GE1/1 Commissioning Plans

Run Organization Meeting

Phase I: Local testing

- DCS and DAQ
  - Connectivity testing
  - Full chain validation
- Detectors
  - Powering, foil stabilization

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- MiniDAQ, joint operations with CSC

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Phase III: Full integration into CMS

- Integration into cDCS and cDAQ

DCS

Done

- [ ] The first version of the local DCS for the full GE1/1 system was deployed at P5 on the 31th of July
  - [ ] Main DCS panel and supportive panels
  - [ ] Alarms and archiving
  - [ ] Data base connections
- [ ] Software fully tested in the lab
- [ ] Gas system DCS panels are ready to install in P5
- [ ] FSM for both chamber view and hardware view implemented

TODO:

- [ ] Rad-mon panels
- [ ] Detector protection system
- [ ] Run DCS test on the cable chain (laptop + multimeter) to confirm the mapping
- [ ] Test FSM for both chamber view and hardware view
  - [ ] Use installed hardware (power supplies), before connecting to chambers
  - [ ] Full connection to chambers
- [ ] Check recipes in config DB, verify readout in cond DB

Detectors

- ☐ HV stability $\rightarrow$ replicate QC6 (GEM foil conditioning)
  - ☐ Procedure to also be used to condition detectors following regular TS
- ☐ Prompt analysis developed for use during QC8

DAQ

- ☐ LV-only connectivity tests, $\sim$ 10 minutes (can do without cooling present) : connectivity good for all components
- ☐ Perform VFAT DAC calibrations at P5 for proper biasing: VFATs able to be used, comparison with values from QC7/8
- ☐ System calibration tests
    - ☐ S-curves, s-bit rate scans, ARM DAC threshold scans: performance comparison wrt QC7/8
    - ☐ VFAT trimming: not done for QC7/8 currently, first new step of setup
- ☐ Prompt analysis equivalent to QC7/QC8
- ☐ Can start nowish for only the first point, provided schedule is arranged with other activities
- ☐ Will start after 10(4?)th October, when LV system will be fully connected and cooling is mounted

Phase I — Local testing

GE1/1–ME1/1 trigger

- ☐ Initial testing ongoing at 904 with a single GE1/1 chamber
- ☐ Trigger data successfully sent from GEM to OTMB
- ☐ This fall continued testing of the path

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- Sign-off on unattended operations
- Prepartion for action matrix review

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DAQ

- ☐ Stress testing system in miniDAQ – deliverables: ensure that DAQ actions are working well
  - ☐ Shake out (potential) clocking issues (we spent much time on this for the slice test)
  - ☐ Ensure state transitions are working
  - ☐ Ensure configurations and special run types are working
  - ☐ Full endcap operation, understanding ZS modes

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- ☐ Latency scan with cosmics
  - ☐ Need CSC trigger (well, any trigger that comes from a particle that was likely to have gone through a GE1/1 chamber...)
  - ☐ QC8 took data for 5 minutes per latency bin ($\sim$ 100Hz) over a range of 40 points
  - ☐ Jian gives a rough estimate of $\sim$ 1Hz ME1/1 cosmic rate at P5
  - ☐ We can play a few games with the chip parameters, to do a very coarse scan, and then a fine scan
  - ☐ Would foresee this to be done during continuous overnight runs after full endcap installation – so November or 2020
- ☐ Prompt analysis equivalent to QC8
- ☐ Deliverable: latency for P5 operations, required for all data taking activities

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Detectors

- ☐ WP definition HV scans
  - ☐ Need long period of cosmics with CSC trigger – overnight runs
  - ☐ After latency determined

DCS

- ☐ Finalization of the action matrix
  - ☐ Slice test matrix can be reused with minor modifications
- ☐ Finalization of the protection system
  - ☐ System that puts the detector in a safe state when the beam is injected $\rightarrow$ NOT needed for the initial commissioning
- ☐ Alarm forwarding to the central shifter
- ☐ Definition of the operational procedures for GEM DOCs and central shifter
- ☐ To be tested and validated during "Handshake test" before the end of the shutdown, together with the other subsystems
- ☐ Current priority of the team is to ensure the control of the power system for the ongoing installation

DAQ

- Take part in MWGRs
  - Absolute earliest would be the last one in November 2019
  - Would benefit for minus endcap from early 2020, especially if ME1/1 minus participates
  - Regular inclusion after June 2020

Summary

- ☐ Gleaned valuable feedback from initial commissioning of July superchambers
- ☐ Overall, procedures are defined and no significant changes
- ☐ Progress already being made where possible
- ☐ minus-side endcap
  - ☐ installation hiatus after next week for cooling work
  - ☐ Plan to begin full phase I around 14th October
    - ■ **LV connection done at this point**
    - ■ **Cooling should be fully in place**
  - ☐ Proceed in sectors (2 SC/day installation rate), as must await long chamber insertion before cooling circuit can be closed
- ☐ plus-side endcap (2020)
  - ☐ Services installation to take place, starting in April
  - ☐ Chamber installation starting in May
  - ☐ Start phase I by June