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Trigger Paths for Alignment and Calibration for LHC Run 2 - 2018

---++ Introduction

---++ Trigger bit for special runs

---+++ scan/mu scan LumiPixelsMinBias

| **Dataset** |*HLT Path* | **Change time (run)** | **Revert time (run)*** |
| **ZerBias[1-8]** | | |

---+++ Strip full/mini high voltage bias scan

!SiStripCalMinBias full scan

| ***Dataset** |*HLT Path* | **Change time (run)** | **Revert time (run)*** |
| **ZerBias[1-8]** | | |

!SiStripCalMinBias mini scan

| ***Dataset** |*HLT Path* | **Change time (run)** | **Revert time (run)*** |
| **EGamma** | | |

---++ List of mandatory streams // datasets // paths

| ***Stream** | **Dataset** | **Path** | **Notes** |

| ALCALUMIPIXELS | AICaLumiPixels | AICa_LumiPixels_Random | |

| ALCALUMIPIXELS | AICaLumiPixels | AICa_LumiPixels_ZeroBias | |

| ALCALUMIPIXELSEXPRESS | AICaLumiPixelsExpress | AICa_LumiPixels_Random | |

| ALCAP0 | AICaP0 | (all) | |

| ALCAPHISYM | AICaPhiSym | AICa_EcalPhiSym | |

| Calibration | TestEnablesEcalHcal | HLT_EcalCalibration | Will change name soon, see
<https://hypernews.cern.ch/HyperNews/CMS/get/tier0-Ops/1623/1.html> |

| Calibration | TestEnablesEcalHcal | HLT_HcalCalibration | Will change name soon, see
<https://hypernews.cern.ch/HyperNews/CMS/get/tier0-Ops/1623/1.html> |

| DQMCalibration | TestEnablesEcalHcalDQM | HLT_EcalCalibration | |

| DQMCalibration | TestEnablesEcalHcalDQM | HLT_HcalCalibration | |

| EcalCalibration | EcalLaser | HLT_EcalCalibration | |

| Express | Express | HLT_Random | |

| Express | Express | HLT_ZeroBias | |

| Express | Express | HLT_ZeroBias_FirstCollisionAfterAbortGap | |

| Express | Express | HLT_ZeroBias_Alignment | |

| ExpressAlignment | ExpressAlignment | HLT_HT300_Beamspot | This stream can be added **only** when

tracking can be safely run at HLT. |

| ExpressAlignment | ExpressAlignment | HLT_ZeroBias_Beamspot | This stream can be added **only** when tracking can be safely run at HLT. |

| DQMOnlineBeamspot | DQMOnlineBeamspot | HLT_HT300_Beamspot | This stream can be added **only** when tracking can be safely run at HLT. |

| DQMOnlineBeamspot | DQMOnlineBeamspot | HLT_ZeroBias_Beamspot | This stream can be added **only** when tracking can be safely run at HLT. |

| RPCMON | RPCMonitor | AICa_RPCMuonNormalisation | |

---++ Needs for the online beamspot measurement

During 2017 we switched to a new workflow where the tracks were reconstructed at HLT with specific paths and then feed to the DQM through the stream DQMOnlineBeamspot. The DQM beamspot client (a new version as well) would just fit the vertices, without any other reconstruction.

These paths and streams are needed at HLT but can run only when it is safe to enable track reconstruction, i.e. never at the start up of a new data taking year.

When this stream cannot be enabled, we need to change the DQM beamspot client enabling the old one (which was making use of the DQM stream, always present in any menu)

and make sure that the proper output file is used (the name is different for the two different clients). DQM and WBM experts should be alerted!

---++ Definition of the Express Dataset

---+++ Regular Express

| **Path** | **Rate** |

| HLT_ZeroBias | 20 Hz |

| HLT_Random | 10 Hz |

| HLT_Physics | 10 Hz |

| HLT_IsoMu27(24,20) | 5 Hz |

| HLT_Mu17_TrkIsoVVL_Mu8_TrkIsoVVL_DZ | 5 Hz |

| HLT_Ele23_Ele12_CaloIdL_TrackIdL_IsoVL | 5 Hz |

| HLT_ZeroBias_FirstCollisionAfterAbortGap | 10 Hz |

| HLT_ZeroBias_IsolatedBunches | 10 Hz |

| HLT_ZeroBias_Alignment | 10 Hz |

---+++ Express Alignment

| **Path** | **Rate** |

| HLT_HT300_Beamspot | 60 Hz |

| HLT_HT450_Beamspot | 0 Hz (in the shadow) |

| HLT_ZeroBias_Beamspot | 20 Hz |

Notice - the rate and paths of Beamspot may depend on the run conditions. For instance, for low pileup / VdM conditions, we could have a lower HT path (usually HT60) and a higher rate of HLT_ZeroBias_Beamspot (up to 60 Hz if the PU is around 0.1, up to 500 Hz if the PU is around 0.01). **These are just guidelines - always contact the Beamspot experts!***

---+++!! JIRA tickets

* **This filter should let you see all AICa tickets:** <https://its.cern.ch/jira/issues/?filter=21701> 

----+ Trigger paths in CondDB

See <https://twiki.cern.ch/twiki/bin/view/CMSPublic/SWGGuideAlCaRecoTriggerBits>

----+ Input from DPG/s POGs

Input from the ALCA workshops in 2017 and 2018.

----- Offline Beamspot

| ***ALCARECO | Dataset | Rate | Size |**
| TkAlMinBias | ExpressAlignment* | 80 Hz | (not mentioned) |

----- Pixel Calibration

| **ALCARECO | Dataset | Rate | Size |**
| SiPixelCalZeroBias | Express, ExpressCosmics | (not mentioned) | 2 MB, **per lumisection** |

----- Tracker Alignment

* No need to give them the split datasets nor the "isolated bunches".

| **ALCARECO | Dataset | Rate | Size |**
TkAlMinBias	HLTPysics, Express, Zero	10 Hz (HLTPysics and Express), 70 Hz (ZeroBias)	150 kB (HLTPysics, Express), 100 kB (ZeroBias)
TkAlCosmics0T	Cosmics, ExpressCosmics	4 Hz	4 kB
TkAlCosmicsInCollisions	NoBPTX	0.15 Hz	8 kB
TkAlMuonIsolated	SingleMuon	80 Hz	6.4 kB
TkAlZMuMu	DoubleMuon	5 Hz	6.5 kB
TkAlUpsilonMuMu	MuOnia	1.5 Hz	5 kB
TkAlJpsiMuMu	Charmonium	30 Hz	5 kB

----- Tracker Calibration

* For detector ageing studies: To be able to monitor this with needed accuracy we re going to need:
* 100--150Hz of "SingleX" (X=muon,electron) events for the small bias scans
* 500Hz of "ZeroBias"-like events for the full scans (SiStripCalMinBias)

| **ALCARECO | Dataset | Rate | Size |**
SiStripCalMinBias	Express, ZeroBias	30 Hz	500 kB
SiStripCalMinBiasAAG	Express	10 Hz	500 kB
SiStripCalZeroBias	Express, ZeroBias	10 Hz ZeroBias + 10 Hz Random (Express), 30 Hz (ZeroBias)	250 kB
SiStripPCLHistos	Express	10 Hz ZeroBias + 10 Hz Random (Express), 30 Hz (ZeroBias)	250 kB

----- ECAL

* Pedestals entered (on October 2017) the Prompt Calibration Loop
* Plan to have also pulse-shapes / timing at PCL for 2018

| **ALCARECO | Dataset | Rate | Size |**
EcalCalPhiSym	/AlCaPhiSym*/RAW	3 kHz	1.5 kB
EcalCalPi0Calib	/AlCaP0*/RAW	6 kHz (EB), 2 kHz (EE)	1.6 kB
EcalCalEtaCalib	/AlCaP0*/RAW	2 kHz (EB), 300 kHz (EE)	1.6 kB

EcalUncalZElectron	/DoubleEG/*EcalUncalZElectron*/ALCARECO	5.6 Hz	0.2 kB
EcalUncalZElectron	/SingleElectron/*EcalUncalZElectron*/ALCARECO	8 Hz	0.2 kB
EcalUncalWElectron	/DoubleEG/*EcalUncalWElectron*/ALCARECO	3 Hz	0.2 kB
EcalUncalWElectron	/SingleElectron/*EcalUncalWElectron*/ALCARECO	40 Hz	0.2 kB
EcalESAlign	/SingleElectron/*EcalESAlign*/ALCARECO	90 Hz	50 kB
 * 2018-05-04: Fixed typo in size of EcalESAlign (0.1 or 1 kB --> 50 kB)

----- HCAL

- * HF and HO will be essentially unchanged from 2017 to 2018
- * For HE, the photodetectors and front-end electronics are upgraded:
- * HPD -> SiPM, up-to-3 depths -> up-to-7 depths
- * For HB & HE, reco algorithm will be upgraded from M2 to MAHI for offline
- * For HLT, transition to MAHI with full depth is still needed to be discussed

| **ALCARECO** | **Dataset** | **Rate** | **Size** |

HcalCalIsoTrk	/Commissioning	3.5 Hz	1.5 MB
HcalCalIsoTrkFilter	/DoubleEG , /Jet/HT	7 Hz (DoubleEG), 10 Hz (JetHT)	1.7 MB
HcalCalIsolatedBunchSelector	/Commissioning	Active only for special runs with isol. bunches, 100 Hz	--
HcalCalIsolatedBunchFilter	/JetHT	Active only for special runs with isol. bunches, 100 Hz	--
HcalCalIterativePhiSym	/DoubleEG, /SingleElectron, /SingleMuon	70 Hz (DoubleEG), 115 Hz (SingleElectron), 245 Hz (SingleMuon)	90 kB
HcalCalMinBias	/HcalNZS	8--10 Hz	25 kB
HcalCalHBHEMuonFilter	/SingleMuon	90 Hz	900 kB
HcalCalHO	/SingleMuon	240 Hz	1 kB
 * 2018-05-04: Fixed typo in size of HcalCalHBHEMuonFilter (90 --> 900 kB)

----- Muon Alignment

| **ALCARECO** | **Dataset** | **Rate** | **Size** |

| MuAlCalIsolatedMu | SingleMuon | 25 Hz | 50 kB |

----- Muon Subsystems

| **ALCARECO** | **Dataset** | **Rate** | **Size** |

DtCalib	Express, Single Muon	3 Hz	(not mentioned)
DtCalibCosmics	ExpressCosmics	3 Hz	(not mentioned)
N/A	RPCMON	400 Hz	26 kB

----- LUMI and BRIL

- * We still have this naming problem between "LumiPixelsMinBias" and "AlCaLumiPixels"
- * New development: splitting between random triggers (for corrections) and zero bias (for luminosity measurements)
- * AlCaPCCRANDOM: AlCaPixelExpressStream with AlCaPCC at HLT, RawPCC and CorrPCC at PCL
- * AlCaPCCZeroBias: AlCaPixelStream with AlCaPCC at HLT, RawPCC at T0
- * See: <https://its.cern.ch/jira/browse/CMSHLT-1762>

| **ALCARECO** | **Dataset** | **Rate** | **Size** |

| AlCaPCCRANDOM | AlCaLumiPixels | 1600 Hz (ZeroBias), 400 Hz (Random) | 150 B (ZeroBias), 300 B (Random) |
 | LumiPixelsMinBias | Express | ??? | ??? |

---++ TSG documentation for L1/HLT menus

---++ Tier-0 information

- * Versioned configuration: <https://github.com/dmwm/T0/blob/master/etc/ProdOfflineConfiguration.py>
- * Live configuration: <http://cmst1.web.cern.ch/CMST1/tier0/ProdOfflineConfiguration.py>
- * First Conditions Safe Run: <https://cmsweb.cern.ch/t0wmadatasvc/prod/firstconditionsaferun>
- * Tier-0 policies: <https://twiki.cern.ch/twiki/bin/view/CMSPublic/CompOpsTier0Policies>

---+ Summary of Conditions Change at HLT

<https://twiki.cern.ch/twiki/bin/view/CMS/TriggerStudiesConditionsInDataTaking2018>

---+ Rerun HLT on data with updated condition(s) with respect to online GT

---++ Updated beamspot on run 300806
More... Close

Reference tag: **BeamSpotObjects_byLS_031c09_TEST**, available in PREP database. Load it with:

```
<verbatim>
process.GlobalTag.toGet.append(
cms.PSet(
record = cms.string("BeamSpotObjectsRcd"),
tag = cms.string("BeamSpotObjects_byLS_031c09_TEST"),
connect = cms.string("frontier://FrontierPrep/CMS_CONDITIONS")
)
)
</verbatim>
```

Then, just add this line to the of your hlt.py file: **hltOnlineBeamSpot = cms.EDProducer("BeamSpotProducer");** This will overwrite the beamspot producer and let the HLT use the beamspot from the Conditions rather than the one from the SCAL in the data stream.

---++ Tracker alignment using week 32 update
More... Close

Reference of 1-IOV tag

- * <https://hypernews.cern.ch/HyperNews/CMS/get/calibrations/3148.html>
- * <https://hypernews.cern.ch/HyperNews/CMS/get/tk-alignment/1714.html>

Reference of TK alignment reload

*
https://github.com/cms-sw/cmssw/blob/CMSSW_9_2_X/Alignment/HIPAlignmentAlgorithm/python/common_cff.py

Config fragment

configure the database file - use survey one for default

```
process.GlobalTag.toGet = cms.VPSet(
cms.PSet(record = cms.string("TrackerAlignmentRcd"),
```

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```
tag = cms.string('TrackerAlignment_StartUp17_v10'),
connect = cms.string('frontier://FrontierProd/CMS_CONDITIONS')
),
# cms.PSet(record = cms.string('TrackerSurfaceDeformationRcd'),
# tag = cms.string('TrackerSurfaceDeformations_2015-EOY_v1_RunD'),
# connect = cms.string('frontier://FrontierProd/CMS_CONDITIONS')
# ),
# cms.PSet(record = cms.string('GlobalPositionRcd'),
# tag = cms.string('GlobalAlignment_2009_v2_express'),
# connect = cms.string('frontier://FrontierProd/CMS_CONDITIONS')
# ),
# cms.PSet(record = cms.string('TrackerAlignmentErrorExtendedRcd'),
# tag = cms.string('TrackerIdealGeometryErrorsExtended210_mc'),
# connect = cms.string('frontier://FrontierProd/CMS_CONDITIONS')
# ),
)
```

---++ Links

* AlCaDB Workshop 2018: <https://indico.cern.ch/event/686247/>

Main.SimoneGennai - 2018-04-14

This topic: CMSPublic > SWGuideCalAliTrigger2019

Topic revision: r1 - 2019-03-27 - AshishSharma



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