EDR
-
Engineering Design Report Plans

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Previous relevant Reviews:

- EDR of the CMS Central beam pipe (5-3-2012)
  - https://indico.cern.ch/conferenceDisplay.py?confId=180478
- PRR of the CO2 cooling plant full scale prototype at TIF (9-5-2012)
  - https://indico.cern.ch/conferenceDisplay.py?confId=190020
- PRR of the on detector Lasers (6-12-2012)
  - https://indico.cern.ch/conferenceDisplay.py?confId=220231
- Review of the collar design for the beam pipes support at 1.6m (tomorrow 10-4-2014)
- Stainless Steel CO2 transfer lines on YB0 (17-04-2013)
- Review of the installation issues and mitigating actions (26-04-2013 ?)

EDR - *Definition of EDR from the CMS Constitution (chapter 5.7)*

"Before launching the construction of major parts of any sub-detector or sub-system, or engaging in major related expenditures, the Technical Coordinator, at the request of (or with the agreement of) the relevant sub-project manager, organizes reviews to confirm the soundness and completeness of the chosen design including the coherence of all interfaces with respect to neighbouring sub-detectors or other parts of CMS; the aim being to minimize risks in cost and schedule."

EDR Phase I Pixel Upgrade:

The review will touch all aspects of the Phase I Pixel Upgrade Project, focusing on the progress and changes since the TDR. It also focuses on a new adjourned set of milestones and the plan for each of the main blocks of the project to achieve those milestones. This review should allow to have a more up do date overview of the project and a set of documents from which is easier to assess progress, understand the technical issues and be in a position to follow its evolution also from an external broader perspective.

As many important aspects of the project cannot yet be properly evaluated based on exhaustive system test results or larger scale pre-production performance and yield, likely other reviews will spawn from this as a consequence.

EDR plan requested by CMS Upgrade Coordination
Reviews relevant for LS1 tasks requested by CMS TC

Initial Thoughts

- UC wants to have an EDR early and before spending the bulk of the budget
  - BEFORE the vacation period – **best in June** …
- Items can be followed up later in PRR, ECR, ESR, ISR…
  - But the initial EDR should contain the steps/plan towards the follow ups
- The Main EDR makes no sense before we have the first working module ~ end of June
  - → **EDR Mid-July**
- Discussed early on to have a 1st technical main EDR and a 2nd readiness for data taking EDR later

Main EDR – full scope Probably week 30 (July 22nd ff)

1. Reminder of the achievable physics performance (brief)
   - *Focuses on new results with respect to the TDR, status and plan for the reconstruction code, tracking etc., degraded performance in various longevity scenarios.*
2. Overview the detailed design, manufacturing and testing plans of the major components and blocks.

EDR can span 2 days

1. On detector ASICS:
   - *ROCs for layers 2-4, TBM, test results and performance, production, testing, QA plans etc. Plans for the high rate version of the ROC.*
2. Other on detector electrical components:
   - *HDI, cables, opto-components, DC-DC converters, power, signals and controls distribution system for BPIX and FPIX, system test and performance*
3. Sensors
   - *Sensors choice, procurement strategy, QA, distribution to module assembly sites, etc.*
4. Module assembly
   - *Organization, bump bonding, QA, system test etc. for BPIX and FPIX*
5. Mechanics
   - *Module, module assembly and integration in larger structures, shells, disks, half-cylinder, supply tube, cooling mechanical integration. Fabrication, QA etc.*
6. DAQ
   - *FED, FEC, integration in the existing CMS DAQ system, new developments etc.*
7. Power distribution system
   - *Power supplies, power modularity and distribution, expected performance and longevity.*
8. CO2 cooling system
   - *Cooling plant design, readiness and testing strategies (mock-ups etc.), cooling performance for BPIX and FPIX, operational margins.*
9. Pilot blade system
   - *Readiness, integration, etc., what do we want to learn from it ?*
     - Installation issues
10. *Mechanical installation issues and mitigations. Survey strategies.*

3. Summary of milestones, organization, cost and funding.
   - *Include in this section a proposal for further reviews as also emerging from section 2. An important review that will follow concerns all aspects of the project that need to fall in place in order to allow a smooth transition from the present Pixel to the Upgrade Pixel from physics data dating readiness with one to physics data taking readiness with the other.*

Possible Further Reviews

- PRR for the silicon sensors *
- PRR for HDI *
- PRR for the DC-DC converters
- PRR for the ROC chip production *
- PRR for the POH (Pixel Opto Hybrids)
- PRR on module production *
- DAQ
- Power supplies
- CO2 cooling plant
- Online/Offline readiness

* Could hopefully be tackled inside main EDR

2nd main EDR – early 2014 or late 2013

Fast Switching & Readiness for Data Taking

- Installation
  - Insertion
  - Establish services, test, QA
- Commissioning
  - Detector integrity - Pre-commissioning
  - In-situ commissioning
  - Final calibration plan - alignment
- DAQ
  - ONLINE tools
- Full Offline chain
  - DQM
  - RECO / Validation
  - Alignment
  - Etc