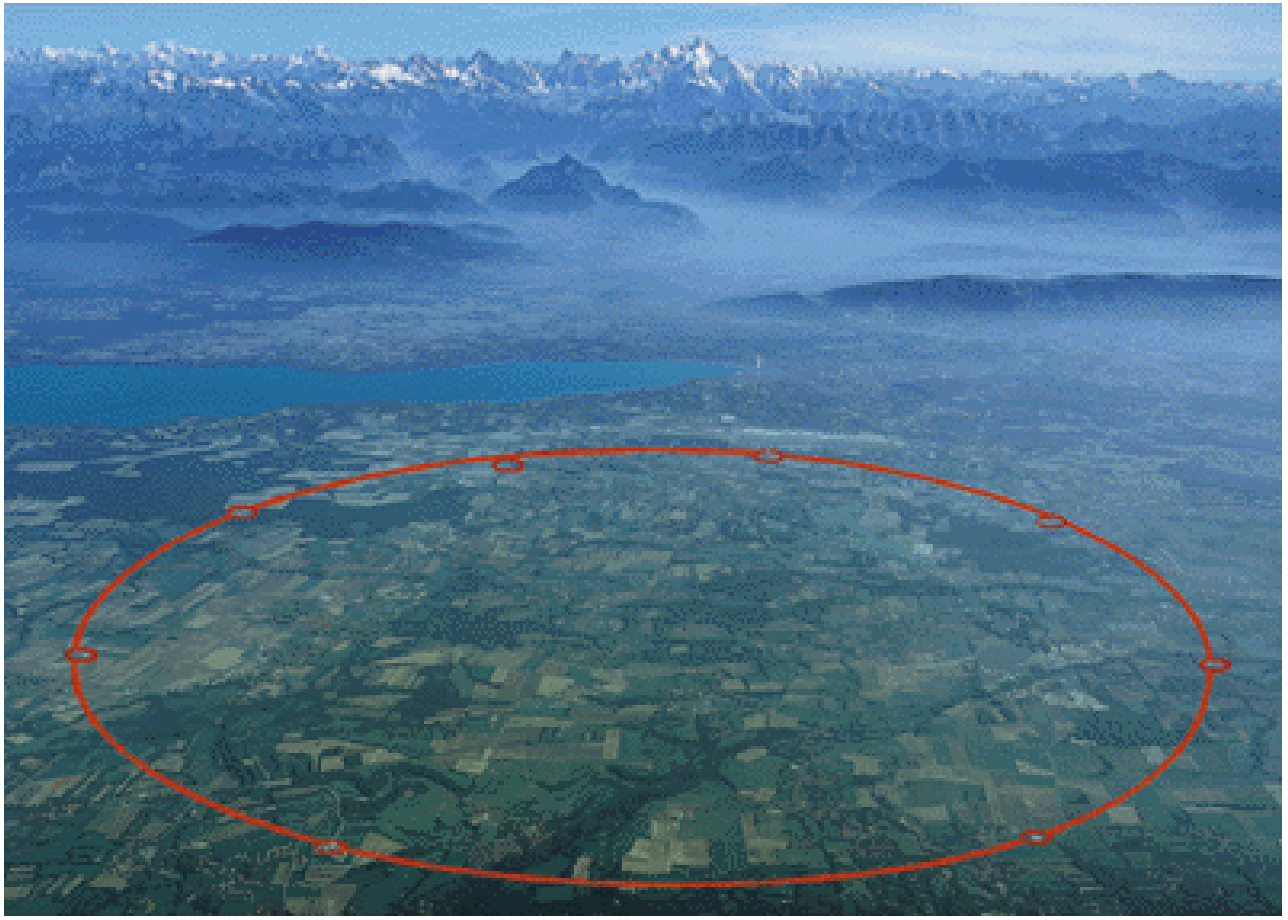
QuickTime™ ja
TIFF (LZW) pakkauksen purkuohjelma
tarvitaan elokuvan katselemiseen.

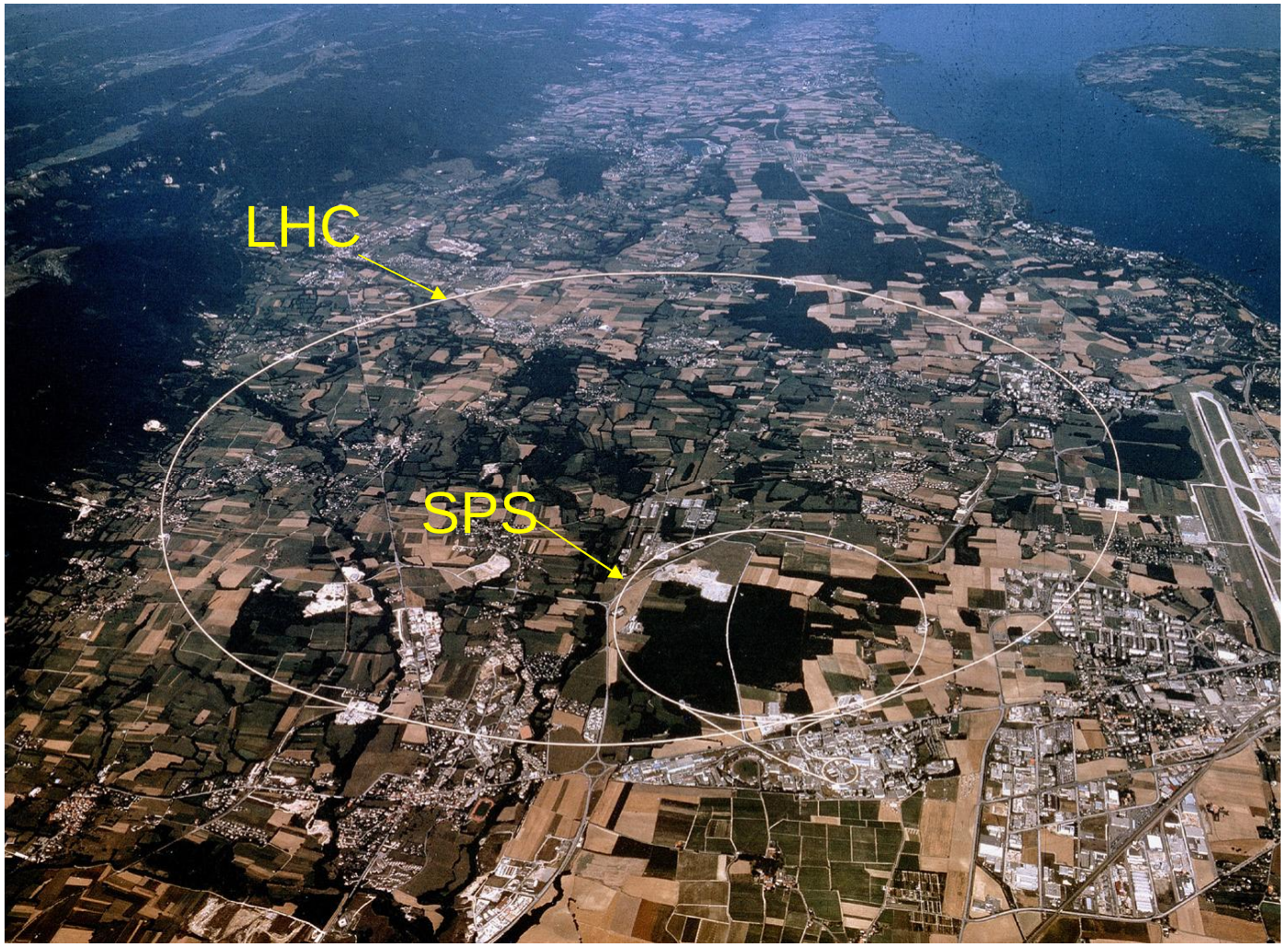
# STATUS OF THE CERN LHC PROJECT



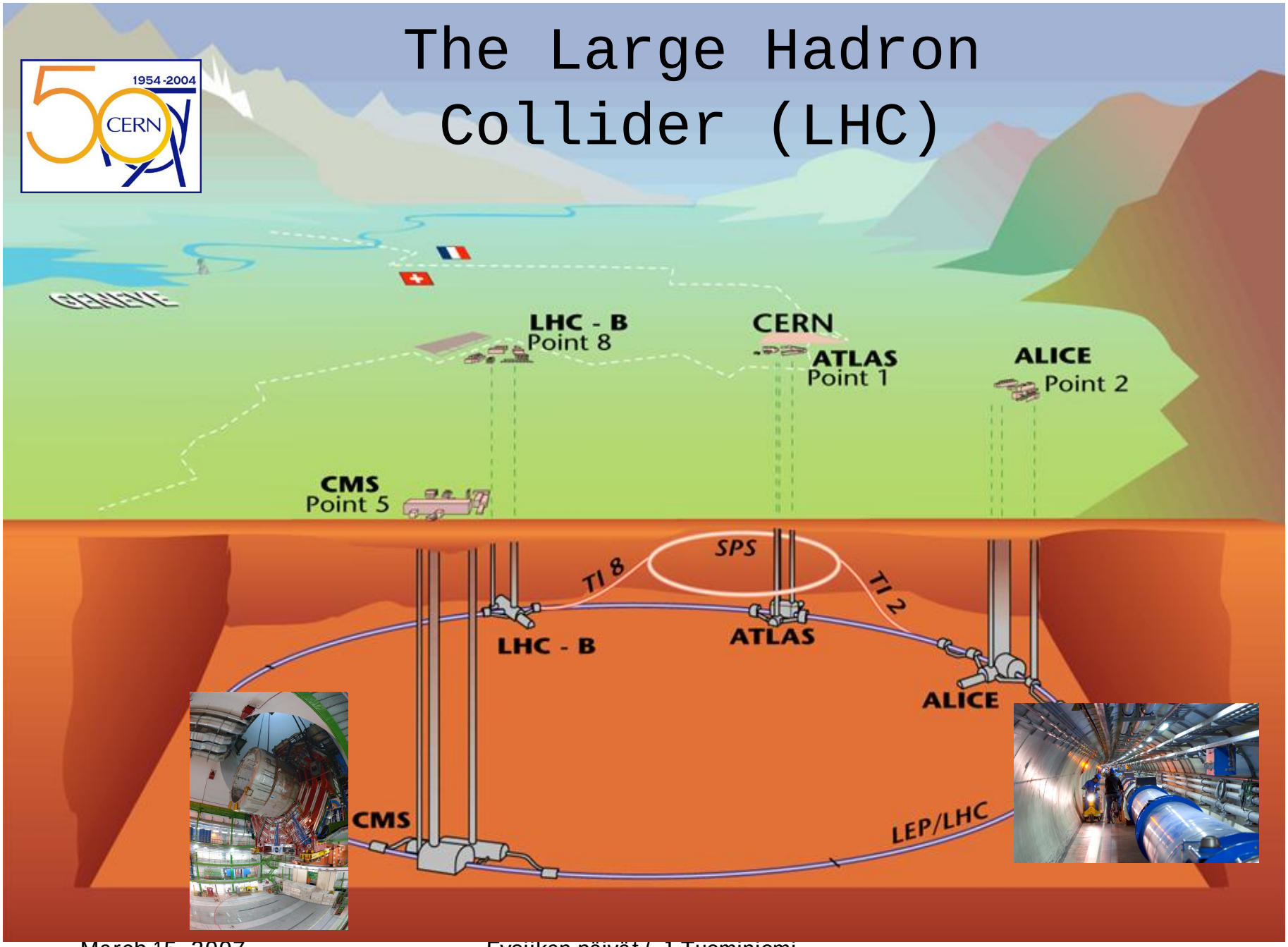
# LHC

7 + 7 TeV
proton-
proton
collider

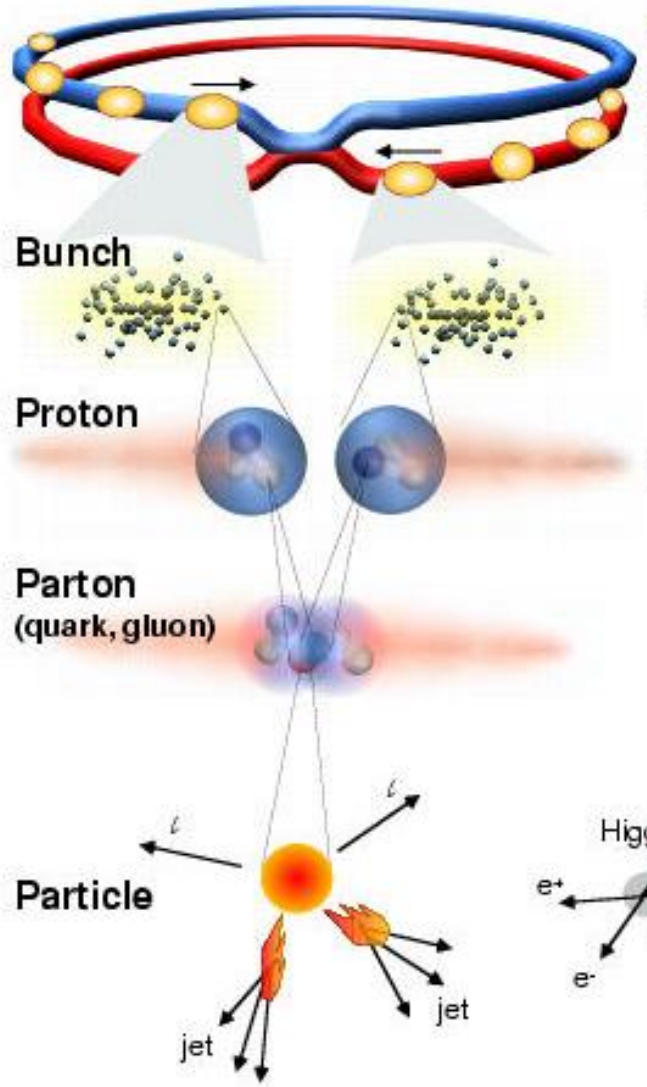
at CERN



# The Large Hadron Collider (LHC)



# LHC parameters




| | |
|---|---|
| Proton-Proton | (2835 x 2835 bunches) |
| Protons/bunch | $10^{11}$ |
| Beam energy | 7 TeV ($7 \times 10^{12}$ eV) |
| Luminosity | $10^{34}$ cm$^{-2}$ s$^{-1}$ |
| Crossing rate | 40 MHz |
| Collisions ≈ | $10^{7}$ - $10^{9}$ Hz |

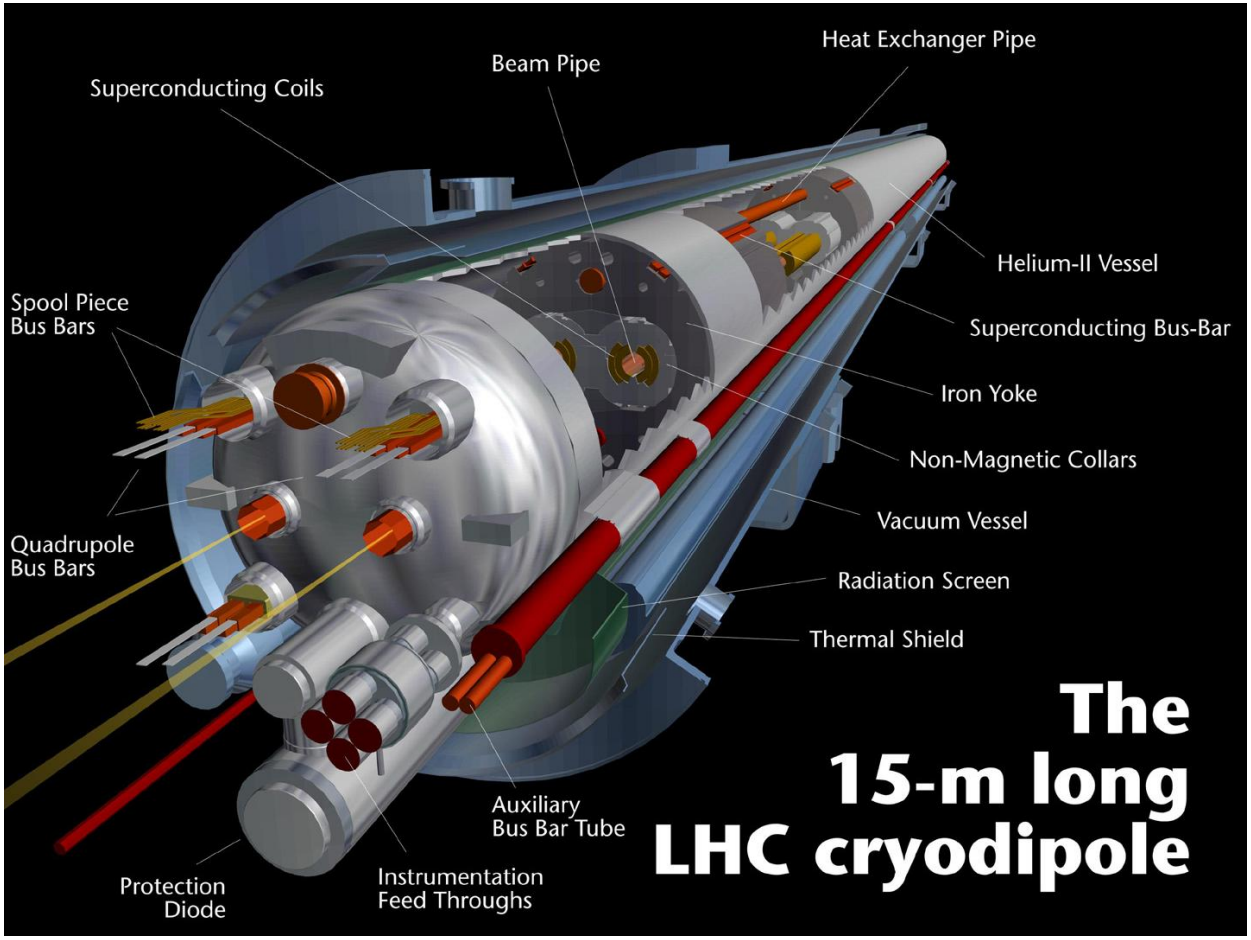
Higgs

SUSY.....

Marc

**Higgs productip / 10,000,000,000,000 collisions**

# Two-in-one synchrothron collider

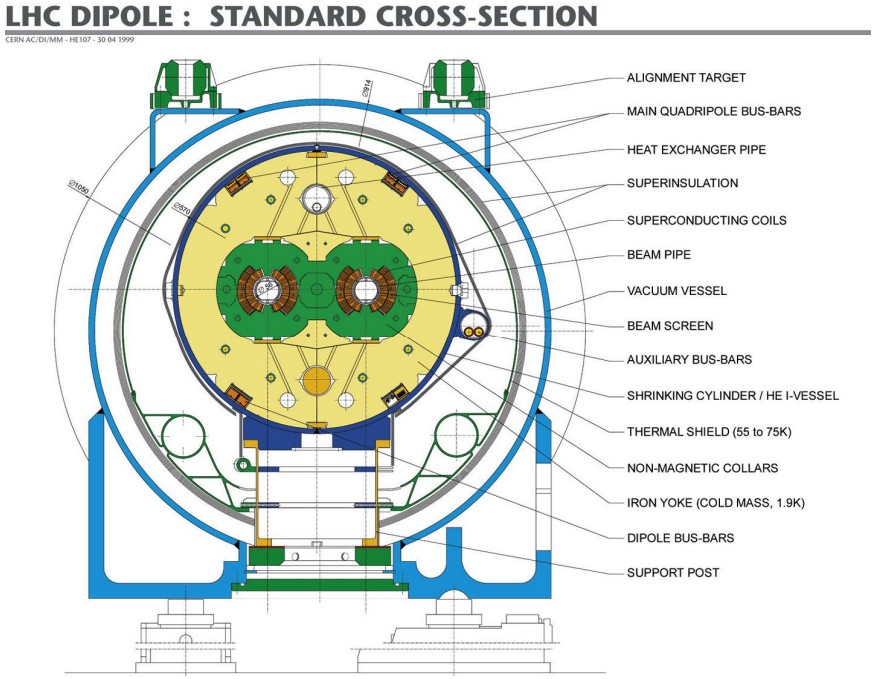


# Cryodipoles

Coil: NbTi superconductors at 1.8 Kelvin.
(1/8 from Pori Copper)

*Magnet design:* CERN

*Construction:*
Babcock Noell
Industries, Alsthom,
Ansaldo.



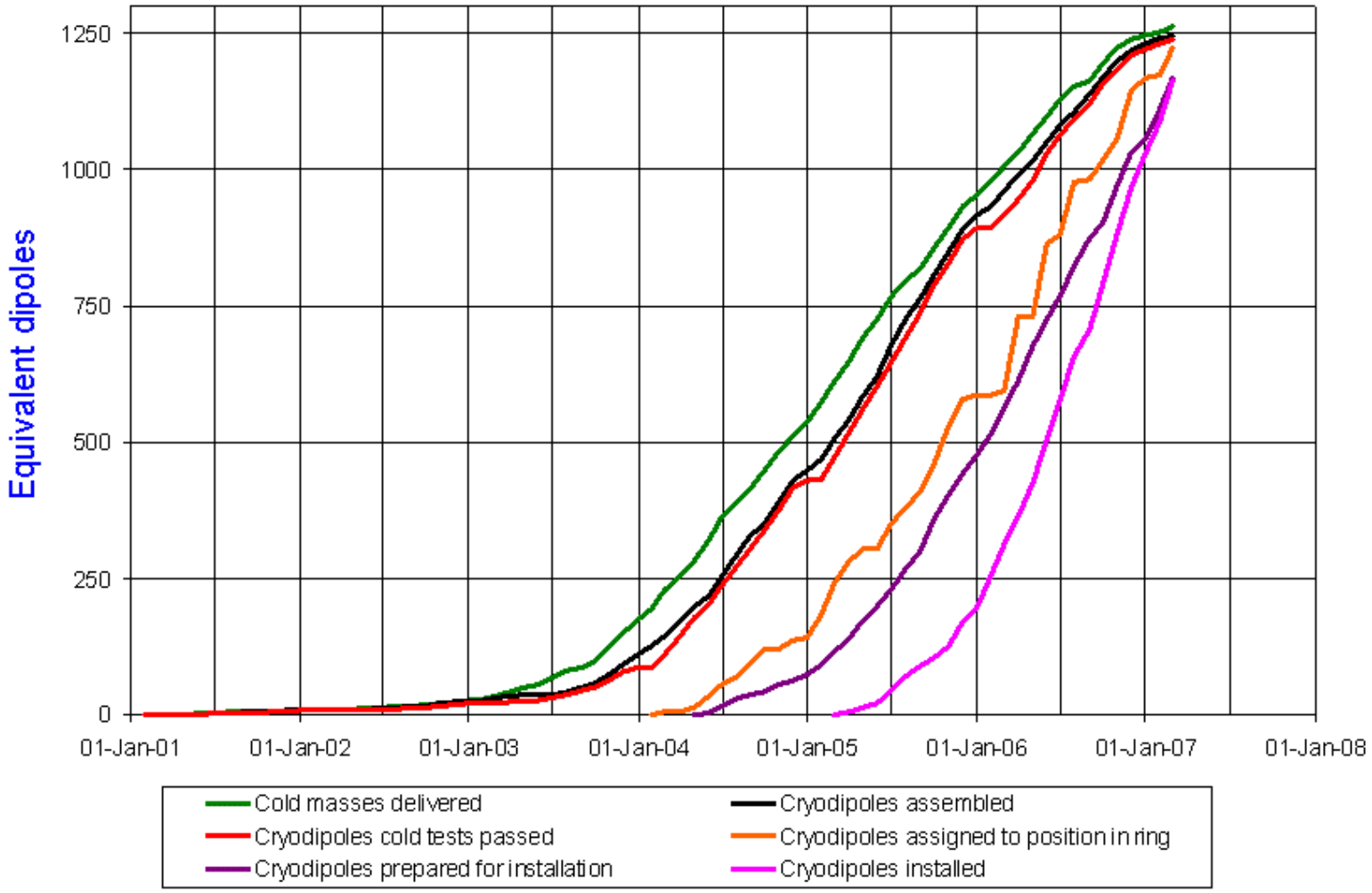
# Installation of the dipoles



# LHC Progress Dashboard

Accelerator Technology Department

## Cryodipole overview



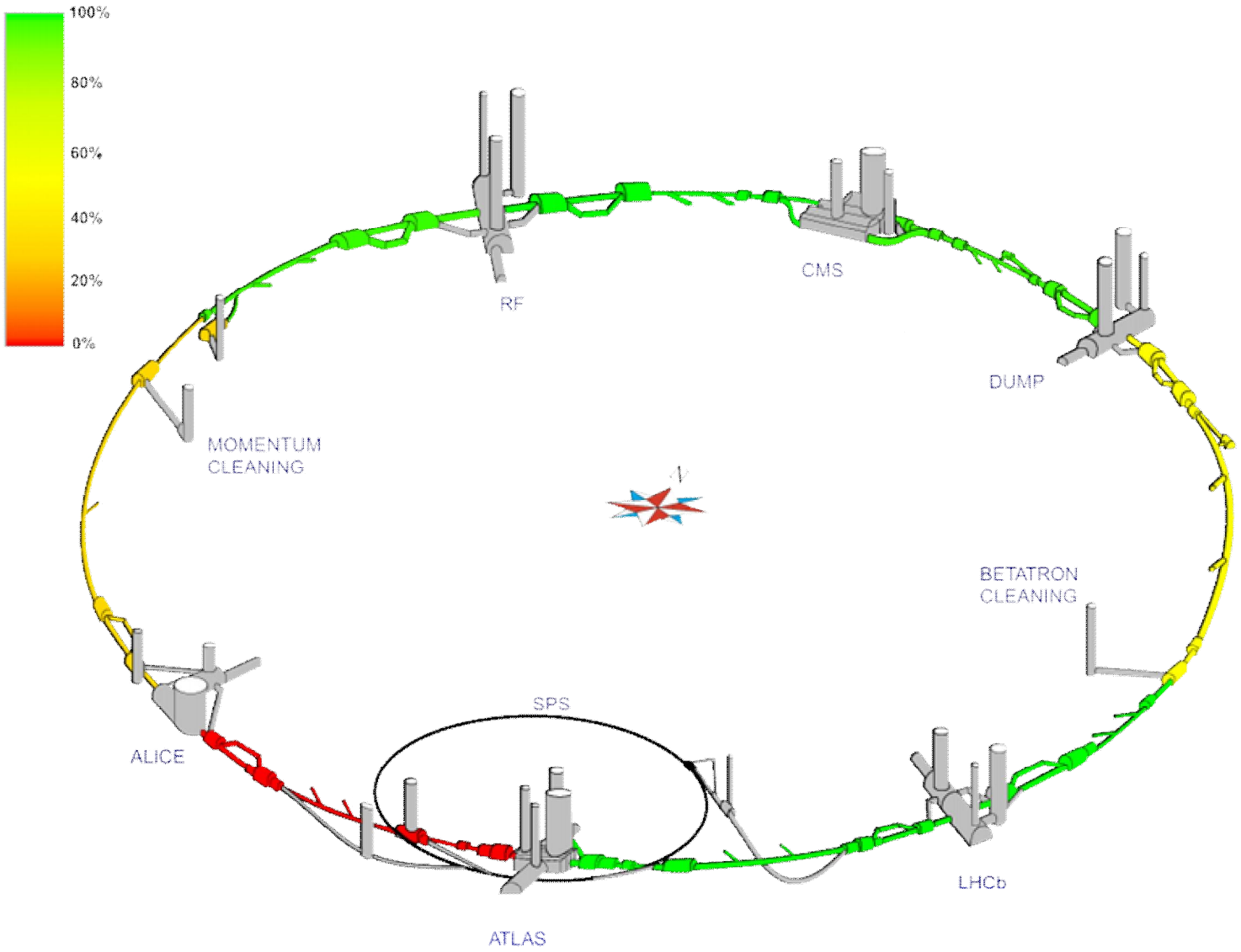

Updated 28 Feb 2007

Data provided by D. Tommasini AT-MCS, L. Bottura AT-MTM

# Last delivered dipole, 27 November 2006



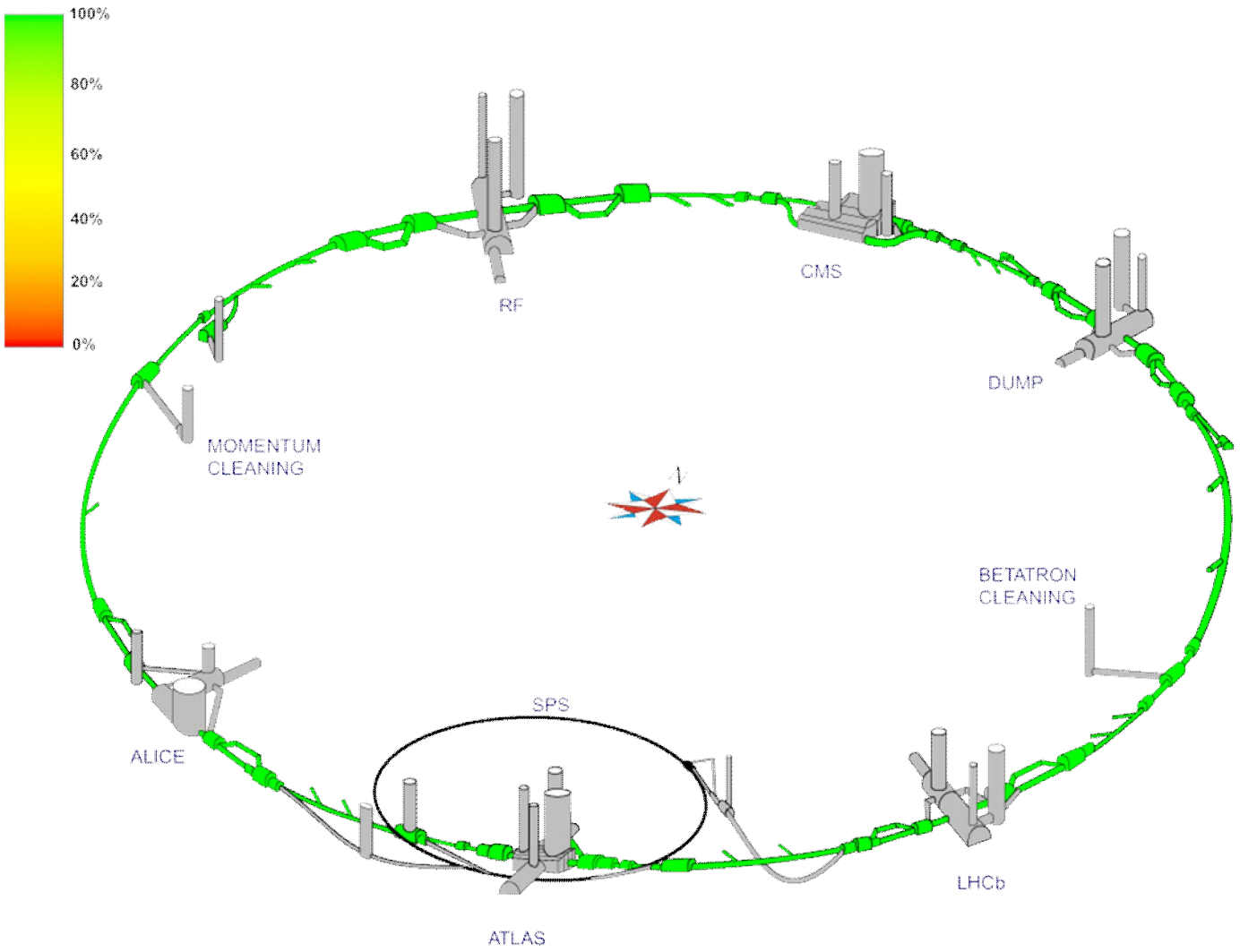
# Progress Report: magnet installation



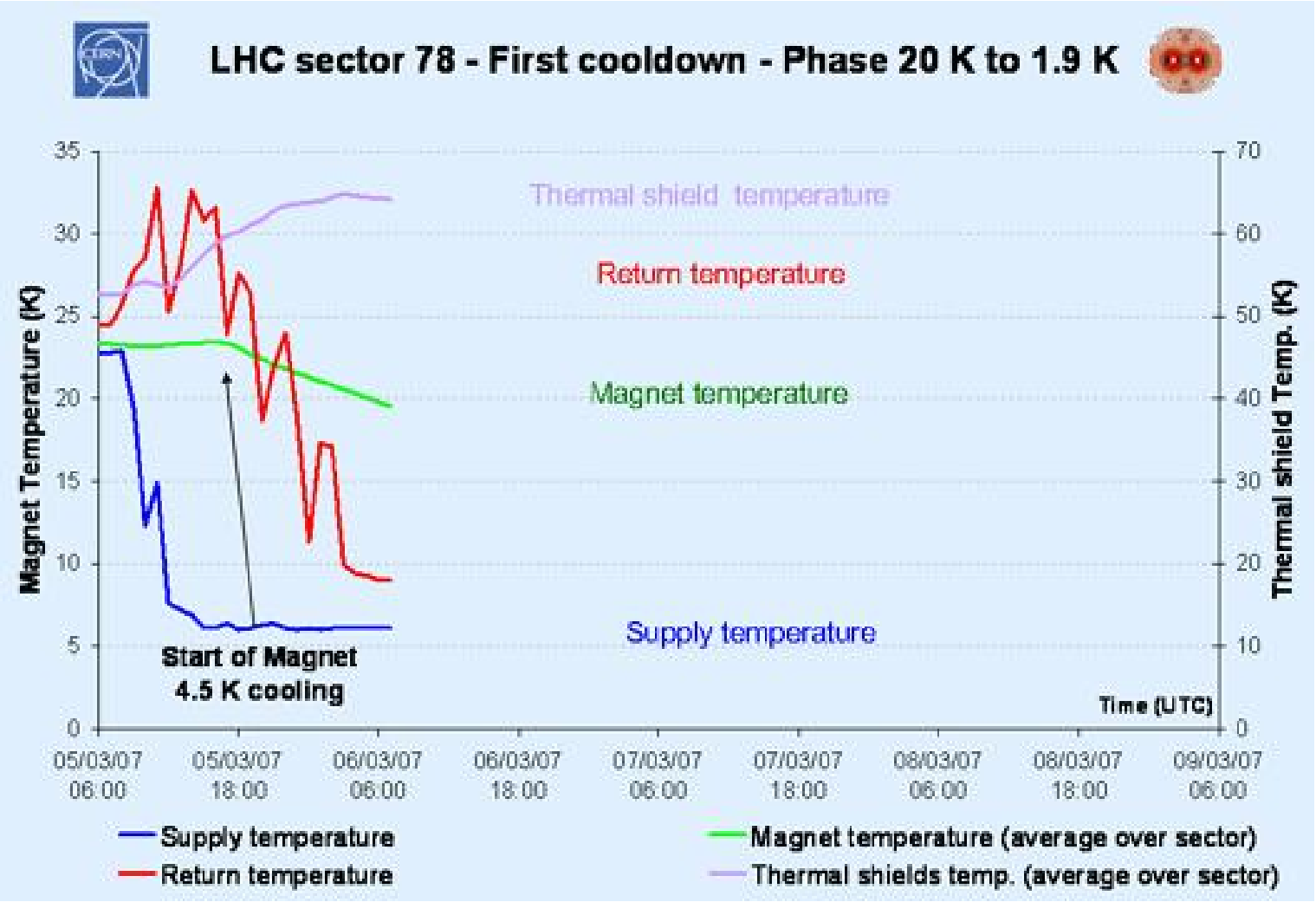
# Cryogenic lines



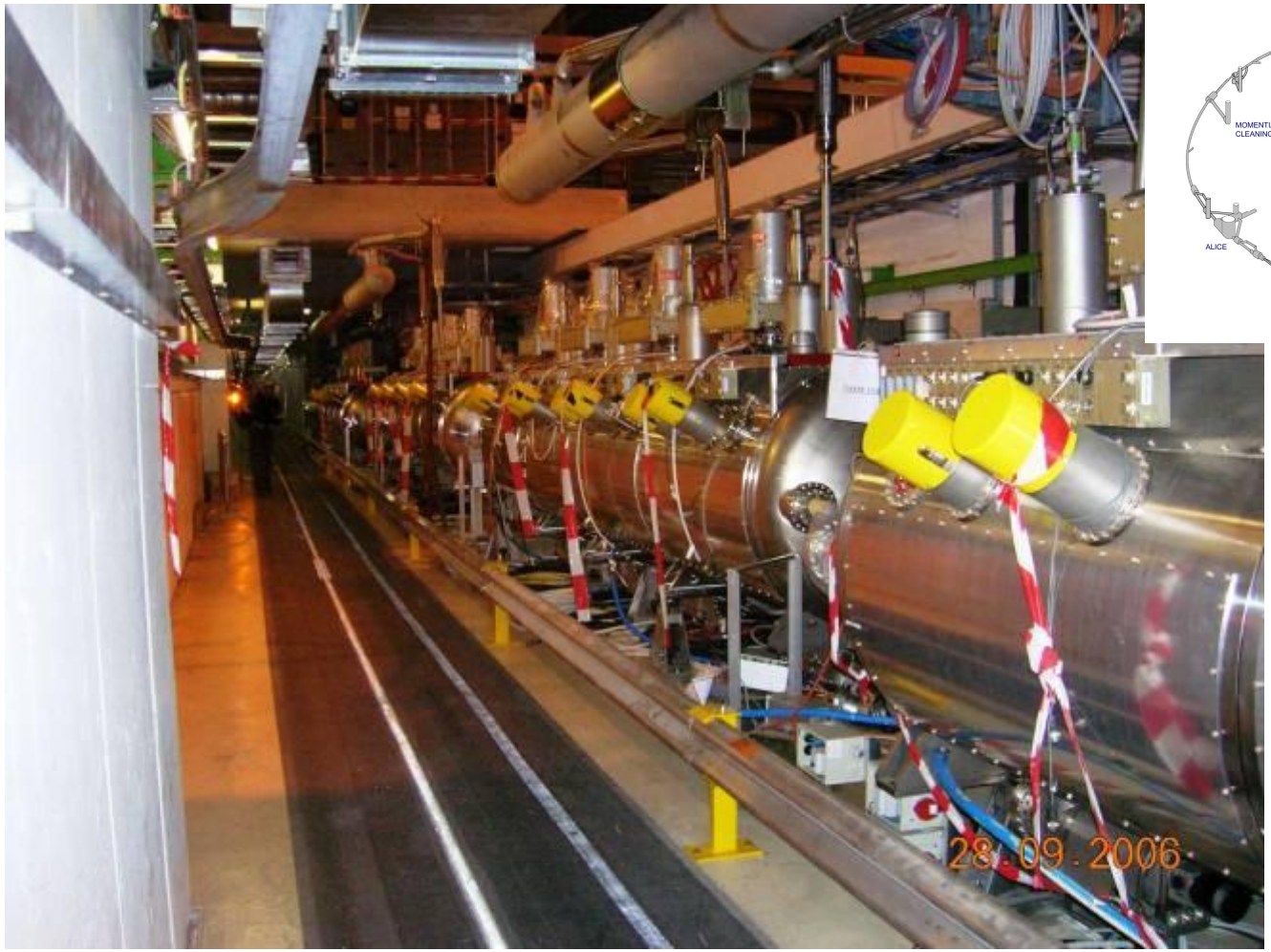
# Progress Report: installation of the cryogenic line

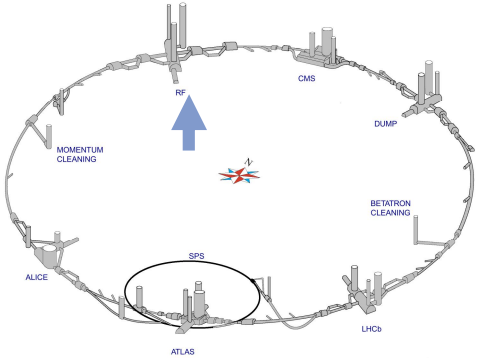


# LHC cooldown



# The RF modules on the UX45 « tunnel » platform



# LHC construction schedule

**January 07** **Last magnet tested**

**March 07** **Last magnet installed**

**30 Aug 07** **Beam-pipe closed**

**Nov 2007** **Collisions at 900 GeV**

**April 2008** **Close for 14 TeV physics run**

**June 2008** **Collisions at 14 TeV**

**Prospects for Integrated Luminosity**
**2008 1 $fb^{-1}$**
**2009 5 $fb^{-1}$**

# Machine Commissioning

Power tests on magnet circuits

- Sectors 7-8, 8-1, 4-5 fully hardware commissioned
  - Cycled to 7.2TeV with full protection systems
  - 7-8 8-1 kept on standby below 80K after HWC
  - 4-5 kept at nominal operating temperature after HWC
- Sectors 3-4, 5-6, 6-7 hardware commissioned for 450GeV
  - Cycled to ~1TeV with limited protection systems
  - Kept at nominal operating temperature after HWC
- Sector 23, 12 hardware commissioned for 450GeV just in time

All special function equipment has been tested to 450GeV and more

- Transfer lines, Injection systems, Extraction systems
- RF, BI, Collimators
- RP systems, MP systems (users)

Vacuum closed end August 2007

Global test of Access Control System October 2007

Engineering run in 2007

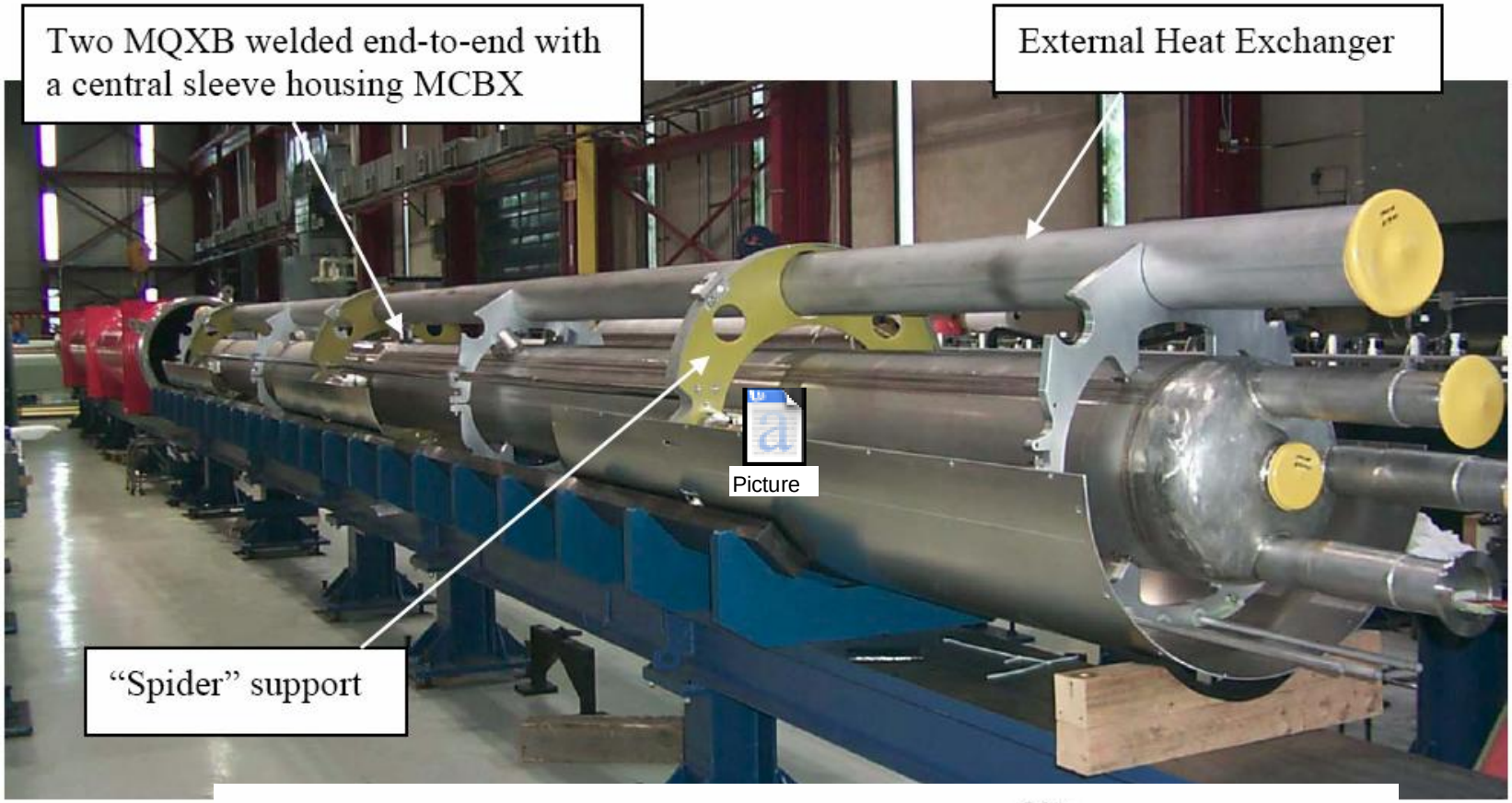
Shutdown to commission hardware to top energy

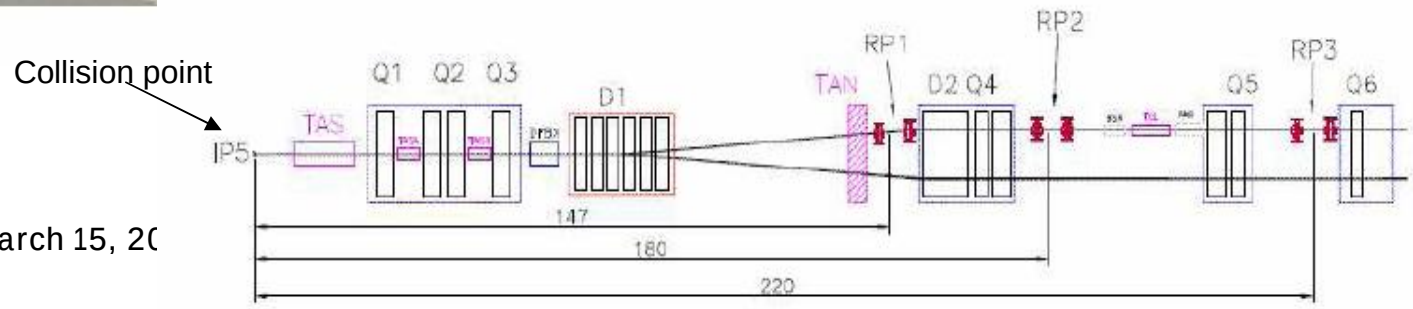
Commission with beam to top energy in 2008

# New problem: Triplet Repair

- During the pressure test of Sector 8-1 (25th November) the heat exchanger tube in the inner triplet failed at 9 bar differential pressure
- A repair procedure is being validated and will have to be implemented on all 24 quadrupoles (18 are already installed)
- Priority: Inner triplet quadrupoles in 5L and 5R to be repaired in time for Sectors 4-5 and 5-6 cooldown. Others afterwards.
- Consequences
  - Planning will have to change
  - Sector 8-1 will be cooled down and commissioned after 4-5
  - Sector 8-1 will be commissioned only to 450GeV in 2007
  - 450GeV run in 2007 is still the target
  - More time needed for commissioning hardware to high energy in 2008

# Triplet Repair



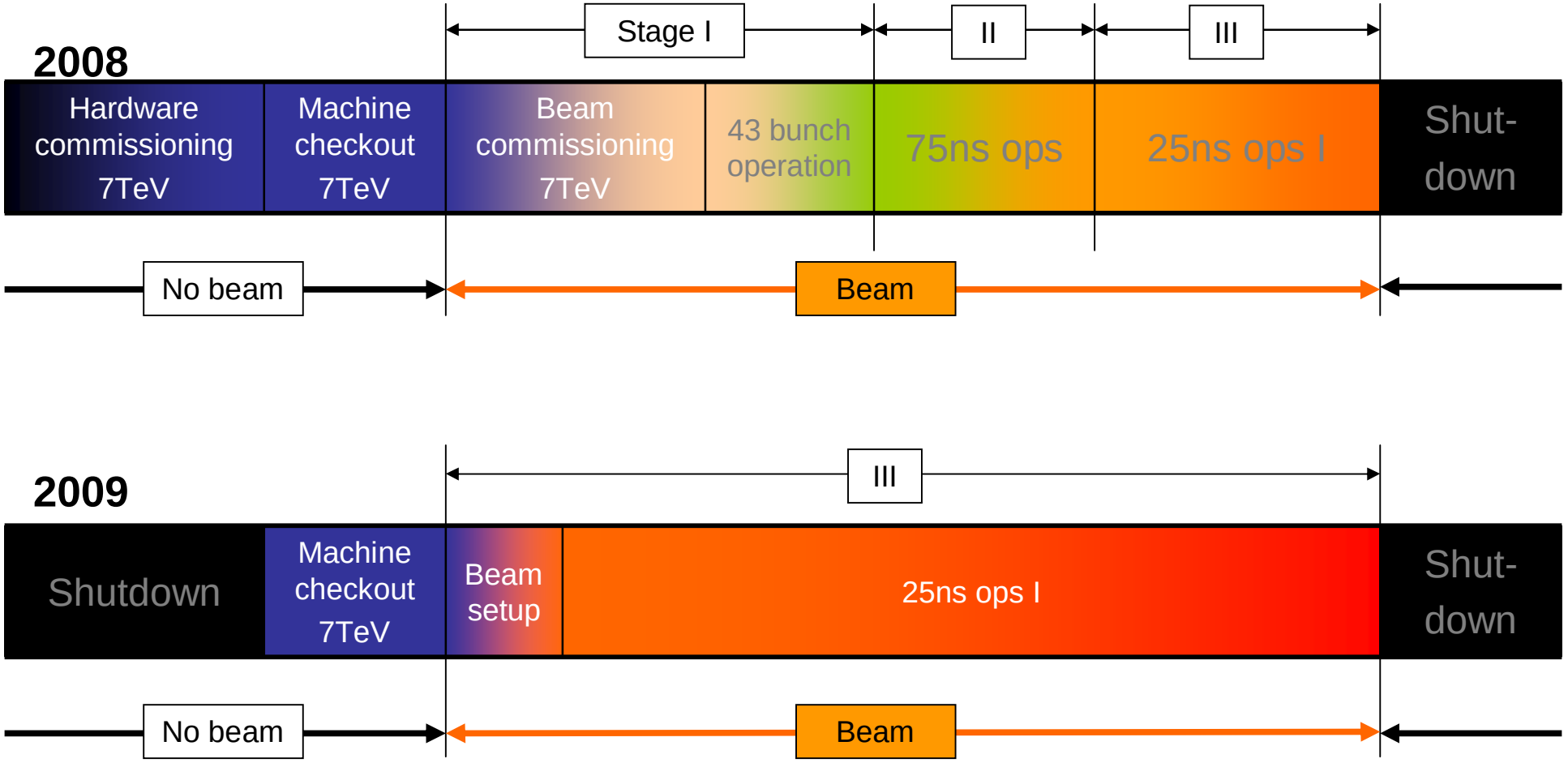



# Triplet Repair



The affected heat exchanger pipes will be changed.
The repair will start on 26 February at Point 5 +end.
The consequences on the 2007 schedule will be evaluated once this repair has been carried out.

# Beyond 2007


2008
Stage I
II
III
Hardware commissioning 7TeV
Machine checkout 7TeV
Beam commissioning 7TeV
43 bunch operation
75ns ops
25ns ops I
Shut-down
No beam
Beam
2009
III
Shutdown
Machine checkout 7TeV
Beam setup
25ns ops I
Shut-down
No beam
Beam