



**Minutes of the 19th Resources Review Board Meeting
Held at CERN on 24th October 2007**

Present:

Europe

F. Le Diberder (IN2P3, Paris, France), E. Aslanides
J. Zinn-Justin (CEA/DSM/DAPNIA, France)
K. Ehret (BMBF, Bonn, Germany)
F. Ferroni (INFN, Rome, Italy), P. Campana
F. Linde (NIKHEF, Amsterdam, Netherlands), A. van Rijn
J. Królikowski (University of Warsaw, Warsaw, Poland), G. Polok
F-D. Buzatu (National Institute for Physics, Bucharest, Romania), L. Puscaragiu (Romanian Mission)
V. Savrin (Ministry of Science and Technology, Moscow, Russia)
J. Fuster (MEC, Madrid), L. Garrido (University of Barcelona, Spain)
A. Bay (EPFL, Switzerland)
J. Seed (STFC, Swindon, United Kingdom), V. Gibson

North America

M. Pripstein (NSF, Washington), J. Whitmore

Asia

Y. Zhang (National Science Foundation, China), P. Ji

CERN

J.-J. Blaising, J. Engelen (chairman), D. Jacobs, C. Jones (secretary), S. Lettow, B. Salami (repl. P. Geeraert), J. Salicio Diez, S. Schmeling, E. Tsesmelis, E. Van Hove, F. Sonneman¹⁾

LHCb

R. Forty, A. Golutvin, T. Nakada, M. Pepe-Altarelli, A. Smith, O. Ullaland, W. Witzeling

G. Lafferty (Chairman of the M&O Scrutiny Group)

19th Meeting of the LHCb Resources Review Board RRB, 24th October 2007**1. Introduction****J. Engelen, Chief Scientific Officer**

J. Engelen welcomed the delegates to the 19th meeting of the LHCb resources review board.

2. Approval of the Minutes of the 18th Meeting (CERN-RRB-2007-005)

The minutes of the 18th meeting were **approved** without comment. J. Engelen thanked C. Jones for having taken these minutes. There were no matters arising.

3. Status of the Experiment**T. Nakada, Spokesperson**

Paper CERN-RRB-2007-095

Presentation CERN-RRB-2007-096

T. Nakada presented a status report on the LHCb experiment. He divided his talk into four parts namely: Construction and Installation, Costs and Funding, Collaboration Items and conclusions.

3.1 Construction Status

T. Nakada presented the LHCb construction status in detail and this information can be found both in his paper and his presentation referenced above. This information is not summarized further in these minutes with the exception of the major points in the conclusions below.

3.2 Cost and Funding

T. Nakada highlighted the changes since the previous RRB in April 2007. The overall cost had remained at 75.341 MCHF. They had received new contributions from US-NSF via Syracuse for computers; \$ 200 k in November 2007 and a similar sum one year later. This solved the problem of a shortfall in CPU and brought the total USA contribution to 1.04 MCHF. The total pledged funding was now at 75.324 MCHF as shown by Funding Agency in slide 28.

T. Nakada then turned to the question of the VELO full replacement detectors. All of the 42 sensor modules needed replacement after an integrated radiation of around 6 fb^{-1} . This had been pointed out in the TDR. This was far beyond the typical level of spares which was at the 10 to 15% level. The Collaboration Board considered that it was reasonable that these costs be partly shared by the collaboration.

The cost of the total project 3.6 MCHF, of which 2.3 MCHF was for manpower and infrastructure, 1 MCHF was the total material cost and 0.3 MCHF covered the overhead for an accelerated production in order to complete the production by 2010. The manpower and infrastructure would be covered by UK. An additional 0.8 MCHF had already either been allocated or requested from within the VELO project. This was made up in detail from UK-Liverpool (300 kCHF approved and 200 kCHF requested as their M&O Category B contribution) and CH-EPFL (who had requested 300 kCHF as their additional contribution to the project). There remained 0.5 MCHF which it was proposed to share over 5 years, pro rata around the Collaboration.

It was now considered that after full exposure the silicon sensors and detector bases could be active and might need to follow lengthy radiation safety procedures for the replacement operation, e.g. a cool down period. Limited working hours, restricted working space, etc. In other words the replacement operation might take longer than the normal annual shutdown. In such a case having two pre-mounted detector halves would be an advantage but would require two new detector bases at a cost of around 0.9 MCHF. This decision should be taken in a couple of years with a better knowledge of the irradiation at LHC.

A second issue was the replacement of UX85/3, the third Be section of the beam pipe. There had been leaks due to the non-conformal Be material which had been fixed by varnishing in order to be

operational. There was no long term guarantee that this solution would continue to work under irradiation. Together with the CERN Vacuum Group, responsible for the procurement and operation, they were discussing with the original manufacturer, using better material. For this R&D was needed, possibly with Russian funding. They were also discussing with an alternative manufacturer. If the first approach were successful then the cost could be covered by CERN. If the second solution was chosen then additional funding might be needed. It was planned to clarify this situation by the RRB of April 2008.

3.3 Collaboration Issues

T. Nakada noted that there was a new collaborator, University College Dublin (see slide 32). This was important since there was no established HEP programme in Ireland and official participation in an LHC experiment would help to develop HEP activities and funding. University College Dublin had already been working with LHCb as a Technical Associate and had done very useful work.

A new spokesperson had been elected in September 2007: Andrey Golutvin, ITEP Moscow, Russia and he would take over from T. Nakada as of 1 May 2008.

3.4 Conclusions

T. Nakada concluded as follows:

- 1) The remaining installation for VELO modules, TT ladders, RICH-1 photon detectors and IT boxes would be complete by the end of 2007, and M1 chambers by the end of March 2008. Commissioning had started for many sub-detectors. Computing and physics preparation for data were ongoing.
- 2) The schedule was still tight, in particular, for the installation of IT, RICH-1 mechanics integration, and M1 installation.
- 3) With further additional contributions of \$ 400 k from US-NSF, the CPU farm was basically financed, and there were no missing funds for the detector. However, the replacement of the vacuum pipe replacement might require additional money, depending on the manufacturer, and the VELO replacement modules for running beyond 6 fb^{-1} needed 500 kCHF from the collaboration.

Discussion

J. Engelen thanked T. Nakada for his clear and comprehensive presentation of the experiment and the finances. He asked if there were any questions on the technical part of this presentation or on the related paper, from the LHCC secretary E. Tsesmelis, giving the LHCC deliberations.

K. Ehret asked whether the tight schedule was a question of material availability or manpower. T. Nakada replied that for the inner tracker this was not really a manpower issue, it was more the number of things still to be done one after the other. W. Witzeling added that for the M1, which was somewhat late, there had not been enough designers and engineers to work on parts of the detector in parallel.

M. Pripstein was gratified that they had found a solution for the gain loss issue, but intrigued to know what led them to use Araldite as the glue. T. Nakada noted that ageing tests had been performed with these chambers and they saw no ageing effect. In this case the problem was not really one of ageing but rather some form of deposit on the wires.

J. Engelen asked how they would commission the system given that they were not blessed with cosmic rays. T. Nakada agreed they had insufficient cosmic going from the VELO down to the muon detector but they thought that they had sufficient rate to align parts of the detector in other ways which he described.

J. Engelen then proposed to move to discussions of finance. Good progress had been made for the global funding.

M. Pripstein noted that, in the replacement of the VELO modules, they had made a logical virtue of the fact that, since the infrastructure for building the modules was already setup, then they might as well go ahead and make the spares. Yet they seemed to be paying a penalty of 0.3 MCHF for an accelerated production. T. Nakada replied that they had originally foreseen to replace up to half the modules, and to build these over 5 or 6 years. Now they needed to replace all the modules, and build them over 3 years. J. Engelen asked whether they would replace the modules with the same sensors or more radiation-hard sensors. T. Nakada replied that they would stick to the same sensors or they would have to start R&D again. J. Engelen wondered then whether, should LHCb continue long enough, they would need a third VELO. T. Nakada replied that their original physics programme was around $10\text{-}15\text{ fb}^{-1}$ and two VELOs should be enough.

F. Linde asked for a breakdown between materials and manpower since he considered that more than 1 MCHF for 42 sensors was incredibly expensive. T. Nakada explained that this was 100% materials but this was not just sensors. There were sensors and two hybrids and carbon fibre feet and couplings. J. Engelen proposed that, before asking this Board to make a decision, the LHCC should look at this situation and produce an independent report.

F. Ferroni was not happy with the way in which the money was being asked. This detector had a lifetime which was known when they decided to build it. The groups that took the responsibility to construct this detector knew that this was not going to last the lifetime of the experiment. They knew that they had to build a second VELO. The normal process was that the group that built also maintained. Italy had not participated in the VELO and they did not like the philosophy that they now had to pay even if this was not a great deal of money. Furthermore it created a precedent that the whole collaboration should pay for replacements. The decision was delayed until the next meeting but at the present time he was not very positive.

On the other hand F. Ferroni was very pleased with the financial situation of the experiment and he wished to thank his USA colleague for finding the money as had been requested strongly at the previous RRB. He also wished to thank T. Nakada for all he had done as spokesman and hoped they would find a suitable way to thank him correctly at his last meeting as spokesman in April 2008.

J. Engelen summarized the discussion by noting that they would have the costing of the VELO reviewed by reviving a procedure that had been in place for the LHCC such that at the next meeting they could have a quantitative discussion and also a discussion on principle. T. Nakada wished to go ahead in the meantime because of certain long lead times. J. Engelen thought the situation was very clear, the problem had been known for a long time, and if they thought that on the basis of funds that they have that they could proceed then it was on their own responsibility. However the RRB wished to review this properly. F. Le Diberder expressed support for LHCb in practice, whatever the situation in principle.

4. LHCC Deliberations (paper only)

Paper CERN-RRB-2007-099

E. Tsemelis, LHCC Scientific Secretary

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

5. Financial matters

Paper CERN-RRB-2007-097

B. Salami, CERN Finance Dept.

Presentation CERN-RRB-2007-098

5.1 Status of Common Fund accounts

B. Salami presented an update to his financial report giving transactions as from the end of August 2007. An additional contribution to the Common Fund of 180 kCHF had been received from Switzerland. Outstanding contributions to the Common Fund for a total of 590 kCHF were owed by Italy, Romania and Ukraine.

5.2 Status of M&O accounts

Additional contributions to M&O-A had been received from Spain and China for 128 kCHF. Outstanding contributions to the M&O-A up to the end of 2006, totalling 115 kCHF, were owed by Spain, Russia and Ukraine. For 2007 a further 700 kCHF was still outstanding.

Discussion

J. Engelen thanked B. Salami for his presentation and asked whether there were any questions or comments. P. Campana noted that the Italian contributions were underway.

6. Construction Budgets

Paper CERN-RRB-2007-091

O. Ullaland, Resources Coordinator

Presentation CERN-RRB-2007-092

This was the first meeting where O. Ullaland had taken over from A. Smith as the Resources Coordinator of LHCb. The spending and commitment of the Common Fund at the end of August 2007 amounted to 1.58 MCHF spent and 0.67 MCHF committed. Spending on infrastructure, which covered the installation costs for the fixed cabling as well as structures and other common items, had already been substantial and would continue at about the same rate throughout this year. The detectors covered by funds from the Common Fund have either spent the funds available or were in commissioning phase. About 1.8 MCHF was still uncommitted at the end of August.

Most of the CORE spending came to an end in 2006. The last delivery of HPDs for the RICHs was completed in the first half of 2007 and some payments were still expected. The Muon chamber production was approaching the end, but some CORE funding was still required. Purchasing for DAQ and data storage would continue at about the same rate throughout 2007 and 2008 and would be funded by CORE and non-CORE resources. No additional requests for funds were foreseen to be presented to RRB.

Discussion was postponed until after the M&O presentation.

7. M&O Budget

Paper CERN-RRB-2007-093

A. Smith, Resources Manager

Presentation CERN-RRB-2007-092

7.1 M&O Draft Budget for 2008

O. Ullaland presented the draft M&O-A budget for 2008, as discussed with the Scrutiny Group whom he thanked for their helpful remarks. There were very small adjustments compared to this year. There was a new collaborating institute in University College, Dublin. The power estimate was changed to reflect scheduling changes of LHC and thereby the overestimate for 2007. Slide 4 gave the sharing between the Funding Agencies.

There were no known changes in the M&O-B budget, apart from an agreement at the LHCb Collaboration Board in September to fund the missing 500 kCHF as a special contribution shared between all LHCb collaborators to cover part of the cost for VELO spares. The total cost was estimated to be 3.6 MCHF, of which 3.1 MCHF was expected to be financed within the VELO project. It was proposed to ask all of the Collaboration to cover the remaining 0.5 MCHF as an exceptional contribution to be spread over five years, and shared as given in the table on slide 5.

7.2 M&O Scrutiny Group Report

Paper CERN-RRB-2007-112

G. Lafferty, Scrutiny Group Chair

G. Lafferty, chairman of the M&O Scrutiny Group, presented some remarks specific to the LHCb experiment, having already presented the general part of his report during the RRB Plenary Session. The Scrutiny Group held three meetings over the summer with A. Smith and O. Ullaland. The costs for 2008 had been reduced to reflect the fact that the engineering run did not take place and hence gave rise to savings. Service agreements were increasing significantly for all

experiments and would remain a topic for the Scrutiny Group for future years. Currently they were satisfied with these costs.

Pool rental items had reached a significant sum in Category A and this should be looked at. Where possible items should be moved into M&O-B with the rational of obliging specific sub-detectors to take ownership of the rental items and consider whether they really needed them.

The on-line system would be at 20% in 2008 but at 100% in 2009 which was a rapid build-up. This implied high replacement costs in the time frame 2-11-2012. It was hoped that some way could be found to smooth this.

Overall the Scrutiny Group was happy with the proposals and recommended the approval of the ALICE 2008 M&O Budget.

Discussion

J. Engelen thanked G. Lafferty for report and for the work of the Scrutiny Group. He asked for any comments or questions. M. Pripstein queried why the power for 2008 was only half of that requested for 2007. O. Ullaland replied that there had been no engineering run in 2007 as previously foreseen and the savings in power had been subtracted from the 2008 request. There being no further questions the LHCb M&O-A Budget for 2008 was **approved**,

8. Composition of the Scrutiny Group in 2008 J. Engelen

J. Engelen returned to the issue raised in the Plenary Session by G. Lafferty, namely that of replacing some members of the Scrutiny Group whose term of appointment was at an end. J. Engelen was looking for a replacement for the scientific secretary. He was also still looking for a delegate to represent the smaller member states. The USA had already started the process of selecting a candidate to replace the USA member and would provide the name shortly. There was also a member need to represent France or perhaps a large member state.

G. Lafferty emphasized the importance of finding members who would perform this work seriously and willingly. J. Engelen would communicate with members of the RRB via email whilst they were establishing the new composition.

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

J. Engelen considered that they had received a very good and thorough report by the Spokesperson and also the Resource Coordinator. There was an action for the next meeting where they would receive a scrutinized report from the LHCC concerning the VELO replacement. There had been good progress with the NSF participation in LHCb and he recognized the work done by the NSF representative M. Pripstein. Technically the experiment was making very good progress which should be ready in 2008 to receive data.

The next RRB meetings in 2008 are provisionally scheduled to take place at CERN on
Monday 14th, Tuesday 15th and Wednesday 16th April 2008
and on
Monday 10th, Tuesday 11th and Wednesday 12th November 2008

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

C. Jones
November 2007