The Phase 2 upgrade of CMS Drift Tube Detector for High Luminosity LHC

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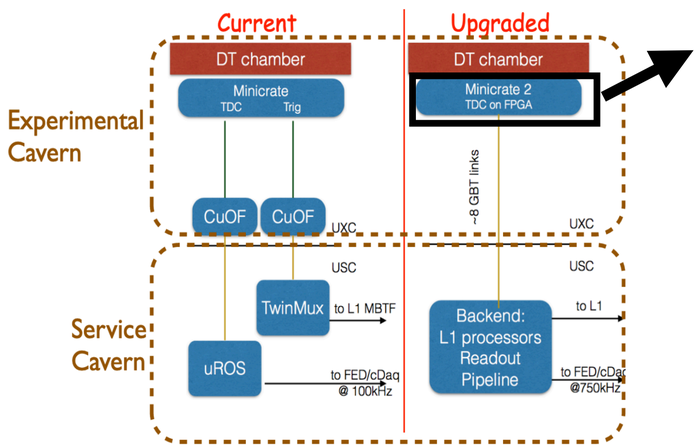
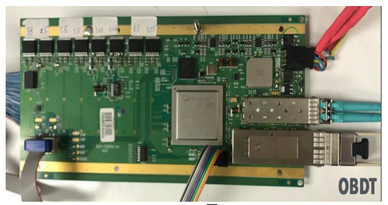
Motivation

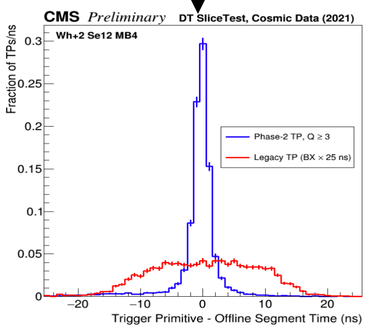
- In order to meet the challenges posed by the high radiation environment of HL-LHC, Drift tube detector in the barrel region of CMS muon are ongoing the upgrade of its electronics during Long shutdown 3
- The upgrade contains new generation of the on-chamber electronics
  - TDCs (implemented in FPGAs)
  - Optic transceivers directly on board
  - Radiation tolerant components
  - Trigger logic moves completely to the Backend at service cavern

DT Phase 2 Slice Test

- Four DT chambers in Sec 12 of wheel YB+2 have been equipped with Phase 2 On Boards DT electronics (OBDT) : DT Slice Test
- **OBDTs :** On Board Electronics for Drift Tubes for HL-LHC consist of a single type of board performing < 1 ns time digitisation in FPGA of chamber signal
- Data from OBDTs goes to backend electronics (AB7) based on TM7 boards, where they are used for trigger primitive generation and readout







Summary & Plans

- The Phase 2 DT Slice Test successfully installed & operated over the LHC LS2
  - The performance is in line with the one of the Phase 1 system already exploiting the DT cell resolution
- Aiming to operate the present DT Phase 2 Slice Test setup at the beginning of Run 3 in parallel to the legacy system
  - Updated DT DQM (data quality monitoring) for checking online the Slice Test plots
  - Dedicated offline analysis frame work to process Slice Test data
- Further developments of OBDT prototype versions and integration plans with the Phase 2 Muon Trigger Backend also ongoing in parallel