DESY @ CMS

On Behalf of the DESY-CMS Group
Wolfram Zeuner

- **Organization**
- **Trigger & DQM**
- **Computing – CSA07**
- **Tracker Alignment**
- **Castor Calorimeter**
- **Technical Coordination & BRM**
- **Summary and Outlook**

Organization

DESY CMS group has meanwhile five main activities

I. Physics

- **Top physics**
- **Underlying event & mulitple interactions**

II. HLT & DAQ

- **HLT supervisor**
- **Data Quality Montoring**

III. Technical Coordination

- **Management**
- **Technical help**
- **Commissioning Beam Radiation Monitor**

IV. Computing & Software

- **Management**
- **Software instal. & MC production**
- **Tracker Alignm. (with Uni HH)**

V. CASTOR Cal.

- **Coordination**
- **design & construction for testbeam (2007)**
- **FEA calculations**
- **electronics**
- **physics (proton structure)**

Organization

- DESY CMS group has now members from Hamburg and Zeuthen
- Group size grew significantly, now: 21 scientists, 5 PostDocs, 7 PhD Students, 2 Students
- Engineers and Technicians from DESY contribute to several projects

In the CMS Management DESY is well represented

- 2 DESY physicists in the Executive board – M. Kasemann as Computing Coord.
  W. Z. Deputy of the Tech. Coord.
- Coordinating tasks – J. Mnich: Top Physics
  A. Meyer: High Level Trigger & Data Quality Monitoring
  C. Wissing: Computing Integration Coordination
  K. Borras: Castor Calorimeter

Trigger

HLTS components provided

HLTS FM (Java)

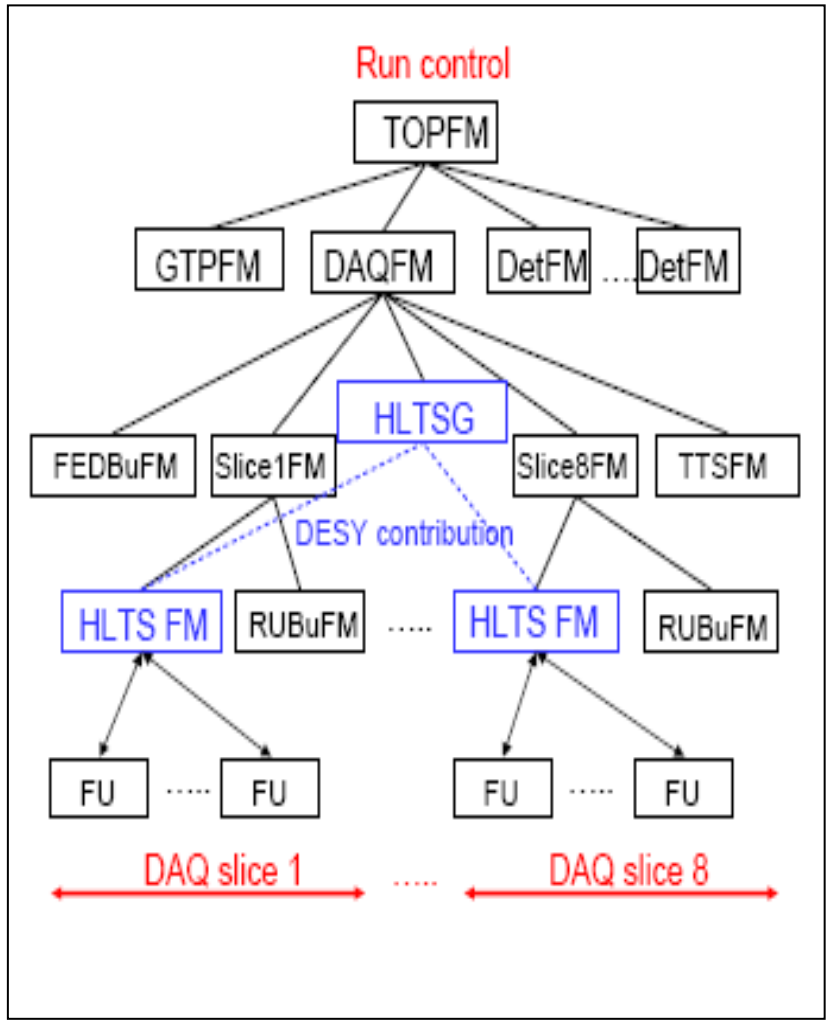
- per slice FM controlling FUs
- drives state transition requests from RC to FUs
- distributes run configuration from DB at start of run
- gathers slice monitoring information
- handles FU error states

HLTSG (Java)

- single instance of process for configured slices
- accumulates information from all HLTS slices
- stores trigger statistics
  per 93 sec Lumiosity Section (LS) to DB
- Allows luminosity tracking with trigger prescale factors
  sources web service monitoring information

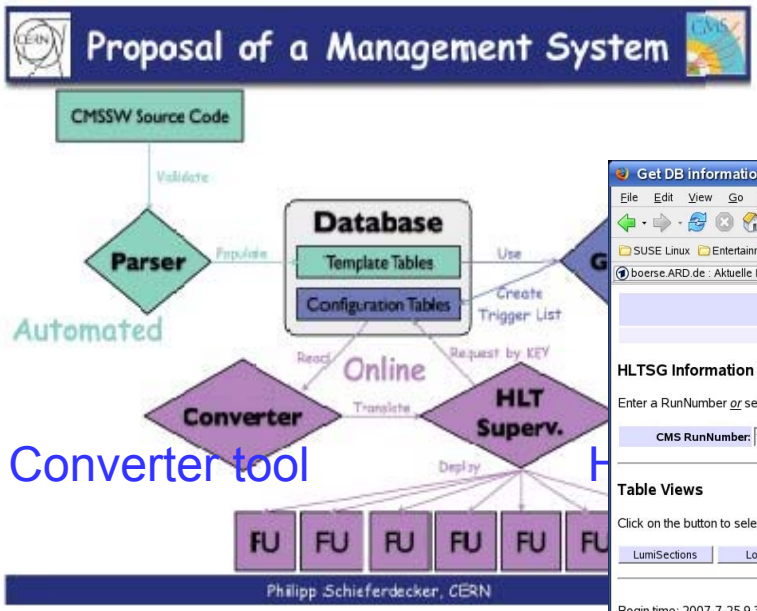
Prescaler service class to analysis Famework (C++)

- Gives analysis program running in FU
  access to prescaler

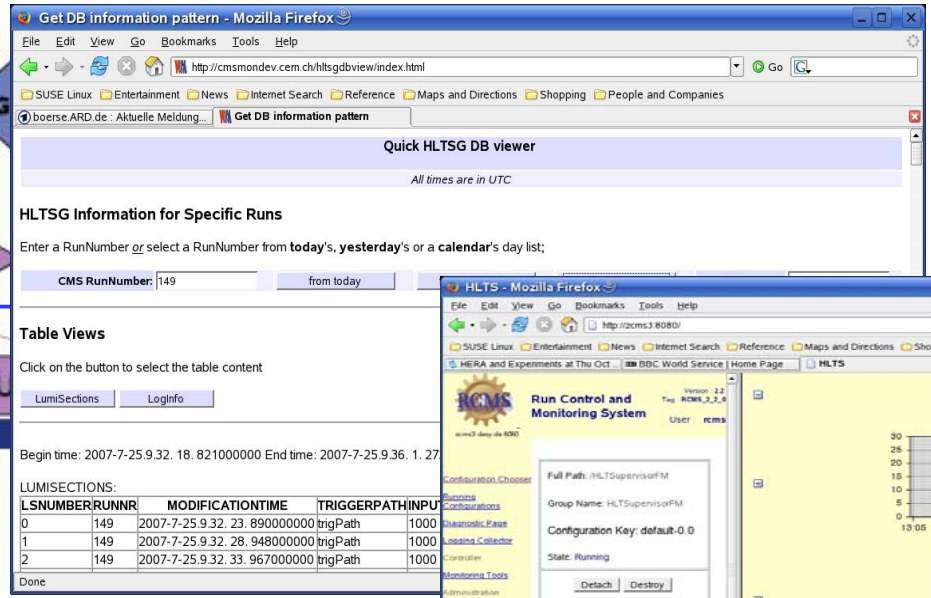


Trigger

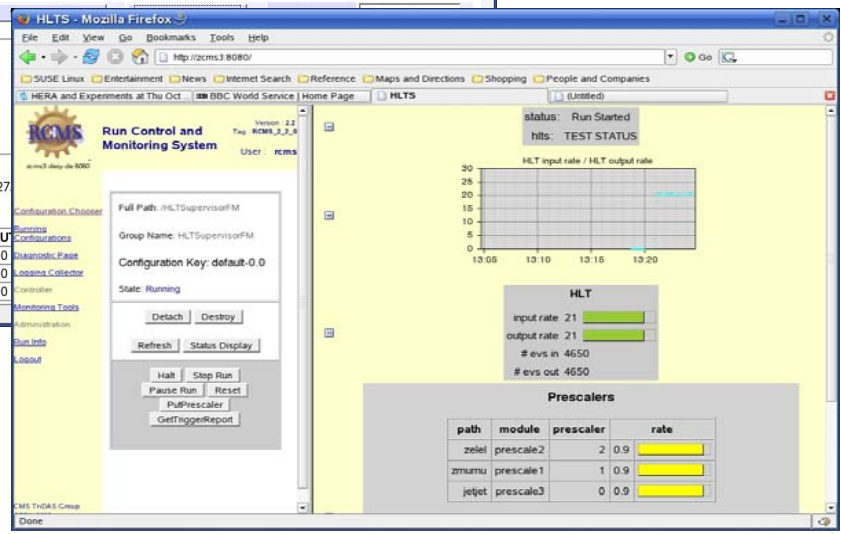
Configuration, Viewing and Monitoring Tools



HLTSG DB viewing tool



Monitoring tools



Configuration DB converter tool

- Get configuration from DB using key at start of run
- Send configuration string to FUs

Cmsmon tool to view HLTSG DB entries (Ajax+Java)

Monitoring tool to view HLTS performance (Ajax+DWR)

DQM

DQM GUI

- **Web-based service**
  no specific S/W installation at user side

access from

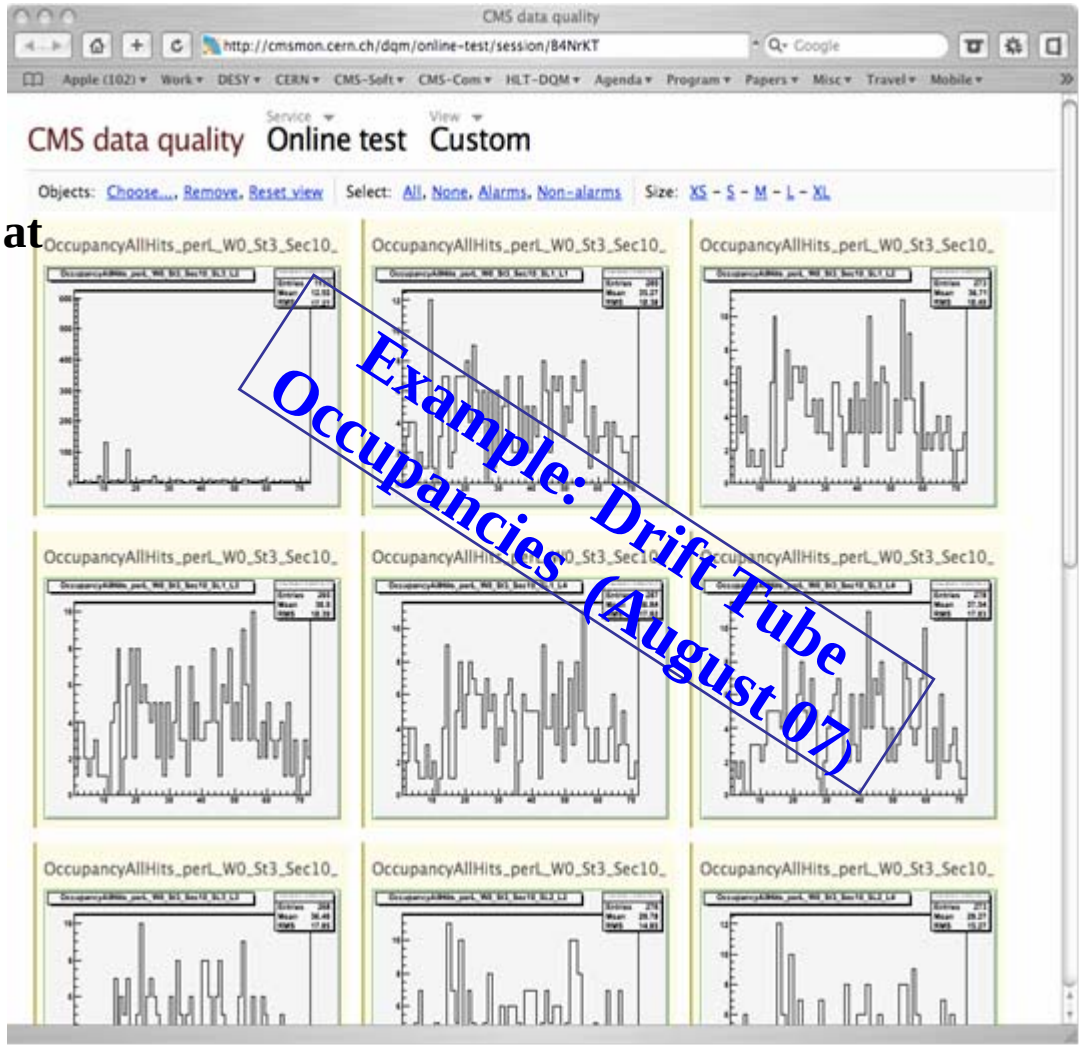
- **Experiment**
- **CERN**
- **Any remote location**

access to

- **Online (live)**
- **Online (archive)**
- **Offline (e.g. CSA07)**

Release Validation

...



DQM

Timeline for Online DQM

- Automated operation and shifters
- GUI: introducing layouts and plugins
- Remote monitoring (from ROC@FNAL)

GRES 09/07

- GUI: with full navigation and robust backend interface
- Introduce DQM application baseclass

GREN ~11/07

CCR07

- DQM in Run Control
- Subdetector and trigger DQM fully integrated

CCR0T

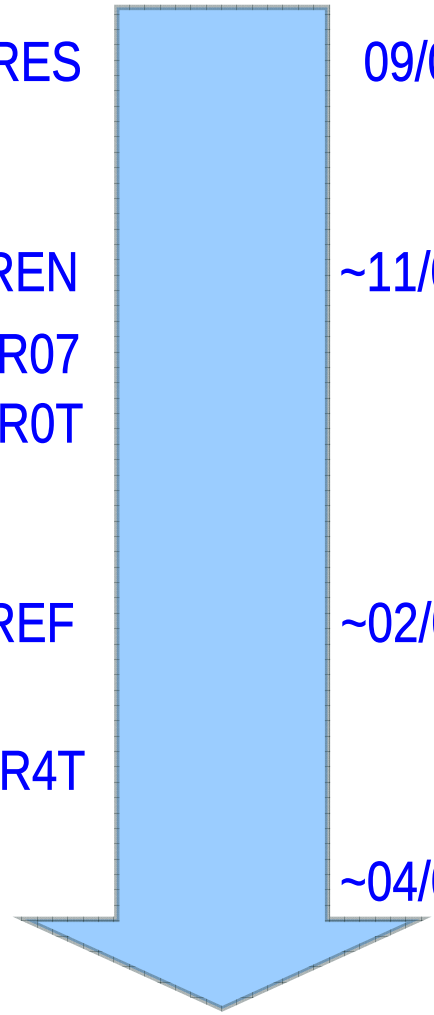
- Archival & retrieval of DQM info (GUI backend)
- Error reporting and persistency

GREF ~02/08

- GUI, history, trends, correlations with conditions
- Standardized DQ certification criteria (first set of standardized status bits)

CCR4T

~04/08



DQM must be up for pp-collisions in June 08

DQM

Progress since Summer 07

Online DQM

- Several subsystems have been integrated: Trigger, HCAL, ECAL, DT
- GUI Development started, first working version available for DQM shift operation

Offline DQM

- Architecture defined, development starting
- Produce, view and archive one set of histograms per data set (streams, runs, MC-sets)
- Same Framework as for online DQM

- Development and integration of Data Quality Monitoring is well underway
- Looking for 1-2 FTE for help (programming) in core development and integration

Computing – CSA07

Computing,**S**oftware and **A**lignment

50% of the system at startup

First pass at Tier0

RAW → RECO → AOD

Aim for 100Hz @ T0

RECO, AOD shipped at Tier1 with 2.4 Gbits/s

Central analysis skims at Tier1

RECO → Analysis algos → AOD + Analysis Data

Analysis skim output shipped at Tier2

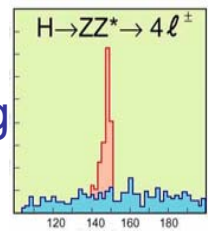
Final analysis pre-selection at Tier2

AOD + Analysis Data → Further selection, Reduced output → Fewer AOD coll. Analysis Data

Final samples shipped at Tier3

CSA took place all Oct.07

fast processing at Tier3

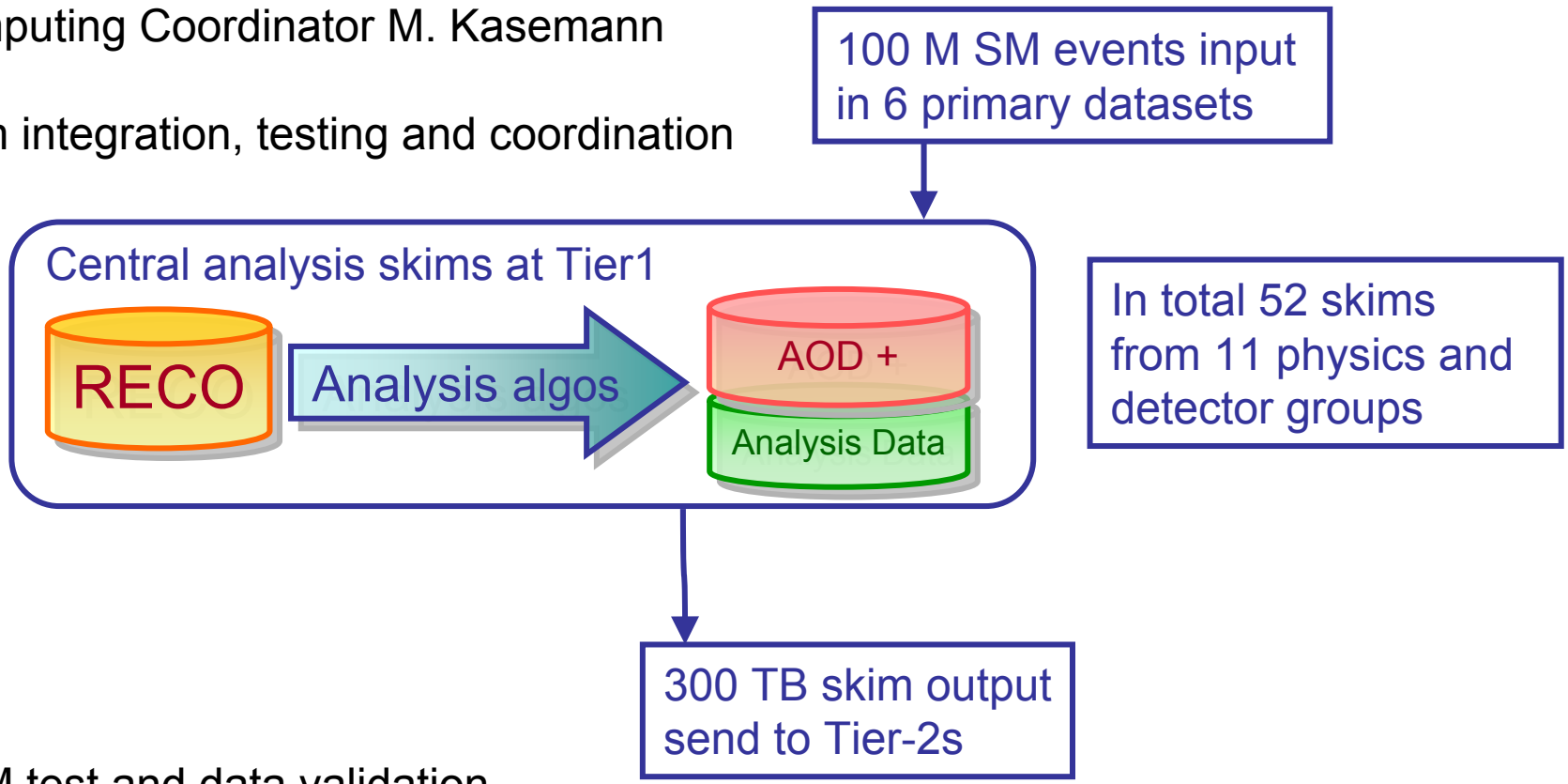


Computing – CSA07

DESY participation

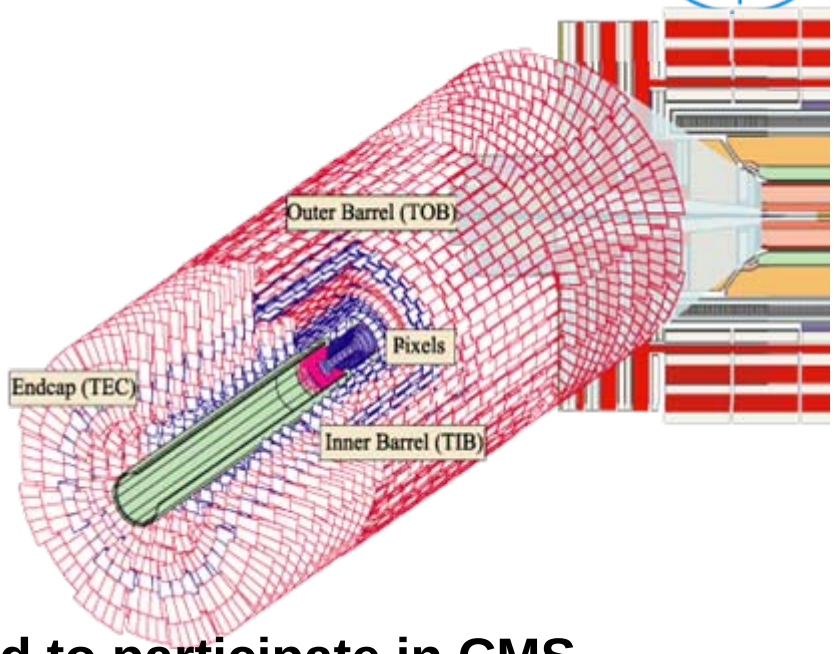
- General management, planning and coordination
- Computing Coordinator M. Kasemann

- Skim integration, testing and coordination



- DQM test and data validation

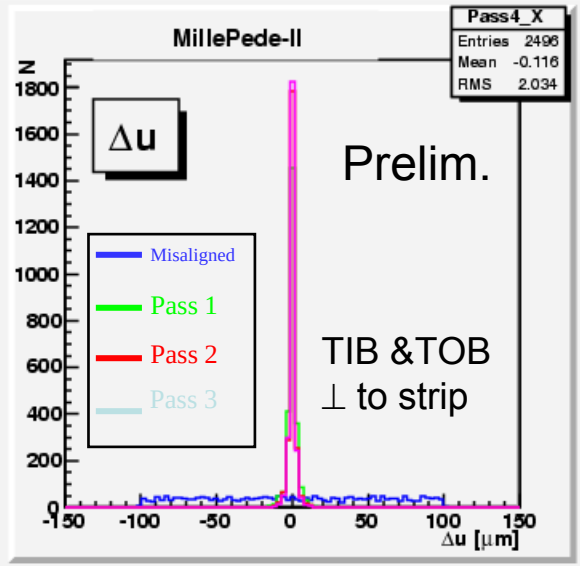
CMS Tracker Alignment

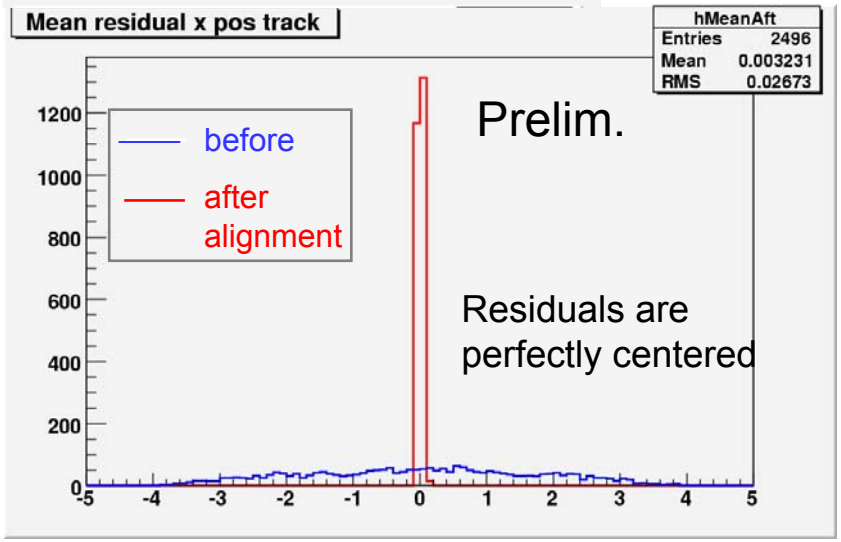


- **CMS features one of the most complex tracking systems ever built**
  - performance depends critically on accurate alignment
  - formidable alignment problem (in full detail >50000 free parameters)
  - key issue for b and τ tagging
- **Members of CMS DESY have started to participate in CMS tracker alignment effort**
  - benefit from experience gained in the HERA experiments during alignment of silicon vertex detectors
  - in close collaboration with CMS group of University of Hamburg
  - using MillePede-II algorithm by V. Blobel

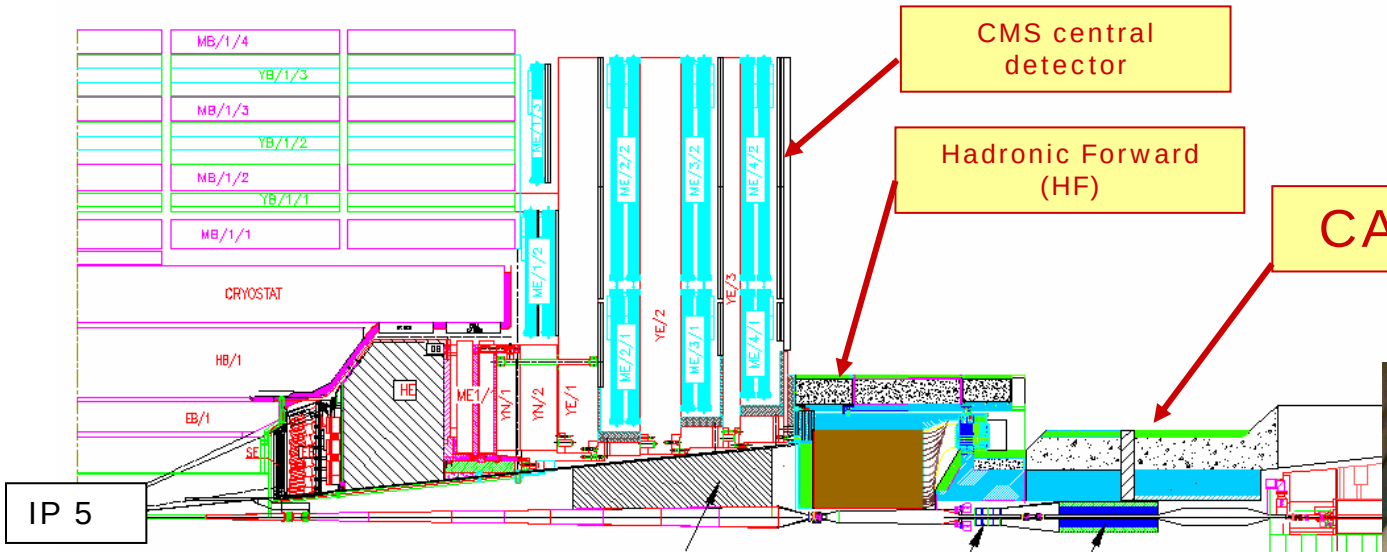
CMS Tracker Alignment

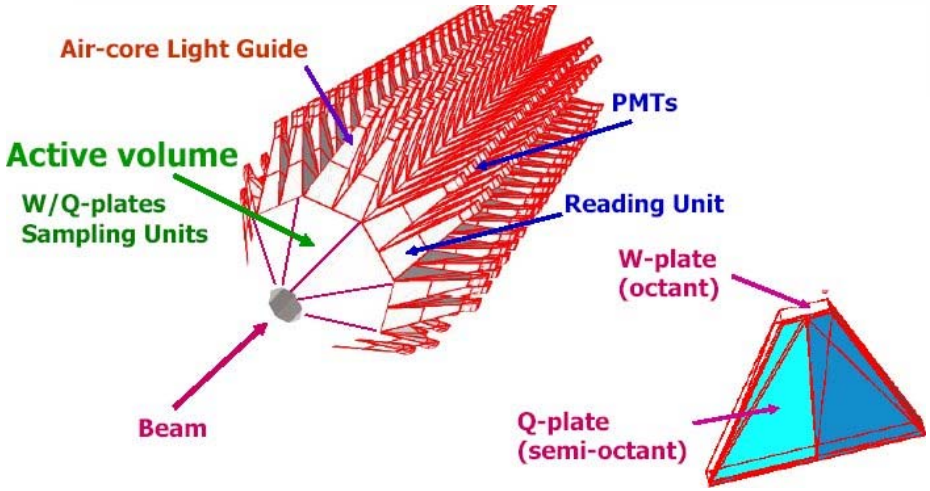
- **DESY has been responsible for conducting the MillePede alignment exercise for the CSA07 challenge in Oct'07**
- 1.7 million of simulated Z→μμ events, ~12000 parameters
  - full production chain
    - starting from AlCaReco files (produced by HLT)
    - ended with uploading of aligned geometry into the database
  - performed on the newly instated CAF system (=CERN Analysis Facility)
- **Full exercise lasted 1 day**
  - first alignment constants uploaded after 3 hours

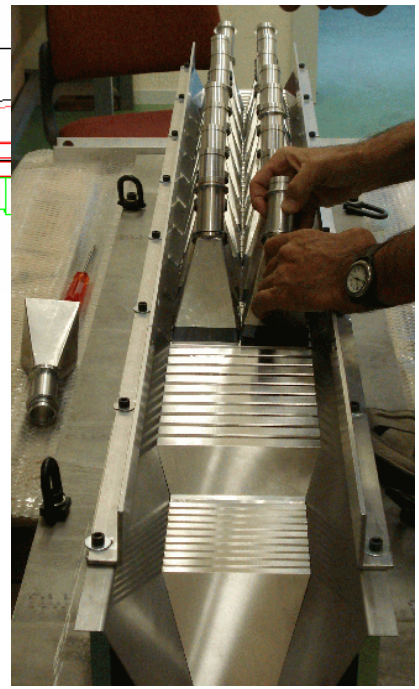




Activities for the CASTOR Calorimeter

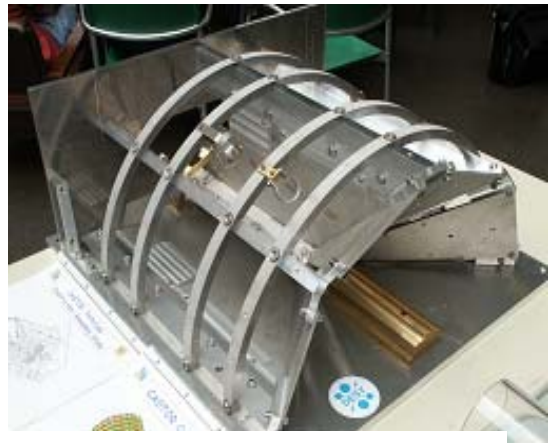






Present Status of CASTOR

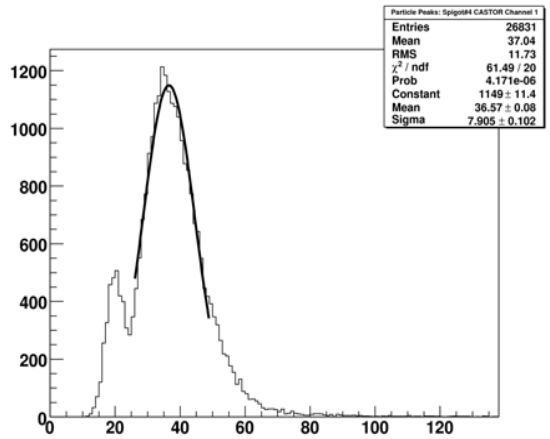
Jan 2007: DESY members joint CASTOR group
contributing to: physics (HERA know how), construction, electronics, DAQ-software, beam test analysis, project coordination



May 2007: CASTOR approved as CMS component

EM1 channel: muons, 50 GeV

Aug 2007: beam test of prototype verifies design



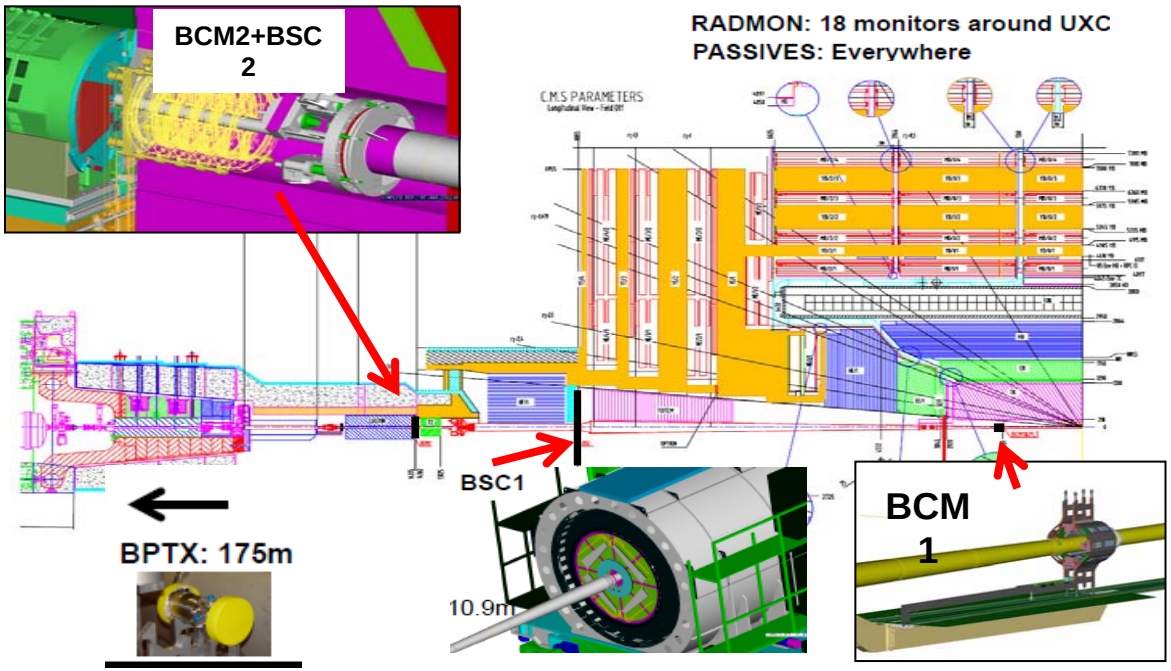
Sep 2007: contribution to funding and manpower through a new approved Helmholtz-Russian-Joint-Research group: DESY–ITEP–MSU– MEPHI

Oct 2007: Engineering Design Review passed

Ultimate Goal: installation and data taking at start of LHC running

Commissioning of BRM System Components

BRM: Beam and Radiation Monitoring
- monitoring of the beam induced radiation
- monitoring of the machine status and the subdetector operation conditions
- real time fast diagnostics of beam conditions and luminosity optimisation



DESY responsibility:
- Test and characterization of diamond sensors for BCM1L
- **Test and running in of the BCM1F part of the BCM W.Lange currently @ CERN**

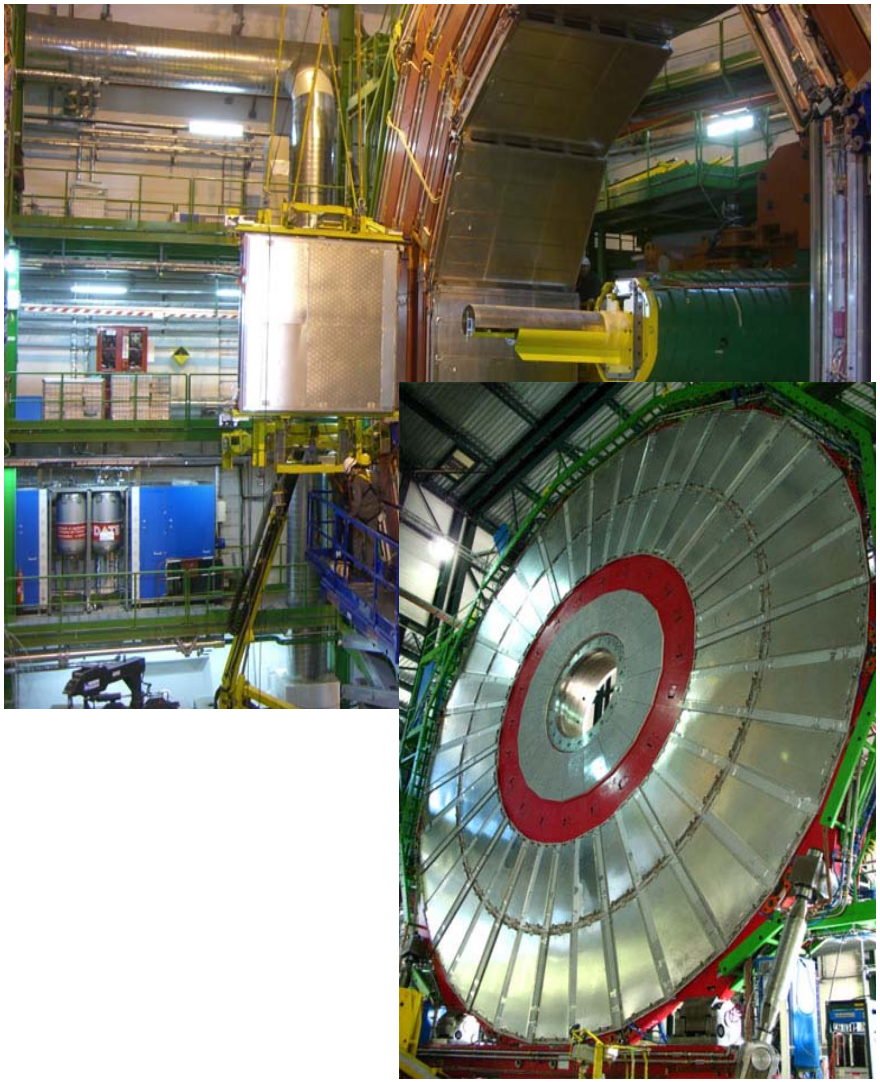
Technical Coordination

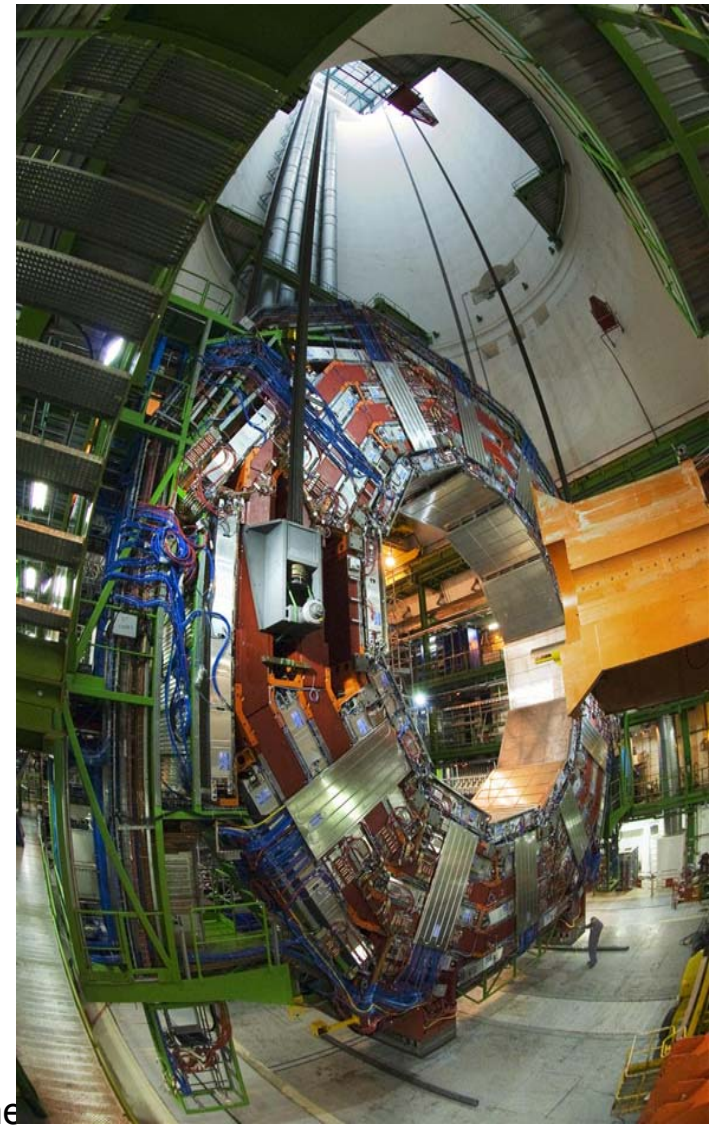
Main progress since June:
- ECAL fully installed
- YB0 cabling end in sight !
  Tracker Cooling & LV and HB finished
  EB cabling & Optical Fiber installation in full swing

- YB-1 & YB-2 lowered
- HF rising operation tested
- All Muon chambers installed - DTs and RPCs
- Infrastructure almost ready for positive Endcap and YB0 – LV and cooling

Still to come
- Tracker Installation
- Lowering and connection of 3 negative endcap disks
- Beampipe, Pixel & BRM Installation

Technical Coordination





Summary and Outlook

- **DESY- CMS is a very active group with a broad variety of activities**
  - **produces high quality results**
  - **highly respected within CMS**
  - **high visibility, good representation in the management of CMS**

- **Set up of ROC at DESY is planned**

- Further increase of group size is desirable
  More PostDocs for Physics and DQM are most welcome

General Outlook

LHC time schedule unchanged – Beam announced for End of May 08
- Recent problems solved – Triplets, RF-fingers…
- Cool down schedule is very aggressive…

CMS WILL BE READY FOR THE FIRST BEAM