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Summary of Principal LHCC Deliberations
(November 2001, January 2002 and March 2002 Sessions)

14th Meeting of the ATLAS Resource Review Board
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1. General

This document summarises the principal LHCC deliberations concerning ATLAS at the Committee's sessions in November 2001, January 2002 and March 2002.

ATLAS has investigated the configuration of their initial staged detector given that the total ATLAS requests for supplementary funds to ensure completion and pre-operation costs are available in full but only by 2007 or are available only partially by 2007. Two scenarios have been studied. In the case of 80% of the supplementary funding being available, the ATLAS detector is expected to perform near the level of the fully-funded initial staged detector (Higgs significance reduced by 10%) but will be commissioned under much more restrictive conditions and with higher risks of failure as there would be reduced testing during the commissioning phase. In the case of less resources, very severe cuts into the main physics potential would occur.

A new ATLAS installation schedule (Version 5), taking into account the revised LHC schedule, is now in preparation with the aim of submitting it to the Collaboration for approval in the summer. A preliminary version of the schedule will be available for the July LHCC Comprehensive Review of ATLAS.

2. Magnets

The Magnet Advisory Group to the LHCC (MAG) submitted a written document providing an update on the status of the LHC spectrometer magnets. The review is not yet finalised and agreed to by the LHCC.

However, concerning the ATLAS barrel toroid magnet, the firm contracted to perform the integration of the coils into the casings claims to have underestimated the work and requests a large additional payment to take-up the job. ATLAS has commenced planning for a possible cancellation of the contract and is considering doing the integration work at CERN. While the incurred 3-month delay is expected to be recovered by adding extra shifts, such extra resources are considered to be a burden.

Progress was reported for the end-cap toroid. The schedule can be kept as long as there are no further delays, but this will require close monitoring by the LHCC.

The MAG has no major concerns for the central solenoid magnet.

3. Inner Detector

3.1 Pixel Detector

The LHCC considers progress on the Pixel Detector to be satisfactory.

3.2 Semiconductor Tracker (SCT)

Good progress was reported on the new hybrids for the SCT end-cap module, indicating that the higher than expected noise observed earlier is now understood. The LHCC will, however, continue monitoring the progress regarding these hybrids.

3.3 Transition Radiation Tracker (TRT)

The LHCC noted the problems with the TRT wire joints and the resulting impact of the schedule of the Barrel TRT. Tests on the glass tube joint of the Barrel TRT, which separates the wires of the straws in two halves, using the standard gas in the straws, showed that after an irradiation to a charge equivalent to about 1 month of high-luminosity operation, much of the glass was etched away resulting in HV-breakdown of the straw. Production of the wire joints and their stringing was stopped. ATLAS is looking for replacement material for the wire joint and is also investigating an alternative gas mixture and have progress in identifying possible options. The LHCC will continue monitoring the progress and a final decision to the solution will be presented by ATLAS in May.

4. Calorimeters

4.1 LAr Electromagnetic Calorimeter (EM) and Presampler

Good progress was reported on the electrode production, the cryostats and preparations for the calorimeter integration. Concerns still remain over one of the presampler production facilities. Series production of the on-detector electronics is starting and the installation procedure of the calorimeters in the ATLAS experiment is being developed.

4.2 LAr Hadronic End-cap Calorimeter (HEC)

Good progress was reported on the HEC.

4.3 Forward Calorimeter (FCAL)

The LHCC expressed its concern on the challenging schedule for the FCAL. Substantial progress has been made but the LHCC will continue monitoring.

4.4 Tile Calorimeter

The LHCC considers progress on the Tile Calorimeter to be satisfactory.

5. Muon Spectrometer

Good progress was reported on the Muon Spectrometer.

6. Trigger

The LHCC is reviewing the ATLAS trigger rates and the associated physics performance and is making a comparison to the corresponding studies in CMS. In particular, the Committee is currently concentrating on comparing the expected trigger rates in the two experiments and evaluating the number of events needed for calibration purposes and that associated with the physics processes as a function of the integrated luminosity.

7. LHC Computing Grid Project

The LHCC recommended that the LHC Computing Grid Project be treated by the Committee in a manner similar to that for the experiments. Therefore, the LHC Computing Grid Project will make available to the LHCC for review, documents and reports from the project, including its TDR. As a first step, and following the appointment of referees, the Committee will analyse the relation between the detector parameters and computing requirements, including the expected experiment trigger rates as a function of the machine luminosity. The procedure will be performed in consultation with the LHC experiments. The LHCC and the management of the LHC Computing Grid Project agreed to the above scheme of interaction between the Committee and the Project.

8. Test Beams

The requests from the LHC experiments to use test beams in the years 2003 to 2006 have been scrutinised by the LHCC at its January meeting and also in a dedicated meeting held on 14 February.

The LHCC believes that test beams are necessary in 2003 and 2004 for all LHC experiments to calibrate the final calorimeter modules, to perform the integration of the modules in the detectors, to validate the latest versions of the front-end read-out electronics and DAQ chain, to monitor the quality of the detector construction and to test the alignment procedures.

The Committee also believes that in the case of ALICE, ATLAS and LHCb, there are no compelling reasons to use test beams in the year 2005. The CMS test beam requirements in the years 2004-2006 are driven primarily by the calibration of the Electromagnetic Calorimeter (ECAL). The experiments have therefore been asked to proceed with their test beam programme assuming that beam will be available only in 2003, 2004 and 2006, where the operation of the SPS in the latter year is also required to commission the machine as an injector for the LHC.

The LHCC also recommends keeping the PS Complex operational in 2005 in order for the experiments to be able to perform final tests and calibrations that do not require the higher energy particles available at the SPS.