



---

# CMS Cryogenics

## Supply of an integrated turn-key system

Pascale Dauguet  
DTA - Advanced Cryogenics

---

# CMS He Refrigeration System :

## ■ Engineering and construction :

- ✓ **Basic design** from CERN functional specification
- ✓ **Detailed design** and procurement
- ✓ Workshop **manufacturing**
- ✓ **Installation** on the surface at P5
- ✓ **Commissioning** and test
- ✓ **Re-installation** in CMS cavern
- ✓ Start up and transfer of care and control



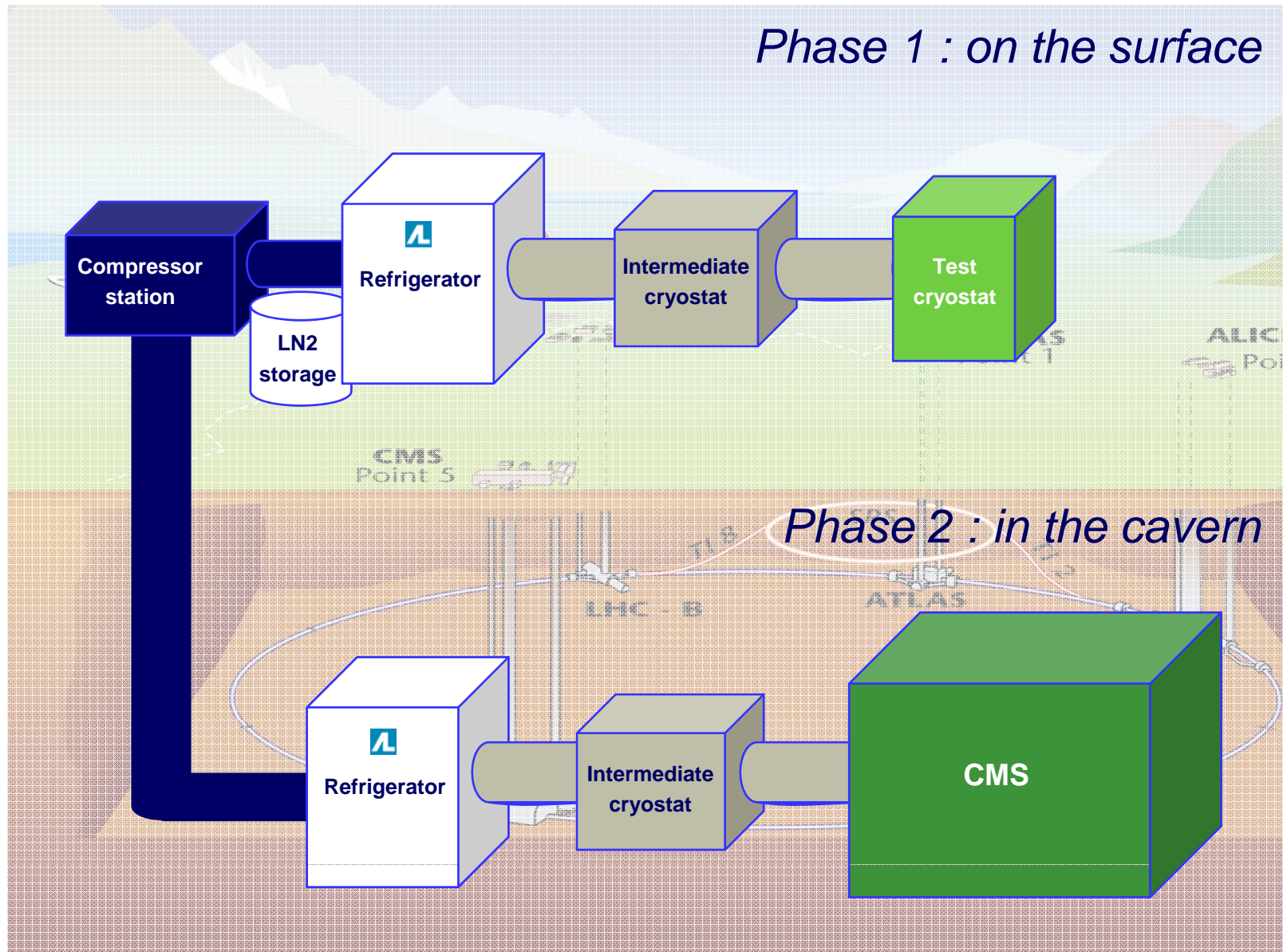
## ■ Equipments supplied :

- ✓ Compressor station
- ✓ Refrigerator cold box (1.25 kW @ 4.5K)
- ✓ Intermediate cryostat (dewar and valve box)
- ✓ Cryogenic lines to CMS experiment
- ✓ Test cryostat
- ✓ LN2 storage



- **Challenge: management of installation in a complex environment with strict space constraints (cavern) and simultaneous installation of other equipments**

## 2 phases of site activities



## Advantages of a turn-key contract for the customer :

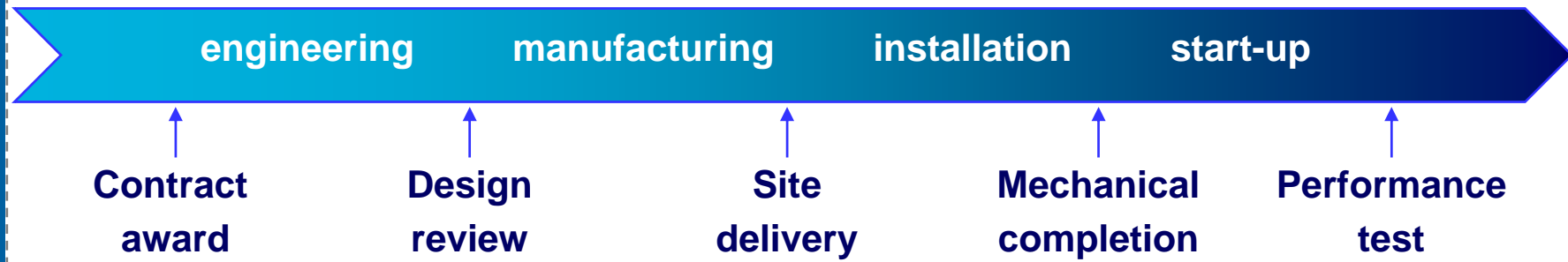


- A unique supplier addressing the complete system
  - ✓ *Less resources needed for contract management*
  - ✓ *Less interface coordination*
  - ✓ *Better cost control*
  
- A unique design team for the complete system
  - ✓ *Overall compatibility between sub-systems*
  - ✓ *Optimization of performances*
  - ✓ *More efficient risk management*
  
- *The number of turn-key projects has increased...*

# Air Liquide's recent turn-key contracts in advanced cryogenics :



# Typical turn-key project schedule :



**Typical turn-key project schedule : 2 to 3 years**

