The LHC Access System

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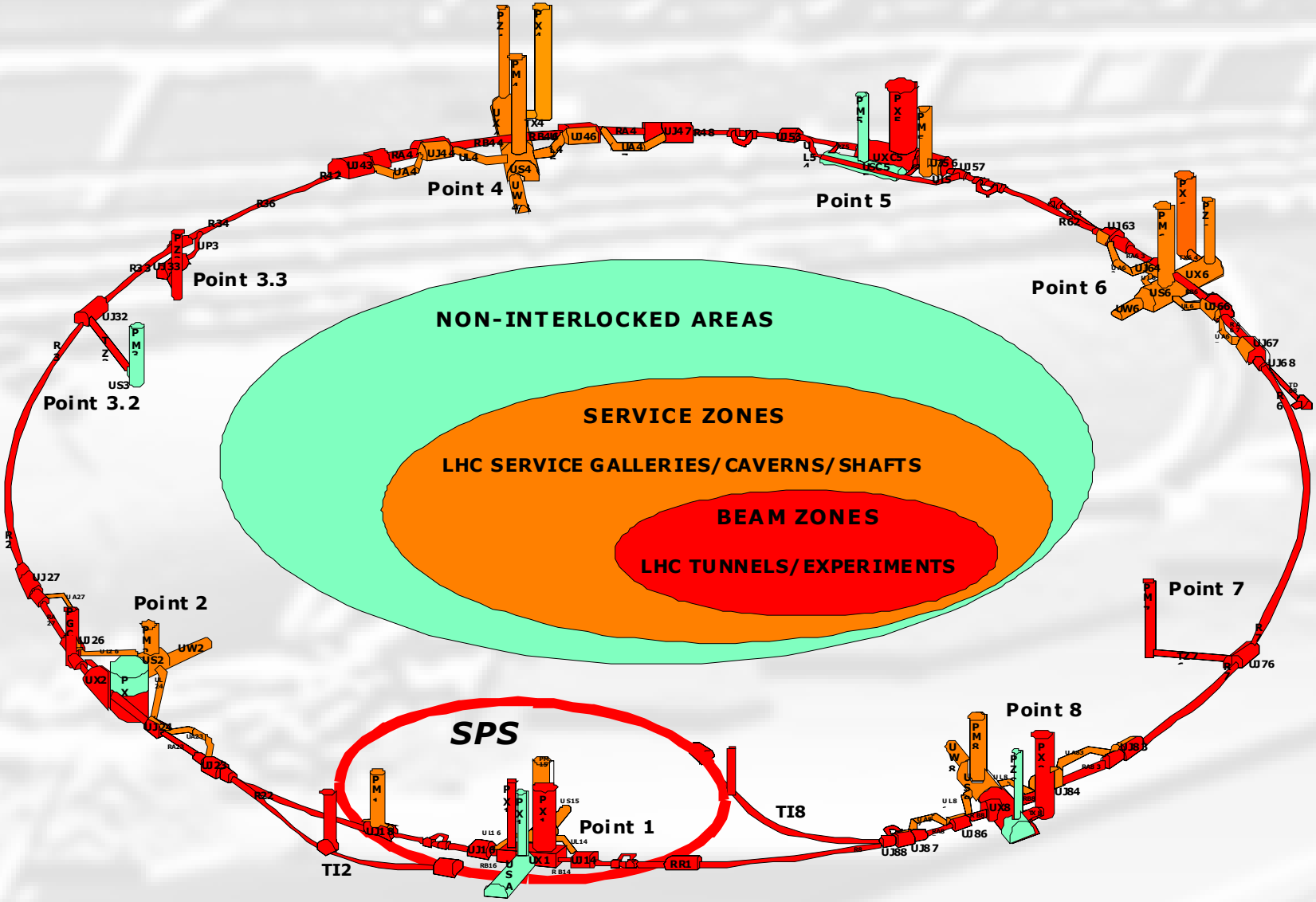
LHC Days in Split , 2-7 October 2006

Agenda

- Introduction
- LHC Areas
- LHC Access Control System
- LHC Access Safety System
- Installation
- Next steps

LHC Areas


Point 4
Point 5
Point 3.3
Point 6
Point 3.2
NON-INTERLOCKED AREAS
SERVICE ZONES
LHC SERVICE GALLERIES/CAVERNS/SHAFTS
BEAM ZONES
LHC TUNNELS/EXPERIMENTS
Point 2
Point 7
SPS
Point 8
Point 1
TI8
TI2

LHC Access Project is made of 2 parts:

LHC Access Safety System
LASS

Interlock System
Beam => No Access
Access => No Beam

LHC Access Control System
LACS

Off-the-shelf Access
Equipement

Integrated concept for the LHC Machine & Experiments
to protect people against LHC radiation hazards.

LHC Access Control System

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LHC Access Control System (LACS)

Goals:

- Identify users
- Verify qualifications (safety training)
- Manage access rights into the LHC
- Limit number of users
- Automatic or remote control of the access systems

Status

- Contract running from Sept. 04
- System engineering completed
- Site acceptance of "LHC 0" June 2005
- Production and installation of doors (LHC 7, LHC 8) in the tunnel

LHC Access Control System

Some figures :

- 34 Access points
- 95 controlled sectors doors
- 65 interlocked End-of-Zone doors
- 26 interlocked access ladders
- 17 interlocked mobile shielding walls
- 170 Racks
- 110 surveillance cameras
- Central monitoring systems and MMI for CCC and XCRs,

LHC Access Safety System

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LASS Safety Objective

Goals:

Protect persons from radiological risks related to the exploitation of the LHC Machine

- Radiation due to the injection or circulation of beam
- Radiation generated in the RF cavities
- Inducted or remaining radiation (air, materials)
- Other sources

  - During Beam operation
    - nobody inside - Stop LHC if a Door is opened or an Emergency Stop is activated

  - Allows Access operation when safety conditions are met
    - No radiation hazards (LHC beam, RF)

LASS Status

- Specifications review EDMS 456549 (Access Safety Working Group)
- HW and SW Architecture prototyping (Siemens Safety Matrix)
- Contract running for the system integration, installation and commissioning.
- In production

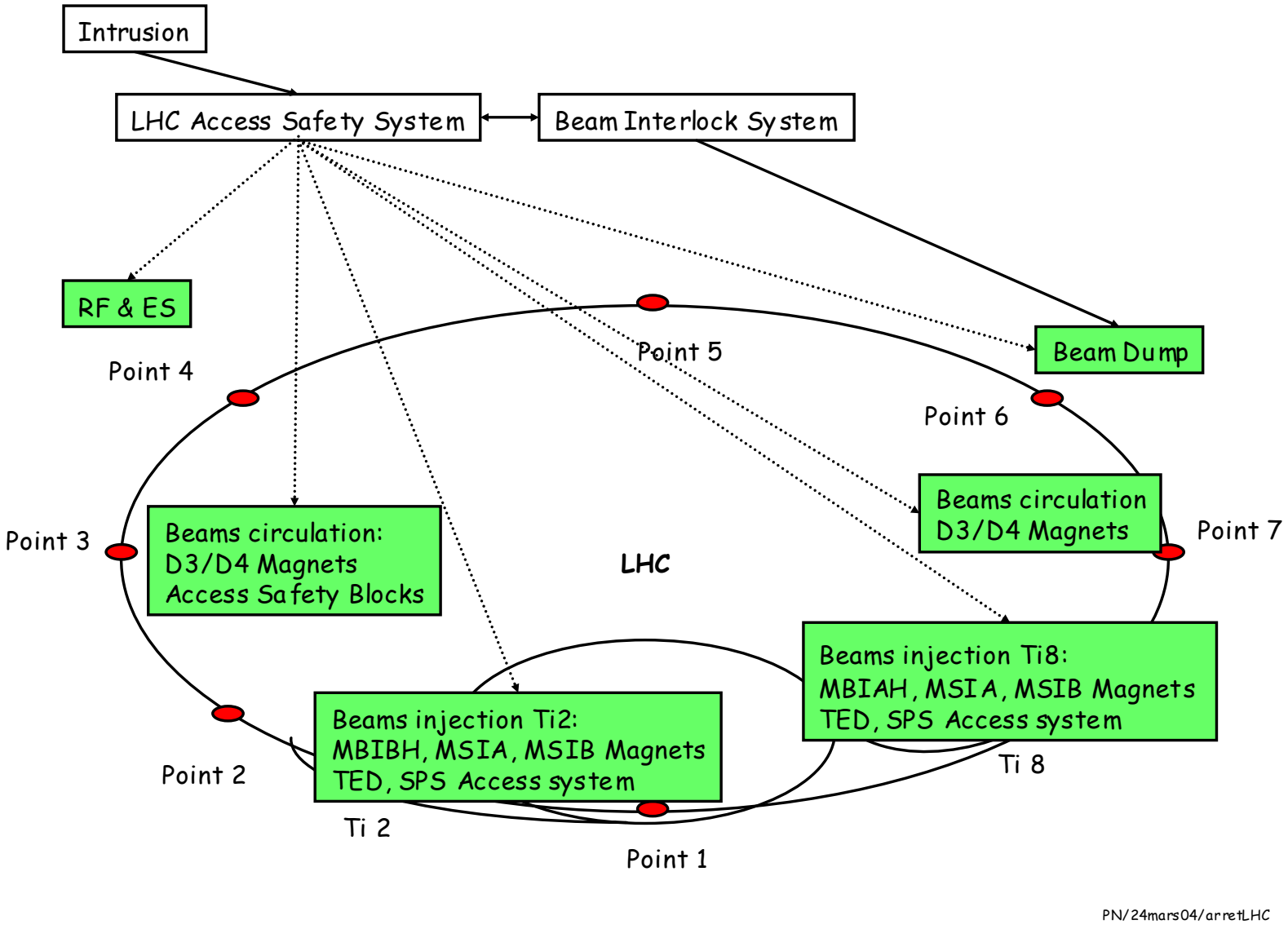
French Nuclear Safety Authorities

- By convention between CERN and French Government the LHC is considered as an *Installation Nucléaire de Base (INB).*

- LASS is subject to the regulations of the French Nuclear Safety Authorities
  - prescriptions and inspections

- Objective vs. French Nuclear Safety Authorities
  - Prove the safety and correct functioning of the LASS system to protect personnel from the radiological risks.

LHC Elements Interlocked



LHC Access System Architecture

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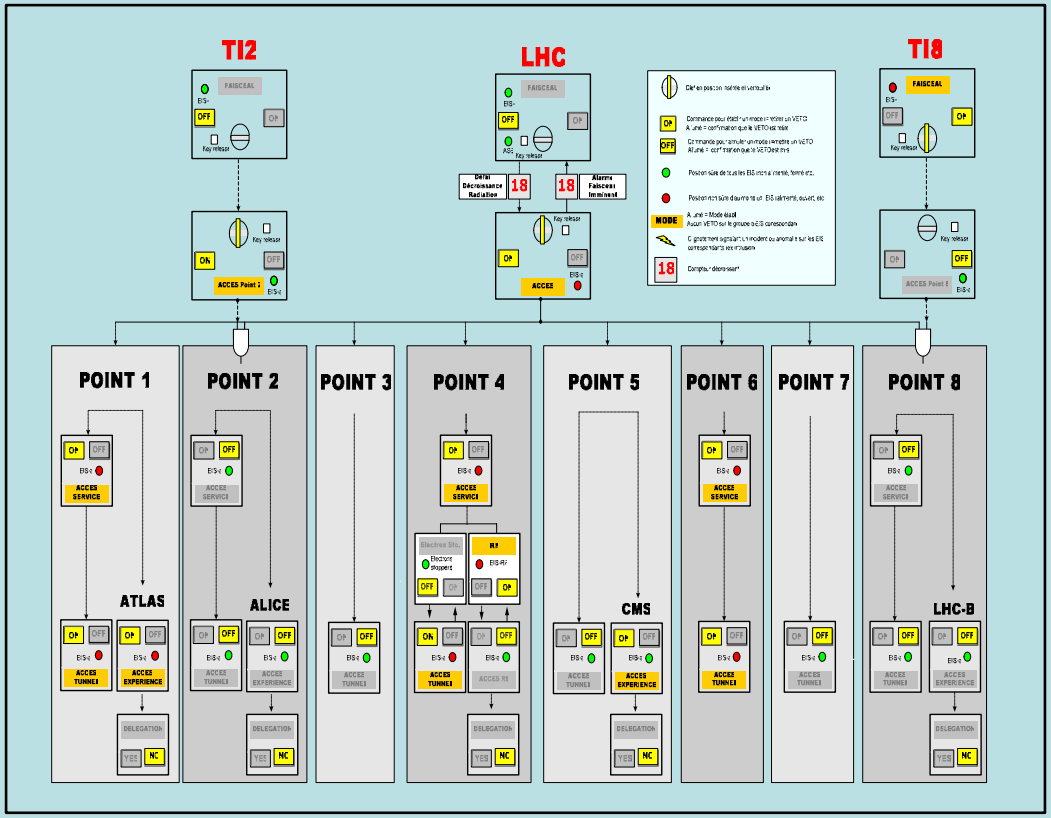
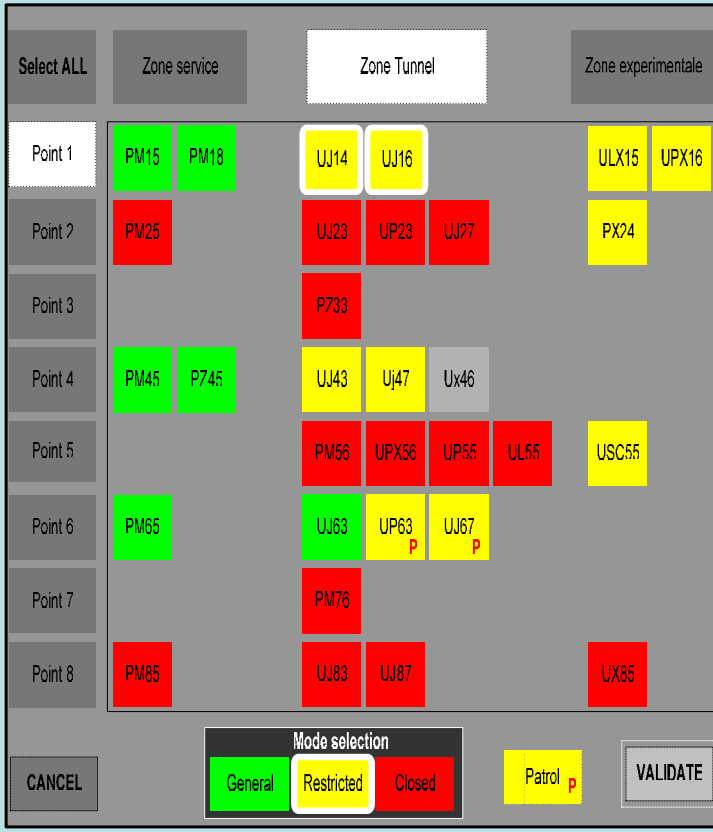
LASS operation mode selection





LHC Access Safety

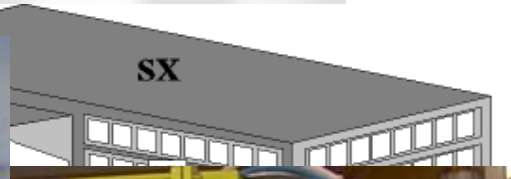
LHC Access Control

The Safety Matrix generates an executable program from a Cause&Effects table

LHC Access Safety

LHC Access Control

LHC OPERATION

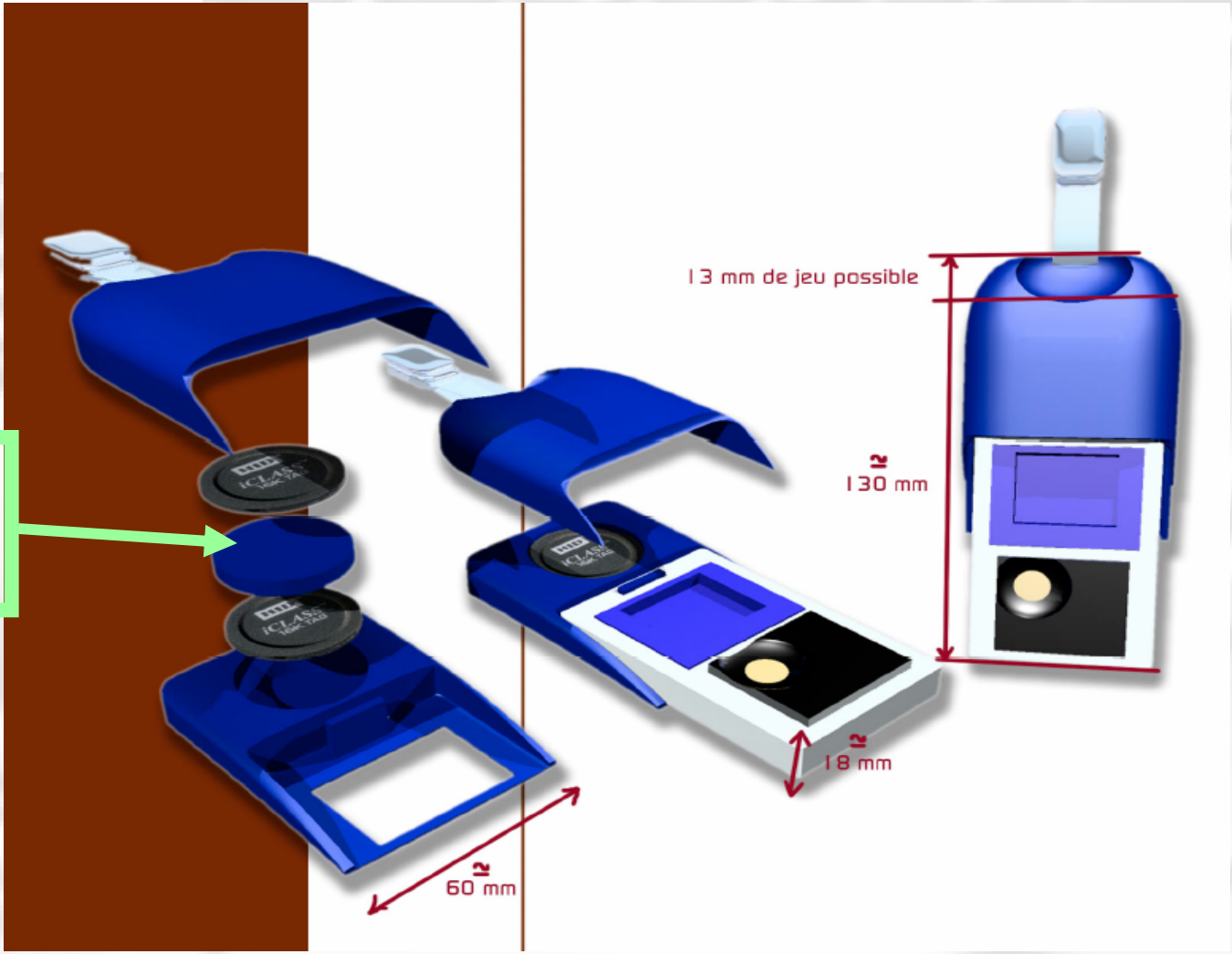


The LI
contro

the LHC accelerator and exp
access control systems:
For NON ACCESSIBLE areas
beam operation

ACCESSIBLE areas
during beam
operation

Dosimeter with the LHC access badge



LHC Experiments

- Dedicated list for controlling the access to the experimental areas
- Delegation of the Access Control Desks to the experimental control rooms

Installation

Installation

- Phase 1:
  - No impact on magnet transport and installation in the tunnel
  - To assure safety of personnel,
  - Access works will be in parallel with the activity of interconnection of magnet in the tunnel
- Phase 2:
  - Access surface installation is only allowed to start in each point when HC in adjacent LSS sectors has started (to avoid disturbing the transport of bulky material)
- Phase 3:
  - Co-activities not allowed during the first and last 2 weeks of Cold-down HC and the period dedicated to Powering test

Before Operation

- Access Help Desk (B55) operational mid-October
- Access Enrolment Desks (B55)
  - Biometry data acquisition
  - Access badge in dosimeter,
  - Training when enrolment (PAD, biometry validation)
- Users information
  - Local Posters
  - Bulletin

Next steps

Next Steps

- LASS & LACS operational in LHC7, LHC8, CCC for the end of November 2006
  - Access control in pits head requiring the new badge

- Equipment on site or under production
- Verification
- Planning relies on
  - No major technical issue during integration
  - Contractors and subcontractors respect the deadlines
    - Difficult until now

Thanks to the LHC Access projects collaborators

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Thank you for your attention