Ad-hoc Mobile Broadband

Application in Emergency Situations

EU FP7 Project Report

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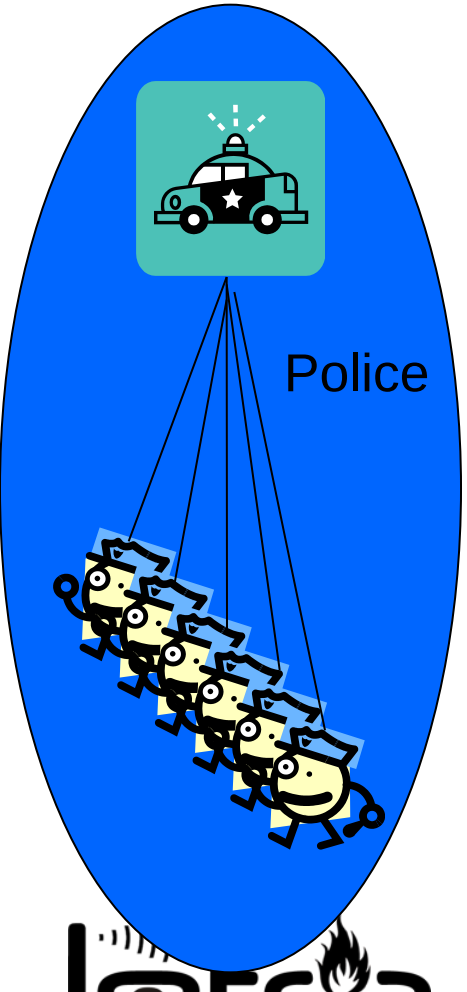
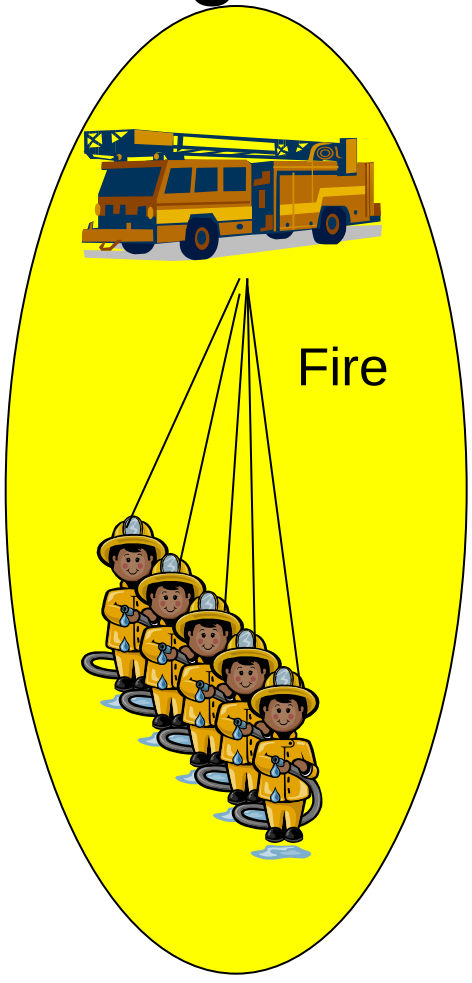
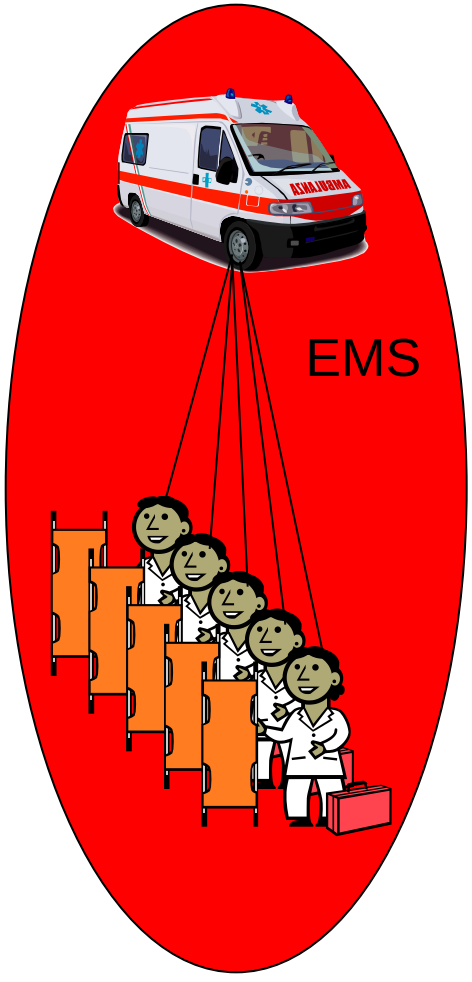
Agenda

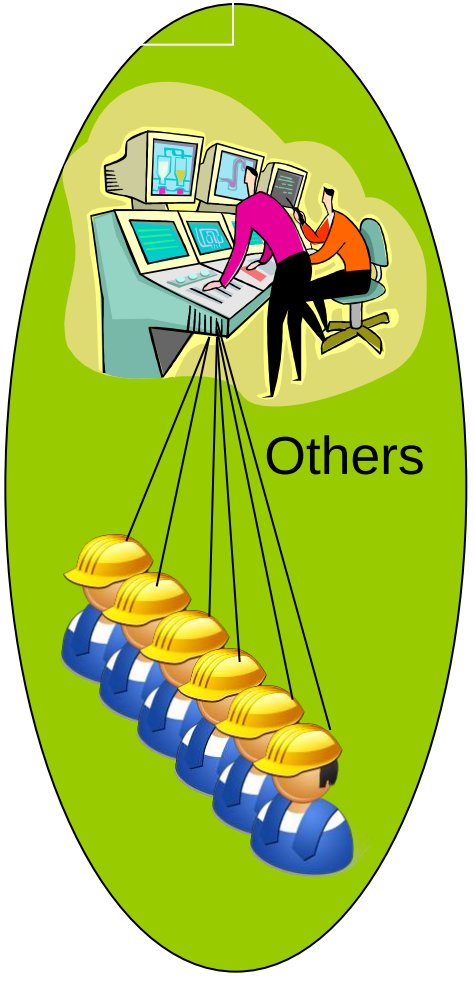
- Deployment of ad-hoc Mobile broadband, in tunnels, mines, destroyed buildings and other crisis-related environments,
- Presentation of the FP7 project "INFRA" which made several advances in the field,
- Usage made by INFRA of the Mobile broadband infrastructure.
- Discussion of advantages and problems of such deployments
- A report on a recently concluded Field Trial conducted in Europe and observed by several European First responder and other emergency management agencies.

Problem 1: Fragmentation







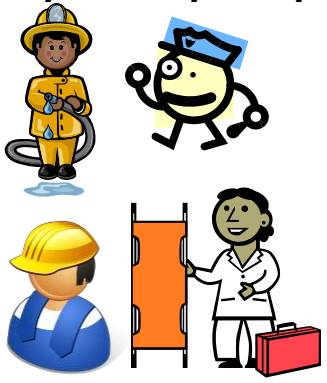


Problem 2: High Bandwidth needed on unreliable infrastructure

Deployable Sensors

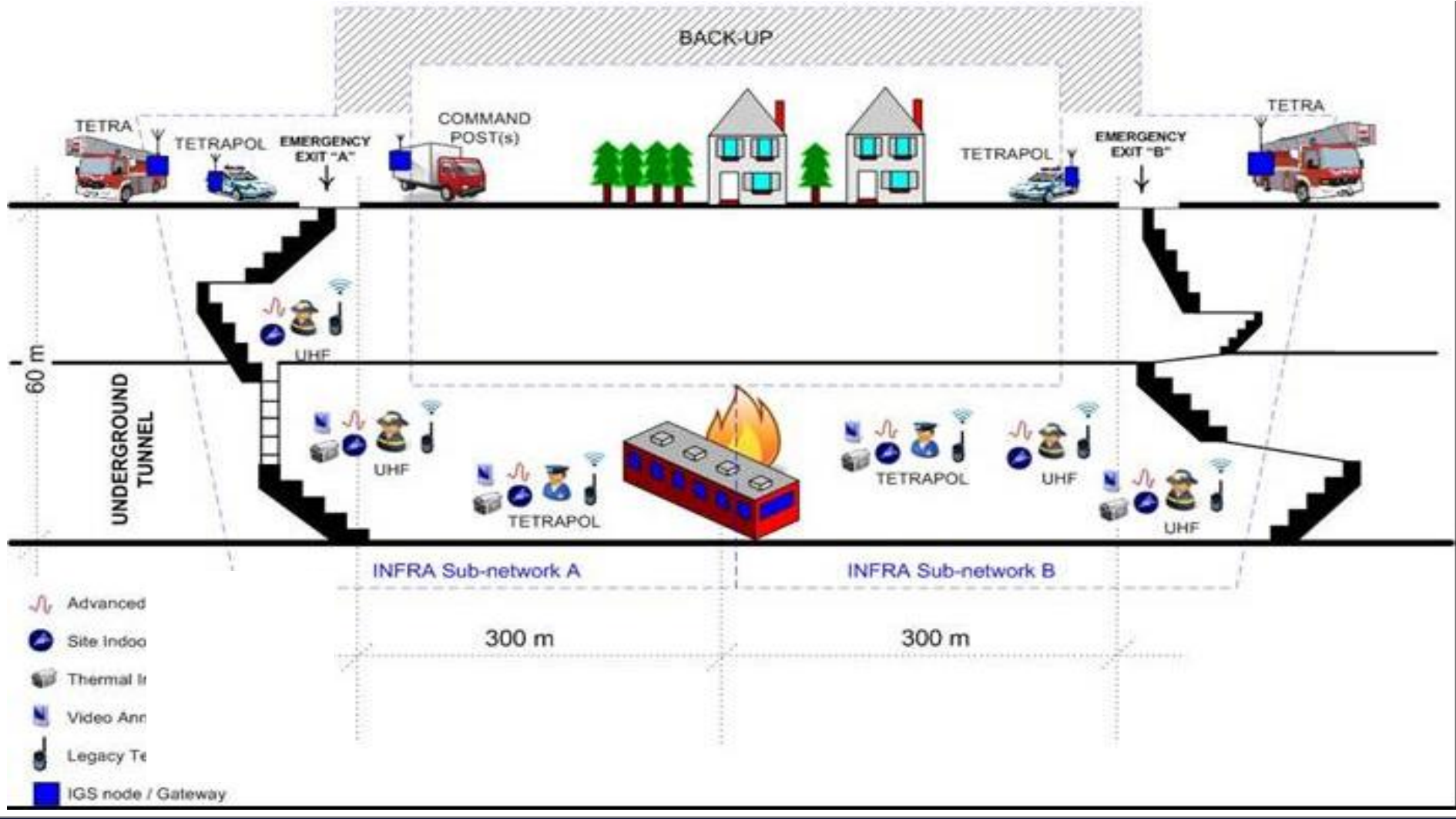
LTE? WiMAX?
GSM? 3G/4G?
TETRA? P25?

Mobile First Responders (Police, EMS, FD, etc)

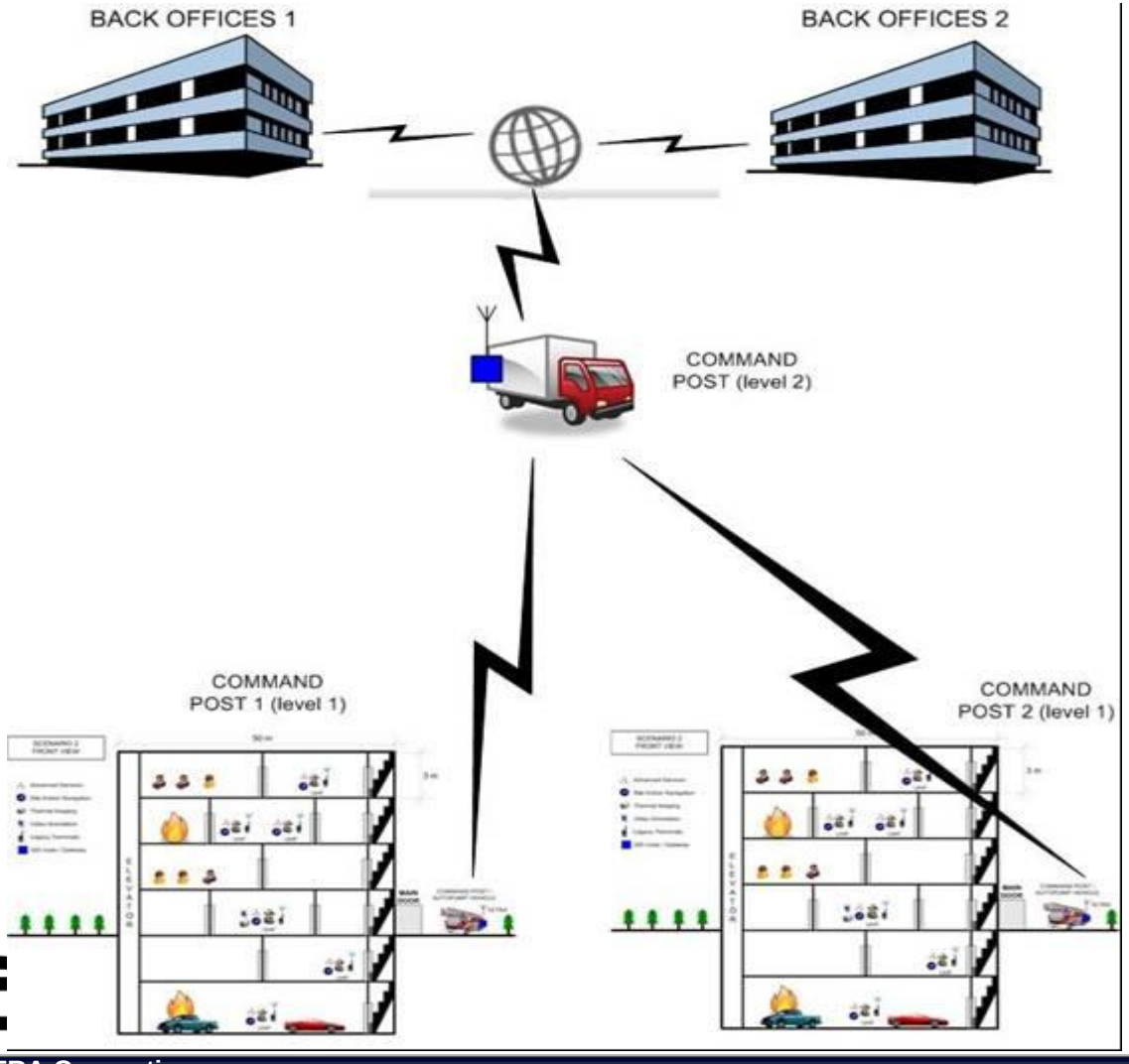


Command Centers

Problem 3: No coverage



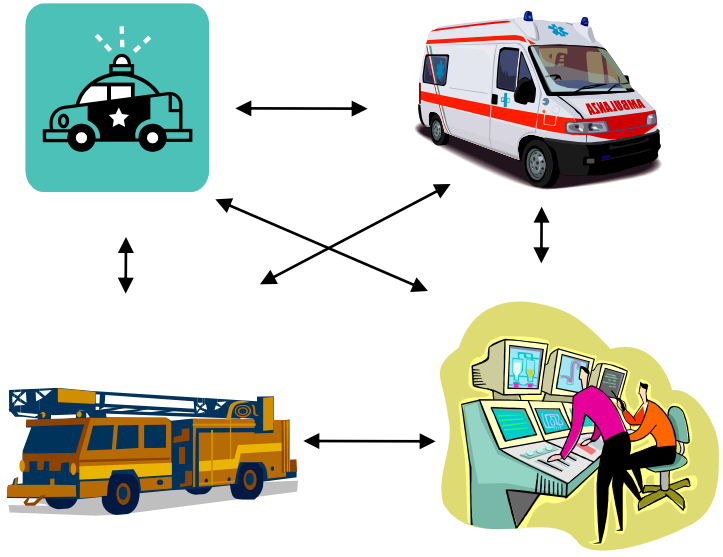
Problem 4 : Long Distance Command and Control

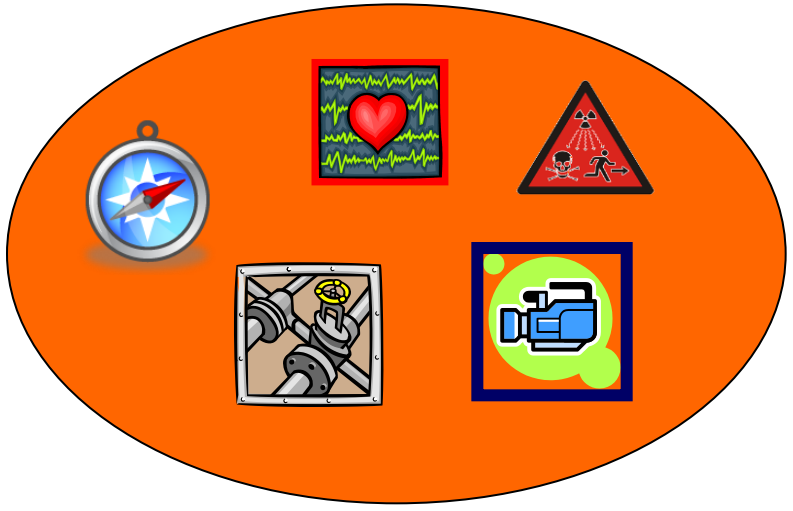


Conclusions

- In emergency situations, the Forces are fragmented and coordination is difficult
- Normal Communication networks are not applicable in emergencies
  - FR's networks are not compatible
- In difficult enviroments, off-the-shelf solutions will not work.

- **What is needed:**
  - Reliable broadband communications that does not require an infrastructure
    - Can be deployed "ad-hoc"
    - Self powered
    - IP based
    - Preferably interoperable with other systems in the field

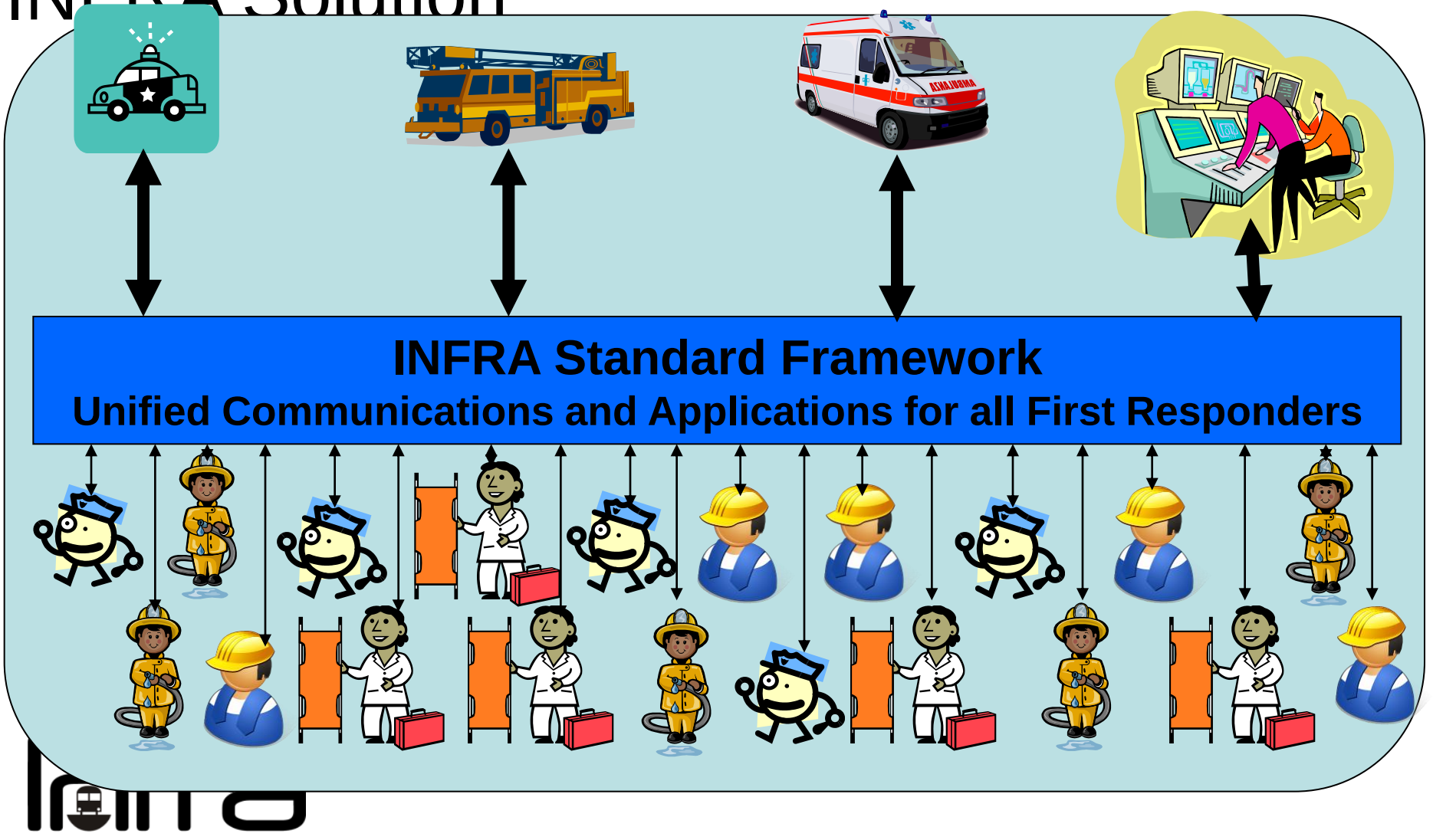




- Full interoperability of voice and data communications
- Support for Harsh Environments (tunnels)
- Deployable Ad-Hoc

- Create infrastructure forInnovative technologies & applications
- Standard & Open framework for FR applications

INFRA Solution



INFRA project Essentials

- Innovative Novel First Responders' Applications
- INFRA IS:
  - 10 Partners in 7 countries
  - Funded by the FP7 Project
  - **Topic ICT-SEC-2007-1.0-04**
    - **ICT support for first responders in crises occurring in critical infrastructures**
  - **Work Started 1 April, 2009, expected to end in March 2011**
  - **Total Budget: 3.8M Euros**
  - **Heavy involvement by end users.**

www.infra-fp7.eu

Project Goals:

1. Applications:

- Novel Technologies (Site Navigation, Sensors, Thermal Imaging)
- Specific to First Responders in Critical Infrastructures

2. Interoperability

- Creation of a European standard for interoperability of applications, different FR forces & CI control center
- Plug and play capabilities

3. Proof of Concept

- Live test with real end users

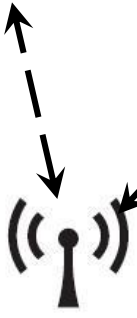
INFRA Solution

Sensors

Voice

Video

wifi



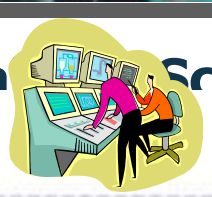
Wireless Ad-Hoc

Data network

(COFDM BASED)

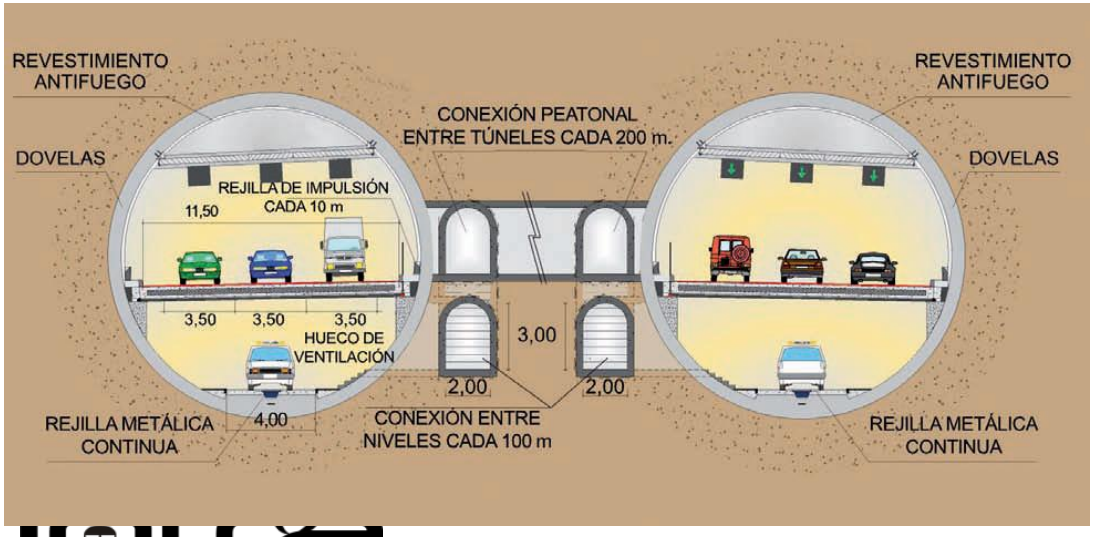
FR Data network

Typica Scenario



The M30 Tunnel- Bypass Sur

- 7219 Meters
- Construction started: 2003
- Completed 2007
- €792m



The Proof of Concept

Bio
(

Video Annotation
(

Location tag
( )

Wifi

Gas and Heat Sensors

Tetra Handset

Transciever+
Radio Gateway
WIFI switch
(Rinicom)

Wifi

COFDM
Transceiver
(Rinicom)

M30

RoIP Terminal
(ATHENA)

Infra System
Terminal
( )

"event" (~1KM from the entrance)

Tunnel

Command Post

conclusions

- Hardware wise – we should aim for "drop and Lose" type equipment
- Ad-Hoc COFDM concept worked, and worked well at ranges of up to 1.5 KM
- Mesh Network is useful and efficient.
- Using WiFi- for short range sensors is useful but needs further work.

Thank you!

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