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PRINCIPAL LHCC DELIBERATIONS

22ND MEETING OF THE ALICE RESOURCES REVIEW BOARD

25 APRIL 2007

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This document summarises the principal LHCC deliberations concerning ALICE at the Committee's sessions in November 2006 and in February and March 2007.

STATUS OF THE ALICE TECHNICAL DESIGN REPORTS

	Submission to LHCC	Research Board Approval
RICH HMPID	August 1998	November 1998
Photon Spectrometer	March 1999	June 1999
Zero Degree Calorimeter	March 1999	June 1999
Inner Tracking System	June 1999	September 1999
Muon Arm	August 1999	November 1999
Addendum to Muon Arm TDR	December 2000	June 2001
Photon Multiplicity Detector	September 1999	February 2000
Addendum to PMD TDR	September 2003	February 2004
Time Projection Chamber	January 2000	April 2000
Time-of-Flight	February 2000	June 2000
Addendum to TOF TDR	May 2002	November 2002
Transition Radiation Detector	October 2001	February 2002
Computing	June 2005	March 2006
Physics Performance Report Vol. I	November 2003	
Physics Performance Report Vol. II	December 2005	
Trigger / DAQ / HLT	January 2004	May 2004
Forward Detectors	September 2004	March 2005
Electromagnetic Calorimeter Technical Proposal	September 2006	November 2006

CONCERNS FROM THE PREVIOUS ALICE RESOURCES REVIEW BOARD

SUB-SYSTEM	CONCERN	STATUS
Inner Tracking System (ITS)	On-time completion of the ITS remains the ALICE premier concern.	Excellent progress was reported on the ITS. The Silicon Drift Detector (SDD) and Silicon Strip Detector (SSD) are integrated in the ITS ready for their final installation in ALICE while the Silicon Pad Detector (SPD) will follow soon.
Dimuon Spectrometer	Timely delivery of the read-out electronics for the tracking chambers.	Production of electronics for the Dimuon Spectrometer is advancing on schedule.
Photon Spectrometer (PHOS)	Short-fall in the level of funding.	Funding of the electronics for the total five modules has recently been approved in Japan. However, the currently available funding only provides resources to build three detector modules.

LHCC COMPREHENSIVE REVIEW

The seventh of the LHCC Comprehensive Reviews of ALICE took place on 19-20 March 2007. The LHCC referees addressed the following systems and areas: Inner Tracking System and Time Projection Chamber, Particle Identification and Dimuon Spectrometer, Forward Detectors and Calorimeters, Trigger, High-Level Trigger, DAQ, Controls and Offline, Installation and Commissioning, Strategy for Data-taking, Alignment and Calibration, First Physics, and the topics of Management, Technical Coordination, Integration, Schedules and Costs.

Since the sixth of the Comprehensive Reviews in March 2006, the ALICE Collaboration has made very significant progress towards the realisation of an experimental set-up ready to record proton-proton and heavy-ion collisions at the LHC. The LHCC considers it reasonable to expect ALICE to be ready with an initial working detector for the start of LHC operation in 2007, assuming that the timely delivery of sub-detectors and the smooth advancement of the production schedules remain ensured, and detector installation can be foreseen beyond this date.

Construction of final components for the initial detector configuration is approaching completion. Installation and commissioning of the ALICE detector and sub-systems is advancing well and reasonable plans are put in place for the data-taking, alignment and calibration as well as for the

initial physics programme. The LHCC noted as a concern the late installation and the resulting tight schedule in the installation of the Miniframe, which carries services without which commissioning of the sub-detectors cannot be completed, and in the delivery of power supplies required for the ALICE commissioning. Compared to the schedule at the Comprehensive Review last year, the current status is five months later than planned but the delay of the LHC schedule by four months has meant the rest of the installation is still feasible, although it remains very tight.

The conclusions and concerns of the LHCC are given below. They will allow the Committee to follow up outstanding issues and to monitor future progress of this project in upcoming sessions of the LHCC prior to the next ALICE Comprehensive Review.

- Excellent progress has been reported on the Inner Tracking System (ITS). The Silicon Drift Detector (SDD) and Silicon Strip Detector (SSD) are integrated in the ITS and the Silicon Pad Detector (SPD) integration is to follow soon. The late connection of services means that the final testing of the ITS can only be done very late, leaving no possibility of repair for any serious problem that might be found. The Time Projection Chamber (TPC) installation and commissioning is under control. The chambers are in excellent condition as shown by test results using various methods.
- All particle identification detectors of ALICE have made very good progress since the last Comprehensive Review. Installation of the High Momentum Particle Identification Detector (HMPID) is almost complete and commissioning will start after Easter 2007. One Transition Radiation Detector (TRD) Supermodule (SM) has been installed already in 2006 and it is planned to install two more SMs before the 0.9 TeV LHC run in 2007. The schedule for this is very tight. During installation of the first two SMs of the Time-of-Flight (TOF) detector inside the L3 magnet some mechanical redesign of the support rails became necessary. The present schedule foresees installation of five further TOF SMs before closing the L3 magnet in summer 2007. Installation of the tracking and trigger chambers of the Dimuon Spectrometer have started and commissioning is ongoing in parallel. Production of electronics is proceeding well. In summary, the LHCC identified no major concerns in the areas of the particle identification and the Dimuon Spectrometer.
- Realisation of the ALICE Forward Detectors - V0, T0, Forward Multiplicity Detector (FMD), Photon Multiplicity Detector (PMD) and the Zero Degree Calorimeters (ZDCs) - is advancing well and the hardware construction is on track. In the case of the PMD, not all electronics may be ready for the LHC engineering run in 2007, but this will not have a lasting impact. The Photon Spectrometer (PHOS) group is ready to install one module, and the funding is now secure for a further two modules to be ready for the 2008 run. The Electromagnetic Calorimeter (EMCAL) support structure is ready but is delayed in shipping. The latter is not yet a concern but the structure's delivery to CERN cannot be delayed by more than six weeks from now.
- Deployment, integration and pre-commissioning of the Trigger, High-Level Trigger, DAQ and Controls systems are progressing well. The integration process has gained considerable momentum over the last months, though due to the complexity of the experiment, the time scale is nevertheless tight. In the offline sector, sizeable efforts are ongoing to prepare the software for real data, which need stronger support from sub-detector and physics groups. While the balance of pledged computing resources within the World-wide LHC Computing Grid (WLCG) has improved, there are still shortfalls expected in 2008 and beyond.
- Good progress was reported on the installation and commissioning of the ALICE detector. The LHCC noted the late installation of the Miniframe, which carries services without which commissioning of the sub-detectors cannot be completed, the availability of power supplies and the integration of the experimental control system with the sub-detectors. In order to make most of a cosmic-ray run, the LHCC recommends that ALICE clarifies the aims of such a run and subsequently appoints a run manager for this period.

- The LHCC considers that the strategy for data-taking, alignment and calibration presented by ALICE is reasonable and no major issues were identified.
- The LHCC reviewed the ALICE physics programme for the 0.9 and 14 TeV proton-proton runs, and for a PbPb pilot run. The proton-proton programme has the right degree of realism and ambition, with measurements of inclusive properties of the final states apt for a tuning of Monte Carlo tools, as well as studies of the dynamics of very high multiplicity final states and of possible benchmarks for PbPb observables. Few days of low-luminosity PbPb data taking will provide a very valuable sample of events, with which to start the core programme of ALICE by determining global event properties and measuring the first hard-probe observables.
- The LHCC took note that several new institutes have recently joined or are about to join the ALICE Collaboration, bringing with them valuable resources and expertise. Good progress was reported on securing funding for the Electromagnetic Calorimeter (EMCAL), the Photon Spectrometer (PHOS) and for the Transition Radiation Detector (TRD). The Collaboration continues to adopt measures to control increases in the cost-to-completion.

ALICE ELECTROMAGNETIC CALORIMETER TECHNICAL PROPOSAL

The Technical Proposal for an Electromagnetic Calorimeter in ALICE was recommended for approval by the LHCC in September 2006 with the request that the physics simulation studies should be developed further prior to the submission of a Technical Design Report in 2007. This was endorsed by the Research Board at its meeting in November 2006.