Technical Support 2004 Workshop

Managing the Detector Fixed Gas Distribution Contracts

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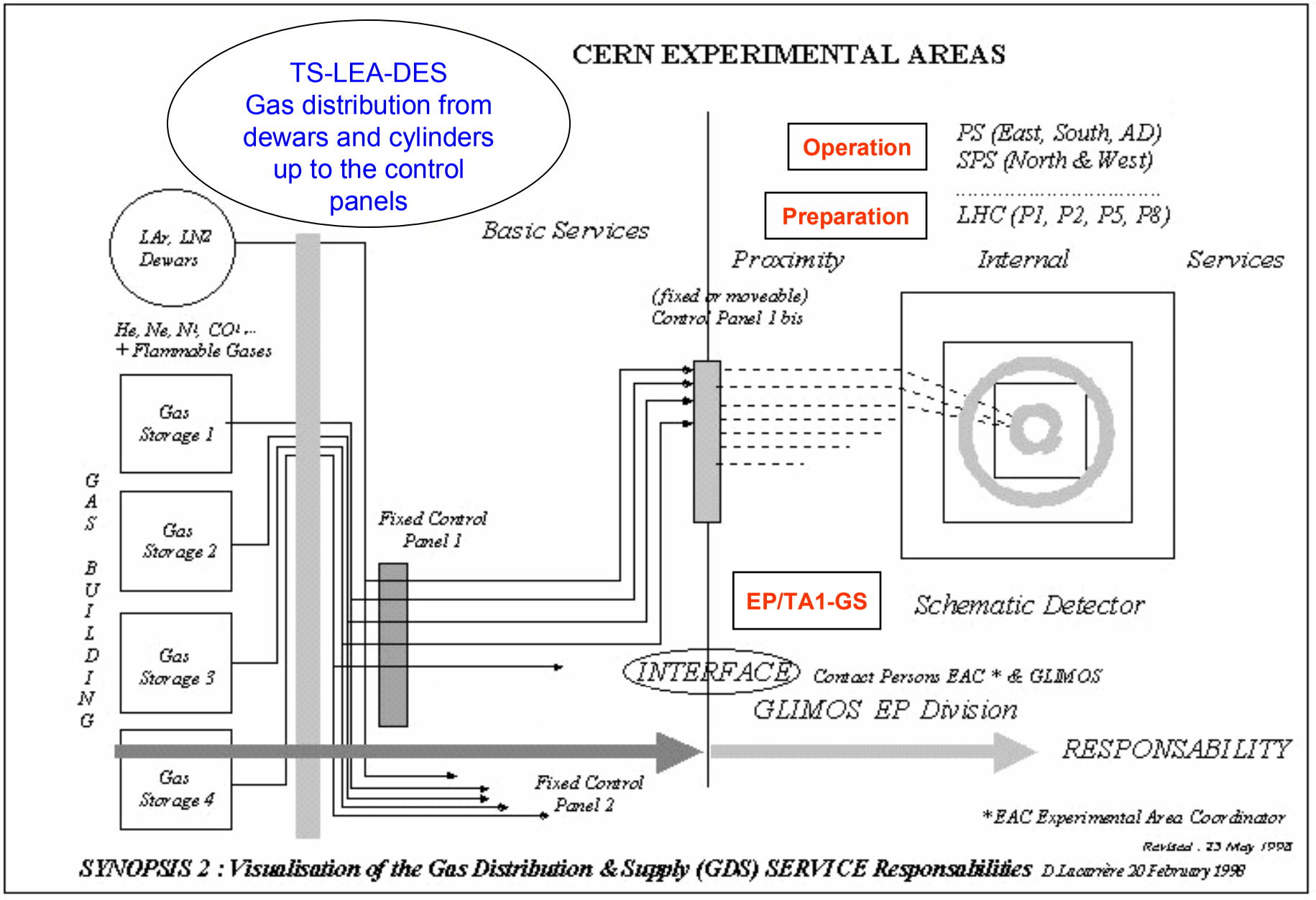
Why do we need a fixed gas system?

- Specific gaseous atmospheres are required by the detectors in order to carry out physics experiments.
- Due to safety reasons this gas can not be stored close to the detector.
- An infrastructure of pipes and control panels are required to supply these gases to the proximity of the detector.


CERN EXPERIMENTAL AREAS
TS-LEA-DES
Gas distribution from dewars and cylinders up to the control panels
Operation
PS (East, South, AD)
SPS (North & West)
Preparation
LHC (P1, P2, P5, P8)
Basic Services
Proximity
Internal
Services
LAr, LN2 Dewars
He, Ne, N2, CO2 ...
+ Flammable Gases
(fixed or moveable) Control Panel 1 bis
Gas Storage 1
Gas Storage 2
Gas Storage 3
Gas Storage 4
GAS BUILDING
Fixed Control Panel 1
Fixed Control Panel 2
EP/TA1-GS
Schematic Detector
INTERFACE
Contact Persons EAC * & GLIMOS
GLIMOS EP Division
RESPONSABILITY
*EAC Experimental Area Coordinator
Revised : 23 May 1998
SYNOPSIS 2 : Visualisation of the Gas Distribution & Supply (GDS) SERVICE Responsabilities D Lacarrère 20 February 1998

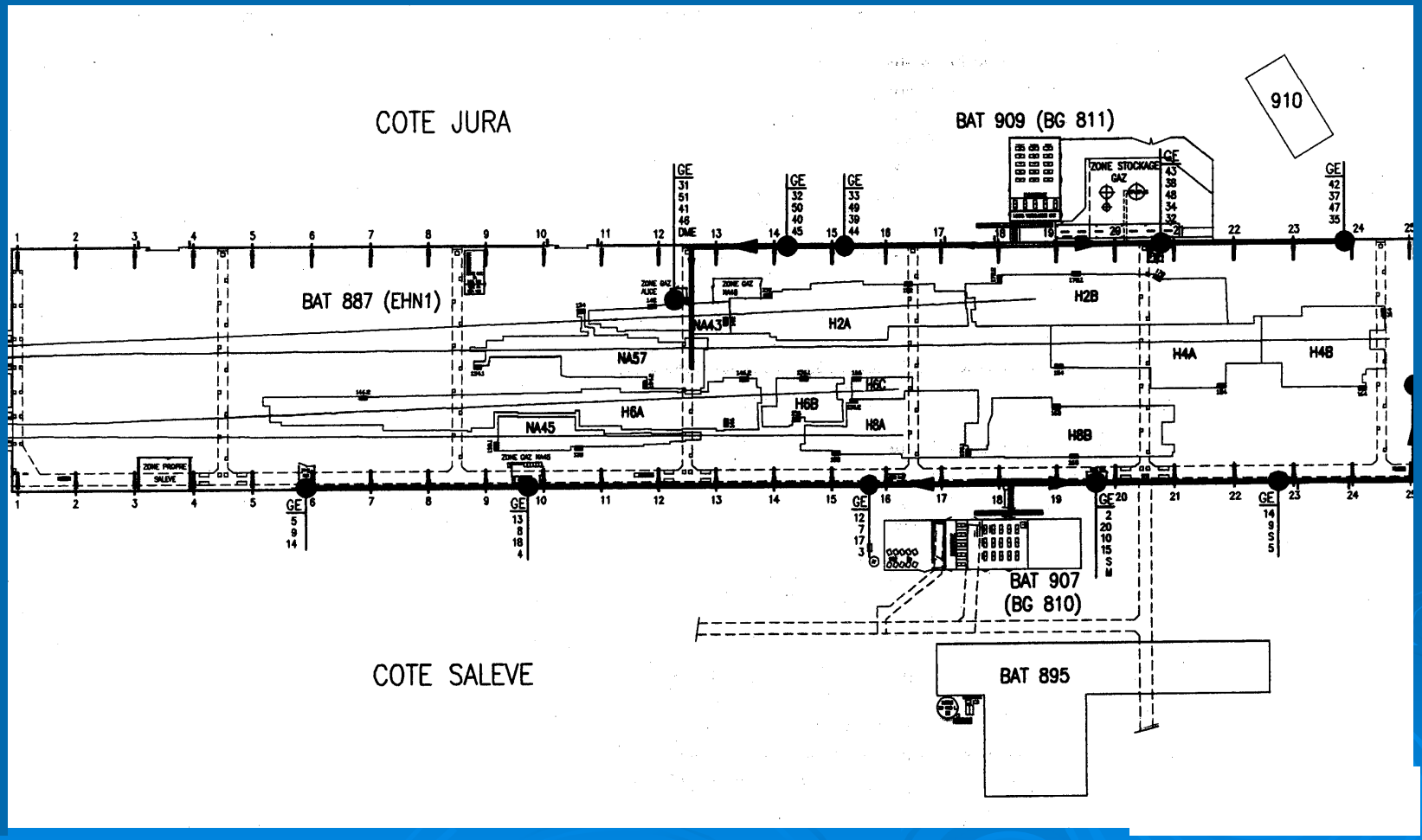
What gases do we use?

- Neutral Gases
  - N_2, CO_2, Ar, CF_4, $C_2H_2F_4$, SF_6, He, Xe, Ne
- Flammable Gases
  - Ar/H_2, i-CH_4H_{10}, CH_4

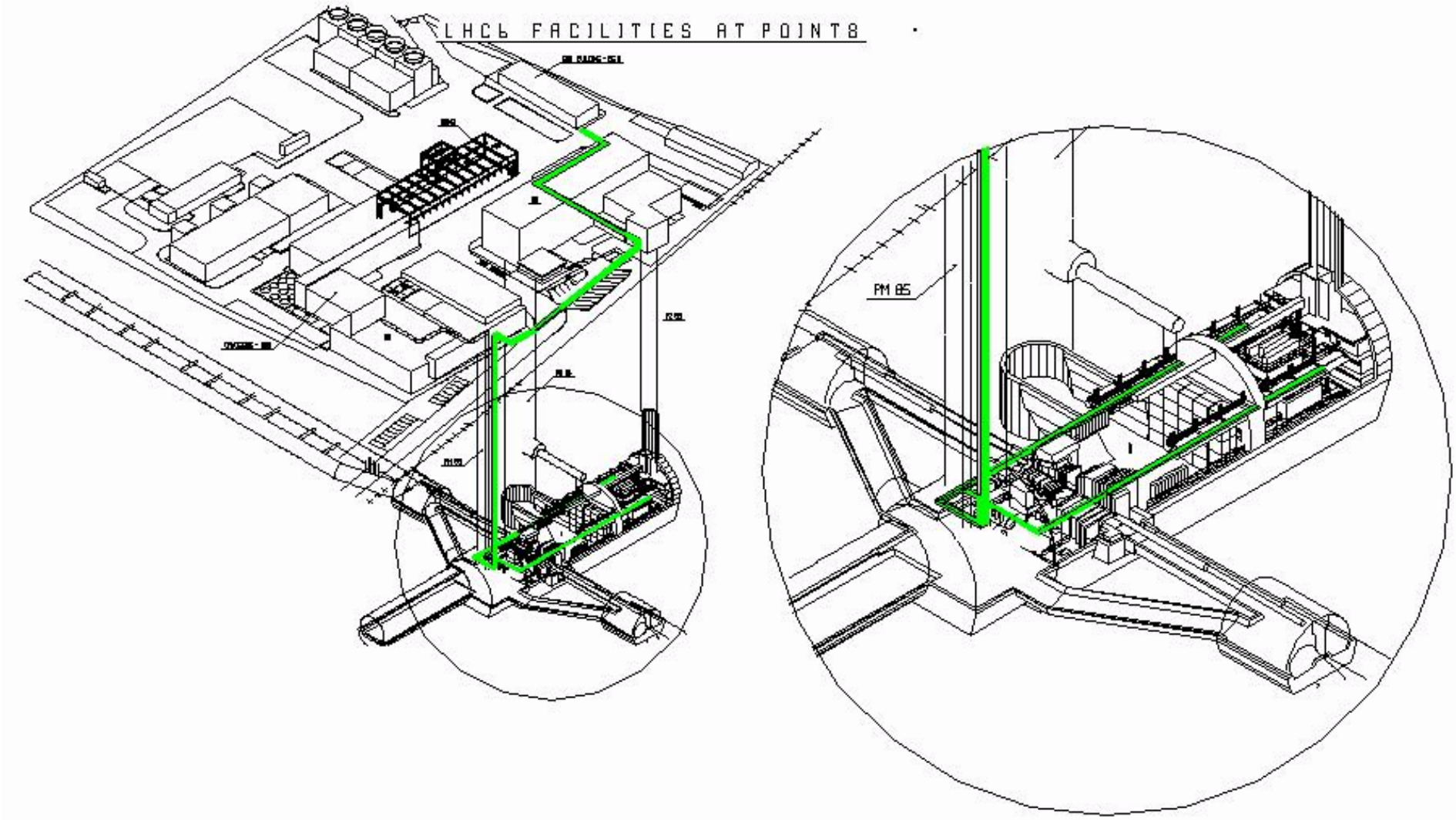
Where are these systems located?

- LHC
  - Point 1 (ATLAS)
  - Point 2 (ALICE)
  - Point 5 (CMS)
  - Point 8 (LHCb)
- SPS Area
  - EHN1 (907 / 909)
  - ENH2 (908)
  - ECN3 (920)
  - West Hall (297 / 182)
- PS Area
  - AD Hall (193)
  - East Hall (157)
  - South Hall (150)
- Equipment in operation
  - 70 Km of stainless steel pipes (6mm to 118mm)
  - 20 km of copper pipes (6mm to 28mm)
  - 50 Neutral gas control panels
  - 60 Flammable gas control panels
  - 21 Dewars (320 litres to 11m^3)
  - 81 Patch panels

Gas systems in an experimental hall



Gas system in the LHC



Contracts in place

- F-447
  - The design, supply, installation and commissioning of distribution systems for clean gases that are required for the operation of particle detectors at Points 1 & 5 of the LHC.

- E-070
  - The technical support required for Maintenance and Operation (M & O) of the Gas Distribution Systems (G.D.S.) for particle detectors in all the existing and future experimental areas of CERN. This includes the modifications required to the existing systems at Points 2 & 8 of the LHC.

What is involved in the M & O?

- **Maintenance and Operation**
  - Daily inspection of the Gas Distribution Networks at CERN
  - Ordering of gases
  - Replacing gas cylinders or batteries of cylinders
  - Supervising filling of cryogenic storage tanks (Dewars)
  - Checking working pressures of the different Gas Distribution Networks
  - Replacing failed or damaged gas handling equipment and instrumentation
  - Minor pipe modifications
  - Responding to and correcting reported faults of the Gas Distribution System
  - Logging of “Maintenance and Operation” events and activities

- **Safety Aspects**
  - Removing, calibrating and re-installing safety valves
  - Checking tightness of gas regulation units
  - Checking safety devices of cryogenic storage tanks
  - Purging all flammable Gas Distribution Networks
  - Reception tests and safety inspections

History of the Contracts

- F-447
  - Signed October 2001 (Value = 3.6 MChf)
  - Point 1 completed September 2004
  - Point 5 completed December 2005
- E-070
  - Signed Sept 2002 (Value = 2.7 MChf)
  - M & O ongoing on a daily basis
  - Point 2 completed December 2005
  - Point 8 completed Spring 2006

Key points to manage

- Schedule conflicts
- Cleaning of pipes / analysis
- Payment schedule
- Fire permits
- A.O.C.
- I.C.
- P.P.S.P.S
- Permits for working in Switzerland
- Regular planning meetings

Concluding points

- The installation work for all 4 points of the LHC are on schedule and within budget.
- As each area is upgraded, remote monitoring systems are being installed to improve the service we currently offer to the experiments
- DES communicates closely with the experiments and the Gas Coordination Panel to make sure every needs of the experiments are being met.