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The Control System for the Muon Detector of LHCb

Within the Framework of the CERN Control System Project, using PVSS as the main tool, we developed an instrument to manage of the Muon System of LHCb.
Adjustment and monitoring of High and Low Voltage power supplies,on-line diagnostics and fine tuning of the Front-End read-out devices, data acquisition from the gas system and the monitoring of pressure and temperature of the experimental hall have been implemented.
The system will also manage long term data archiving and the alert handling.
The Control System performance is now being deeply tested in a cosmic ray station.
Built as a final quality control of the LHCb Multi-Wire Proportional Chambers, allowing acquisition of data from as many as 600 Front-End readout channels, the cosmic ray station is fully managed by means of a Control System prototype.
The developed tools and the test results will be presented.

Summary

The LHCb muon system, presently under construction, will be composed of five detector stations (M1-M5) equipped with more than 1400 detectors.
High efficiency and a good space resolution are required.
The large number of the detectors and the high performance required make the Control System of the Muon System Apparatus a significant task to accomplish.
Within the Framework of the CERN Control System (CS) Project, using the PVSS program, we designed an instrument to fully manage the Muon System during the data acquisition.
Performance of the chambers in the Muon System will strongly depend on the temperature and pressure of the experimental hall.
Consequently, it will be mandatory to monitor and acquire the environmetal parameters.
An equalization and a stabilization of the gain will be achieved by tuning the high voltage supplies on a case by case basis.
The Control System will also manage the ramp-up and ramp-down phases of the entire high voltage system, monitoring of the current drawn at the same time.
The Muon System will be made up of 120,000 readout channels.
Electronic channels will need a constat monitoring in order to single out dead or noisy channels and adjust the channel settings, such as thresholds and masks.
An array of low voltage supplies will be used to provide power to the front end readout devices.
Their main paramenters such as current, voltage as well as their overall status will be will be acquired.
The data coming from the gas distribution system, regarding the supply of the gas mixtures to the detectors will be monitored and acquired.
The Control System will manage the long term archiving and alert handling for all the data concerning the status of the apparatus.
A first down scaled implementation of the Control System is now being used and tested to fully manage a cosmic ray station built for the studies of the LHCb MultiWire Proportional Chambers.
The CS controls high and low voltage supplies as well as the front-end readout devices, stores data regarding the system status and manages the alert and the alarm situations.
The CS test is giving a unique possibility to study in details their different features and is an usefull tool to test the robustness of the Muon Detector CS.

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