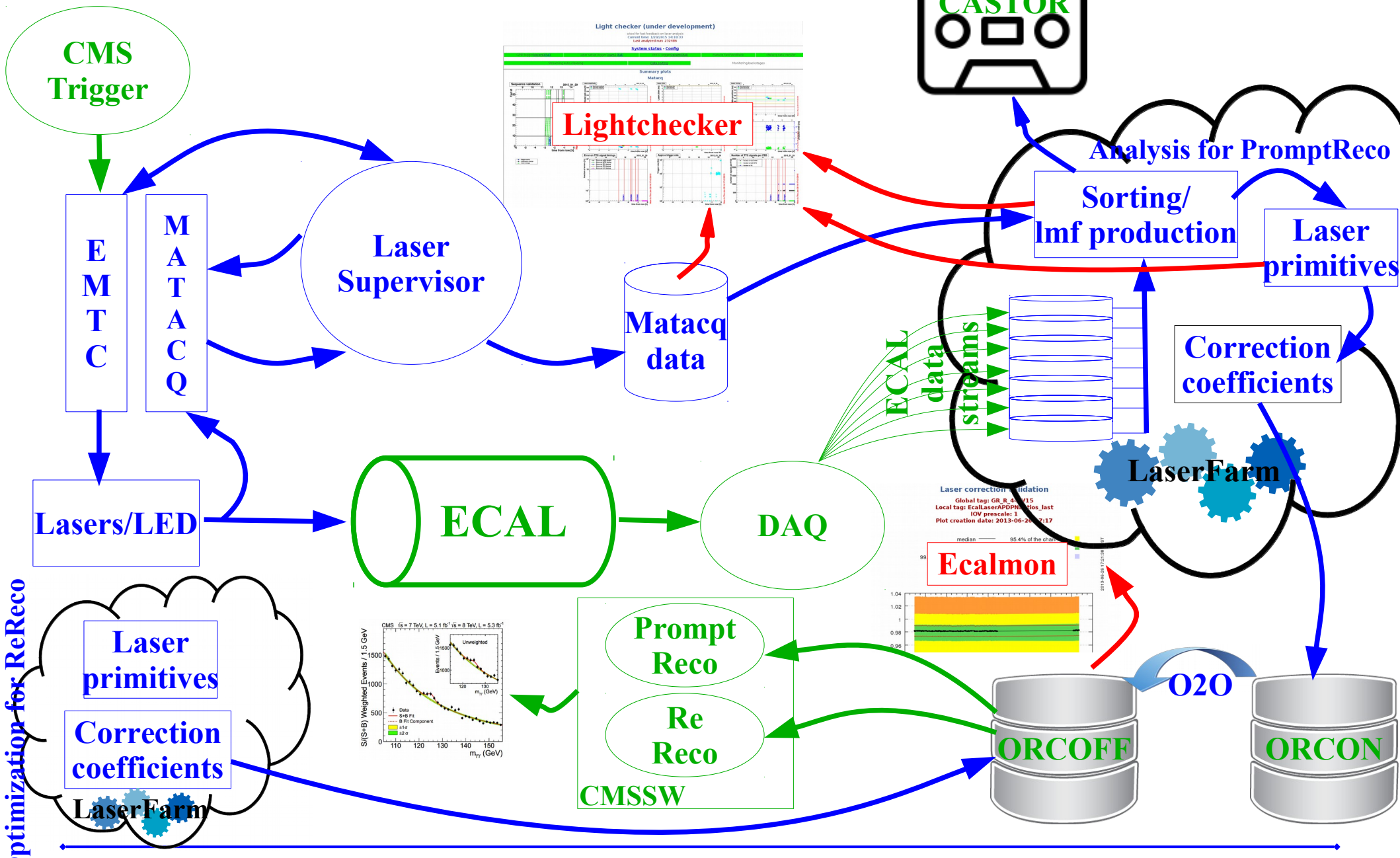
Response corrections

M. Dejardin
for the ECAL monitoring team

Schematics


CMS Trigger
EMTC
MATACQ
Laser Supervisor
Lightchecker
Matacq data
CASTOR
Analysis for PromptReco
Sorting/ Imf production
Laser primitives
Correction coefficients
ECAL data streams
LaserFarm
Lasers/LED
ECAL
DAQ
Ecalmon
Prompt Reco
Re Reco
CMSSW
ORCOFF
O2O
ORCON
Laser primitives
Correction coefficients
LaserFarm
Optimization for ReReco

Workflow (1/3)

- Monitoring sequence steered by CMS global trigger
- Light generated by Lasers/LEDs upon WTE signal
  - Measured @1Gs/s pulse by pulse (Matacq)
    - ► Online Monitoring with LightChecker in real time (few seconds delay)
- Calibration events captured at Event Builder level
  - Streamed to "laser farm"
  - 48 (?) parallel streams/1 file per stream per lumi section

No streaming during last MWGR

- Events sorted and repackaged ("Sorting")
  - Rebuild time-ordered monitoring sequences
  - Merge with Matacq data
  - Generate local Laser Monitoring Files (lmf)
    - ► dump of DCC raw data + Matacq (FED 655)
    - ► 1 lmf per SuperModule per color

OK if the right CMSSW version is present on the laser farm

Workflow (2/3)

- **Analyze lmf (10 minutes after data taking)**
  - Compute laser characteristic and prepare pulse reconstruction
  - Compute pedestals , TP and noise for APD and PNs
  - Compute APD/Pns, APD/PIN, correction factors
  - Write laser primitive file (dst) V0
    - ► Online monitoring with LightChecker
- **Optimization 1 (<4 hours after end of run)**
  - Select “best” PN for each monitoring region
  - Search for sequence splitting
    - ► Merge files
  - Retrieve useful info from WBM and apply correction if needed
    - ► B value, lumi, etc
    - ► Laser pulse width correction
  - Write laser primitive file V1

Workflow (3/3)

- ✔ **Compute correction coefficients**
  - From dst-V1 history
  - Define IOVs, normalized to t=0 (beginning of 2011)
  - Write in ORCON

Need to be recommissioned

- ✔ **Prepare corrections for Prompt-Reco**
  - O2O process
  - Write in ORCOFF

Need to be recommissioned

- ✔ **Optimization for Re-Reco**
  - Restart from dst-v0
    - ► Reapply v1 corrections
    - ► Apply TP corrections
    - ► Apply residual linearity corrections
  - Write dst-V2
  - Write corrections in ORCOFF

Need to be recommissioned

Monitoring the monitoring

- **Online monitoring**
  - **LightChecker**
    - ▶ Laser monitoring
    - ▶ Processes monitoring
    - ▶ Disks monitoring
    - ▶ Streaming monitoring

Still some updates to perform to cope with PC upgrades

- **Offline monitoring**
  - **DQM**
    - ▶ APD monitoring
    - ▶ PN monitoring
  - **EcalMon**
    - ▶ Correction monitoring at ORCOFF level

Need to be recommissioned

  - **PFG**
    - ▶ General Physics validation

Signal generators

- **Lasers and LEDs**
  - ✓✓ 2 Blue Photonics lasers (447 nm)
  - ✓ 1 Green Laser (527 nm) — No spare
  - ✓✓ 1 Red Quantronix laser (800 nm)
  - ✓✓ 1 Blue LED system (455 nm)
  - ✓✓ 1 Orange LED system (617 nm)
- **Charge injection**
  - ✓✓ Internal MGPA DAC for APD electronics
  - ✓✓ External voltage generator for PN electronics

Monitoring sequence

- **Mandatory :**
  - **Blue (447 nm) : 24/7**
- **Accessory :**
  - **Green ++ (Redundancy/Consistency)**
  - **Red**
  - **LEDs**
- **Proposition for 2015**
  - **447+527 in production**
  - **447+527+800 from times to times**
  - **No soak light**
    - ► **Not used in 2012 pp collisions**
  - **No LEDs in production**
    - ► **Nobody uses it**

Correction coefficients

- **2015 starting point**
  - **Normalize to early 2011 transparency values (as for Run 1)**
  - **Reuse of latest 2012 intercalib coefficients**
    - ► **Need up-to-date transparency measurements**
  - **Need a global transparency measurement of ECAL**
    - ► **With collision conditions (M=50, B-ON, T=18°C)**
    - ► **EB+9 absent of November CRAFT**
    - ► **Wait for forthcoming CRAFT**
      - **FULL DETECTOR "ON" MANDATORY !**

Weak points

- From experience
  - Disk missing after a power cut
    - ▶ Mirror 2 laser farm PCs
    - ▶ Put a single swap procedure

    To be done
  - Disk overflow due to processing stop
    - ▶ Ensure that the production CMSSW release is always present on the farm

    How ?
  - No laser data on the farm
    - ▶ Streaming should be put on the check-list of the central shifters

    To be done
  - Strange monitoring sequence
    - ▶ Very old key loaded after a recovery
    - ▶ Load the right key

    How ?
  - Available people
    - ▶ 5 new people involved in the business (busyness ?)
    - ▶ Knowledge and responsibility transfer from Federico and Philippe

To be done

- (Re)Commission/(Re)Check/Tune
  - DB writing of corrections
  - O2O
  - L1 corrections in EE
  - L1 corrections in EB
  - Protections against overflow/underflow/crazy/no correction
- Finalize diagnostic tools
  - Lightchecker
  - EcalMon
- Improve redundancy/availability
  - PC mirroring
- People training / Doc writing
- Recalibrate electronics (shapes/linearity)

Conclusion

~/bin/lmfc start all