


CERN PROJECT:

Simulation of a particle accelerator

A presentation by Lennart Beyer, Julius Seidel



AGENDA

- (1) Project:
 - (1) TE-EPC group
 - (2) Open days at CERN
 - (2) Our task:
 - (1) Simulation of a particle accelerator
 - (2) Programming Code
 - (3) Presentation
 - (3) Visits:
 - (1) Static VAR compensator
 - (2) Cern Control Centre
 - (3) AMS Centre
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TE-EPC GROUP

TE - Technology Department

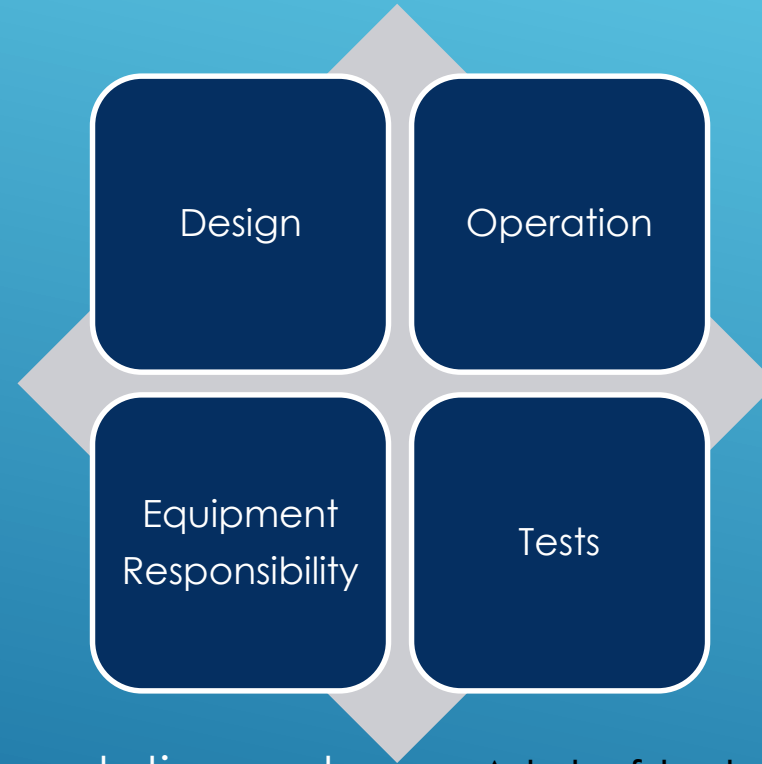
EPC - electrical power converters

- EPC Group divided in 7 sections:
- design, development, procurement, construction, installation, operation and maintenance of electrical power systems for all accelerators, transfer lines, experimental areas and tests facilities at CERN

- Design
- New project or consolidation programs are always an opportunity to design new Power Converters, new Concepts to better match with accelerator machine needs
- Operation
- A large part of technical people from group TE-EPC joins Stand-by Service and is then operating on various equipment to allow a high availability of accelerator machine.
- Equipment
- Responsible Each technical people in TE-EPC is responsible of some equipments, and has to ensure the viability of the equipment: documentation up to date, consolidation program, repair, spare parts...
- Tests
- A lot of tests are always susceptible to be conducted: design phase or Operation phase, when trying to better understand issues.

design new Power Converters, new Concepts to better match with accelerator machine needs

Stand-by Service, operating on various equipment to allow a high availability of accelerator machine



ensure viability of equipment: documentation up to date, consolidation program, repair, spare parts

A lot of tests are always susceptible to be conducted: design phase or Operation phase, when trying to better understand issues.



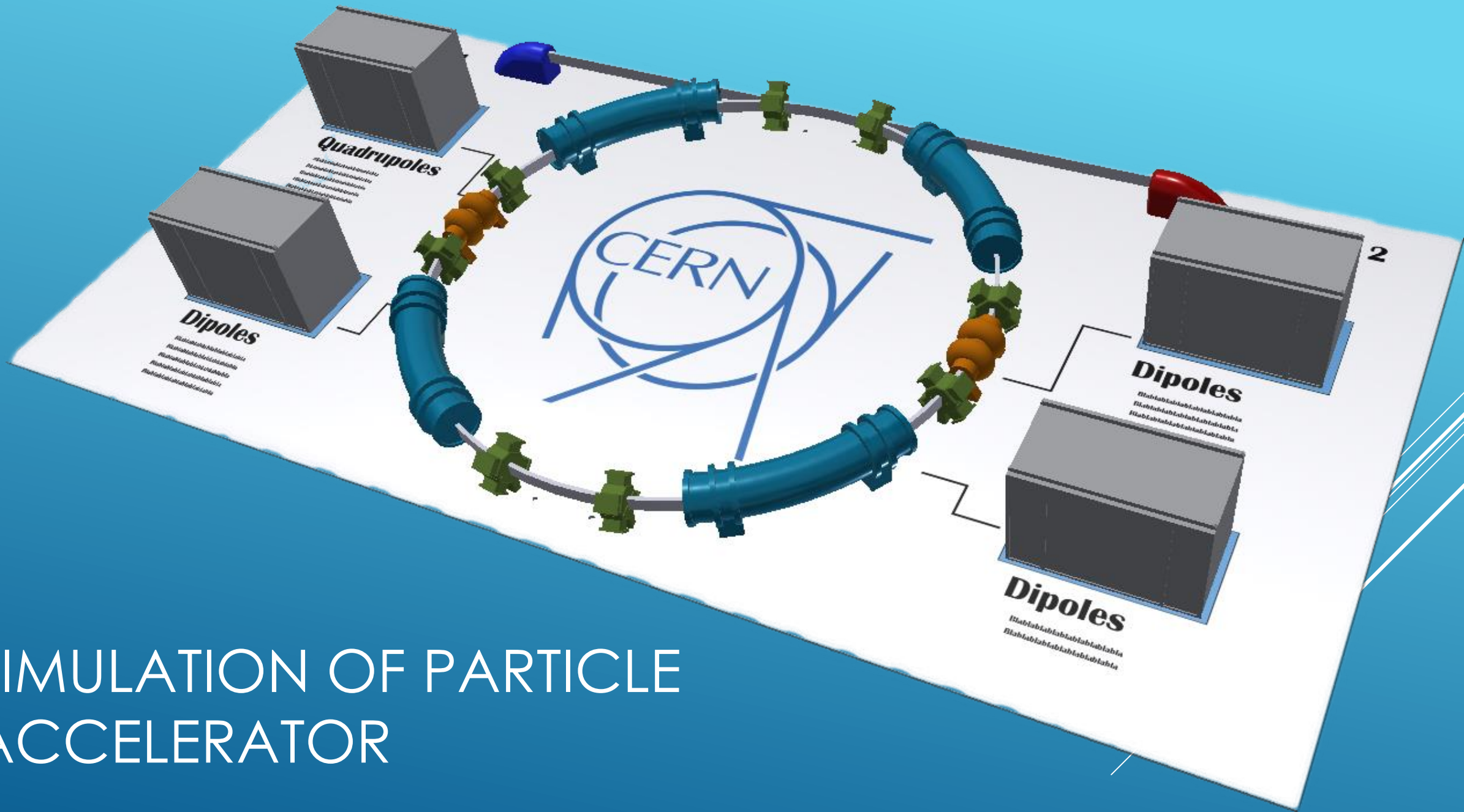
CERN OPENDAYS

- ▶ Explore the future with us
- ▶ Explorez le futur avec nous

14.-15. SEPTEMBER 2019



SIMULATION OF PARTICLE ACCELERATOR



- Every 2 days a 180° direction change - but we are all fine

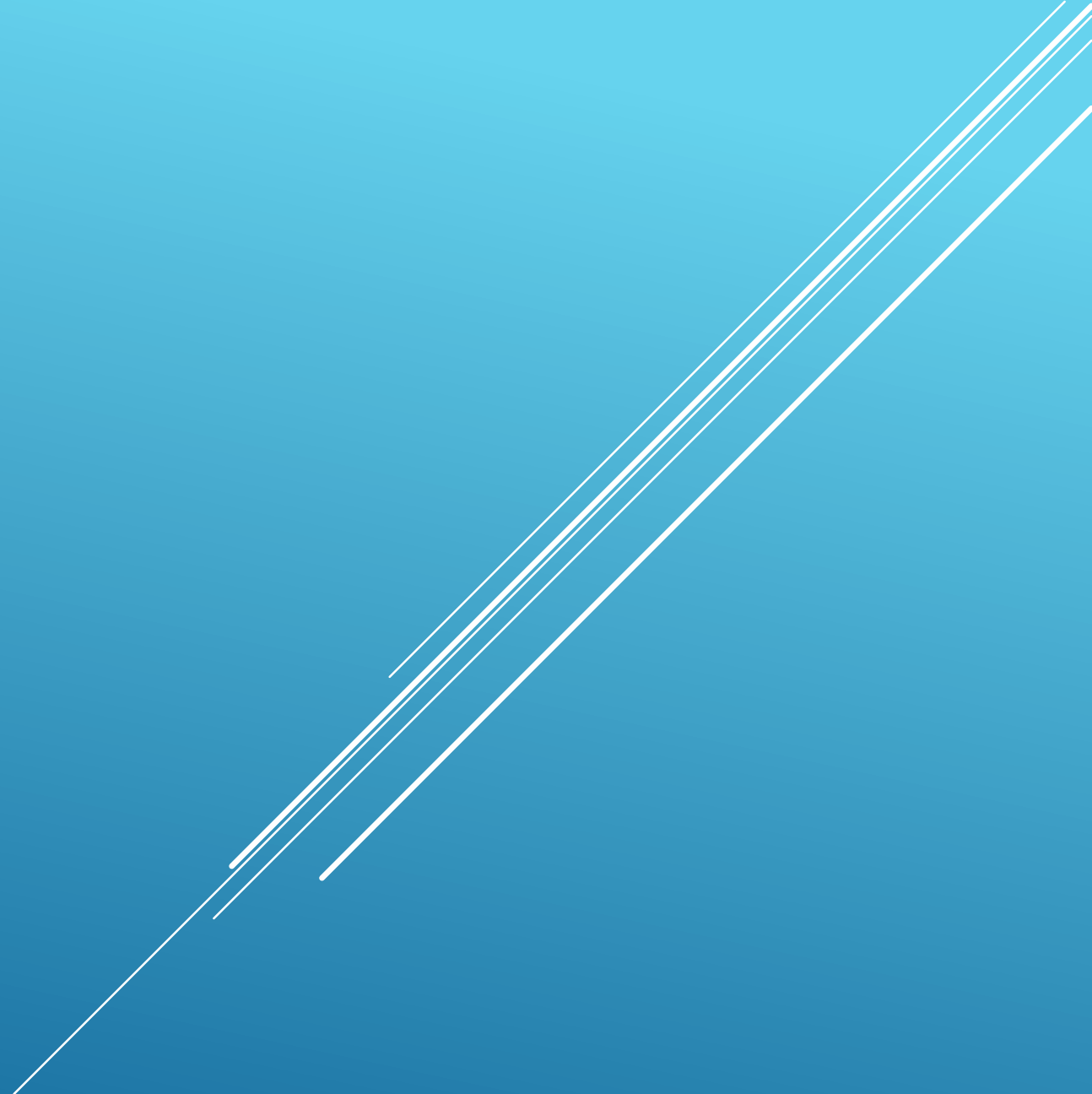
PROGRAMMING CODE

PRESENTATION



VISITS

SVC, CCC & AMS Centre

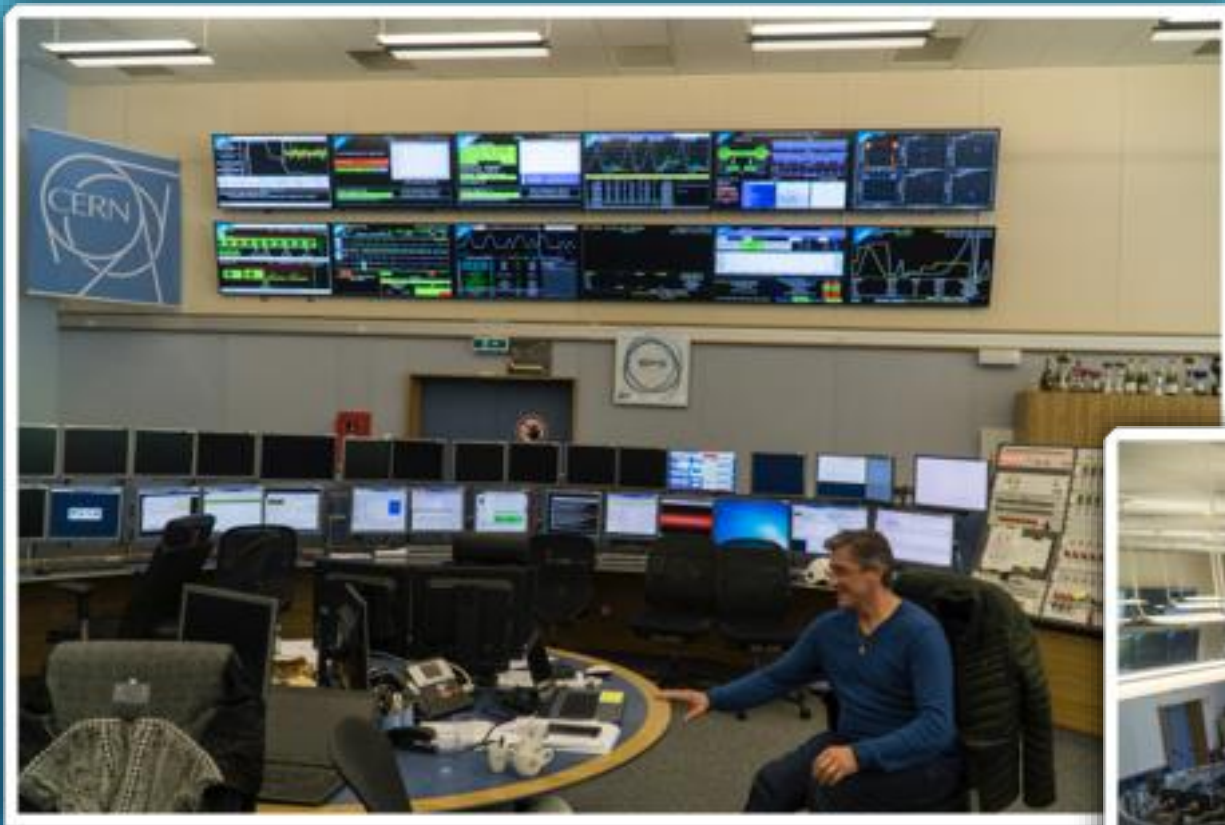




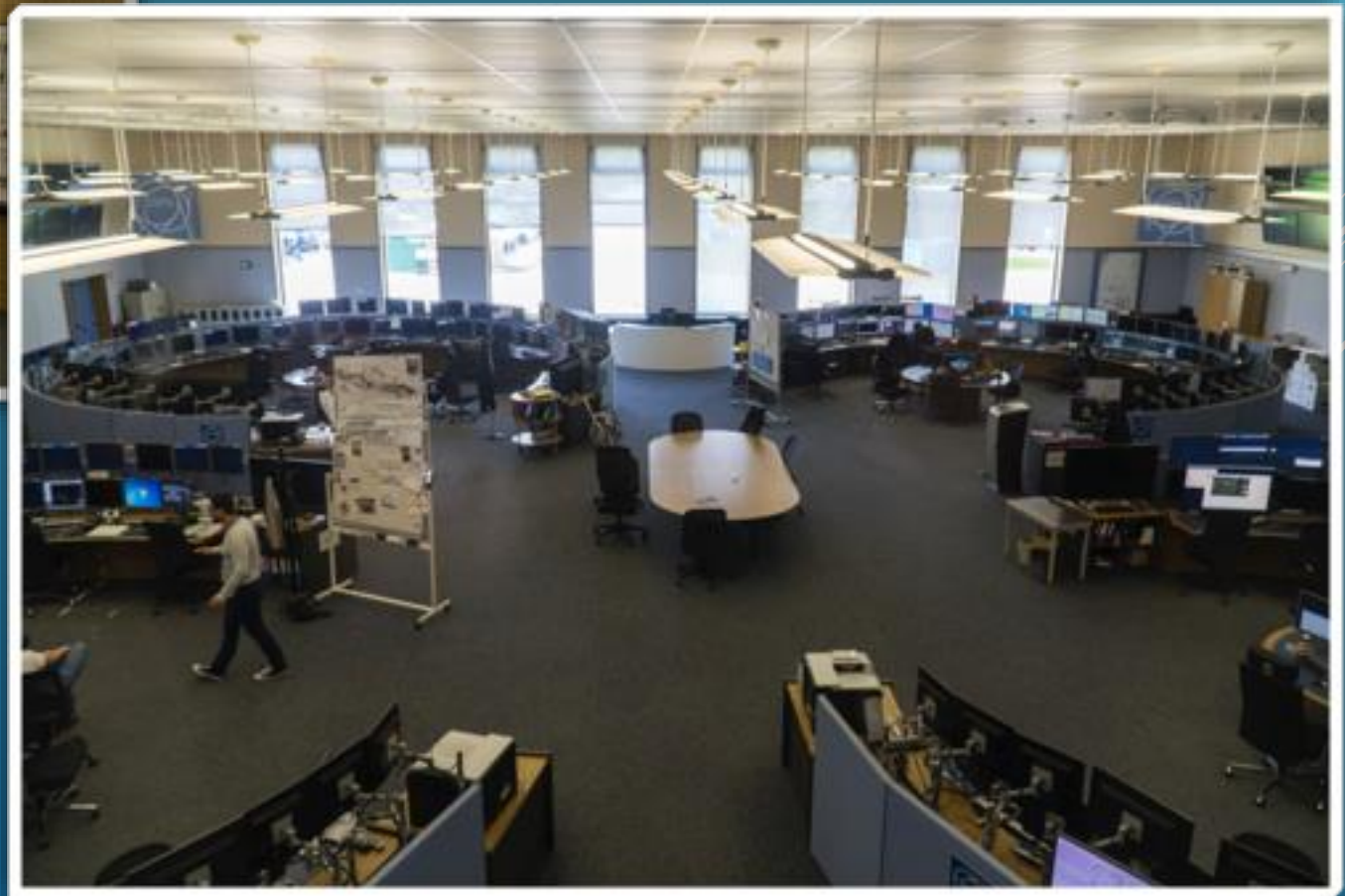
STATIC VAR COMPENSATOR

- ❑ Used for the stability of the power grid, when the SPS is active (nSec range)
- ❑ Decreasing disturbances caused by changes in reactive power and voltage fluctuations

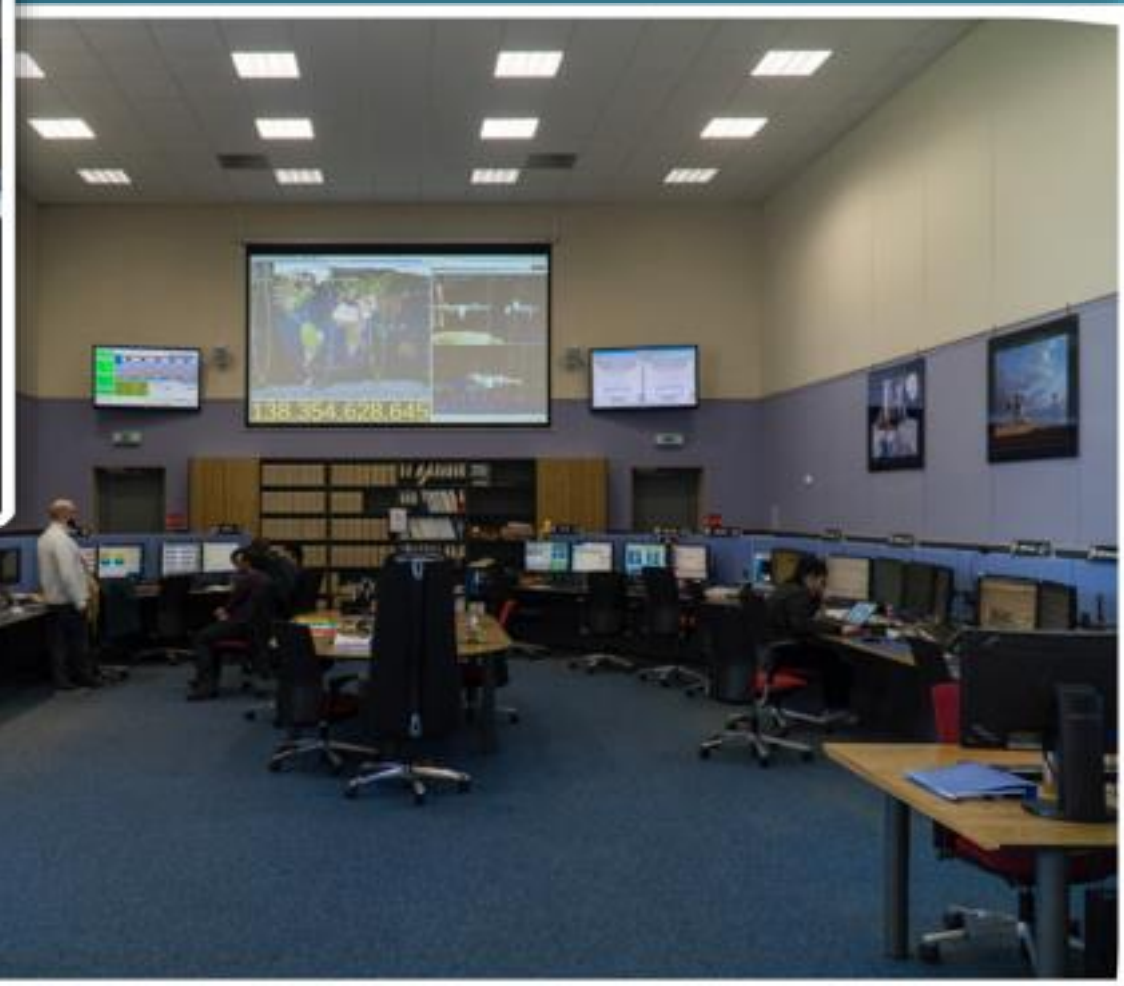
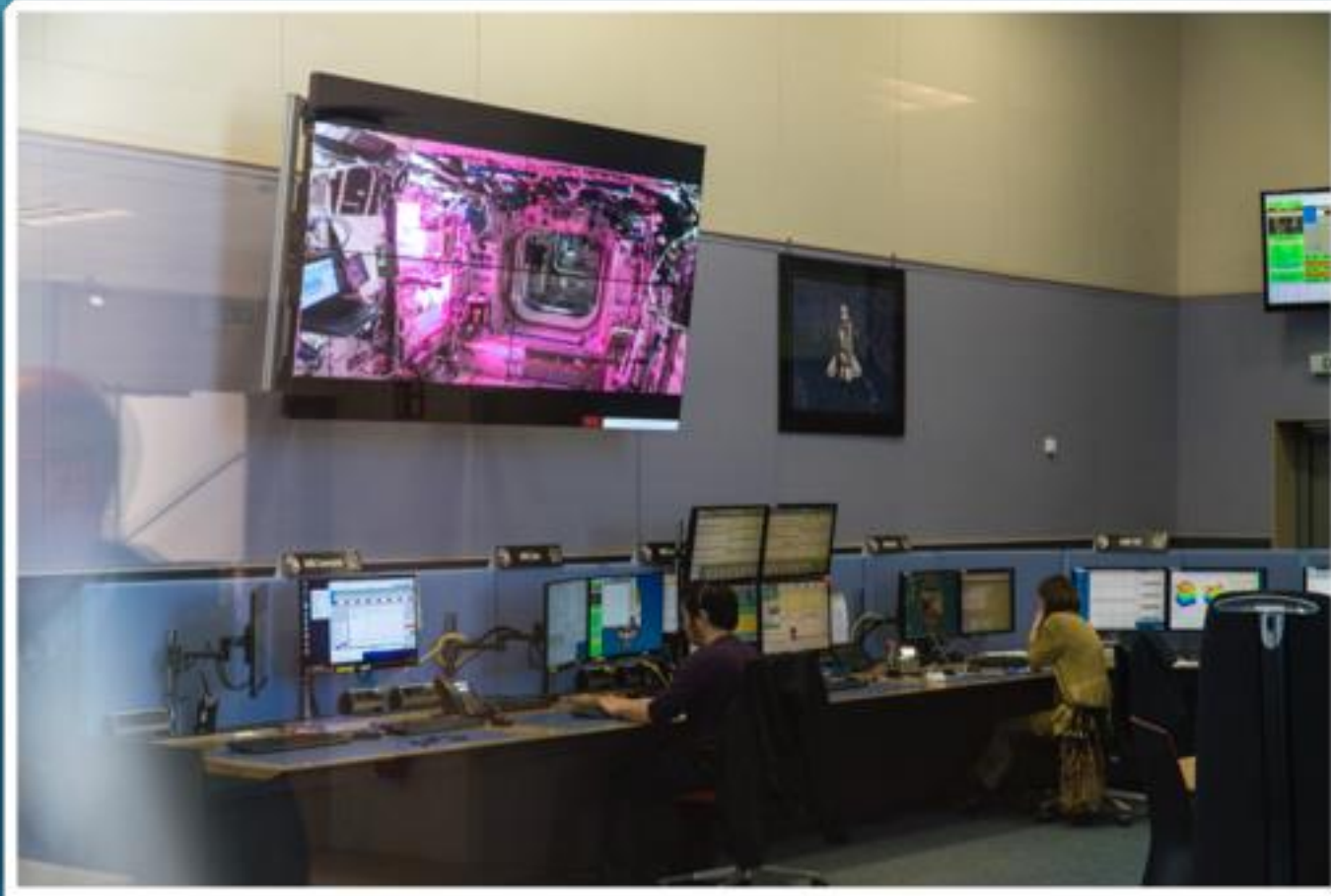
CCC - CERN CONTROL CENTRE



- monitors and controls the particle accelerators: PS/Booster, SPS, LHC & technical infrastructure



AMS CENTRE- ALPHA MAGNETIC SPECTROMETER



- Particle detector for precision measurements of cosmic rays, dark matter & anti matter

