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

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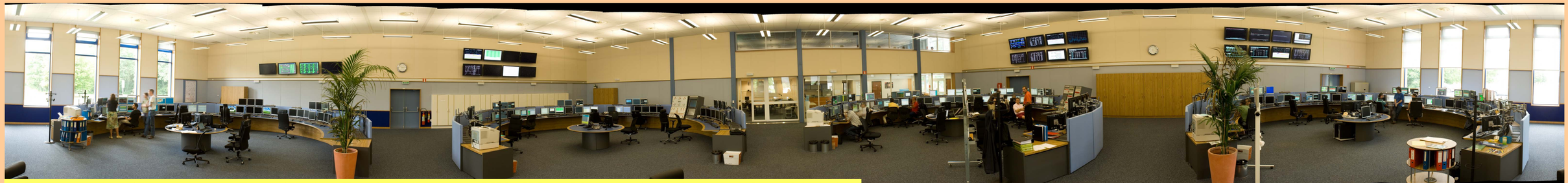
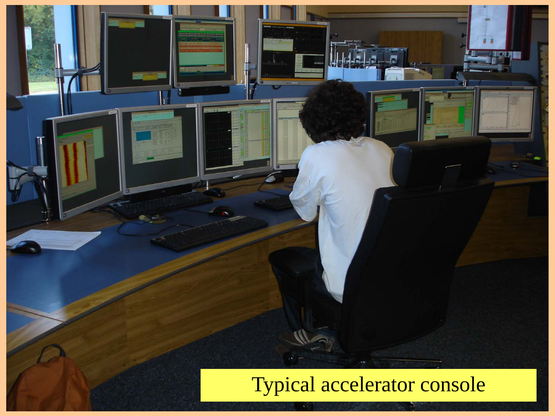


Developped view of the control room. From left to right: Technical Infrastructure, LHC, SPS and PS complex islets. (photo Joao Carlos Oliveira)

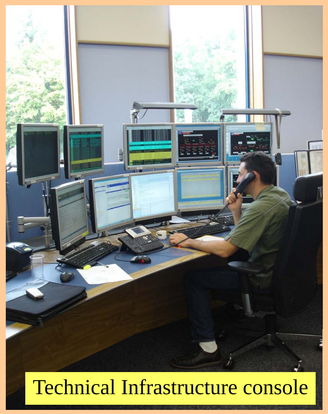
BUILDING

- Designed for the control room, not the other way around!
- Square structure 25 m x 25 m = 625 m^2 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

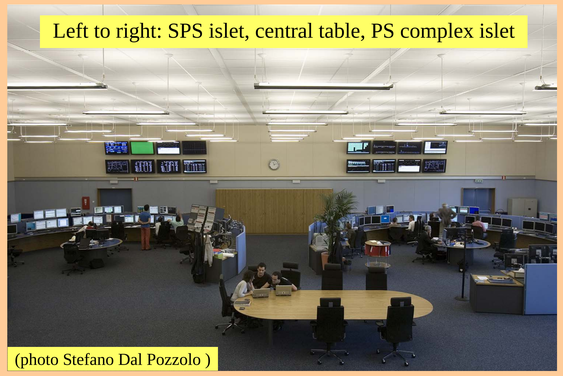
The unequipped control room



Typical accelerator console



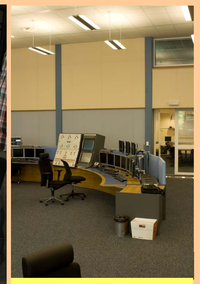
Technical Infrastructure console



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

(photo Stefano Dal Pozzolo)

Proton Synchrotron complex access console



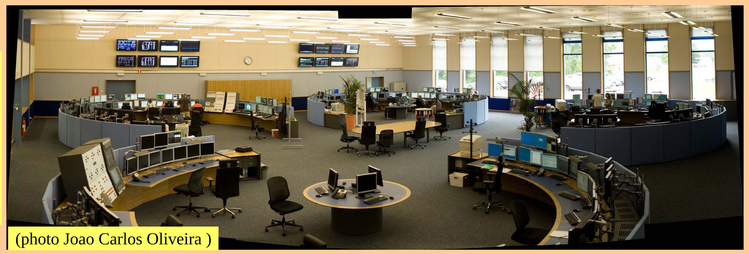
Large Hadron Collider access console

CONSOLE

- 3.6 m curvature radius, marmoleum top, wood appearance (american oak), made of two sector tables of 24º
- 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 screen supports

Simulation … versus reality!

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