



CMS

31 July 2008

## Minutes of the 26th LHC Resource Review Board Meeting (CERN, Geneva, 14th April 2008)

### Present:

C-E. Wulz (HEPHY, Vienna, Austria)  
J. Lemonne (FWO, Belgium)  
J. Sacton (FNRS, Belgium)  
P. Cheng (Ministry of Science and Technology of China, China)  
G. Chen (Institute of High Energy Physics, China)  
H. Li (National Natural Science Foundation of China, China)  
X. Liu (National Natural Science Foundation of China, China)  
Y. Zhang (National Natural Science Foundation of China, China)  
H. Sanchez Moreno (Colciencias, Colombia)  
M. Losada (UAN, Colombia)  
D. Denegri (Repr. Ministry of Science and Technology, Zagreb, Croatia)  
M. Raidal (NICPB, Estonia)  
D-O. Riska (Helsinki Institute of Physics, Finland)  
J. Tuominiemi (Helsinki Institute of Physics, Finland)  
J. Zinn-Justin (CEA Saclay, IRFU/DIR, France)  
F. Le Diberder (CNRS/IN2P3, France)  
Y. Sirois (LLR, Palaiseau, France)  
K. Ehret (DESY, Germany)  
M. Fleischer (DESY, Germany)  
T. Hebbeker (RWTH Aachen, Germany)  
E. Gazis (NTU-Athens, Greece)  
G. Vesztegombi (KFKI-RMKI, Hungary)  
R. Veeraraghavan Pakshi (Department of Atomic Energy, India)  
A. Gurtu (Tata Inst of Fundamental Research, India)  
U. Dosselli (INFN, Italy)  
M. Diemoz (INFN, Italy)  
F. Ferroni (INFN, Italy)  
H. Hoorani (National Centre for Physics, Pakistan)  
J. Duszyński (Undersecretary of State for Science, Poland)  
J. Krolkowski (University of Warsaw, Poland)  
J. H. Choi (Ministry of Education, Science and Technology, Republic of Korea)  
Y. I. Choi (Sungkyunkwan University, Republic of Korea)  
M. Dae (KICOS, Republic of Korea)  
R. Lednicky (JINR, Dubna, Russia)  
I. Golutvin (JINR, Dubna, Russia)  
Y. Kozlov (Russian Federal Agency for Science and Innovation, Russia)  
V. Savrin (SINP MSU, Russia)  
J. Fuster (University of Valencia CSIC, Spain)  
T. Rodrigo (IFCA (CSIC-UC), Spain)  
Q. Ingram (PSI, Switzerland)  
T. Nakada (CHIPP EB member, Switzerland)  
Y.B. Hsiung (National Taiwan University, Taiwan)  
I. Turk Cakir (TAEA, Turkey)  
J. Seed (STFC, United Kingdom)  
G. Hall (Imperial College London, United Kingdom)  
M. Pripstein (National Science Foundation, United States Of America)

J. Butler (FNAL, United States Of America)  
T. Ferbel (DOE/University of Rochester, United States Of America)  
S. Gonzalez (DOE, United States Of America)  
R. Cousins (UCLA, United States Of America)

G. Lafferty (University of Manchester, Scrutiny Group Chair)  
R. Heuer (DESY, Director-General Designate)

## CERN

J. Engelen, S. Lettow, E. Tsesmelis, D. Jacobs, R. McLaren, J-J. Blaising, J. Salicio-Diez, S. Schmeling, S. Moos, P. Geeraert, E. Van Hove, F. Sonneman.

## CMS

T. Virdee, A. Ball, L. Foa, A. Petrilli, G. Tonelli

## Apologies

A. Sissakian, A. Bernotas, A. Macpherson

Documents can be found in the RRB indico pages; accessible via the LHC-RRB home page  
<http://committees.web.cern.ch/Committees/WelcomeLHCRRB.html>

### 1. Introduction J. Engelen, Chief Scientific Officer

J. Engelen welcomed delegates to the 26<sup>th</sup> meeting of the RRB. He introduced the new scientific secretary, R. McLaren.

### 2. Approval of the minutes of the last meeting. J. Engelen, Chief Scientific Officer CERN-RRB-2007-120 (report)

The minutes of the last RRB were approved without comment.

### 3. Status of the experiment, including Financial Plan. T. Virdee, Spokesperson CERN-RRB-2008-025 (report) CERN-RRB-2008-026 (presentation)

Collaboration news since the last RRB:

New memberships: Wayne State University, Detroit, USA was voted in as a full member. The Central Laboratory of Mechatronics and Instrumentation of the Bulgarian Academy of Sciences, Sofia was admitted with Associate Membership.

Management changes: D. Green (FNAL) was elected as Chairperson of CB. The new project for the upgrades will be led by J. Nash.

T. Virdee illustrated the progress of CMS with a series of photographs and summarized the progress since the last RRB as:

- Solenoid: Cooled down - will inject a low current at a convenient moment soon.
- Tracker: Inserted on 15 Dec 2007, aligned to  $\pm 1$  mm, and connected (980 pipes, 3350 optofibres, 2330 cables). Commissioning ongoing - initial tests indicate v. good noise performance. The cooling plant suffered a serious failure due to a manufacturing fault as it was being commissioned the fluid (C6F14) was contaminated and needed replacement. Corrective actions have been taken to prevent recurrence. Currently commissioning the

plant.

- Pixels: Forward part is ready for installation; barrel part - all layers mounted, minus-side assembled and tested. Plus side is being integrated with supply tube - ready end-Apr.
- ECAL: All 36 supermodules commissioned in CMS. Last endcap crystals delivered on schedule in early March. Barrel crystals ordered for the spare SM. Supercrystals (5x5 crystals) mounted on 3 out of the 4 endcap Dees.
- Infrastructure Readiness - use HAZOPs procedure to evaluate readiness for sustained operation
- Commissioning: in situ commissioning going apace (including cosmic data-taking).
- DAQ: The final system has been installed in the underground services cavern (USC) . Surface control room (SCX): first 800 computers for the online farm (1/8th of final power). Ordering 400 PCs to attain L1 HLT of 36 kHz for first physics. HLT timing (~ 40ms/event) has now been demonstrated on 20 PCs in online environment (HiLTON).
- Software & Computing Infrastructure: Functional tests for CCRC (Combined Computing Readiness Challenge) successfully done in February. Considerable work was invested for the CMSSW\_2\_0 release which will be used in CCRC, CRAFT (Cosmic Run at 4T), CSA08 (Computing, Software and Analysis Challenge) in May. Development has started on CMSSW\_2\_1 cycle to prepare for data taking.
- Preparation for physics focus on startup integrated luminosities of 1, 10 and 100 pb<sup>-1</sup>, associated issues of calibration and alignment, and early physics.

During the CERN Open Day, almost 6000 people passed through SX5 on their way underground (UX5) including a delegation from the Mairie of Cessy, the CMS host village.

T. Virdee recalled that the LHC Upgrades will be carried out in phases:

- Phase 1: 2013 – Will concentrate on items for operation at a luminosity of  $2 \cdot 10^{34} \text{ cm}^{-2}\text{s}^{-1}$ .
- Phase 2: 2017 – Will concentrate on items for operation at a luminosity up to  $\sim 10^{35} \text{ cm}^{-2}\text{s}^{-1}$

An organisational structure to examine and manage the upgrades is already in place. Further details will be presented at next RRB.

T. Virdee then gave details of the current status of commissioning of the detectors and the software, computing and physics analysis. He then continued with the computing progress and plans before reminding the RRB of the early physics programme and the next steps in physics preparation.

Moving on to the schedule, he gave a graphical view of the preparation for the LHC startup.

T. Virdee then concluded by saying that

- CMS is continuing to make good progress. All CMS detectors are installed except for the pixels and the ECAL Endcap.
- CMS is aiming to close the experiment at the end of June and to take cosmic data at operating field (3.8T).
- In June all detectors should be installed except for one ECAL Endcap. The critical path is the installation of the beam-pipe.

- Commissioning, including using cosmics, with evermore complete setups (complexity and functionality) is proceeding apace. Work already carried out gives confidence that CMS will operate with the expected (TDR) performance.
- CMS is eager to take collision data at nominal or close to nominal energy.

**Questions and discussion**

M. Pripstein (NSF, USA) Commented that progress was very impressive but asked for more details concerning the slack in the schedule. J. Virdee replied that there was about a week's float. The beam-pipe is being installed with help from engineers from the CERN/AT-VAC group. Expert manpower is required and CMS is working closely with the accelerator engineers to avoid deviating from the current schedule.

J. Seed (STFC, UK) asked if the early physics programme assumed 10 TeV beams from July. T. Virdee replied that they had looked at differences between 10 and 14 TeV and that for this year running at 10 TeV would still be interesting.

Turning to the Financial Plan, T. Virdee reminded the RRB of the three stages defined in the October 2006 RRB.

- Step 1: complete the low luminosity detector (17.5 MCHF for crystals, CF and C&I)
- Step 2: complete the DAQ (8.4 MCHF).
- Step 3: upgrade to design-luminosity detector (16.6 MCHF)

and summarized the current situation in the following table.

	Step 1	Step 2	Step 3	Comment
Austria	211	45	171	← Austria
Belgium-FNRS	136	77		
Belgium-FWO	136	34		
Brazil	n.a.			Request made for Step 2
Bulgaria				Awaiting response
CERN	4,569	297	1,119	
China	Endcap RPC	Endcap RPC	Endcap RPC	
Croatia	15			
Cyprus				Awaiting response
Estonia	5	8	31	← France CEA
Finland	272	49		Funding in 2010 and 2011
France-CEA	341	58	218	← Step 3 likely in 2009
France-IN2P3	n.a.	2,000	n.a.	
Germany BMBF	919	169	637	
Germany DESY	n.a.	2,000	n.a.	
Greece				News in Oct RRB
Hungary				Discussing
India	Endcap RPC	Endcap RPC	Endcap RPC	Request Submitted, News in Oct RRB
Iran	Endcap RPC	Endcap RPC	Endcap RPC	Discussing
Ireland	n.a.	4	16	
Italy	2,500			Step 1 likely to be partially covered
Korea	Endcap RPC	Endcap RPC	Endcap RPC	← Korea
Mexico	n.a.			Awaiting Response
New Zealand	n.a.	12		Discussing Step 3
Pakistan	Endcap RPC	Endcap RPC	Endcap RPC	
Poland	132	49		
Portugal	108	21		
RDMS-DMS				Discussing
RDMS-Russia				Discussing
Serbia	20			
Spain	344	140		
Switzerland	n.a.	124	466	
Taipei	121	45		
Turkey	47	74		← Turkey
U.K.	575	202	762	
USA-DoE/NSF	5,252	1,722		Request for Steps 1&2 in 2009/2010
<b>Sum</b>	<b>15720</b>	<b>7130</b>	<b>3390</b>	
<b>Requested</b>	<b>17,530</b>	<b>8,400</b>	<b>16,600</b>	
<b>% covered</b>	<b>90%</b>	<b>85%</b>	<b>20%</b>	

Bold: Input since the October 2007 RRB.

Steps 1, 2, 3: 90%, 85%, 20% covered

(In red new pledges/payments since last RRB)

Table 3: The state of funding of the restoration of the forward RPC system.

FUNDING Countries	Contributions kCHF	Comments
Belgium	420	Likely to use its Step 3 funds for RPC system
China	500	
India	800	Request made. News in Oct.
Iran		Discussing. Request made in Oct'06 RRB was for 800 kCHF
Korea	522	Korea -405 kCHF
Pakistan	1250	

Bold: Input since the October 2007 RRB.

RE - Phase 1 upscope: funding now ~3.3 MCHF.

Detailed cost estimate, participation and sharing will be presented to the Oct 08 RRB

He noted that Austria, France, Korea and Turkey had made payments since the last RRB. In addition the Steps are 90%, 85% and 20 % covered. An update of the financial position of

CMS, including the adjustments made necessary by the shift of the LHC startup, will be presented at the November 2008 RRB.

T. Virdee concluded the presentation of the Financial Plan by stating that:

- The completion of the low-luminosity detector is imminent; CMS again urgently requests all the Funding Agencies that have not yet made commitments with respect to the October 2006 Global Financial Plan to do so as soon as possible, at least for the Steps 1 and 2 and to the restoration of the Phase 1 of the RE system.
- The construction, installation, and commissioning of the low luminosity CMS detector is now very close to being completed.
- CMS is very grateful to all the Funding Agencies for the support provided over the long construction period.

### **Questions and discussion**

J. Engelen queried whether CMS could live with the present plan. T. Virdee replied that CMS operations were not limited by the current situation; CERN had helped a lot with the cash-flow. In practice any Step 1 shortfall would be covered by Step 2 payments. J. Engelen emphasised that the November RRB should provide a better understanding of commitments and "still missing" funds.

### **4. LHCC deliberations (paper only).** E. Tsesmelis, LHCC Scientific Secretary CERN-RRB-2008-015 (report)

Delegates had no further comment to make and the RRB took note of the report of E. Tsesmelis.

### **5. Financial matters.** P. Geeraert, Head, CERN Finance Dept. CERN-RRB-2008-003 (paper) CERN-RRB-2008-008 (presentation)

#### **Status of Common Fund accounts**

P. Geeraert presented an update to CERN-RRB-2008-003. In this report there was a deficit of 2.3 MCHF in the Common Fund and an open commitment of 1.6 MCHF. Since the 1<sup>st</sup> of March, 20 kCHF had been received from Serbia and 40 kCHF from Belgium-FNRS. Looking at the contributions received for 2007-2008, Step 1 has now received a total of 3.3 MCHF (out of 17.5 MCHF), Step 2 has received a total of 2.2 MCHF (out of 8.4 MCHF), Step 3 has received a total of 0.8 MCHF (out of 16.6 MCHF).

#### **Status of M&O\_A accounts**

Since the 1<sup>st</sup> of March 1.9 MCHF has been received and Croatia has very recently paid 59 kCHF. The outstanding amounts, with the exception of Italy, are all from 2008. The total outstanding amount is 3.5 MCHF for Member States including the 2008 contributions.

For the non-member states, only Korea Universities and Mexico had outstanding payments for 2002-2007 totaling 0.15 MCHF. The total outstanding amount is 5.9 MCHF including the 2008 contributions.

## Questions and discussion

U. Dosselli (INFN, Italy) announced that the Italian outstanding M&O\_A will be paid within a month. J. Engelen expressed his thanks.

E. Gazis (NTU-Athens, Greece) announced that the Greek M&O\_A payment had arrived at CERN and would be transferred to CMS at the end of the week.

Y.I. Choi (CMS, Korea) Concerning the payments of Korea, the situation was unclear. Following the intervention of the chairman, it was agreed that this question would be resolved offline. Note added: The debt in question (126 kCHF) concerns Korean Universities and not KICOS(Korea). However it still remains that the funds still have to be found. Korea (KICOS) has paid the funds due after they signed the CMS M&O MoU.

T. Hebbeker (RWTH Aachen, Germany) was of the opinion that Germany-BMBF has completely paid steps 1, 2 and 3. J. Engelen promised that, if this was confirmed to be the case, it would be corrected. This was indeed the case.

**6. Construction Budgets.** A. Petrilli, Resources Manager  
CERN-RRB-2008-027 , CERN-RRB-2008-028 (reports ), CERN-RRB-2008-053 (presentation)

### Expenditure 1995-2007

After a short introduction, A. Petrilli showed the overview of Annex 3.

	1995 - 2006		2007		1995 - 2007			
	Comm	Paid	Comm	Paid	Comm	Paid	Comm	Paid
<b>Totals</b>	<b>520.3</b>	<b>485.5</b>	<b>27.0</b>	<b>41.5</b>	<b>547.3</b>	<b>527.0</b>	<b>100%</b>	<b>96%</b>

And commented that:

- Most of the Funding Agencies had committed all of their funding under MoU and CtC by the end of 2007
- For the remaining ones, commitments can only take place during 2008
- There are no foreseen problems with the MoU and CtC funding
- Step 1, 2 and 3 funding is detailed in the CMS Status Report (cf. CERN-RRB-2008-025)

He also presented graphs of yearly commitments and payments for the years from 1995 until 2009

## **Preliminary Draft Budget for Construction 2009**

In 2009 the only payments foreseen are for the installation and commissioning of DAQ slices and the completion of the ECAL Preshower. A. Petrilli also commented that:

- The present estimates for all payments in 2009 add up to 2.4 MCHF
- Together with the payments made by the end of 2007 (527 MCHF) and the 2008 budget planned payments for existing and new commitments (19 MCHF), the total estimated payments by the end of 2008 would total some 549 MCHF - This is 100% of the funding requested under MoU, CtC, Step 1 and 2.

The remaining requests are 0.2 MCHF for the ECAL and 2.2 MCHF for the DAQ.

The present Preliminary Draft Budget is balanced provided all Step 1 and Step 2 requested funds are pledged:

- Step 1 expenses will be completely paid by the end of 2008
- Step 2 funds must be committed in 2008 and are needed for payment in 2009 to maintain the construction schedule.

## **Questions and discussion**

J. Engelen commented that Step 1 pledges are at 90% and should be paid by the end of 2008, however it is important to continue to work for the missing 10%. Problems still remain, but they are manageable.

M. Fleischer (DESY, Germany) remarked that DESY had pledged 2.2 MCHF for the Step 2 in HLT but that this pledge would only be fulfilled in 2010. J. Engelen commented that similar agreements existed with several Funding Agencies. T. Virdee confirmed that this was the case and thanked CERN for allowing CMS to borrow against the future payment of the pledges.

**1:00:35**

**7. Maintenance and Operation budgets.** A. Petrilli, Resources Manager  
CERN-RRB-2008-029 , CERN-RRB-2008-030 (reports ), CERN-RRB-2008-054 (presentation)

### **a. Expenditure 2007**

A. Petrilli stated that the M&O-A received contributions are indicated in the Finance report and offered his thanks to all Funding Agencies for their timely payments to the 2007 M&O-A.

Looking at the 2007 expenditures, the budget request was 9.7 MCHF and 9.4 MCHF have been paid. More details are available in Annex 1 of the report. In addition he underlined that only 0.1% of the contributions were outstanding for 2007, an excellent result. Outstanding contributions from the past have also reduced.

CMS does not centrally invoice for M&O-B; the Collaboration is reporting qualitatively on these expenses. The arrangements made in 2007 are working satisfactorily and there are no reports of Institutes not participating in their fair share of M&O-B costs.

There had been no change in the status of M&O signatures since the last RRB.

## **Preliminary Draft Budget for 2009**

### **Discussion and questions**

A. Petrilli presented, for information only, the draft Budget Request both for Category A and Category B M&O. The totals for M&O-A and B are 12.9 MCHF and 6.5 MCHF respectively.

He reminded the RRB that CMS is working towards a Memoranda of Agreement (MoA) to formalize the service work to operate the CMS detector and that there may be some partial overlap between MoA and M&O-B.

He also added that:

- M&O-A costs will be reviewed by the CMS Finance Board and will be submitted to the Scrutiny Group
- The M&O-A cost estimates have changed with respect to the October 2007 RRB meeting in one area with a total increase in the cost estimates of some 150 kCHF
- The M&O-A sharing is based on the latest PhDs list available in October 2007 (cf. CERN-RRB-2007-083), this list will be updated for the November 2008 RRB.

To conclude he invited the RRB to take note of the present, unscrutinized, cost estimates for M&O-A and M&O-B.

D-O. Riska (Helsinki Institute of Physics, Finland) asked for more quantitative details in the report. In particular, he requested references and statistics illustrating the actual M&O expenses compared to the plan in 2002. J. Engelen recommended that this should be presented in the next RRB.

### **8. Summary** J. Engelen, Chief Scientific Officer

The status report indicated that the CMS would be ready to be closed and ready for data on schedule. CMS has managed, with the help of CERN, to maintain cash flow. Some of the contingency has been taken from the DAQ system and this must be brought to full capacity. J. Engelen thanked the Funding Agencies for their timely contributions to the M&O budgets. He suggested that the November RRB, where a detailed report would be presented by the Scrutiny Group, would be a suitable occasion for a detailed look at the financial situation.

There being no further business, the chairman thanked the participants and closed the meeting.