TOTEM Status Report

for the NOV 2008 RRB

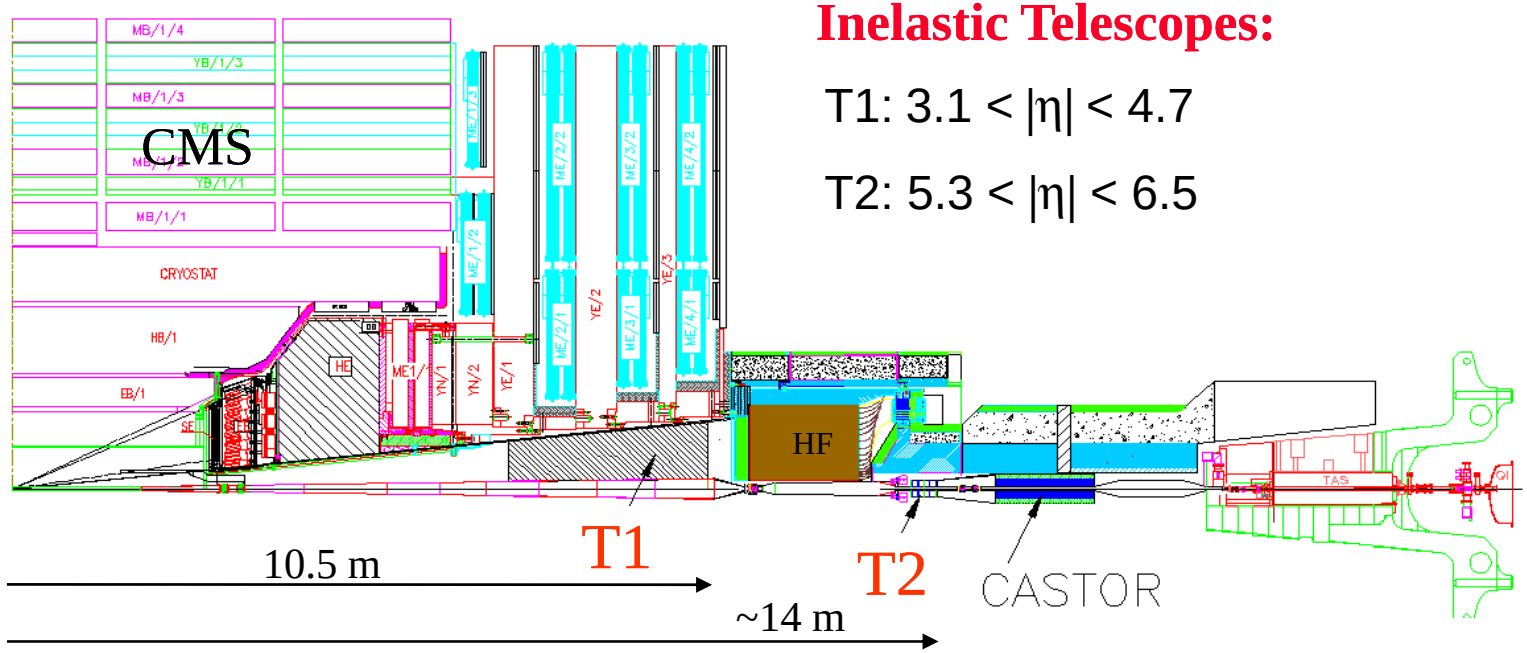
Karsten Eggert

on behalf of the

TOTEM Collaboration

http://totem.web.cern.ch/Totem/

The TOTEM Detectors

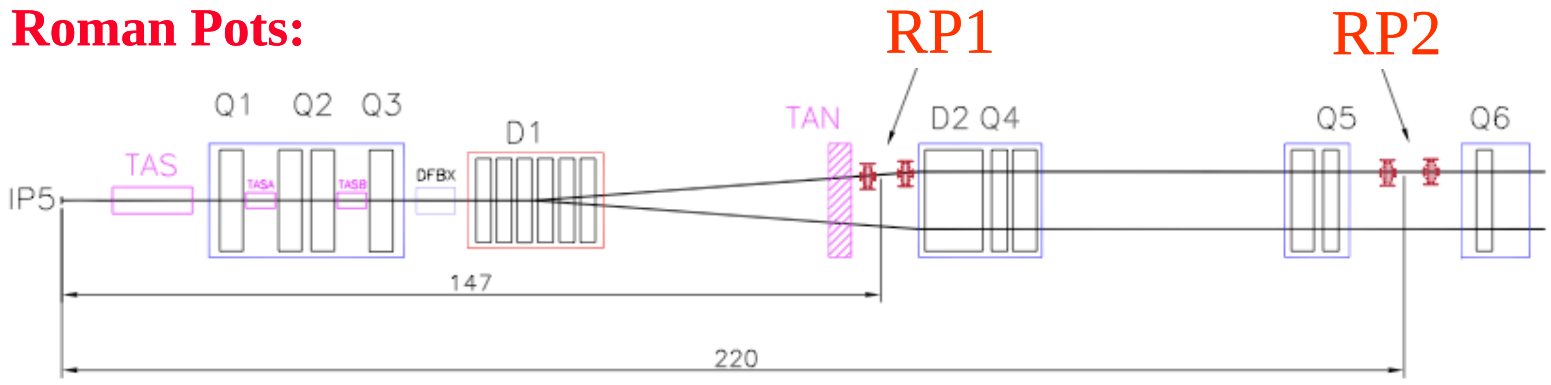


Inelastic Telescopes:

T1: 3.1 < |η| < 4.7

T2: 5.3 < |η| < 6.5

Roman Pots:

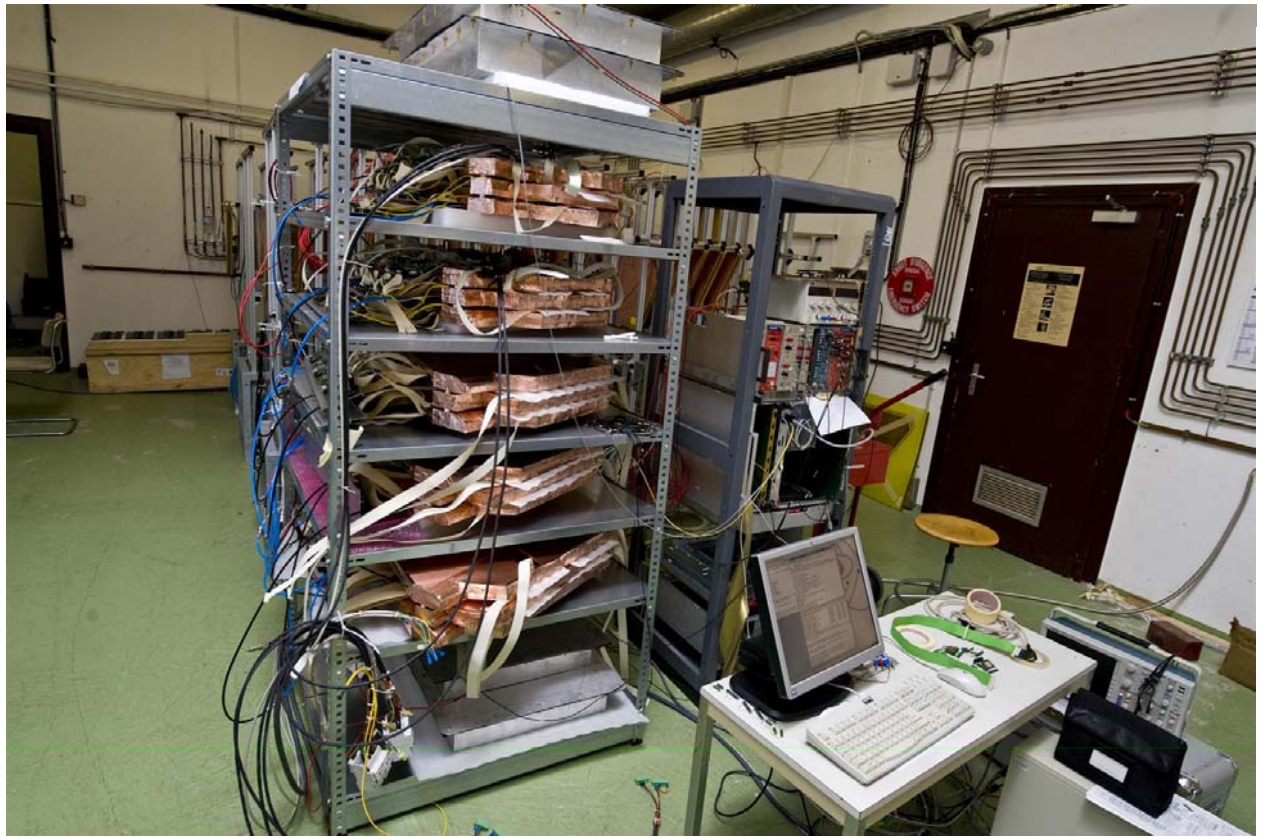


The T1 CSC chambers

Cosmic Ray test set-up

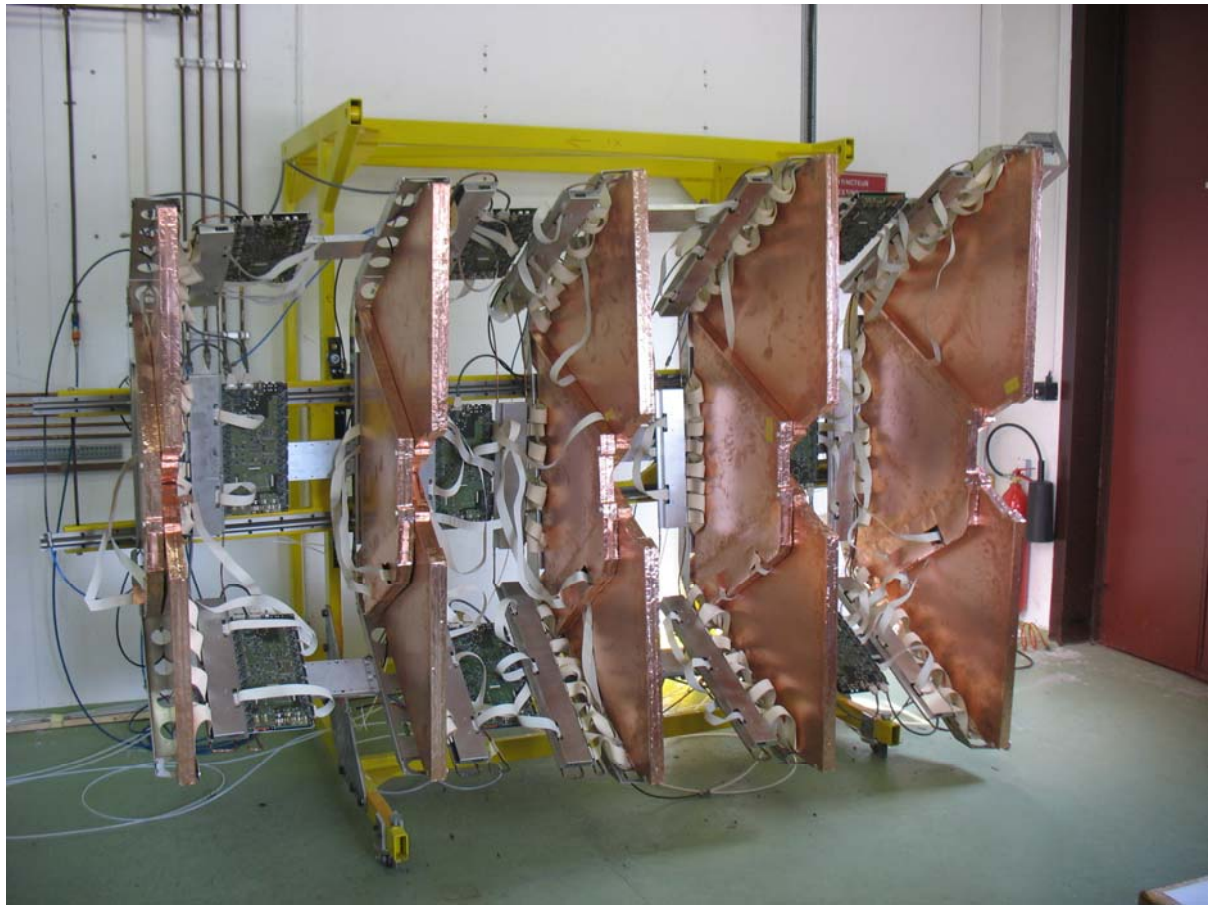
15 CSCs for first ¼ telescope

Even firemen help !!

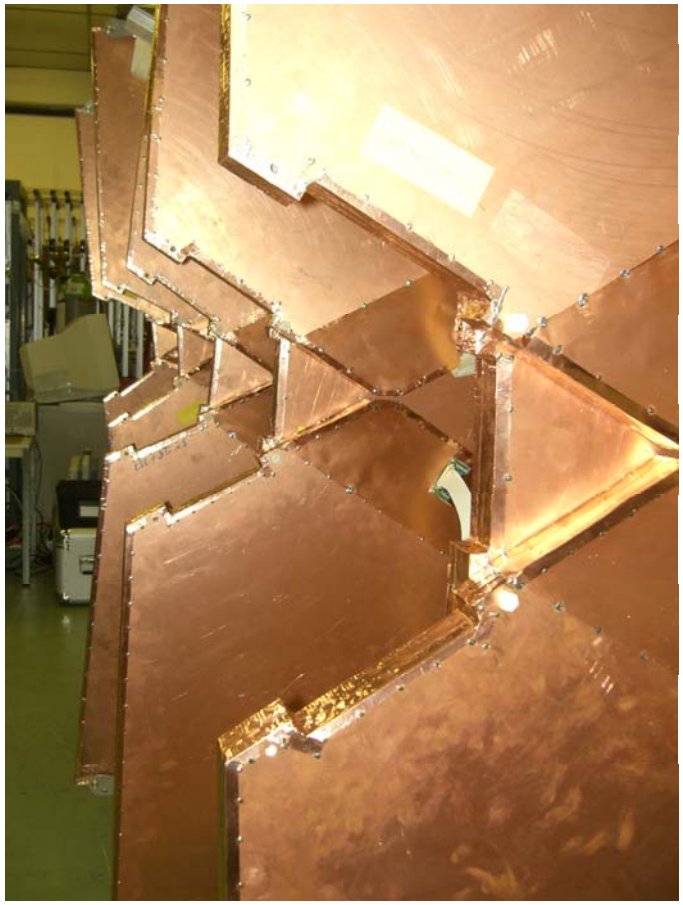


¼ T1 Telescope complete with CSC chambers

15 CSCs mounted 3 by 3

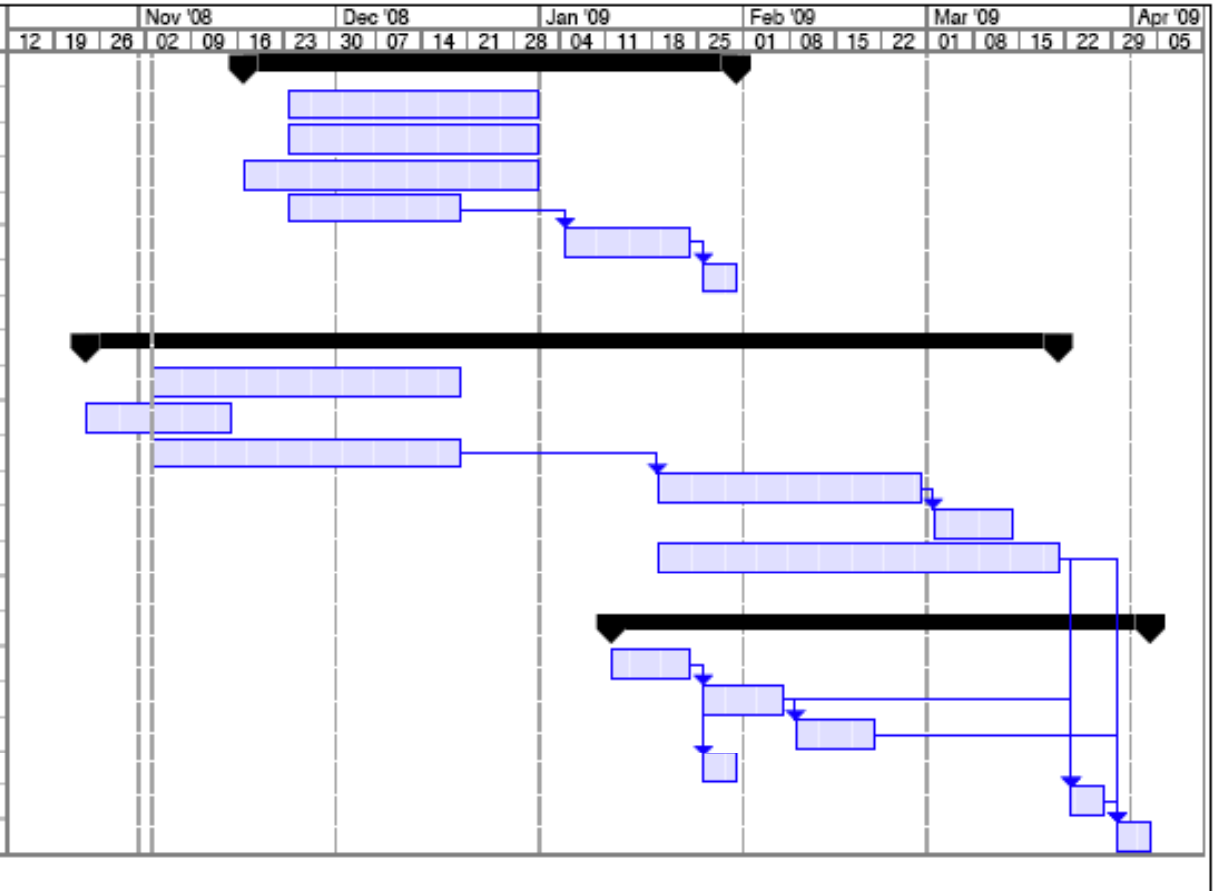


Tilt between layers

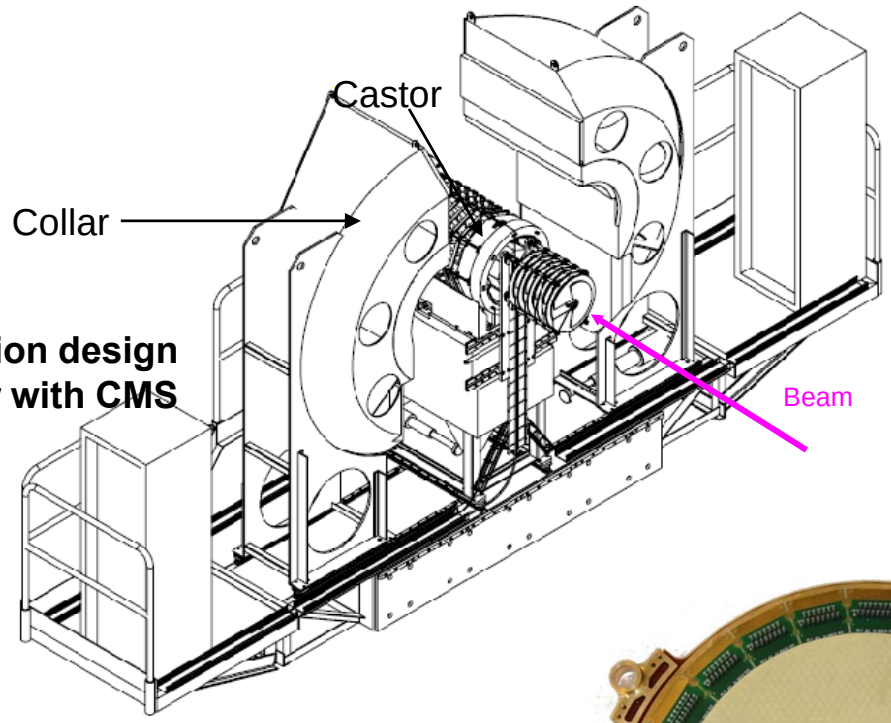


T1 planning

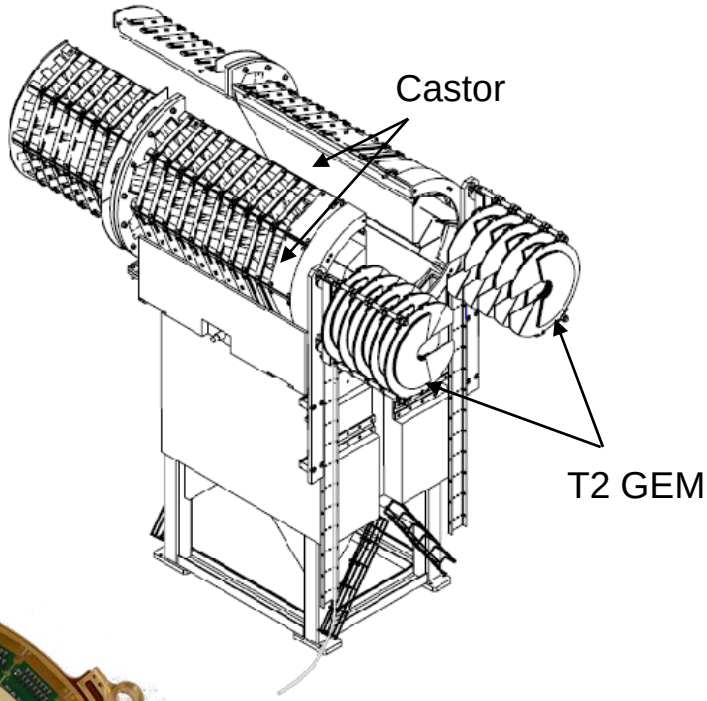
ID	Task Name
1	**Electronics**
2	AFEC final production
3	CFEC final production
4	ROC final production
5	TRGM design
6	TRGM production
7	TRGM test
8	
9	**Chambers**
10	PNPI delivery (11 chamb.) transport
11	12 pannels production
12	12 pannel delivery to PNPI
13	8 chambers production in PNPI
14	8 chambers delivery at CERN
15	chamber finishing and test
16	
17	**Half arms**
18	2nd half arm: mechanics
19	3rd half arm: mechanics
20	4th half arm: mechanics
21	2nd half arm: chambers + services + test
22	3rd half arm: chambers + services + test
23	4th half arm: chambers + services + test

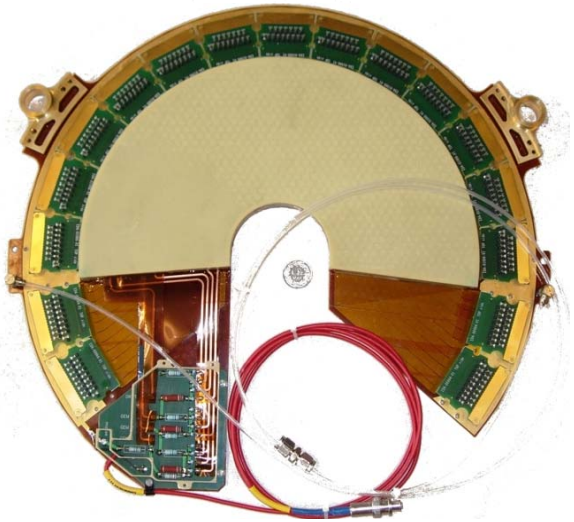


The T2 Telescope



Installation design together with CMS



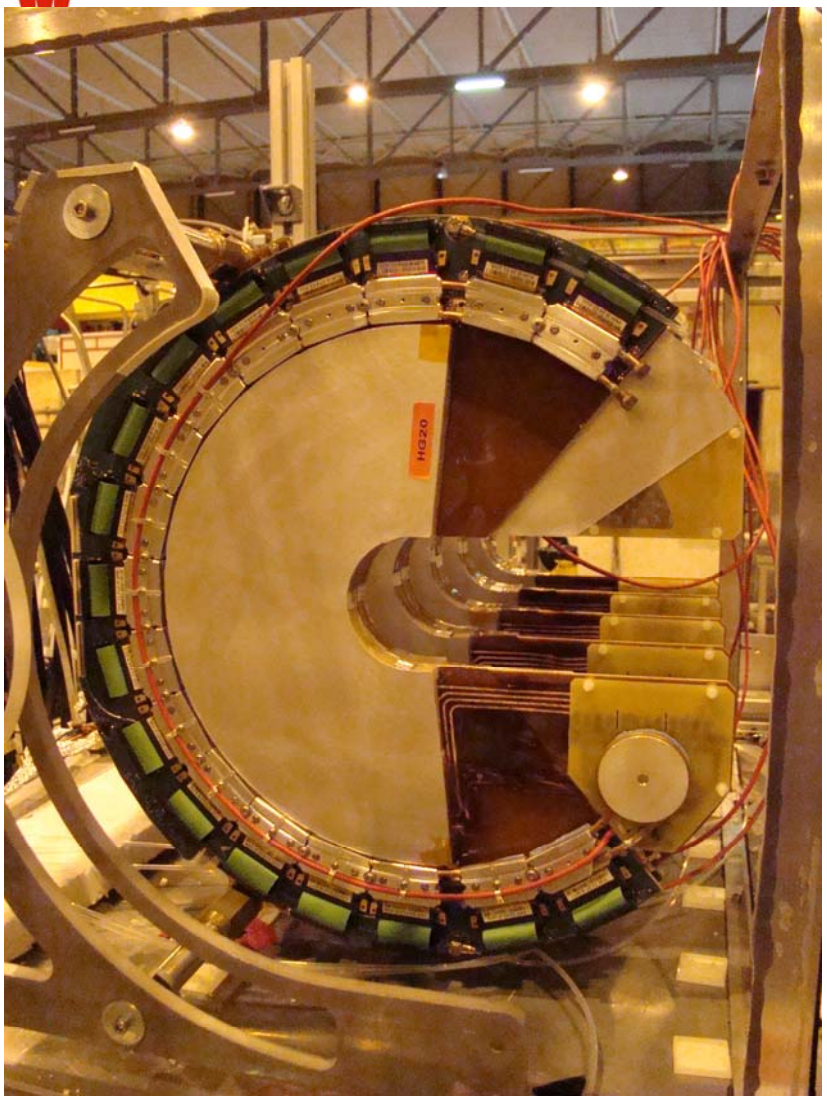


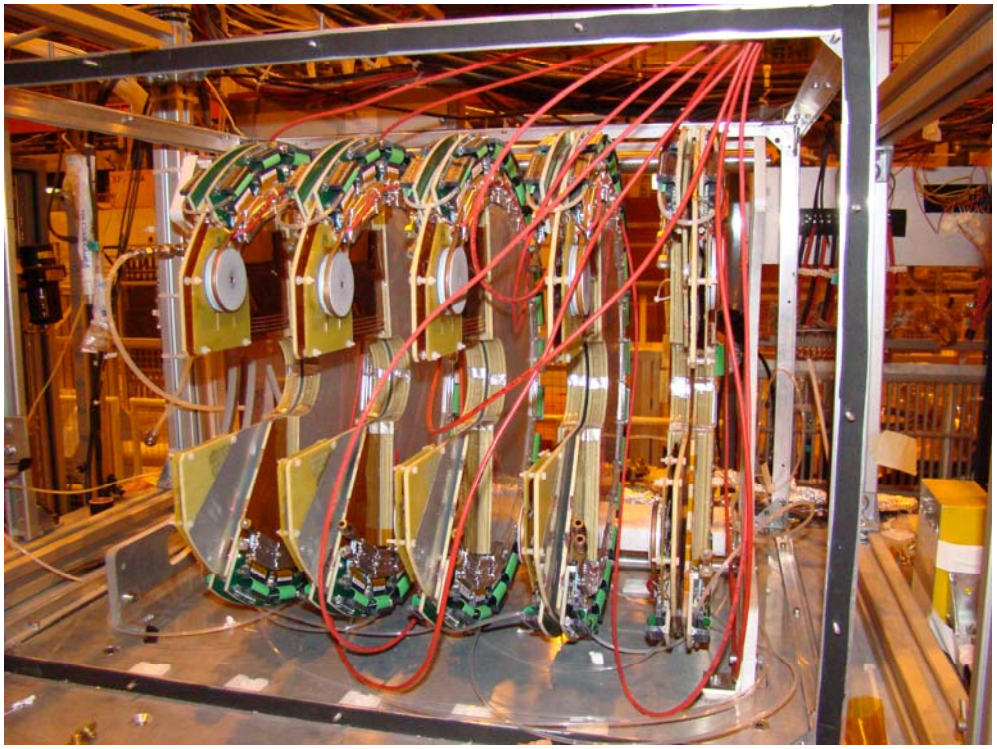
Final GEM chamber

10 triple-GEM planes on each side of the IP to cope with high particle fluxes.

$5.3 < |\eta| < 6.6$

T2 Telescope Assembly in Test Beam





Production at Helsinki (50 GEMs)

Final assembly at CERN

T2 Status (1)

Detectors

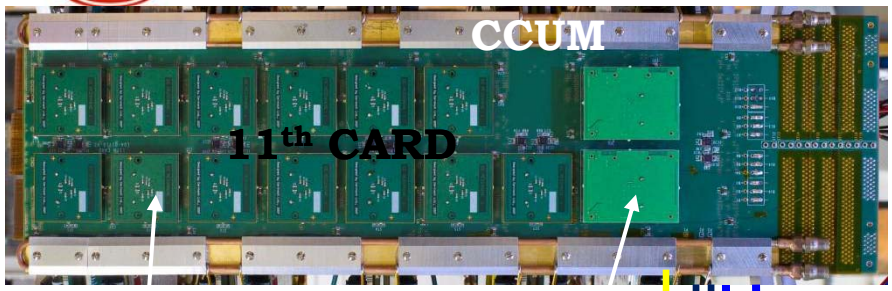
- Production of 50 GEMs (40 + 10 spares) finished in Helsinki about one year ago.
- Big effort for a Quality Control on GEM foils and readout boards
- GEM chambers of 1st quarter fully characterized on SPS beam line H8 during Summer 2008.

Electronics

- Designed and produced in Pisa/Siena/CERN laboratories, then tested and mounted at CERN on the assembled 1st quarter.

- The full electronics production for the readout and the trigger is almost finished and the full assembly and the installation are planned for the next few months.

T2 Readout and Trigger hardware



Cavern (IP5)

Counting Room

Rack

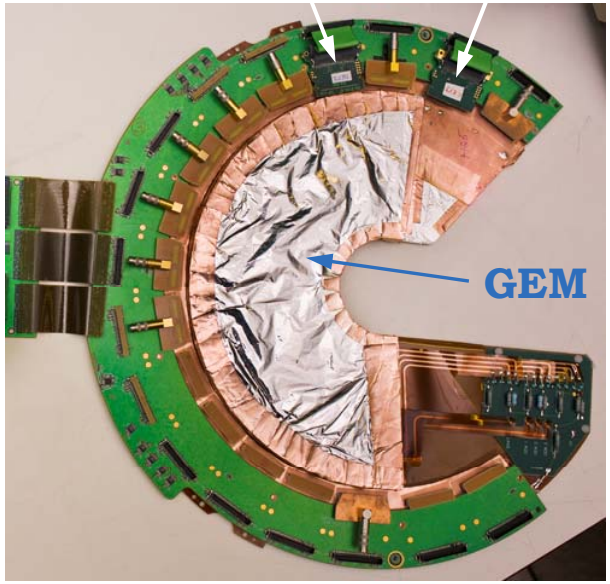
GOHs
DOB

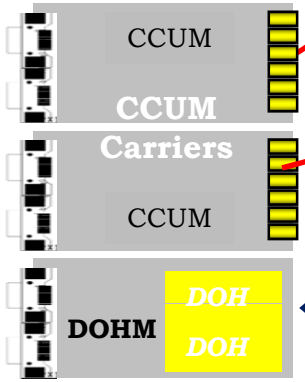
GOHs
TOB

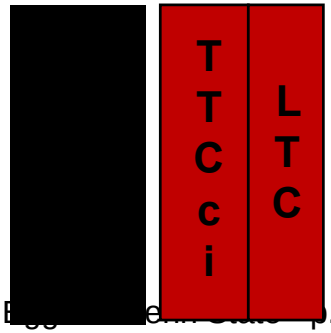
Readout data

Trigger data

TTC data



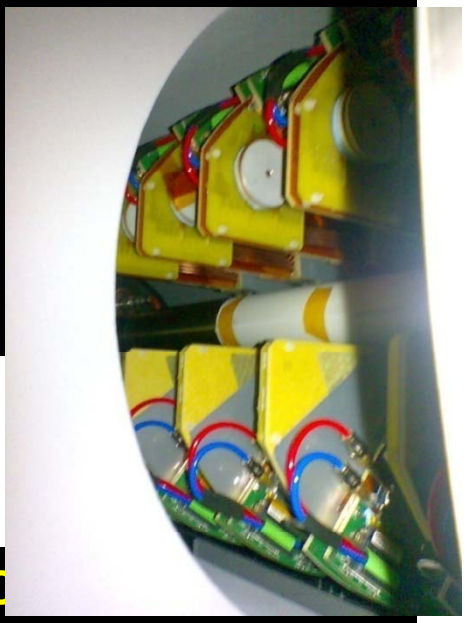




T2 Status (2): Installation

Installation of 1st quarter

- We have assembled, tested and installed (in August 2008) a fully equipped half T2 Telescope (a quarter of T2).
- During the shutdown it will be temporarily removed to stiffen its mechanical support due to the unforeseen strong magnetic field in CMS forward region.

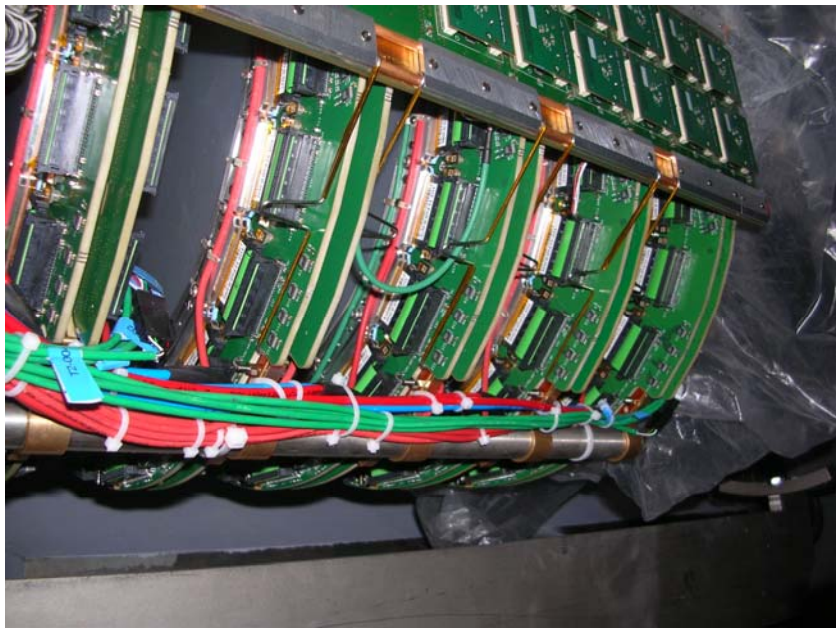


Installation of remaining 3 quarters

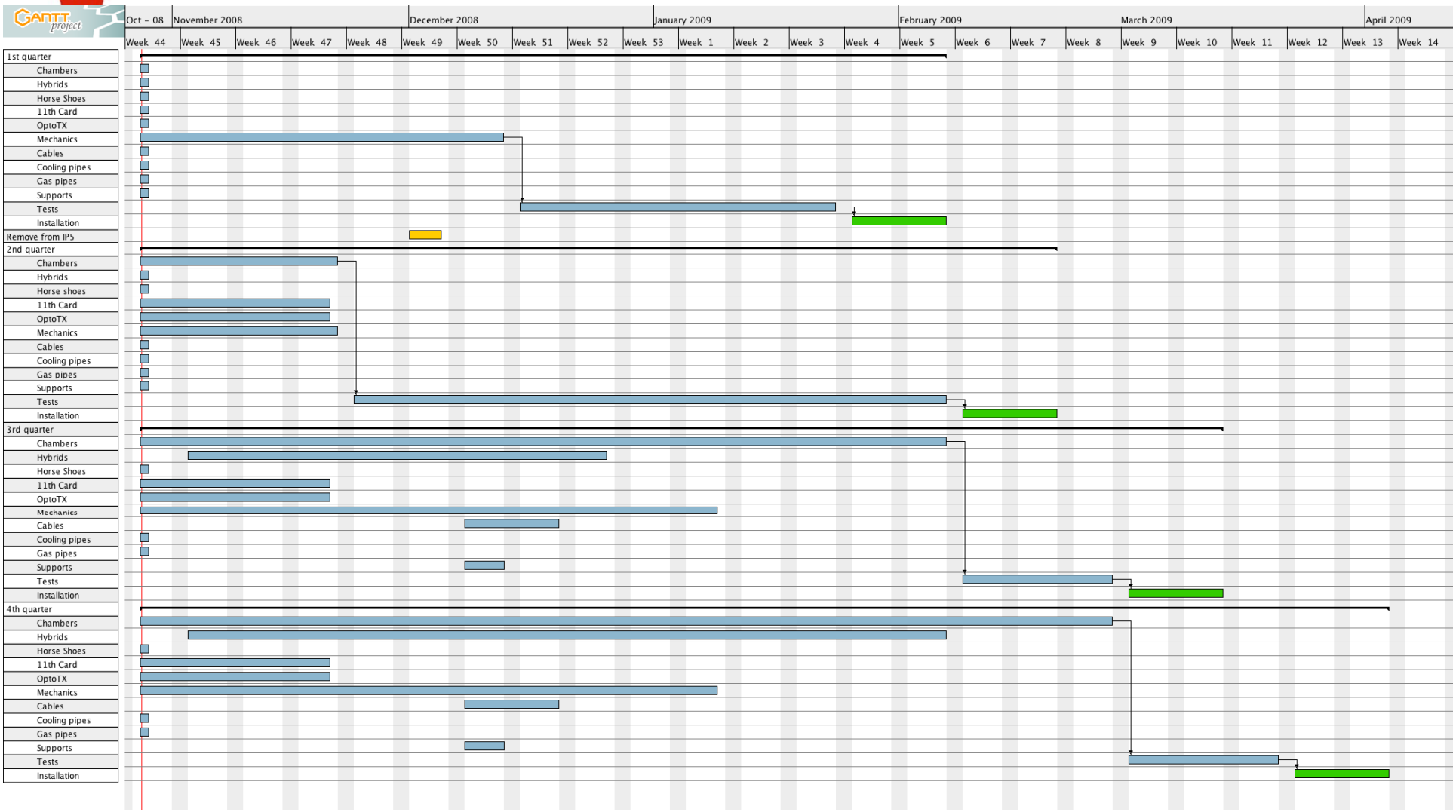
- Second T2 quarter presently assembled in TOTEMINC
- 3rd and 4th Quarters are being fully assembled in Helsinki. The mechanical assembly with the readout electronics will be carried out at CERN.

- The complete T2 is planned to be installed in IP5 between January and March 2009.

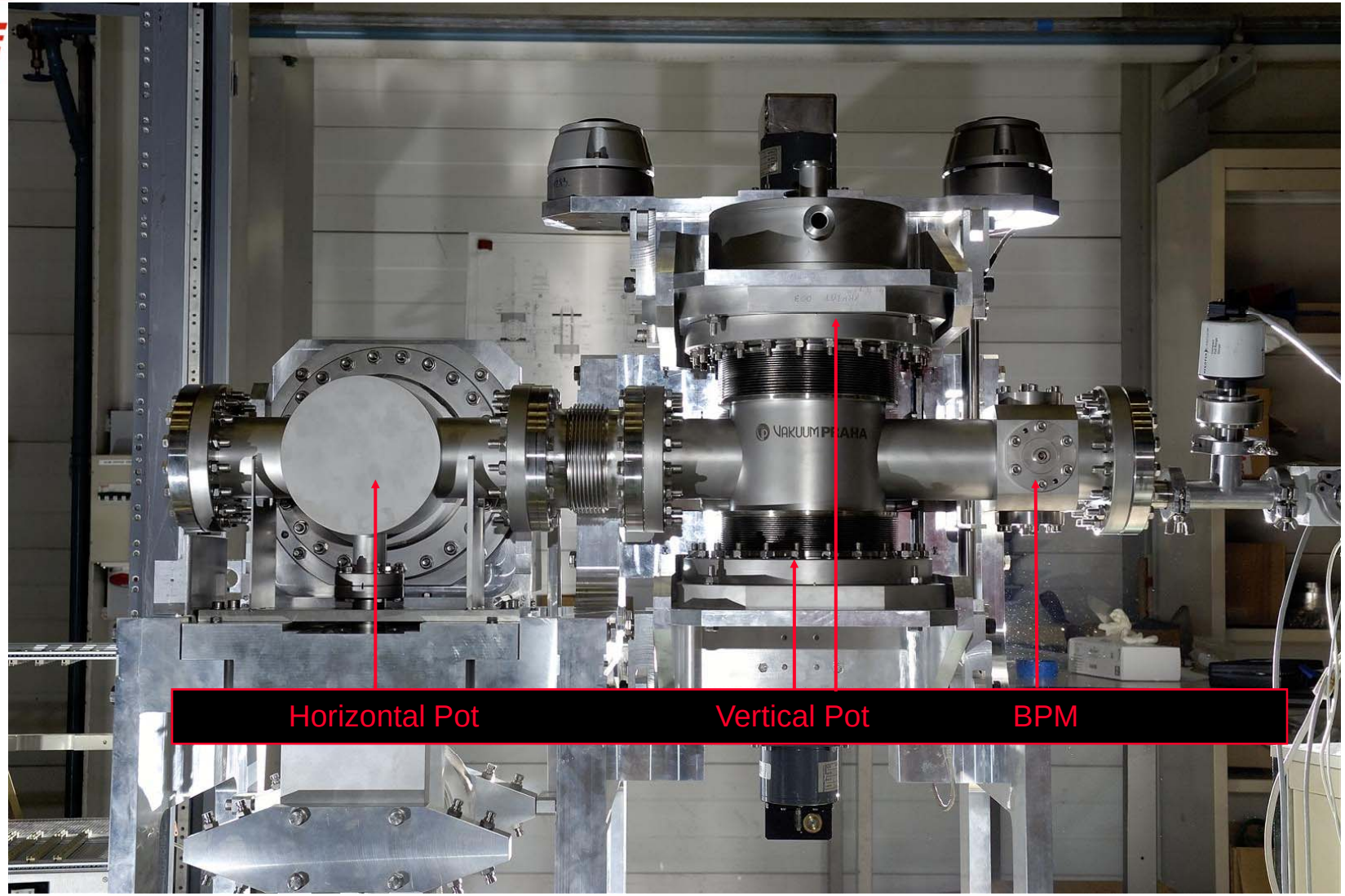
Installation of the T2 telescope in CMS

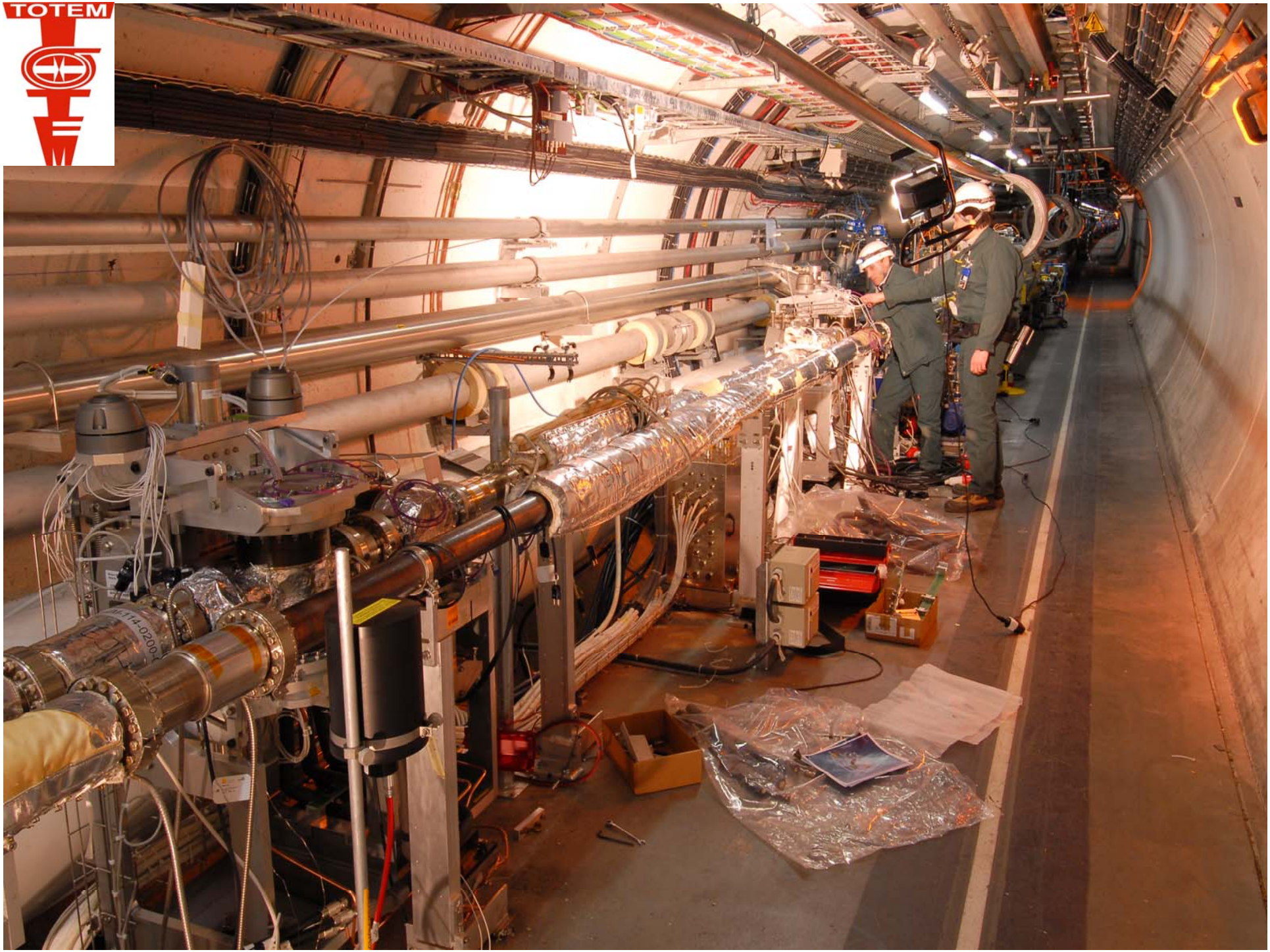


T2 Planning

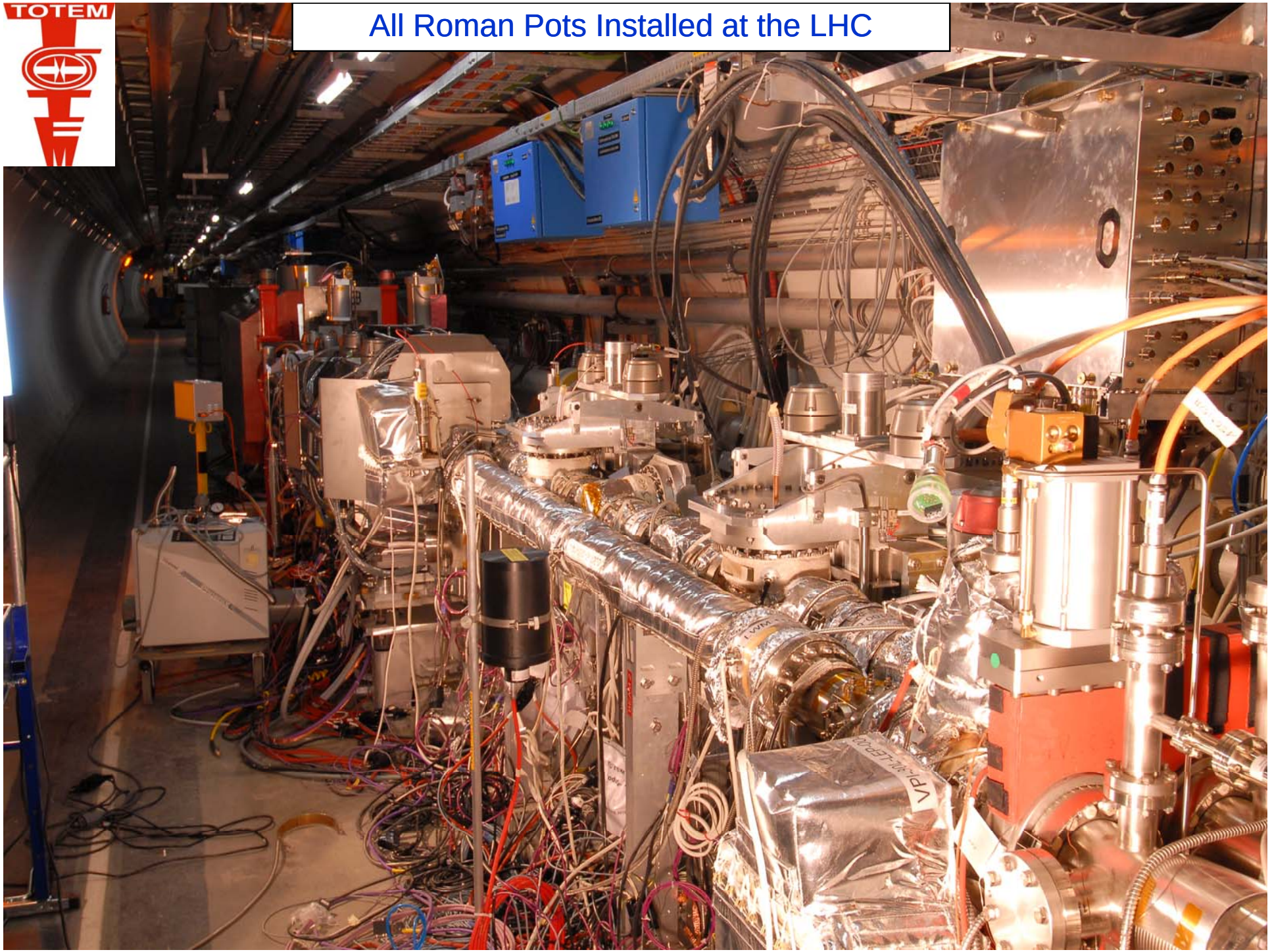

Oct – 08
November 2008
December 2008
January 2009
February 2009
March 2009
April 2009
Week 44
Week 45
Week 46
Week 47
Week 48
Week 49
Week 50
Week 51
Week 52
Week 53
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Week 14
1st quarter
Chambers
Hybrids
Horse Shoes
11th Card
OptoTX
Mechanics
Cables
Cooling pipes
Gas pipes
Supports
Tests
Installation
Remove from IP5
2nd quarter
Chambers
Hybrids
Horse shoes
11th Card
OptoTX
Mechanics
Cables
Cooling pipes
Gas pipes
Supports
Tests
Installation
3rd quarter
Chambers
Hybrids
Horse Shoes
11th Card
OptoTX
Mechanics
Cables
Cooling pipes
Gas pipes
Supports
Tests
Installation
4th quarter
Chambers
Hybrids
Horse Shoes
11th Card
OptoTX
Mechanics
Cables
Cooling pipes
Gas pipes
Supports
Tests
Installation

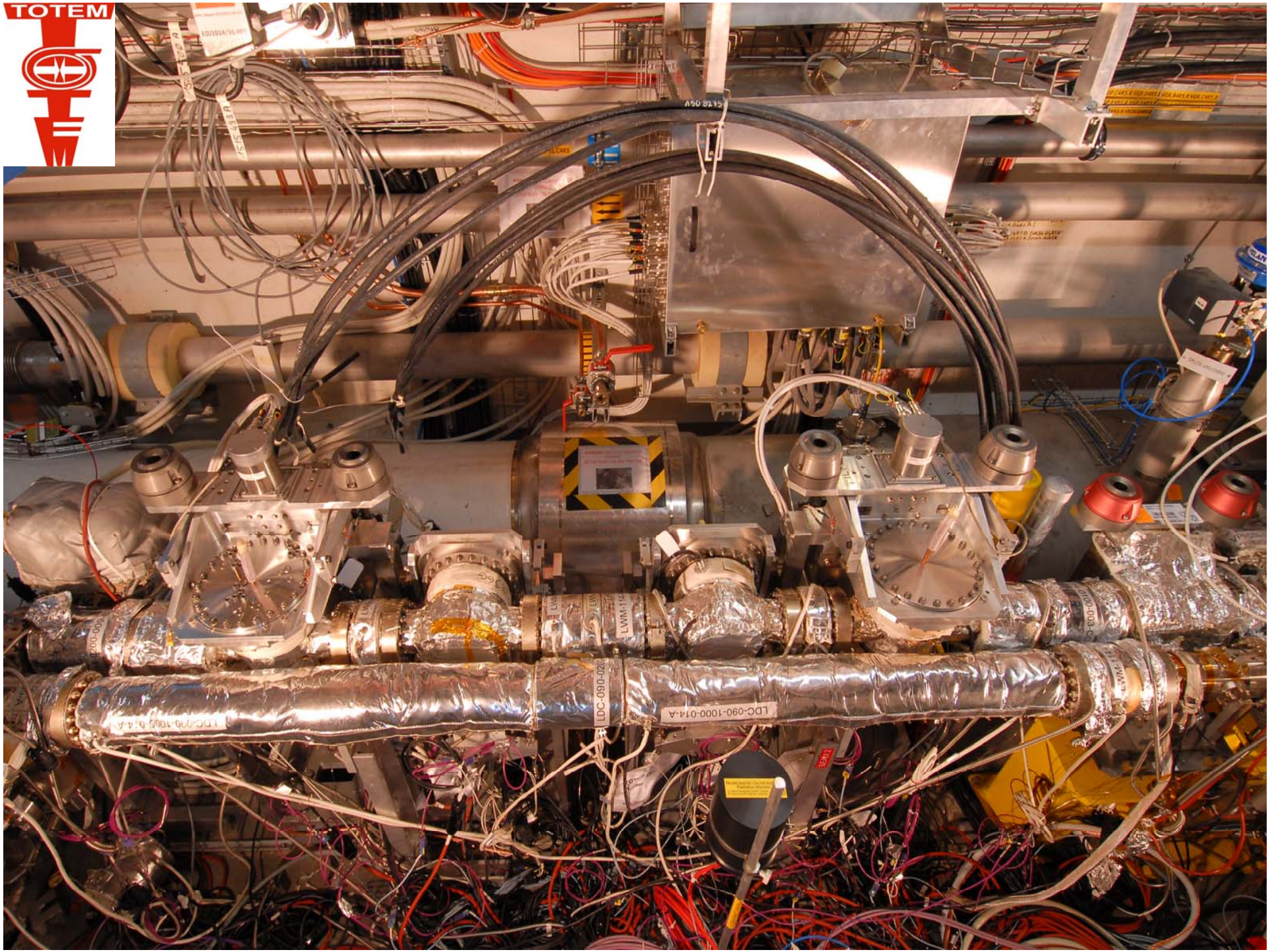
Roman Pot



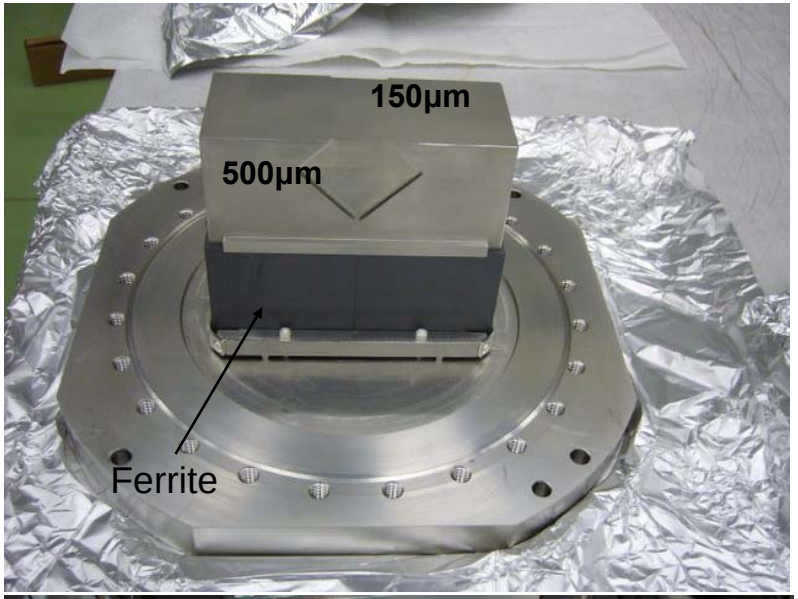

TOTEM

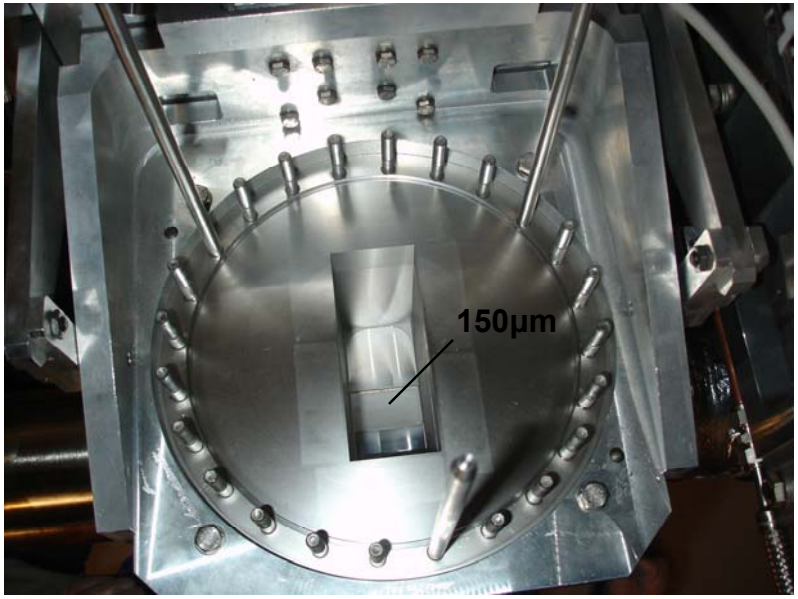
All Roman Pots Installed at the LHC

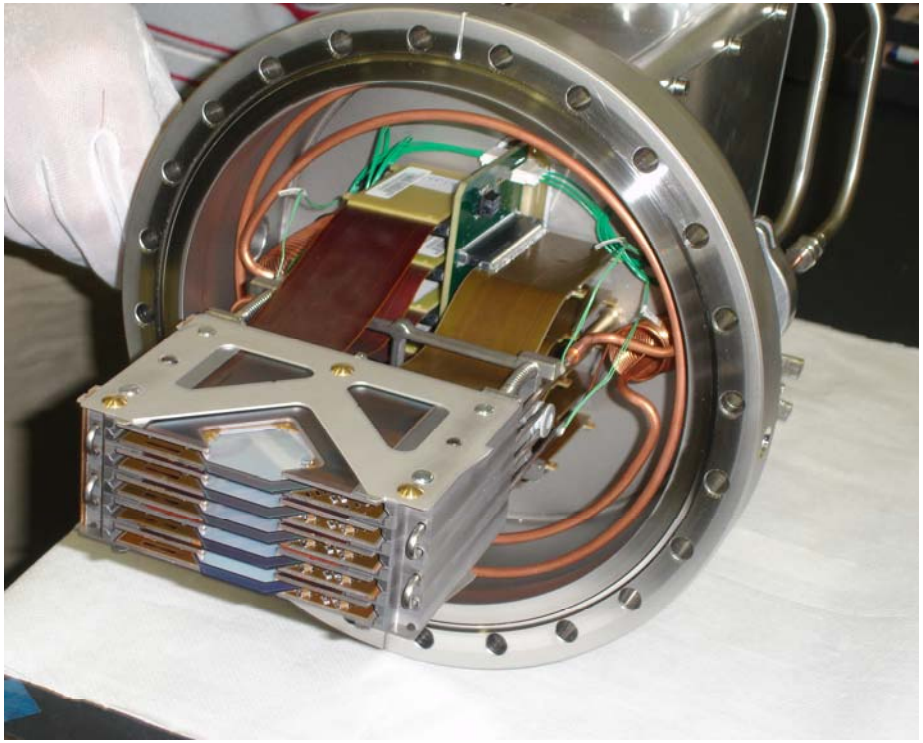



TOTEM
LDC-090-1000-014-A

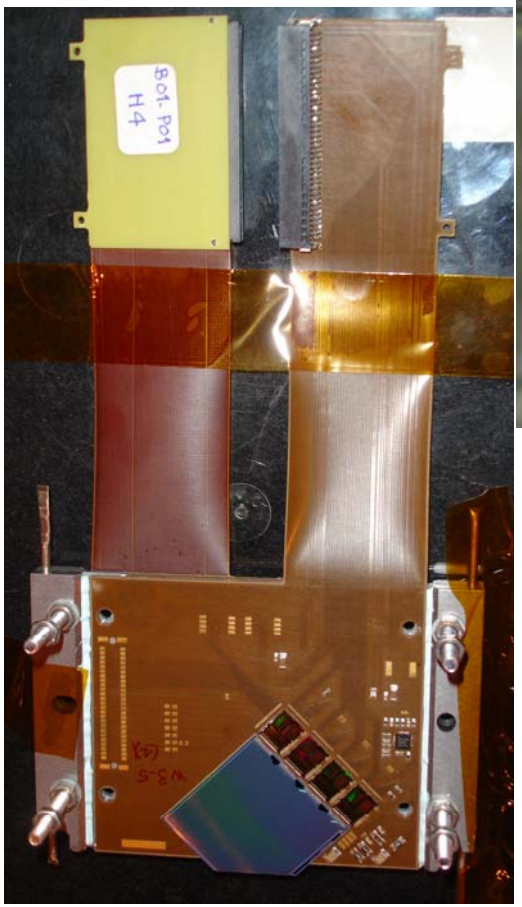
The window and the detector assembly



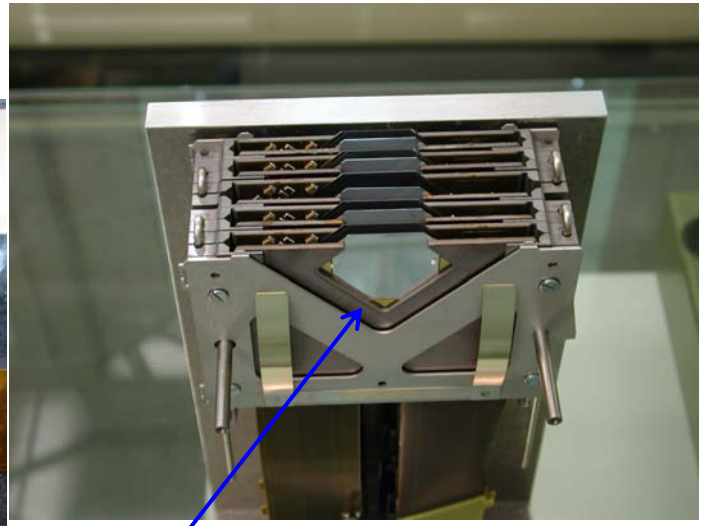




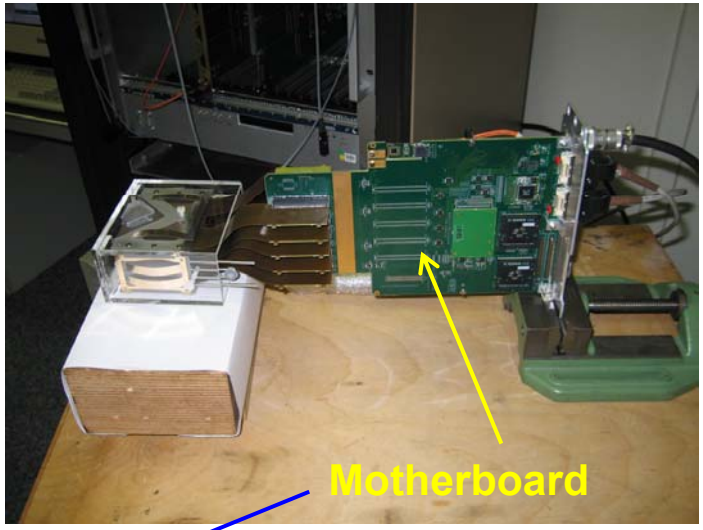
The Hybrid and the Assembly

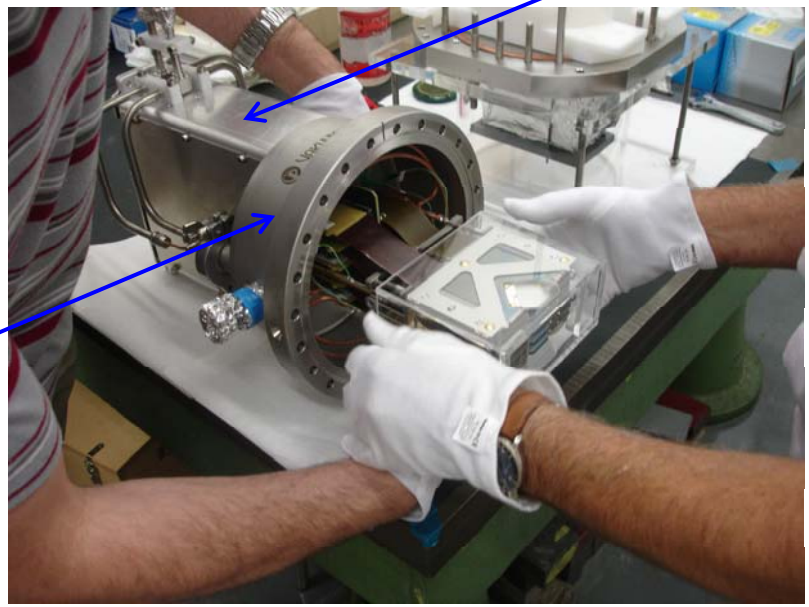


Kapton hybrids
laminated on CE7

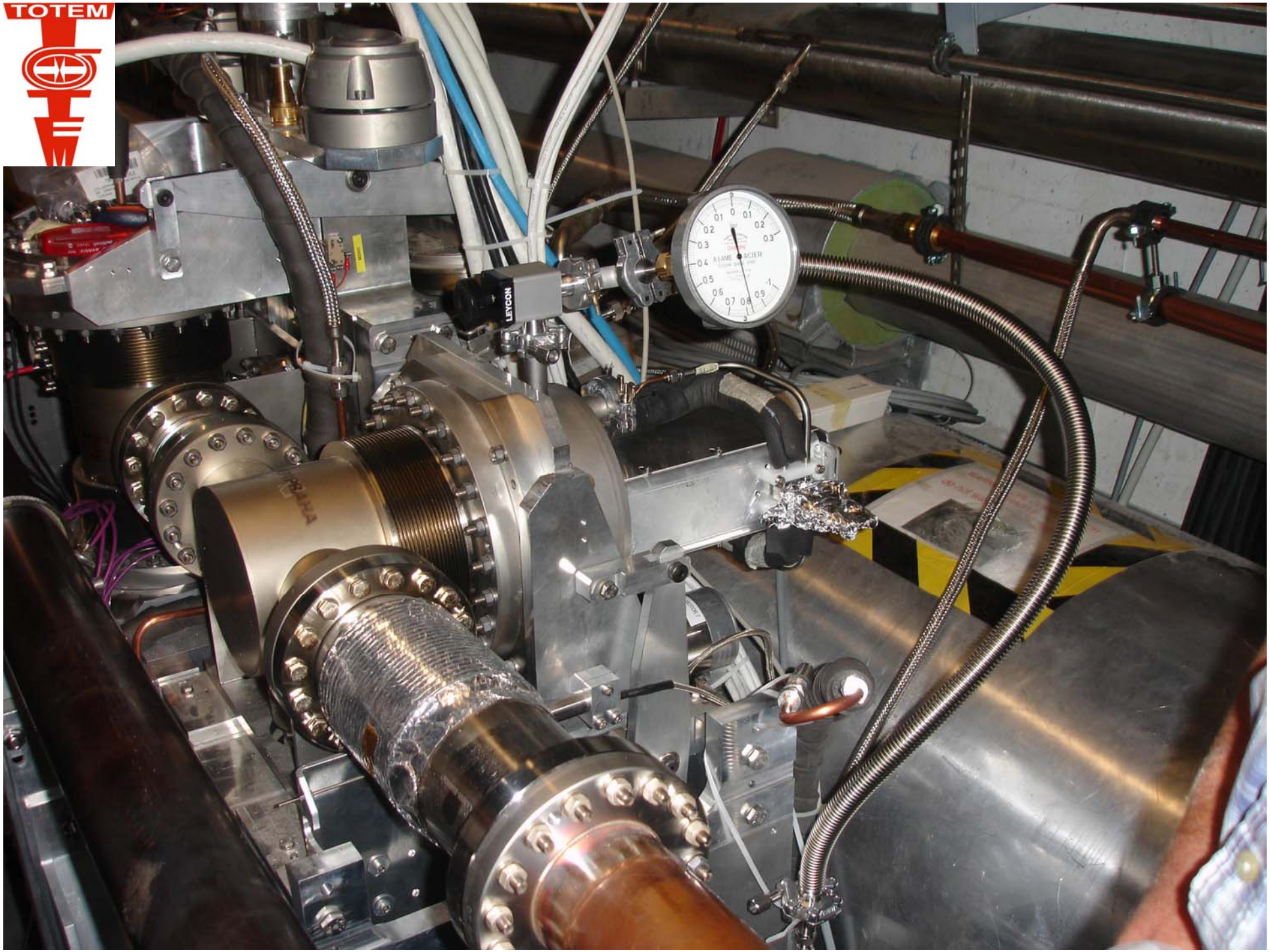


Assembly of
10 detectors

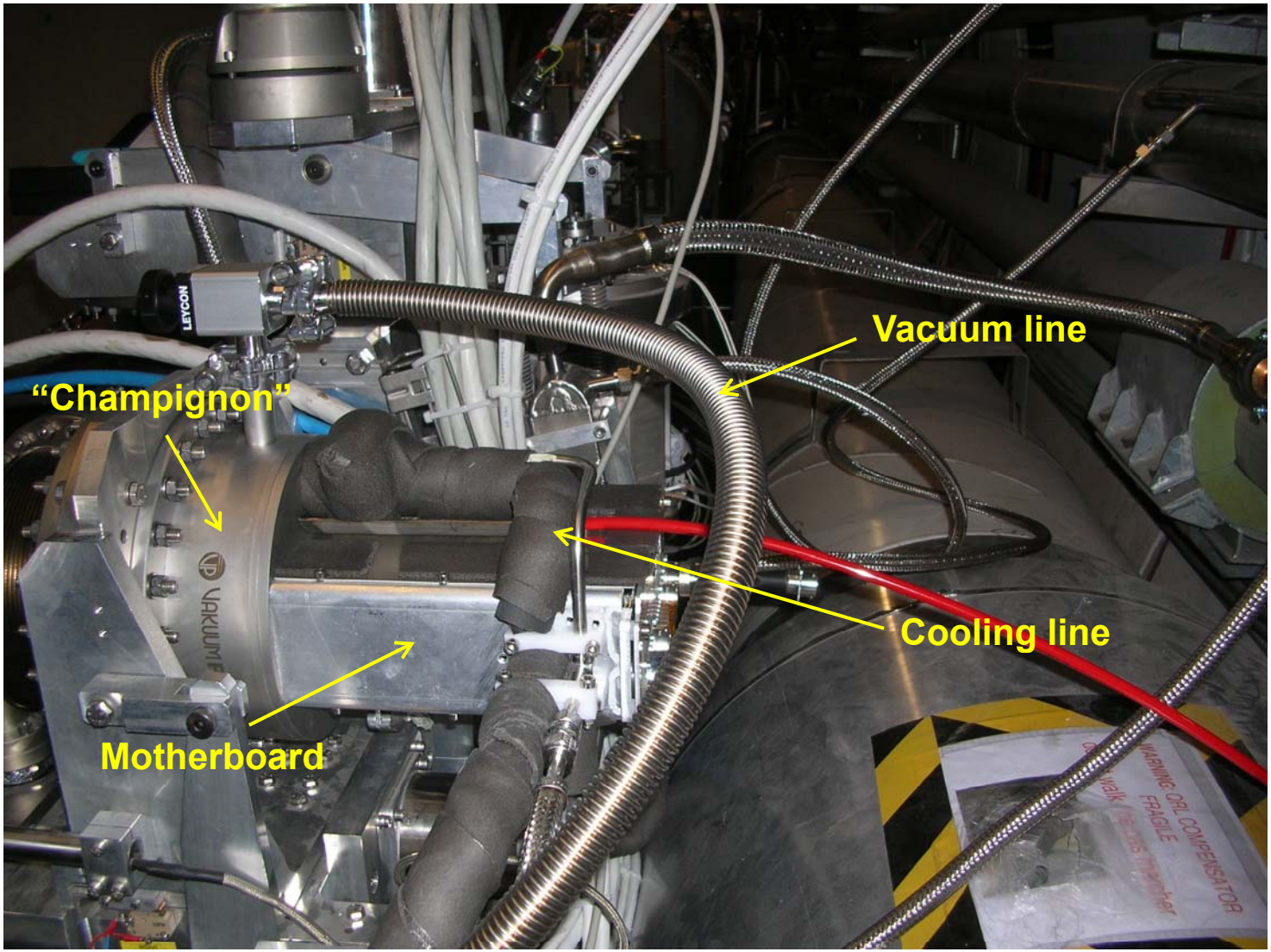




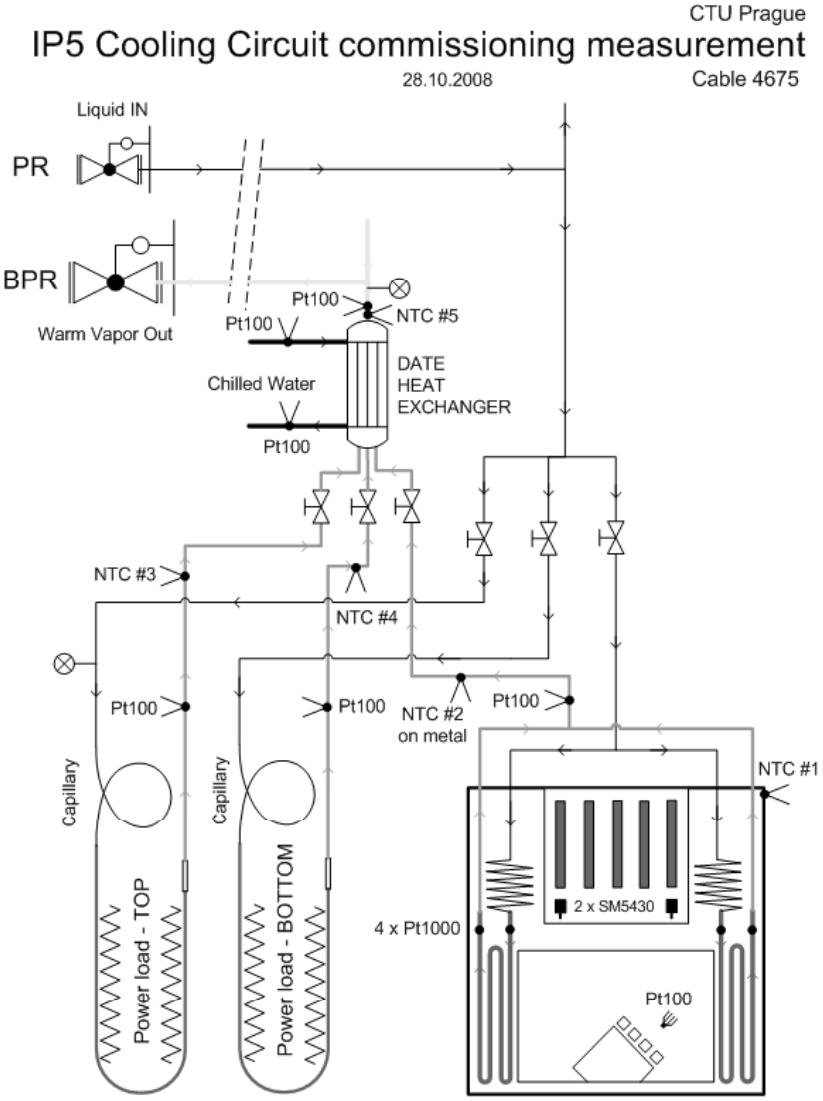
"Champignon"

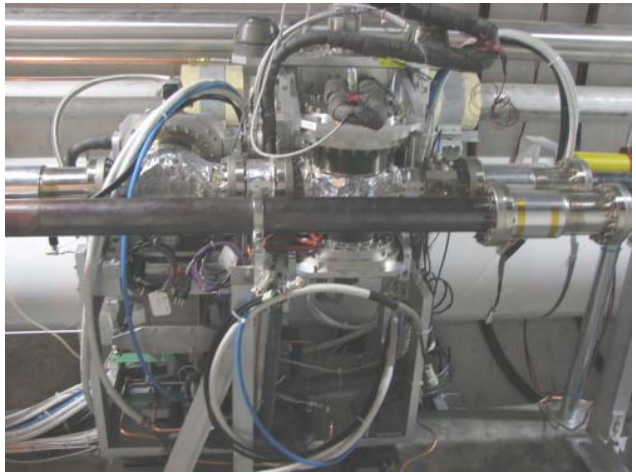

TOTEM
LEYCON

Detector Assembly mounted in Roman Pot



RP cooling system commissioning in the tunel

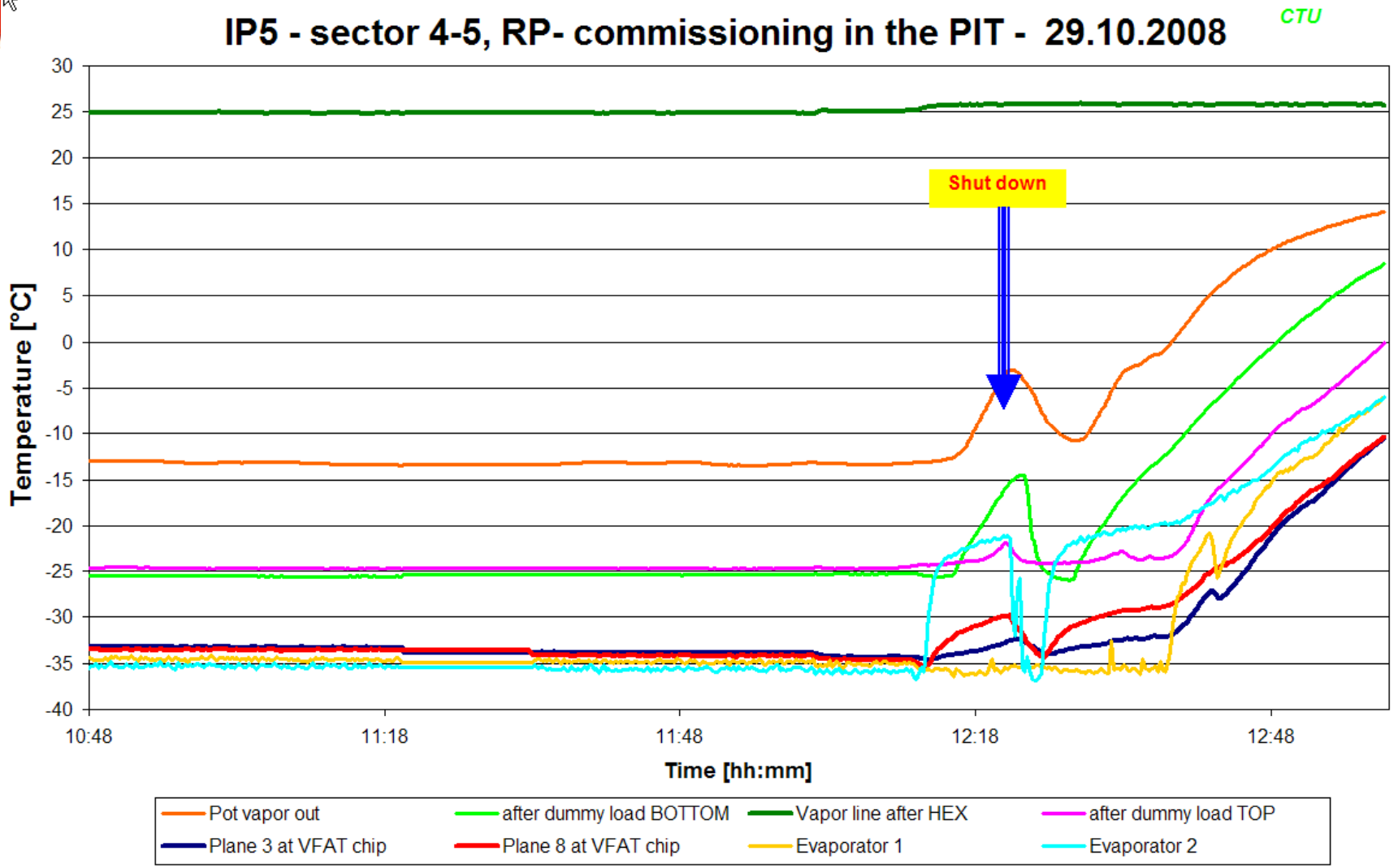




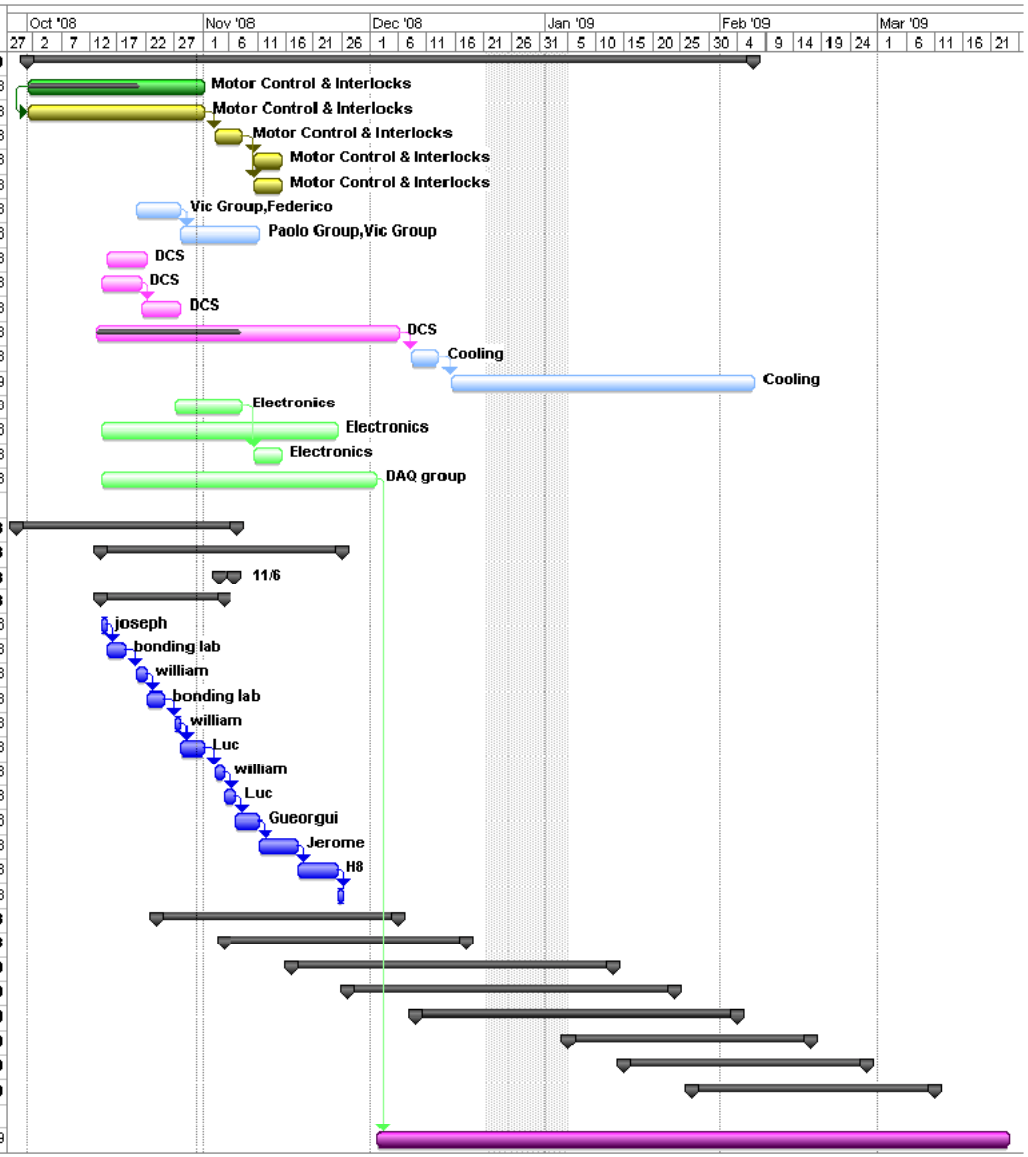
Roman Pot station in the LHC tunnel with one RP and two Dummy loads

RP cooling system is commissioned via refrigerant circulation to the sectors at both sides of the CMS at 220m station (45; 56) equipped with one fully functioning RP at each side. 1 Pot + 2 dummy loads (capillary + evaporator + dummy heaters) serve to close the refrigerant lines. Initial run performed with no load.

Temperature profiles



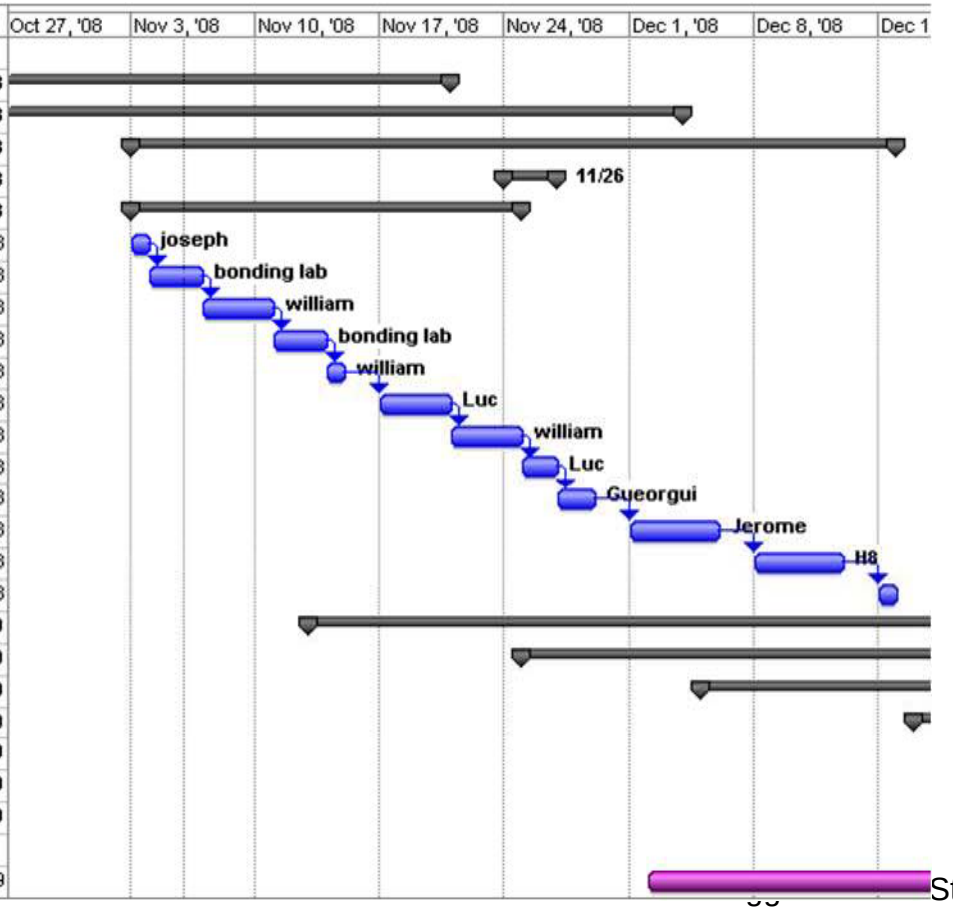
Task Name	Duration	Start	Finish
Infrastructure	**83 days**	**Wed 10/1/08**	**Fri 2/6/09**
Fesa software+PXI integrated	23 days	Wed 10/1/08	Fri 10/31/08
Interlocks	23 days	Wed 10/1/08	Fri 10/31/08
Test of motor movement	5 days	Mon 11/3/08	Fri 11/7/08
Motor Commissioning with CCC	5 days	Mon 11/10/08	Fri 11/14/08
Survey & LVDT calibration	5 days	Mon 11/10/08	Fri 11/14/08
MiniDCS for cooling preparation	6 days	Mon 10/20/08	Mon 10/27/08
Commissioning cooling with miniD	10 days	Tue 10/28/08	Mon 11/10/08
Install ELMB Boxes	5 days	Wed 10/15/08	Tue 10/21/08
Confirmation of pinout tables	5 days	Tue 10/14/08	Mon 10/20/08
Development (Adopt functionalitie	5 days	Tue 10/21/08	Mon 10/27/08
I-1234	40 days	Mon 10/13/08	Fri 12/5/08
Liquid Circulation in Roman Pot wil	5 days	Mon 12/8/08	Fri 12/12/08
Cooling Test with Dummy Loads	30 days	Mon 12/15/08	Fri 2/6/09
Install cables (which cables?)	10 days	Mon 10/27/08	Fri 11/7/08
Finish Racks	30 days	Tue 10/14/08	Mon 11/24/08
Test Connectivity	5 days	Mon 11/10/08	Fri 11/14/08
Read out system	35 days	Tue 10/14/08	Mon 12/1/08
Pot 3	**29.5 days**	**Mon 9/29/08**	**Fri 11/7/08**
Pot 4	**31 days**	**Tue 10/14/08**	**Tue 11/25/08**
MB ready	**3 days**	**Tue 11/4/08**	**Thu 11/6/08**
test VFAT and Hybrid	**16 days**	**Tue 10/14/08**	**Tue 11/4/08**
Inspection	1 day	Tue 10/14/08	Tue 10/14/08
VFAT Mount	3 days	Wed 10/15/08	Fri 10/17/08
electric test 1	2 days	Mon 10/20/08	Tue 10/21/08
sensor mount	3 days	Wed 10/22/08	Fri 10/24/08
electric test 2	1 day	Mon 10/27/08	Mon 10/27/08
bars mount	4 days	Tue 10/28/08	Fri 10/31/08
electric test 3	2 days	Mon 11/3/08	Tue 11/4/08
Detector Package (DP)	2 days	Wed 11/5/08	Thu 11/6/08
MB + DP test	2 days	Fri 11/7/08	Mon 11/10/08
Champignon	5 days	Tue 11/11/08	Mon 11/17/08
H8 Test	5 days	Tue 11/18/08	Mon 11/24/08
IP 5 Installation	1 day	Tue 11/25/08	Tue 11/25/08
Pot 5	**31 days**	**Fri 10/24/08**	**Fri 12/5/08**
Pot 6	**31 days**	**Wed 11/5/08**	**Wed 12/17/08**
Pot 7	**31 days**	**Mon 11/17/08**	**Mon 1/12/09**
Pot 8	**32 days**	**Thu 11/27/08**	**Fri 1/23/09**
Pot 9	**31 days**	**Tue 12/9/08**	**Tue 2/3/09**
Pot 10	**31 days**	**Mon 1/5/09**	**Mon 2/16/09**
Pot11	**31 days**	**Thu 1/15/09**	**Thu 2/26/09**
Pot12	**31 days**	**Tue 1/27/09**	**Tue 3/10/09**
IP5 Commissioning	3.5 mons	Tue 12/2/08	Mon 3/23/09



The construction of each Detector Package requires a sequence of operations which lasts more than 1.5 months .

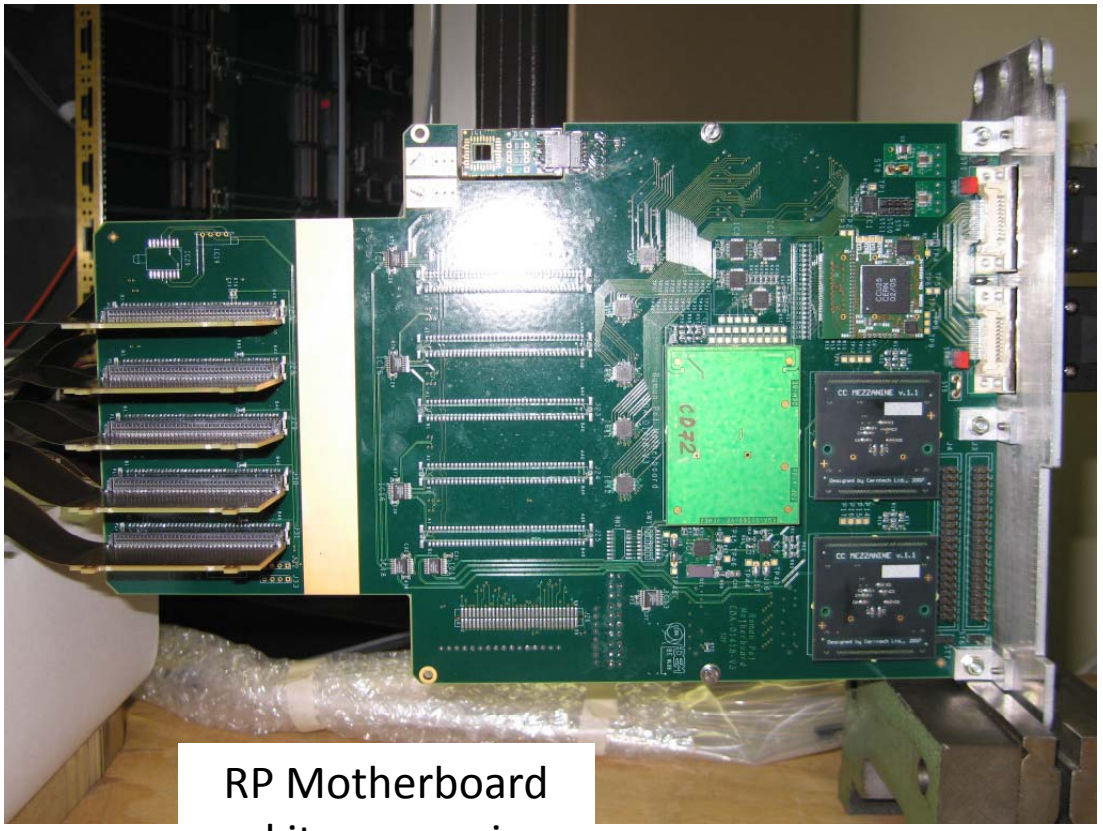
ID	Task Name	Duration	Start	Finish	Oct
19					
20	**Pot 3**	**39 days?**	**Mon 9/29/08**	**Thu 11/20/08**	
27	**Pot 4**	**37 days?**	**Tue 10/14/08**	**Wed 12/3/08**	
48	**Pot 5**	**31 days?**	**Mon 11/3/08**	**Mon 12/15/08**	

ID	Task Name	Duration	Start	Finish
19				
20	**Pot 3**	**39 days?**	**Mon 9/29/08**	**Thu 11/20/08**
27	**Pot 4**	**37 days?**	**Tue 10/14/08**	**Wed 12/3/08**
48	**Pot 5**	**31 days?**	**Mon 11/3/08**	**Mon 12/15/08**
49	**MB ready**	**3 days?**	**Mon 11/24/08**	**Wed 11/26/08**
56	**test VFAT and Hybrid**	**16 days**	**Mon 11/3/08**	**Mon 11/24/08**
57	Inspection	1 day	Mon 11/3/08	Mon 11/3/08
58	VFAT Mount	3 days	Tue 11/4/08	Thu 11/6/08
59	electric test 1	2 days	Fri 11/7/08	Mon 11/10/08
60	sensor mount	3 days	Tue 11/11/08	Thu 11/13/08
61	electric test 2	1 day	Fri 11/14/08	Fri 11/14/08
62	bars mount	4 days	Mon 11/17/08	Thu 11/20/08
63	electric test 3	2 days	Fri 11/21/08	Mon 11/24/08
64	Detector Package (DP)	2 days	Tue 11/25/08	Wed 11/26/08
65	MB + DP test	2 days	Thu 11/27/08	Fri 11/28/08
66	Champignon	5 days	Mon 12/1/08	Fri 12/5/08
67	H8 Test	5 days	Mon 12/8/08	Fri 12/12/08
68	IP 5 Installation	1 day?	Mon 12/15/08	Mon 12/15/08
69	**Pot 6**	**31 days?**	**Thu 11/13/08**	**Thu 1/8/09**
90	**Pot 7**	**31 days?**	**Tue 11/25/08**	**Tue 1/20/09**
111	**Pot 8**	**31 days?**	**Fri 12/5/08**	**Fri 1/30/09**
132	**Pot 9**	**31 days?**	**Wed 12/17/08**	**Wed 2/11/09**
153	**Pot 10**	**31 days?**	**Tue 1/13/09**	**Tue 2/24/09**
174	**Pot11**	**31 days?**	**Fri 1/23/09**	**Fri 3/6/09**
195	**Pot12**	**31 days?**	**Wed 2/4/09**	**Wed 3/18/09**
216				
217	IP5 Commissioning	3.5 mons	Tue 12/2/08	Mon 3/23/09



The RP Motherboard links the frontend to the counting house. First tests in the TOTEM 555 lab.

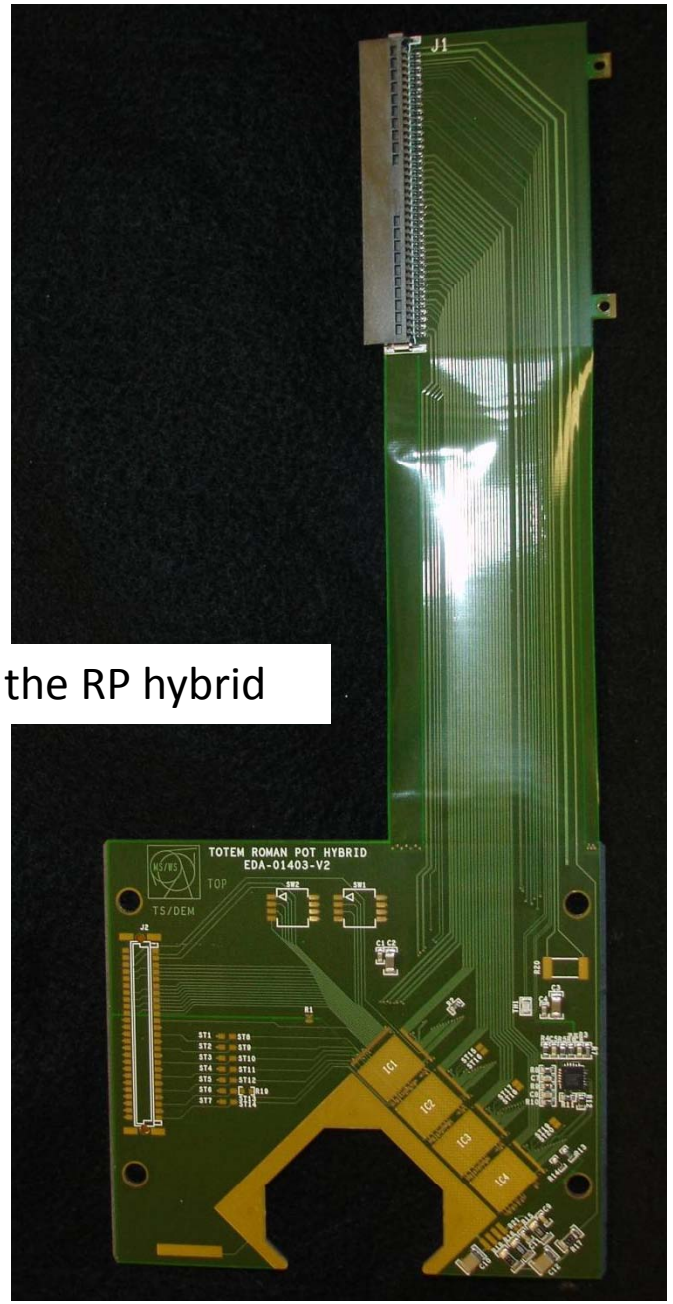
ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**



RP Motherboard and its mezzanines

Cards delivered by TS-DEA are inspected and then the VFATs are mounted in the bonding lab

ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**

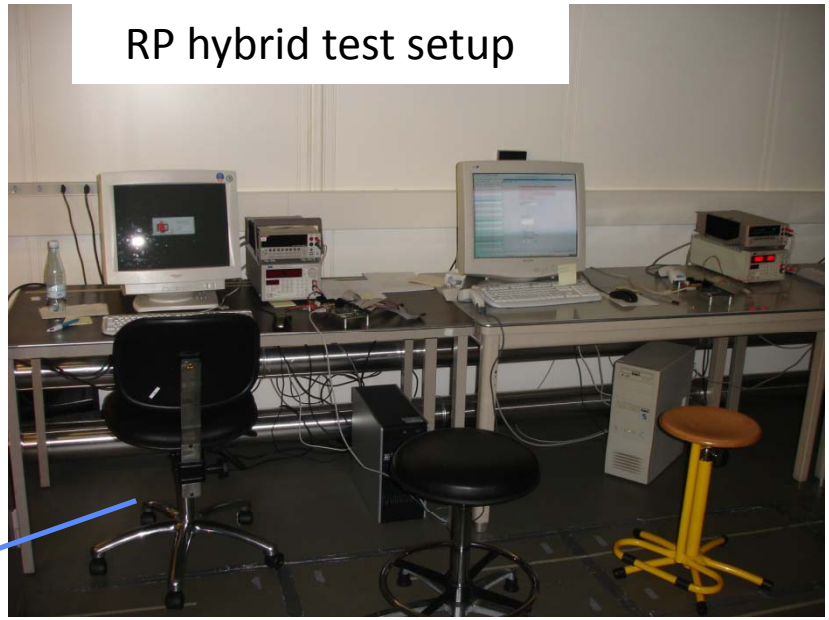


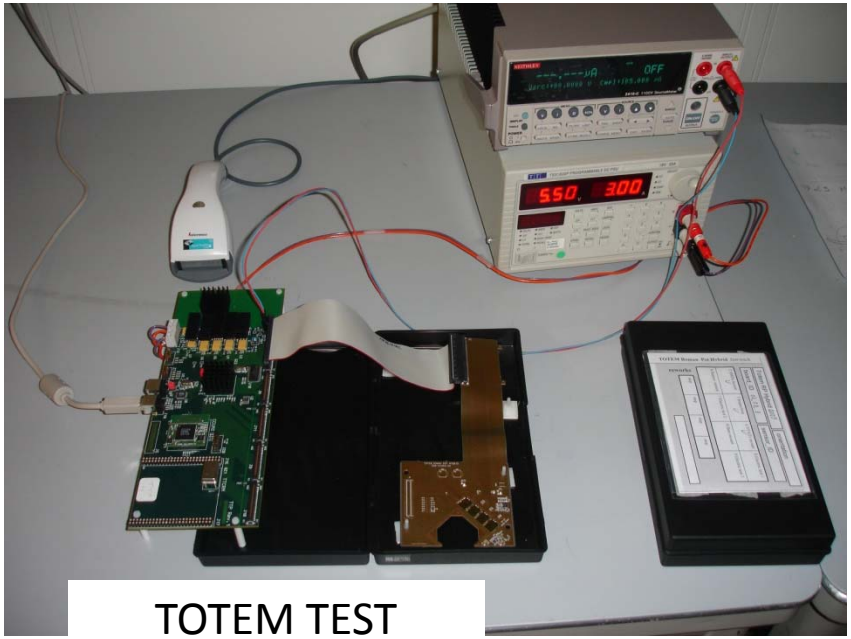
PCB of the RP hybrid

The RP hybrids together with the VFATs are tested with the Totem Test Platform (TTP).

ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**

RP hybrid test setup

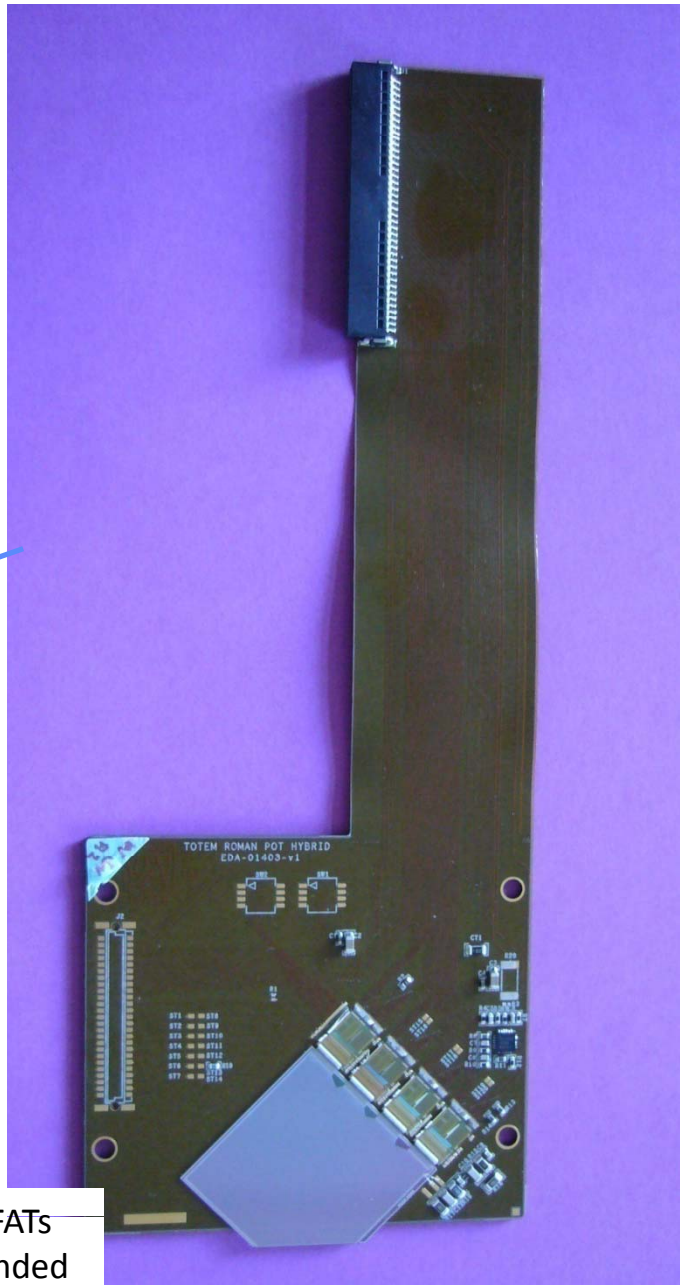




TOTEM TEST PLATFORM

Prequalified Edgeless Silicon sensors are mounted and bonded in the bonding lab. Then the sensors are tested with the TTP

ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**



RP hybrid with VFATs and sensors all bonded

The support bars are precisely mounted on the hybrid. The hybrid is connected again to the TTP for a test of the VFAT+Si sensor

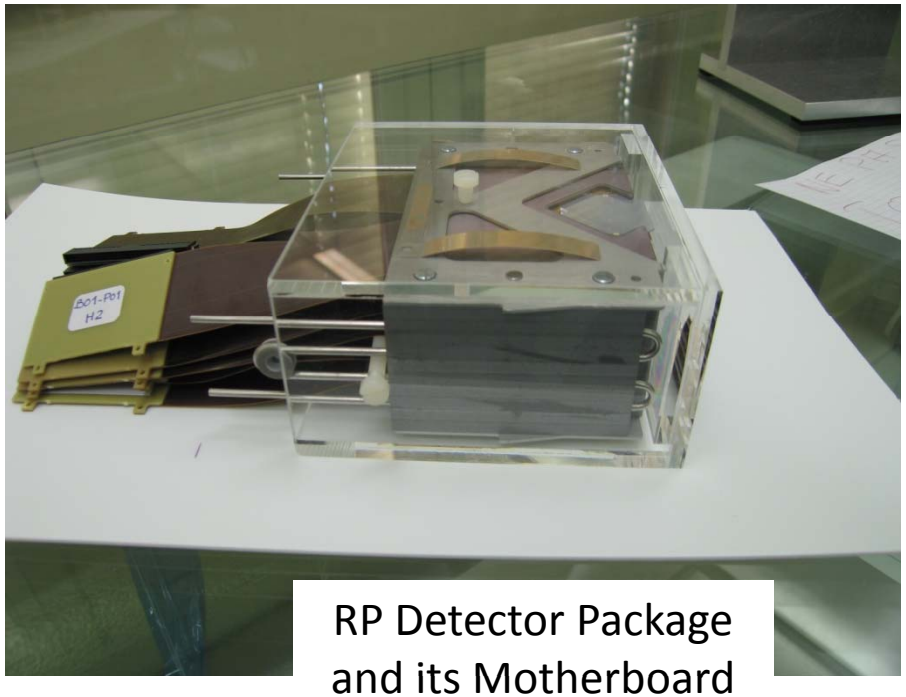
ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**

Computer Measuring Machine (Bonding Lab)

RP hybrid fully mounted with support bars

The Detector Package is assembled. The DP is tested with it's Motherboard in the TOTEM Lab "555"

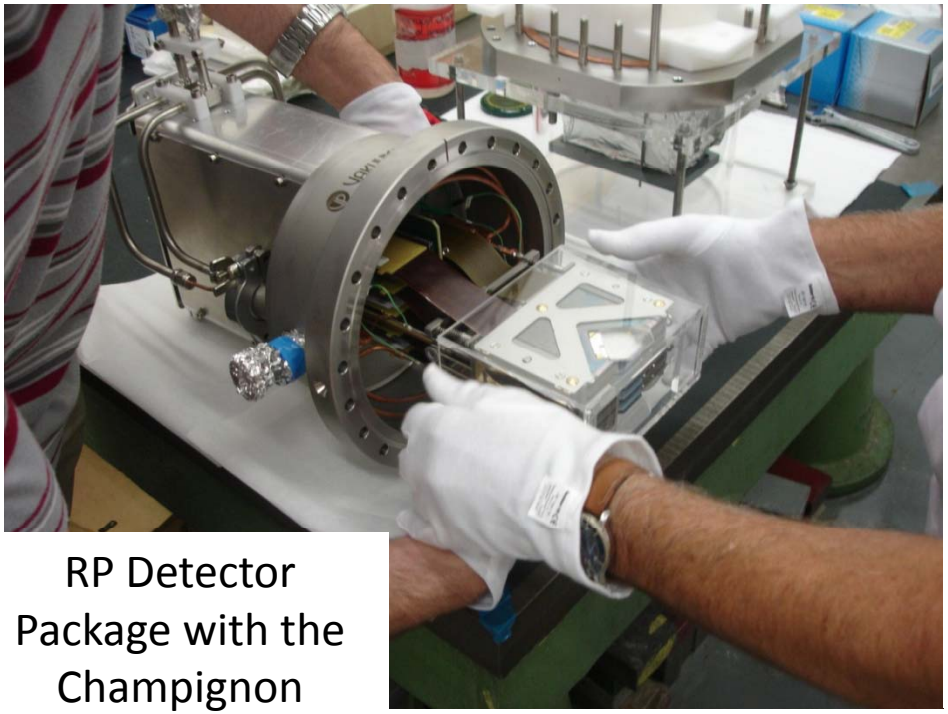
ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**



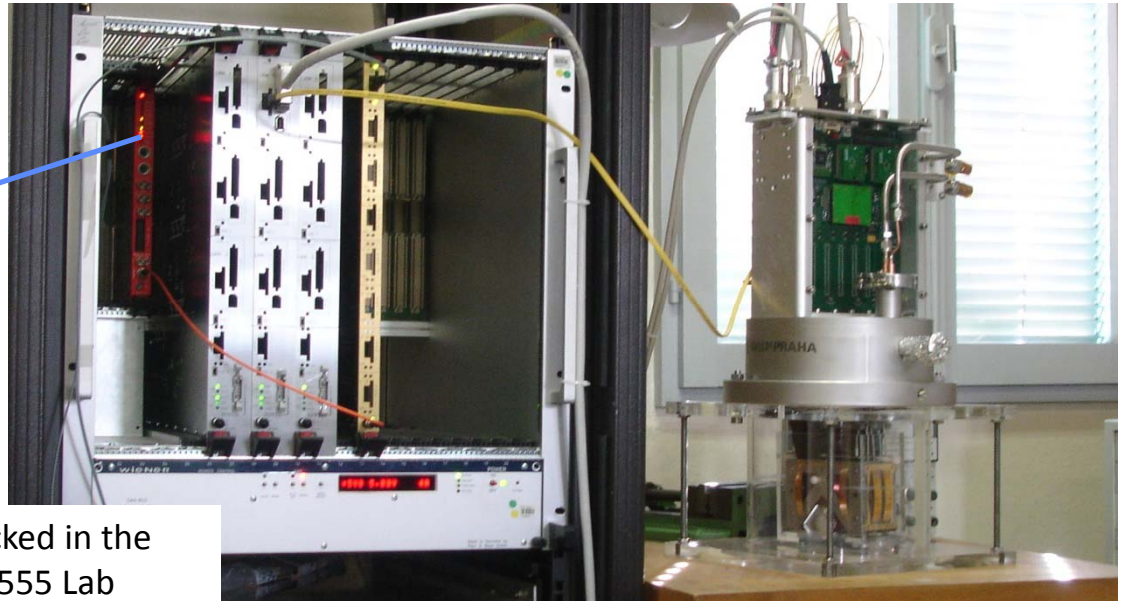
RP Detector Package and its Motherboard

The DP and it's Motherboard are assembled together with the "Champignon". A final check is then made.

ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**



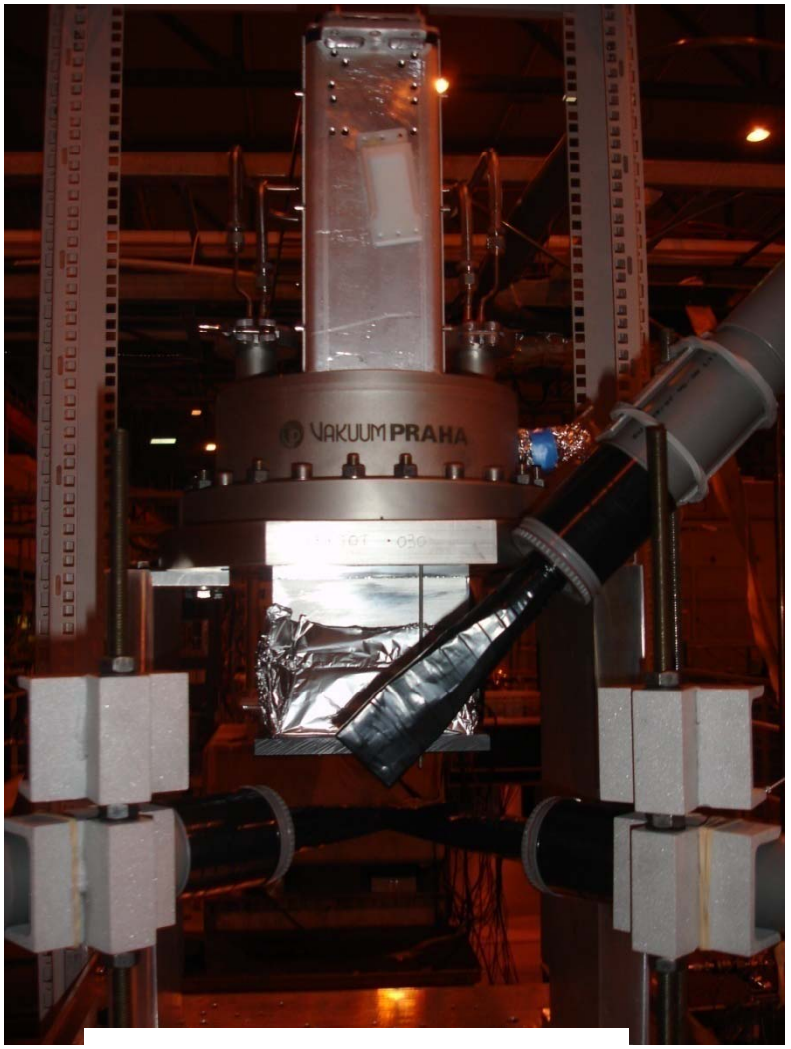
RP Detector Package with the Champignon



RPDP checked in the TOTEM 555 Lab

The RP Detector Package is inserted in a prototype pot with thin window and installed in a test beam setup in H8 for data taking

ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**

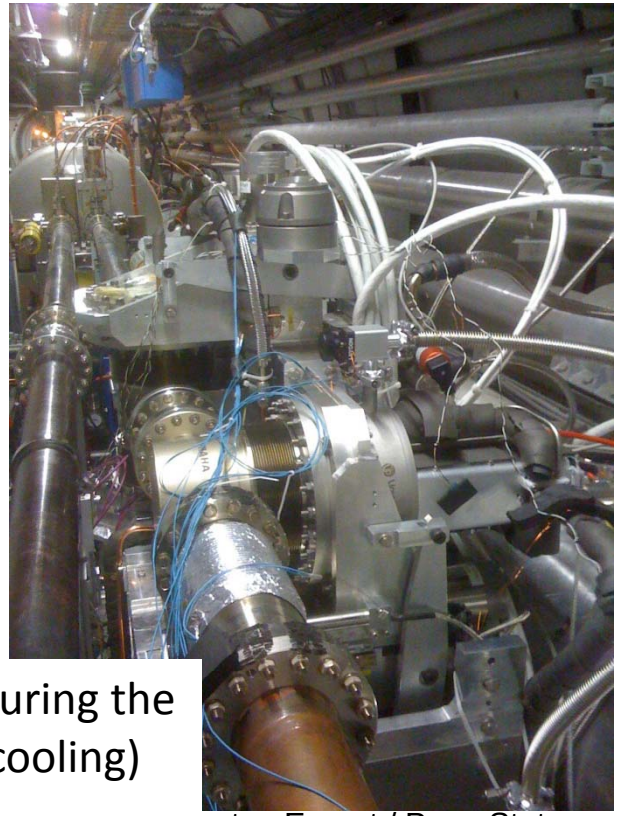


RPDP in a prototype pot with thin window in H8

At the end of the production the pot is made available for the installation in the tunnel.

ID	Task Name	Duration
19		
20	**Pot 3**	**39 days?**
27	**Pot 4**	**37 days?**
48	**Pot 5**	**31 days?**
49	**MB ready**	**3 days?**
56	**test VFAT and Hybrid**	**16 days**
57	Inspection	1 day
58	VFAT mounting	3 days
59	electric test 1	2 days
60	sensor mounting	3 days
61	electric test 2	1 day
62	bars mounting	4 days
63	electric test 3	2 days
64	Detector Package (DP)	2 days
65	MB + DP test	2 days
66	Champignon	5 days
67	H8 Test	5 days
68	IP 5 Installation	1 day?
69	**Pot 6**	**31 days?**

RP DP in the LHC Tunnel



RP DP installed in LHC (during the commissioning of the cooling)

Electronics planning

W. S. 31.10.2008		Quantity													
		RP	T1	T2	Test setups + spare	Total	who	design	proto	test	Start Prod	End Prod.	Start Test	End of Test	Comment
RP Cards															
RP Hybrid	EDA-01403-V2	240			40	280	CERN					Nov-08	Jan-08	Dec-08	Finished, but 25% to reproduced
RP Motherboard	EDA-01418-V1	24			6	30	CERN					Nov-08	Feb-08	Dec-08	10 add'l cards being launched
T1 Cards															
T1 anode hybrid (*)	EDA-01068-V4		120		20	140	Genova					Nov-08	Jan-08	Dec-08	Production almost finished
T1 cathode hybrid (*)	EDA-01068-V4		360		30	390	Genova					Nov-08	Jan-08	Dec-08	Production almost finished
Anode FrontEnd Card (AFEC)			60		10	70	Genova					Nov-08	Jan-08	Dec-08	
Cathode FrontEnd Card (CFEC1)			120		20	140	Genova					Nov-08	Jan-08	Dec-08	
T1 Readout Card (ROC)			40		5	45	Genova					Nov-08	Jan-08	Dec-08	
Cathode FrontEnd Card (CFEC2)			290		30	320	Genova								Upgrade to higher resolution
T2 Cards															
GEM strip hybrid (*)	EDA-01068-V4			160	20	180	Pisa					Nov-08	Jan-08	Dec-08	Production almost finished
GEM Pad hybrid (*)	EDA-01558-V2			520	60	580	Pisa					Nov-08	Jan-08	Dec-08	Production almost finished
Horseshoe Card	EDA-01067-V1			40	5	45	Pisa					Nov-08	Jan-08	Nov-08	21 to be finished (mounted only)
Kaptons between Horses. & 11th	EDA-01709-V1-0			40	7	47	Pisa								
	EDA-01725-V1-0			40	7	47									
	EDA-01726-V1-0			40	7	47									
11th Card	EDA-01710-V1			4	2	6	Pisa					Oct-08	Jan-08	Nov-08	In rerun
H,P,T card (sensor carrier)				4	2	6	Pisa							Dec-08	To be started
Opto TX				8	2	10	Pisa					Oct-08	Jan-08	Nov-08	Sending produced cards for mounting
Trigger cards															
TriggerTimingControl Card (TTCci)		1			4	5	CMS								General trigger/timing
Local Trigger Control Card (LTC)		1			1	2	CMS								General trigger/timing
Coincidence Chip hybrid		48		52	20	120	Hungary					Oct-08	Mar-08	Dec-08	On-detector coincidences
VFAT Trigger mezzanine	EDA-01569-V1-0	24		8	6	38	CERN					Oct-08	Mar-08	Dec-08	Trigger bits synchro&storage
Repeater Card						0	CERN			Nov-08	Nov-08			Dec-08	To operate with CMS (RP 220m)
Optocoupler card		2			1	3	CERN			Nov-08	Nov-08			Dec-08	To operate with CMS (RP 220m)
Trigger output card		1			1	2	Pisa							Dec-08	To operate with CMS
T1 Trigger Merger Mezzanine			2		1	3	Genova								To operate at high rate
DAQ Cards															
Gigabit Opto Hybrid (GOH)		120	100	72	53	345	CMS								
OptoRX	CMS-EC-EC-0003	12	10	10	9	41	Preshower							Nov-08	Last few being equipped with optical comps
VME64x Host Board	EDA-01349-V2	6	4	4	6	20	CERN							?	51/90 cards delivered, problem with rest being investigated
VME Back Plane		4			1	5	Bari							Nov-08	In mounting
Slink64 card		8	6	4		18	CMS								to operate with CMS, available
Control Cards															
CCUM (CCU mezzanine)		24	40	20	16	100	CMS								Need to relaunch for more spares
CCUM Carrier			4	4		8									
DOHM (DOH on it available)	EDA-01667-V1-0	4	4	4	2	14	CERN							Nov-08	Some cards need optical mounting
FEC		1	1	1	1	4	CMS								
FEC mezzanine		4	4	4	2	14	CMS								
ELMB						20	CERN Pool								
ELMB Motherboard						16	CERN Pool								
ELMB DAC (Radmon readout)		8	3	2	3	16	CERN/LHCb								
Patch Panel board (Radmon readout)		8	3	2	3	16	CERN/LHCb						Nov-08	Dec-08	In mounting
Radmon integrated sensor carrier		24	8	4		36	CERN DT								
Interlock card					2	2	CERN								Finishing after finalization specs
Test cards (TTP needed in larger quantity for development)															
Horseshoe adapter card	EDA-01728-V1-0				2	2	Pisa								
Horseshoe prod test card					1	1	Pisa								
HOST board test setup					2	2	Preshower								
OptoRX test setup					2	2	Preshower								
TOTEM Test Platform (TTP)	CMS-EC-EG-0114 v.1				20	20	CERN								to test production of hybrids

(*) The GEM strip hybrid and T1 hybrids are identical, for the cathodes the wire bonding is different if only the digital part of the VFAT is used (CFEC2).
The GEM pad hybrid is only slightly different to match the channel to trigger sector correspondence.

Electronics modules status

- On-detector cards linking front end chips to the outside world now fully tested. This required preliminary firmware and software version and took longer than expected. Production expected to be completed before Christmas.
- Some boards required for joint operation with CMS still in design. Also interlock required development of new board, specifications now finalized.
- Production problems:
  - RP hybrid: metallization problem on 25 % -> production relaunched after careful investigation
  - Hybrid for T1 and T2: production showed low yield, to be completed Jan 09
  - Coincidence Chip Hybrid: production relaunched after processing problem, first new ones expected Mid-November, rest end of the year
  - Just have been informed on processing problem of the HOST boards, are currently investigating. 51 delivered, but electrical test failed on remaining 39
- Good progress in counting room installation: LV, HV and VME crates done, for DCS several boards and crates have been developed, which are being cabled now.

TOTEM OFFLINE SOFTWARE

The TOTEM Offline Software is developed based on the CMSSW Framework.

The TOTEM related packages can be incorporated in the CMS Software, allowing in future a combined detector simulation and analysis.

The first release has been issued in summer 2008: reconstruction performances have been cross-checked, when available, with Test Beam data.

A more complete release, including the L1 Trigger Simulation is foreseen for end of 2008.

2009 Schedule:

- production of simulated data, including Trigger, for the early physics scenarios.

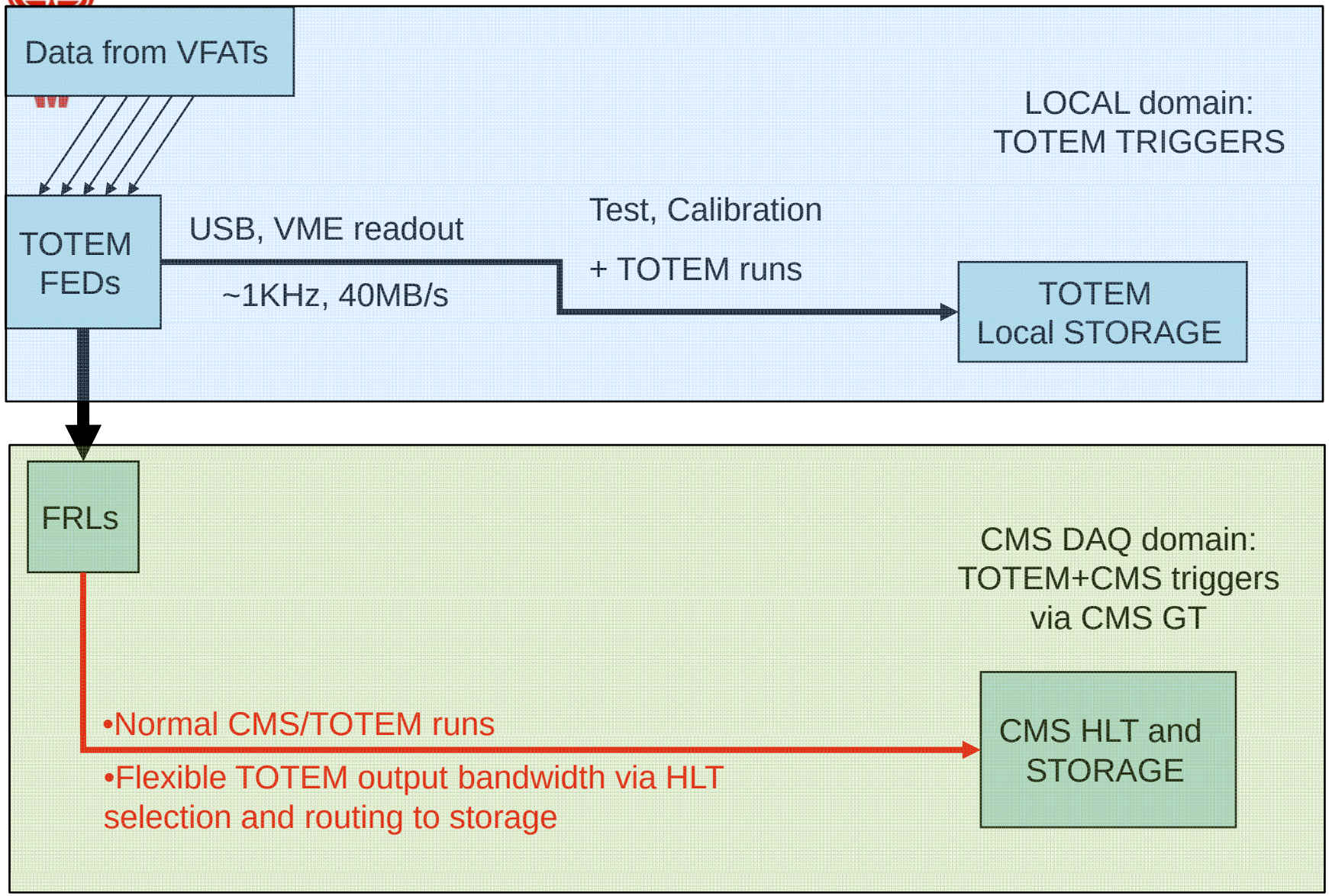
- optimisation of software performances

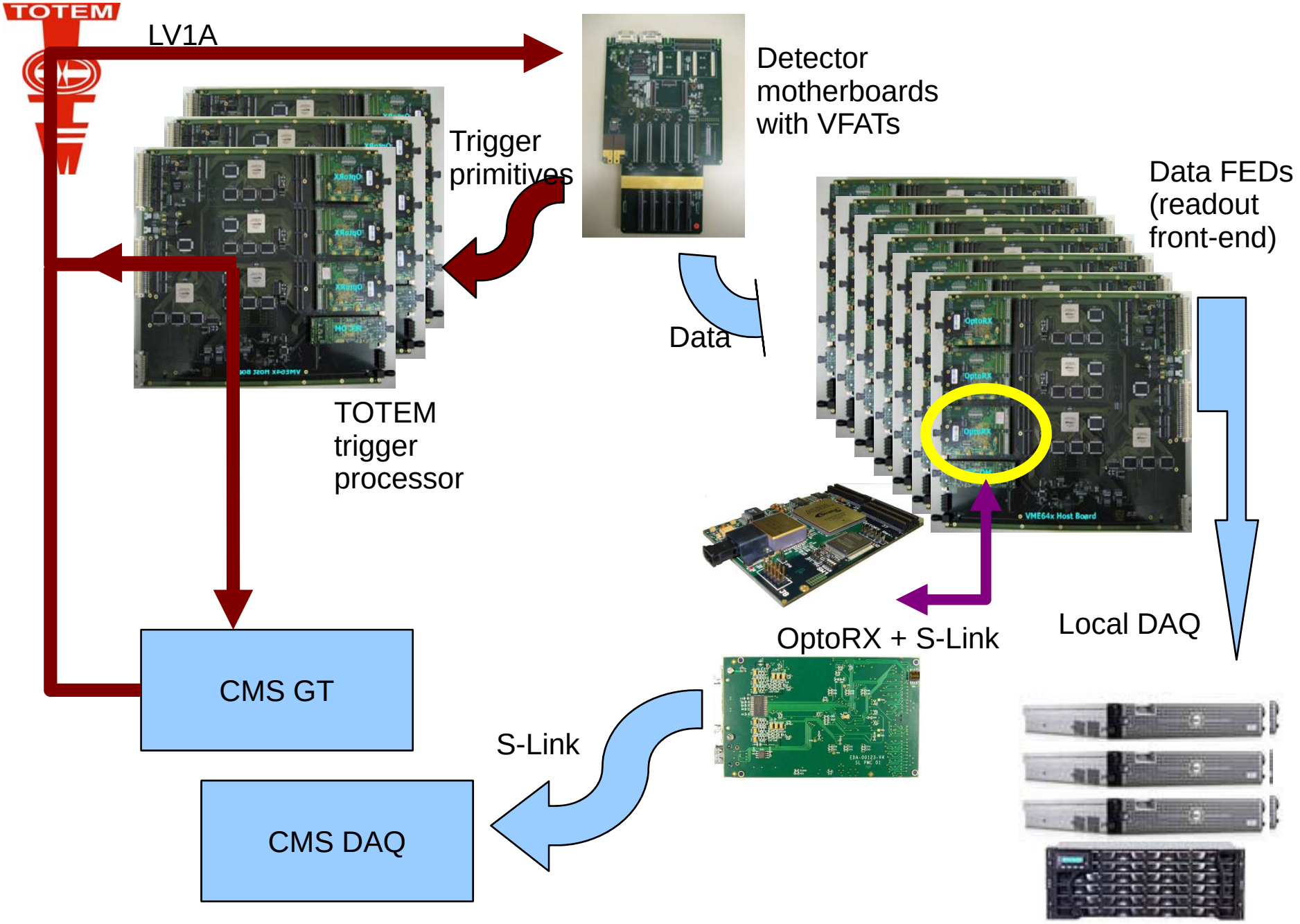
- tuning of the simulation and reconstruction based on the detector commissioning

- Include access to the Conditions Data Base for Calibration and Alignment

- Finalize and tune the Roman Pot Detector Alignment

Trigger scenarios




TOTEM
LV1A
Detector
motherboards
with VFATs
Trigger
primitives
Data FEDs
(readout
front-end)
Data
TOTEM
trigger
processor
OptoRX + S-Link
Local DAQ
CMS GT
S-Link
CMS DAQ

Summary and Outlook

TOTEM ready for complete installation in spring/summer 2009

Commissioning has already started and will continue

Analysis software finalized in spring 2009

First standard runs will be used for:

- **calibrations and alignments**
- **background studies**
- **trigger studies**

Physics programme for standard runs:

- **large t elastic scattering**
- **Double Pomeron and single diffraction**
- **minimum bias physics**

Specialized 90 m runs:

- **total cross-section and low t elastic scattering**
- **Diffraction with proton measurements**

Financial matrix

TOTEM - 12/09/2008 - Financial Matrix

TOTEM	TOTAL			CERN			INFN			Finland			Brunel			Estonia			Prague			NSF			Hungary			C.Projects		
	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	Proj	Paid	MoU	In	Out
1. ROMAN POTS	**2476**	**3226**	**2970**	*1702*	*2450*	*2336*																								
1.1 Roman Pot mechanics	651	865	845	456	618	598													195	247	247									
1.2 Movement	204	243	243	204	243	243																								
1.3 Beam position monitor	171	122	122	169	120	120													2	2	2									
1.4 Detector mechanics	133	175	160	133	175	160																								
1.5 Silicon sensors	228	299	299	110	236	299							55	0	0							63	63	0						
1.6 Cooling	209	310	219	209	310	219																								
1.7 Electronics	554	643	562	175	260	258										40	42	42				324	244	165	0	80	80	15	17	17
1.8 Power supplies and cables*	287	459	429	206	378	348	48	48	48	13	13	13				2	2	2	5	5	5	13	13	13						
1.9 Miscellaneous	40	110	91	40	110	91																								
2. T1-CSC	**1820**	**1742**	**1706**	*441*	*361*	*324*																								
2.1 70 CSC Detectors	627	640	640				627	640	640																					
2.2 Electronics	666	567	566	73	66	65	509	416	416													70	70	70				15	15	15
2.3 Power supplies and cables	159	201	201	119	81	81	40	120	120																					
2.4 Supports and services	369	334	299	249	214	178	50	50	50																			70	70	71
3. T2-GEM	**1303**	**1521**	**1414**																											
3.1 50 GEM Detectors	434	515	471							434	515	471																		
3.2 Electronics	533	570	560				518	555	546																			15	15	14
3.3 Power supplies and cables	138	172	167				138	172	167																					
3.4 Supports and services	199	264	216							90	155	106																109	109	110
4. TEST SETUP	**150**	**150**	**150**																											
4.1 Cables, power supplies & infrastr.	40	40	40																									40	40	40
4.2 Electronics DAQ and computing	70	70	70																									70	70	70
4.3 Pool rental & Consumables	40	40	40																									40	40	40
5. DAQ EVENT BUILDER	**720**	**723**	**222**																											
5.1 Readout column	170	137	137				170	137	137																					
5.2 Link into CMS DAQ**	500	500	0																											
5.3 Online PC & storage	50	86	85				33	69	69																			17	17	16
TOTAL TOTEM	**6470**	**7362**	**6462**	**2142**	**2811**	**2660**	**2133**	**2207**	**2193**	**537**	**683**	**590**	**55**	**0**	**0**	**42**	**44**	**44**	**202**	**254**	**254**	**470**	**390**	**248**	**0**	**80**	**80**	**390**	**393**	**393**

* Item 1.8 includes the redistributed Polish funds. The status of the compensation funds for those 127k is shown in the Credits sheet.

** Item 5.2 is foreseen for linking to CMS DAQ. It is not included in current CERN MoU and Projection columns, but it is included in the TOTAL MoU and Projection columns.