Contribution ID: **57**   Type: **Oral**

Development and Testing of the Upgrade to the CMS Level-1 Calorimeter Trigger

Tuesday, 23 September 2014 11:35 (25 minutes)

In 2015 the LHC will resume operations with a center-of-mass energy at 13 TeV and significantly higher Pile Up than previous runs at the LHC. In order to operate under these challenging conditions, CMS is upgrading its calorimeter trigger in two stages: the Stage 1 upgrade will be used in 2015 and integrated with the legacy system. Scheduled for 2016, Stage 2 will have an improved position and energy resolution at the Level 1 trigger.

Summary

In 2015 the LHC will resume operations with a center-of-mass energy at 13 TeV and significantly higher Pile Up than previous runs at the LHC. In order to operate under these challenging conditions, CMS is upgrading its calorimeter trigger in two stages: the Stage 1 upgrade will be used in 2015 and integrated with the legacy system. Scheduled for 2016, Stage 2 will have an improved position and energy resolution at the Level 1 trigger. Stage 1 will include the existing Regional Calorimeter Trigger (RCT) which will be reprogrammed and have data output via a new optical interface card (oRSC). The oRSC provides direct optical link data connections to the upgraded GCT. The upgraded GCT system will make use of the Master Processor board (MP7) which is based on Virtex-7 FPGAs and has the capability to input and output data at a rate of 3/4 Tbit per second. The upgraded system will also include the Calorimeter Trigger Processor (CTP7), also based on Virtex-7 FPGAs. The CTP7 is a micro-TCA card with multi-gigabit transceivers, a large processor core and dedicated control system based on Xilinx ZYNQ technology running embedded Linux. Also presented here are results of board and system integration tests between the RCT, oRSC, CTP7 and MP7 performed during the first and second quarters of 2014. The assimilation of these boards into the Level 1 trigger as well as the switch to optical links will allow for the implementation of new triggering algorithms which are essential to the physics program at CMS.

Primary author: OJALVO, Isabel (University of Wisconsin (US))

Presenter: OJALVO, Isabel (University of Wisconsin (US))

Session Classification: Systems, Planning, Installation, Commissioning and Running Experience

Track Classification: Systems