Eyecom Explosion Sensitive Field Signaling and Communications

Excel Telecommunications Limited
Member of EYECOM Group
www.eyecom-telecom.com

Agenda

- Company Introduction
- HK Project Team
- Systems Overview
- NMS (Remote Monitoring and Control System)
- Project References

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1 Company Introduction

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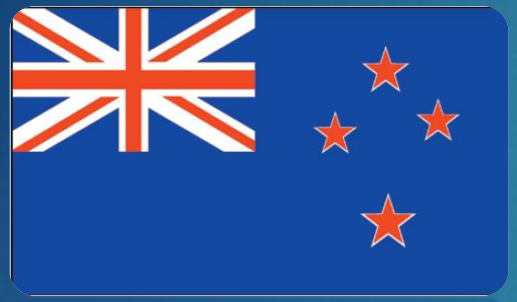
Company Introduction



History:

- **1996 -** Eyecom New Zealand Ltd. was founded by Deltec New Zealand and its ex-employees
- **1999 -** Set up the Eyecom Telecom Ltd. in Guangzhou, China to lower manufacturing costs
- **2003 –** China factory expended, plays an important role in business development

What we do:

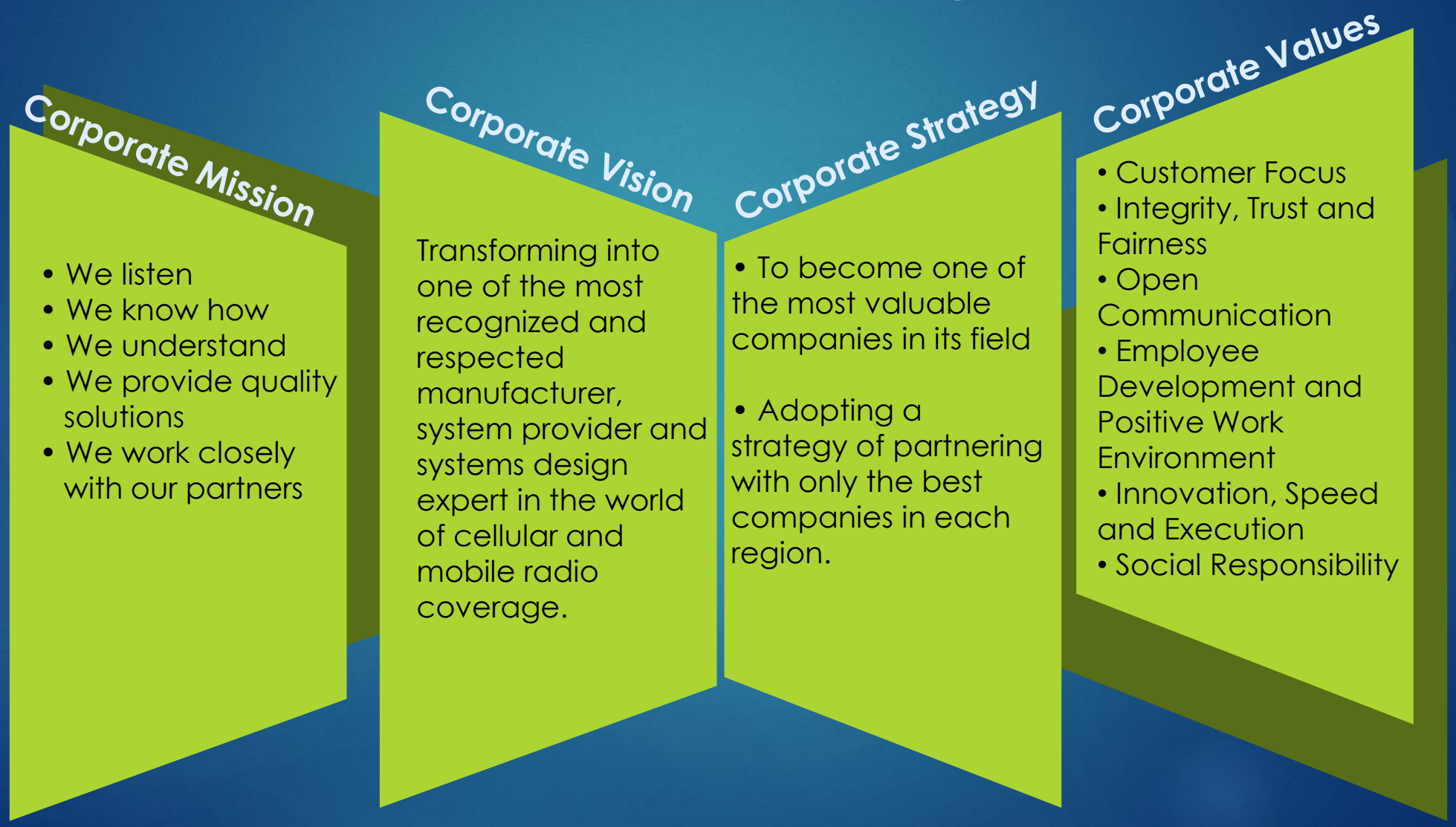
Design and Manufacturing of:

- Tower Top RF products:
  Base station antenna, RET and MDT, single to Multi-bands
  TMA, Lightning arrestors, RF feeder cables
- IRDN (DAS) products for PMR, Tetra and Cellular:
  Antennas, POI/Filters, RF/Optical Repeaters, power dividers
- Signaling and Control Products:
  Complete range of signaling and Safety products for Railway/Metro Tunnel and Confined area safety/ control/monitoring; RFID/GPS target global positioning

Technology Milestones

1996: World's first 11 cellular systems POI
1996: Eyecom – introduces MB-DAS to APAC
1999: PMR/GSM Optical Repeater
2001: Cellular FSR
2001: Dual band dual pol EDT antenna
2002: Ultra high linearity Amplifier
2003: Ultra high dynamic range repeater
2003: Tetra Repeater
2005: Pilot Beacon generator for CDMA
2006: Remote RF Unit for CDMA and GSM
2007: High EDT (27 degree) BTS antenna
2008: Tetra FSR repeater
2008: Digital Optical repeater
2009: ICS repeater
2010: Optical multiband MCPA DAS Repeaters
2011: Digital Basestation Hotel Solutions – cellular & DMR
2012: MIMO active DAS and MIMO Indoor Antenna & MIMO POI
2013: …

Mission, Vision, Strategy, Values



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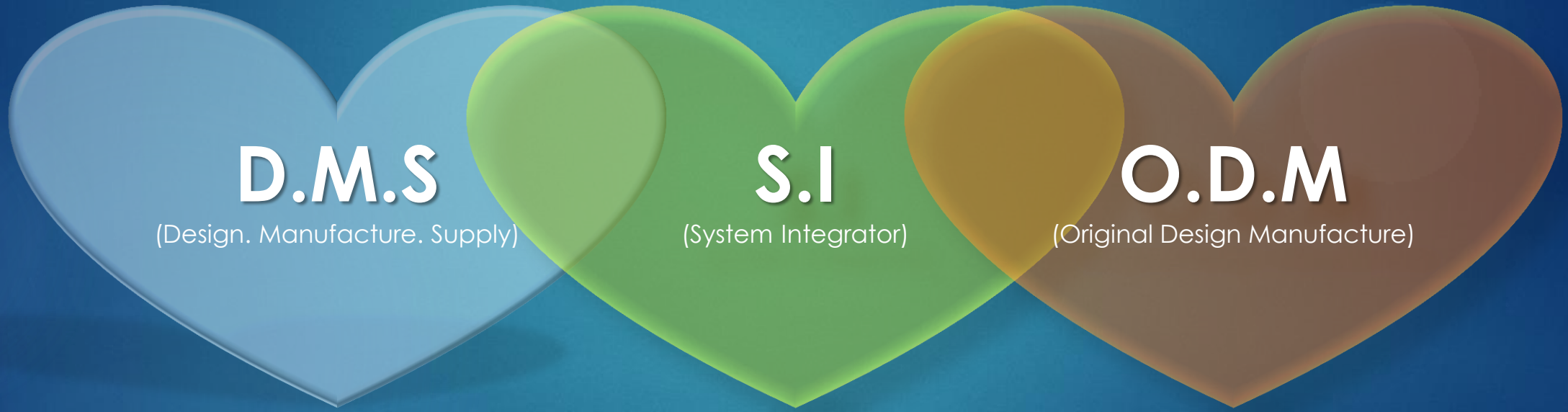
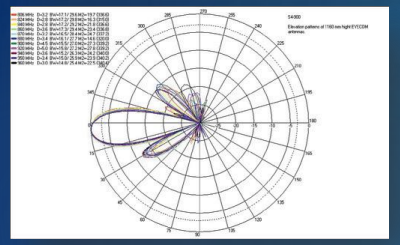
services

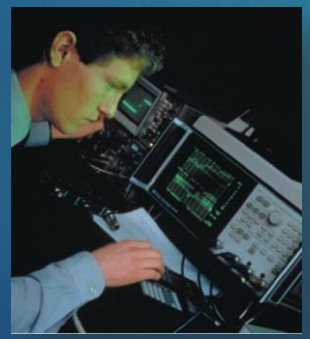


Research & Development

- **> 25 years** of innovations continues to deliver superior products.
- Constantly challenged by customers to meet demanding requirements
- Eyecom's strengths:
  - *Complete flexibility and custom design approach*
  - *Imagination, creativity and the care for the smallest detail*
  - *Meet and better the customers requirements to future proof our designs*

Our strengths have led us to being the customers "**First Choice Supplier**"





Patent invention certificates from Eyecom in BTS RET antenna dipole and phase shifter design.

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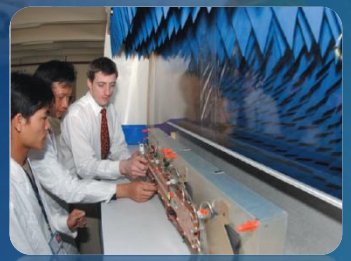
Manufacturing



"Customer Satisfaction" our foremost concern!

- We will not compromise on quality or reliability
- China factory reduces production costs
- Production savings reinvested into improving quality and reliability
- New RF and radiating cable production facility provides full turnkey solution for our customers
- ISO 9001 Accreditation

*Our quality and reliability will lead to us being the customers "**First Choice Supplier**"*

Factory Facilities

China Factory

- Guangzhou, 7-8/F Blk E, Tianhe Software Park
- 4000 m^2 Factory production area
- Full production QA system and facilities
- 162 staffs

- **Maximum production per shift:**
  - Repeaters 50/day
  - BTS Antennas 300/day
  - Passive Components 1000/day
  - Filters 200/day

- **R&D Facilities in:**
  - Wellington, New Zealand
  - Guangzhou
  - Beijing
  - Shanghai
  - Spain (joint development Scheme)

Sale and Service Offices

QA Facilities

Programmable Constant Temperature and Humidity Testing Machine

Variable frequency vibration test unit

Intermodulation testing of all units

RF Consolidated Test Bed

Typical unit complexity

(Tri-band repeater)

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2 Systems Overview

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Eyecom Tunnel Solution System

- **Eyecom tunnel solution** combines tunnel communication and safety systems in one network. Robust plug and play design ideally for application of tunnel under construction, Data-Bay supports all systems via a single cable.

- Systems supported
  - PMR and cellular radio systems from 70-2700MHz
  - Intercom, Fire Alarm, RFID, CCTV
  - Remote gas sensing, flooding alarm, plant machine operation
  - Consolidated NMS diplay all information in OCC

Eyecom Tunnel Safety Solution System

- **Eyecom Communication System**
  - FSD Digital Communication System (TETRA standard)
  - Cellular(GSM) service
  - PMR(Walkie-Talkie) system
- **Eyecom Surveillance System**
  - Fire-Alarm
  - Intercom Phone
  - Personnel Tracking system
  - Gas Detection
  - Flooding Detection
  - CCTV
- **Eyecom Machine Control System**
  - Fan Control
  - Pump Control

1. Eyecom Communication System

FSD Digital Communication System (TETRA standard)

Used by fireman in case of emergency and required by HK government's regulation

Cellular(GSM) Service

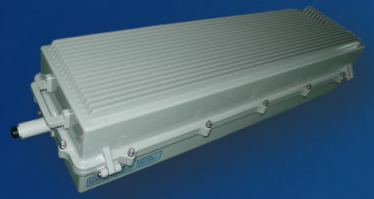
Providing underground coverage for cellular phone

PMR(Walkie-Talkie) system

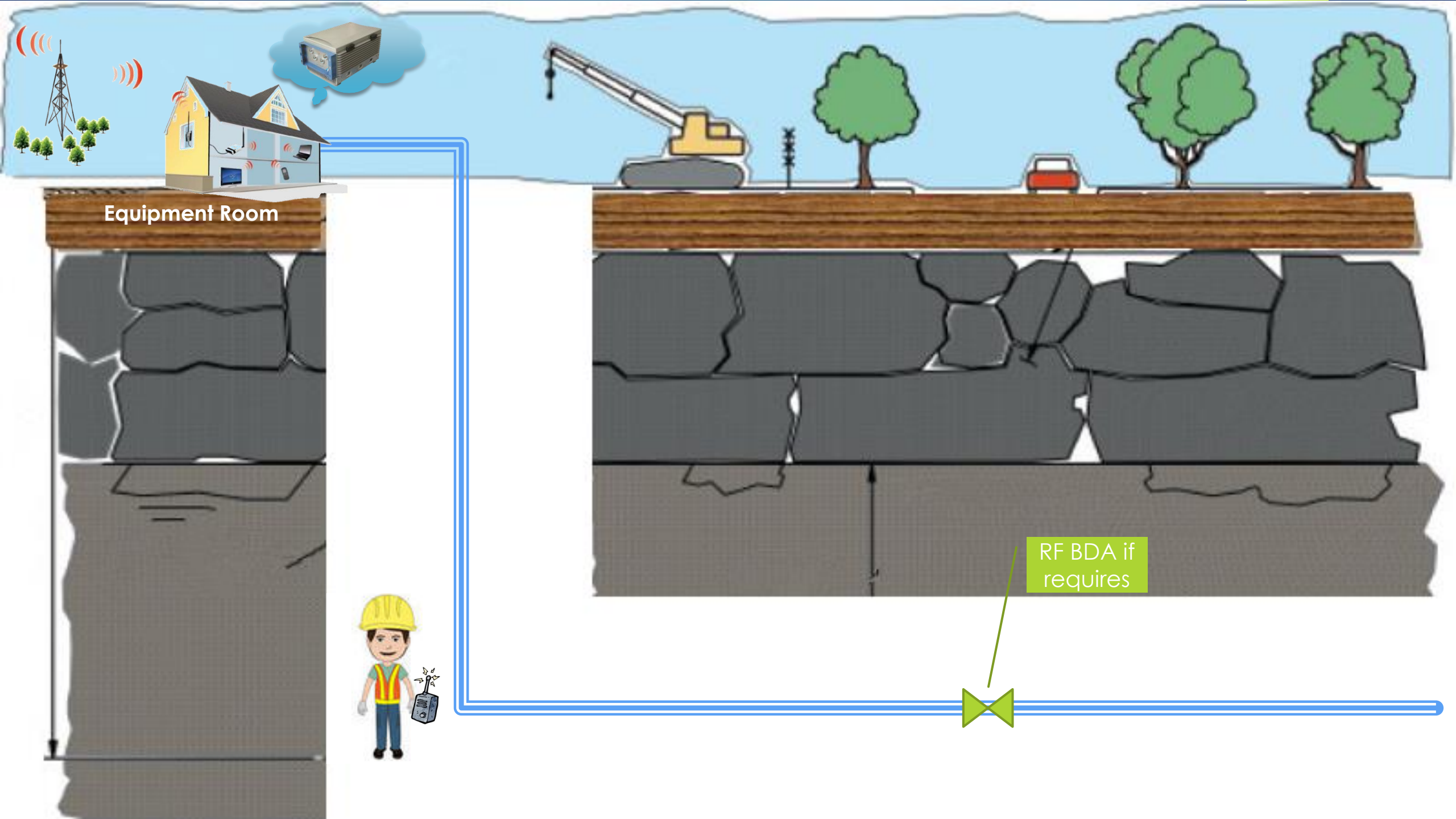
Providing walkie-talkie system from outside to inside tunnels. It is a cheap and speed way for operation communications

Compulsory

1. Eyecom Communication System



Tetra Repeater & BDA

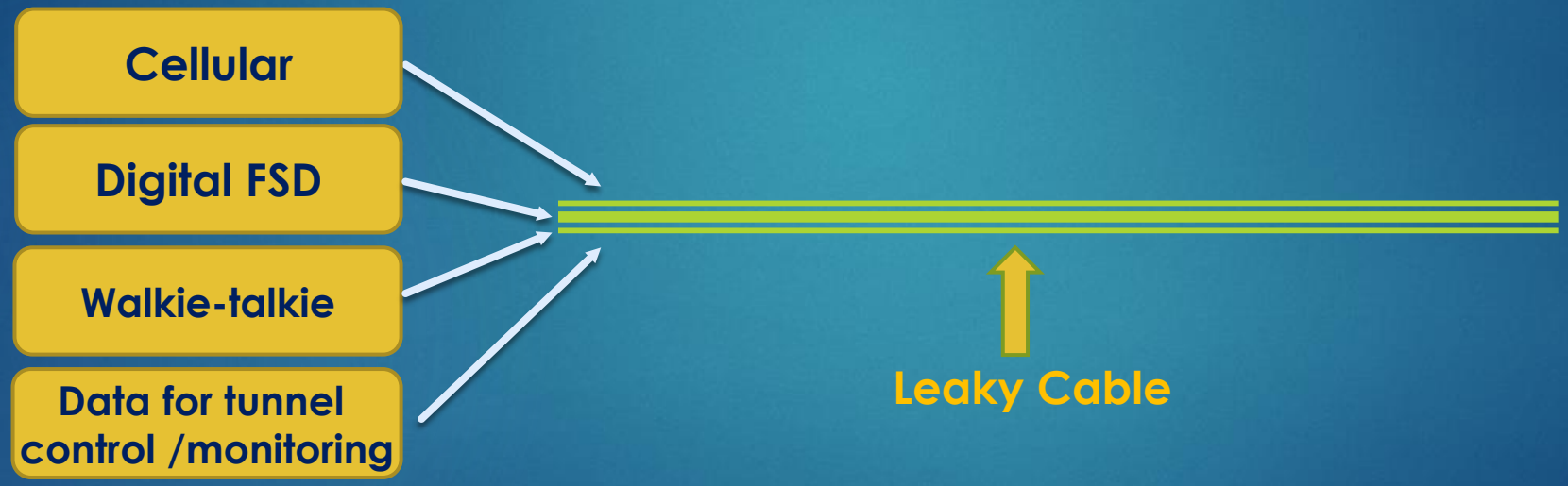

Equipment Room
RF BDA if requires

1. Eyecom Communication System

Eyecom Advanced technology

Minimized Cable Number used in tunnel

- Single Leaky cable for FSD radio + Walkie-Talkie radio + GSM + Back Bone for Tunnel Control Data transmission



1. Eyecom Communication System

Important Consideration:

FSD requirements to Tunnel Communication equipment

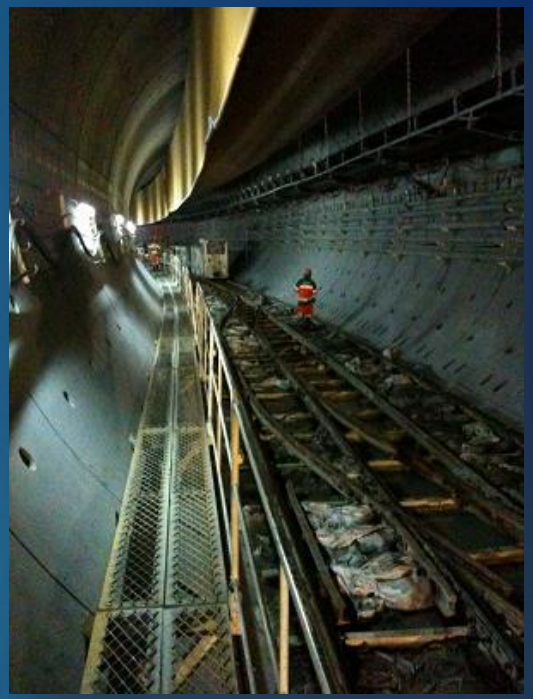
- All repeater used should with high reliability 99.99%: full redundant repeater should be used in FSD Tetra radio network
- All Amplifiers and repeaters used in the entire tunnel for FSD coms system should be OFCA Type Approval and certified and shown on OFCA web-site
- All FSD coms systems amplifiers should built-in UPS for 4 hours UPS support

1. Eyecom Communication System

Eyecom Suggests

Tunnel Communication system's extra Future

- Leaky cable coms systems in different sections of tunnel should be easily upgraded to "Talk Though" radio configuration for communication available through out entire tunnel after the tunnel is digging through.
- 100% coverage in tunnel, important area such as TBM internal and cutting face, or tunnel blasting area should have excellent radio signal communication coverage.



1. Eyecom Communication System

Tunnel Communication system Implementation Road Map

1. Contract Awarded
2. Site Survey, system design: **2-4 weeks**
3. Civil contractor/MTR approval: **1-2 weeks**
4. FSD approval in principle: **8-10 weeks**
5. Product delivery: **4-8 weeks from approval**

Approx. **16 weeks** required for project product delivery from PO issued

2. Eyecom Surveillance System

- **Fire-Alarm**

  Consisting by Break-glass, alarms and light. Required by HK government's regulation

- **Intercom Phone**

  Let workers have a phone communication outside in high reliability. Required by HK government's regulation

- **Personnel Tracking system (RFID)**

  Monitoring the real-time locations of people/equipment/vehicle in open environment (tunnels)

- **Gas Detection**

  Monitoring the real time content of CO_2,CO,O_2,NO_2 and CH_4 at the fixed locations

- **Flooding Detection**

  Providing alarms for defined water levels

- **CCTV**

  For safety and security

2. Eyecom Surveillance System

Fire-Alarm System

- Fire-Alarm Panel
- Fire-Alarm Box -- control switches with Siren-light located at every 60-90 meters

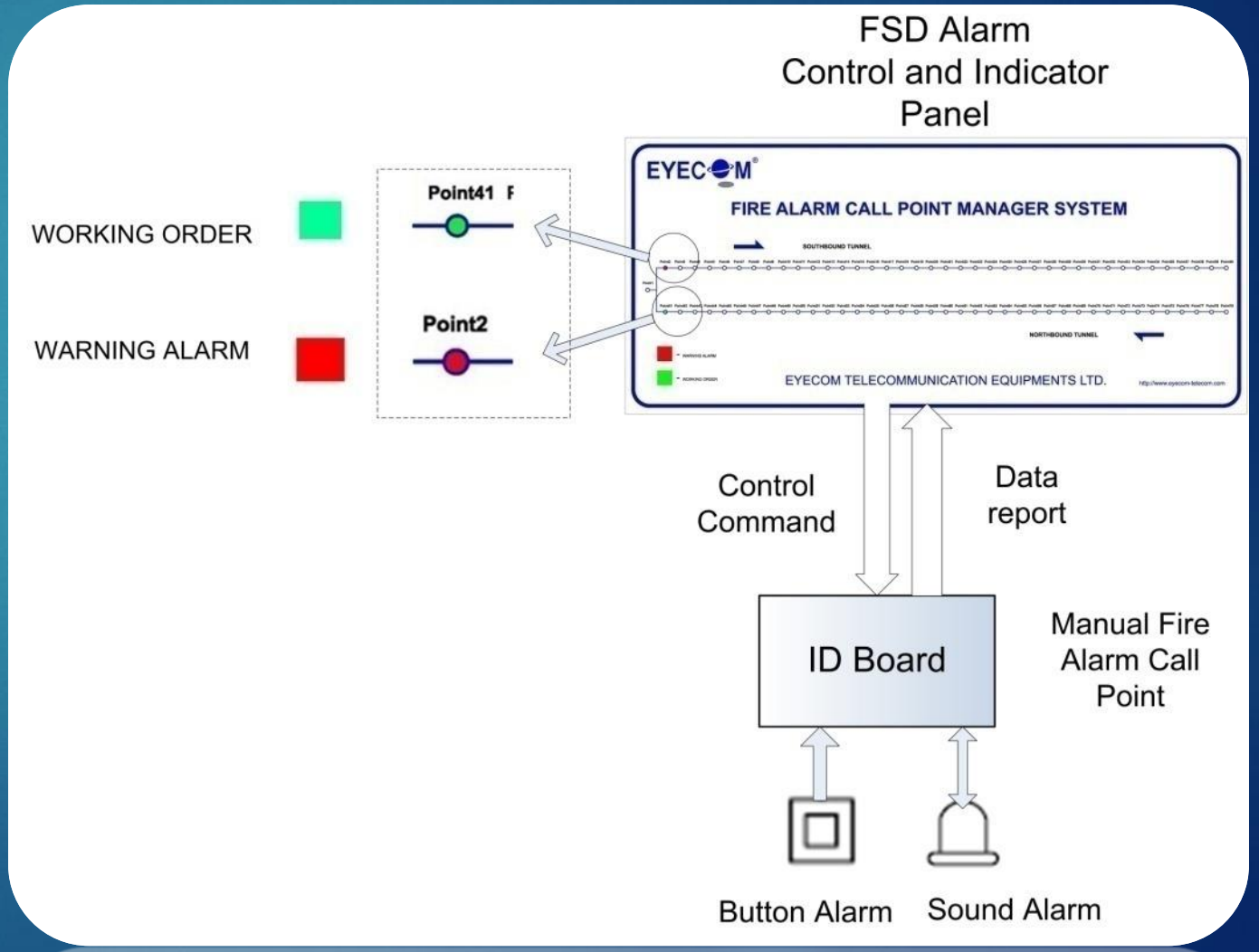
Per FSD requirement:

- Advanced NMS, alarming detector is shown in tunnel digital map
- Light and Siren on alarm box to indicate alarming location

2. Eyecom Surveillance System

Fire-Alarm System

- **Fire-Alarm Panel**

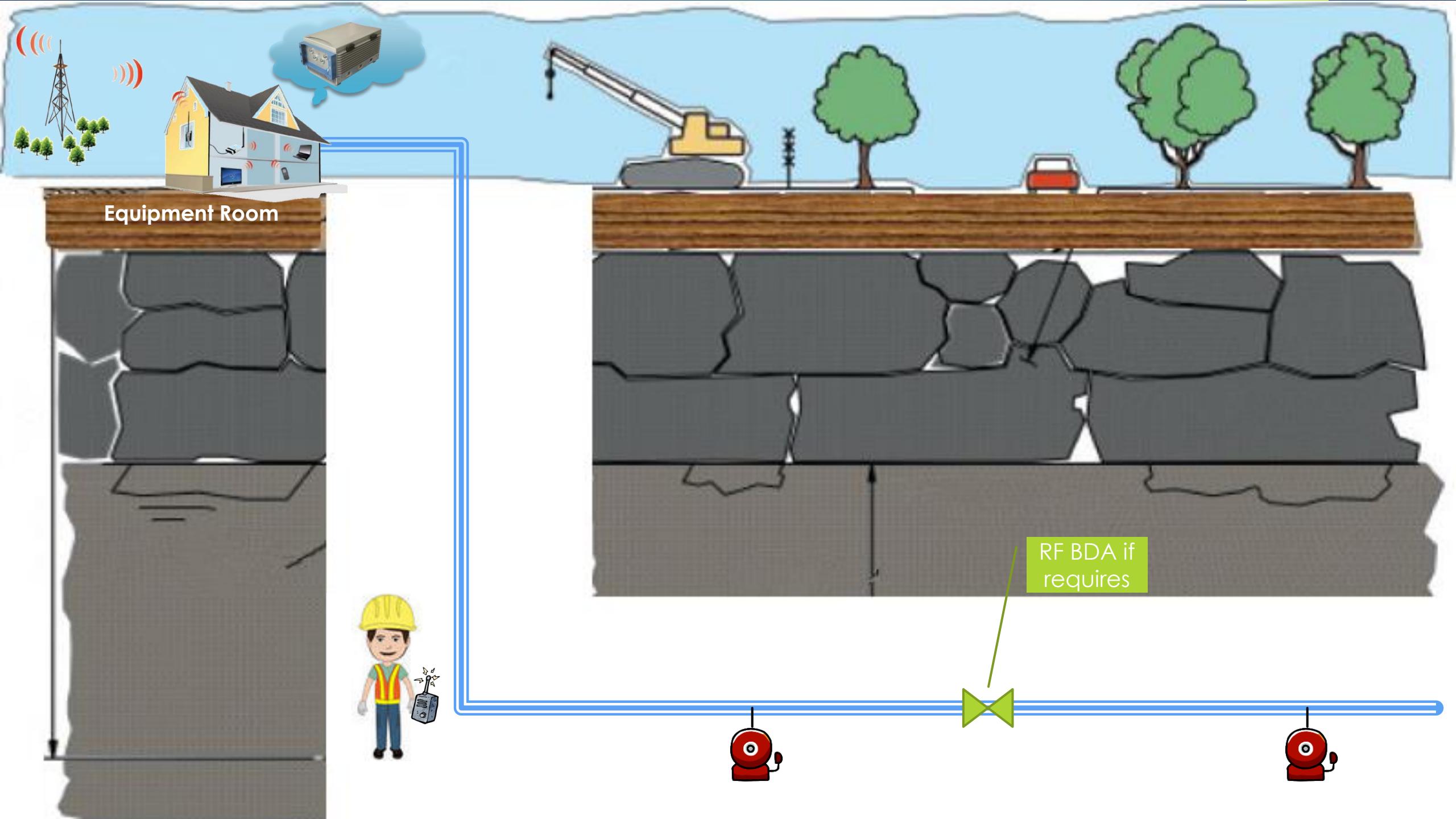


2. Eyecom Surveillance System

Fire-Alarm System

Fire-Alarm Box

- Adopt RS485 bus transmission, it features of fire-fighting alarm with audible voice and visual light, extending function for toxic gas detection and so on.
- Be convenient for pre-disaster evacuation warning, smashing the glass upon the "Break Glass Button" of Call Point Device to activate the audible horn and visual strobe alarm once a fire alarm occurs; Extensible function for toxic gas detection, it can improve the safety insurance of tunnel and closed area in high risk environment.

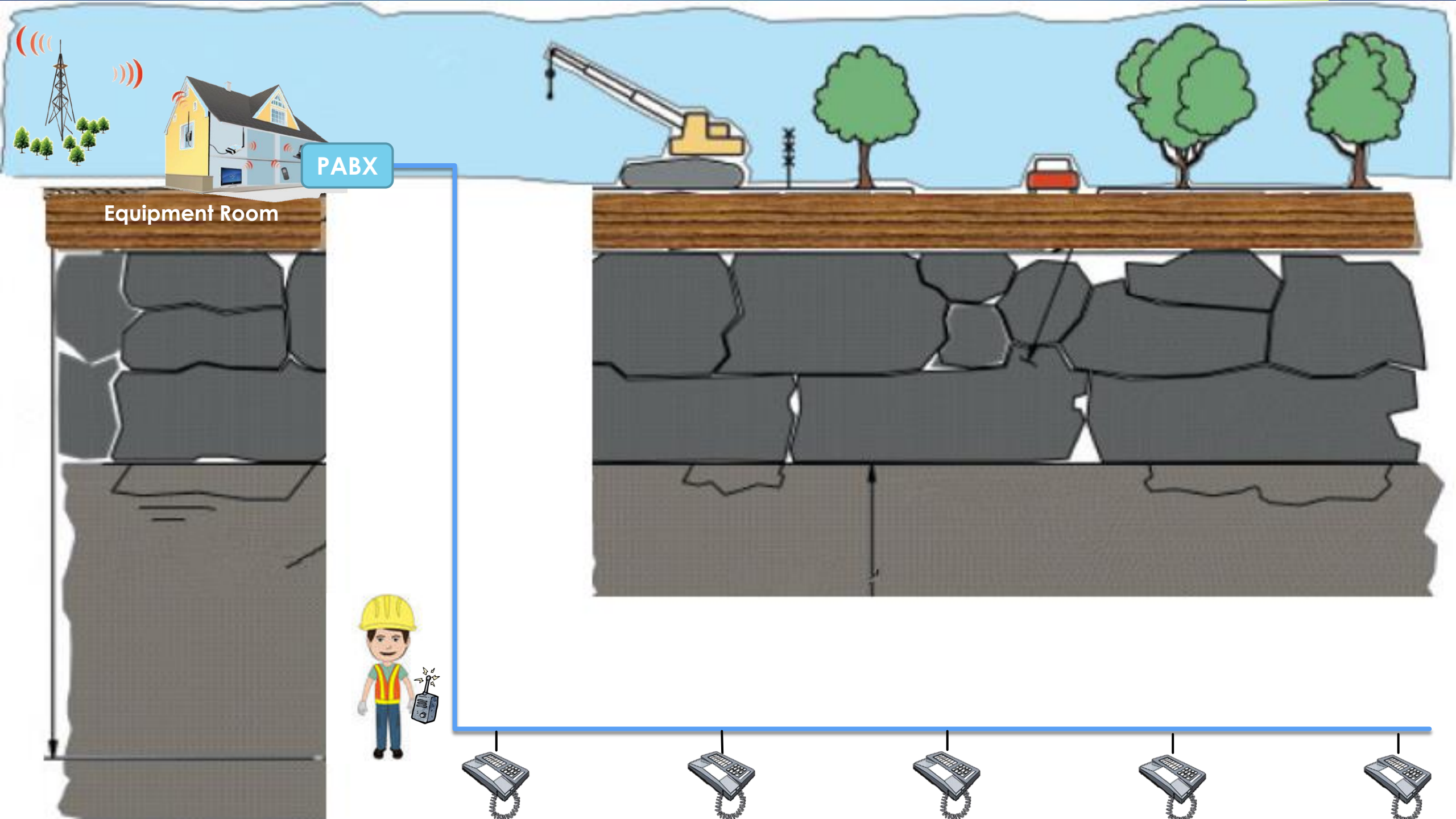

Equipment Room
RF BDA if requires

2. Eyecom Surveillance System

Intercom Phone

Features:

- Phone sealed, ABS plastic shell, solid and durable.
- Ringing sound up 80dB or more high
- Comprehensive call feature
- Crystal clear voice quality


PABX
Equipment Room

2. Eyecom Surveillance System

Personnel Tracking system

Personnel Tracking System Description:

- Keep track of people and asset status
- Position people, machines, tools and other assets
- People with RFID tags are positioned by RFID readers
- Reader interval: 20-160 meters
- Positioning accuracy: 10-80 m
- Readers are linked by leaky cable to the tracking system
- Advanced NMS, position is shown via tunnel digital map
- Target people & assets can be positioned in priority
- And shown graphically in central control room NMS

2. Eyecom Surveillance System

Personnel Tracking system

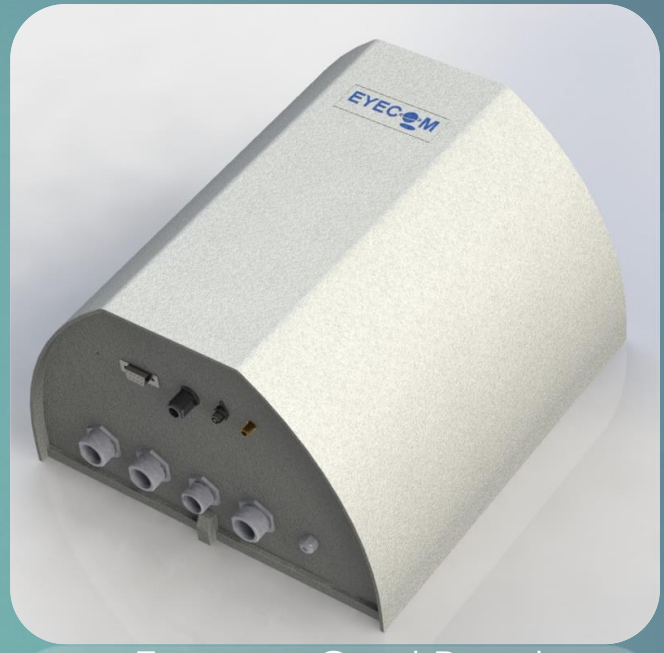
The Worker carry the Active RFID Tag

The Tunnel with Leaky Cable

2. Eyecom Surveillance System

Personnel Tracking system Components

Eyecom Tag

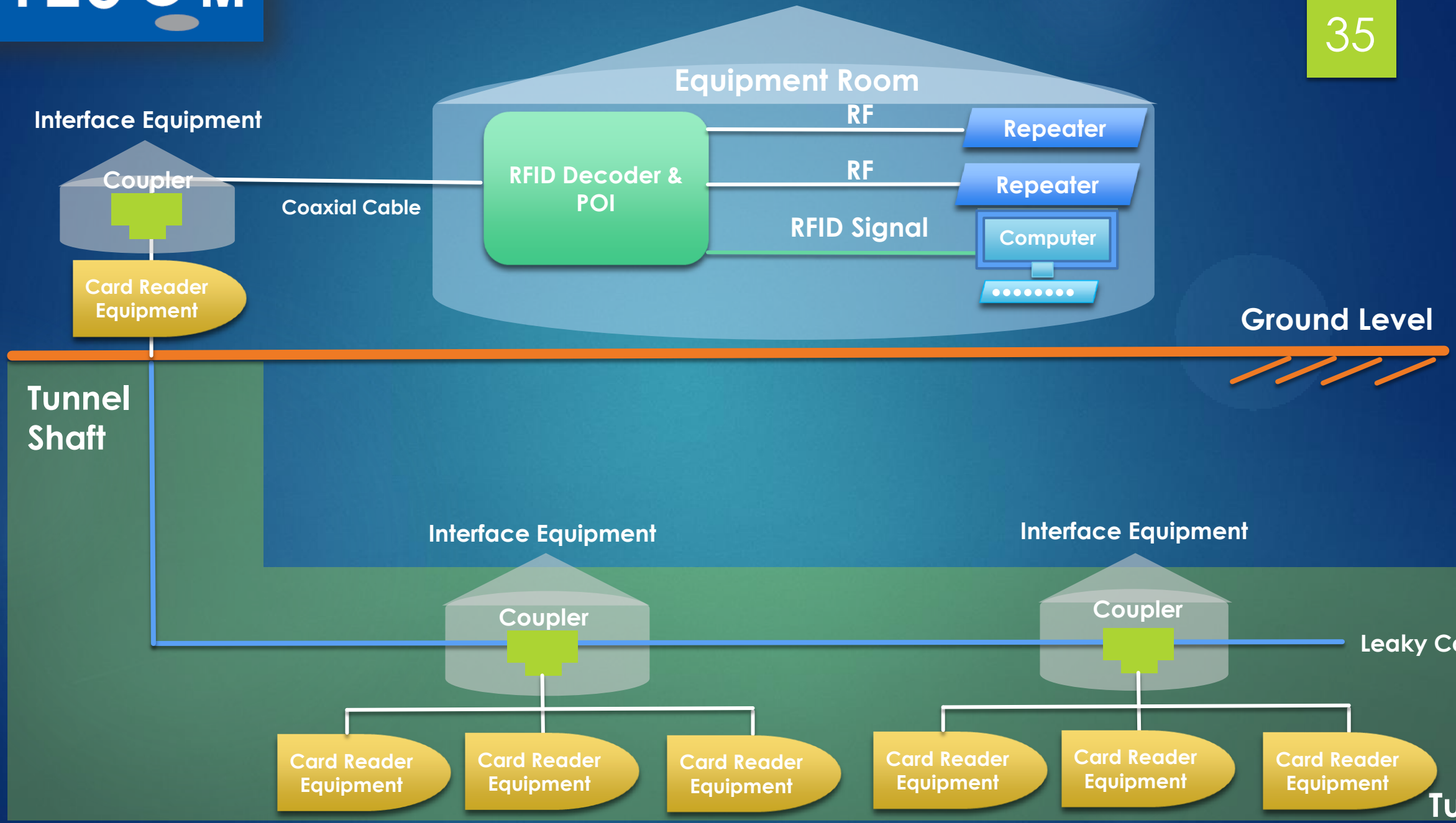


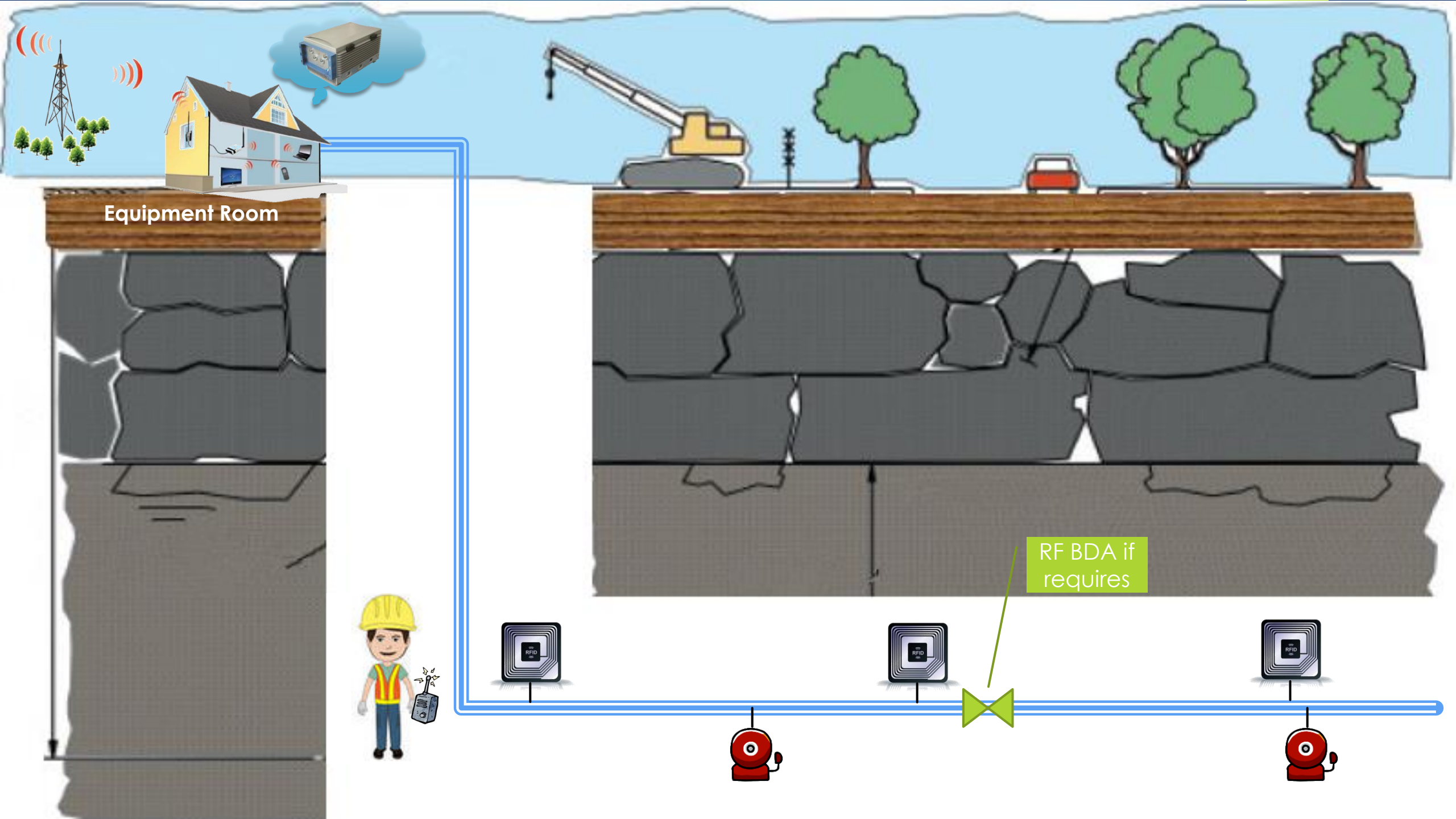
Eyecom Card Reader

SYSTEM COMPONENTS:

- Active tags in card format
- Card Readers

Personnel Tracking system Schematic



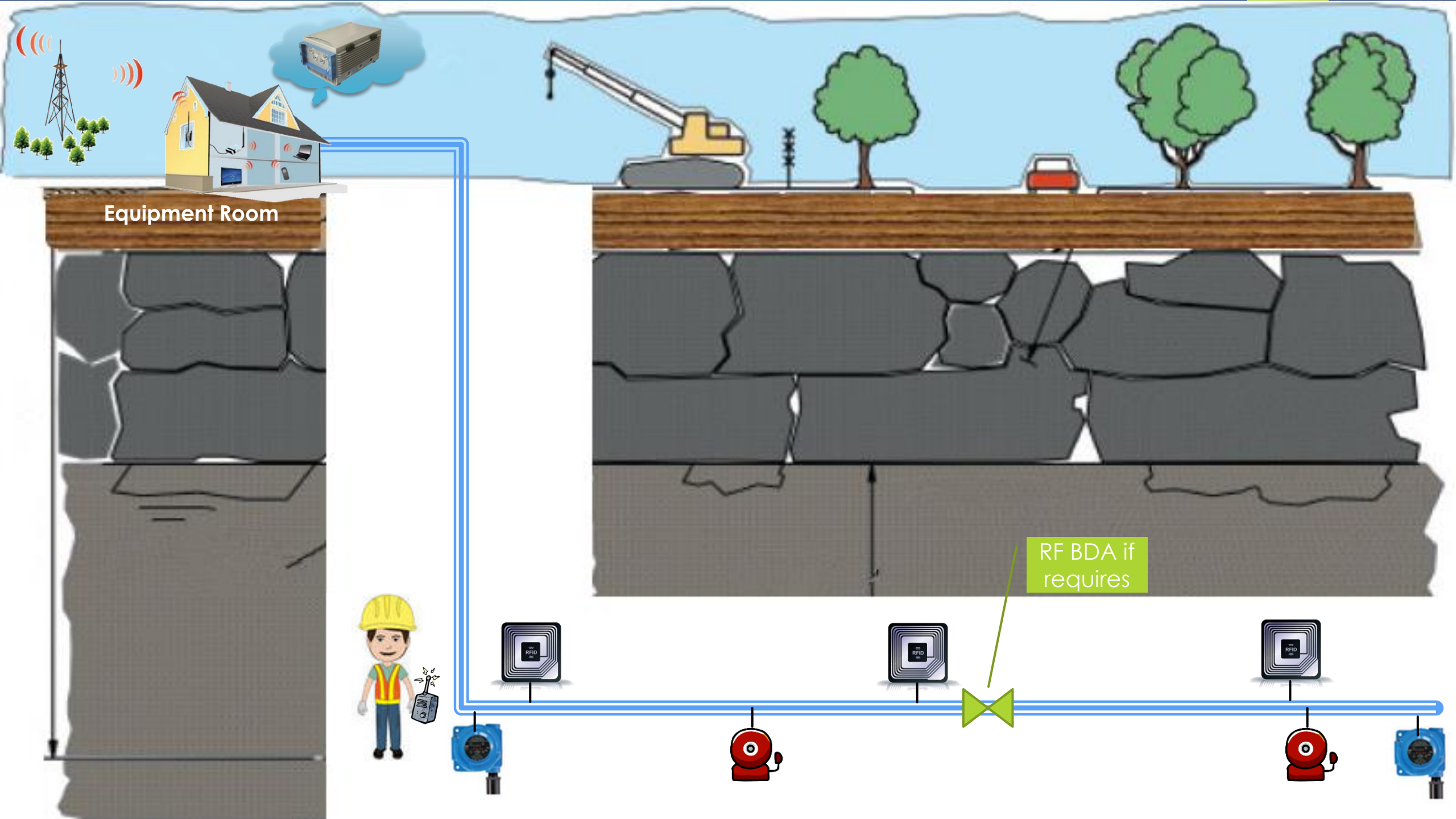

Equipment Room
RF BDA if requires

2. Eyecom Surveillance System

Gas Detection

Features:

- Provide gas sensing system to monitor toxic gas level
- Sensor groups positions at drop-shaft bottoms and tunnel faces
- Provide handheld Radon measurement device
- Advanced NMS, alarming detector is shown in tunnel digital map

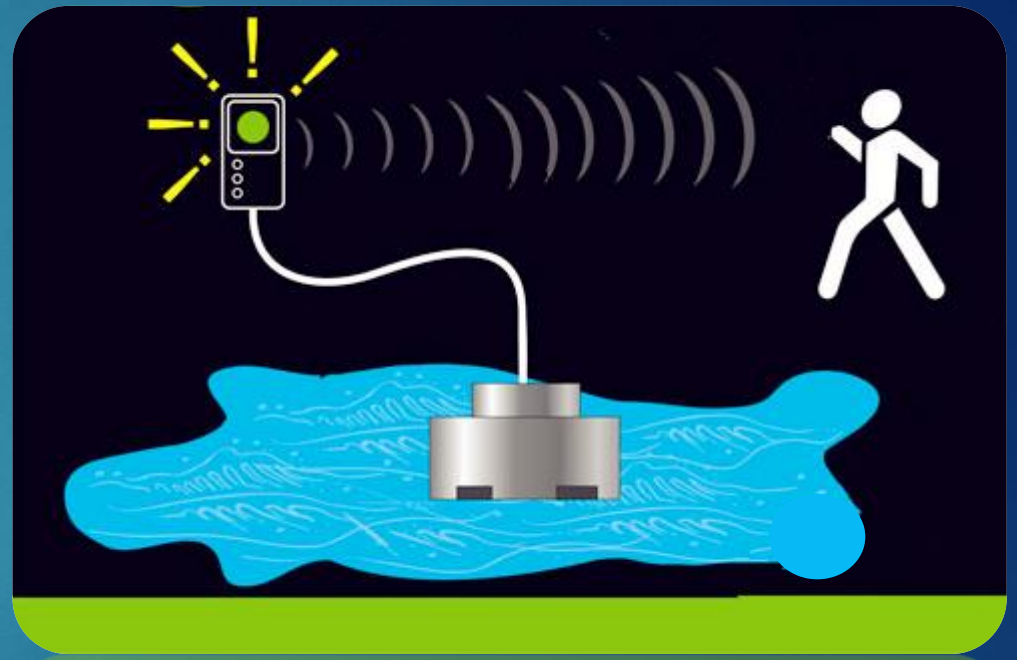

Equipment Room
RF BDA if requires

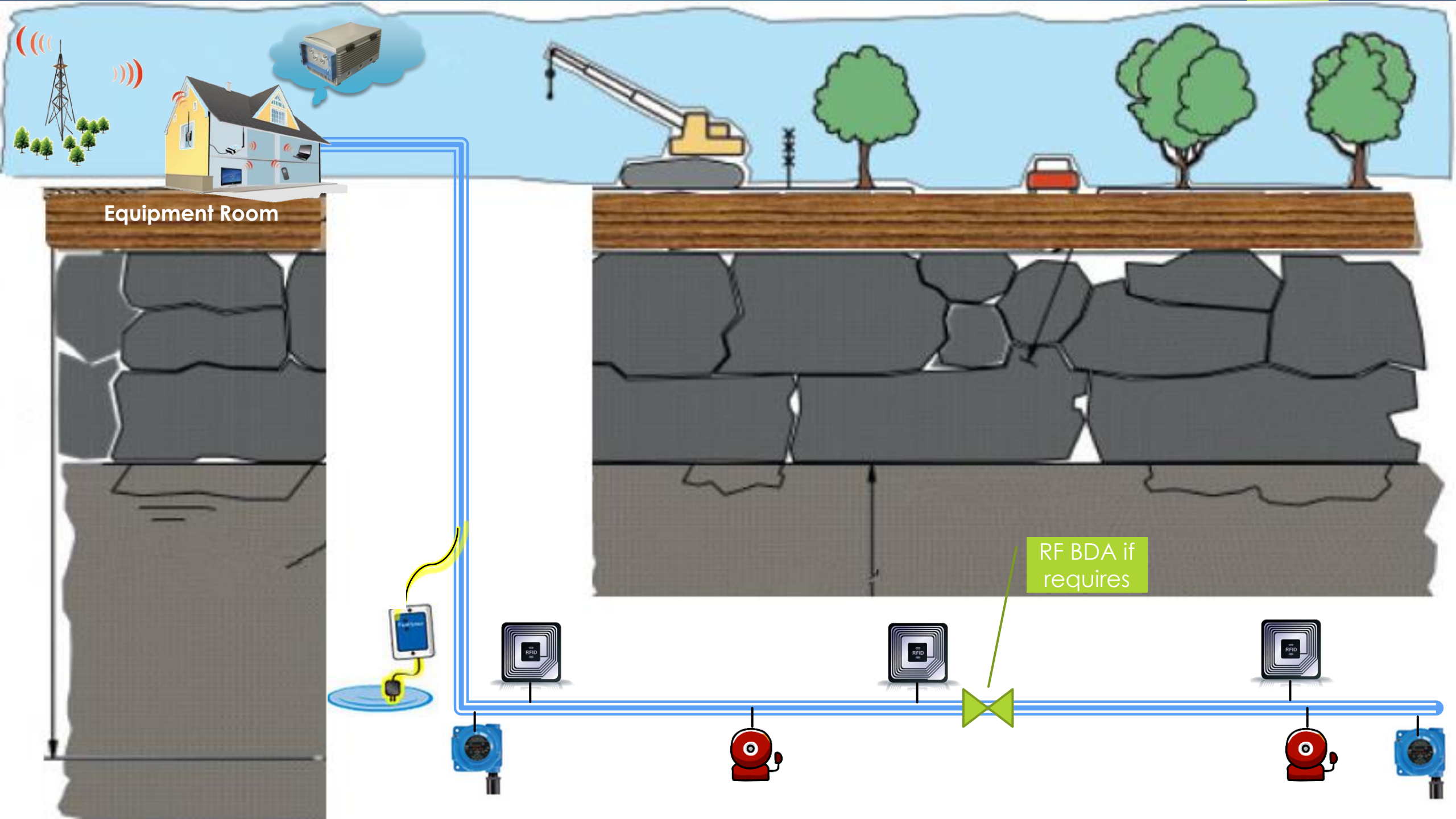
2. Eyecom Surveillance System

Flooding Detection

Features:

- Flooding sensors located at every FSD bridgehead (450m intervals) within the pump sump
- Advanced NMS, alarming detector is shown in tunnel digital map
- Quality float switches with protection cadge proposed



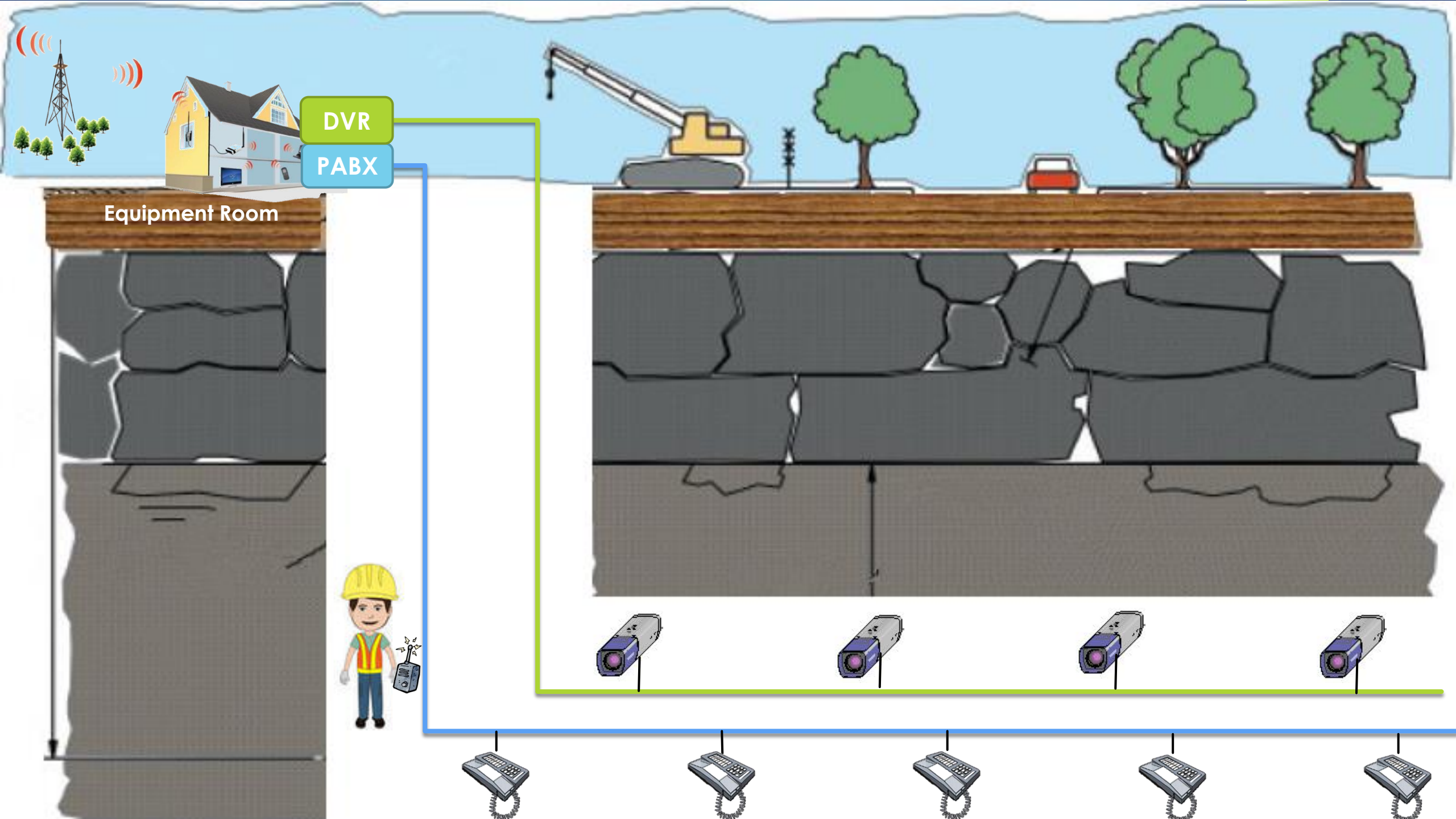

Equipment Room
RF BDA if requires

2. Eyecom Surveillance System

CCTV

Features:

- Camera groups proposed in each of bridgehead in 450m intervals
- ERR monitor with multiplexer
- DVR recording


DVR
PABX
Equipment Room

3. Eyecom Machine Control System

- **Fan Control**

  Providing remote-control from our head end control room outside tunnels

- **Pump Control**

  Providing remote-control from our head end control room outside tunnels

Compulsory

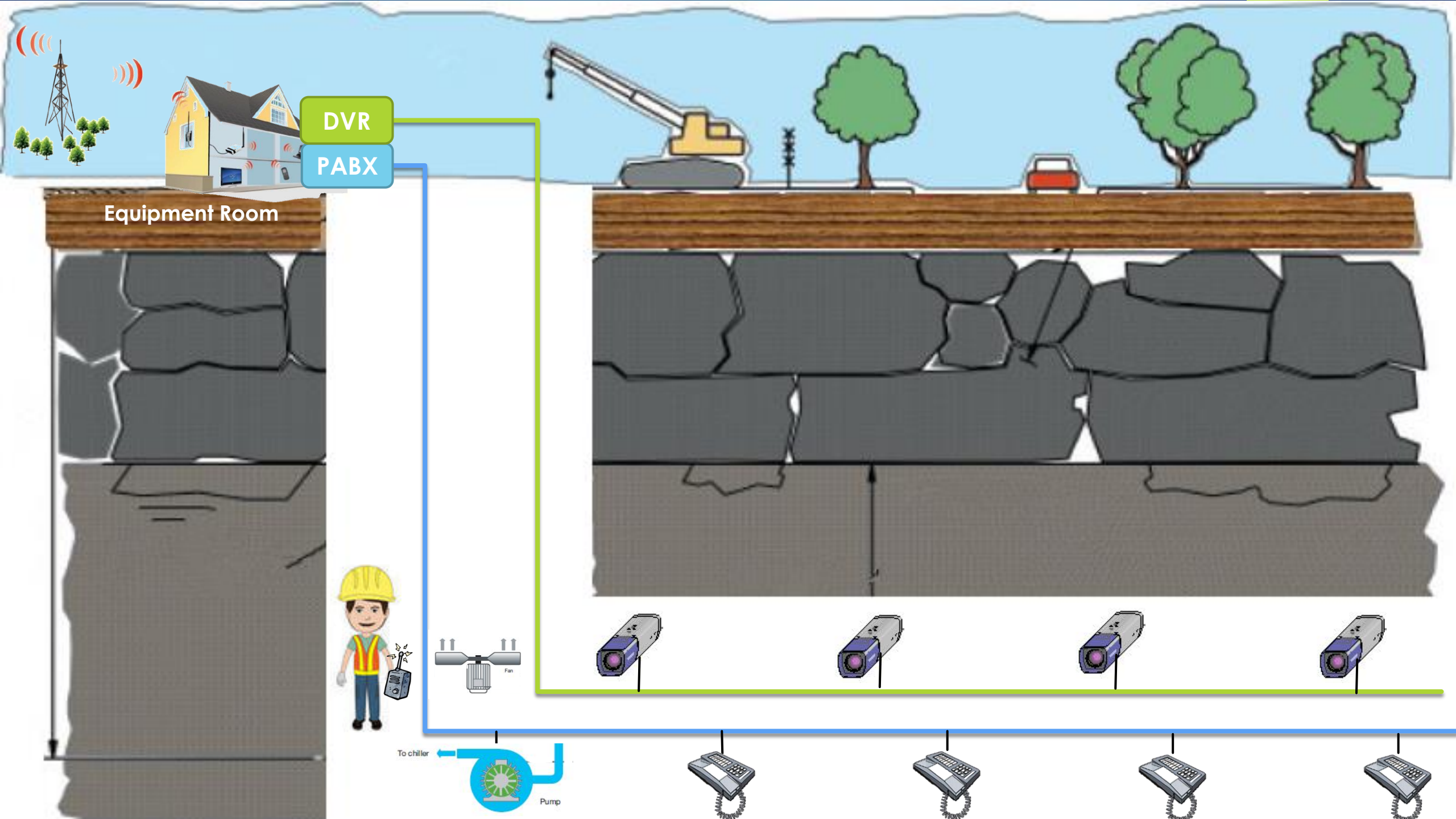
3. Eyecom Machine Control System

Fan Control System

Features:

This system is requested by the PS

- Control boxes to remotely control the fan and damper PLC
- Advanced NMS, alarming detector is shown in tunnel digital map
- Remotely monitor fan and damper working status
- Damper-fan Failure alarm monitoring


DVR
PABX
Equipment Room
Fan
To chiller
Pump

Eyecom Tunnel Solutions

- **Application Environment:**
  - High Speed Railway
  - Tunnels: including Temporary Tunnels and Permanent Tunnels
  - Drilling Oil Field
  - Tanker Vessels
  - Combustible Gas and Explosive Dust Environment
  - Fire Control Safety
  - Humid Environment or Underwater Environment

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3

NMS
(Remote Monitoring and Control System)

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Eyecom NMS

Remote Monitoring and Control System

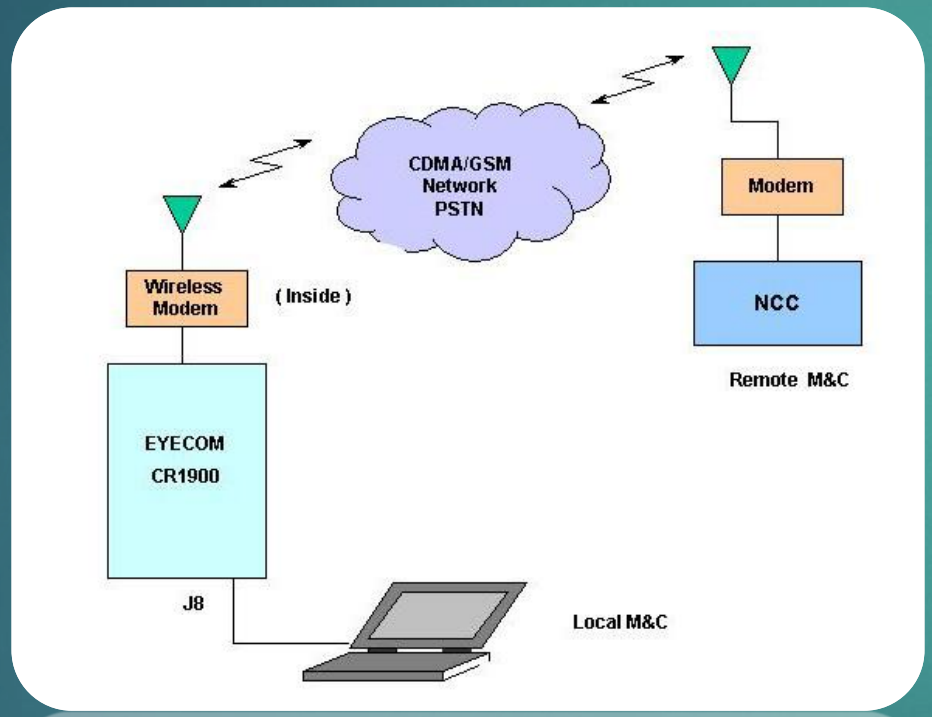
- **Remote control and monitoring:**
  - HPA Switch on/off
  - Temperature alarm
  - HPA status
  - LNA status
  - BSA status
  - DC Power Supply Failure
  - Cabinet Door

- **Dry Contacts:**
  - Temperature alarm
  - HPA status
  - PSU status
  - Summarized Status of all NMS alarm signals
  - that under monitoring

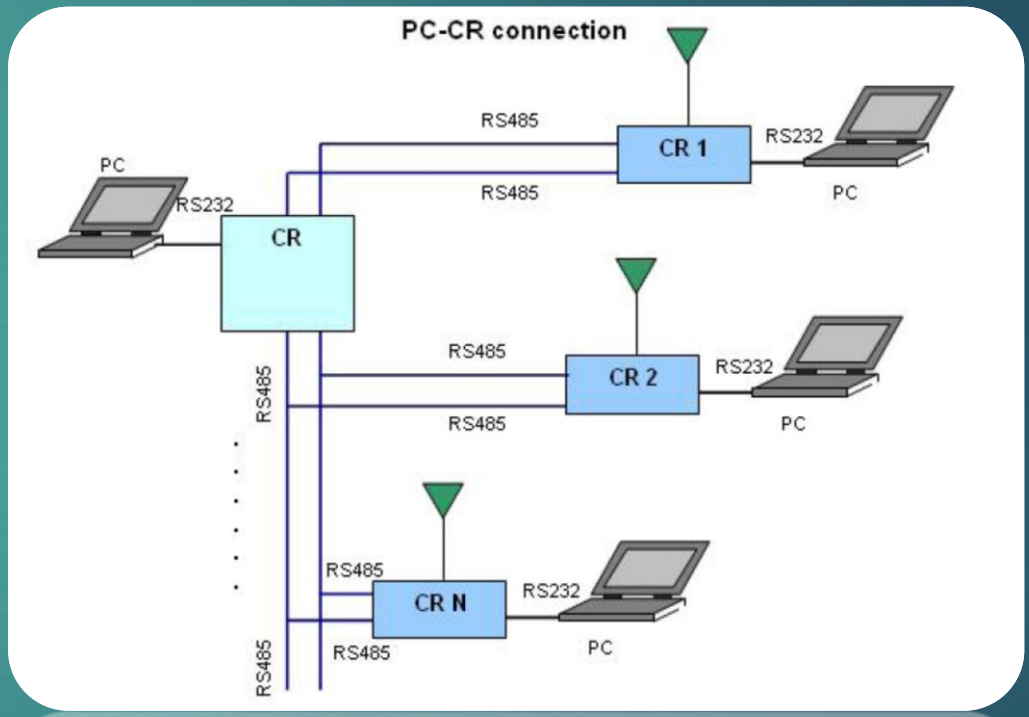
- Be Able to Interfaced with all other make BDAs

Eyecom NMS

Remote Monitoring and Control System



- Single Repeater NMS via SMS

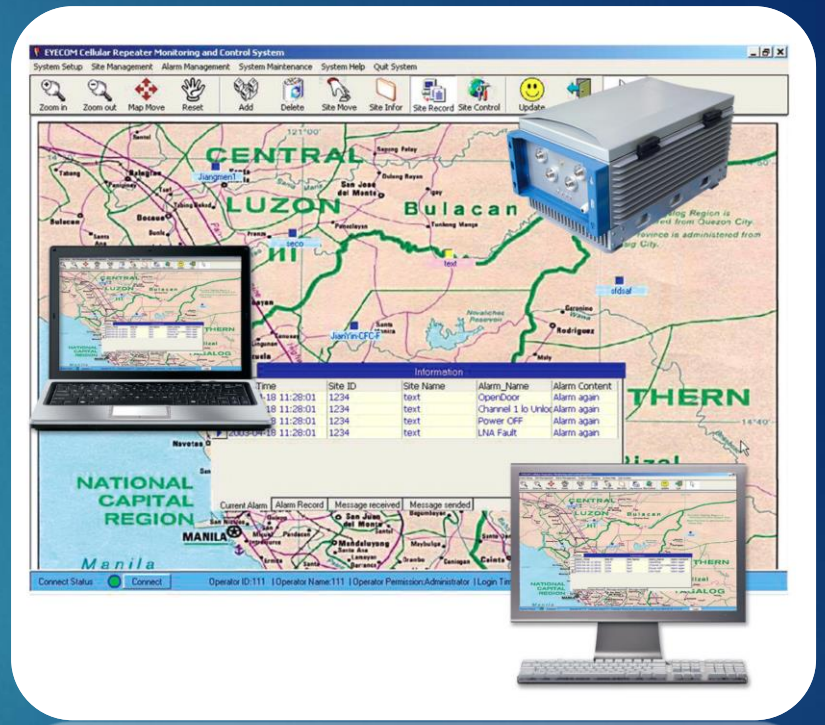


- Multiple Repeater NMS via RS485 and RS232 cables: NMS supports maximum 999 repeater units

Eyecom NMS

Remote Monitoring and Control System

- Eyecom amplifiers and repeaters are able to be monitored and controlled remotely via Eyecom NMS (Remote Monitoring and Control System).
- NMS sends repeater working status data to OMC via cellular wireless SMS, PSTN modem or LAN line. Service engineers are able to monitor and control every repeater across the country
- **PSTN, Wireless modem or LAN line transmission**



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4 Project References

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Eyecom Tunnel Solutions
Hong Kong Project References

- **MTR Constructions:**
  - XRL 820,821,822 (GSM),824,825
  - WIL 703,704,705
  - SIL 902
  - KTE 1001,1002

Eyecom Tunnel Solutions

- **HKSAR DSD (Drainage Services Dept)**
  - **HKWDT (Hong Kong West Drainage Tunnel)**
    - Tunnel Solutions for Construction Phase
    - Tunnel Permanent Solutions
  - **HATS (Harbour Area Treatment Scheme)**
    - Tunnel Solutions for Construction Phase
      - Infra-structure for 4 tunnels
      - Total 9 Systems for each tunnel

HATS Project

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Project References
Permanent Projects

► Digital Frequency Shifting Repeater Police Force SEA

130-170MHz APCO-25 (2012)

Digital FSR for P-25, extends BTS coverage from 20Km to 40Km

Turnkey System Integrator

► Hong Kong Metro Tetra Repeater

380-400/806-870MHz Tetra systems (2007-2009)

Supplied Tetra repeaters/Optical BDA/IRDN components

Project References

Hong Kong International Airport

380-400/806-870MHz Tetra systems (2007-2009)

Supplied Tetra repeaters/Optical BDA/IRDN components

New Delhi International Airport

400MHz Tetra system (2008-2009)

Supplied Tetra repeaters/Optical BDA/IRDN components

Project References

DMRC/DELHI Airport Express Line

380-420 MHz Tetra Repeaters (May 2008-now)
Supplied 400MHz Tetra Optical BDAs/repeaters

India CWG Tetra System

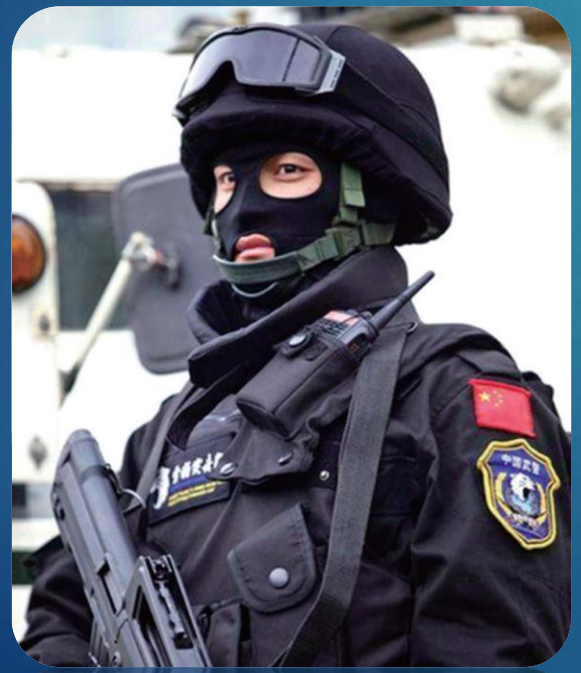
380-430 MHz Tetra (March 2010 - June 2010, India)
Supplied repeater, POI, antenna and IRDN components

Project References

Hyderabad Airport Tetra Optical BDA

380-430 MHz Tetra Repeaters (Jan. 2008)

Supplied 400MHz Tetra Optical BDAs/repeaters



China Police Tetra System

350MHz~370MHz Tetra network (Aug. 2009)

System integrator, supplied POI, BTS antenna and repeaters

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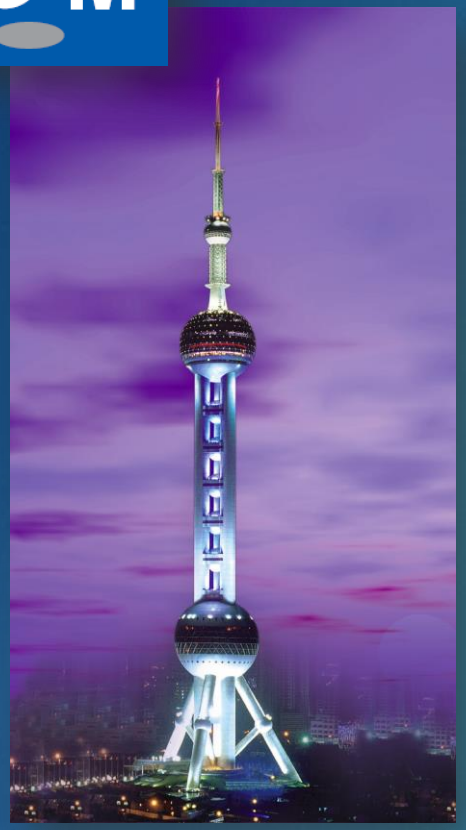
Project References



Shanghai Oriental Pearl Tower Cellular RF Coverage System

800-2100 MHz (Oct 2002, system integrated by Eyecom)
Supplied CDMA+GSM+3G cellular RF signal coverage inside tower and high speed lift shafts.

HK Convention & Exhibition Center

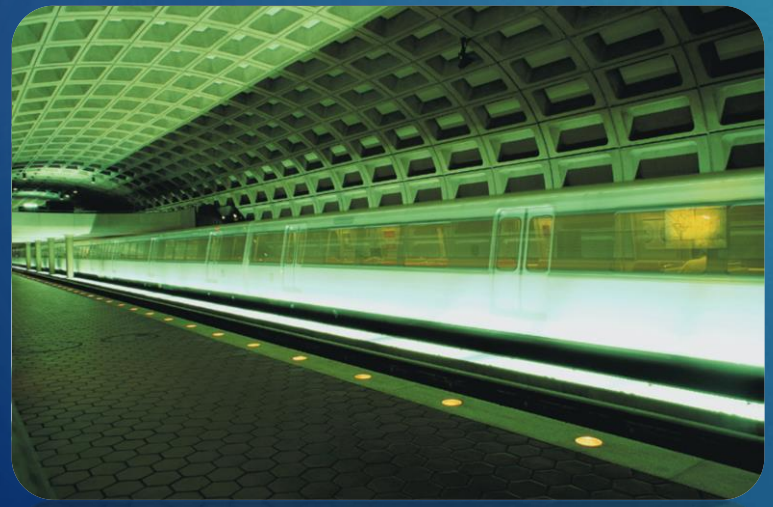
800-1800MHz cellular system POI (Jan. 1997)
440-470MHz DMR DAS system (Feb. 2009)
Supplied POI to support CDMA, USDC, GSM900 and GSM1800 systems
Turnkey system integration of DMR DAS

Project References

Macau Encore Tower Cellular DAS

(Feb 2010-2013)

Supplied POI, passive components, antenna, multi-band MCPA for CDMA800,GSM900, DCS1800, WCDMA and LTE



Taipei Metro

800 MHz-1800 MHz LCX POI

(1996, 12, supplied by Eyecom NZ Ltd.)

Supplied POI to combine USDC, GSM and DCS1800

Project References

Taiwan Express Railway

Track side Tetra Radio Coverage Network (380-400MHz) (2009-2013)

Supplied Track side BTS sector antennas and RF/Optic repeaters.

Shanghai Metro

806-866MHz Tetra Optic repeater (2012-2013)

Supplied optic repeaters

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Project References

Hong Kong Drainage Tunnels

380-470MHz Tetra/DMR 20Km LCX Radio system

(Sept 2009-July 2012)

Turnkey system integrator of dual band Tetra/DMR LCX system. Power fed via patented water resist LSOH LCX, Atex BDA, system supports RFID, CCTV, Gas, Flooding, Intercom, Fire Alarm and plant machine control

Light Tower ICS Repeater Site

380-470MHz Tetra RF Channelized ICS RF Repeater

(July 2012)

Supplied dual band channelized Tetra ICS RF repeater system. ICS repeater gained at 95dB when site antenna isolation reaches 70dB only

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Thanks!