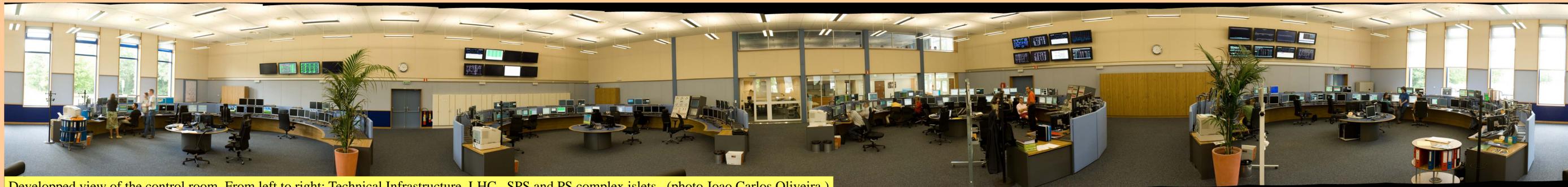




THE CERN CONTROL CENTRE: SETTING STANDARDS FOR THE 21ST CENTURY



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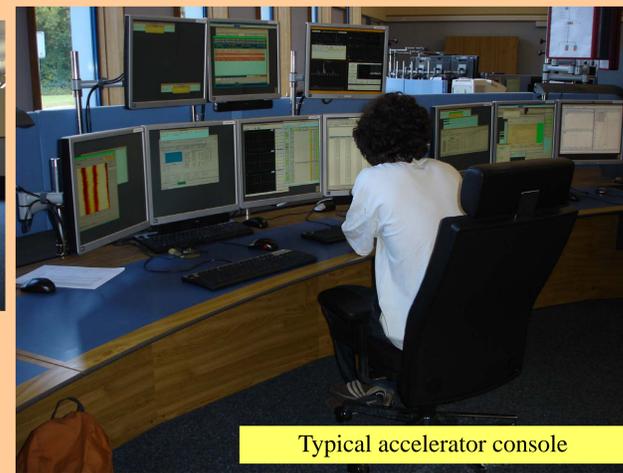
Developed view of the control room. From left to right: Technical Infrastructure, LHC, SPS and PS complex islets. (photo Joao Carlos Oliveira)

BUILDING

- ☞ Designed for the control room, not the other way around!
- ☞ Square structure 25 m x 25 m = 625 m² optimizing use of space
- ☞ High ceiling (5 m) to avoid parking effect, allow space for lighting system, and comfortable distribution of the conditioned air
- ☞ No pillars to support the roof slab, allow good visual communication and easy console layout reconfiguration
- ☞ 8 slotted windows with view on Jura Mountains, NW orientation, with rollable blinds to block sunset light in summertime
- ☞ To ensure reverberation time < 400 ms, all surfaces are acoustically treated for damping: wall linings, carpet, ceiling
- ☞ Direct/indirect (20% vs 80%) lighting system for homogeneous light distribution at the console level
- ☞ 81 luminaries and 8 blinds computer controlled; settings stored by scenarios



The unequipped control room



Typical accelerator console



Technical Infrastructure console

Left to right: SPS islet, central table, PS complex islet



(photo Stefano Dal Pozzolo)



Proton Synchrotron complex access console



Large Hadron Collider access console

CONSOLE

- ☞ 3.6 m curvature radius, marmoleum top, wood appearance (american oak), made of two sector tables of 24°
- ☞ 10 screens distributed into: 2 x3 for controls applications, 2 for fixed displays, 1 split in 4 for video signals, 1 for administration
- ☞ Hosts 4 computers and 1 media centre for treatment of video signals
- ☞ Acoustic back panel on hinges for easy maintenance
- ☞ Prototype tried for 2 months in actual accelerator operations next to Meyrin Control Room
- ☞ Accelerators access consoles integrate special cabinets with 19" standard racks to host systems with hardwired signals

LAYOUT

- ☞ 4 islets respectively dedicated to: LHC+ 1/3 Cryogenics, Technical Infrastructure + 2/3 Cryogenics, Super Proton Synchrotron, Proton Synchrotron complex
- ☞ Each islet has up to 5 consoles (accelerator islets have an access control rack/cabinet), and one round table with public computers, plugs for laptops, Wifi
- ☞ 28 giant screens (46") wall mounted, providing graphical information throughout the control room
- ☞ One large oval table for discussions between operations crews



(photo Joao Carlos Oliveira)



Acoustic panel on hinges, CPUs and screens supports

CONCLUSION

- ☞ The CCC now replaces four previous control rooms (MCR, PCR, TCR, QCR) and controls all CERN accelerators, cryogenics and technical infrastructure
- ☞ On schedule and within budget
- ☞ The control room was built with ergonomics as a first concern, and with the operator at the centre of the project
- ☞ Invaluable contribution of the consulting companies (CCD & GTD). Their fees, which amounted to 1.5% of the budget, was money well-spent
- ☞ Users opinions taken into account at all phases of the design process
- ☞ Milestones reached from the CCC: restart of PS and SPS after 18-month shutdown, commissioning of ions in the PS and SPS, of TT40 and TT60, of CNGS, of LHC hardware
- ☞ Design copied by other "Accelerator and Large Experimental Physics Control" centres around the world: ALICE, ATLAS, CMS, LHC@FNAL, PSI; ITER is interested



Simulation in 2005 ...



reality in 2007!