



# TETRA @ CERN

(CERN Safety Radio Communication Network)

Speaker: Aurélie Pascal IT-CS

# Agenda

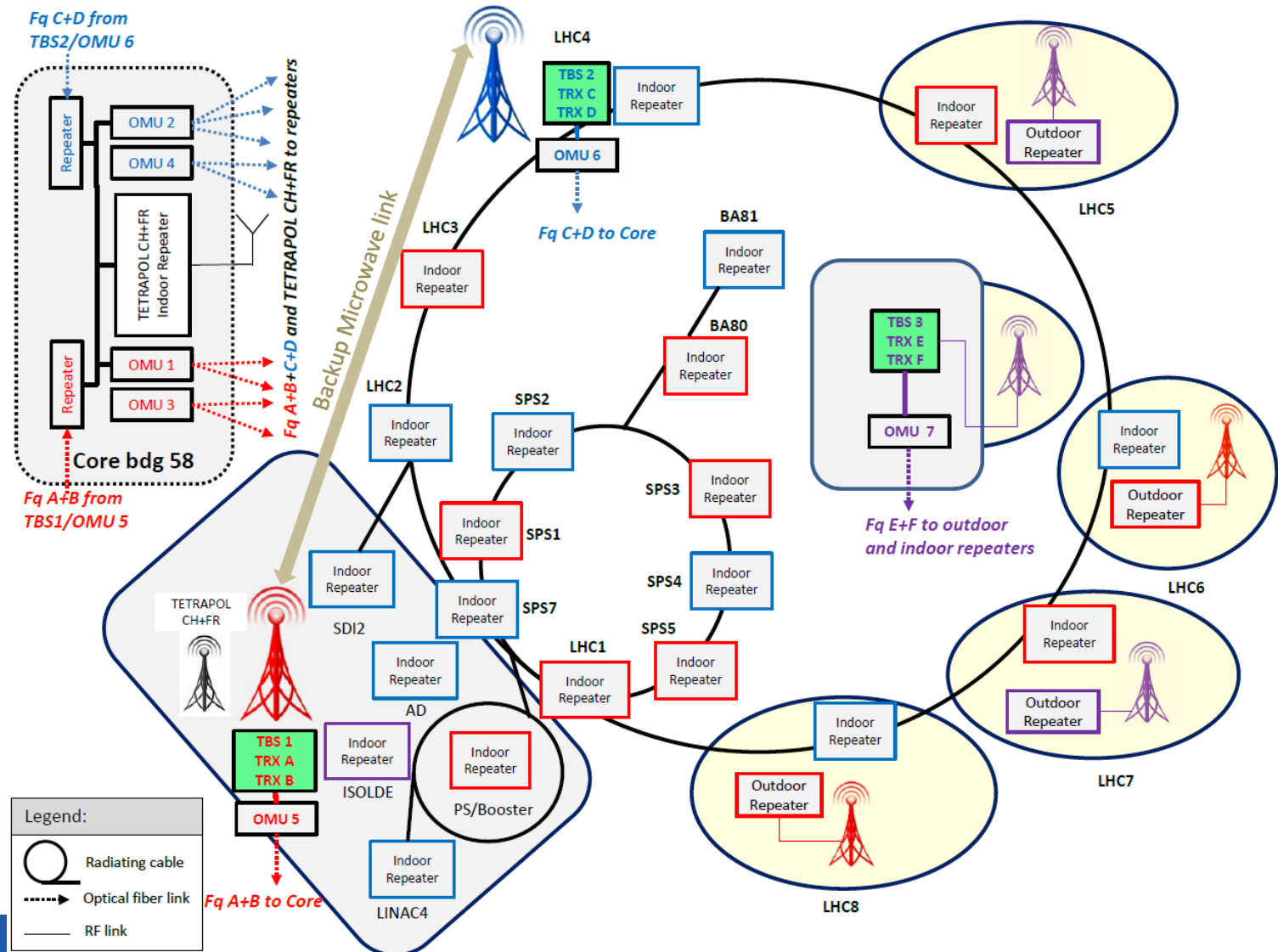
- CERN TETRA Network
  - services
  - design overview
  - TETRAPOL repeating system
  - Coverage
- Indoor Geo-localisation and Lone Worker Protection concepts
- TETRA handsets
- Support and maintenance
- CERN TETRA users
- What next...?

# CERN TETRA Network

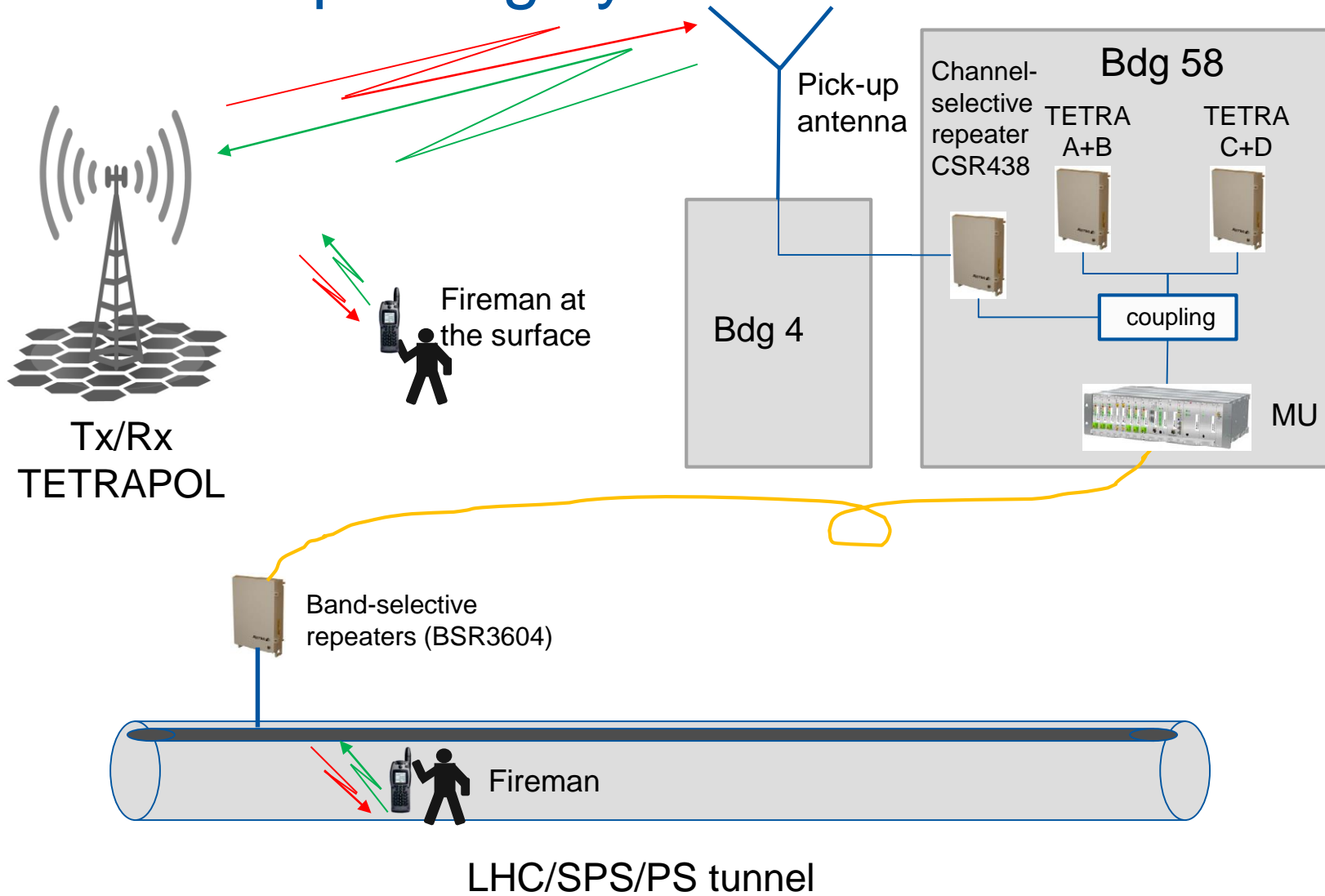
# Services

- High resiliency:
  - Backup of each core equipment (at different locations) and interconnections
  - All equipment by 48V battery chargers themselves powered by a Diesel distribution
- Network capacity: up to 500 terminals
- Voice capacity: 21 simultaneous calls (TMO) and 3 DMO frequencies
- SDS and status services
- Man Down & Emergency alerting
- Dispatchers (GPS and Indoor Localisation System)
- PABX calls: via ISDN lines
  - Reserved to the Fire Brigade
- Relay of Swiss and French TETRAPOL frequencies

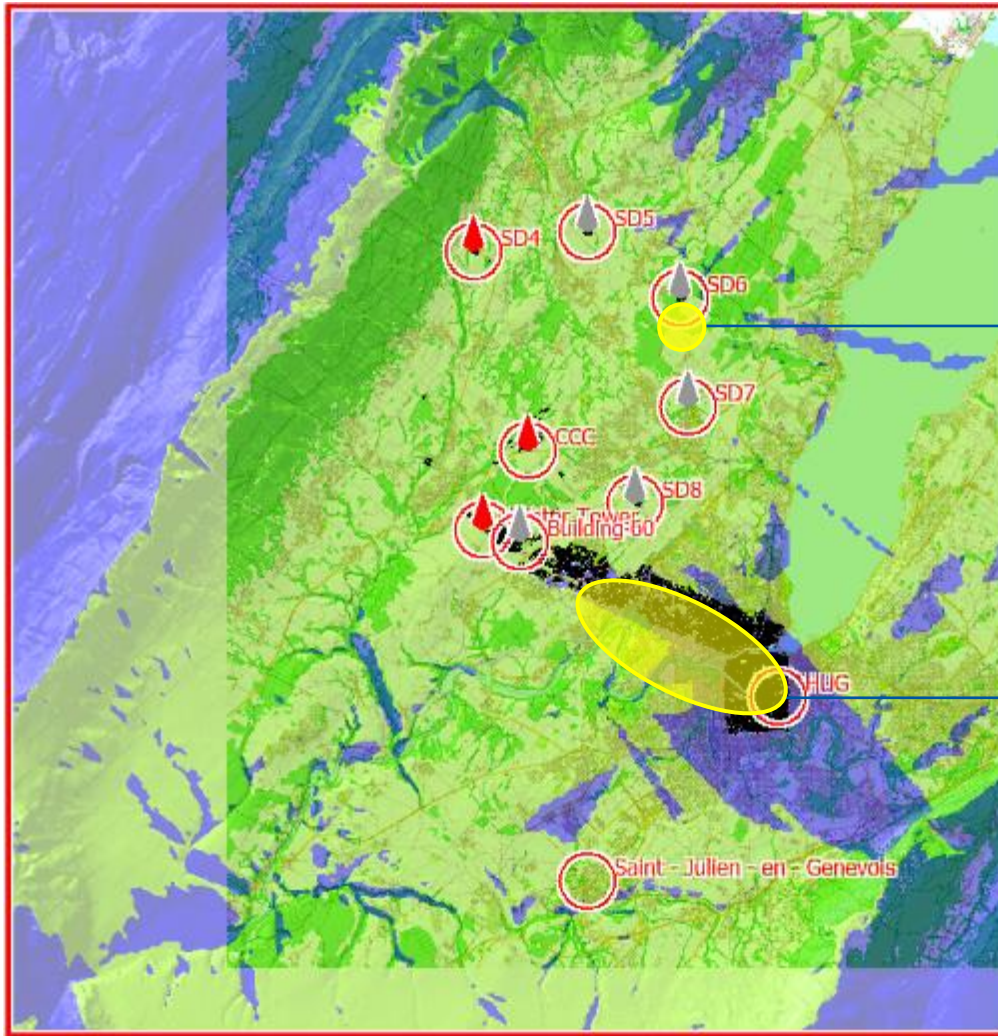
# Design overview



# TETRAPOL repeating system



# Coverage (outdoor)



Received Power  
[dBm]

> -95.00  
< -95.00

Lose of communication due to forest



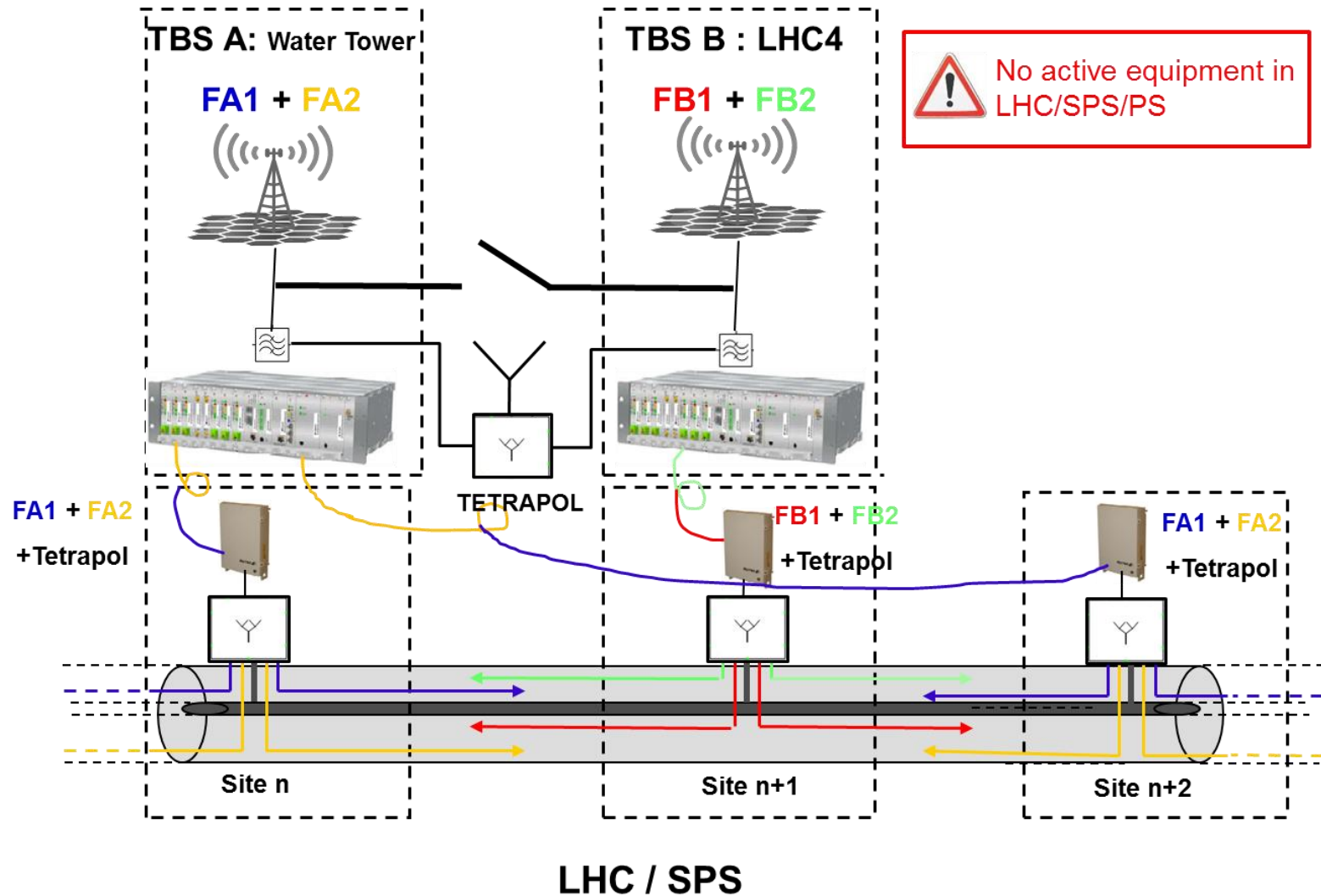
Base Station



Repeater

Lack of coverage due to relief

# Coverage (indoor)





# Indoor Geo-localisation and Lone Worker Protection concepts

# Indoor Geo-localisation and Lone Worker Protection concepts

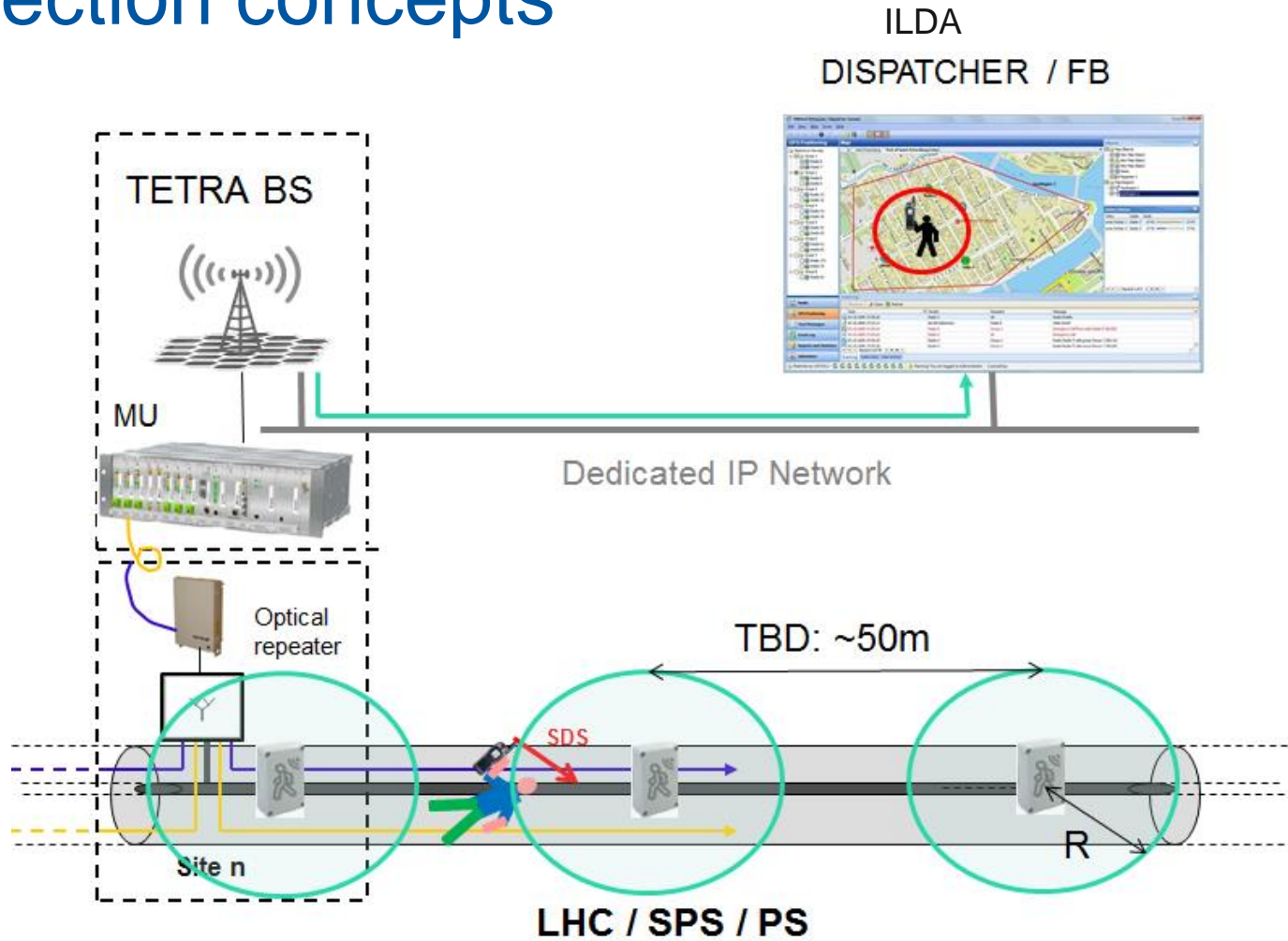
Based on the STProtect solution developed by SYSOCO in collaboration with SEPURA.

## System description:

- **Beacons:**
  - TX power max : in tunnel → around 15m of coverage
  - Frequency band: ISM 868MHz
  - Powering (autonomous): 4 batteries 3.6V
- **Boards** integrated into pur standard and ATEX terminals



# Indoor Geo-localisation and Lone Worker Protection concepts



# Indoor Geo-localisation and Lone Worker Protection concepts

ILDA DISPATCHER / FB

2. When catching the ID from the beacon, the terminal forwards it in a SDS over TETRA via the radiating cable to the Dispatcher Workstation at the Firebrigade

3. When incident 'man down' detected or emergency button pressed → emergency SDS sent over TETRA via the radiating cable to the Fire Brigade Dispatcher

1. Beacons located in the tunnel send their ID through their internal antennas to TETRA terminal

\* Lone Worker Protection/Man down = loss of verticality and/or loss of mobility

# TETRA Handsets

# Zoom on the handsets

- **Standard model: STP8038 from SEPURA**
  - Man Down and GPS capable and supplied with Indoor Localisation feature
- **ATEX model: STP8X from SEPURA**
  - Man Down and GPS capable and supplied with Indoor Localisation feature
- **Fixed radios: SRG3900 from SEPURA**
  - No Man Down capable, No Indoor Localisation feature
  - Only radios in vehicules are GPS capable

# Support and maintenance

# Support and maintenance

- Infrastructure:
  - Monitored 24/7 via the Computer Center over Spectrum
  - Maintenance:
    - 1<sup>st</sup> level done by an external company
    - 2<sup>nd</sup> level done by CERN
    - 3<sup>rd</sup> level done by SEPURA
    - Spare parts: CERN
    - Repairing: through our maintenance contract
- Terminals:
  - Spare parts and configuration managed by CERN
  - Repairing managed by SEPURA through our maintenance contract
  - Online training (soon) and practical training (Firebrigade) on radio delivery





# CERN TETRA users

# Who is using CERN TETRA?

- **Firebrigade** 
- Guards
- Technical services:
  - gaz & fire detection,
  - cooling and ventilation,
  - electrical service,
  - radio protection & safety specialists
  - ...
- **Experiment:** ALICE (soon)
- **Special events:** Open days, 60th CERN's anniversary, TEDx...

# What next ...?

# Next steps

- Coverage extension:
  - To HUG
  - In some CERN facilities (ISRs, EHN1...)
  - Study to be done in LHC tunnel
- Services:
  - ILDA (Indoor Localisation and Dispatcher Add-on) commissioning
  - Enhancement of ILS beacons radiations « resistance »
  - Pagers integration
- Monitoring:
  - Study and deployment of a probe-based monitoring solution
  - Gathering of all TETRA data (logs, system...) in a central database