



## Minutes of the 20<sup>th</sup> Resources Review Board Meeting Held at CERN on 19<sup>th</sup> April 2005

### Present:

#### *Europe*

D. Kuhn (Bundesministerium für Bildung, Wissenschaft und Kultur, Wien, Austria)  
 O. Abdinov (National Academy of Sciences, Baku, Azerbaijan)  
 V. Vrba (Institute of Physics, Prague, Czech Republic), M. Lokajicek  
 J.D. Hansen (Niels Bohr Institute, Copenhagen, Denmark)  
 M. Jacquemet (CEA-Saclay, Gif-sur-Yvette, France), P. Brossier, J. Ernwein  
 F. Le Diberder (IN2P3, Paris, France), D. Fournier, F. Etienne  
 J. Richter (BMBF, Bonn, Germany), K. Ehret (DESY, Hamburg), K. Kleinknecht (University of Mainz), S. Bethke (MPI Munich), H. Oberlack  
 E. Rabinovici (Racah Institute of Physics, Jerusalem, Israel)  
 U. Dosselli (INFN, Rome, Italy), F. Ferroni, L. Mandelli, F. Ferrini (Geneva Mission)  
 F. Linde (NIKHEF, Amsterdam, Netherlands), A. van Rijn  
 S. Irgens-Jensen (Norwegian Research Council, Oslo, Norway), B. Jacobsen, B. Stugu  
 J. Królikowski (University of Warsaw, Warsaw, Poland), M. Turala  
 F. Bello (ICCTI, Lisbon, Portugal)  
 V. Zamfir (National Institute for Physics and Nuclear Engineering, Bucuresti, Romania),  
 L. Puscaragiu (Geneva Mission)  
 Y.F. Kozlov (Ministry of Education and Science, Moscow, Russia), V. Savrin  
 A.N. Sisakyan (JINR, Dubna, Russia), R. Rusakovich  
 A. Sitarova (Ministry of Education of the Slovak Republic, Bratislava)  
 M. Komac (Ministry of Education, Science and Sport, Ljubljana, Slovenia)  
 D. Espriu (University of Barcelona, Spain), M. Cavalli-Sforza (IFAE, Barcelona)  
 L. Gidefeldt (Swedish Research Council, Stockholm, Sweden), A.C. Lagerkvist  
 A. Clark ("CHIPP" Geneva, Switzerland)  
 R. Wade (PPARC, Swindon, United Kingdom), R. Jones, J.N. Jackson (University of Liverpool)

#### *North America*

I. Blain (NSERC, Ottawa, Canada), R. Orr  
 J. O'Fallon (DOE, Washington, USA), T. Ferbel, S. Gonzalez, H. Gordon  
 J. Whitmore (NSF, Washington, USA)

#### *Asia*

W. Shen (NSFC, Beijing, China, PR), J. Peiwen, Z. Yongtao  
 H. Iwasaki (KEK, Tsukuba, Japan), S. Iwami, S. Terakado (Geneva Mission)  
 S. Lin (ACSS, Tapei)

#### *Australia*

S. Tovey (Australian Research Council, Melbourne)

#### *CERN*

R. Aymar, J. Engelen (chairman), P. Geeraert, E. van Hove, D. Jacobs, C. Jones (secretary),  
 C. Saitta, J. Salicio Diez, E. Tsesmelis

#### *ATLAS*

P. Fassnacht, F. Gianotti, P. Jenni, M. Nessi, M. Nordberg, S. Stapnes

#### *Apologies*

T. Kondo (Japan), D. Weselka (Austria)

## 20th Meeting of the ATLAS Resources Review Board RRB, 18<sup>th</sup> April 2005

Documents can be found at the URL <http://committees.web.cern.ch/Committees/LHCRRB/> and are also listed in Appendix 1 of these minutes

### 1. Introduction

**J. Engelen, Research Director**

J. Engelen welcomed RRB delegates to this 20<sup>th</sup> session. He introduced Chris Jones as the new scientific secretary of the RRB.

### 2. Approval of the Minutes of the 19<sup>th</sup> Meeting (CERN-RRB-2004-104)

The minutes of the 19<sup>th</sup> meeting were approved without comment. There were no comments on the minutes of the associated Plenary RRB (CERN-RRB-2004-110). J. Engelen thanked D. Jacobs for having exceptionally taken these minutes. There were no matters arising.

### 3. Status of the Experiment

**P. Jenni, Spokesperson**

Paper CERN-RRB-2005-016

Presentation CERN-RRB-2005-048

#### 3.1 Collaboration News and Management

P. Jenni announced that ATLAS had received a formal expression of interest from McGill University, Montreal who wished to contribute to the high level trigger. ATLAS would decide at their June meeting. Other contacts were being pursued with new groups from Germany, Italy, U.S., Turkey, Argentina and Chile. No action on this point was requested at this stage from the RRB.

He showed the composition of the Collaboration which now comprised 151 Institutions from 34 Countries. Total Scientific Authors totalled 1770, with Scientific Authors holding a PhD or equivalent evaluated at 1328.

The newly elected Collaboration Board Deputy Chairperson Christopher Oram (TRIUMF, Canada) had taken up his function in January. P. Jenni showed the organisational chart of the Executive Board where several changes had taken place as described in the paper.

#### 3.2 Construction Progress

P. Jenni presented a most detailed report of construction progress of the experiment with the latest photographs (see presentation for details). A summary is presented in these minutes.

**Inner Detector.** There was steady progress on the four sub-systems of the Inner Detector but the schedule remained very tight with no reserve left. The silicon tracker, SCT, and the second end-cap transition radiation tracker, TRT, were on the critical path. He thanked the Funding Agencies which had made special efforts to improve the bump-bonding rate in the pixel detector, and hence to allow ATLAS to plan for a 3-layer system, namely BMBF, INFN, IN2P3 and the US under contingency. The first completed disk from the Pixels with a total of 2.2 million channels has just been completed.

**ATLAS Barrel Calorimeter.** The barrel LAr calorimeter integration and surface cold tests (including the solenoid in the common barrel cryostat) were successfully completed during 2004 in Hall 180. After warm-up a few HV problems were found, which implied only 0.22% dead EM acceptance. The cryostat was transported to Pit-1 and lowered into the cavern last October. The mechanical installation of the LAr and Tile Barrel Calorimeter in the pit had been completed on the support trucks below the access shaft. Installation of electronics and services was on-going. The calorimeter barrel would be ready for insertion in August this year. For the LAr End-Caps, cold testing was progressing steadily with good results, and a very low percentage of dead channels. For the LAr electronics, there had been a delay of ~ 6 months for the "QPLL" on the FB

boards which was being addressed with an aggressive production and testing schedule which should recover about half of the delay. Low voltage power supplies had failed under load test. This situation was under detailed investigation, and currently the series production was on the critical path. The Back-end Electronics was advancing according to plan. For the Tile Calorimeter components there was steady progress, with one of the long and difficult jobs, namely the production, insertion and certification of the Super-drawer electronics, expected to be complete by the end of April. LV power supplies were on the critical path but taking off with two production lines.

**Muon Spectrometer Instrumentation.** Following the resolution of some problems with RPC panel delamination, the preparation of the MDT+RPC barrel muon stations were meeting the installation requirements but only just in time. Improvements were being implemented. The first 22 MDT+RPC muon stations had been installed in the feet region of the barrel toroid. Pre-assembly of the end-cap muon “Big-wheels” had started in hall 180.

**Trigger, DAQ and Detector Control.** The level-1 system (calorimeter, muon and central trigger logics) had completed the developments of the final ASICs and testing of full-functionality prototype modules. Series production had started. The HLT/DAQ/DCS work proceeded within the framework of the TDR approved in early 2004. A pre-series system was now being purchased and would be installed in Pit-1 (as a 10% data flow test).

**Computer System Commissioning Goals.** P. Jenni showed the ATLAS Computing Timeline. They had completed Data Challenge two, albeit a little late. They had also completed the Computing Model paper. They had recently defined the high-level goals of the Computing System Commissioning operation during the first half of 2006. Data Challenge three would be closer to continuous operation than a stand-alone challenge. The main aim of Computing System Commissioning would be to test the software and computing infrastructure that would be needed at the beginning of 2007. At the end (mid-2006) the aim was to have a working and operational system, ready to take data with cosmic rays at increasing rates.

**ATLAS combined test beam in 2004.** A full “vertical slice” of ATLAS was tested on the CERN H8 beam line May-November 2004. For the first time, all ATLAS sub-detectors were integrated and run together with common DAQ, “final” electronics, DCS, etc. Hence much global operational experience was gained during ~ 6 month run. Common ATLAS software was used to analyze the data.

**Current Construction Issues and Risks.** A list of these issues was monitored monthly by the TMB and EB, and was publicly visible on the Web, including a description of the corrective actions undertaken:

<http://atlas.web.cern.ch/Atlas/TCOORD/TMB/>

P. Jenni also presented the new installation schedule version 7.0. The aim was to have the detector ready for beam on the 11<sup>th</sup> April 2007, after which there would be a global commissioning with cosmic rays.

Finally the Collaboration was discussing how to run and operate the experiment in the future. It was also guided by a steering group to ensure coherence and efficiency in the R&D activities for the future very high-luminosity LHC upgrade.

### 3.3 Cost to Completion, and initial staged detector configuration

P. Jenni reminded the RRB that the Cost to Completion (CtC) was defined as the sum of Commissioning and Integration (C&I) pre-operation costs plus the Construction Completion (CC) cost in addition to the deliverables.

He noted that ATLAS was proceeding within the framework agreed at the October 2002 RRB, namely:

**The following framework was accepted at the October 2002 RRB**

(ATLAS Completion Plan, CERN-RRB-2002-114rev.):

CtC                      68.2 MCHF (sum of CC = 47.3 MCHF and C&amp;I = 20.9 MCHF)

Commitments from Funding Agencies for fresh resources (category 1)                      46.5 MCHF

Further prospects, but without commitments at this stage (category 2)                      13.6 MCHF

The missing resources, 21.7 MCHF, have to be covered by redirecting resources from staging and deferrals.

The funding situation will be reviewed regularly at each RRB, and is expected to evolve as soon as further resources commitments will become available

This had led to an agreed plan with staging and deferred components, with the understanding that the full potential of the detector needed to be restored for high luminosity running ( $10^{34}$ ).

ATLAS had pursued, since the October 2002 RRB, its initial detector construction within the above accepted framework. Many constructive interactions continued to take place with Funding Agencies, and the national communities within ATLAS continued their actions to secure the funding required to complete the detector. Step by step the overall funding situation had slowly improved, even though ATLAS was still short of some 12 MCHF to meet its initial detector requirements, and therefore would be forced to start up with a significantly staged initial configuration.

Since the last RRB, the BMBF, Germany, had made a highly appreciated move to secure the full calculated share of its CtC, and the increased manpower contributions from Russia was also gratefully acknowledged. The present status of the Completion Funding planning was given in the updated table (CERN-RRB-2005-016).

There remained also a serious issue of cash flow, mainly due to late contributions to the baseline MoU Common Fund construction funding. This would be addressed in the budget presentation in this meeting by Markus Nordberg. For the successful implementation of the Completion Plan it was also very important that the funds for deferred items be made available early on.

The Collaboration was very grateful to all the Funding Agencies that have already agreed to the category 1 completion funding and found new resources, and it hoped very much that the others would be able to support the ATLAS completion as well in the future.

**3.4 Conclusion**

P. Jenni conclude by noting that:

- The ATLAS detector construction was proceeding within the framework of the accepted Completion Plan.
- Component construction was (almost) complete for several sub-systems, and emphasis had shifted to integration, installation and commissioning.
- The remaining construction concerns were regularly reported to, and reviewed with the LHCC referees.
- Large-scale surface system tests, in particular the combined test beam runs, had been a very major activity in 2004.
- M. Nessi would report on the good progress of the schedule-critical magnet assembly, and on the general installation status and activities in the cavern.
- Very major software and computing activities proceeded according to plans as well

- The underground commissioning has started, and the planning for the early physics phase had been initiated

ATLAS was on track for LHC physics in 2007, and close to the initial physics goals. However, to really achieve this on time, an effort would still be required from all partners in terms of resources to complete the project.

### 3.5 Discussion

J. Engelen asked for any questions on the status of ATLAS, including any comments on the paper presented by E. Tsesmelis entitled LHCC Deliberations.

J. O'Fallon asked how many toroids were now down in the cavern. P. Jenni replied there were three as the RRB would see on their visit to the experiment that afternoon.

T. Ferbel asked P. Jenni to comment further on the high luminosity R&D schedule. He replied that there had been a number of workshops on this issue, and the goal was to have a schedule in place by the end of the year. The inner detector was a most important component, and in order to have this ready for 2012/2015, it was necessary to start the R&D rather soon. Although some people were working on this schedule, the over-riding priority was to get ATLAS working for 2007.

The Chairman noted that it was gratifying that BMBF had been able to join those Funding Agencies that were able to satisfy fully the requests for the remaining cost to completion. As had been explained by the Director General yesterday, everyone was invited to join that club.

M. Jacquemet announced that the CEA would provide an in-kind contribution of 162 k€ to a specific work package. The Chairman noted this contribution with thanks.

There being no further questions, the Chairman thanked P. Jenni for his comprehensive presentation.

### 4. Status of Common Projects

Paper CERN-RRB-2005-017

### M. Nessi, Technical Coordinator

Presentation CERN-RRB-2005-050

M. Nessi presented an update on the common projects and the installation. See his paper and presentation for details and for a number of interesting recent photographs.

#### 4.1 Magnets

He began with the four magnets that ATLAS was constructing. The Barrel Toroid was deep in the installation phase. Six coils had been tested successfully; although they wished to do further testing on coil three before installation, and two coils remained to be tested. The last coil should be ready for installation by the end of June. The complete associated warm structure would be at CERN by the end of May and was not on a critical path.

The End Cap Toroids, for which the vacuum vessels had been at CERN since 2002, had needed a project re-organisation. There was a problem with the company manufacturing the cold mass as had been reported to earlier RRBs. The contract was re-scoped with the company now manufacturing the coil only and the integration work was moved to CERN. Twelve coils had been delivered and four more were foreseen to be delivered by the end of April. The integration work was proceeding well and it was now expected that the two ECTs would be ready for installation in March and September 2006.

#### 4.2 Detector Installation

All seven surface buildings had been delivered with operational infrastructure; hence they had already entered an M&O regime.

Since the last RRB major progress had been made in the cavern such that, rather than essentially empty, it now appeared half full. The first three coils has been lowered into the cavern and installed. The calorimeter barrel was fully assembled and was being instrumented with services and electronics. From the point of view of the technical infrastructure, 95% was completed and operational, and the remaining activities would converge by September 2005. The Barrel Calorimeter would be moved to its final position in the centre of the detector in August 2005 once the BT assembly was complete.

For the barrel toroid the fourth coil was being lowered that day, but the crane had developed a fault and so lowering had been suspended; a delicate moment in a spectacular operation. Three coils were installed and the plan was to have all coils installed by July 2005.

Twenty two muon chambers had been installed in the toroid feet. There were 750 chambers to be installed in total in the barrel toroid.

Installation was in progress of the cryogenics for liquid helium and liquid argon and should be ready for the magnet and the LAr tests from autumn 2005 (this would then move into an M&O mode).

The three Counting Rooms, two in the cavern and one on the surface, were in the course of commissioning of the electronics, cabling, networks, optical interconnectivity and computing support. The plan called for 5000 cable bundles to be installed to the detector for August 2005.

#### **4.3 Schedule**

M. Nessi showed the overall schedule, noting that they were about two weeks behind. The next months were very active with the aim to be in a point in spring 2006 with:

- The Barrel Toroid mechanically ready and fully connected, functional test at full current done
- All calorimeters (EM, HAD, barrels, endcaps, forwards) installed and in their final position, barrels connected and commissioned, LAr barrel vessel cold
- All muon barrel chambers (precision + trigger) installed, individually commissioned and aligned
- All inner detector services (pipes and cables) in place, ready to receive the ID detectors starting in Mar 06, Solenoid field mapping done.

#### **4.4 Resources**

In terms of resources he noted that:

- Most infrastructure contracts executed or committed. Expenditure profile matches budgets plans presented at the RRB as part of the ATLAS CtC
- The Cost of the Magnet System showed no surprises, contracts cease, finishing of installation and commissioning remains, cost was within the full CtC budget allocated
- The bulk part of the planned common resources (CtC A) was now concentrating on the proper detector installation and its services, the equipment of the counting rooms and the commissioning of the common parts. Part of it was dedicated to financing the necessary manpower needs
- Currently, for the various detector assembly activities, including detector integration, ATLAS had at CERN ~110 FTE. 30% of this was directly supported by CERN funds, 70% by the Collaboration (common funds, special programs, etc.). ATLAS asked all collaboration partners to help in keeping this level of effort up until completion (Example: request to CERN for a special crash-program in order to keep Staff and PJAS at today's level). ATLAS acknowledged the great deal of support by many individual institutions in ATLAS
- Various items had entered the M&O phase

#### 4.5 Conclusion

He concluded with the following summary:

- ATLAS was proceeding well and on schedule (master schedule 7.0) with the installation work, targeting spring 2007 for readiness
- The in-time availability of components and services was still the main and critical issue which might affect the overall schedule. ATLAS kept on its “top watch list”, as critical items among others, the readiness of the Endcap, Toroids, the Inner detectors (in particular the end-caps) and the Muon Big Wheels
- 2005 would be very critical for the completion of the Barrel Toroid and the installation of the Inner Detector and Calorimeter services
- ATLAS has had in place and working an effective installation organization for more than 1.5 years. They were just starting now with a similar organization for the commissioning of the detector

The Chairman thanked M. Nessi and asked if there were any questions. There were no questions but M. Nessi directed RRB members to the paper CERN-RRB-2005-017 in which was recorded the status of the expenditure of the common projects. This time there were no new in-kind contributions to report.

#### 5. LHCC Deliberations (paper only)

**E. Tsesmelis, LHCC Scientific Secretary**  
CERN-RRB-2005-020

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

#### 6. Financial Matters

Paper CERN-RRB-2005-012

**P. Geeraert, Head, Finance Department**

Presentation CERN-RRB-2005-049

P. Geeraert presented a financial update on the situation reported in his paper referenced above.

##### 6.1 Status of Common Fund accounts

Recent membership fees contributions to the common fund had come from Italy, Sweden, Belarus, Norway, Turkey, Tapei, Slovakia, Switzerland and Armenia to a total of 295.9 kCHF. A cash contribution of 625.0 kCHF had been received from Germany. Commissioning and integration money to a total of 1010.0 kCHF had been received from CERN, Norway and Tapei. For construction completion a total of 2204 kCHF had been received from CERN, Sweden, Tapei and Slovakia. To offset this, in the same period there were new ATLAS expenditures to a total of 4078 kCHF.

There were outstanding membership fees due from Greece, the only member state which had not paid, and from the non-member states Belarus, Brazil, Georgia, Morocco and Russia, amounting in total to 702 kCHF.

##### 6.2 Status of M&O accounts

Additional contributions to M&O A amounted to 129 kCHF and new expenditure to 69 kCHF. He showed a table summarising the overall status of the M&O A contributions. There were still some 284 kCHF unpaid from 2002-2003, some 324 kCHF unpaid from 2004 and the total as yet not received for 2005 amounted to 2.780 MCHF.

He emphasized the importance of the request of P. Jenni to settle these outstanding contributions as ATLAS was quite close to a cash flow problem.

There being no questions the report of P. Geeraert **was accepted**.

## 7. Construction Budgets

Paper CERN-RRB-2005-018

## M. Nordberg, Resources Co-ordinator

Presentation CERN-RRB-2005-051

### 7.1 Closing report for 2004

M. Nordberg noted that the full tables and detailed explanations were to be found in the paper, whilst the presentation would contain summaries only. His first slide re-stated a number of definitions.

In 2004 there had been commitments for 33.6 MCHF and payments of 52.2 MCHF (see tables 1 and 2 of the paper). He presented a graph of the evolution of the baseline commitments since 1998. All components were above 90%, with some close to 100%, except the trigger DAQ which was at 30 % but picking up. He showed the corresponding evolution of baseline payments. He also showed the cumulative evolutions of the commitments, which amounted at the end of 2004 to more than 430 MCHF, and of the payments which were at the same period about 370 MCHF.

For C&I (cat. A+B) in 2004, contributions at 5.263 MCHF exceeded payments by 1.811 MCHF. He proposed to return to this point later. For CC (cat B) there was a balance of 1.929 MCHF.

The RRB **approved** the 2004 budget report.

### 7.2 Current status for 2005

M. Nordberg reported, for information only, that the 2005 planned commitments amounted to 46.5 MCHF and payments to 75.2 MCHF. For C&I there was a budget deficit of 4.079 MCHF. For CC (cat. B) there was a negative balance of 5.438 MCHF.

### 7.3 Preliminary estimates for 2006

For 2006 total new commitments amounting to 12.2 MCHF were planned, and total project payments were foreseen as 19.3 MCHF. However in the common fund this resulted in an overall negative balance of 6 MCHF. For C&I the planned numbers would produce a deficit of 2.8 MCHF and in CC-B a similar deficit of 1.2 MCHF.

### 7.4 Projected Budget Balance

The projected budget balance (table 17) up to 2007 showed a new situation in the cumulative cash flow. For 2005 and 2006 this cash flow was foreseen to be negative at -6 and -12 MCHF respectively. He reminded the RRB that, since October 2004, the line *deferrals*, had been shifted by the Funding Agencies until later.

After considerable discussion, the meaning of deferrals was clarified. They represented the money redirected by not constructing, in a first step, the full detector as planned. In other words deferrals were with respect to, and included in the original baseline funding. For example the DAQ would not be fully equipped in this first phase and the corresponding money used to cover vital components that needed to be present from start-up. Nonetheless it was clear that the full detector as originally planned would be necessary rather soon after the initial runs or ATLAS would not be able to run at full capacity (for the  $10^{34}$  running). Therefore deferrals represented equipment not purchased but which would be needed to complete ATLAS as planned. This should not be confused with the discussions of a much later high luminosity ATLAS ( $10^{35}$  running).

P. Jenni clarified that, of the 68 MCHF estimated cost to completion, they had presently firm contribution commitments of something like 54 MCHF. The difference of 14 MCHF represented the additional cost needed to complete the original baseline ATLAS, and without it ATLAS would be unable to complete the full TDR detector (for example incomplete trigger DAQ, shielding, and muon chambers).

R. Wade noted that it was very important to understand the consequences of not finding this money if one wished to make a case for it.

M. Nordberg returned to the ATLAS cash flow situation which was getting worse. Three Funding Agencies had made contributions for this year, namely UK, IN2P3 and Denmark. He repeated his requests for help from the Funding Agencies to make:

- their (deferral) contributions available now or sooner than intended
- their full (calculated) part of CtC funding available as soon as possible.

## 8. M&O Budgets

Papers CERN-RRB-2005-008  
CERN-RRB-2005-019

**Resources Manager: M. Nordberg**

Presentation CERN-RRB-2005-051

### 8.1 Approval of Add.1 to the MoU for M&O of the ATLAS Detector: Core Computing

J. Engelen explained that, before discussing in detail the M&O budget requests, there was a new item which ATLAS wished to introduce into the M&O budget, namely the M&O costs related to Core Computing (core services and infrastructure tasks). Core computing has not been included in the M&O budget up to this point, but its inclusion had been foreseen in the M&O agreement from the start. This was separate from the LCG MoU and was experiment specific. It was mainly to pay for manpower for infrastructure and services related to computing in the experiment.

D. Jacobs explained that the common part of the four addenda for the four experiments had been drafted by a task force under his direction, but that the information contained in the annex had come specifically from the ATLAS experiment. J. Engelen clarified that the procedure before the RRB involved two stages. First the RRB was asked to give its approval of the principle of adding these core computing tasks into the M&O costs, and then the M&O Scrutiny Group would examine in detail the related numbers as proposed by the resource coordinators and report to the October RRB for their approval of these costs.

There being no questions or remarks, the addendum, the RRB **approved** the addendum number 1 to the Memorandum of Understanding for the Maintenance and Operation of the ATLAS Detector: Core Computing.

### 8.2 Closing report for 2004, including Status of MoU Signatures

M. Nordberg presented the 2004 M&O budgets for approval and book closing. For category A the contribution and payments were 2.7 and 2.6 MCHF respectively. For category B they were 712 and 735 KCHF. The RRB **approved** these numbers.

M. Nordberg showed the M&O Cat. A overall contribution status by Funding Agency. He noted that the balance at year end 2004 of 1.47 MCHF, excluded remaining commitments of 0.6 MCHF and included some advance payments of 2005 money to a total of 0.750 MCHF. The resultant real balance for M&O A was thus 120 kCHF. The total money received up to the end of 2004 from invoiced contributions was at the 90% level. It was important to make renewed efforts to collect the outstanding money. He repeated his plea to Funding Agencies to pay their bills early in the year since it was necessary for the account to remain positive in order to pay bills.

## Discussion

U. Dosselli noted that when he saw a positive balance in M&O A for a Funding Agency at the end of the year, then naively he would assume that one could subtract this number from the contribution for the next year. Given the cash flow situation in ATLAS, he would not do this, but he felt that the rule should be questioned, and perhaps changed. J. Engelen said that, in practice, the situation was a little more complicated and he was grateful that U. Dosselli did not want to frustrate an already difficult cash flow situation at the moment. However, as a point of principle, his remark was well taken.

R. Wade wished to distinguish between a carry-over in the annually managed M&O accounts and a carry-over in the construction accounts. It was important to resolve this problem now as preparation for the sharp increases foreseen in the M&O costs once the experiment became operational. Part of the cash flow problem came from those not paying, and if this were to be resolved the situation would look a lot healthier. There was no way for a Funding Agency to put pressure on a non-paying Funding Agency, other than by putting pressure on the CERN management by withholding contributions. J. Engelen noted that the non payments were neither negligible nor excessive. Some of the non payments were absolutely not acceptable, and it was a matter of how many official trips had to be made in order to recuperate the money. This was a compromise. Some of the other non payments were a little more complicated and one could perhaps generate equivalent incomes by being a little more creative.

A. Naudi noted that for future RRBs they would make sure that the resource coordinators would show very clearly the differences between commitments that had to be paid and the cash balance.

### **8.3 Preliminary estimates for 2006**

M. Nordberg presented, for information, the preliminary estimates for M&O A and B for 2006 (table 6), information that would be given to the Scrutiny Group for inspection. Firm budget estimated would be given to the RRB in October 2005.

#### **Discussion**

K. Kleinknecht asked whether core computing in category A implied hardware. M. Nordberg replied that this was mostly manpower, with a very small component for replacement of servers.

### **8.4 Concluding Remarks**

M. Nordberg showed a graph of the evolution of M&O 2002-2010. The current estimates were lower than the plan made in October 2001 by about a cumulative 32 MCHF. The status of the ATLAS M&O MoU signatures was such that 32 out of the 38 Funding Agencies had signed and they were waiting for signatures from Belarus, Brazil, Greece, Russia, Serbia, and Switzerland.

#### **Discussion**

L. Gidefeldt asked how ATLAS would deal with the budget deficit of 6 MCHF for this year. M. Nordberg replied that if necessary they would come back to the October RRB.

A. Clark pointed out that the reason why Switzerland had not signed the MoU, was not their unwillingness to sign, but rather that it reflected the difficulty in identifying someone who was in a position to sign the MoU. He expected payments to continue nonetheless in a normal way. He added that the same problem applied to the cost to completion.

J. Engelen thanked M. Nordberg for his presentation,

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

J. Engelen concluded that the ATLAS management had conveyed some very interesting information on the progress of the experiment and on the manner in which they continued to resolve the technical problems that arose which were in reality not trivial.

The remaining shortage of funds for the Cost to Completion was a real problem. For the moment the issue was deferred to the future, but it needed to be solved as soon as possible. There were some recent positive movements and they would welcome positive responses from the remaining Funding Agencies.

The very intense installation effort that had started, and which required a constant manpower effort through to 2007 and into 2008, had led to a request to CERN for additional effort. He could not make any definitive statement at this stage but CERN would make an effort and ATLAS would appreciate a similar effort from the side of the Funding Agencies.

<p>The next RRB meetings in 2005 will take place at CERN on <b>Monday 17<sup>th</sup>, Tuesday 18<sup>th</sup> and Wednesday 19<sup>th</sup> October 2005</b></p>
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There being no questions and no further business, the Chairman thanked the participants and closed the meeting.

## Appendix 1

For this 20<sup>th</sup> Meeting the following papers are available at the Web Site:

<http://committees.web.cern.ch/Committees/LHCRRB/ATLAS/index.html>

### Papers:

<a href="#">Registration-20</a>	Registration Form
<a href="#">CERN-RRB-2005-026</a>	Agenda
<a href="#">CERN-RRB-2004-104</a>	Minutes of the Previous Meeting
CERN-RRB-2005-045	Minutes of this meeting
<a href="#">CERN-RRB-2005-016</a>	Status of the experiment
<a href="#">CERN-RRB-2005-017</a>	Status of Common Projects
<a href="#">CERN-RRB-2005-020</a>	LHCC Deliberations (available April 15th)
<a href="#">CERN-RRB-2005-012</a>	Financial Matters
<a href="#">CERN-RRB-2005-018</a>	Construction Budgets
<a href="#">CERN-RRB-2005-019</a>	M&O Budgets
<a href="#">CERN-RRB-2005-008</a>	Add. 1 to MoU for M&O for ATLAS Detector: Core Computing

### Presentations:

<a href="#">CERN-RRB-2005-048</a>	Status of the experiment
<a href="#">CERN-RRB-2005-049</a>	Financial Matters
<a href="#">CERN-RRB-2005-050</a>	Common Projects
<a href="#">CERN-RRB-2005-051</a>	Construction Budgets and M&O Budgets