



# Co**E**xisting Short Range Radio by Advanced **U**ltra-**W**ide**B**and Radio Technology

Project presentation (October 2010)

# EUWB project highlights



## Who

- Industry-led initiative of 26 major industrial and excellent academic organisations from Europe and associated countries

## What

- Application-driven R&D of Ultra-Wideband short range radio technology providing sophisticated new applications enabled by UWB and highly demanded in several European key industrial sectors
  - *Home Entertainment*
  - *Public Transportation*
  - *Automotive*
  - *Cellular Networks*

## When

- April 2008 – July 2011

- **Excellent consortium** existing, driven by global players from different industrial sectors
- **Highly innovative** research embedding UWB R&D results into complex application environments
- **Strong impact** significantly main driver of UWB frequency regulation and standardisation

- Participants

26 industrial and academic partners  
members from 13 European and  
associated countries

- Structure

7 industrial partners	44 % of project budget
6 SME partners	14 % of project budget
4 R&D institute partners	20 % of project budget
9 university partners	22 % of project budget

- Project budget

Euro 21.0 million

- EC contribution

Euro 13.7 million



# Project partners



ALMA MATER STUDIORUM  
UNIVERSITA DI BOLOGNA



**BOSCH**



Hochschule für  
Technik und Wirtschaft  
Dresden (FH)  
University of Applied Sciences

**THALES**



**PHILIPS**



**veebeam**



Exploitation of the enormous potential of the innovative and disruptive radio technology embodied in Ultra-Wideband Radio Technology (UWB-RT) for key industrial sectors in Europe by innovation of cutting-edge short range radio solutions:

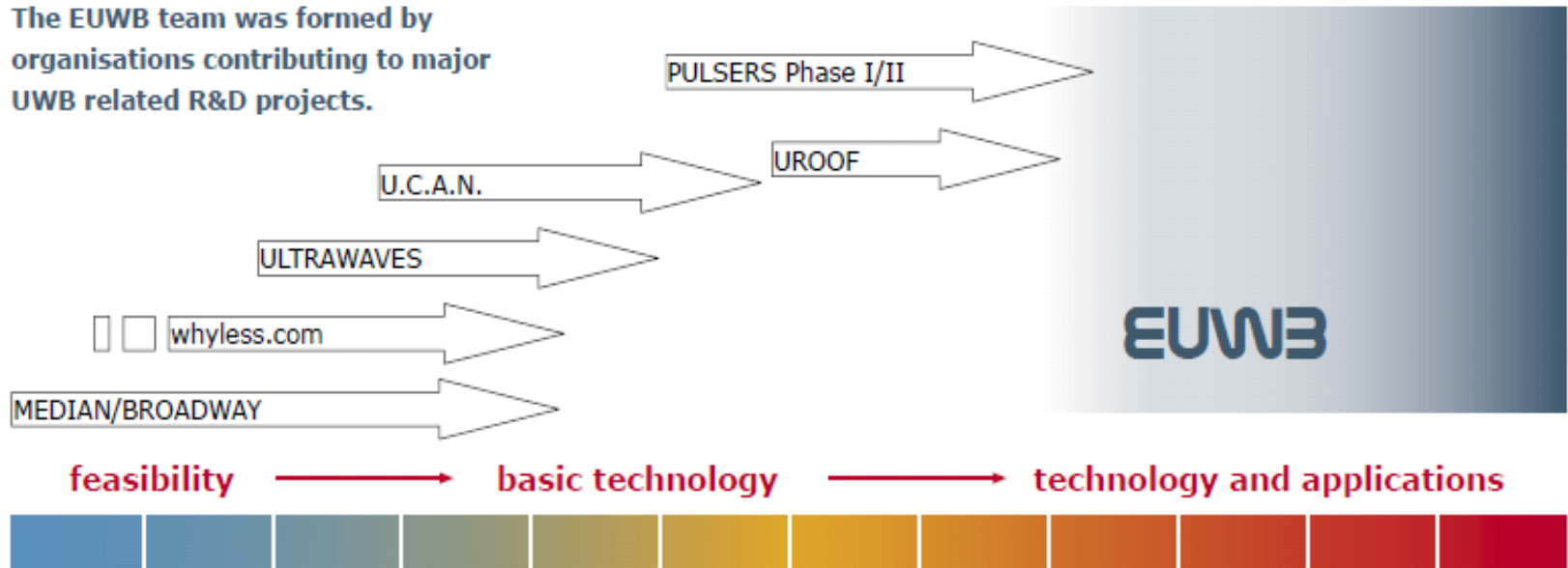
1. Introduction of advanced services and competitive **next generation UWB applications**
2. Further developments **combining UWB-RT with advanced methods of wireless technology** such as cognitive signalling, intelligent multiple antenna and multiband/multimode concepts
3. **Driving international standards and industrial initiatives** (ECMA 368/369, TGUWB, IEEE 802.15.3c/4a, WiMedia, WUSB)

- Definition of protection level and **mitigation technique development** in regulation and standardisation
- Medium term **cognitive radio realisations** by UWB standards
- **New class of performance** in terms of data rate and robustness
- **Interworking with other network technologies** using UWB platforms
- **Development of standards** with regard to new application requirements of the EUWB application scenarios
- Integration in **four main application environments**

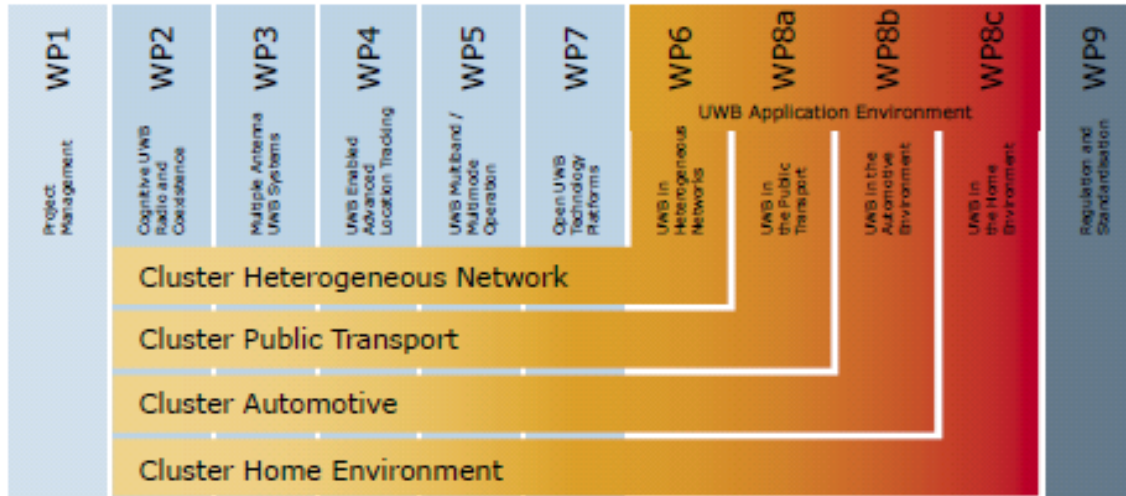
- EUWB — driven by major UWB related R&D projects

## PROJECT HISTORY

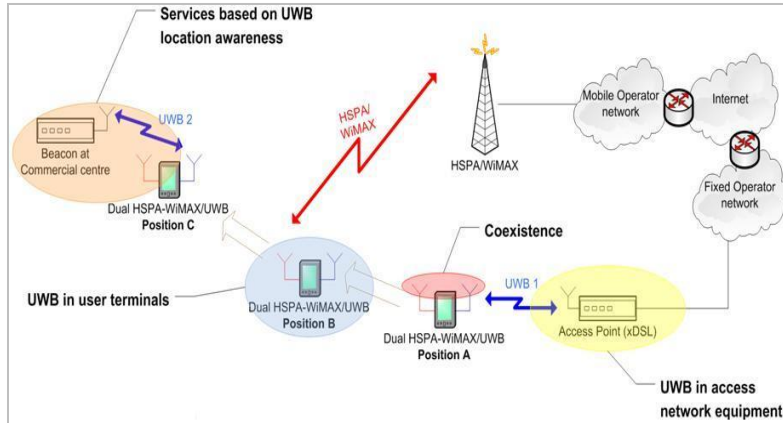
The EUWB team was formed by organisations contributing to major UWB related R&D projects.



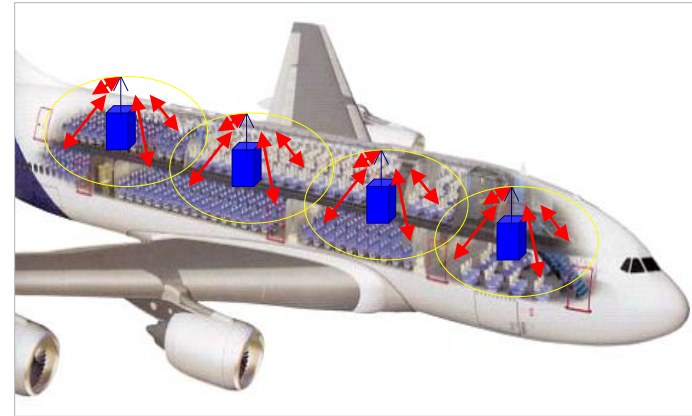
## PROJECT STRUCTURE



## • Heterogeneous Network



## • Public Transport



## • Home Environment



## • Automotive

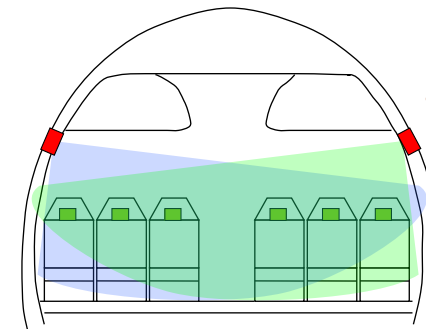
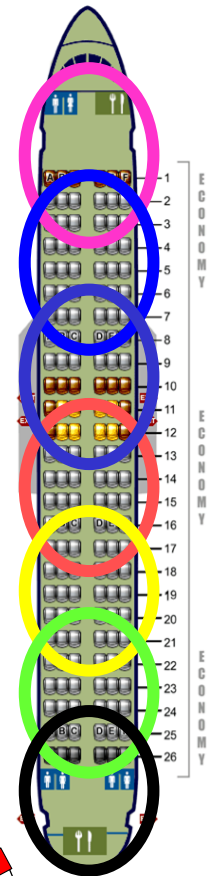
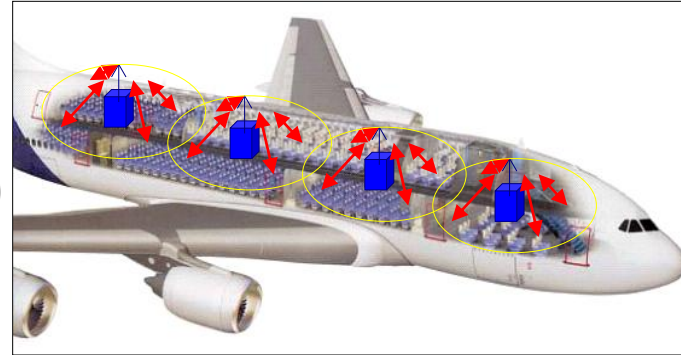


# EUWB application area: Public Transport I



## Application: Aircraft

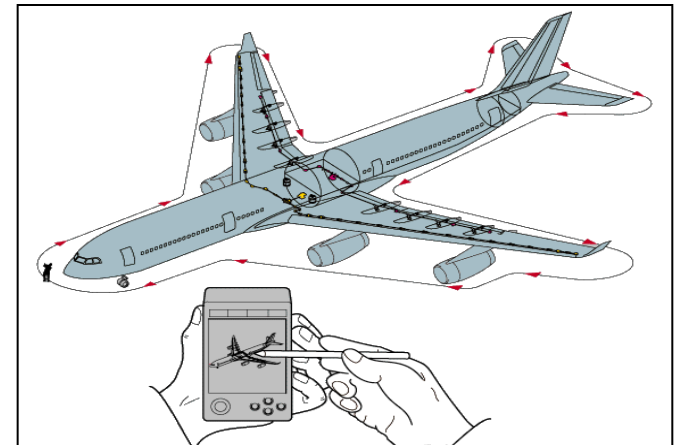
- UWB technology benefits:
  - Robust against multipath
  - Multi-cell architecture (reuse of high frequencies)
  - High data rates (>480 Mbps/channel)
  - Transceiver localisation
  - Low power consumption
- Advantages
  - Eliminate cables
  - Weight reduction
  - Easier cabin layout reconfiguration
  - Easier maintenance
- Open issues
  - Regulation, EMC
  - Performance of UWB systems in aircraft environment
  - Security against intrusion and jamming
  - Reliability of fixed installed services



# EUWB application area: Public Transport II

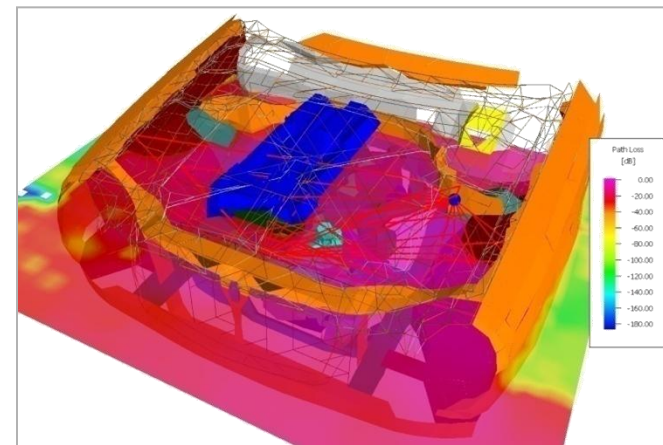


- Wireless cabin and in-flight entertainment
  - High speed broadband content download and streaming into IFE terminals system
  - Next generation cabin management and communication
  - Dynamic tracking of crew members, service and security staff, trolleys, special luggage etc. during operation, maintenance or emergency
  - Monitoring and access control of security sensitive areas
  
- Wireless sensor networks
  - Sensor based maintenance
  - Structural health monitoring
  - System health and usage monitoring
  - Cabin comfort systems



## *Wireless sensor data communication*

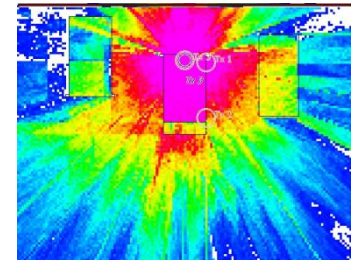
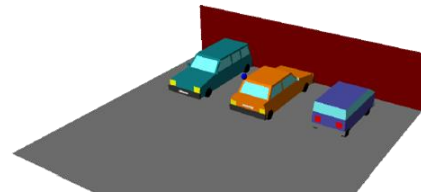
- **Objectives**
  - Reliable data link between sensor and control unit
  - Reduce cable harness complexity
- **Approach**
  - Channel propagation modelling
  - System simulation
  - Verification setup
  - Implementation
    - **Automotive UWB frontends**
    - **Antenna concepts**



## *Location tracking inside and around vehicles*

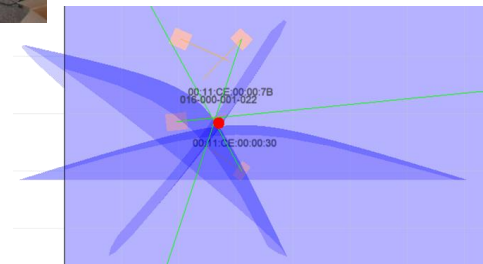
### ● Objectives

- Locate tag inside car and in close proximity (driver authorisation)
- Low cost, low power ranging and data communication



### ● Approach

- Propagation channel modelling
- Verification setup
- Implementation
  - **Automotive UWB frontends**
  - **Antenna concepts**



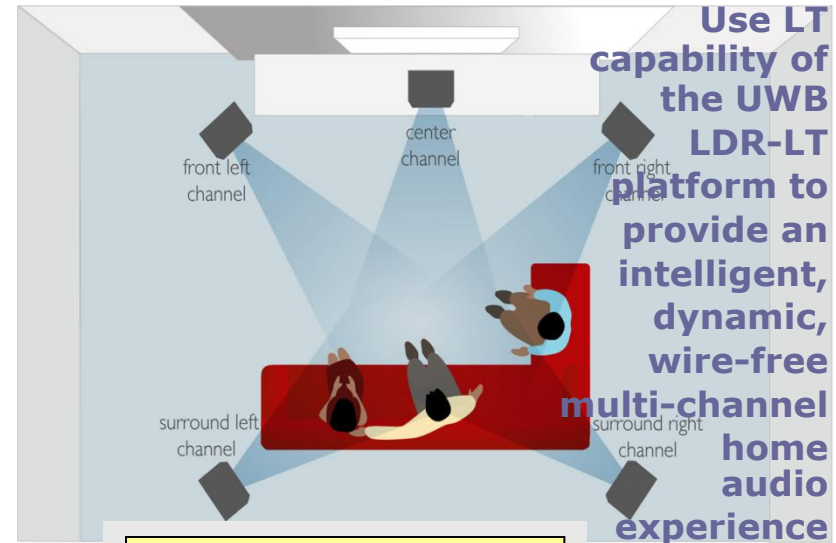
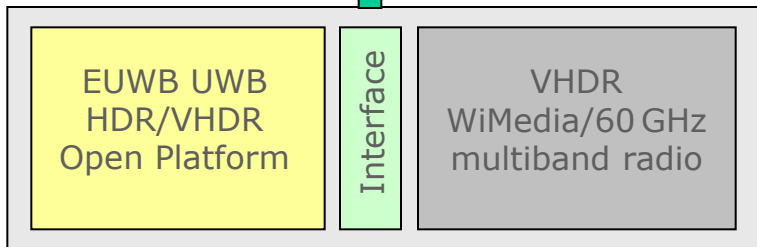
# EUWB application area: Home Entertainment



Use multiband/  
multimode  
capability of  
the EUWB  
HDR/VHDR  
platform to  
provide  
wire-free  
reliable  
high  
definition  
video  
streaming  
experience

**HD-capable  
Home Theatre  
System and Display**

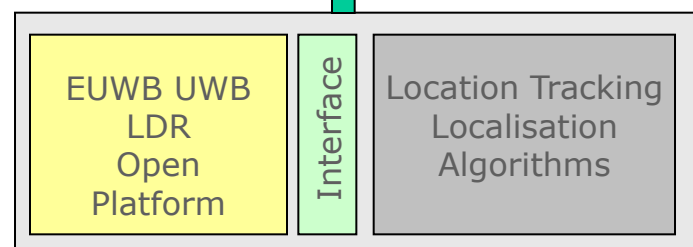
Interface



Use LT  
capability of  
the EUWB  
LDR-LT  
platform to  
provide an  
intelligent,  
dynamic,  
wire-free  
multi-channel  
home  
audio  
experience

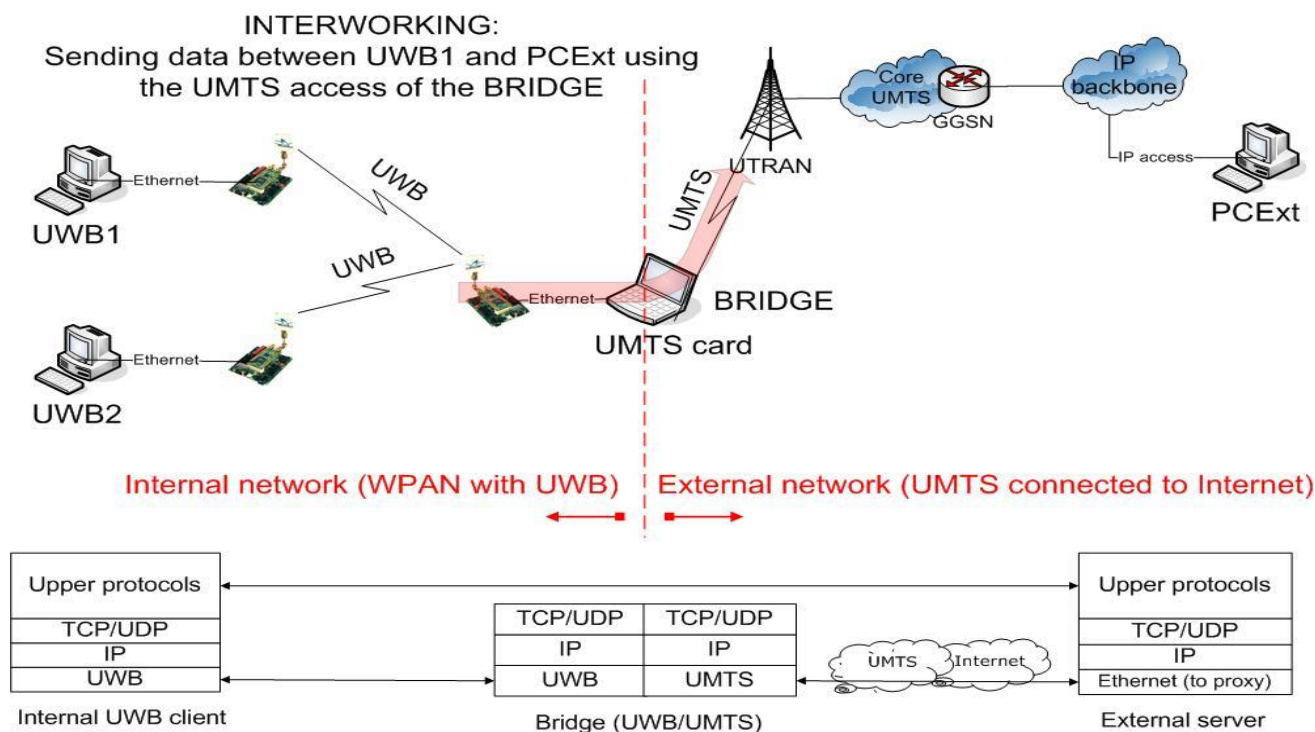
**Home Theatre System**  
Audio Tuning Algorithm

Interface



# EUWB application area: Heterogeneous Network I

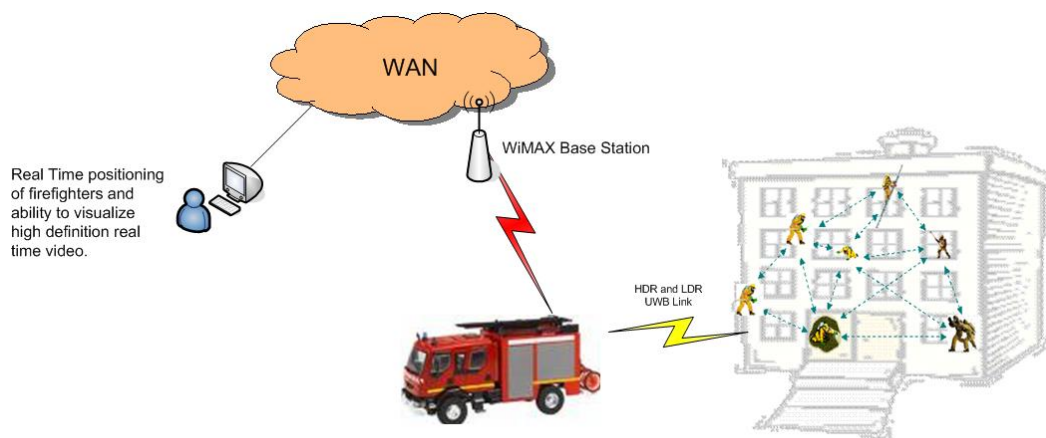
- Provide **new means for convergence of NGNW with ultra high speed short range wireless** access inclusive local hybrid fixed/wireless systems by defining and validating interoperability and coexistence in several heterogeneous scenarios, where multiple and different radio technologies can be present, such as UWB, WiFi, HSPA or WiMAX



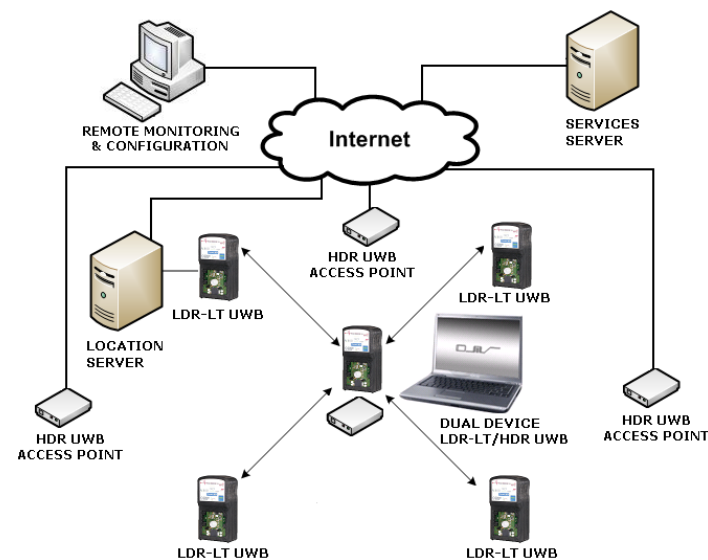
# EUWB application area: Heterogeneous Network II

- **Interoperation** of integrated UWB/cellular terminals seamlessly
- UWB in the **fix to mobile convergence**, as a new access technology with its own particularities, for an “always-best connected” approach
- Interaction with NGMN in which **heterogeneous radio access** is considered
- Development of **novel services** based on UWB features and exploration of the possibilities of integration into future service platforms [IMS]

## – UWB localisation of firefighter in indoor environment



## – Shopping centre



- **Drive European** (ETSI, ECMA 368 / 369) and international (IEEE 802.15.4a / 3c) **standards** and **contribute to global** (WiMedia, WUSB) **industrial alliances**, thereby ensuring coverage of new applications, services and the application-specific operational requirements of users
- **Contribute to European frequency regulation** (CEPT) and implementation of a new paradigm in the regulation area by most efficiently re/double-using radio spectrum while ensuring coexistence with other existing radio systems enabling new markets and applications
- **Drive enhancement of several European industry sectors' competitiveness** (home CE, semiconductors, automotive, public transport, public networks) by enabling new industrial and service opportunities
- **Provide new means for convergence of NGNW** with ultra high speed short range wireless access inclusive local hybrid fixed/wireless systems by defining and validating interoperability in several heterogeneous scenarios

## Project co-ordinator



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