

LHC-Beam Commissioning Working Group

Notes from the meeting held on
13 October 2009

Present: Carmen Alabau, Ralph Assmann, Roger Bailey, Helmut Burkhardt, Andy Butterworth, Bernd Dehning, Lene Drosdal, Massimiliano Ferro-Luzzi, Massimo Giovannozzi, Brennan Goddard, Hitomi Ikeda, Delphine Jacquet, Lars Jensen, Verena Kain, Mike Lamont (chair), Aurélien Marsili, Malika Meddahi, Gabriel Mueller, Lasse Normann, Mario Pereira, Laurette Ponce, Bruno Puccio, Stefano Redaelli, Stefan Roesler, Rogelio Tomas, Katarina Sigerud, Jörg Wenninger, Walter Venturini Delsolaro, Simon White,.

Excused: Kajetan Fuchsberger, Eugenia Hatziangeli, Alick Macpherson, Frank Schmidt, Ezio Todesco, Jan Uythoven.

1. Comments and actions from the last minutes

Follow-up actions:

Concatenated optics for the injection tests: Massimo Giovannozzi. Work is in progress, collimators installed during the shutdown are being added to the sequence, consistency checks between the 'as-designed' and 'as-built' data base are continuing.

Regeneration of all Transfer Function and harmonics: to be done.

2. News from LMC – Mike Lamont (slides)

Summary notes from previous LMC meetings, written by Brennan Goddard or Frank Zimmermann, are available [here](#).

- Repair of electrical connectors on triplets being done
- Powering tests
- nQPS commissioning
- Schedule updates: **NOTE: Sector test confirmed for next week, 23-26 October. Both beam lines** will hopefully be available.
- Operational consolidation
- Pulsed current measurements of stabilisers
- Cabling modifications for TOTEM optics
- CMS pumpdown delay – Massimo Giovannozzi reminded that aperture evaluation depends on the hypothesis taken for the tolerances –being mechanical, alignment ...- The quoted $n_1=5$ has been calculated with 15 mm tolerance; with the new tolerance estimate of 10 mm, the resulting n_1 is within specification.

3. Dry Run news – Verena Kain (slides)

W41:

a- Concentrator stress test: BPMs working fine. Still need to test with pre-pulse for capture. BLMs capture concentrator: from time to time packages are lost and data from some front-ends do not arrive. It has been investigated to speed up the acquisition time for acquisition mode FAST (from 9 s to 2 s) for the crates in point 3. It works. In this way we found that the acquisition time stamp of the XTIMs can be wrong by 1 ms. A temporary solution was found for this (it is not guaranteed that this will cure the problem however).

b- Abort gap monitor: critical settings trimming graphically from application: working fine.

c- First TOTEM controls test with pots in point 5. All the controls layers working fine. Some issues: see summary link below.

d- LHC BTVs interlock tests: all BTVs tested with alarms and BIS. BTV in point 4, beam 2, could not be moved in and status read back due to interference with beam info. Has been fixed (Bruno Puccio).

e- TCDQ: controls tests plus energy interlock thresholds with LHC beam energy ramped at the same time. Essentially working. Some issues were found, see summary link.

f- Tune, headtail: Headtail postponed to this week. Tune: on demand system and continuous for FFT from BBQ available and working nicely. Some RBAC issues were found, see in summary link. Trim functionality from application still needs testing.

g- ALICE spectrometer + compensators: One compensator was consigned, otherwise working nicely. Nominal currents of spectrometer and one compensator need to be verified (see summary link). Also, sequencer tasks for polarity switching are necessary.

h- MKI softstart validity now only updated if real pulse occurs through magnets. It was tested successfully.

i- AC dipole – hole in the waveform: traced back to Oasis acquisition algorithm. Will be tested again.

More details can be found under:

<https://espace.cern.ch/mddb/Activity%20Tracking%20Tool/Activity%20Tracking%20Welcome.aspx?View={593B6E53-F6F9-4485-8646-E7E683D0F681}&SelectedID=51>

Program for W42:

- Experiments: LHCb spectrometer+compensator, luminosity scans, handshake...
- MKI synchronisation: fine now, tested 12 October during beam tests. Etienne Carlier is checking the possible source of the problem. Jörg Wenninger: Kicker delays will have to be revisited once all beam tests are done, including ion settings, and values frozen.
- BPM capture with pre-pulse: fine.
- Timing upgrade: Wednesday
- Headtail monitor
- TCDQ tests continued: Thursday
- LBDS settings upload and MCS check: Thursday
- LBDS arming+inject&dump: Thursday and Friday
- Vacuum+close valves sequence: communication test: possibly Wednesday
- PGC preparation: PGC hypercycle and operational beam processes

4. BIC configuration for sector test – Jörg Wenninger ([slides](#))

Each sector configuration required for the sector test was listed, together with the ring BIS 'inputs'. MPS activities during sector tests:

- Before injections, with downstream TEDs open: beam flags test to be done (30mn). Probe beam intensity: $1e10$.
- FMCM in TI 2 / TI 8: 20mn, quasi parasitic
- BLM trigger test: high priority – schedule ASAP- 30mn if all goes well. Will have to disable the BLMs around collimators.
- Post-Mortem event with beam – mostly parasitic. Post-mortem will have to be available during the sector tests.
- SIS: Parasitic -unless interlocks are generated.

Safe beam flag=true: is now operational.

Bruno Puccio: strategy: disable the un-maskable systems and leave all the maskable ones. Time is needed to set up the systems, and will depend on the beam(s) used. Mike Lamont: It will be decided latest by Wednesday next week.

5. Sector tests and full LHC beam commissioning – Mike Lamont - round table

Injection test dates still hold:

DSO tests: Tuesday 20 October

Full patrol on Friday 23 October

Beam tests: from Friday 23 October to Monday 26 October, 07:00.

Next tentative date for the second sector tests: 7-8 November

Programme of the injection tests, with one or two beams: ([link](#))

Brennan Goddard: To be added in the sector programme: TCDI setting up, checks of phase space coverage and accumulate transmission data. Jörg Wenninger: time could be taken out of the kick response measurement time. Time estimate to be done.

Priority for the high order polarity checks? Mike Lamont: Check at least the MQTs. Massimo Giovannozzi: to add as well skew quadrupoles and also the test for aperture swaps (i.e. change setting for one beam and verify if there is any impact on the other one). It was previously agreed to have this new type of test added to the usual list of polarity checks.

Brennan Goddard: during the sector test, would be very attractive to have 2 LHC cycles in the SPS supercycle, one sending beam to TI 2, the other one to TI 8. Mike Lamont: yes, good point, will be considered.

Mike Lamont: Ions could as well be available at the end of week 43. Ralph Assmann: BLM thresholds with ions vs protons could be rechecked.

Brennan Goddard: Kicker preparation might need an access. Will assume both beams and need to plan with powering and other activities.

Stefano Redaelli: Shift crew will have to be organized for the sector test, taking into account the measurement programme, especially if power tests continue during the week end. Roger Bailey: will be done.

Ralph Assmann: will the sector test be done with the SPS scrapers running? Brennan Goddard: should first preferably be tested during beam line tests.

Update on the LHC beam commissioning schedule: week 48 to mid week 51 [link to schedule](#).

[6- A.O.B.](#)

Outcome of the TI 8 beam test for LHCb: Monday 12 October, 18:00 to 13 October 06:00:

Massimiliano Ferro-Luzzi: LHCb got all data needed. – magnet ON was not tested.

Malika Meddahi: The 2 LHC cycles within the SPS supercycle rendered the beam tests very efficient. Jörg Wenninger loaded the new TI 8 optics and regenerated the whole settings. He also applied new calibration curve for the MQIs. Measurements were performed: trajectory, screen matching (Verena Kain), dispersion, phase advance (Kajetan Fuchsberger). Preliminary results show good agreement with the model. TI 2 optics will be similarly rematched (taking into account b3 and b2 components of MBIs) and **time was requested (8 hours) to perform further checks before the sector tests.**

Mike Lamont: **Sector test preparatory meeting: DAILY, 17:00, in the CCC glass box, as of Monday 19 October.**

[Next meeting](#)

Tuesday 20th October 2009, 15:30, 874-1-011. Agenda will be sent in due time.

Malika Meddahi.