

**Minutes of the 38th Plenary Meeting of the LHC Resource Review Boards (RRB)
(CERN, Geneva, 28th April 2014)**

Documents and slides of all presentations can be found on the RRB indico pages; accessible via the LHC-RRB home page

<http://cern.ch/committees/all/welcomeLHCRRB.html>

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

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

The minutes of the last Plenary Session CERN-RRB-2013-134 were approved.

2. CERN Status and News. S. Bertolucci, Director for Research and Scientific Computing

The experiments are progressing well and are fast approaching the end of LS1. Precise reports will be given during the RRBs dedicated to the experiments. The injectors will restart soon and we are looking forward to the exciting things Run 2 will bring.

The experiments are also doing very well in preparing their TDR MoU's for Phase I. The procedure to scrutinize the cost of their proposals by the newly formed LHCC Upgrade Cost Group is working well. The UCG has a representation of independent people from the committees and representatives from the LHCC and from the Scrutiny group of the RRB. They had a large amount of work because some of the TDRs had already been submitted before the formation of the UCG but now they are up to date.

The FAs had requested greater clarity and involvement in the experiment upgrade strategy and funding approval process and a number of FA's had jointly written to S. Bertolucci outlining their concerns and setting out an improved process to meet their needs. The upgrade approval process has been outlined but it needs to be made more precise, especially for the large upgrades of Phase II. This will require some time because the experiments are still working on the content of these upgrades and the choices that need to be made to obtain a coherent set of upgrades that maximize the physics output. This will be discussed in detail after F. Bordry's presentation.

3. LHC Machine Status. F. Bordry, Technology department head, for the LHC team.

(presentation, <https://indico.cern.ch/event/301343/session/0/contribution/2/material/slides>)

There were no questions to F. Bordry.

4. Summary. S. Bertolucci, Director for Research and Scientific Computing

S. Bertolucci explained that the current experiment approval process is an iterative one, starting from a Letter Of Intent, followed by TDRs. These documents are scrutinized by the LHCC (that reports to the CERN directorate) and then sent for information to the other managerial bodies like the RRB and the SPC. The TDRs are scrutinized both technically for the consistency of the physics as well as for the financial sustainability by the FAs. The S. Bertolucci considered this to be a balanced, iterative, approach in which the ideas of the experiments and the possibilities of the FAs can be scrutinized several times until equilibrium is reached.

After the construction of the LHC experiments, this process was extended to their operation via the M&O A&B and their computing requirements via the WLCG.

When upgrades were first discussed it was decided that the Memoranda that regulated the phases of the approval process were good for ensuring the smooth continuation of operation but that they should only be considered as a baseline framework and that specialised Memoranda should be made to separate the costs of the upgrades from the normal operation. This required the reconstitution of the “Core group” (that had been dismantled after the construction) as the UCG. There is some time for refining this procedure, but we should now open the discussion on whether this is a viable way or whether there are other proposals for improving it.

A. Medland thanked S. Bertolucci for his explanation of the approval process. However, he felt the process was somewhat fragmented and very much focused on a bottom-up process. It should be more of a top-down process (as well as bottom-up) to enable the FAs to engage more effectively and at an earlier point than when TDRs are finalized and detector plans are fixed, as it will be harder to modify if the funds required are not available at that level or timescale. A global view across the detector upgrade portfolio is crucial to enable funding agencies to allocate resources in the optimal way. There is currently very little interaction between the FAs and the LHCC process. The only interaction comes right at the very end at the time of the MoU Addenda. There needs to be more engagement with the FAs at an earlier time so that the experiments understand what funding is available and what the envelope within which they have to operate actually is.

S. Bertolucci replied that the Research Board will only give its approval when the iteration between the FAs, the experiments and the LHCC has been completed. This means that a TDR will only be approved subject to the existence of a realistic money matrix that has been endorsed by the FAs. This mechanism has worked in the past and it is working currently for the Phase I upgrades and there is no reason to make it more formal. However, the process should become more top-down, but in order to do that we first need a mature set of TDRs aligned among the 2 big experiments so that we can understand the full scenario at a level that is mature enough. The experiments were asked to comment.

D. Charlton replied that ATLAS had submitted its Letter-of-Intent for the Phase-2 upgrades to the LHCC in early 2013. This provides the overall picture and cost estimates for the Phase-2 upgrades. ATLAS is planning to submit the first Phase-2 TDR in early 2016, with the remainder to follow from 2017. The TDRs should describe rather closely the final configuration that is expected for the upgrades.

T. Camporesi replied that CMS are planning to have their TDRs ready towards the end of 2016. This will give the time to optimize the design and to understand the constraints on the performance. CMS is planning to achieve a Technical Proposal that should contain a better understanding of our future detectors on the timescale of the next RRB meeting in October. This should pave the road to the TDRs to be written later.

S. Bertolucci thanked the experiments for their input.

A. Zoccoli supported the concerns raised by A. Medland. He commented that the experiments need to be ambitious in planning for the upgrade. But at a certain point a mechanism will have to be set up to cope with realities. Maybe the FAs will not have enough resources to finance everything. So some kind of mechanism to decide priorities or to decide an envelope or to decide how to go ahead should be set up. Maybe now is too early to decide it, but it should be done at a certain point.

T. Camporesi remarked that the experiments' wanting to do an ambitious program seems to indicate that they are trying to get something that is much better than what we have today. However at least as far as CMS is concerned the goal for the future detector is to achieve the same physics performance as in 2012. The detector will be different, possibly more performant given that at the high luminosity LHC one will have to deal with pileups between 150 and 200. But in terms of physics performance, all

the studies of how to fully exploit the full potential of the new machine aim at maintaining the current physics performance, not at improving it.

U. Bassler noticed that in the current scheme the FAs intervene only at the moment of the signature of the MoUs.

S. Bertolucci replied that to scrutiny requests each FA has a national equivalence of the LHCC committee. Thus the groups involved in a TDR will go in front of their national committees to form the money matrix and at this time there is a lot of interaction between the FAs, the LHCC committees and the experiments and also with the CERN management.

A. Medland said he understood why a good Technical Design is needed as a base for any decisions. However he was concerned that we get to a point where those designs are hardened and solidified into something that may not be affordable. That would clearly be the wrong way round for the process to work. He also pointed out that unlike the original LHC construction phase there was a need to maintain and operate existing experiments and computing requirements which also need to be funded at the same time. From the FAs perspective this is a very difficult balancing act to make within a finite set of resources. As the model is currently laid out the engagement that the FAs have in that process is not as well timed as it needs to be.

To summarize S. Bertolucci said he understands all these worries, but emphasised there still is time to put the procedure together by 2016. This time should be used not only for talking 1-1 between the FAs and the experiments but also by joint efforts. For instance, there will soon be a second workshop on the Phase II upgrades. The FAs should participate at these workshops and express their point of view. They should decide together with the specialised committees whether early warning signals need to be given to the experiments or not, bearing in mind that they have so far only given very preliminary evaluations. Much depends on technology choices but also on the experience we will gain at the restart of the machine. We should work on it but not be too impatient.

Concerning the WLCG, the experiments are expecting constant funding commitments from the FAs for Run 2. The experiments need to agree with the FAs where the baseline lies. Further discussions on this topic were postponed to the WLCG RRB meeting.

There being no further business, S. Bertolucci thanked the delegates and closed the meeting. The proposed dates for the next RRB are 13-15 October 2014.