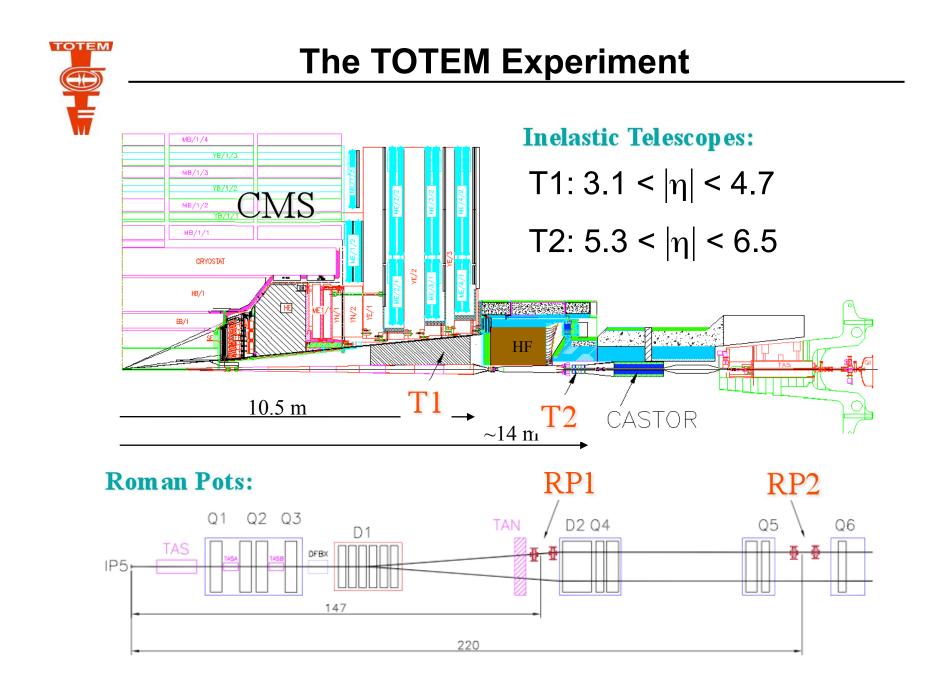


- The Roman Pots
- The T1 Telescope
- The T2 Telescope
- Electronics
- DAQ
- Software
- Early Physics
- Summary



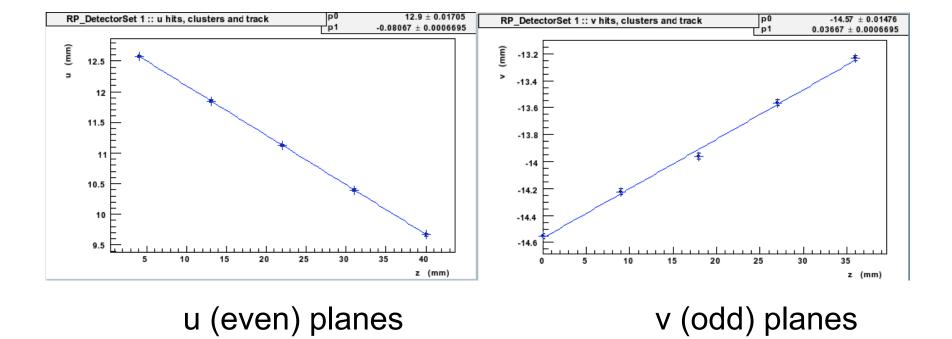


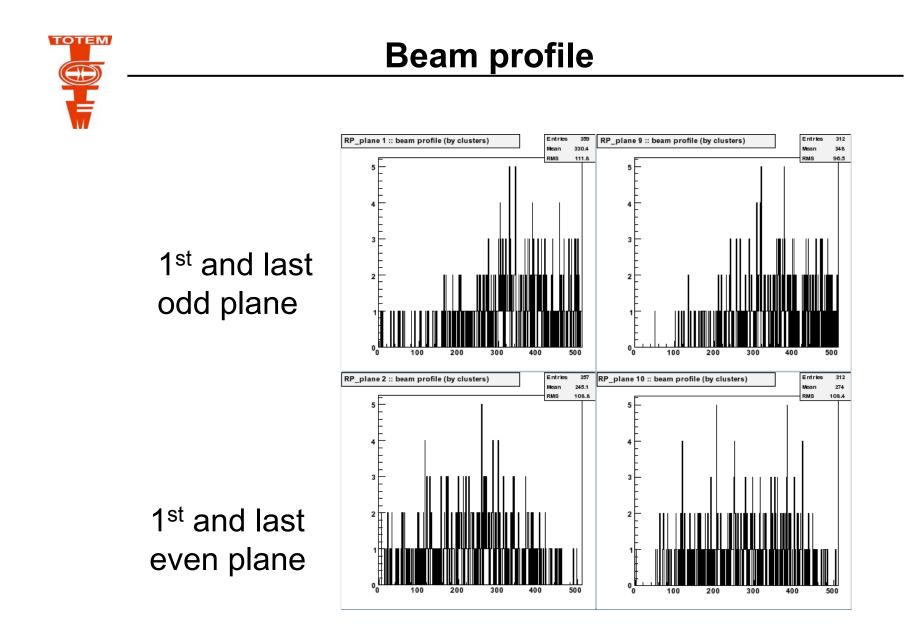
Pot 3 to Pot 7 ready for installation



Track in the Roman Pot



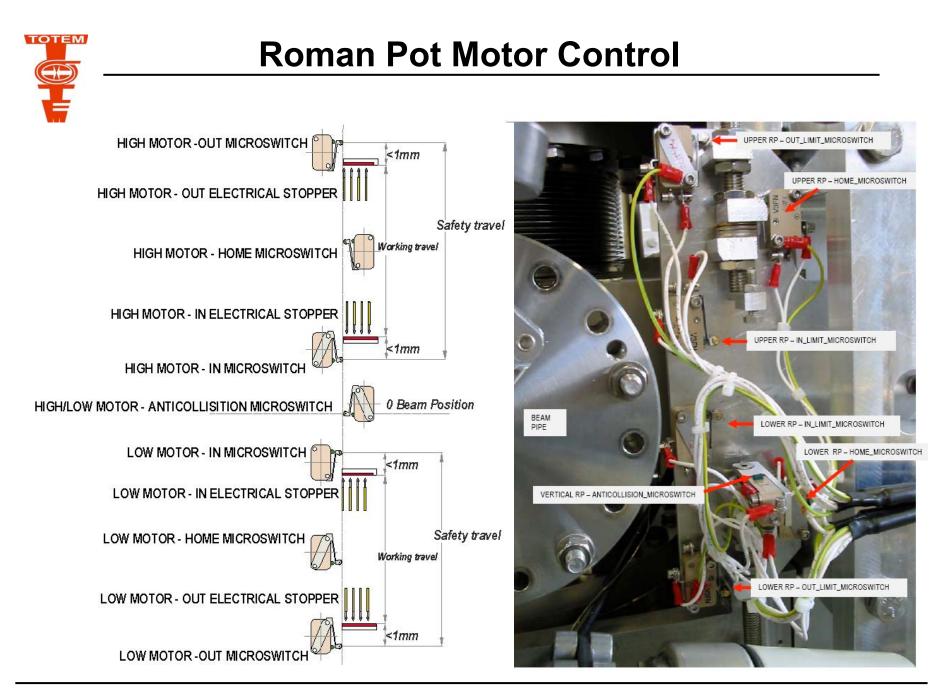






Roman Pot Planning

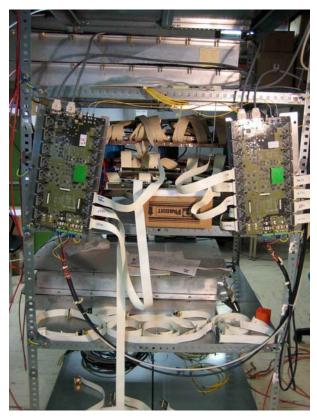
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T1 chambers and supports

Cosmics test stand in Genova

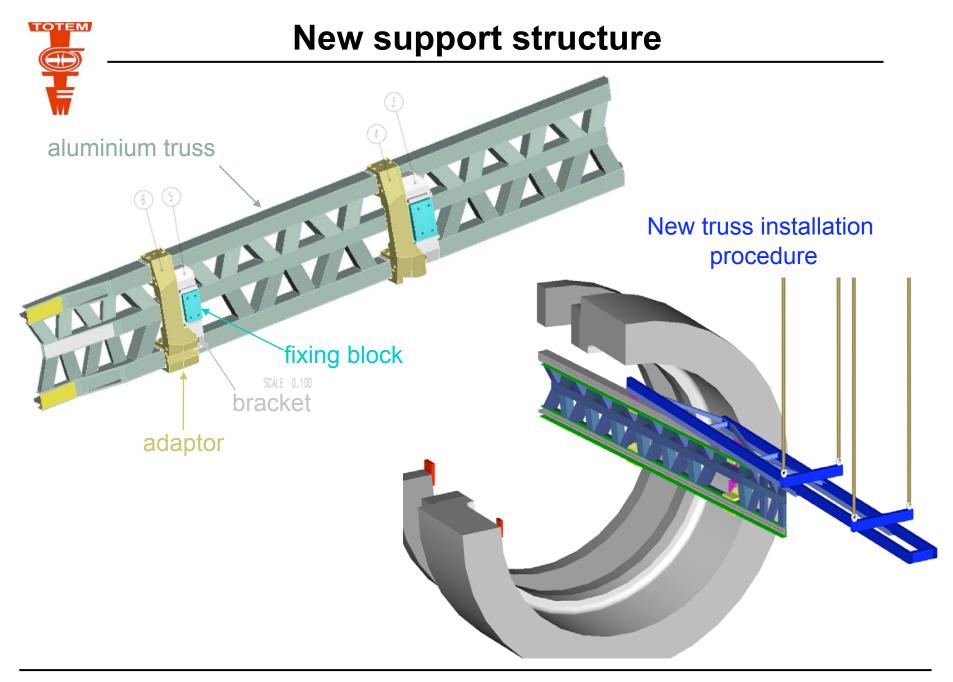


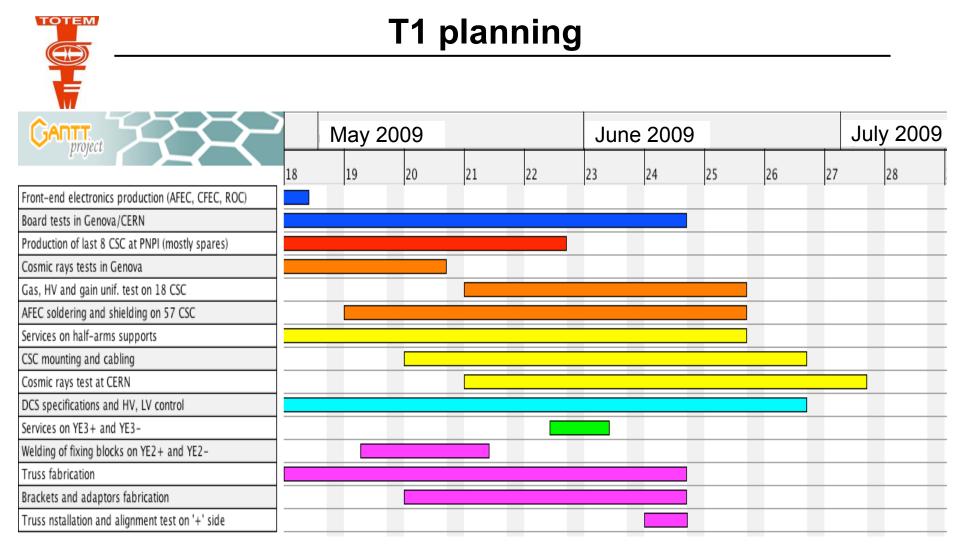


Support of 2nd half-arm

CSC stored at CERN







The trial installation (+ alignment) of the new support structure on one side is planned in June Installation of the two arms of T1 will happen in September



T2 Telescope on the IP5 +side

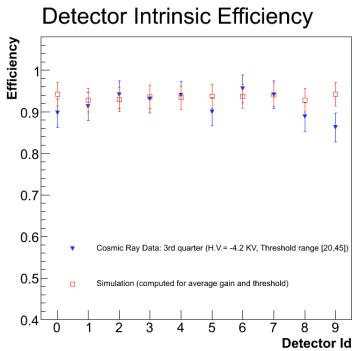
The 3rd quarter has been installed in IP5 plus end. Cabling and piping is under way.

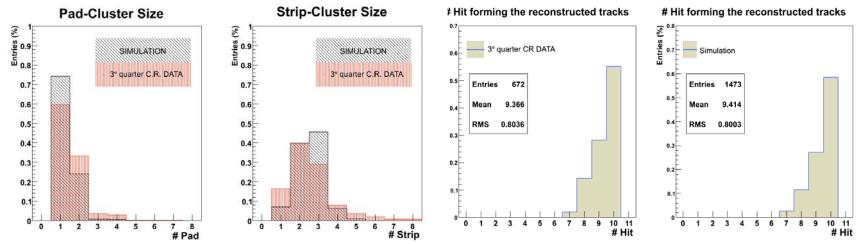
The first two quarters are under gas flow and the local cooling lines tested. The electronics commissioning has just started.





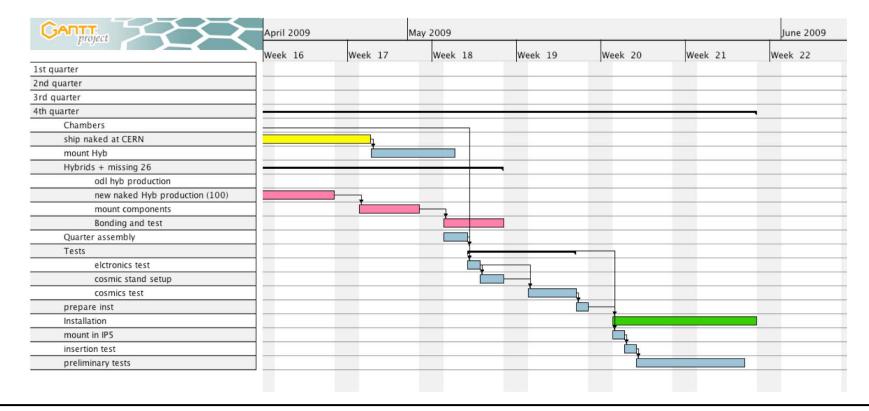
All the detectors have been tested with the final DAQ chain with cosmic rays before installation in IP5. The efficiencies found are in good agreement with detector simulation.





T2 planning

The 4th quarter is under assembly, 8 chambers are ready to be mounted on the telescope. The PADs VFAT Hybrids missing for the last two are produced and assembled these days. The detector will be installed the 3rd week of may, when a radioactive source will be removed from minus end garage.



TOTEM

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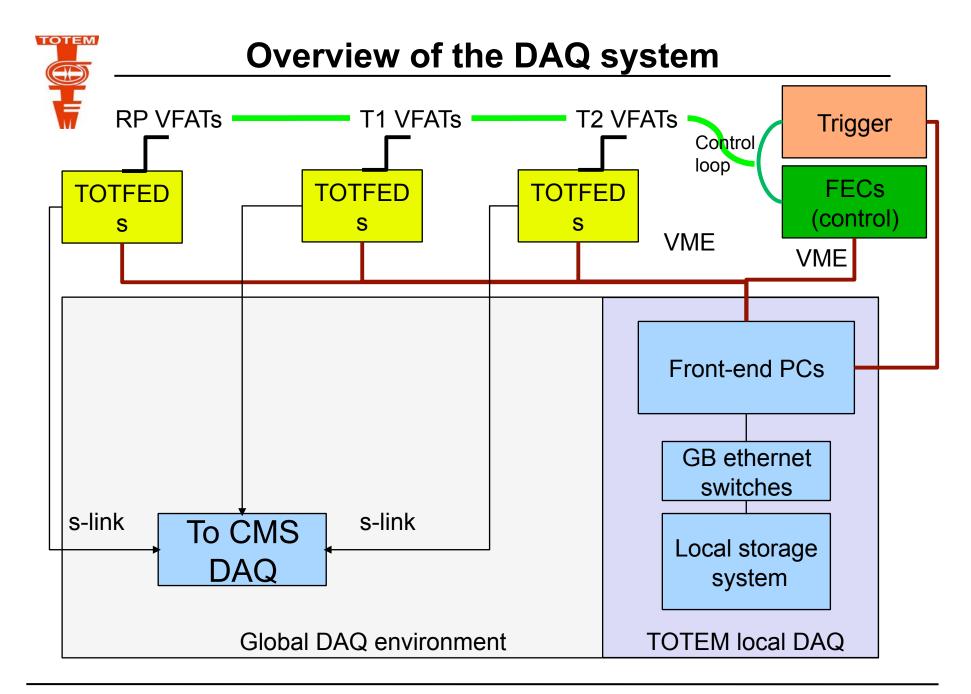


Electronics status (1)

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VFAT Trigger mezzanine24408Repeater Card124124Optocoupler card2Trigger output card1T1 Trigger Merger Mezzanine2		120	Hungary					Apr-09	Mar-08	May-09	final 25 % in rework, ok for 220m
Repeater Card124Optocoupler card2Trigger output card1T1 Trigger Merger Mezzanine2		78	CERN						Mar-08	Jun-09	90% delivered, last 10 % in test after rework
Optocoupler card 2 Trigger output card 1 T1 Trigger Merger Mezzanine 2		136	CERN							Jul-09	produced, tested, fix developed, in verif
Trigger output card 1 T1 Trigger Merger Mezzanine 2		3	CERN							Jul-09	,,,,,,,,,.
T1 Trigger Merger Mezzanine 2	1	2	Pisa							Jul-09	
DAQ Cards		3	Genova							Dec-09	Postponed not needed for early operation
Gigabit Opto Hybrid (GOH) 120 100 72		345	CMS								
OptoRX 12 10 10			Preshower								
VME64x Host Board 6 4 4		22	CERN							Jun-09	Naked card reproduced, mounting starts May
VME Back Plane 4	1	5	Bari								
Slink64 card 8 6 4		18	CMS								
Interlock Cards											
Interlock card		2	CERN								In production after new iteration with machine
(*) The GEM strip hybrid and T1 hybrids are identical, f	2	des the	e wire bonding	a is differ	rent if o	nly the	digital	part of th	ie VFAT i		



- Several production problems with printed circuit boards.
- Succeeded to produce sufficiently for installation this year, need more for RP 147 m and spares.
- Interlock card needed many design iterations, now in production.
- Cabling in tunnel finished in the next weeks, DCS and DSS cabling in counting room underway.





- Installation of VME crates and related software for detector test in IP5: following detector schedules.
- Installation of local storage and eventbuilders: as local storage needs arise, or latest end June.
- Integration tests with detectors, DCS and Trigger: September 2009.



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.

<u>Current Release</u> (2.0) includes (for all TOTEM detectors):

- Simulation (Geant4 + Digitisation), Reconstruction
- Simulation of the Coincidence Chip
- L1 Trigger response
- Proton transportation in the accelerator

2009 Schedule:

- Production of simulated data+Trigger, for the early physics scenarios: first samples already under analysis to optimise software performances, develop analysis tools, define trigger strategy for early runs

- Offline Data Base: characterization of the data, list of requirements, Oracle technology. Develop the access to the data

- Mapping and Calibration: follows the commission and the installation of the detectors in the tunnel

- Finalize the Aligment procedure of all detectors



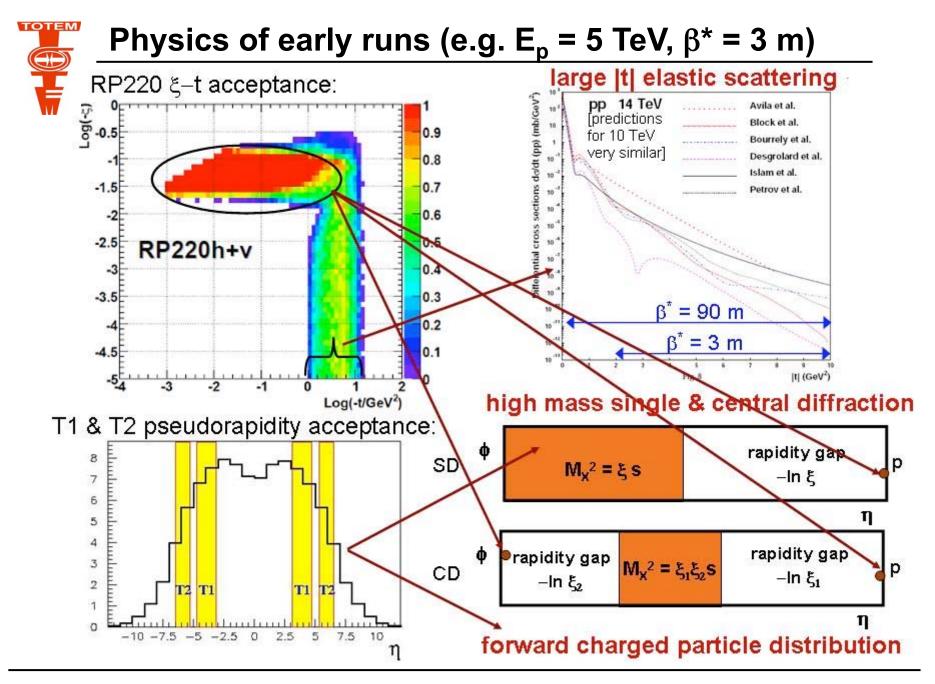
TOTEM will operate in all running conditions.

Programme at \sqrt{s} = 900 GeV:

- poor acceptance for elastic scattering due to large beam size at the Roman Pots and the limitations due to TAS / quadrupole triplet aperture
- alignment of Roman Pot detectors using beam halo and diffractive protons
- study of outgoing protons with momentum losses $\xi = \Delta p/p > 0.1$ in a limited |t| range \rightarrow first look at high mass single diffraction
- study of forward charge particle event topology with T1 and T2 (pseudorapidity distributions and multiplicities)

Programme at $\sqrt{s} = 8 - 10$ TeV:

- early optics (e.g. $\beta^* = 3$ m): large-|t| elastic scattering, high mass single and central diffraction + forward charge particle event topology
- as soon as technically feasible: request short LHC runs with $\beta^* = 90$ m optics \rightarrow first measurement of σ_{tot} with T1, T2, RP (precision: ~ 5 %)





Current Commissioning Planning (1)

D	Task Name	Duration	April 23 30 06 13	May	June	July	August 13 20 27 03 10	September 17 24 31 07 14	October 21 28 05 12 19
1	General Items	114 days?	20 00 00 13	20 27 1 04 1 11	1 10 1 20 1 01 1 00 1 15	22 23 00	10 20 27 03 10	04.09	21 20 00 12 19
2	Electronics in USC55	15 days?	06.04	29.04	+				
5	Cables in USC55	15 days?	06.04	29.04					
9	DAQ	100 days?	14.04	1 1 2 2 3 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1				04.09	
9 15	DCS		06.04	G 13	05			Q 04.05	
	Contraction of the second second second second second second second second second second second second second s	24 days?		¥ 10	1.05				
21	Control room	70 days?	14.04	1	Inner Frank Inner Inner Inner	1 1 1 1	24.07		
24	Water cooling station for T1/T2	62 days? ₽			₩ 10.06				
29									
	Detectors	148 days? 🗩							23
31	Roman Pots at 220 m:	148 days? 🗩							
32	Motor test and interlocks	37 days? 🗩			18.05				
33	Construction of interlock box	22 days		24.04	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
84	Test of interlock box	2 wks?	24.04	11.0	5				
35	Installation of interlock box	1 wk?			18.05				
36	Construction of mechanical stops	25 days?		29.04	10.00				
37	Sector 5/6	18 days?	14.04	11.0					
	10.0% 11.161/11.0%			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
38	Mount new micro-switches on 6 pots	3 days?	14.04 - 17.0	30.04 05.05	I				
39	Mount mechanical stops on 6 pots	2 days?							
0	Calibrate one pot with survey	4 days?		05.05 11.0	A				
11	Sector 4/5	20 days?	17.04		18.05			transformed by the second second second second second second second second second second second second second s	
2	Mount new micro-switches on 6 pots	3 days?	17.04	and the second sec					
3	Mount mechanical stops on 6 pots	2 days?		06.05 08.05					
4	Calibrate one pot with survey	4 days?		12.05	18.05				
15	C3F8 cooling plant	27 days?		04.05	1				
6	Install stainless steel tank	10 days?	-06.04	t t t t t t					
7	Fill liquid in system	5 days?	06.04		1	++			
8	Run system on by-pass	5 days?		22.04	I manual second second second second				
			A CONTRACTOR OF A CONTRACTOR OF		i i i i i i i i i i i i i i i i i i i	1	أربعه المستمر والمتناوية ومترامست		
19	Finish piping at 147 m	4 days?	06.04 14.04		1				
50	Mount 1 heat exchanger at 147 m	4 days?		.)4 04.05					
51	Cabling:	40 days? .	5.01 Carlos de la construcción d	Junior I	29.05				
52	Sector 5/6:	20 days?		29.04					
53	Cabling in alcove	2 wks? 0	allering and an and all and all all all all all all all all all al						
4	Check connectors short cables	1 wk?	06.04 15.04						
55	Make/add short cables	1 wk?	15.04	22.04					
6	Add optical fibres and protection	1 wk?	22.04	29.04					
57	Sector 4/5:	20 days?		0.04 0	29.05				
58	Cabling in alcove	2 wks?		204	4.05				
59	Check connectors short cables	1 wk?		07.06	4 05				
50	Make/add short cables	1 wk		14.05	4.05				
				14,00	.05 29.05				
1	Add optical fibres and protection	1 wk?							
52	DCS	35 days?		Q 1	4 05				
3	Operation of ELMB sensors box	5 days?	30.03						
4	Construction of ELMB radmon box	1 mo?		22.04					
5	Test of ELMB radmon box	2 wks?	22.04	07.05					
6	Operation of ELMB radmon box	1 wk?		07.05 14	4.05				
7	Commissioning at sector 5/6	80 days?	20.04 🗤				13	3.08	
8	Link to DSS	1 wk?	20.04	27.04	1	1 1 1 1 1			
9	Detectors mounted	4 days	20.04		1				
0	Connect vacuum	1 day?		27.04	1				
1					+++++				
	Connect cooling	3 days?		.04 30.04	1				
2	Test cooling	5 days?		30.04 08.05					
3	Connect cables	1 day?		30.04 04.05					
4	Calibrate 5 pots with survey	3 days?		04.05 07.05					
5	Movement test of 5 pots with CCC	1 wk?		07.05	4.05				
	(*************************************		Description				al Taska	Deadline 0	
oject	TOTEM-Plan Task		Progress		Summary		ial Tasks	Deadline &	
te: T	hu 23 04 09 Split		Milestone	\$	Project Summary	Extern	al Milestone 🗇		



Current Commissioning Planning (2)

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99 Switch nut/ und monitor V&I 2 days 2005 2020 0				2 days	Verify vacuum cooling with DCS	18
00 Switch out // and measure i with OUUDAL 2 days 0 00<	06			2 days		9
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44 Test 1231 FELMS radiom box 1 w/r? 20.04 07.05 55 Operate 1231 FELMS radiom box 1 w/r? 12.05 19.05 36 Link to DSS 1 w/r? 12.05 19.05 0.08 37 Commissioning 90 dsys? 02.04 0.08 0.08 38 Installation of first and second quarter di dsys? 6 dsys? 02.04 0.08 0.08 39 Connect ogaz. 1 dsys? 24.03 0.04 0.08 0.08 41 Loak tost of cooling. 1 dsys? 24.03 0.04 0.04 0.04 42 Connect cooling. 1 dsys? 02.04 02.04 0.04 <t< td=""><td></td><td>29.04</td><td>0.03</td><td>1 mo?</td><td>Produce T2&T1 ELMB radmon box</td><td>33</td></t<>		29.04	0.03	1 mo?	Produce T2&T1 ELMB radmon box	33
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Power LV 1 day? 18.05 19.05		11.05		1 wk?	Connect cables	56
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	08.06					
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52 Test on +side 2 mo 06.66 03.07	0307	06.05				
				1 1 1 1 1 1 1 1 1		
63 Test on -side 2 mo				2 mo	Test on -side	63



- The Roman Pot detectors are now installed in sector (5,6), the sector (4,5) will be equipped end of June.
- Few Roman Pot detectors will be mounted at 147 m to gain experience with the first beams (background !).
- Three quarters of the T2 Telescope are installed, the last one follows latest end of May.
- For T1 a pre-mounting of the new support structure is foreseen beginning of June if the CMS schedule allows it.
- Installation of T1 can only be done in September.
- For the Roman Pots and T2 the commissioning can start now.