

MDT data quality assessment at the Calibration centre for the ATLAS experiment at LHC

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ATLAS is a large multipurpose detector, presently in the final phase of construction at LHC, the CERN Large Hadron Collider accelerator. In ATLAS the muon detection is performed by a huge magnetic spectrometer, built with the Monitored Drift Tube (MDT) technology. It consists of more than 1,000 chambers and 350,000 drift tubes, which have to be controlled to a spatial accuracy better than 10 micrometers and an efficiency close to 100%. Therefore, the detector automated monitor is an essential aspect of the operation of the spectrometer. The quality procedure collects data from online and offline sources and from the “calibration stream” at the calibration centres, situated in Ann Arbor (Michigan), MPI (Munich) and INFN Rome. The assessment at the Calibration Centres is performed using the DQHistogramAnalyzer utility of the Athena package. This application checks the histograms in an automated way and, after a further inspection with a human interface, reports results and summaries. In this study a complete description of the entire chain, from the calibration stream up to the database storage is presented. Special algorithms have been implemented in the DQHistogramAnalyzer for the Monitored Drift Tube chambers. A detailed web display is provided for easy data quality consultation. The analysis flag is stored inside an Oracle Database using the COOL LCG library, through a C++ object-oriented interface. This quality flag is compared with the online and offline results, produced in a similar way, and the final decision is stored in a DB using a standalone C++ tool. The final DB, which uses the same COOL technology, is accessed by the reconstruction and analysis programs.

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