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**Calibration, Installation & Commissioning of Sensors for the Alignment of Muon Endcap Chambers in the CMS Experiment** SAMIR GURAGAIN, MARCUS HOHLMANN, Dept. of Physics, Florida Institute of Technology, Melbourne, Florida 32901, US CMS COLLABORATION — The positions of muon endcap chambers are to be monitored precisely in the Compact Muon Solenoid (CMS) experiment at the Large Hadron Collider (LHC) by using analog sensors (R sensors, Z sensors, proximity sensors, and inclinometers) and optical DCOP sensors based on CCDs. The analog sensors were calibrated at Florida Tech using a semi-automated mechanical calibration bench and a Labview-based control and readout system. In summer 2006, half of all the sensors and readout were installed and commissioned on four endcap layers. Lasers beams were carefully adjusted for passage through all DCOPS on 15m Straight Line Monitors (SLM) across three endcap disks. During the summer, the detector was closed up and the huge 4 Tesla solenoid magnet of CMS was turned on for the first time ever. The movement of muon chambers for the alignment in R- $\phi$  and Z directions was monitored continuously by a complex system of wire extension and linear motion potentiometers, inclinometers, and DCOPS during the CMS Magnet Test & Cosmic Challenge in the summer. Sensors clearly indicated the flexing of the large absorber disks when the field was turned on. We present sensor calibration methods and results, an overview of the installed sensor system, and first commissioning results for the endcap alignment at CERN. Supported by Florida Tech, Fermilab and Department of Energy.

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