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# PRINCIPAL LHCC DELIBERATIONS

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29<sup>TH</sup> MEETING OF THE CMS RESOURCES REVIEW BOARD

13 OCTOBER 2009

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SCIENTIFIC SECRETARY, LHCC

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**GENERAL**

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This document summarises the principal LHCC deliberations concerning CMS at the Committee's sessions in July 2009 and September 2009.

**The LHCC considers that CMS has made excellent progress in all aspects of the experiment and is ready for the start of the LHC.**

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**CONCERNS FROM THE PREVIOUS CMS RESOURCES REVIEW BOARD**

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SUB-SYSTEM	CONCERN	STATUS
Resistive Plate Chambers	Demonstration that the gas recirculation can be implemented without increasing dark current remains outstanding and must be resolved.	The dark current of the Resistive Plate Chambers is stable.
CASTOR Calorimeter	Ability to withstand the unexpectedly large stray fields and magnetic forces of the CMS solenoid magnet.	The CASTOR support table is now fastened to the CMS Hadronic Forward (HF) Calorimeter. Magnetic field shaping and shielding of the photomultiplier tubes of the detector are being improved.
Magnet	Unexpectedly large stray fields and magnetic forces.	Understanding of the fringe field has advanced with the new magnetic field model giving good agreement between data and simulation.

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**STATUS OF THE EXPERIMENT SUB-SYSTEMS**

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**MAGNET**

The magnet was re-commissioned and ran at the operational field of 3.8 T during the Cosmic Ray At Four Tesla 2009 (CRAFT09) run in August 2009, though re-commissioning proved a little more difficult than expected, with, for example, movement of the table supporting the CASTOR calorimeter being observed. The CASTOR support table is now fastened to the CMS Hadronic Forward (HF) Calorimeter. Understanding of the fringe field has advanced with the new magnetic field model giving good agreement between data and simulation.

## **TRACKER**

The Tracker cooling plant refurbishment has been completed and is operational. The Tracker has been re-commissioned and successfully operated in peak and de-convolution modes, the latter for the first time and the one that will be the standard mode of operation for CMS.

Seventeen of the total 3900 Tracker high-voltage channels tripped in late August 2009, drawing a large current. The cause of this potentially serious problem has been identified. It was due to a procedure that was incorrectly followed and action has been taken to avoid a recurrence.

## **PRESHOWER**

With the successful completion of the Preshower (ES) detector in April 2009, the CMS low-luminosity detector is now complete.

## **HADRONIC CALORIMETER**

The Hadronic Barrel (HB), the End-cap (HE) and the Forward (HF) calorimeters are fully operational. The outer (HO) calorimeter is fully operational though a few Hybrid Photon Detectors (HPDs) are discharging. Some silicon photomultiplier tubes have been installed to evaluate their suitability as replacement photo-detectors.

## **TRIGGER AND DAQ**

The CRAFT09 run was a highly profitable exercise for the CMS Trigger and DAQ and the experiment has shown that it is ready to properly utilize the LHC beam.

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## **EXPERIMENT SHUTDOWN AND COMMISSIONING**

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The CMS shutdown period was focused on mending outstanding problems and ensuring that the CMS experiment can sustainably run for long periods. The current shutdown will serve as a good model for future shutdowns.

The CRAFT09 run was very successful and a number of publications are under preparation. About 300 M cosmic-ray events were recorded at the operational field. The run re-established the good performance of all CMS sub-systems and of the integrated CMS detector. The CMS sub-detectors showed good availability in CRAFT09 and the measured resolutions (spatial, time and momentum), alignment and efficiency all meet the expectations.

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## **SURFACE INFRASTRUCTURE**

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Partially new facilities as well as continuation and refurbishment of existing facilities (in SX5, Bldg. 904, and Bldg. 186) are needed in a timely manner for proper maintenance and good operation of the CMS experiment as well as for its up-scopes and upgrades. The Committee considers these facilities to be very important for CMS.

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## **SOFTWARE AND COMPUTING**

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Excellent progress has been made on the CMS offline software and major improvements have been made in all applications – fast simulation, full simulation, reconstruction, analysis and event displays.

The CMS computing is ready and well managed and is focused on anticipating potential issues.

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## **PHYSICS PLANS**

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CMS has completed an impressive amount of work for being ready for physics analysis. The effort is well advanced and is led by a highly-effective leadership and organization structure.