The Atlas DEtector POsitioning system (ADEPO) to control moving parts during ATLAS closure

ATLAS is one of two general-purpose detectors at CERN's Large Hadron Collider (LHC). It is 46 m long, 25 m wide and 25 m in height and has a total mass of 7000 tons. During the Shutdown periods of LHC machine, intensive maintenance and/or upgrade programs are performed in the experiment. Such activities require that various large size detectors of up to 900 tons are moved from their "Run position" to an "Maintenance position". Before the end of the shutdown, these detectors have to be moved back to the "Run position" within mechanical accuracy of 0.3 mm. The system described in this article is an upgrade of the general procedure of Detector positioning in ATLAS that is currently based on a geodetic measurement, with a delivery time of hours for the results.

A multi-disciplinary team developed and integrated the Atlas DEtector Positioning (ADEPO) system into the already assembled experiment to control re-positioning of seven major sub-detectors. The system is based on BCAMs (Brandeis CCD Angle Monitor) as sensors in combination with prisms. ADEPO replaces partially the manual measurement and saves time in the critical path of the detector closure and increases the accuracy of the relative repositioning. In this article are treated the specification and technical constraints resulting in the system design and layout. Further are presented challenges of installation and commissioning up to the first measurement results in the maintenance period 2015/2016. The relative precision reaches up to few hundreds of mm. It is integrated in the ATLAS work flow of the movements system for the detectors and data storage in the ATLAS detector database.

Summary

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