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A new Data Acquisition System for the CMS Phase 1 Pixel Detector

A new pixel detector will be installed in the CMS experiment during an extended technical stop of the LHC in the beginning of 2017. The new pixel detector, built from four layers in the barrel region and three layers on each end of the forward region, is equipped with upgraded front-end readout electronics, specifically designed to handle the high particle hit rates created in the LHC environment. The DAQ back-end was entirely redesigned to handle the increased number of readout channels, the higher data rates per channel and the new digital data format. Based entirely on the microTCA standard, new front-end controller (FEC) and front-end driver (FED) cards have been developed, prototyped and produced with custom optical link mezzanines mounted on the FC7 AMC and custom firmware. At the same time as the new detector is being assembled, the DAQ system is set up and its integration into the CMS central DAQ system tested by running the pilot blade detector already installed in CMS. This talk describes the DAQ system, integration tests and results, and an outline for the activities up to commissioning the final system at CMS in 2017.

Primary author: Mr KORNMEYER, Andreas (CERN)

Presenter: Mr KORNMEYER, Andreas (CERN)