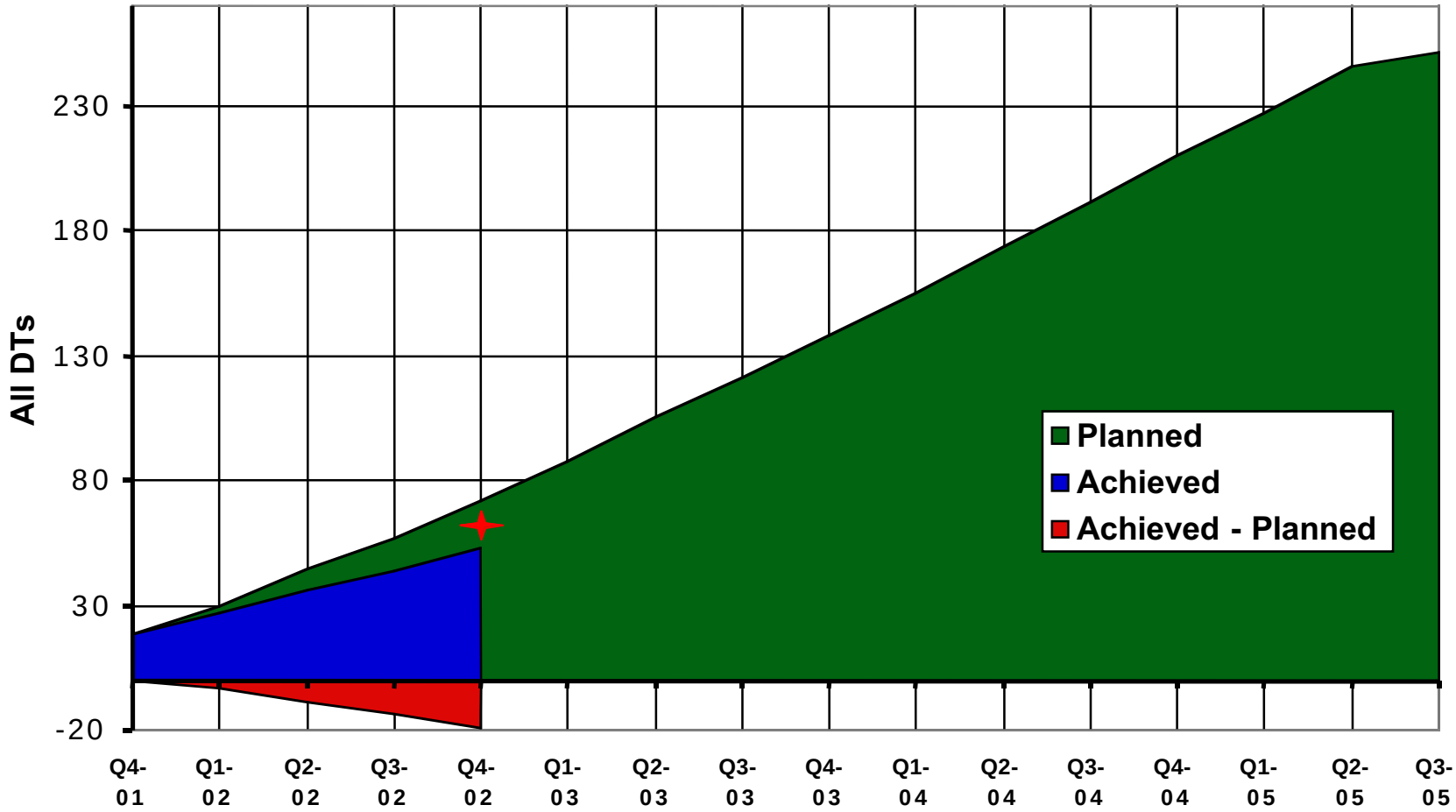
BARREL MU STATUS REPORT
To LHCC Referees Nov.26th 02

fgasparini

Construction status
Electronics
Installation plan
RPC (introduction)

DT Chamber Production (18DT/site/year)

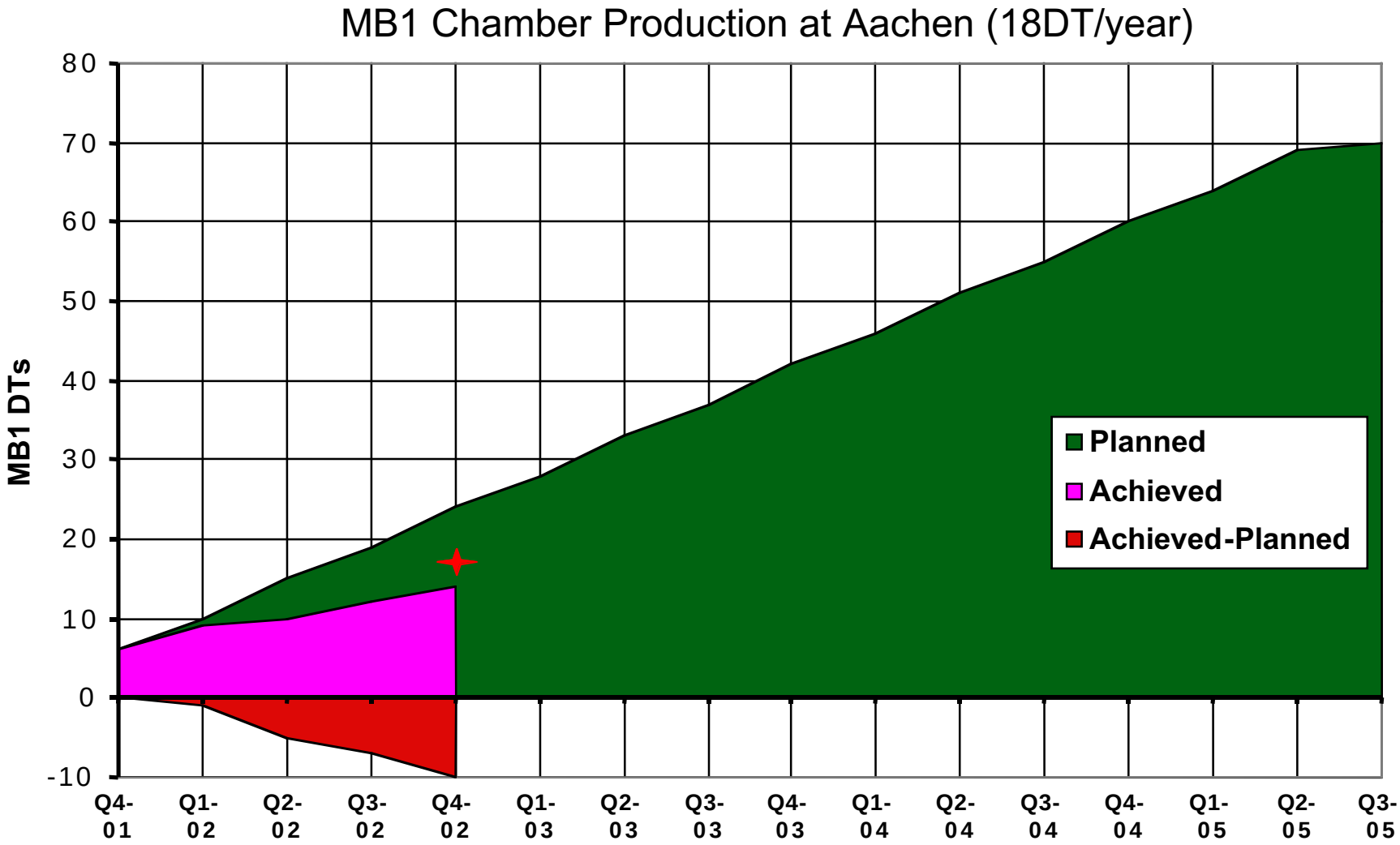


Integral of produced chambers /quarter. Q4-02 is the value at nov/ 15/02

✦ Extrap. End 2002

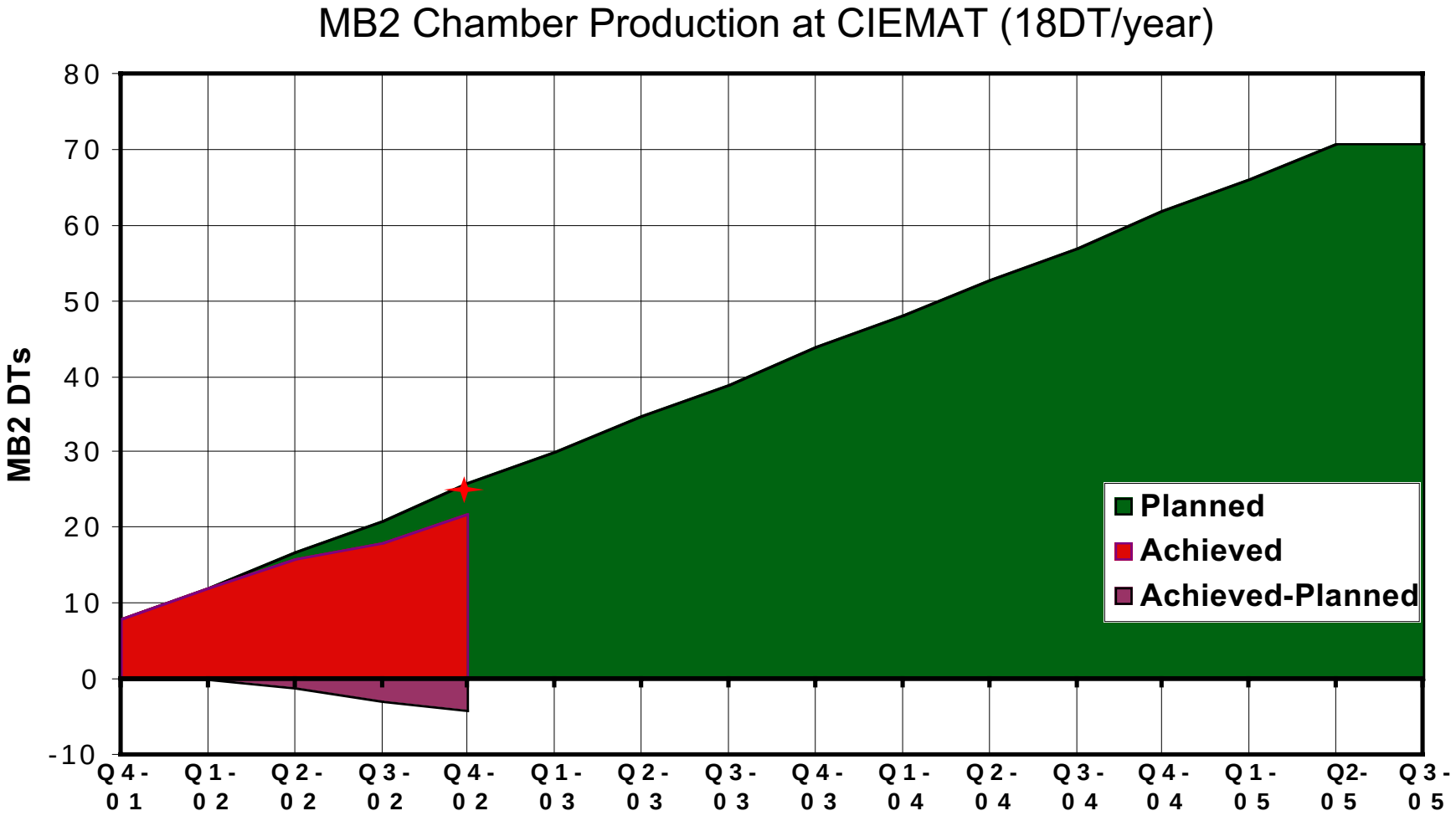
CIEMAT only is working at 18 ~ /20 ch./year since beg. 02

Aachen and LNL reached this figure in mid 02



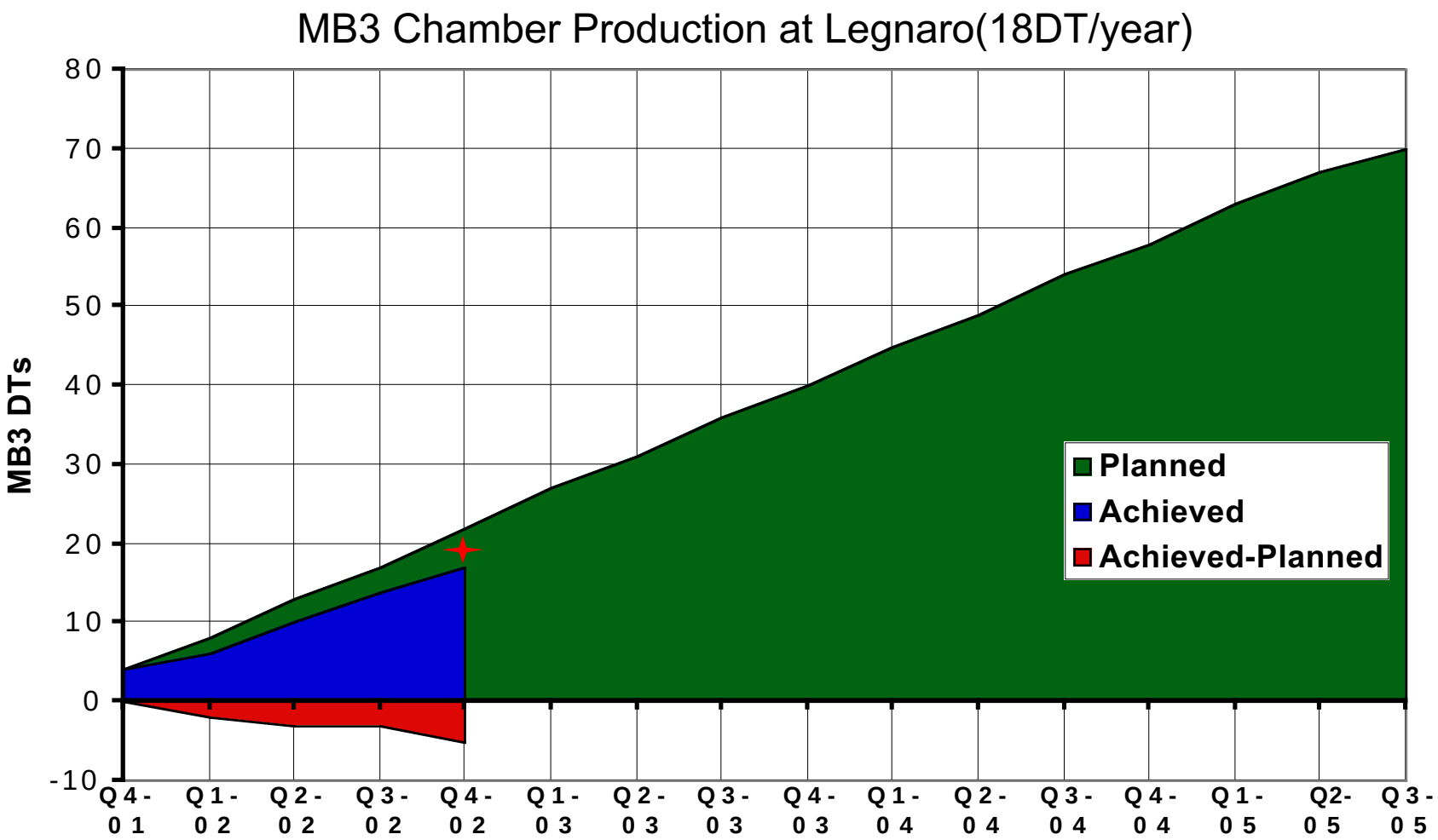
Integral of produced chambers /quarter. Q4-02 is the value at nov/ 15/02

Extrap. End 2002



Integral of produced chambers /quarter. Q4-02 is the value at nov/ 15/02

Extrap. End 2002



Integral of produced chambers /quarter. Q4-02 is the value at nov/ 15/02

Extrap. End 2002

Glossary:

SL: a unit of four layers fully **equipped,tested and working**
Chamber: 3 SL plus HC ready **to be glued / glued**
Complete chamber +RPC pads + gas & cooling pipes & manifold + HV/LV cables
Installable chamber: + measured + **RPC available**

Type	chambers **now / end 02**	complete	at CERN
MB1	12 / 17	------	4 / 12
MB2	20 / 24	------	19 / 19
MB3	15 / 19	------	5 / 5 (15 mid Jan)
total	**47 / 60 (max)**		**28/36** **(46 mid Jan)**
MB4	**first assembly of a MB4 SL march 03**		

The three sites are producing at the rate of 18 ~ 20 chs./ year

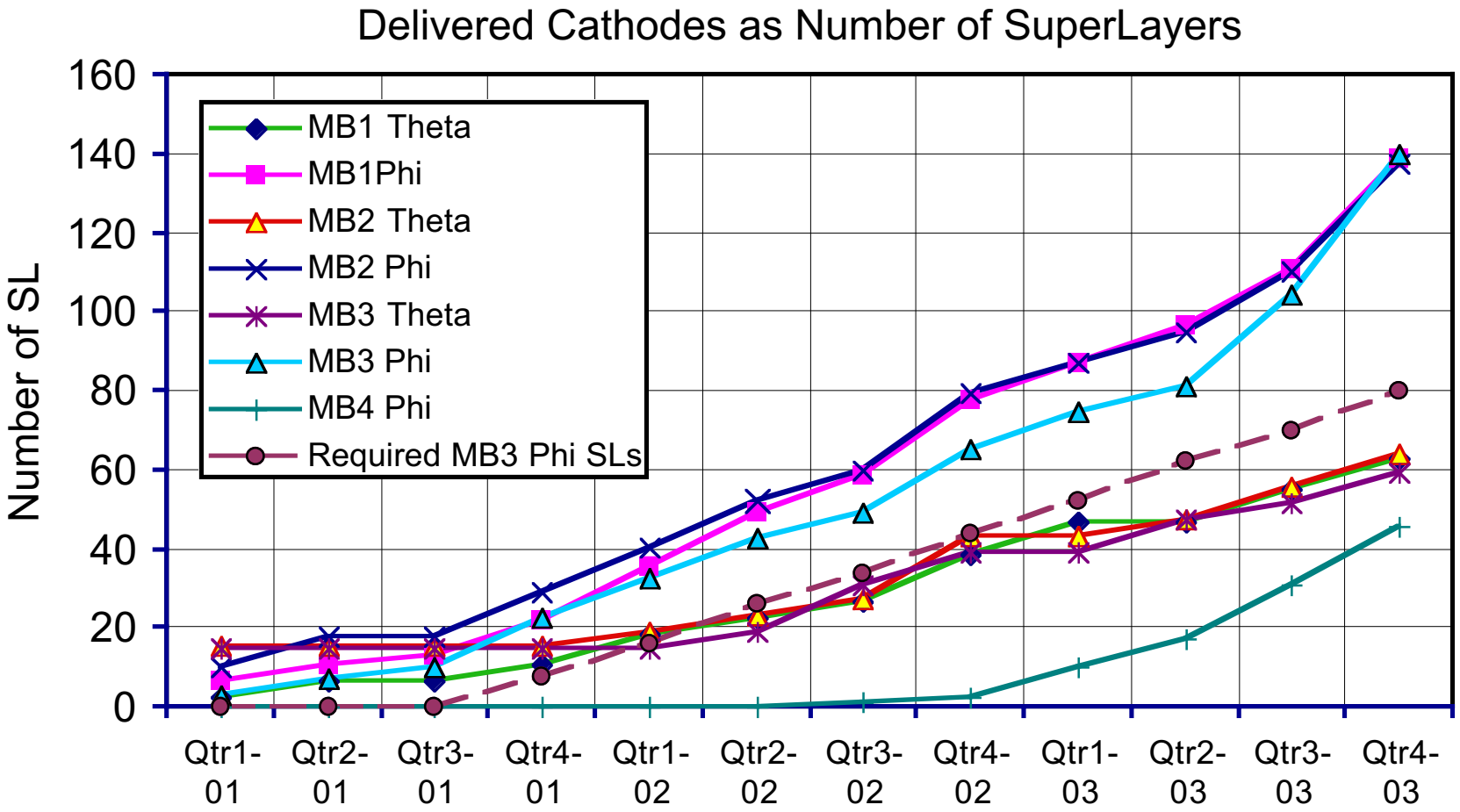
First installation test (MB2) done in August 02,test of installation of 1 MB1and 1 MB3 in sector 5 (no RPC) going on this week,installation with RPC in Jan.2003

Dubna : plates for 93 chambers by end 2002
Protvino:40 ch to Aachen,40 to CIEMAT,33 to LNL >> 113 ch/end 02
A buffer of 6 ~ 8 months in Dubna and of 12 months in Protvino

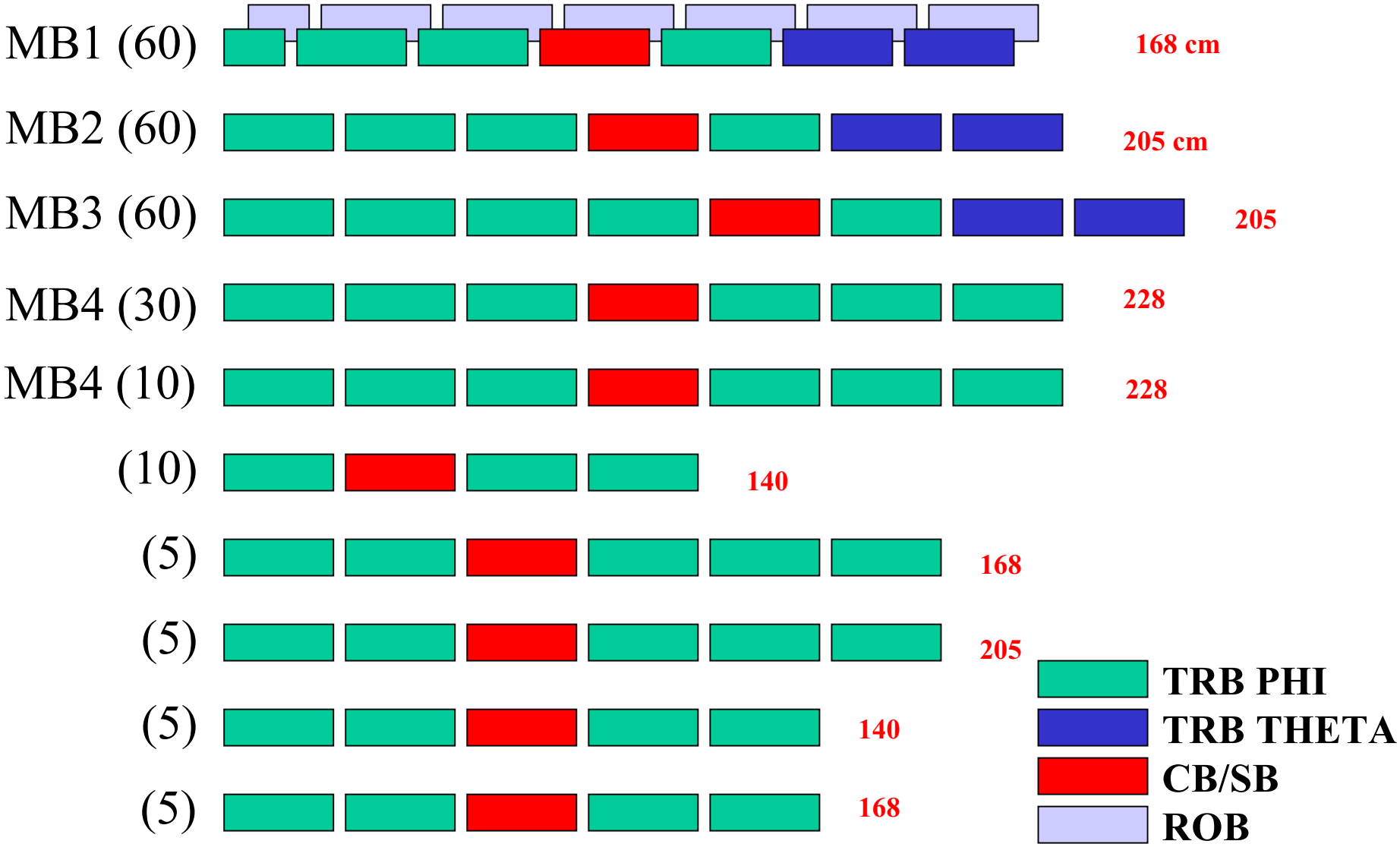
Honeycomb : second preserie (less than 2 mm bending) accepted,next delivery to CIEMAT expected these days , full lot by April 03!
HVB/HVC : 50% done in Beijing
FEB and ancillary : > 75% done (95% for the FEB)

PARTS FOR CHAMBER COMPLETION AT ISR:

RPC pads : available in the labs. and at ISR
Gas and cooling pipes and manifolds :available by end 2002
HV cables : available for the 72 ch. of March 2003 ~ in March 2003 (to be done in Padova)
for 30 chambers more ~ in May from IHEP


Delivered Cathodes as Number of SuperLayers
Number of SL
160
140
120
100
80
60
40
20
0
MB1 Theta
MB1Phi
MB2 Theta
MB2 Phi
MB3 Theta
MB3 Phi
MB4 Phi
Required MB3 Phi SLs
Qtr1-01
Qtr2-01
Qtr3-01
Qtr4-01
Qtr1-02
Qtr2-02
Qtr3-02
Qtr4-02
Qtr1-03
Qtr2-03
Qtr3-03
Qtr4-03

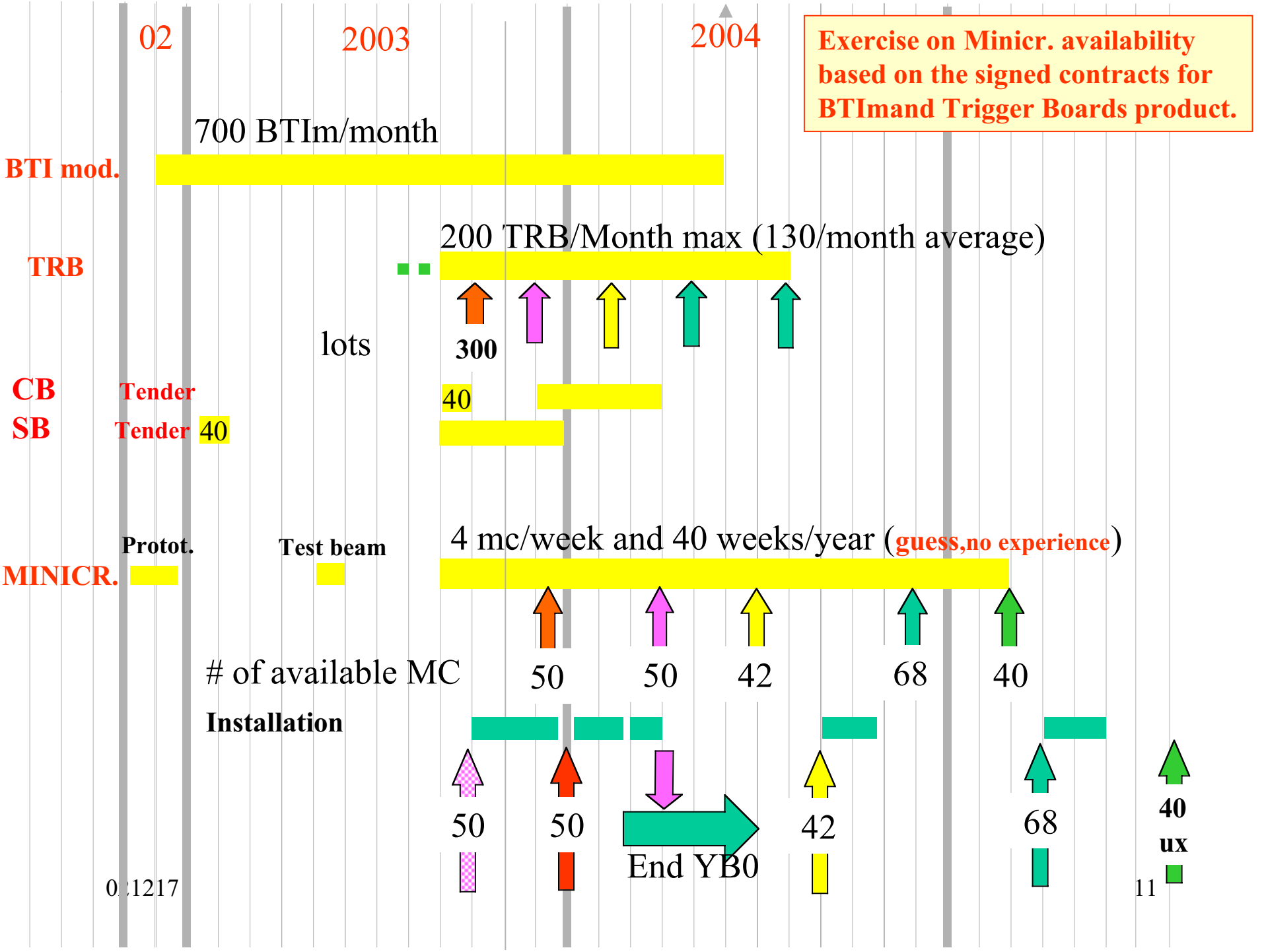
SCHEMATIC OF A MINICRATE



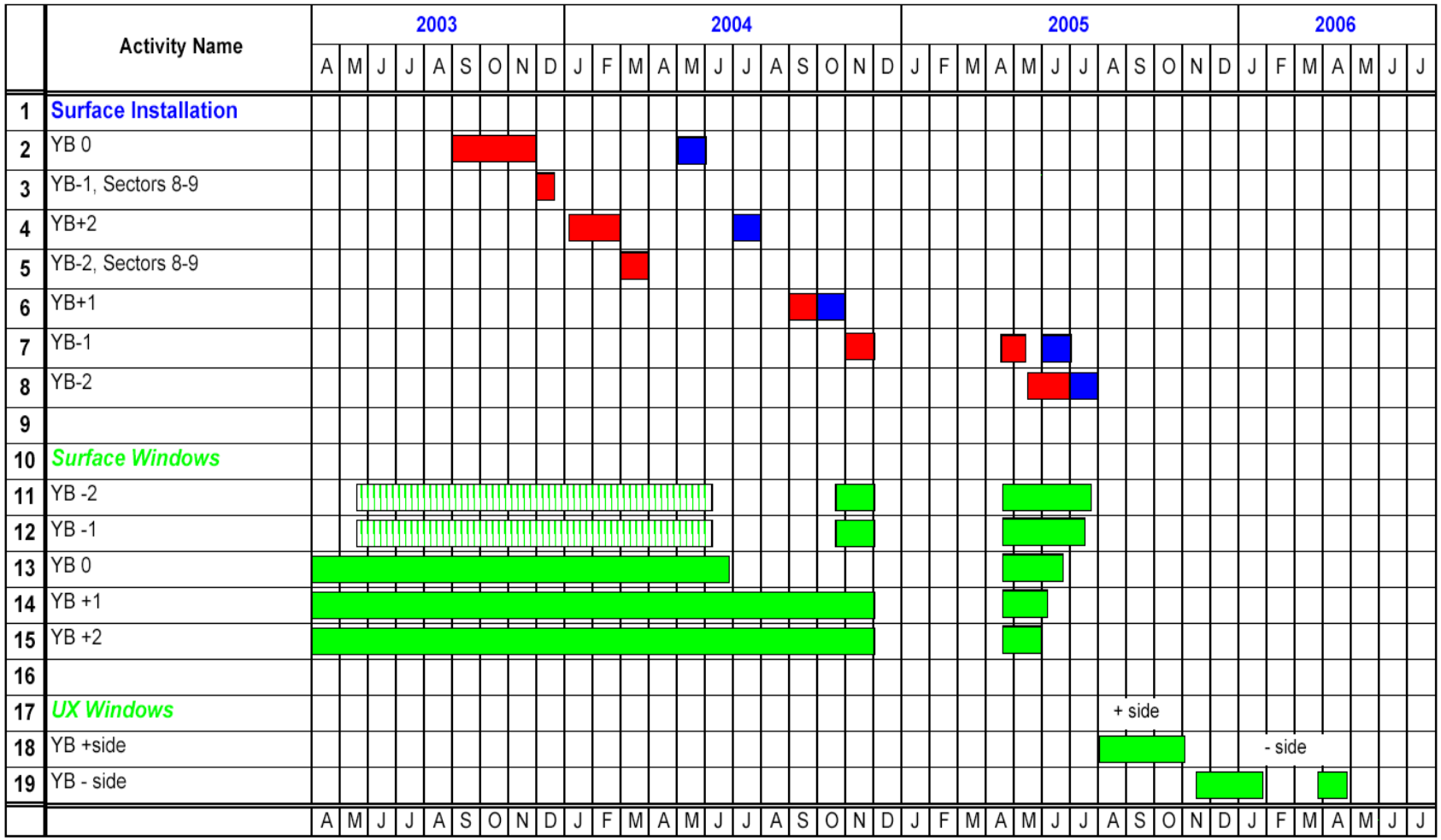
Samples of all the boards (ROB,TRB,SB and CB) for the assembly of the First complete Minicrate (a MB1 type) will be available in Padova during December. Test will begin in January 03.
Boards for the assembly of two Minicrates will be available in Feb. March in view of the test beam of May.

We are launching the tenders of SB and CB (one per MC) before end of November 02

We expect to have boards of all types available for ~ 40 MC by Sept. 2003 to begin the mass assembly.


02
2003
2004
Exercise on Minicr. availability based on the signed contracts for BTImand Trigger Boards product.
700 BTIm/month
BTI mod.
200 TRB/Month max (130/month average)
TRB
lots
300
CB
Tender
40
SB
Tender
40
Protot.
Test beam
MINICR.
4 mc/week and 40 weeks/year (guess,no experience)
# of available MC
50
50
42
68
40
Installation
50
50
42
68
40
ux
End YB0
0 :1217
11

Barrel Muon Installation



Installation Cabling

OLD

Chamber Installation Scenario

- Installation crew of 4 technicians from home Institutions plus crane operators
- Installation rate of one chamber/day at start-up plateau at 8 chambers/week
- One wheel (10 Sectors) = 42 Chambers in 5 weeks

➢ YB 0 YB-1,Sectors 8-9 September-December 2003

➢ YB+2 January-February 2004

➢ YB-2 Sectors 8-9 March 2004 Alignment/Magnet Test

➢ YB+1 September 2004 YB-1 November 2004

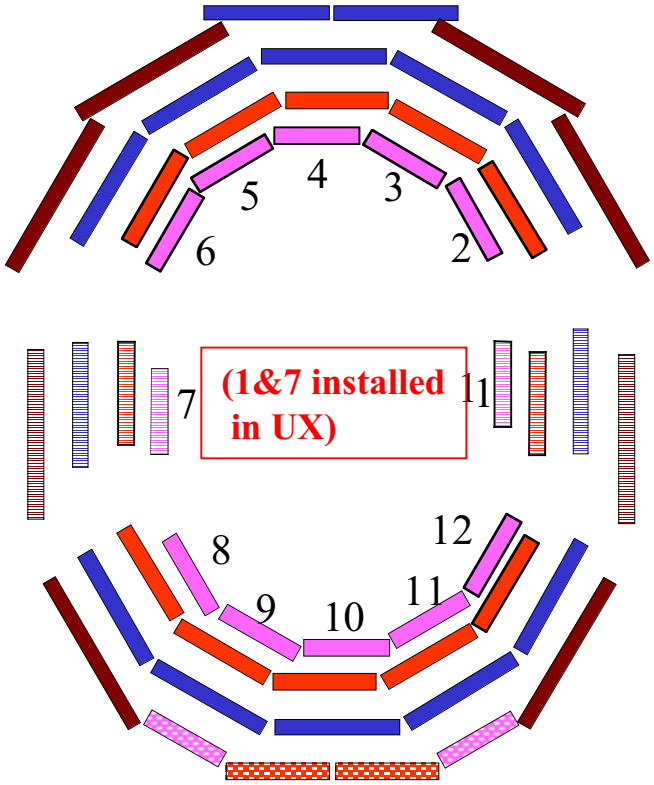
➢ YB -1 YB -2 April-June 2005

- 10 Sectors (40 Chambers) are installed in UX5 starting September 2005 (~10 weeks to complete).

NEW

BMU Installation Scenario

- Realistic estimate => 12 Sectors installed in 2003
- DT chambers are sector specific
  => Fix Installation sequence
- Minicrates are on the critical path
  => Assume late arrival
- Install chambers without minicrates in accessible sectors:
  - YB 0 Sectors 8 => 12
  - YB+2 Sectors 8 => 12
  - YB-1 Sectors 8+9
  - Less demanding for Torino site



Continued in next slide

- Install chambers without minicrates in YB+1 8=>12 and with minicrates on YB 0 2 => 6 January February 2004
- Equip Sectors 8 => 12 YB0, YB+2, YB+1, Sectors 8+9 of YB-1 with minicrates as they become available (~ 2 ….weeks March 04)
- Continue installation of complete chambers:

➢ YB-2 Sectors 8-9 March 2004

➢ sectors 2=>6 of YB+1,YB+2 September 2004

➢ begin YB-1 November 2004

➢ YB -1 YB -2 April-June 2005 (57 Chambers)

Chambers & Minicrates and "NEW" installation schedule

It is assumed Minicrates will be late:

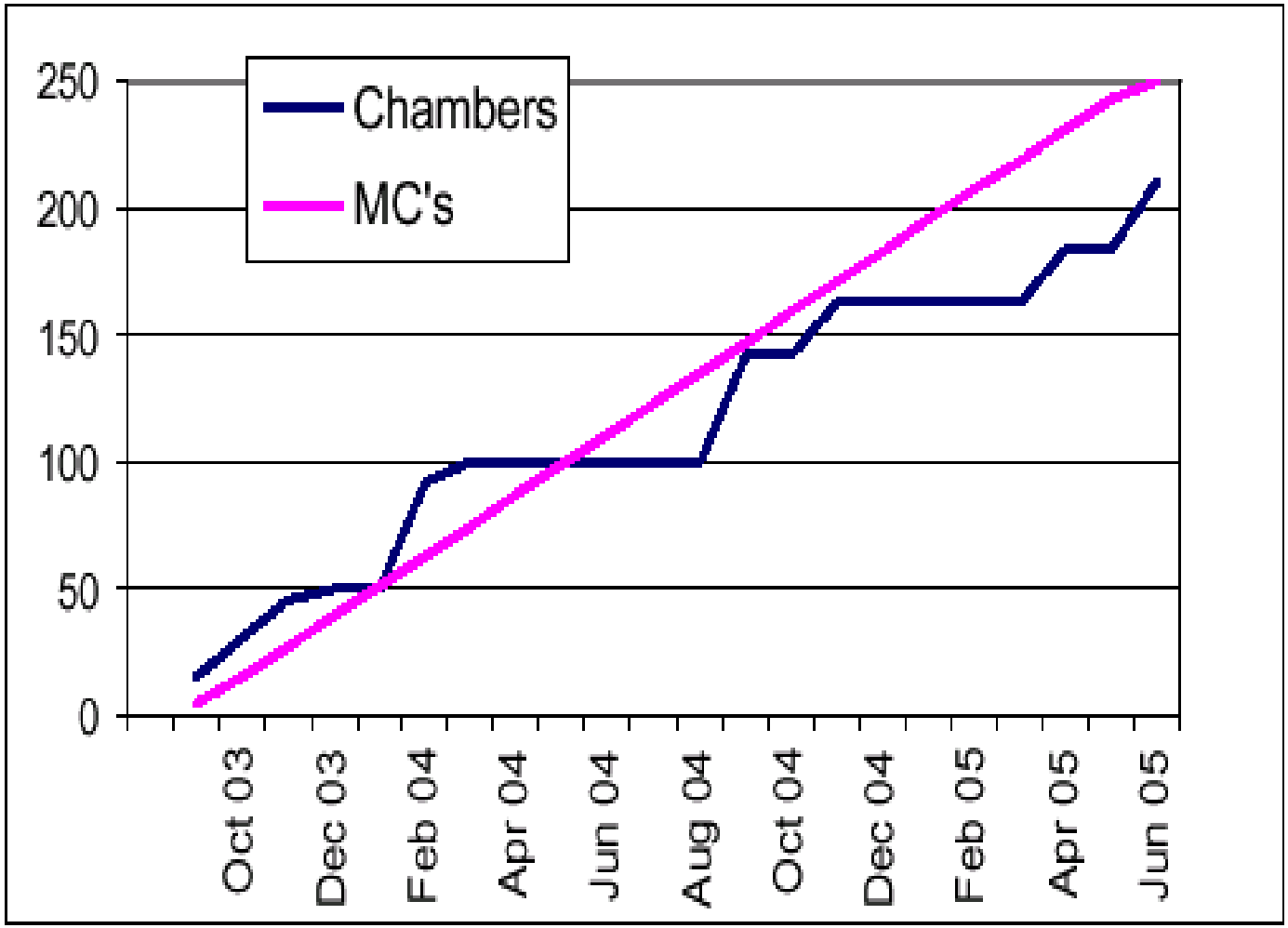
- **50 chambers will be installed during 2003 without Minicrates (Sectors 8 to 12 on YB0 & YB+2 and Sec.8-9 on YB-1)**
- **In Jan-Feb 2004, 21 chambers installed without MC's in YB+1 and 21 chamber with MC's in YB 0**
- **In March 2004 installation of MC's on chambers previously installed without them**
- **From March 2004 installation continues with chambers equipped with MC's**

⇒ The consequence is we need to have assembled

- **21 MC's by January 2004**
- **+79 in March**
- **+150 June 2005**

Possible if :

⇒ First MC October 2003 @ 12 MC's per month



Possible if :⇒ First MC October 2003 @ 12 MC's per month

The number of installed chambers stops at 210 because the last 40 chambers must be installed in the cavern from July 05 to March 06

To speed up the assembly : take into account availability of Boards:

RO assembly

- **Done by a company in Spain: mechanical parts, RO boards, link board, LV connections, CCB+SB, RO bus (+cables under RO boards)**
- **Full RO test at Ciemat**
- **Shipment to Italy**

Trigger assembly

- **Done in Italy: TRB, related cabling**
- **Full test: trigger and RO**
- **Shipment to CERN**

⇒CCB is not going to be ready probably until mid 2003 due
⇒ to QPLL production schedule

Barrel RPC CMS MoU

(not viable because of delayed schedule)

CHINA PU
RB1 mechanics
assembly and test (120 ch)
BULGARIA SOFIA
RB2,3 and 4 mechanics (360 ch.)
RB3 ass.&test (70 ch)
ITALY BA+PV
all the gaps + electronics
assembly (at GT) and test of 240 ch.

Barrel RPC modified

(in principle acceptable by INFN)

CHINA PU
RB1 mechanics
24 RB1 ass.&tested in Bari (supported by INFN)
(96 assembled and tested in Italy at charge of INFN)

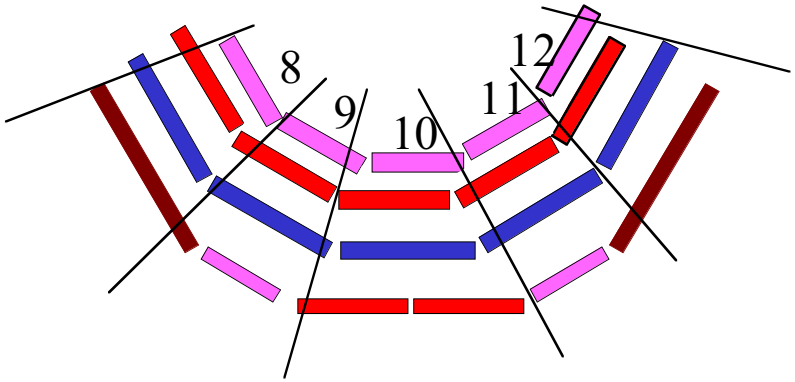
BULGARIA SO *
RB2,3 and 4 mechanics
44 ch ass.tested in Bari (supp. by INFN)
76 ch ass.&tested in Sofia

ITALY BA+NA+PV
all gaps + electronics
ass.&test of 240+96 (RB1) ch.
(two ass. factories in Italy : GT and new one)

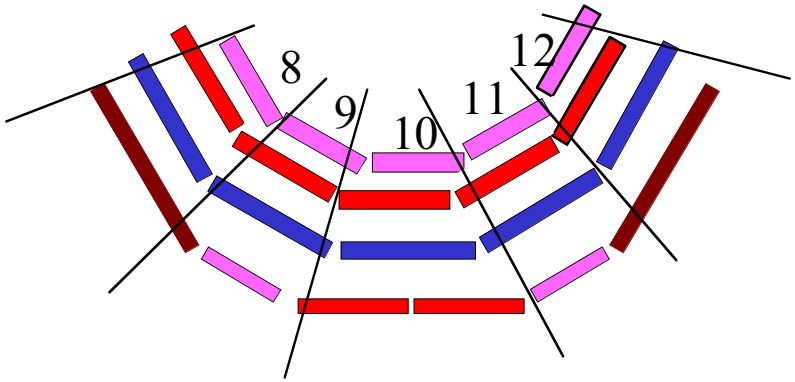
*** After the MoU the design of RB3 was changed by splitting the chambers in two**

RPC Chambers to be installed at the end 2003 (1st installation)

24 RB1
24 RB2
24 RB3
24 RB4

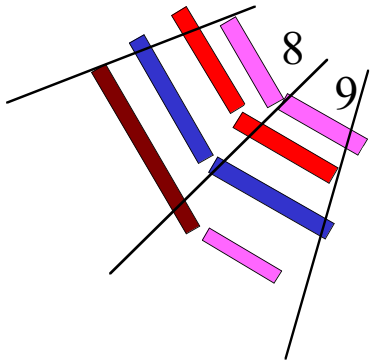


WB 0



WB+2

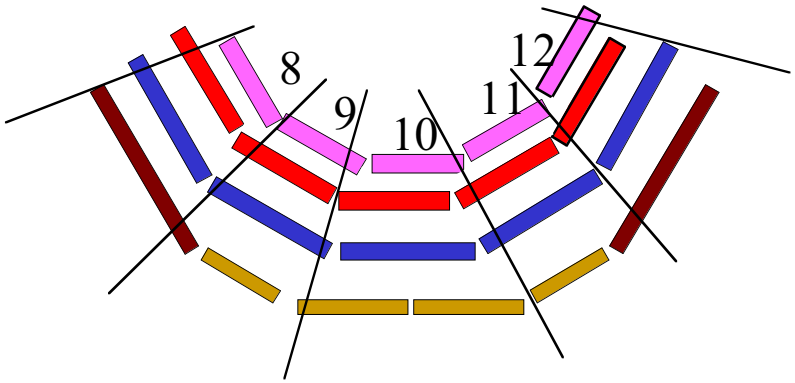
RB1
RB2
RB3
RB4



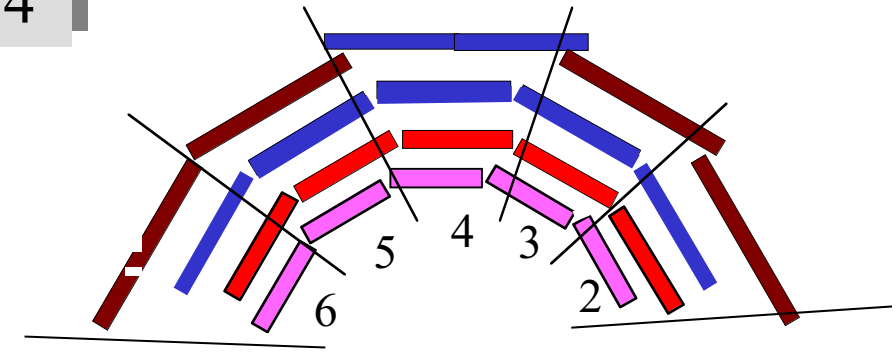
WB-1

RPC Chambers to be installed at the beginning 2004 (2nd installation)

20 RB1
20 RB2
20 RB3
20 RB4



WB +1



WB 0

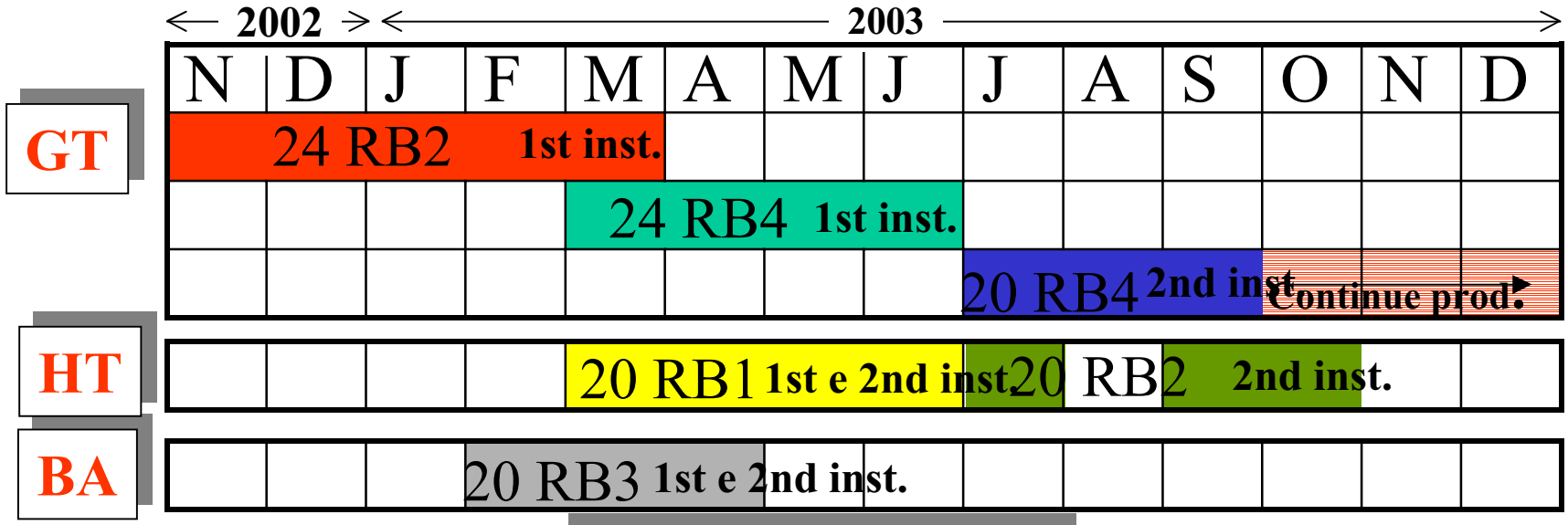
RB1
RB2
RB3
RB4

176 chambers in total are needed in the first phase
48 chambers will be ready by December 2002 (24 RB1 + 24 RB3)

128 to be built in 2003

RPC assembly in 2003

24 RB1 e 24 RB3 already assembled in Bari



Assembly in 2004-2005