

PS RESTART AFTER LS1

26/03/2015

OUTLINE

- 1) LS1 main modifications
- 2) Planning
- 3) Hardware tests
- 4) Cold check-out
- 5) Beam
- 6) Summary

LS1 main modifications

a) PS machine (and experimental areas)

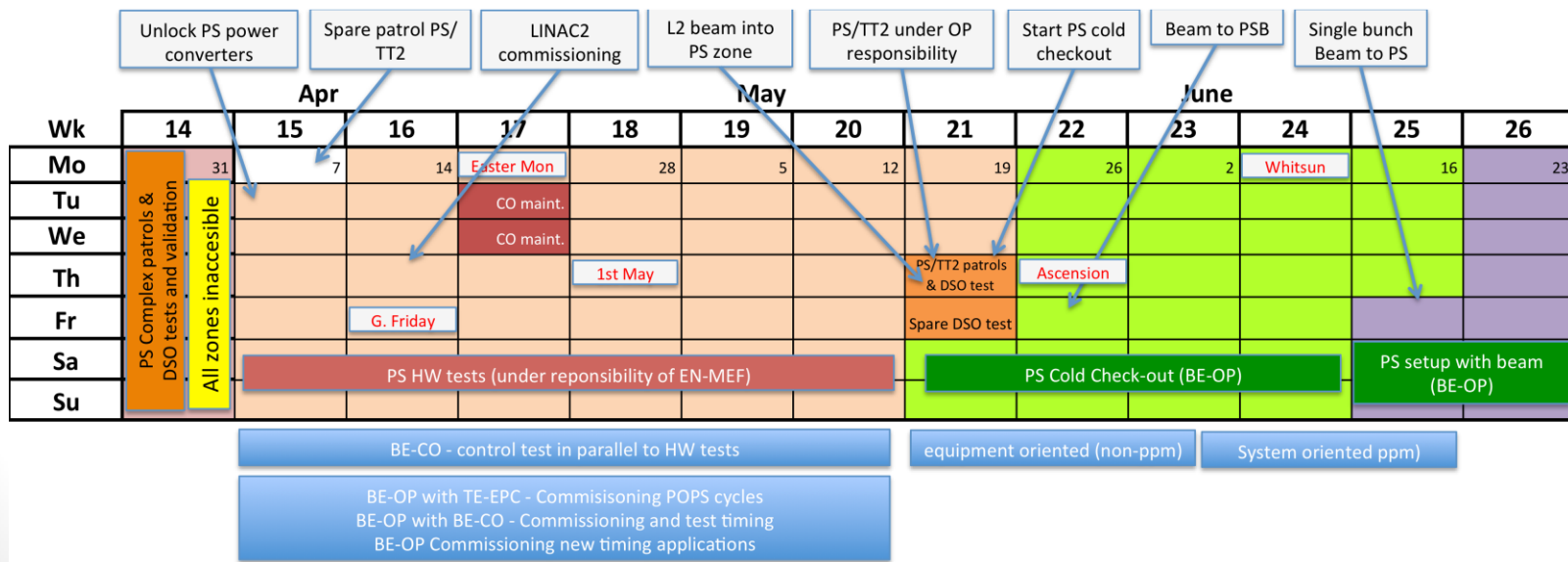
- New access system
- Ventilation renewed
- 7 main magnets consolidated
- Dummy septum installed (in the place of a vertical dipole)
- New sextupoles, octupoles
- New Finemet cavity
- RF cabling to Central Building completely modified
- Etc...(auxiliary) magnets displaced, BI devices removed/installed/displaced...
- New CHARM IRRAD facility in the EAST HALL
- New zone in nTOF

b) Controls

- New timing and function cards
- 33 New front-ends computers (out of 78)
- GM to FESA migration, or new FESA classes
 - RF, Pow, Timings, Kickers, Bumps (CAMAC), functions

Recommissioning planning

- **April-May (6 weeks):** Hardware tests for equipment groups.
 - Responsible: EN-MEF, PS superintendant
- **June (4 weeks):** Cold check-out
 - Responsible: OP



Hardware tests (weeks 15-20)

- Daily morning meeting, 8h30, in MEYRIN

a) Onsite

- Auxiliary power converters tests
 - Should not need a remote control (controls system not available, impossible to program remotely the required functions)
 - Required RMS not always easy to obtain/program
- Polarity checks
 - OP should (at least) provide a procedure to TE-MS
 - Polarity errors discovered with the beam
- POPS
 - Needs the PS to be patrolled and closed
- Alignment issues

b) In the CCC

- Test the new access system
- Check menus in the CCM, launch and check applications...
- Program some cycles (SFTPRO, TOF, AD, EAST) to start working on timings
- Close and patrol (and patrol, and patrol, and patrol, and patrol, and...) the machines
- DSO tests

Cold checkout (weeks 15-20)

a) Checks

- Checklists for all power supplies
 - Control values, functions, acquisition, OASIS signals
- Dry-runs
- Main applications
 - OASIS
 - Orbit, screens, semgrids, wire scanners, transformers
 - Timing Survey Acquisition, tune measurements, Bunch Shape Measurement, Tomoscope
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b) Main Issues

- CO configuration tools missing (CCDB to LSA)
- PPM with the new FESA PowM1553 class (1248 devices)
 - Control and acquisition interrupts required re-configuration for many devices
 - Double-ppm not similar to the old GM class (non-exclusive)
 - Only one specialist, in a holydays period
- Up to 400 ms required for the acquisition of 1553 devices (loops treated one after the other)
- Patrols frequently lost with the new access system

BEAM

a) Beam start-up

- First injection (and acceleration to 26 GeV on H8) on the 19th of June (planned the 20th)
- LHCINDIV on Dump D3 on the 20th
- Start of EAST HALL physics in time (14/07)
- Beam to nTOF one week earlier than planned (24/07 VS 01/08)
- Early August, 2 days OFF due to a vacuum leak

b) Issues discovered with the beam

- External conditions for beam stoppers not connected
 - Several beams dumped by TT2 beam stoppers
- Polarity inversions
 - Inversion on a quadrupole, impossible to cross the resonance for the slow extraction towards East hall
 - Discovered on a (July!!) Saturday afternoon
- Orbits and trajectories measurements for changing harmonics not working
- Semgrids with mixed wires (!!)
- YASP didn't get data from the orbit system before the 22nd
 - Inconsistency between YASP (used for realignment!) and the orbit system
 - And a few issues that could have been found before (PSB-PS context confusion, wrong BPM names...)

SUMMARY

- New access system
 - numerous patrols
 - delays due to access vetos
 - Polarity checks could (should) be improved
 - Power supplies should be controlled locally for magnets patrols
 - Not a good idea to change the realignment calculation method after a long shutdown
 - Even when everything seems to work more or less properly, cycling and PPM is the hard bit (not mentioning multi-PPM)
 - Cold check-out and dry runs were not as efficient as possible because of the controls system (and -so many- new classes)
 - Even with checklists and when we think we have tested as many things as possible, the beam is the true probe
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- In the end beams were delivered in time