



CMS WEEK OPENING SESSION

March 2006

BARREL MU

fgasparini

Status at ISR
Installation in P5
Minicrates
Two sector test with cosmics
Cosmic Challenge preparation
Organization/Manpower at ISR and P5
Some concern
BRPC: production and installation
ALIGNMENT: Status in view of MTCC

DT ISR Workflow



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Muon Barrel Week 07-09 Feb 2006

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Summary

Muon Barrel Week 07-09 Feb 2006

- ▶ 140 chambers (maximum number up to day) stored at ISR
- ▶ All chambers for MT ready, few missing RPC coupling
Installation resumed by February 1st
After MT: wheel 0 is well advanced, currently focusing on wheels -1 and +2
- ▶ Lower certification throughput influenced by end of year shutdown and restart
Certified chambers blocking available space
Fortunately, 7 chambers more are close to certification.
- ▶ Two HV related problems (module exchange and PVSS DB storage)
- ▶ **Chamber and MC testing summarized in a common e-log**

Increased manpower used to speedup chamber dressing, help with crane operations, ...

- ▶ Please, double check that traveller files are updated after HVB replacement

Chamber computation

Type	@ISR	HVB5 (HVBI)
MB1	33	33
MB2	38	31*
MB3	37	37
MB4/1-7	9	9
MB4/9-11	8	8
MB4/10	4	4
MB4/4	6	6
MB4/8-12	6	6
Total	141	134

Commissioning
before mag.test

+ 42 YB+2
 + 40 YB+1
 + 31 YB 0
 + 11 YB-1
 + 10 YB-2
 134 Installed

*7 chambers with old HVBs (spares included as well)

Installation and SX5 Activities Update and Plans

A. Benvenuti

INFN Bologna

Mu week,

CERN

February 7th 2006

YB+2 Status

- The feet chambers have been commissioned. It was possible to make the connections to the MC without removing the cables to the other chambers.
- Cabling is completed for sectors 7 to 12 including fibers.
- The fiber routing for the top sectors has been defined and checked. This allows to prepare the fiber bundles and protections.
- MC test after cabling is not yet finished. Several problems (not related to cabling) were encountered. The latest is a series of communication problems with some MC is S12.

YB+1 Status

- Cabling has started in the bottom sectors. HV cables completed and LV cables only in S10, S11 for lack of cables.
- The Russian team is very good but progress is slow for lack of an adequate cable buffer.
- Two chambers have been extracted to replace faulty RPCs: 1 MB2 in S05 (already re-installed) and 1 MB1 in S06.
- One RPC for MB3 in S12 was also scheduled to be replaced but the HV discharges were traced back to a bad connector that was replaced in situ.

February 2006 installation and plans for the remaining periods

8 March 2006

Installation Plan

YB+0:

- 8 chambers in S10 and S11 (2MB1, 2MB2, 2MB3, 2MB4/10)

The sectors are under the vacuum tank that precludes access to the crane.
The installation is done with a rotator mounted on a lifting platform.

- 12 chambers in S02, S03 and S06 (3MB1, 3MB2, 3MB3, 3MB4)

YB-0:

- 11 chambers in S08, S09 and S12 (3MB1, 3MB2, 3MB3 and 2MB4)

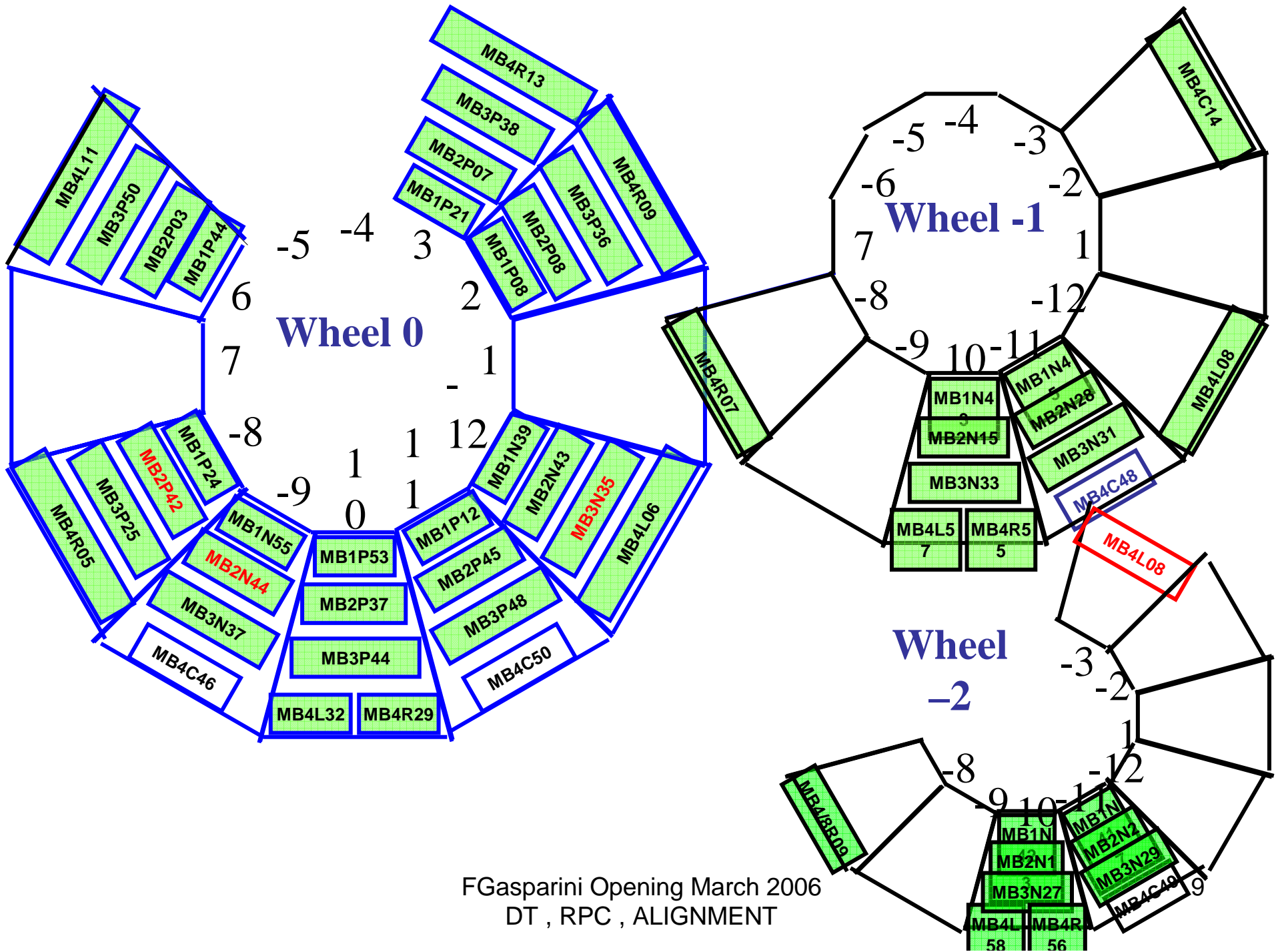
YB-1, YB-2:

- 16 chambers in S10, S11 (4MB1, 4MB2, 4MB3, 4MB4/10)
- 5 MB4 chambers (YB-1 S02, S08, S12; YB-2 S03, S08)

52 chambers (+ 2 feet ch. in YB+1) have to be installed before Mag.Test

the installation was faster than anticipated:

- YB+0 installation was completed on February 14th
- YB-0 was completed on February 20th
- YB-1, YB-2 was completed on March 1st



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Test for Inst. In UX

Sector 1 Installation Test

On March 1st we carried out an installation test in YB-2 S01 with a bare MB2 (MB2P01) that had already been used in other installation tests.



Installation in YB0

The recommendation is to get an electric forklift to use in UX5. The hoisting of the chamber and the final adjustment on the interface pads can be streamlined by using a dedicated balance beam and two electric hoists with remote control. With these improvements and adequate manpower we expect to install 2 to 3 chambers/day in UX5.

SX 5 Thursday March 2 nd



Jim Virdee photograph



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Installation after the Magnet Test

Chamber preparation is progressing according to the sequence given in the following table.

The first phase after the MT comprises lines 1 to 5 (63 chambers).

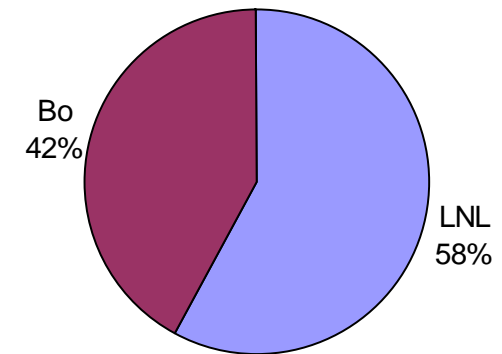
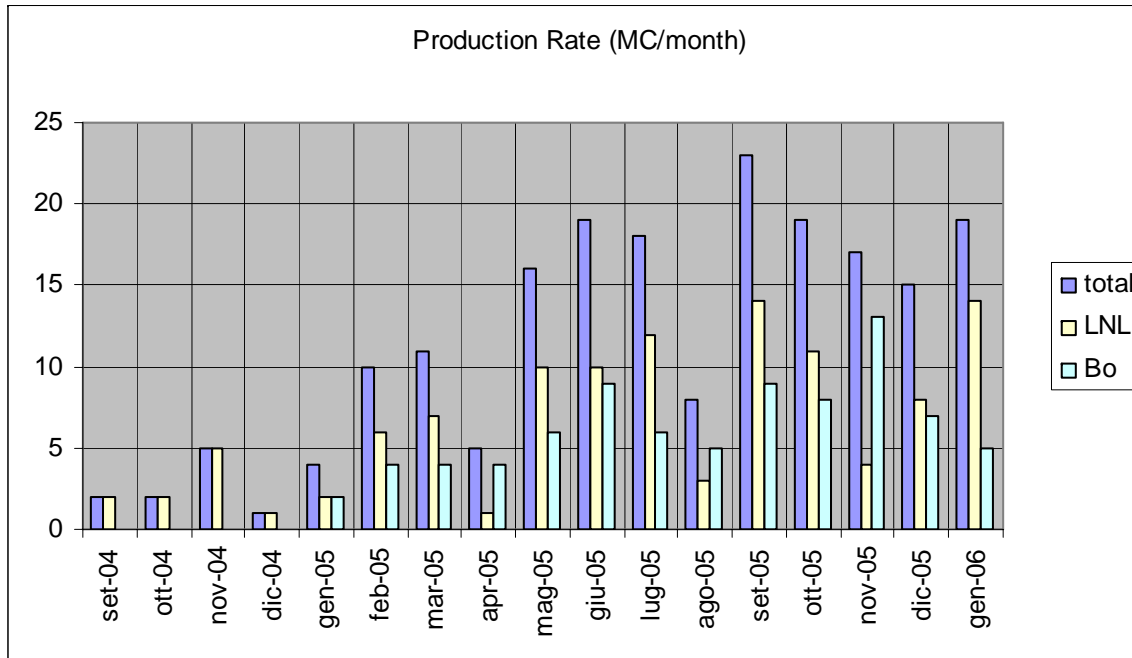
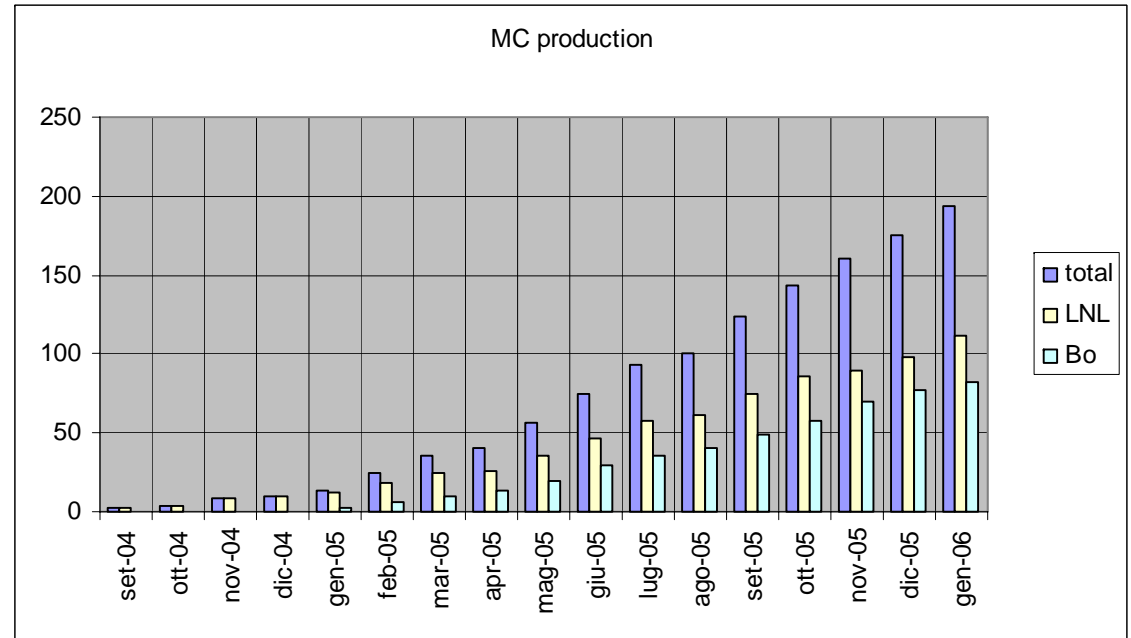
The most urgent point is to clarify the YB-1 installation window since, once the DT/RPC coupling starts, the installation sequence is basically frozen.

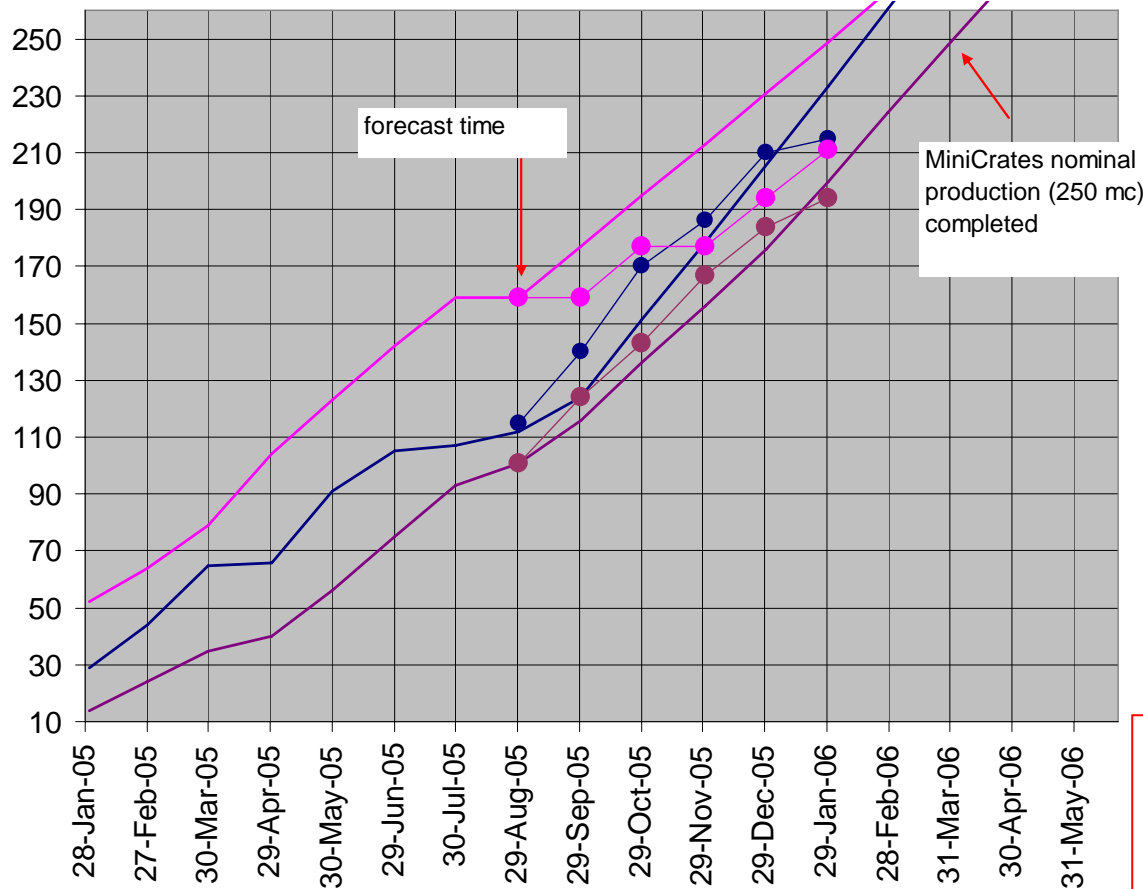
	Wheel/Sector	Chambers Required	Chamber types
1	YB-0 S04, S05	9	2MB1, 2MB2, 2MB3, 2MB4/4, 1MB4
2	YB-1	29	8MB1, 8MB2, 8MB3, 2MB4/4, 3MB4
3	YB+2 S01, S07	8	2MB1, 2MB2, 2MB3, 2MB4
4	YB+1 S01, S07	8	2MB1, 2MB2, 2MB3, 2MB4
5	YB0 S01, S07	8	2MB1, 2MB2, 2MB3, 2MB4
6	YB-2	31	8MB1, 8MB2, 8MB3, 2MB4/4, 5MB4
7	YB-1 S01, S07	8	2MB1, 2MB2, 2MB3, 2MB4
8	YB-2 S01, S07	8	2MB1, 2MB2, 2MB3, 2MB4
	YB0, YB-1, YB-2	6	6MB4/9-11 (feet chambers)
	Total	115	28MB1, 28MB2, 28MB3, 6MB4/4, 17MB4s, 2MB4/8

In UXC

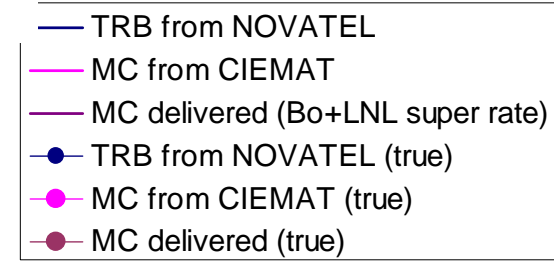
In UXC

MC produced & Production Rate





192 MC delivered at Feb 1st



The boards not yet delivered (~200) are the ones rejected at the first test

- A new production batch
- (using spare BTIM) was
- launched it requires three
- months. **This delay will affect**
- **mainly the spare boards.**

- MC production is aligned with forecast.
- Limiting factor:
 - minicrates delivered by CIEMAT (but situation quickly improving)
 - TRB reworking (TRB is becoming a severe limiting factor; see later)

TWO SECTORS TEST IN SX5

MARCH 9

Dear all,

yesterday a few data were taken on cosmic muons crossing from sector 11 to 10 in wheel+2.

The trigger signal was generated by a coincidence of the chamber trigger output from MB1S11 and MB4(11)S10.

Only events in the overlapping region of S10 and S11 satisfy that requirement.

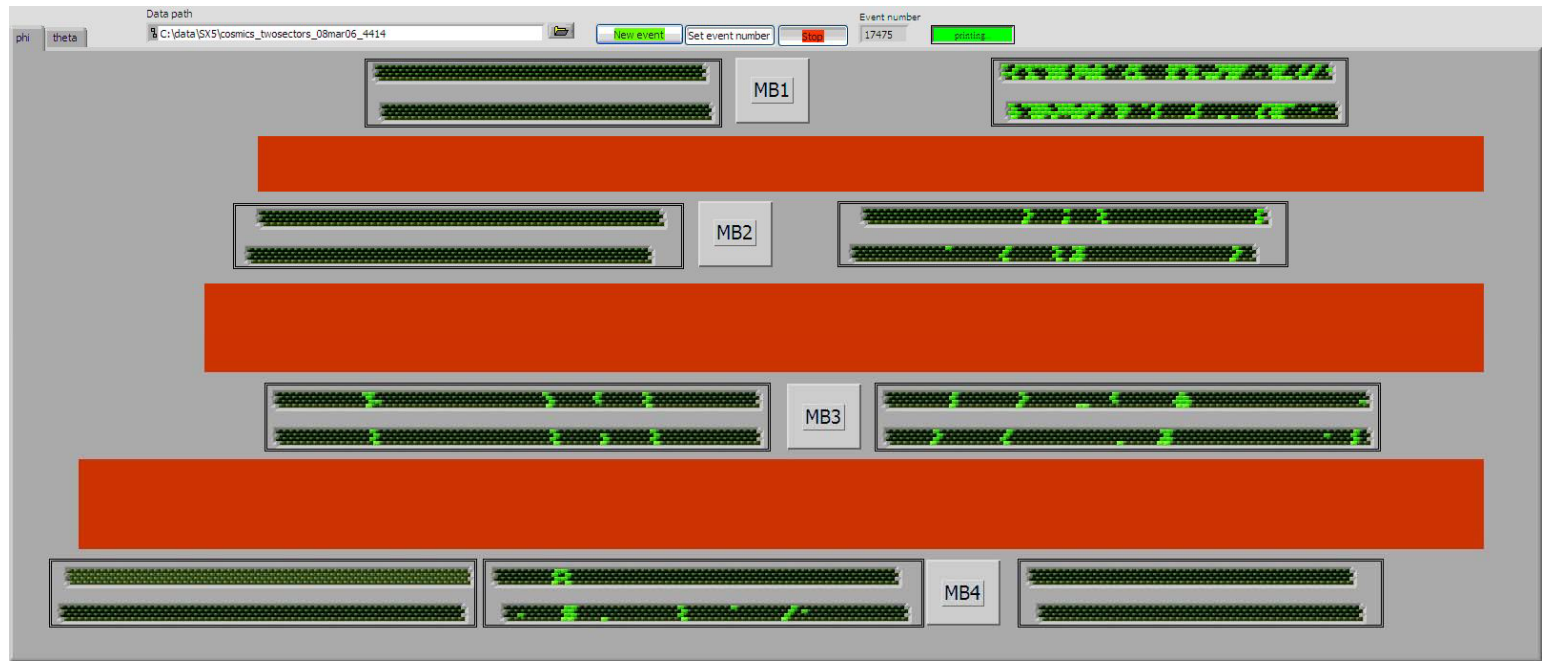
HV,LV,DAQ were controlled from PCs in the green barack (MTCC counting room).

The trigger rate was about 1 Hz. Slightly over 26000 events have been collected, with all five chamber always operational for over 6 hours.

On the low side, for about 50% of the events, although they must have generated a trigger, the data show empty ROBs. It should be investigated.

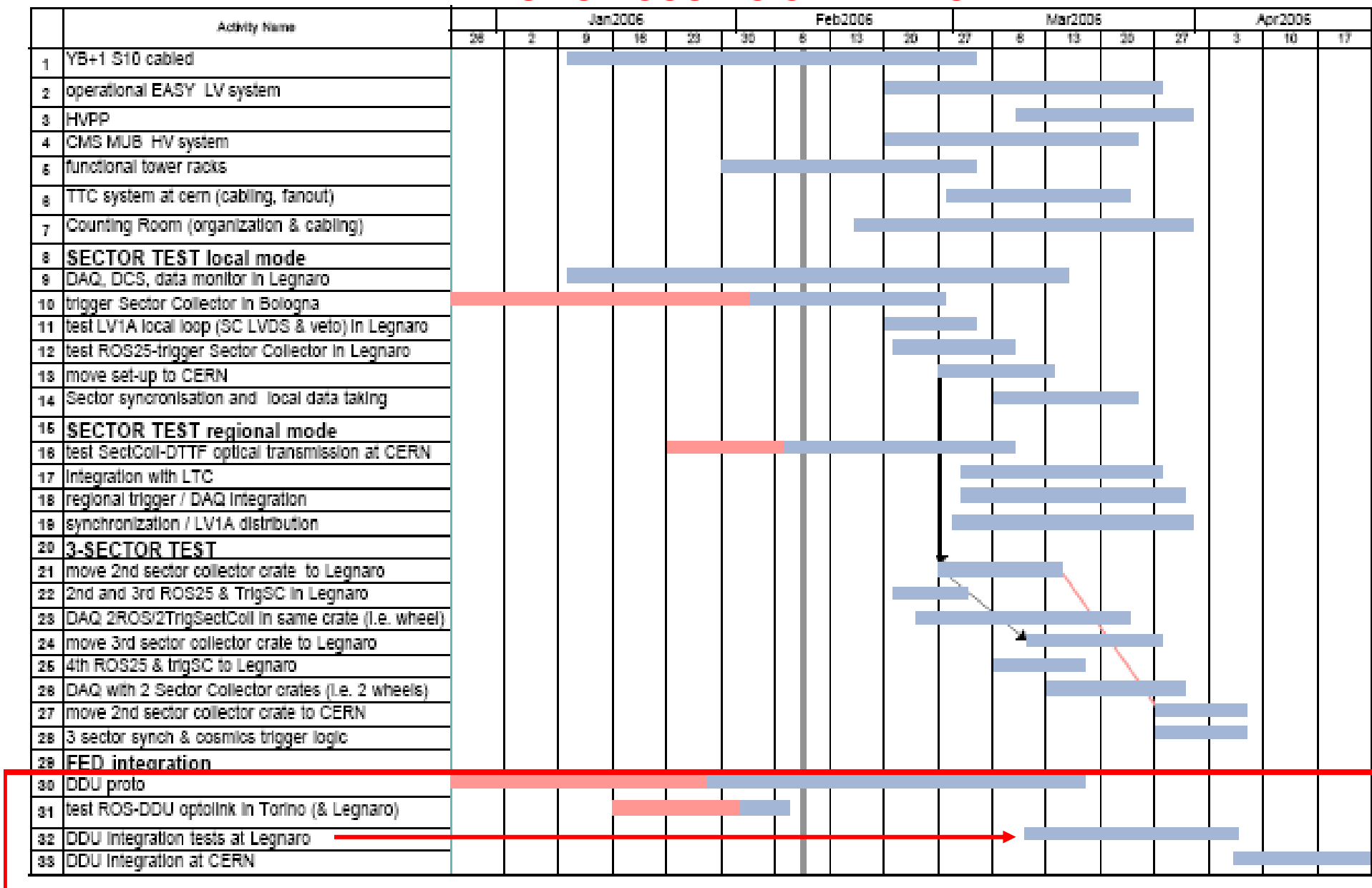
On the bright side, those data give an opportunity for further tuning the offline software --monitor, reconstruction, display.

**Enjoy
Marco**



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PLANS FOR COSMIC CHALLENGE



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LHCC REFEREES REPORT (from the visit of January)

MUON System

Technical progress has been very good. Nevertheless the project is so vast that it will dominate much of the installation and commissioning effort at SX5 for the next few months.

The system managers need to strengthen the manpower and other resources in a major way to face this enormous task.

To this end, they are well along in producing **a resource-loaded schedule.**

Cabling presents a special challenge.

Central CMS management must do everything possible to keep this project on schedule, as it will dominate the critical path for CMS installation throughout 2006.

The report of the January 24 review can be found at

http://feynman.princeton.edu/~smithajs/MUON_LHCC_Feb2006.pdf

LHCC REF.Report (details)

a. Integration and testing in the ISR.

ISR
preparation

breaking point as installation ramps up. **Reenforcements are needed ASAP.**

RPC gas
system

group from Frascati is operating and commissioning the gas system. **If possible the gas system should be expanded to allow longer testing periods for RPC's.**

Cables
preparation

requires cabling and commissioning to proceed in parallel. It is a major concern that many of the cable lengths have not yet been specified – **part of this problem, which must be resolved very soon, appears to stem from the fact the engineer responsible is overloaded.** This is delaying the production of a schedule that takes into account availability of cable, manpower, and access. We note that the cabling

Cabling

schedule, additional cabling teams will be needed to work in parallel after the magnet test. **This will require additional physicists or engineers to supervise the teams and keep them working efficiently.**

RPC
Trigger

iv. *Trigger.* As commissioning and installation continue, the border between detector and trigger will disappear. **The RPC people have to get involved in trigger system, front-end software, and further software development.**

A LIST OF CONCERN AND ACTION:

Chamber certification at ISR for availability for installation after Mag Test

Action : one more FT engineer from march 13 and some part time expert physicists since April. More technicians part time already at work.

Availability and readiness of cables (for chains, YB0 and negative wheels)

Action: **one** more engineer FT and **one** part time since March 1st, more Manpower and carefull plan for cables preparation to be defined this week

Man power availability for many tasks in SX5 (ancillary preparation before Installation, cabling and test of rack towers etc..)

Action: more physicists and technicians involved since March

Some problems found after installation on RPC and on Minicrates on the test after cabling (fixed, but..)

BMU ORGANIZATION

PMs
FG, Iaselli, Rodrigo

Local TB
AB, ,
Reithler Benettoni, Puerta, Montecass., Hoepfner, Checchia, Gonella, Giacomelli,
Dattola, Piccolo, Colaleo (RPC), Bencze (Alignment)

All task responsables are physicists or engineers
in bold RED are new engineers, (P means permanent since beg. of March) . In red are new technicians :Francia perm. Torino is 1 FTE out of 3 people, 1 + 1 part time from Aachen

	Installation	ISR certification	ISR ch.dressing handling etc..	ISR MC inst/test	CABLING & bulk cabl	Integratoin YB0,cables services	DT prep. for commiss SX 5	Commiss SX 5	Rack Connex cabl./ppanelS SX5/UX/SC	MC connex during cabl. SX 5	MC Testing after cabling SX 5	Bat904 HV/LV test
	Benettoni	Puerta	Benvenuti	Gonella	Montecassiano	Dattola	Benvenuti	Hoepfner	Checchia		Gonella	Giacomelli
Needed phys techs	2 6	5 0	0 7	0 0			0 4		2 6		2	1 1 part time
available phys techs	2 6	5 0	7	CREW			CREW		To (0,25) Aa (2) Pd (2) CIEMAT (0,25)	CREW		Total ~ 4, 5 FTE
missing phys techs	0 0	1 0		0 0					0 2			
Phys/Eng.	Benettoni Adamantonio(RP Philips)	Puerta,, Chamizo M. Fernandez Cordero(P)		CREW	Piccolo (RPC) Colonna(P) Calvo (Alignm.) plus CERN Integration	Abajiev(RPC)		CREW	Checchia (0,5), Giac/Giun (1) Gonella (0,5)		CREW	Giacomelli 0,5 Giunta 0,5
technicians	Padova(4)+To(2) RPC (2)		2 IHEP Divincenzo, Francia, Cafaro, Giordano Ahjiado Torino		L. Roscilli (Napoli) M.Rampazzo (Padova) plus CERN Integration				see below			
	in SX5 and later in UX				on wheels and chains		ppanelS, HV, LV gas, cooling		on towers, feet Hardware install.	LV, R-out, trigg	m. c. to rack electronics	HV, LV
	CREW >>>>> Nerv o, Mariotti, Cerminara, Mila, Sowa, Biallas, C. Fernandez, Villanueva, Conti, Zotto, Torassa, Zanetti, Masetti, Rovelli, Cavallo, Perrotta											
	(all Physicists on rotation basis (permanent in blue))											

available tech	CIEMAT	Aachen	Padova	Bologna	Torino	IHEP	CERN
	Ahjiado Full T Francia Full T for ISR X (cabling) 0,25	1+ 1 mech Schulz+ 1 elect part time following needs Fetchenhauer (full time)	Barcellan(ISR/SX) Temporin(SX) X (SX) Y (SX) Borsato (SX) Modenese(SX) Pedrotta (mech) Colombo (mech) all part time= 0,25	Cafaro 1/2 Giordano 1/2	1 mech FTE (out of 3 part time) 1 electr 0,25	2 FTE FT	Divincenzo FT

CONCERN :
AVAILABILITY OF MONEY TO SUPPORT PEOPLE AT CERN (27 FTE for inst and commissioning)

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**All task responsables are physicists or engineers
in bold RED are new engineers, (P means permanent since beg. of March) . In red are nev**

	Installation	ISR certification	ISR ch.dressing handling etc..	ISR MC inst/test	CABLING & bulk cabl	Integration YB0,cables services
	Benettoni	Puerta	Benvenuti	Gonella	Montecassiano	Dattola
Needed phys techs	2 6	5 0	0 7		0	
available phys techs	2 6	5 0	7	CREW	0	
missing phys techs	0 0	1 0			0 0	
Phys/Eng.	Benettoni Adamantonio(RP) Philips	Puerta,, Chamizo M.Fernandez Cordero(P)		CREW	Piccolo(RPC) Colonna(P) Calvo (Alignm.) plus CERN Integration	Abajiev(RPC)
technicians	Padova(4)+To(2) RPC (2)		2 IHEP Divincenzo, Francia, Cafaro,Giordano Ahjiado Torino		L.Roscilli (Napoli) M.Rampazzo (Padova) plus CERN Integration	
	in SX5 and later in UX				on wheels and chains	
	CREW >>>>> Nervo,Mariotti,Cerminara,Mila,Sowa,Biallas,C.Fernandez,Villanueva,Conti, (all Physicists on rotation basis (permanent in blue))					

new technicians :Francia perm. Torino is 1 FTE out of 3 people, 1 + 1 part time from Aachen

DT prep. for commiss SX 5	Commiss SX 5	Rack Connex cabl./ppanel SX5/UX/SC	MC connex during cabl. SX 5	MC Testing after cabling SX 5	Bat904 HV/LV test
Benvenuti	Hoepfner	Checchia	Gonella		Giacomelli
0	4	2	2		1
6					1 part time

CREW To (0,25) Aa (2) Pd (2) CIEMAT (0,25) Total ~ 4 , 5 FTE

0	2
---	---

;) CREW Checchia (0,5), Giac/Giun (1) Gonella (0,5) CREW Giacomelli 0,5 Giunta 0,5

see below

ppanel, HV, LV
gas, cooling

on towers, feet LV, R-out, trigg
Hardware install.

m.c. to rack
electronics

HV, LV

ti, Zotto, Torassa, Zanetti, Masetti, Rovelli, Cavallo, Perrotta

PMs
FG , Iaselli , Rodrigo

Local TB
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Dattola, Piccolo, Colaleo(RPC), Bencze(Alignment)

available tech	CIEMAT	Aachen	Padova	Bologna	Torino	IHEP	CERN
Available technicians	Ahjiado Full T	1+ 1 mech	Barcellan(ISR/SX)	Cafaro 1/2	1 mech FTE	2 FTE	Divincenzo FT
	Francia Full T for ISR	Schulz+ 1 elect part time	Temporin(SX)	Giordano 1/2	(out of 3 part time)	FT	
	X (cabling) 0,25	following needs	X (SX)		1 electr 0,25		
		Fetchenhauer (full time)	Y (SX)				
			Borsato (SX)				
			Modenese(SX)				
			Pedrotta (mech)				
			Colombo (mech)				
			all part time= 0,25				

total FTE Technicians + Physicists

	2,25	2	2	1	1,25	2	1
			plus 6 install.crew		plus 2 install.crew		
Technicians	2,25 FTE	2 FTE	3,5 FTE	1 FTE	1,75 FTE		1 FTE
Physicists	1,5 crew	1 Hoepfner	0,5 Gonella	0,7 Giac	0,7 Nervo		1 hoepfner
	3 certification	1,5 Crew	0,5 Checchia	0,7 Benv	0,5 Crew		0,5 Montecass
	0,09 Giunta	0,12 Giunta	1 Monteca	0,3 Giunta	0,7 Mariotti		0,5 Dattola
			1,5 Crew		0,8 Cordero		0,5 Colonna
			1 install.		0,3 install		0,5 Giunta

Total = 27 FTE

CONCERN :
AVAILABILITY OF MONEY TO SUPPORT PEOPLE AT CERN (27 FTE for inst and commissioning)

Two more FTE Tech. are needed for work in SX5. Looking for permanent people from CMS Institutions

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RPC

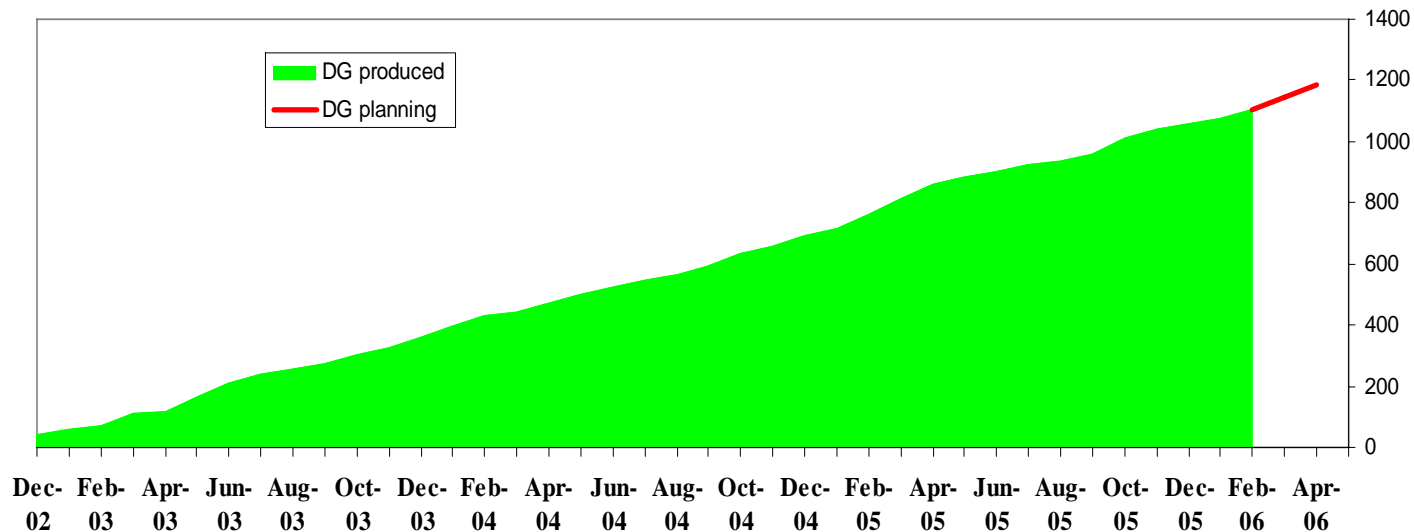
SG & DG production

3000 Single gaps built: end of the production

1080 DG produced (~ 96 % accepted) → ~ **75 DG** to be built to finish production

~7 % of total production

DG planning production 40 DG/month → Finish production: **April 06**



RPC

Chamber production

471 Chamber produced → 75 Chambers have to be built to finish production

~14 % of total production

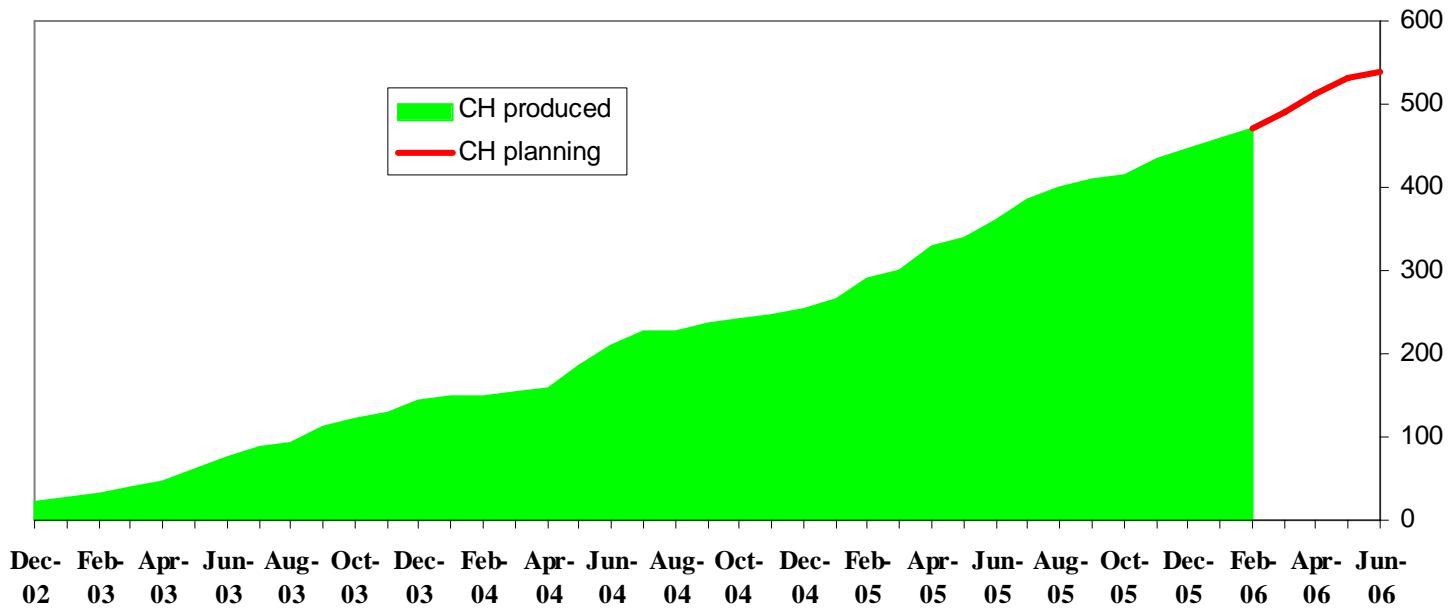
Total to be installed 490

Construction planning:

GT → 15 ch/month

Sofia → 5 ch/month

→ Finish production: **June 06**



RPC

Chamber Test

Cosmics test sites: 75 % of total chambers have been accepted after the cosmic test and sent to ISR for the long stability current test



After the coupling with DT **functionality tests** (gas leak, HV test, threshold setting-reading, strips connectivity) are done.

laselli

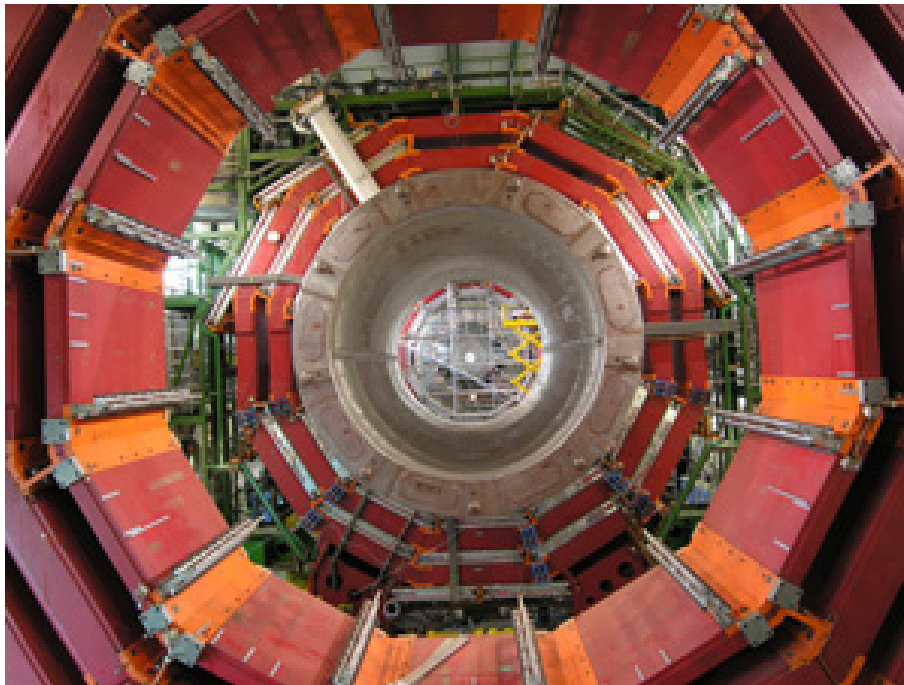
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27

Installation & Commissioning at SX5

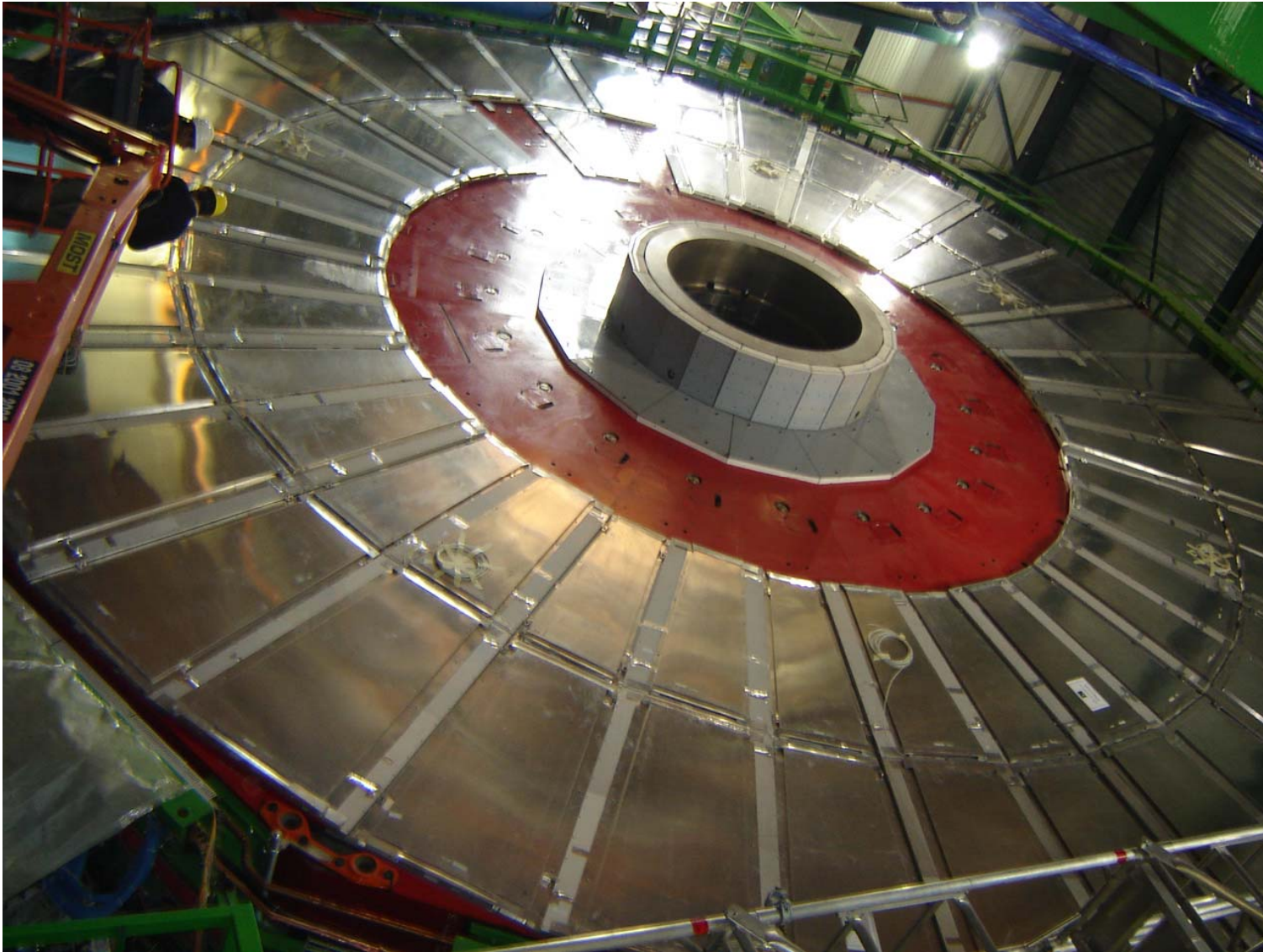
Full wheels +1 and +2 installed but sect 1/7
Full wheel 0 installed but sect 1-4-5-7
wheel -1 installed sect.10-11 (+3 station RB4)
whell -2 installed sect 10-11 (+1 station RB4)

53 % of total stations



W+1 & W +2: all installed chambers are checked for gas leak, strips connectivity, threshold setting-reading, current vs HV.

RE2 FWD RPC from Pakistan installed in FWD disk



ALIGNMENT

Hardware assembly and calibration at the ISR (and home institutes).

- Endcap and Link subsystems :about 90% of the instrumentation for the MTCC, in +Z side is completed
- MAB assembly and calibration is late, still some mechanics is missing in the calibration bench. We still think we could arrive on time (at the last installation slot available, in April) for the MTCC.

Installation in Endcap discs and Barrel wheels:

- Cabling on the endcap discs is completed. Still missing ancillary cables inter-racks for communications and LV power
- The installation of the hardware has been completed for the layers ME+3, ME+2. Tests of lasers and readout is planned by March - April.
- Layer ME+1 is not yet instrumented. **We have only done "installation test" of some components in January. The next installtion slot is scheduled for March 24.**
- Nothing is yet installed on the barrel wheels (only the old MAB "installation test"). Final cables for YB+2 are rfi.

Readout Electronics, DAQ software - DCS integration, LV power.

- **The hardware electronics is ready.** About 50% is at CERN, the rest is still at the institutes.
- **Software for DAQ is working in standalone programs and languages. Only about 50% is integrated in "official" PVSS form.** The integration with DCS through FSM is still in a very early state (most probably this part will not be ready for the MTCC)
- LV-CAEN modules (A3006): The 10 modules needed for the MTCC will not arrive before May (CAEN dixit). **We have decided to implement a "standalone" power for the MTCC.**

Setup of the FED, CR and Laser room for the MTCC.

- Needs are defined and computers are available at the FED and CR. Communication and LV cables not yet ready for installation. Laser room will be setup not before April

Reconstruction software and DBs.

- COCOA core software (for hardware alignment) is ready. DB handling still on work, this implies Geometry and Calibrations DBs.
- **Software for alignment with tracks (mainly for barrel muons) is progressing well.** Commissioning data have been reanalyzed in terms of chamber alignment. An extra effort has been put to have a working track extrapolator to be able to reconstruct muon tracks in the instrumented sectors.