

**CMS**10<sup>th</sup> May 2006

## Minutes of the 22<sup>nd</sup> Resources Review Board Meeting Held at CERN on 24<sup>th</sup> April 2006

**Present:***Europe*

C.-E. Wulz (Bundesministerium für Bildung, Wissenschaft und Kultur, Wien, Austria)  
J. Lemonne (FWO, Brussels), J. Sacton (FNRS, Brussels)  
D. Denegri (Ministry of Science and Technology, Zagreb)  
D.O. Riska (Helsinki Institute of Physics, Helsinki), J. Tuominiemi  
P. Rebougeard (CEA-Saclay, Gif-sur-Yvette, France), M. Dejjardin  
F. Le Diberder (IN2P3, Paris), L. Dobrzynski  
J. Richter (BMBF, Bonn), K. Ehret (DESY, Hamburg), T. Hebbeker (RWTH, Aachen)  
E. Gazis (National Technical University of Athens)  
G. Vesztergombi (NKTH, Budapest)  
U. Dosselli (INFN, Rome), F. Ferroni, G. Tonelli, F. Ferrini (Italian Mission, Geneva)  
J. Królikowski (Univ. of Warsaw, Warsaw), J. Kurzydowski (Min. of Education and Science)  
S. Sidorowicz (Polish Mission, Geneva)  
F. Bello (ICCTI, Lisbon)  
A. Petrov (Research Inst. of Nuclear Physics, Moscow), V. Savrin, Y. Kozlov  
A.N. Sissakian (JINR, Dubna), I. Golutvin  
P. Adzic (Vinca Institute of Nuclear Sciences, Belgrade)  
D. Espriu (Univ. of Barcelona, Barcelona), M. Cerrada, T. Rodrigo  
Q. Ingram (PSI, Villigen), K. Baltensperger (ETH, Zürich), F. Pauss, D. Poulidakos, A. Rubbia  
R. Wade, (PPARC, Swindon), R.M. Brown

*North America*

J. O'Fallon (DOE, Washington), T. Ferbel, S. Gonzalez, D. Green  
M. Pripstein (NSF, Washington, USA), R. Cousins (UCLA)

*Asia*

P. Ji, (National Funding Agency of China), Y. Zhang  
C. Jiang (Institute of High Energy Physics, Beijing), Y. Huang (Academy of Science, China)  
Y. Peng (Ministry of Science and Technology (Beijing))  
C.V. Anandabose (DAE, Mumbai)  
D. Son (Kyungpook National University, Korea), J-H. Kim (Min. of Science and Technology)  
S.C. Lee (Institute of Physics, Academia Sinica, Taipei)

*CERN*

R. Aymar, J. Engelen (chairman), C. Jones (secretary), J.J. Blaising, D. Jacobs, A.J. Naudi,  
E. Tsesmelis, P. Geeraert, J. Salicio Diez, D. Schlatter, E. Van Hove

*CMS*

M. Della Negra, A. Ball, L. Foà, A. Hervé, H-F. Hoffmann, J. Nash, A. Petrilli, G. Rolandi, P. Sharp, T. Virdee

**22<sup>nd</sup> Meeting of the CMS Resources Review Board RRB, 24<sup>th</sup> April 2006****1. Introduction****J. Engelen, Chief Scientific Officer**

J. Engelen welcomed RRB delegates to this 22<sup>nd</sup> session.

**2. Approval of the Minutes of the 21<sup>st</sup> Meeting (CERN-RRB-2005-046)**

C. Jones noted two corrections to the minutes in the financial situation as reported by P. Geeraert. A corrected version had already been posted in the web. The minutes of the 21<sup>st</sup> meeting were approved with no further comments. J. Engelen thanked C. Jones for having taken these minutes. There were no matters arising.

**3. Status and Financial Plan of the Experiment, M. Della Negra, Spokesperson**

Papers CERN-RRB-2006-031

Presentation CERN-RRB-2006-055

**3.1 Collaboration News**

M. Della Negra noted that there were nine new groups which had applied to join CMS, all of whom had been approved, namely:

**6 new USA Groups:**

	<b>Presented</b>	<b>Approval Status</b>
1. Lawrence Livermore Nat. Lab (LLNL), Doug Wright	Sep05	Dec05
2. SUNY at Buffalo, A. Karchilava	Sep05	Dec05
3. Texas A&M University (TAMU), David Toback	Sep05	Dec05
4. Perdue Calumet, Neeti Parashar	Sep05	Dec05
5. University of Puerto Rico, Angel Lopez	Dec05	Mar06
6. Rockefeller Univ, Anwar Bhatti	Dec05	Mar06

**3 new non US groups:**

	<b>Presented</b>	<b>Approval Status</b>
1. Frascati (INFN, Italy), Stefano Bianco	Sep05	Dec05
2. Universidad de los Andes Bogota (Colombia), C. Avila	Dec05	Mar06
3. DESY, Hamburg (Germany), J. Mnich	Dec05	Mar06

M. Della Negra noted that in the non-US groups there were two new Funding Agencies, namely Columbia and DESY, and MoUs would have to be signed in consequence.

Concerning the election of a new spokesperson, M. Della Negra noted that his term as spokesman would end in December 2006. Since they were switching phase from construction to operation and later data taking they had adopted new rules, approved by the Collaboration Board on the 17th February 2006:

- The term of office should be two years.
- The election for the term starting in Jan 2007 should be held in Dec 2006, to allow the "Spokesperson Elect" to become familiar with the demands of the job
- A person may not serve two consecutive terms as Spokesperson. (A Deputy may become SP for the following term, but not the reverse.)
- Exceptionally and uniquely, the first term under the new rules, starting in Jan 2007, should be for three years, to oversee the transition from construction to operation.

The election would be held on the 21<sup>st</sup> June 2006 with three candidates:

- Dan Green (FNAL, US)
- Gigi Rolandi (CERN)
- Jim Virdee (Imperial College, London, UK and CERN)

Alain Hervé had decided to step down as Technical Coordinator, ending his mandate in March 2006. His main reason was to push the younger people in the TC team to take responsibility for the end of the construction phase, while he was still around.

As a consequence, and in agreement with the CERN Management, M. Della Negra had nominated Austin Ball as the new CMS Technical Coordinator for the period 20 Mar 2006 to 31 Dec 2006. This change had been approved by the CMS Collaboration in the last CMS week (13-17 March). Alain would continue as the Magnet and Infrastructure Project Manager.

### 3.2 Construction Progress

M. Della Negra presented a summary of the construction progress since the October 2005 RRB. The overall message was that there had been a great deal of progress since the RRB of October 2005. He noted some of the highlights:

- The 4 Tesla superconducting coil was now cold, at liquid Helium temperature 4.5° K.
- The new Tracker Integration Facility (TIF) had been in operation since the end of '05.
- 78% of barrel crystals delivered, and 22 of the 36 bare supermodules (1700 crystals) had been assembled. Electronics integration proceeded at a rate of 1 SM/week. 9 out of 36 SM had been integrated so far.
- HCAL source calibration was complete. HCAL pre-calibrated to ~ 4%
- Over 3 out of 5 wheels worth of DT/RPC packages were installed. More than 90% of the CSC were installed on endcap disks. Half of endcap RPCs installed.
- Physics TDR Vol 1 - Detector Performance - was submitted to LHCC in Jan. This was the first of three Physics TDR documents to be produced.

He particularly emphasized that commissioning, using cosmics, of large sub-parts (systems tests) had started. Cosmics had been recorded for all sub-detectors: TK, ECAL, HCAL and the Muon system. The next important milestone would be the Magnet test and Cosmic Challenge of a full slice of CMS in July and August 2006.

For further details of the construction see the paper and slides of M. Della Negra referenced above.

### 3.3 Conclusion

In conclusion M. Della Negra noted that CMS Construction continues to make good progress. The next steps include:

- MTCC (detector-electronics-DAQ-CPT chain) i.e. low rate data from Pt5 to desktop
- Lowering of detector and hardware commissioning in UXC, USC in 2nd half of 2006.

They had a plan for the commissioning of Physics:

- Putting in place final software: Cross-project Software Readiness Reviews.
- CSA06 exercise 24/7 bulk distribution of data and analysis i.e. T0 to desktop.
- Physics TDRs, vol3: Startup, HLT and detailed scenario of physics at startup and into 2008.

The CMS Schedule needed to recover around 6 weeks after YB0 lowering in order to maintain the target date of 30<sup>th</sup> June 2007 for first beam circulation. Nonetheless he was confident that the CMS initial detector would be ready for collisions in 2007.

M. Della Negra wished to emphasize an extract taken from the report on LHCC Deliberations to this committee, CERN-RRB-2006-046:

“...The overall schedule remains very tight and challenging as delays have reduced the contingency in the schedule. To consolidate the schedule, settle the crystal procurement issues, and implement the new Tracker integration plan, CMS will soon need the 4 MCHF requested from the Resource Review Board.”

## Discussion

J. Engelen noted that considerable technical progress had been made and invited comments at this stage of the presentation on the status of the CMS experiment, including comments on the LHCC Deliberations paper (point 4 on the agenda below).

E. Gazis asked M. Della Negra to report on the progress of the pre-shower end cap ECAL. He replied that this was essentially on time, and Greece was involved. However the pre-shower silicon detector had to be installed together with the endcap crystals and there was no point in installing this in 2007 without the crystals, even though it could be ready on time. They would wait until they had at least enough endcap crystals before installing the pre-shower detector. It had been designed so that it could be installed with the beam-pipe in place i.e. without cutting the beam-pipe.

Questioned as to what exactly the LHCC had meant in the above statement by “crystal procurement problems” M. Della Negra noted that the LHCC at that time had referred to the missing money as part of the 4 MCHF needed to reimburse CERN. He noted that the speed of crystal production was currently just above the contracted rate.

J. Engelen proposed that, before the discussion of the Financial Plan, he introduce the topic of the contract for the 7000 missing crystals for the end caps. This concerned 7000 out of approximately 15 000 endcap crystals in total. In previous meetings of this board there were ideas of obtaining these crystals as an in-kind contribution from the Russian Ministry. The current situation was now known and he invited the Director General to comment.

R. Aymar reviewed the history of the difficulties in ensuring steady production from the factory. They decided to try to help this situation by going directly to the Minister in charge. This resulted in a new contract, which has delivered 1100 crystals per month contractually guaranteed and on-time. The cost was a large increase over the previous contract but at least delivery was assured. There was some hope at this point that the final 7000 crystals would be delivered as an in-kind contribution. At the meeting in October 2005, the Minister agreed to guarantee the delivery but not the in-kind contribution. It was thought at this time that perhaps 3500 crystals could be delivered in-kind, the rest to be reimbursed in some other way. At the last meeting with the Minister in spring this year the situation was even worse, and the Minister was only prepared to deliver 1500 crystals in kind, noting the difficulties that the Ministry had to pay industry directly. Therefore, there were quite some managerial details that needed to be solved before a contract could be written. This needed to be resolved within the next few months in order to start crystal production before the end of the year.

J. Engelen proposed to postpone questions and discussion on this point until after the presentation of the CMS Financial Plan.

### 3.4 Financial Plan

M. Della Negra then presented the details of the Financial Plan. He showed the table presented in the October RRB in which column 5 showed the “guidelines for the cost increase” for a total of 32.5 MCHF and gave the sharing between the different Funding Agencies. The situation had improved a little since the previous RRB inasmuch as a letter had been received from PSI. The current finding gap for completion of the CMS low luminosity detector as shown on this slide was now  $32.5 - 28.7 = 3.8$  MCHF, plus the money related to the end cap crystals that had just been presented.

He then presented in detail the request that they had made specifically for the ECAL crystals. They had targeted only those agencies which were directly related to the ECAL construction. In the case of Russia they had made a request for 7000 crystals, which they would value at 7800 kCHF. As the Director General had explained, the Russian Ministry was currently only willing to fund 1500

crystals and hence the funding for 5500 crystals needed to be found. CMS would discuss further and report to the RRB in October.

The Tracker Funding request for 4950 kCHF was currently missing 500 kCHF. He noted however that the availability of sufficient manpower at CERN for the final integration and commissioning of the tracker coming from the institutes was crucial to the timely completion of the tracker. This was not included in this financial request.

In terms of Common Projects, covering mainly commissioning, integration and infrastructure, the missing funds amounted to 1.8 MCHF. The request for 3.2 MCHF was distributed to all the countries not involved in the tracker or the ECAL and they received pledges for 1.4 MCHF. These 1.8 MCHF were needed very urgently in order to complete CMS on time. He repeated his request to all the Funding Agencies for an urgent solution to this problem. In fact this concerned a relatively large number of requests for not such large sums of money, eleven countries having not responded.

As stated in the Status Report on CMS Construction the Global Calorimeter Trigger (GCT) had to be constructed using more recent technology. The additional cost to completion for this project was foreseen to be around 1.6 MCHF. Since the GCT was a UK deliverable, the UK groups had requested access to UK contingency funds from PPARC. This was under urgent consideration.

M. Della Negra then addressed the situation as regards the data acquisition. The CMS DAQ system was modular and consisted of 8 independent DAQ slices, each of which could handle 12.5 kHz of Level 1 trigger rate. The cost of each DAQ slice was 2 MCHF. After the review of cost to completion in October 2002 they had requested 63 MCHF in extra funds, and they received promises for 52 MCHF. This has forced CMS to decide to stage 4 DAQ slices (8 MCHF). The recent additional costs for the Tracker had forced CMS to stage yet another DAQ slice, with the result that they proposed to start with 3 DAQ slices. They had shown to the LHCC that limiting the L1 rate to 37.5 kHz ( $3 \times 12.5$ ) did not compromise the initial physics programme.

However, they needed a plan in order to recover the 5 missing DAQ slices. This plan included requests to new collaborators (e.g. US\_NP, US\_NSF\_Cornell, DESY, one DAQ slice requested from each). The other two slices were included in the ramping profile of the M&O Cat. A, which included replacement of DAQ slices as a function of time when they became obsolete (2 DAQ slices) - already in forward projections of M&O Cat. A.

The conclusion of this section on the financial plan was that CMS was currently missing pledges for 2.3 MCHF in order to complete the low luminosity detector (ECAL end cap excluded), namely 0.5 MCHF for the Tracker and 1.8 MCHF for common project (installation and commissioning). These funds were now urgently needed for a timely completion of the low luminosity detector. CMS urges the Funding Agencies to fully fulfil the requests made in the April 2005 RRB.

The installation and Commissioning of sub-detectors would depend crucially on availability of manpower at CERN. In view of the nature of this work, some unforeseen manpower requests might have to be made. A new financial problem had developed for the completion of the ECAL end cap crystal delivery. The CERN management, CMS management and the Funding Agencies needed to address this problem.

### **Discussion of the Financial Plan**

J. Engelen opened the floor for discussion of the Financial Plan. J. Lemonne referred to the slide of the tracker funding. He wished to clarify that the 395 kCHF, which was cost to completion, had been attributed to the FAO since 2002, but should be better classified "best effort" in the sense that the formal decision had not yet been taken, even though this was at the top of the priority list.

M. Pripstein asked whether, with the benefit of hindsight, the current situation with the end cap crystals could have been avoided. J. Engelen replied that the summary by the Director General was quite correct. The mistake, if it could be called that, was made many years ago when the initial

contract and expectations were based upon what we now knew to be an unrealistic price. That would have amounted to a *de facto* very large in-kind contribution by those providing it. They considered that the price of the present contract, under which crystals were being produced reliably and on-time, was the correct price.

F. Le Diberder announced that IN2P3 had taken the steps necessary for the cost to completion to provide not only the 2 MCHF which were on the table now but also a further 2 MCHF which had been requested at the beginning. CMS could now count on this money. J. Engelen thanked him for his very welcome comment which was in exactly the spirit which was required.

R. Wade announced that the UK was prepared to release contingency funds for the Global Calorimeter Trigger in order to meet the increased costs. With regards to the missing funds towards the cost to completion, the situation was that the UK was holding a contingency fund to cover all of their deliverables for the four LHC experiments. At this stage in the project they were still not prepared to release any of this money other than for contingency on deliverables. He assured the RRB that as things progressed they would be reassessing the situation and their ability to contribute to the cost to completion and hopefully be able to give a very favorable answer on that but it really depended on progress in these coming months of construction. J. Engelen thanked him for this comment.

There being no further requests for intervention, J. Engelen noted that the RRB should not go home with the impression that there were no problems in the financial sense for CMS. There were small but persistent and urgent problems left, and he felt that those funding agencies that were listed with pending requests should let the RRB know their status.

C.-E. Wulz responded that, in Austria, the money had been agreed in principle, and the letter was going to be written in the next week. J. Engelen thanked her for this contribution. Q. Ingram noted that there was a letter from PSI and it was hoped that the final outcome would be positive but that nothing more could be said at this stage.

J. Engelen proposed that one could not wait until the next RRB in order to resolve these remaining issues. He proposed to work with the experiment and with a number of agencies in order to arrive at greater clarity by the next meeting. He repeated his thanks to those Funding Agencies that had come forward with contributions.

J. Engelen questioned the contribution from new groups joining the collaboration, since they were not yet represented around the table. M. Della Negra noted that for DESY and for Columbia they were discussing an MoU for the construction. For DESY this would include a DAQ slice and some manpower for the technical coordination. The Director General felt there was a question of fairness to be considered. For those joining near the end of construction, how much should they be asked to contribute? He felt that it was not fair to come at the last moment and to benefit from the others. Personally he felt clearly that one should consider some participation to the capital which the others had been paying for years.

T. Ferbel felt that the collaboration had to decide whether they were interested in a new group or person joining and if this was in the interests of the collaboration they should vote yes. Certainly financial issues should also come into the picture but the decision should be made on the basis of what the group or person offers. R. Aymer noted that this should include a firm financial contribution.

M. Della Negra wished to comment. He wished to distinguish the case of an entirely new Funding Agency, from that of a new group, attached to a Funding Agency that was already part of CMS. To take a clear example, CMS was happy to have new groups from the USA, not because they knew that the construction fund from the agreement could not be increased, but because they could benefit from experience and manpower for the commissioning, for the software and many service tasks that would be needed, when they switched to operation and data taking in CMS. Furthermore, in the particular case of the USA, they were targeting a new contribution to the

“research programme” which included computing, R&D for an upgrade, and operational M&O Cat. A and B. It was clear that for this budget the contribution should be proportional to the number of physicists, as it is by definition for M&O Cat. A, but, in their view, also for computing and many other tasks of service work. In addition, CMS felt that the sharing with ATLAS could no longer be 1 to 1 since there were 1.5 times as many USA physicists in CMS as in ATLAS. He hoped that this gave an outline as to the thinking within the collaboration. In addition, in the case of the very large group from Cornell, they were looking whether the provision of a DAQ slice would not be possible.

He also noted that there was a new group in CMS from INFN. They were taking a very important responsibility at Frascati on the RPC commissioning and gas system, but they did not bring more money from INFN as such.

J. Engelen noted that it was clear that there were on the one hand the responsibilities of the collaboration, and on the other hand those of this board, and they had to meet at some point. As long as the resource problems were not solved there was an issue for the RRB.

#### **4. LHCC Deliberations (paper only)**

Paper CERN-RRB-2006-046

**LHCC Scientific Secretary, E. Tsesmelis**

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

#### **5. Financial matters**

Paper CERN-RRB-2006-023

**Head, CERN Finance Dept., P. Geeraert**

Presentation CERN-RRB-2006-050

P. Geeraert presented an update to the financial situation reported in the above paper, in which the information was correct to the end of February 2006. The full details can be found in his slides and in his paper.

For the outstanding contributions, he noted in particular that they had now received money from Greece which they were distributing to the various experiments. Of this around 1 MCHF would go to CMS which should settle the outstanding contributions. There were outstanding contributions to the Common Fund from four other Member States: Austria, Belgium, Hungary and Switzerland. Since these were for 2006 this was not unusual at this time of year. Amongst the non Member States there were outstanding contributions from Croatia, India and Turkey.

The M&O Cat. A budget had received a further 2.3 MCHF since the end of February whilst new payments amounted to 258 kCHF, leaving a positive balance of nearly 3 MCHF. There were open commitments of the order of 300 kCHF.

There were still outstanding amounts of M&O Cat. A for the period 2003 to 2005 from Bulgaria, Italy, Poland, Korea and RDMS-DMS.

#### **Discussion**

U. Dosselli did not fully understand the numbers concerning Italy and it was agreed that this would be settled outside of the meeting.

A. Naudi wished to emphasize the need to make these long outstanding payments as soon as possible given the end of the construction period next year. J. Engelen agreed with the CFO as to the need to collect these outstanding payments and felt that some increased action between meetings was now appropriate.

D.O. Riska noted that, as a representative of a member of the collaboration that has paid what has been requested, he could understand that there were problems beyond that which had been requested of the members, but that there was no way that he could go to his funding sources and

ask for more money in a situation where several members of the collaboration had not paid what has been agreed by the collaboration as being a reasonable and rational request.

## 6. Construction Budgets

**Resources Manager, A. Petrilli**

Papers CERN-RRB-2006-032  
CERN-RRB-2006-033

Presentation CERN-RRB-2006-052

### 6.1 Summary of Expenditure for CMS Construction for the Period from 1995 to 2005

A. Petrilli noted that the document CERN-RRB-2006-032 summarized the expenditure for CMS construction for the period from 1995 to 2005. Only items present in the breakdown of items of the CMS Construction MoU and its All-Silicon Tracker amendment were included. For comparison with the MoU, all commitments and payments are given to the detail of Level 3 as in the MoU. All expenditure was reported in current prices whilst the original MoU cost estimate was in 1995 prices (for the Tracker in 2000 prices). For the purpose of this report, "commitment" gave the amounts for which a legally binding document had been signed. The expenditure compiled in this report was, however, gathered from a large number of institutions which follow their own policy of making commitments. Some institutes prefer to report on "payments" only. Their "payments" are shown here as "commitments". The total level of "commitments" was therefore likely to be higher than reported here.

He made three overall comments:

1. This document used in all tables, including the comparisons of expenditures vs. costs:
  - the currently available Funding and
  - the Cost Estimates figures as reported in the Status Report (cf. CERN-RRB-2006-031). Available funding would be reviewed in time for the October 2006 RRB
2. The Commitments and Payments yearly plots presented the foreseen profiles as detailed in the Financial Plan
3. The DAQ staging of 1 slice towards the Tracker Integration Facility was explicitly shown in the DAQ and Tracker tables.

In Annex 3 of the paper A. Petrilli showed the commitments and payments for the years 2002 to 2005 inclusive. The magnet was essentially paid. The subdetectors were paid at around 70%. Overall 87% was committed and 77% paid. He showed the breakdown by Funding Agency.

The year 2005 was a special year with 96 MCHF of commitments, dominated by the contracts for the crystals. The year was also especially high in payments, which amounted to 75 MCHF, again dominated by a full year of production of crystals, and also the sensors for the tracker.

There were no questions on the construction budget up to 2005.

### 6.2 Preliminary Draft Budget for Construction 2007

A. Petrilli then presented the preliminary draft budget for construction 2007, summarizing the preliminary funding requirements for all the payments planned in 2007 to follow the CMS construction schedule. He noted that in 2007, the magnet would be completed and all subdetectors would be in the integration/commissioning phase. This preliminary draft budget was based on the overall planning as presented in the CMS Status Report (cf. CERN-RRB-2006-031), including funds not yet authorized.

The present estimates for all payments in 2007 added up to 34 MCHF. Together with the payments made by the end of 2005 (418 MCHF), the 2006 budget planned payments (59 MCHF) and the estimated delayed payments (10 MCHF), the total estimated payments by the end of 2007 would total some 522 MCHF. This represented about 98% of the Financial Plan revised cost and 99% of the funding currently available. He then showed the breakdown of the 34 MCHF estimate for 2007. This resulted in a total deficit of 5.8 MCHF which was mostly the 3.8 MCHF missing funds



presented by M. Della Negra, plus missing input from some agencies and some cash flow problems.

The present Preliminary Draft Budget was not balanced, with these 5.8 MCHF not covered, and would be needed in 2007 to maintain the construction schedule on target.

Finally, Annex 10 of CERN-RRB-2006-033 summarized the preliminary draft budget for 2007 by Funding Agency and by subsystem. The exact request for 2007 would depend on the outcome of the present RRB meeting and of the review of the needs of each subdetector.

The RRB was invited to take note of this preliminary budget request.

## **Discussion**

E. Gazis asked whether the figures shown for Greece included the money which had recently arrived. A. Petrilli replied that this was until end 2005 and did not include the new money.

### **7. M&O Budgets**

Papers CERN-RRB-2006-034  
CERN-RRB-2006-035

### **Resources Manager, A. Petrilli**

Presentation CERN-RRB-2006-054

#### **7.1 M&O Expenditure for 2005**

A. Petrilli presented the M&O expenditure for 2005, and compared them with the budgets. There were outstanding contributions for 2002 to 2005 from Bulgaria, Italy, Poland, Korea and RDMS-DMS amounting to around 495 kCHF (Greece having recently paid.) This was to be compared with an overall budget of 8.8 MCHF.

A. Petrilli showed the progression of outstanding contributions over several years. The overall percentage of M&O-A outstanding to date for the years 2002, 2004, 2005 and 2006 was 5.8%, 6.0%, 6.6%, and 8.7% respectively. He noted some detailed discussions in progress with the Funding Agencies concerned.

The expenditure underspent over the year 2005 was around 5% of the total budget. Despite this, given the above missing income, CMS had ended up with a technical deficit of 150 kCHF.

Turning to M&O-B, as CMS does not centrally invoice for M&O-B, the collaboration was reporting qualitatively on these expenses. The arrangements made in 2005 worked satisfactorily and there were no reports of Institutes not participating to their fair share of M&O-B costs.

The RRB was invited to take note of the present 2005 M&O expenditure report. CMS kindly asked Funding Agencies to ensure that payments were made as early as possible. They ask urgently Funding Agencies with outstanding contributions for the previous years to make these payments as soon as possible. With the help of CERN, CMS would keep working on reducing the outstanding contributions

#### **7.2 Status of M&O MoU Signatures**

The only change since the previous RRB was the signature of RDMS-Russia. There were two M&O MoUs under discussion.

#### **7.3 Preliminary Draft M&O Budget for 2007**

A. Petrilli then moved to the preliminary Draft M&O Budget for 2007. The CMS Collaboration was presenting, as last year, a preliminary Draft Budget Request both for M&O Cat. A and Cat. B for information only. The cost sharing presented here was for information only and would change. Further input from the Scrutiny Group would be taken into account in the October M&O Draft Budget.

M&O-A costs were reviewed by the CMS Finance Board prior to being submitted to the Scrutiny Group. The M&O-A cost estimates had changed with respect to the October 2005 RRB meeting in 4 areas with a total increase in the cost estimates of some 550 kCHF. The M&O-A sharing is based on the latest PhDs list available in September 2005 (cf. CERN-RRB-2005-108), this list would be updated for the October 2006 RRB. The grand total for 2007 was 10.9 MCHF of which 9.3 was for M&O proper.

M&O-B costs had also been reviewed by the CMS and this budget request would be further updated before submission to the Scrutiny Group. The M&O-B cost sharing presented was the same as that presented in October 2005 and this sharing was still subject to changes. The overall total for material resources amounted to 7.3 MCHF and the human resources to 121 FTE with 45 FTE at CERN in technical manpower and 75 FTE in core computing in the respective institutes.

The RRB was invited take note of the present, as yet not scrutinized, cost estimates for M&O-A and M&O-B. There being no questions, J. Engelen thanked A. Petrilli for his clear presentation.

### **9. Summary, Future Activities & A. O. B. J. Engelen**

The Chairman noted that they had heard a Project Status Report which showed great progress which was most impressive. He was sure that those of the RRB who would visit CMS later would confirm that impression. This progress was consistent with having a detector ready for the start of collisions in 2007.

The RRB had revisited the known remaining financial problems. There was a great need for clarity of this situation before the next RRB. These problems were not overwhelmingly big, but neither were they negligibly small. He needed to understand with the collaboration just how serious they were, and what were the real prospects from the Funding Agencies concerned. In fact it was the purpose of this meeting not only to review the status in a passive way but also actively to contribute to the discussion and to make communications. He was grateful for the positive statements he had heard, but he would have expected somewhat more input than had been received today since the problems were neither new nor declared unreasonable by any Funding Agency.

The new problem was one that they had not been able to discuss in a quantitative sense in that they had missing funding for 5500 end cap crystals. On the basis of the existing contract it was possible to compute the equivalent sum of money. He had no solution to offer at this point. CERN management would not walk away from this problem. They repeated the view that this project was almost there and that it was hard to imagine that they would now let it down and leave CMS to operate with a hole in the detector. The cash flow assistance that CERN could offer had its limits but in this case one could perhaps show maximum flexibility. The CMS management was talking to several RRB delegates in this direction and he hoped that in October one could make progress. Between now and October they had to decide how to place this contract and to guarantee its financing.

R. Wade noted that there were some major problem issues, the crystals and the computing requirements were two examples, which were not huge as such, but if they were not solved then nobody would reap the benefits of the huge investment that had been made so far. It seemed to him that these RRB's were not a particularly efficient way, at this stage near the end of the project, of solving these problems. He was not sure how to effect a change, maybe a working group of the RRB was necessary, or some working group across RRBs such that the Funding Agencies could work directly with the management and of course involve Council at some stage. He was not sure that we should continue just to hope that people would step up to the plate.

<p>The next RRB meetings in 2006 will take place at CERN on <b>Monday 23<sup>rd</sup>, Tuesday 24<sup>th</sup> and Wednesday 25<sup>th</sup> October 2006</b></p>
---

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

C. Jones