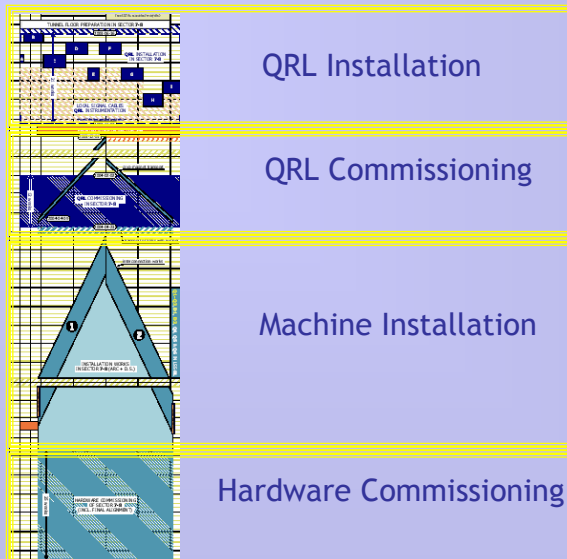


- 1 After the **qualification for operation of the individual systems** of a sector (vacuum, cryogenics, quench protection, interlocks, powering, etc.),
- 2 **each sector will be commissioned as a whole** up to the powering to nominal current of all the circuits.
- 3 **Validation and specific studies** will be carried-out on the first commissioned sector.

Hardware Commissioning

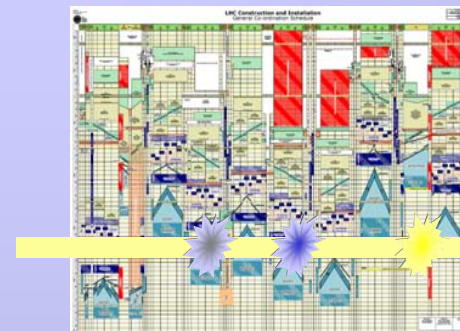


QRL Installation

QRL Commissioning

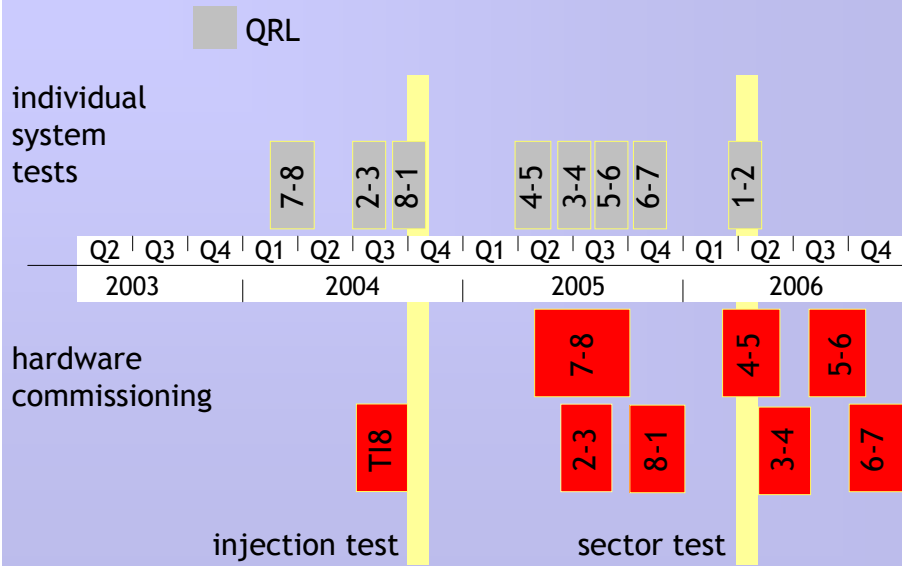
Machine Installation

Hardware Commissioning



Hardware Commissioning
QRL Tests
Magnet Installation

milestones



two big questions

1

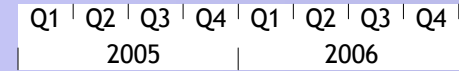
What do we stuff in there?

2

Can we avoid this?



3 months almost 6 for 7-8 the first sector



the context

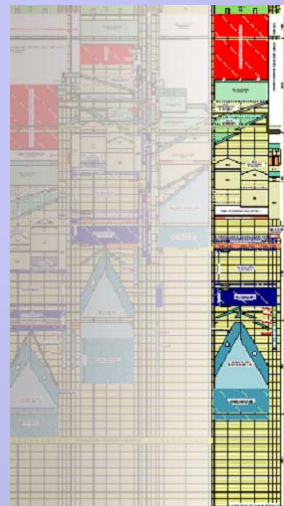
From the AB-OP point of view

October 2004

SPS stop

April 2006

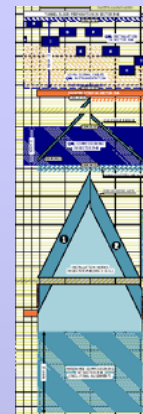
run all machines including LHC



March 2005

December 2006

the phases 1 individual system tests



hardware commissioning team ensures

CONTROLS
is it a system *per se*?

system owners define & carry-out

- What tests
 - the procedures and the sequence
- How
 - what conditions are required to start
 - what conditions determine it is finished
 - what conditions are required during the tests

controls and individual system tests

Like for all other systems, parts of the control system can profit from the individual system test scheme

Timing

Communications (fieldbuses, networks, etc.)

Interlocks

the phases 2 hardware commissioning

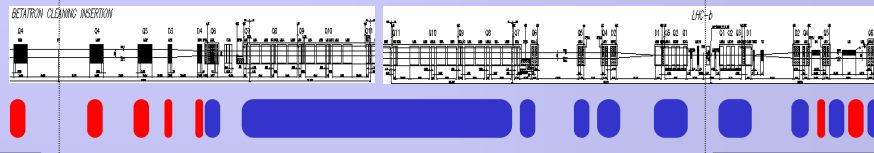


the hardware commissioning team defines & carries-out

- What tests
 - the procedures and the sequence
- How
 - what conditions are required to start
 - what conditions determine it is finished
 - what conditions are required during the tests

the layout

sector 7-8



Subsector including the circuits at room temperature in R7

Arc Subsector 78

Matching Section L8
Inner Triplet L8

the circuits

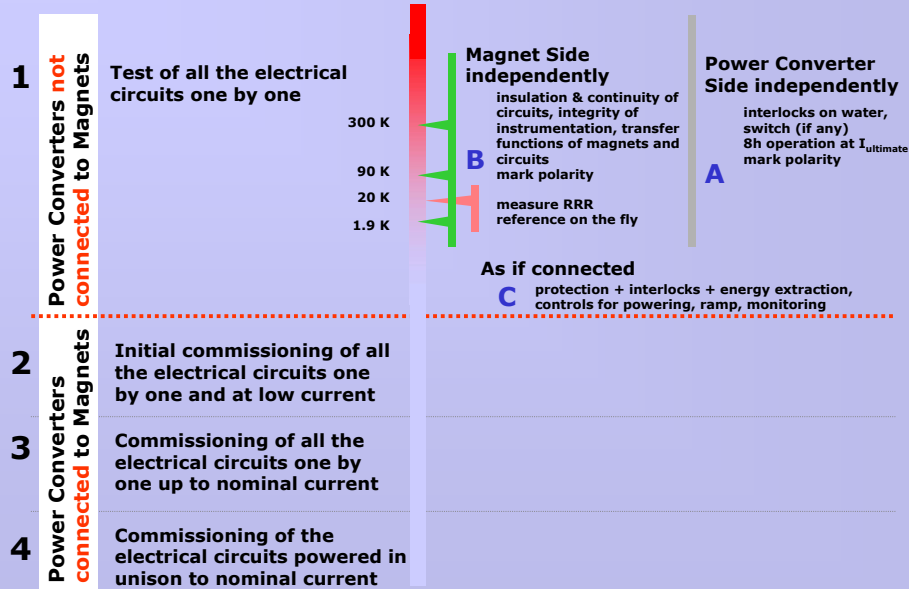
	Circuit Name	Powering Subsector
1	RB.A78.UA83	CIFCA.L8
2	RQD.A78.UA83	CIFCA.L8
3	RQF.A78.UA83	CIFCA.L8
4	RCD.A78B1.UA83	CIFCA.L8
5	RCD.A78B2.UA83	CIFCA.L8
6	RCO.A78B1.UA83	CIFCA.L8
7	RCO.A78B2.UA83	CIFCA.L8
8	RCS.A78B1.UA83	CIFCA.L8
9	RCS.A78B2.UA83	CIFCA.L8
10	RQ10.L8B1.UA83	CIFCA.L8
11	RQ6.L8B1.UA83	CIFCA.L8
12	RQ7.L8B1.UA83	CIFCA.L8
13	RQ8.L8B1.UA83	CIFCA.L8
119	RQT4.R7.UJ76	WIPC.LR7
120	RQT5.L7.UJ76	WIPC.LR7
121	RQT5.R7.UJ76	WIPC.LR7
122	RBLWH.R8.SR8	WIPC.LR8
123	RBXWH.L8.SR8	WIPC.LR8
124	RBXWH.L8.SR8	WIPC.LR8
125	RBXWH.R8.SR8	WIPC.LR8

	Circuit Name
1	RCBH11.L8B1.C12L8
2	RCBH11.R7B1.C12R7
3	RCBH12.L8B2.C12L8
4	RCBH12.R7B2.C12R7
5	RCBH13.L8B1.C14L8
6	RCBH13.R7B1.C14R7
7	RCBH14.L8B2.C14L8
8	RCBH14.R7B2.C14R7
9	RCBH15.L8B1.C16L8
10	RCBH15.R7B1.C16R7
11	RCBH16.L8B2.C16L8
90	RCBV32.L8B1.C32L8
91	RCBV32.R7B1.C32R7
92	RCBV33.L8B2.C34L8
93	RCBV33.R7B2.C34R7
94	RCBV34.L8B1.C34L8

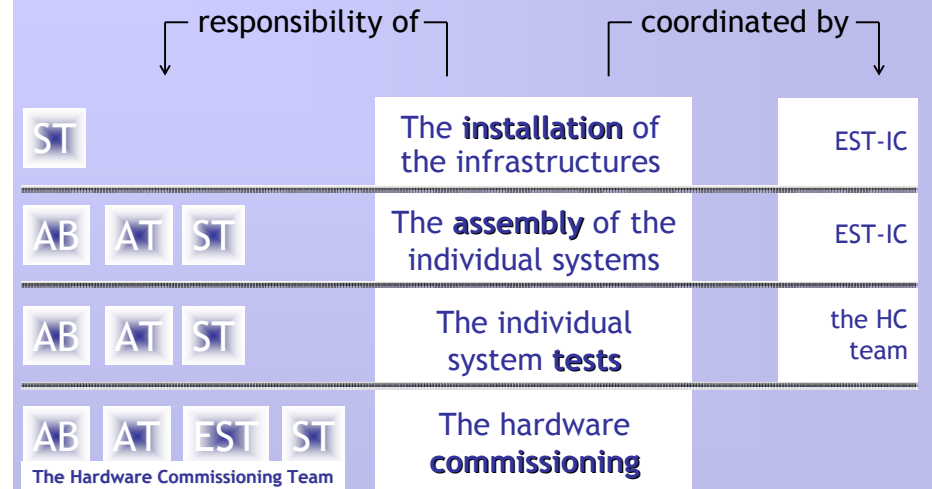
94 orbit corrector circuits

125 circuits across the subsectors

String 2 : commissioning of the electrical systems



the rôles during installation & commissioning



HCWG : the mandate

- group
1. defining the commissioning programme
 2. coordinating the tests for the qualification of the individual systems
 3. following-up the preparation work of the assemblers and the specialised teams checking their systems
 4. carrying-out and coordinating the hardware commissioning
 5. carrying-out validation and specific studies on the first commissioned sector
 6. bridging between hardware commissioning and operation with beam
- team

HCWG structure : organized as sub-groups

Assembly & Survey
Cryogenics & Vacuum
Cold Magnets
Warm Magnets

Controls

Powering & Protection

Beam Instrumentation
Collimators
RF

Cryomagnets, Cryogenics, Vacuum, Survey
Magnets, Cooling & Ventilation, DC Cabling, Survey

Signal Cabling, Networking, Fieldbus, Logging, Alarms, Post-Mortem, Timing, Supervision, Control Room

Power Converters, Quench Protection, Machine Protection, DC Cabling

- Sequentially meet
- Order and frequency adjusted to the needs

1 individual system tests

the inventory of individual system tests

the vacuum systems, the cryogenic systems, the power converters, the quench protection, the machine protection, the injection and dump systems, the warm magnets, the cold magnets, the RF, the cleaning system, the link with experiments, the controls

their schedule

2 hardware commissioning

the procedures for

the sub-sectors,

the sectors,

the special sectors (RF, cleaning, injection, dump)

the injection lines

their sequence

the resources

3 the boundary conditions

the safety conditions

the access conditions

the interference with transport, assembly & tests

the interfaces (inventory)

the conditions imposed on every system

First meetings (3)

- Define the context
- Membership
- Assess the situation
 - cryogenics
 - transfer tunnels
- A close look at the inner triplet assembly, vacuum and electrical quality assurance

Next meeting (Thursday, June 19th)

- Powering profile
- Individual system tests
 - Water cooled cables
 - Dump system
 - Injection lines