



ATLAS

16 June 2008

**Minutes of the 26th LHC Resource Review Board Meeting
(CERN, Geneva, 15th April 2008)**

Present:

M. Rubio (Agencia Nacional De Promocion Cientifica Y Tecnologica, Argentina)
M. Dova (UNLP, Argentina)
G. Taylor (The University of Melbourne, Australia)
A. Ovsat (Institute of Physics, Azerbaijan)
I. Blain (Natural Sciences and Engineering Research Council of Canada, Canada)
W. Davidson (National Research Council of Canada, Canada)
R. Mcpherson (University of Victoria, Canada)
M. Ramírez (CONICYT, Chile)
Y. Zhang (National Natural Science Foundation of China, China)
H. Li (National Natural Science Foundation of China, China)
X. Liu (National Natural Science Foundation of China, China)
H. Sanchez Moreno (Colciencias, Colombia)
M. Losada (UAN, Colombia)
J.D. Hansen (Niels Bohr Institute, Denmark)
F. Le Diberder (CNRS/IN2P3, France)
J. Zinn-Justin (CEA Saclay, IRFU/DIR, France)
B. Mansoulie (CEA Saclay, IRFU, France)
D. Fournier (LAL Orsay, France)
S. Bethke (MPI, Germany)
K. Ehret (DESY/BMBF, Germany)
M. Fleischer (DESY, Germany)
S. Tapprogge (Institute of Physics, Johannes Gutenberg University, Mainz, Germany)
E. Gazis (NTU-Athens, Greece)
E. Rabinovici (Hebrew University, Jeusalem, Israel)
G. Mikenberg (Weizmann Institute of Science, Israel)
U. Dosselli (INFN, Italy)
M. Curatolo (INFN Laboratori Nazionali di Frascati, Italy)
F. Ferroni (INFN, Italy)
H. Iwasaki (KEK, Japan)
K. Saito (Permanent Mission of Japan, Geneva, Japan)
A. Van Rijn (Nikhef, Netherlands)
B. Jacobsen (The Research Council of Norway, Norway)
J. Krolkowski (University of Warsaw, Poland)
M. Turala (IFJ PAN, Poland)
F. Buzatu (Institute of Atomic Physics, Romania)
R. Lednicky (JINR, Russia)
A. Petrov (Permanent Mission of Russia, Geneva, Russia)
V. Savrin (SINP MSU, Russia)
D. Bruncko (IEP SAS Kosice, Slovakia)
M. Mikuz (University of Ljubljana / Jozef Stefan Institute, Slovenia)
J. Fuster (University of Valencia CSIC, Spain)
F. Barreiro (Universidad Autonoma de Madrid, Spain)
P. Karlsson (Swedish Research Council, Sweden)
T. Ekelöf (Uppsala University, Sweden)
A. Clark (DPNC, University of Geneva, Switzerland)
T. Nakada (CHIPP EB member, Switzerland)
S. Lin (Academia Sinica, Taiwan)

S-C. Lee (Institute of Physics, Academia Sinica, Taiwan)
I. Turk Cakir (TAEA, Turkey)
J. Seed (STFC, United Kingdom)
J. Butterworth (University College London, United Kingdom)
T. Ferbel (DOE/University of Rochester, United States Of America)
S. Gonzalez (U.S. Department of Energy, United States Of America)
H. Gordon (Brookhaven National Laboratory, United States Of America)
M. Pripstein (National Science Foundation, United States Of America)
M. Tuts (Columbia University, United States Of America)
G. Lafferty (University of Manchester, Scrutiny Group Chair)

CERN

J. Engelen, R. Aymar, S. Lettow, E. Tsesmelis, D. Jacobs, R. McLaren, J-J. Blaising, J. Salicio-Diez, S. Schmeling, S. Moos, P. Geeraert, E. Van Hove, S. Schmeling, S. Moos, R. Heuer (DESY and CERN Director-General Designate)

ATLAS

F. Gianotti, P. Jenni, M. Nessi, M. Nordberg, S. Stapnes, K. Jon-And, P. Fassnacht,

Apologies

A. Sissakian (JINR, Dubna, Russia)

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. Welcome. J. Engelen, Chief Scientific Officer

J. Engelen welcomed delegates to the 26th 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-2007-119 (report)

The minutes of the last RRB were approved without comment.

3. Status of the experiment (I). M. Nessi, Technical Co-ordinator CERN-RRB-2008-031 (report), CERN-RRB-2008-056 (presentation)

A great deal of progress has taken place since the October RRB:

The two Endcap Toroids have been installed and connected; they have been tested up to 75% of the maximum current.

Installation of all services, cables, pipes, gas, cooling systems and access platforms for the barrel muon spectrometer are complete. All chambers are in place and are connected to services. Hardware and connection of services of all forward muon big wheels is complete and they have been tilted into their final position. In March, both small wheels were installed, connected and brought into operation.

All Calorimeters have been connected, cooled and brought to operation. Retrofitting and re-installation of all power supplies achieved. Retrofitting of all electronics front-end boards achieved.

The TRT and SCT inner trackers have been signed off. The problem of the evaporative cooling system (heaters) has been solved. The in-situ connection of the pixel detector should be completed this week, followed by the final cooling and electrical tests.

The remaining components of the beam pipe are now ready and have been tested in situ to anticipate eventual problems. The last one to be installed contains the LUCID detector.

The main control room is fully operational, including a new videoconference room. Milestone week #6, where all subsystems were present and integrated, has just been successfully completed and the move to continuous operation has begun.

Detector closing operations, which will last about 2 months, have started. Full tests of the magnet system will follow.

The critical path is to sign off the pixels and close the end wall of the inter detector; this should take place in the next 10 days. The barrel will be closed, full magnet tests will take place and steady operation will begin. In parallel, the forward detectors will be closed and the last parts of the beam pipe in the forward region and the EO wheels will be installed.

More and more of the system is moving to operation mode, this includes preventive maintenance which is a heavy load.

M. Nessi went through the detector, system by system; most operations have proceeded as scheduled. The status of each detector was presented, often with cosmic rays allowing first performance measurements.

One unexpected event occurred when at 14.8kA one end-cap toroid moved towards the calorimeter by a few cms. This damaged the cryoline of LAr End-cap. The cause of the incident was that the toroid was not in final position, with the detector open by three meters; this meant that the iron of the calorimeter was much closer to the coil than in the final configuration and the coefficient of friction was incorrect. The LAr damage has now been repaired.

Moving to the TDAQ system; the L1 trigger installation in USA15 has been completed and is now in the final stages of commissioning. Slide 35 showed the DAQ implementation status.

A series of 9 steps toward the final closing of the detector have been defined:

1. Remove/modify scaffolding C + movement
2. Close Calo C
3. Close SW-C + EBA
4. Close SW-A
5. Close ETC-C + VT-A connection
6. Close ETC-A + EO sectors C side
7. JFC1 + VJ-C installation
8. VJ-C completion + VJ-A installation
9. Shielding completion + BW closing

To summarize:

All major detector components are installed and are being commissioned and debugged. Only a few beam pipe sections and the forward shielding are still missing. When the CERN management gives the green light, the detector will be closed.

The critical path is to sign off of the Pixel system and to finalise the commissioning of the Trigger RPC.

The detector control and data flow has been tested for several months with a severe commissioning program. All components were integrated and the entire readout chain was exercised. All systems behaved as expected.

During the next 2 months ATLAS will start staffing the control room in shift mode and the move to continuous operation will begin.

Questions and discussion

M. Pripstein (National Science Foundation, USA) asked if the end-cap toroids had been powered up to full current. M. Nessi replied that they were taken up to 50% and 75% of their maximum current, respectively .

4. Status of the experiment (II). P. Jenni, Spokesperson CERN-RRB-2008-031 (report), CERN-RRB-2008-034 (presentation)

P. Jenni continued the ATLAS Progress Report covering the data acquisition and showing results from the tests of the High Level Trigger. Measurements of the throughput during the Common Computing Readiness Challenge were presented in addition to runs of the Full Dress Rehearsal.

He recalled the Operational model and the Operation Task Sharing, as well as the ATLAS organization which steers R&D for future upgrades. There are now 26 proposals for R&D activities in different stages of approval.

P. Jenni turned to administrative matters. Since last October there have been no formal admissions. Three institutions: Julius-Maximilians-University of Würzburg, Germany, the Palacký University in Olomouc, Czech Republic and the University of Texas at Dallas, U.S.A. have filed their expression of interest to join ATLAS.

Changes to the collaboration's organization chart since the last RRB include: K. Jon-And is now Chairperson of the Collaboration Board, new project leaders are: I. Wingerter-Seez for the LAr Calorimeter, L. Pontecorvo for the Muon Instrumentation) and T. Wengler for Commissioning/Run Coordinator.

On financial affairs, P. Jenni reminded the meeting that in 1995 the Construction Baseline was agreed at 475 MCHF, later updated to 468 MCHF. There was an additional Cost to Completion (accepted in RRB October 2002) of 68.2 MCHF based on the Completion Plan (CERN-RRB-2002-114) and a subsequent Additional CtC identified in 2006 (CERN-RRB-2006-069) 4.4 MCHF. This brought the total costs for the initial detector to 541 MCHF.

Today the missing funds are:

For the initial detector; Construction Baseline, mainly Common Fund, 7.2 MCHF of which 2.6 MCHF are in progress of being paid, and 4.6 MCHF remain at risk.

For the 2002 Cost to Completion (CC and C&I) 9.2 MCHF of which 2.8 MCHF are in progress of being paid, and assuming that the U.S. will provide their remaining 4.5 MCHF on a best effort basis, only 2 MCHF remain at risk.

P. Jenni stressed that all these resources, already specified in the 2002 completion plan, are essential to complete the initial detector.

Note for planning purposes that the following items are not included:

- Additional manpower costs of 200-250 kCHF per month due to delayed beam pipe closure (initially estimated as August 2007). These are not all charged to CtC, being partially covered. These costs must be properly assessed at the end of the installation.
- There is no provision for future 'force majeure' cost overruns.
- Re-scoping of the design-luminosity detector, estimated material cost of parts not included in present initial detector (CERN-RRB-2002-114) 20 MCHF.
- Forward detectors parts (luminosity) not funded yet 1.5 MCHF.

Moving on to look at physics at ATLAS, P. Jenni mentioned that the physics potential has been re-assessed with the most realistic detector performance knowledge. It is being documented in a book of about 2,500 pages. To illustrate the high expectations he showed two examples for the Higgs boson search and for the search of Supersymmetry.

P. Jenni concluded by saying that

- The ATLAS project has proceeded within the framework of the accepted 2002 Completion Plan, all the resources requested in that framework are needed to complete the initial detector. This would also be sufficient to cover the additional CtC costs as reported in 2006.
- Construction and installation are now ending, and the emphasis has strongly shifted onto the commissioning and the start of operation.
- Very major software, computing, trigger, data preparation and physics activities are underway, demonstrating readiness for exploiting the LHC data.
- The worldwide LHC Computing Grid (WLCG) is the essential backbone for the ATLAS distributed computing resources needed for the Analysis Model.

Questions and discussion

J. Engelen asked what rules were applied for groups joining the collaboration. P. Jenni replied that there was a membership fee. Especially important was that the new members

should enhance the scientific life of ATLAS. Also, for the first two years, new groups were requested to take a larger share of operation tasks.

I. Blain (NSERC, Canada) was the bearer of good news. Physicists in Canada have been very active trying to find new funds for ATLAS. In the 2008 competition of NSERC grants the McGill group, headed by Brigitte Vachon, had been granted an award of 1.58M Canadian Dollars (1.52 MCHF). This is earmarked for hardware for the high level trigger system. J. Engelen and P. Jenni expressed their gratitude for the hard work of all those involved in obtaining this grant.

M. Pripstein (NSF, USA) asked if finishing the commissioning of the muon RPC was critical. M. Nessi replied that this was an essential part of the trigger system, and every effort would be made to complete the commissioning.

Looking at the Updated Financial Overview (slide 42) and in particular at the numbers in red (missing funds for the initial detector) J. Engelen asked if this was serious and, if so, what measures would be taken to improve the situation before the next RRB. P. Jenni replied that this was serious and that the missing contributions were essential. One substantial part was the resources from the Russian collaborators for which there is a plan but this was over a long timescale. In the worse case, the only solution would be to reduce the processing power of the DAQ system. However, bearing in mind the overall cost of the experiment, P. Jenni felt that it would be a tragedy not to be able to fully exploit its full potential. J. Engelen requested, and P. Jenni agreed, that further steps should be made to resolve this problem with the aim of presenting a more definitive picture before the next RRB.

U. Dosselli (INFN, Italy) announced that Italy will pay 50% of the CtC debt before the next RRB, the remainder at the beginning of 2009.

5. LHCC deliberations (paper only). E. Tsesmelis, LHCC Scientific Secretary
CERN-RRB-2008-014 (report)

J. Engelen noted that the RRB should take into consideration the paper on the LHCC deliberations provided by the scientific secretary of the LHCC, E. Tsesmelis. The contents were consistent with the previous presentations and confirmed that the LHCC was in agreement with the reports. Delegates had no further comments to make and the RRB took note of the report.

6. Financial matters P. Geeraert, Head, CERN Finance Dept.
CERN-RRB-2008-002 (paper), CERN-RRB-2008-007 (presentation)

P. Geeraert presented an update to the financial report. In the document the common fund deficit was 7.8 MCHF at the end of February. Contributions of a total of 273 kCHF from the US and JINR have recently been received.

Outstanding contributions are down from 11.3 MCHF at the last RRB to the current figure of 9.9 MCHF, not including the Canadian and Italian payments.

On M&O A. Contributions have been received from the United Kingdom, Germany, Sweden, China, Romania, Argentina and the Czech Republic for a total of 1.87 MCHF. Outstanding Contributions from Member states total 3.9 MCHF. These are mostly 2008

contributions but Italy and Portugal have debts outstanding for 2002-2007. For non-Member States, the total of unpaid contributions is 812 kCHF for 2002-2007 and 5.0 MCHF for 2008.

Questions and discussion

U. Dosselli (INFN, Italy) stated that the outstanding contribution from Italy from 2007 will be paid before the end of May.

E. Gazis (NTU-Athens, Greece) stated that the Greek contribution has arrived at CERN and should be transferred to ATLAS account.

J. Engelen asked how the Finance department planned to deal with the deficit. P. Geeraert replied that this was a difficult time for CERN and the only option was to take out a loan, which is expensive for the organisation.

7. Construction Budgets M. Nordberg, Resources Co-ordinator
CERN-RRB-2008-033 (report), CERN-RRB-2008-036 (presentation)

Closing report for 2007

M. Nordberg showed graphs of the evolution of the commitments and the payments. Total payments of the baseline in 2007 were 15.1 MCHF with a large percentage in the common fund. Total contributions were 9.6 MCHF. This resulted in a negative cash balance of almost 6 MCHF.

C&I and CC payments for 2007.

Total payments were 553 kCHF. The income was 2.0 MCHF with a positive cash balance of 1.4 MCHF. 2007 was the last year for these activities.

For Construction Completion Cat B. (CC-B); total payments were 3.3 MCHF, income was 0.5 MCHF, showing a cash deficit of 2.7 MCHF.

This is also the last year for CC activities

2008 status (for information)

For the baseline, with the exception of TDAQ, all subsystems are finished. If all missing contributions are paid in 2008, income will be 10.2 MCHF. This is unrealistic and a gap of 5 MCHF is expected.

Annex II shows the remaining common fund contribution per funding agency, a total of 7 MCHF remaining. Outstanding CtC contributions total 3.2 MCHF .

Table 17 summarises the situation and is reproduced below.

PAYMENTS	95-01	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Baseline + CC(A)	231	71	56	52	43	29	19	5	2	2	509
<i>of which deferrals</i>					-3	-2	-4				-9
C&I (A+B)	0	1	3	4	9	2	1	0			21
CC (B)		1	1	1	4	2	3				12
TOTAL	231	73	61	57	54	30	19	5	2	2	532
INCOME	95-01	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Baseline + CC(A)	252	65	55	54	33	15	13	7	2	1	495
C&I (A+B)		1	9	3	4	4	2	0			23
CC (B)		2	4	2	1	2	0	0			11
TOTAL	252	68	68	59	38	20	15	8	2	1	529
BUDGET BALANCE	21	-5	7	2	-15	-11	-4	3	0	-1	-3
CUMULATIVE	21	15	23	25	9	-1	-6	-3	-3	-3	
CUMULATIVE (OCTOBER 2007)	21	15	23	25	9	-1	-7				

These figures are not pledges, but what is expected to be received by the management. 532 MCHF is committed but income is only 529 MCHF. This results in a projected deficit of 3 MCHF up to the end of 2010. The cumulative deficit thus amounts to -6 MCHF for 2007. The only way to balance the budget would be to reduce the funds available to TDAQ by 3 MCHF, this corresponds to the remaining un-committed funds showed earlier.

M Nordberg explained that the deficit is due to missing or due contributions. The Canadian news will help the situation, and the delay in the US is due to a procedural complication. P. Jenni had already explained the situation concerning Russia and Dubna.

Technical problems were encountered in heaters and electronics of the Inner Detector. Costs related to repairs have been dealt with through M&O repairs and additional help from Funding Agencies.

Financial plans assumed that operations would start in August 2007. Rescheduling has resulted in "standing army" costs of ca. 250 kCHF per month. The total cost impact on ATLAS is still unknown but CERN is helping and more details will be presented in the next RRB. M. Nordberg also thanked those "modest" funding agencies, wishing to stay anonymous, who were making advance contributions to help the situation.

8. M&O Budgets M. Nordberg, Resources Co-ordinator CERN-RRB-2008-035 (report)

Closing report for 2007

For Cat. A, the total payments were 10.5 MCHF. The dominant cost drivers were technical services linked to the operation of the experiment; manpower, gases, cooling and electricity. The second largest cost is the operation of the magnet which is expensive in terms of manpower and consumables. Other costs were Core computing, which is basically in-kind and the On-line system.

Turning to Cat. B, the total was 6.7 MCHF. The largest costs were again services, manpower and replacement of electronics in tile and LAr. 87 FTEs core computing was in-kind. Gases and coolants have been moved to Cat. A.

Preliminary budgets for 2009

The Cat. A budget is estimated at 16.3 MCHF. The cost drivers being technical services, magnet operation, core computing, On-line and energy. The relative costs are similar, percentage-wise to 2007. However the overall budget is increased to allow for full operational cost.

The Cat. B budget is estimated at 7.3 MCHF. The cost drivers are technical services and replacement of electronics. As a reminder, the cost of detector gases and coolants are now all in Cat. A.

Status of M&O Contributions

The status of Cat. A contributions on 14th April 2008 is: Italy - resolved following the earlier announcement, Portugal - money being paid, Armenia - under discussion, Belarus- invoices sent, China - resolved, Morocco - working on solution, Romania - paid, JINR - working on a solution, Russia - paying slowly. The same remarks apply to M&O Cat. B contributions.

Status of M&O Signatures

Brazil is contributing but the final paperwork is still on-going.

To conclude, M. Nordberg reminded the RRB that the final 2007 M&O numbers are for approval, 2009 figures are estimates for information. There being no objection, J. Engelen considered the figures were approved.

9. Summary J. Engelen, Chief Scientific Officer

J. Engelen summarised that the technical and organisational report was very positive and demonstrated that ATLAS was almost ready for operation. On the financial side, there is a problem of missing investment of cost to completion. There had been positive developments but a better understanding of the situation should be presented at the November RRB.

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