CP3 – Distributed Temperature Sensing (DTS): first overview for ICL

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With courtesy of Diego Di Francesca, Jeremy Blanc, Flavien Colaco (EN-EL-FO)

PSS-CONS – Coordinated Package 3 (CP3)

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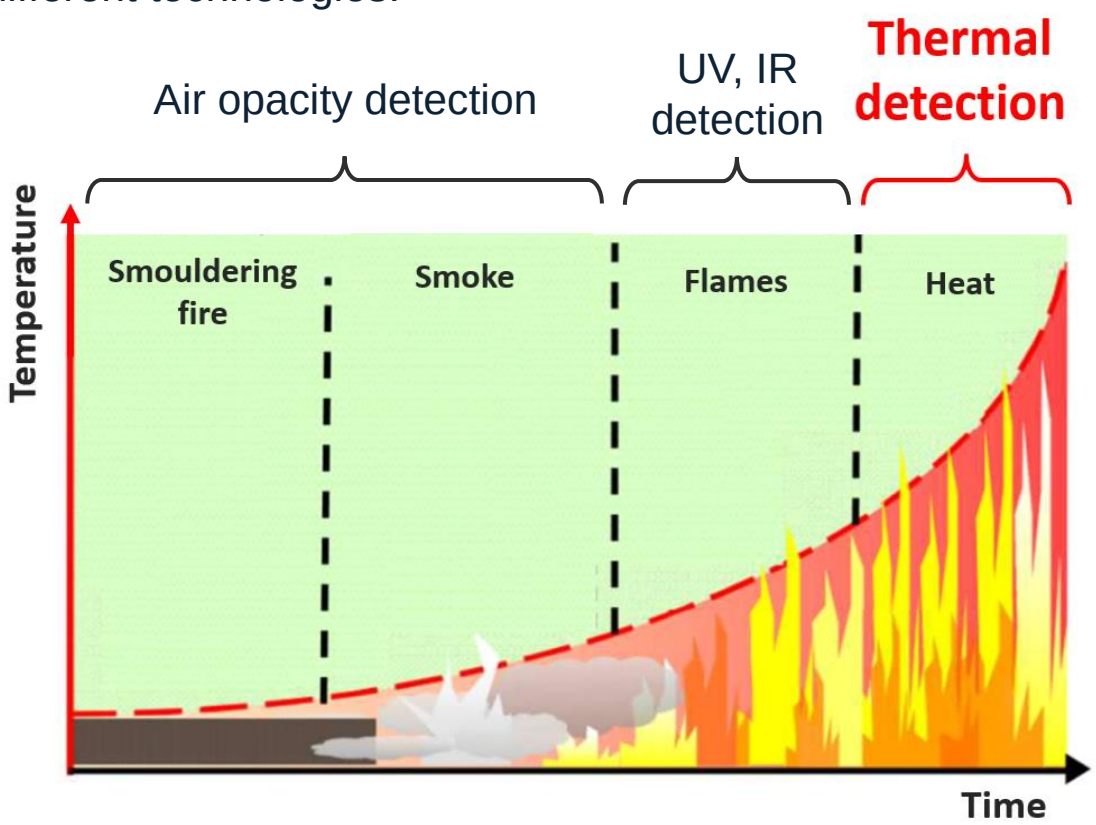
EDMS-3067318V1

Context and objectives: detection of a Fire and a Cryogenic leak (ODH)

Fire detection

A fire usually follows several steps which can be detected by different technologies.

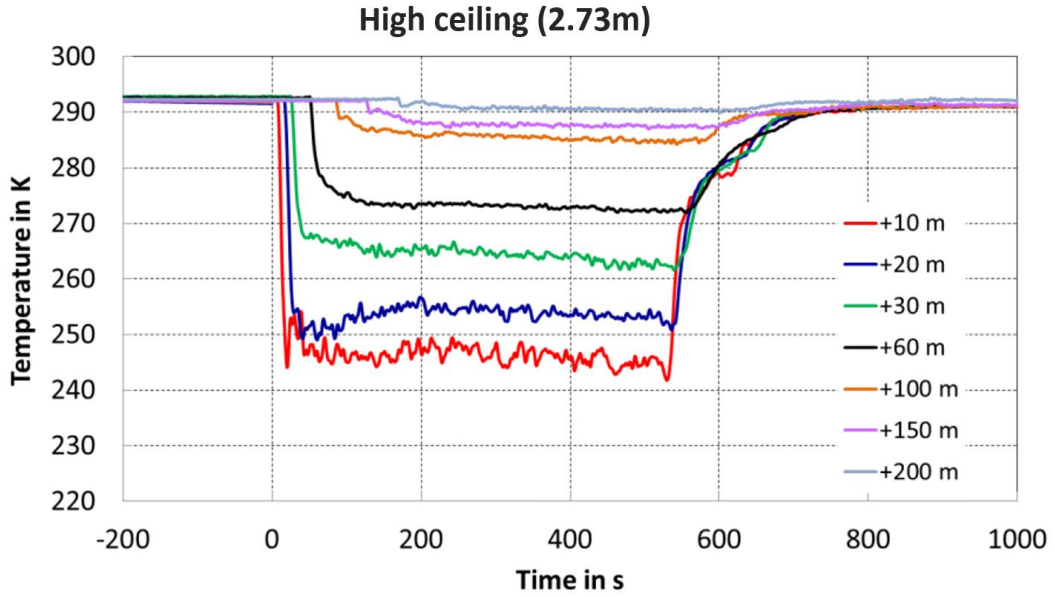


These steps may vary in duration depending on the combustible. For LHC tunnels, where there are mainly electrical components and cables to be burnt, all steps are expected.

Cryogenic leak (ODH) detection

Cryogenic leak → Decrease of oxygen concentration
Cryogenic leak → **Decrease of temperature**
Cryogenic leak → Lead to an ODH risk
} In some cases

During LS1, a scenario of 100 g/s of cold Helium leak have been tested in LHC tunnels. This scenario was the most conservative and corresponds already to an absence of risk for personnel.



(Extractions from EDMS-1403825V1 and EDMS-1410247V2)

Context and objectives - Planning

Within CP3, the project of Distributed Temperature Sensing (DTS) for fire and cryogenic leak detection in LHC tunnels has been splitted into 3 phases:

- Phase 1: pre-study and pilot deployment in YETS 24/25 (budget already allocated)
- Phase 2: general study and LHC tunnels installation
- Phase 3: maintenance and operation

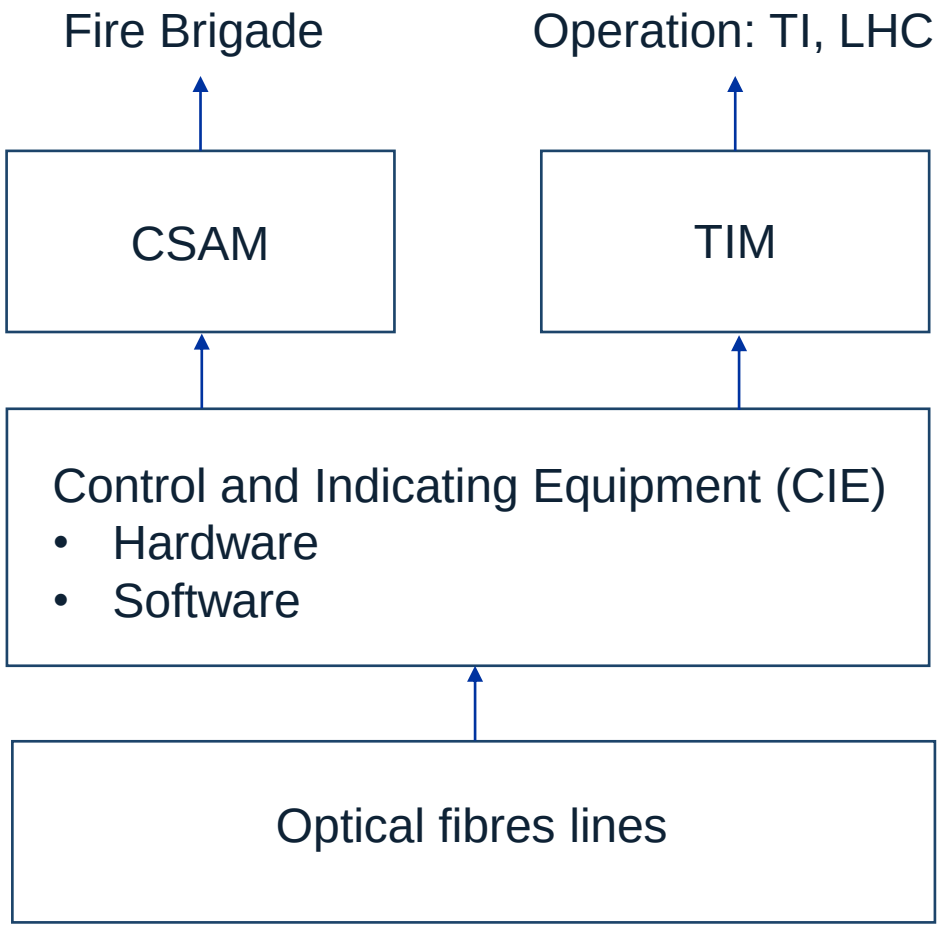
This presentation will focus on Phase 1 which is funded and on-going.

System description - Architecture (first draft)

Supervision Layer (surface)

Control Layer (surface)

Acquisition Layer (underground)



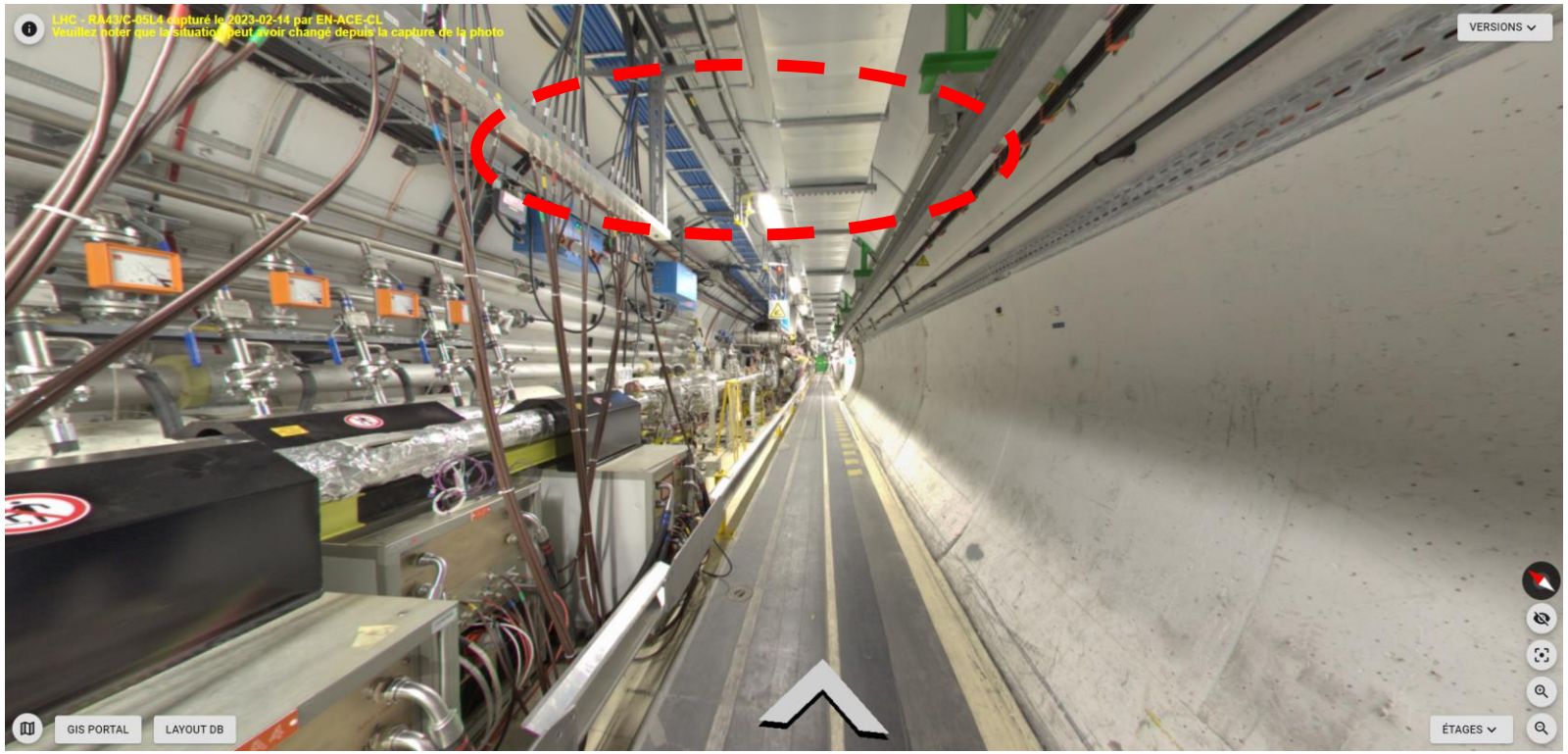
System description – Pilot integration (LHC4, RF area in tunnel)

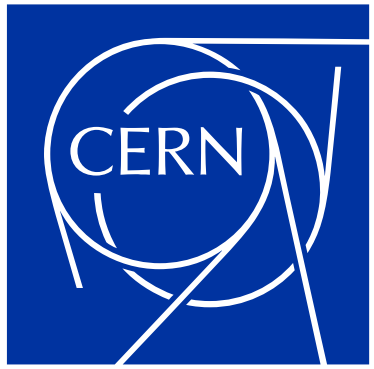
Surface:

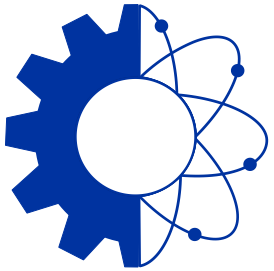
- 1 control rack
- Location: surface building, exact location to be confirmed

Undeground:

- 1 cable on the upper part of the tunnel vault
- In contact with air
- Exact location to be confirmed







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