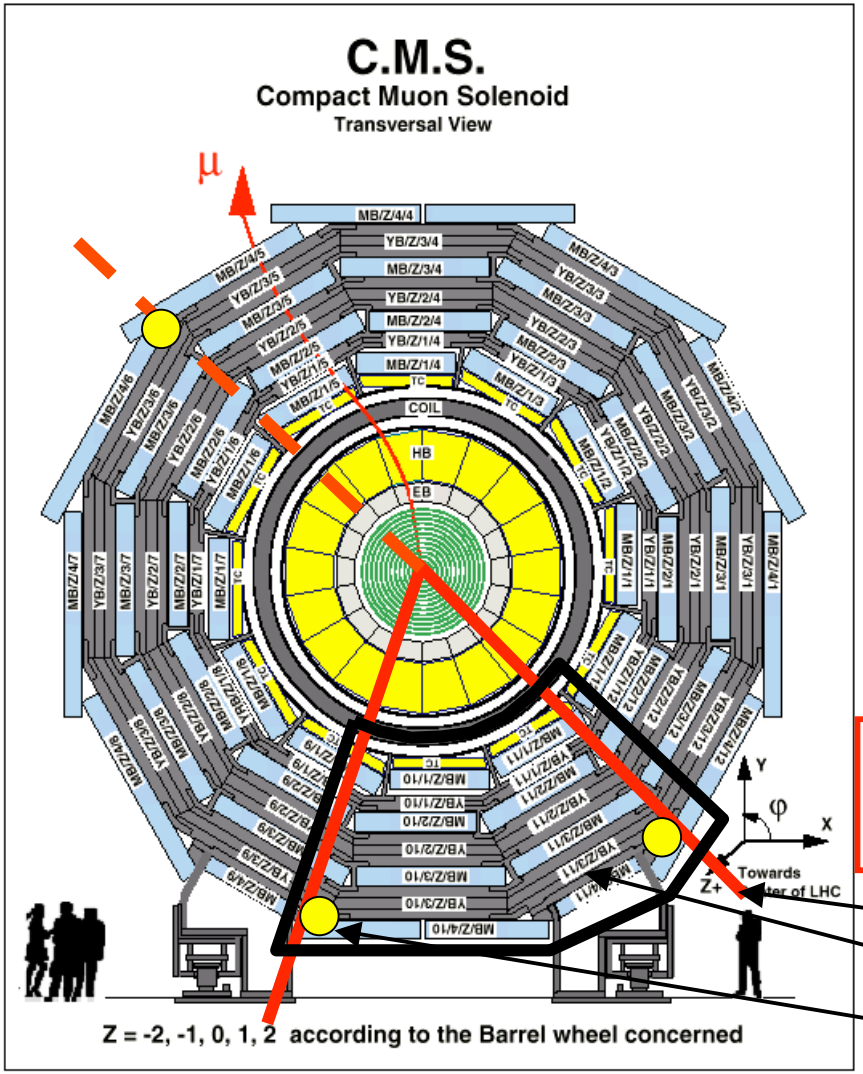
Ch ready at ISR + 1 month…

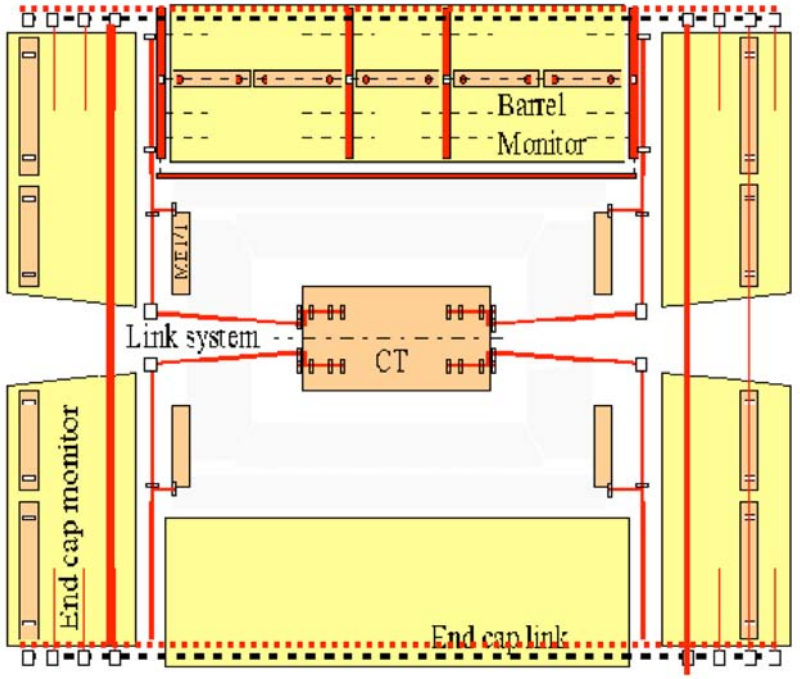
Big concern about availability of RPC signal cable in time for the cabling of YB+2, planned in June/july

Connectors on the LINK BOARDS side are still undefined. Their definition and procurement is crucial for the installation Schedule.

ALIGNMENT

Magnet Test Configuration



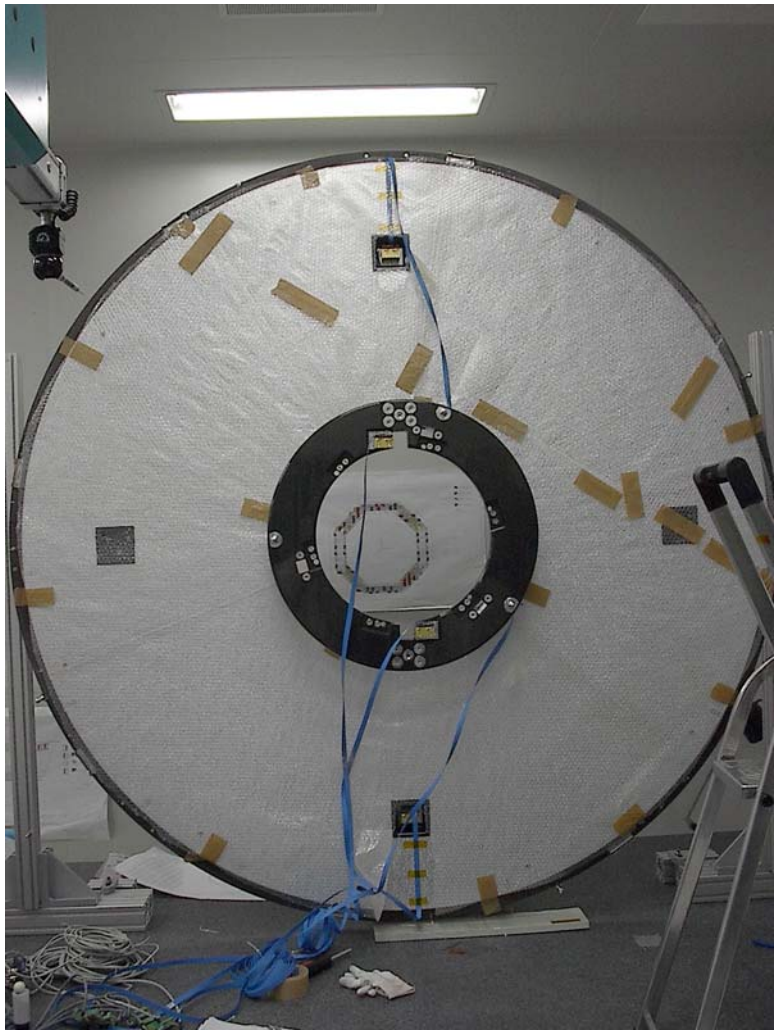


~ 1/3 of the full system will be installed for the Magnet test

Link line
Barrel zone
Endcap transfer line

TK-Link align assembly and 3D measurement at Aachen

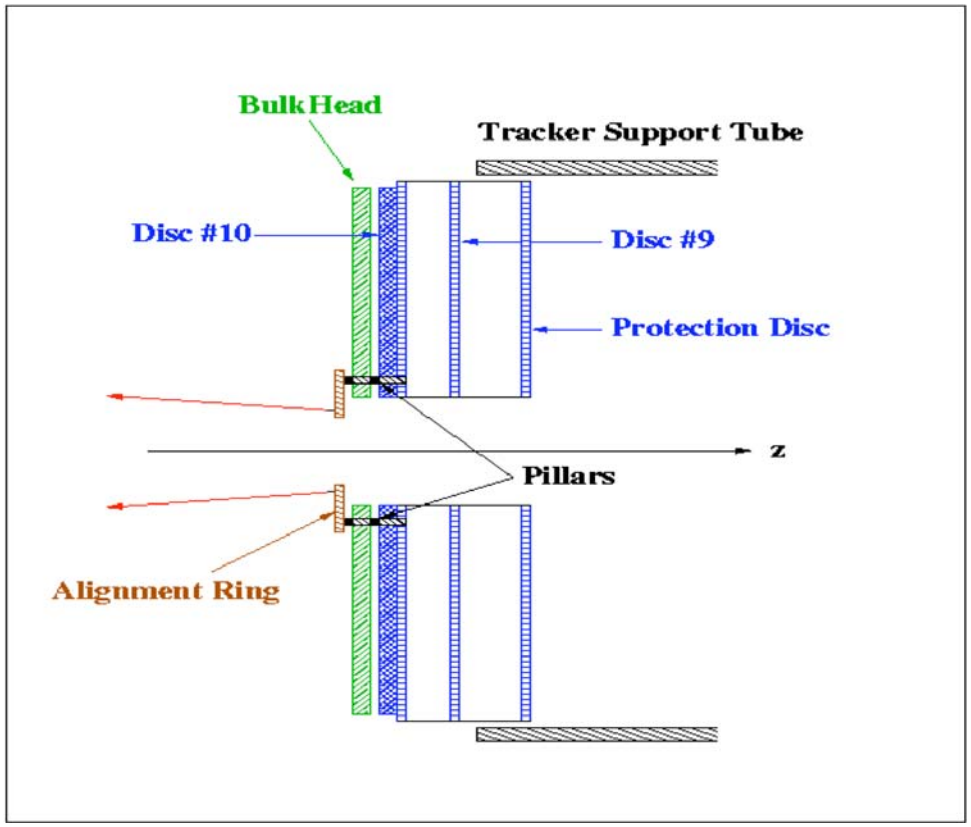
(from Francisco and Mar)



At the Aachen CMM (last week)

TK-Link align configuration for the Magnet Test

Proposed layout for the –Z side: TEC- mockup



Disc10 (BD) instrumented with
2 1D Tilt assemblies

AR- (final unit) fully instrumented:
- collimators
- Tilt assemblies
- z-displacement sensors

The specs for the TEC placement and orientation accuracy w.r.t. its nominal position:

transverse offsets (X,Y) : ≤ 2 - 3 mm
longitudinal offset (Z) : ≤ 5 mm
azimuthal and polar tilts (θ,φ) :
≤ 0.5 - 1 mrad

STATUS AND PLANNING

+ Z side

ALIGN.RING+ assembled in Aachen and	**arrived at ISR**
LINK RING+ versus A.RING+ intercalibration	**april at ISR**
LR (Santander) is already at ISR	

- Z side

ALIGN.RING- in Aachen	**april at ISR**
LINK RING+ versus A.RING+ intercalibration	**may at ISR**
MABs equipment going on in CERN and Debrecen	
Calibration	**june at ISR**

SET UP FOR AR and LINK RING at ISR