

**Minutes of the 31<sup>st</sup> Plenary Meeting of the LHC Resource Review Boards (RRB)**  
**(CERN, Geneva, 11<sup>th</sup> October 2010)**

**1. Welcome.** S. Bertolucci, Director for Research and Scientific Computing

S. Bertolucci welcomed delegates to the 31st Plenary meeting of the RRB.

*The minutes of the April Plenary Session CERN-RRB-2010-061 were approved.*

**2. CERN Status and News.** R. Heuer, Director-General (DG)

Discussions on the CERN budget had resulted in a good compromise between budget reductions and scientific progress. It had been necessary to accept reductions in the contributions from the Member States, the obligation to pay back the budget deficit and the requirement to balance the Pension Fund and health insurance. At the same time, it was important to maintain a strong scientific programme. Thanks to fruitful discussions with the Member States, a good compromise had been reached. Over the next five years; the budget would be reduced by 135 MCHF and the Pension and health insurance would receive 300 MCHF. The reduced budget would result in some changes in the consolidation programme, which nevertheless would remain aggressive. There would be a slowdown of some of the programmes but there was no risk to the LHC.

There is a general programme for the operation of the LHC for the next two decades. The first decade would bring the machine up to the design luminosity. After a long shutdown and upgrades in 2020, LHC would move into the high luminosity,  $5 \cdot 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ , decade. In order to match this timescale, R&D for detectors must start immediately and the funding must be made available accordingly. The DG then gave details of the plan for this decade, with the caveat that new physics could change the timescales:

- 2010 - Run to end of October, then heavy ion. Aim for a peak luminosity of  $10^{32} \text{ cm}^{-2} \text{ s}^{-1}$
- 2011 - 1 fb<sup>-1</sup> per experiment
- 2012 - 15 month shutdown
- 2013 - Physics
- 2016 - Shutdown improving machine and experiments
- 2017, 18, 19 - Physics

Returning to budgetary issues, all accelerators would stop in 2012 to save money and manpower. LINAC refurbishing would be slowed down. CLIC would not have a budget cut, but would have a reduction in the increase of the budget. Outside partners will hopefully contribute to these new projects; as an example Australia will participate in CLIC.

Five new countries have applied for membership of CERN. If approved by the December Council final negotiations will take place. The criteria for Associate membership (non-European countries) has been already been approved by Council and Brazil has signed a letter of intent.

### 3. LHC Status Report. R. Bailey, LHC Operations

R. Bailey gave an in depth presentation of the current status of the LHC, focussing on four main topics:

- Early Beam Operation
- Strategy and Progress so far
- Observations
- Issues

He concluded by summarising:

- Limited in 2010
  - 3.5 TeV per beam
  - 20% intensity
  - $\beta^* > 2$  m
- Started with safe beams
  - Qualified machine protection systems
- First collisions at 7 TeV March 30
- Three phases for physics thereafter
  - Low bunch current, increase kb
  - Nominal bunch current, increase kb up to limit without Xing angle
  - Nominal bunch current, 150ns trains, increase kb to limit of ring (~400)
- 4 orders of magnitude L improvement in 6 months
  - Highest Luminosity so far  $\sim 9 \cdot 10^{31} \text{ cm}^{-2} \text{ s}^{-1}$
- Factor 2 more to go to be ready for 2011 campaign
- Possibility to operate in high beam-beam regime
- Starting to see intensity related effects

*There were no comments or questions on this presentation.*

### 4. M&O Scrutiny Group (SG) Report. B. Loehr, Chairman CERN-RRB-2010-070 (report), slides

B. Loehr reminded delegates of the composition of the Scrutiny Group for 2010 and thanked the members and the resource coordinators for their hard work. He gave some introductory remarks before moving on to the scrutiny of each experiment. For each experiment he reported on the closing report, the request for 2011 M&O A and projections to 2014, highlighting the main cost items and major points of discussion.

In summary, the Scrutiny Group made the following recommendations:

ALICE:

The SG recommends the approval of the ALICE closing report for 2009 and the M&O A budget request for 2011.

ATLAS:

The SG recommends the approval of the ATLAS closing reports for M&O A and M&O B of 2009.  
The SG recommends the approval of the M&O B budget request for 2011.  
The recommendation of the 2011 budgets for the IBL and for the consolidation of the Inner Detector cooling are contingent on the approval of these projects by the LHCC.

CMS:

The SG recommends the approval of the CMS closing report for M&O A of 2009 and of the M&O A budget request for 2011.

LHCb:

The SG recommends the approval of the LHCb closing report for 2009 and the M&O A budget request for 2011.

TOTEM:

The Scrutiny Group recommends that TOTEM and CMS formalize their financial inter-dependence.  
The SG recommends the approval of the TOTEM closing report for 2009 and the M&O A budget request for 2011.

Turning to collaborative tools, B. Loehr summarised the discussions about collaborative tools. Presently a commercial system, VIDYO, is being evaluated by the IT-Division and the LHC experiments as an alternative to EVO. The previous assumption was that a one-time license fee will have to be paid for VIDYO which will be borne by CERN. Following the advice of the DRC, the experiments had planned for 50% of last year's EVO costs for 2010 and nothing for the following years. Recent news from IT indicates that permanent costs will also arise for VIDYO, however, less than for EVO.

It is not yet decided to what extent the experiments will be charged if VIDYO will be chosen to replace EVO.

The experiments face considerable expenses for installation and training courses which are related to personnel and radiation safety. These costs are now collected under a new level-2 item, Safety, which is different from the existing one, Detector Safety Systems.

On the issue of On-line hardware replacement, the DRC and the Scrutiny Group had previously questioned the validity of the Agreement between LHC experiments and CERN management on replacement policy dated 6 September 2004. It was decided to review the model with all LHC experiments together after they gained some experience with real data taking. The LHC experiments agree to this but insist that the revision will be done in a uniform process for all experiments.

The Scrutiny Group strongly suggests that requests for the 2012 budget, to be made in April 2011, should be based on a revised model.

The DRC and the Scrutiny Group have agreed that a revision process will be started this year and a new model will be worked out by the end of February 2011.

Accidents and unexpected urgent repairs can happen again anytime and it is important to have a mechanism which assures the early transmission of information to and from the CERN management, the Funding Agencies and the Scrutiny Group.

The Scrutiny Group recommends the installation of a mechanism which addresses the financial aspect of unexpected events which require immediate spending of a larger amount of money not foreseen in the budget.

Looking at “fluctuating budgets” vs. “flat budgets”. The SG predicted that the real spending profiles for M&O A will be fluctuating considerably due to:

- DAQ systems are being completed leading to periodic replacement costs;
- Operating scenario of LHC with long shutdown only every third year;
- Several large consolidation projects in experiments over the coming years.

The Scrutiny Group seeks advice from the RRBs regarding the future procedure.

Finally concerning the composition of the Scrutiny Group, five members of the present Scrutiny Group have reached the end of their 3 year appointment:

G. Batigniani (INFN Pisa)  
M. Davenport (CERN)  
C. Diaconu (Marseille )  
G. Ginther (FNAL, Rochester)  
E. Tsesmelis (CERN)

B. Loehr, on behalf of the Scrutiny Group, thanked these members for their invaluable contributions to its work. He added that the success of this year’s scrutiny process has been made possible by the fruitful cooperation of the Resource Coordinators and the management of the LHC experiment’s Collaborations, and the excellent material they have provided.

*S. Bertolucci stated that VIDYO was being evaluated and tests would be complete early 2011. At present CERN was considering bearing the cost of the license and of the maintenance. The transition from EVO would need staging with an overlap of 6 or 12 months.*

*On the topic of “Fluctuating budgets” vs. “flat budgets”, he prefers the “flat budget”. For a related issue, the On-line hardware replacement, a committee will be set up to draft a proposal for consideration by the RRB in 2011.*

*G. Tonelli thanked the Scrutiny Group for the hard work done in a difficult year. He stated that the whilst the most urgent items had been included in the upgrade projects, the profile for 2012, 2013, 2014 has to be reviewed.*

*P. Chomaz (CEA) stated that he has not yet the final budget for 2011 but, given the financial crisis, he foresees significant cuts. He asked the working group to consider defining a strategy to address a possible reduction of 10-20% in M&Os.*

*A. Medland also thanked the Scrutiny Group for their thorough report and analysis. He regretted the lack of time to discuss the details. He noted that there were differences in reporting practices of the experiments and*

*asked if the Scrutiny Group had comments. B. Loehr replied that overall procedures were similar; however the approach to Upgrade Projects should be more standardised.*

*The Italian delegation was concerned with increasing costs of experiments. They considered that the impact of the financial crisis should be considered by the management.*

*The German delegation also thanked the Scrutiny Group. They found it hard to understand that M&O B was scrutinised only for ATLAS; they would propose that the M&O B costs were scrutinised for all experiments. B. Loehr reminded the meeting that the current mandate was to only look into M&O A. R. Heuer recommended that this matter was revisited in the CMS RRB. N.B. After further discussion during the CMS RRB the chairman of the RRBs advised the Scrutiny Group to perform the M&O B scrutiny process for all experiments in 2011.*

## **5. Summary.** S. Bertolucci, Director for Research and Scientific Computing

S. Bertolucci thanked the members of the Scrutiny group for their excellent work.