



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

Project presentation (June 2011)

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



Leibniz
Universität Hannover



PHILIPS



TES
Electronic Solutions



ACORDE



veebeam



FBCONSULTING
THINK WIRELESS FOR TOMORROW



Wrocławskie
Centrum
Badań

EIT+



Telefonica

Telefónica
Investigación y Desarrollo



GWT forschung+innovation



CREATE-NET



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:

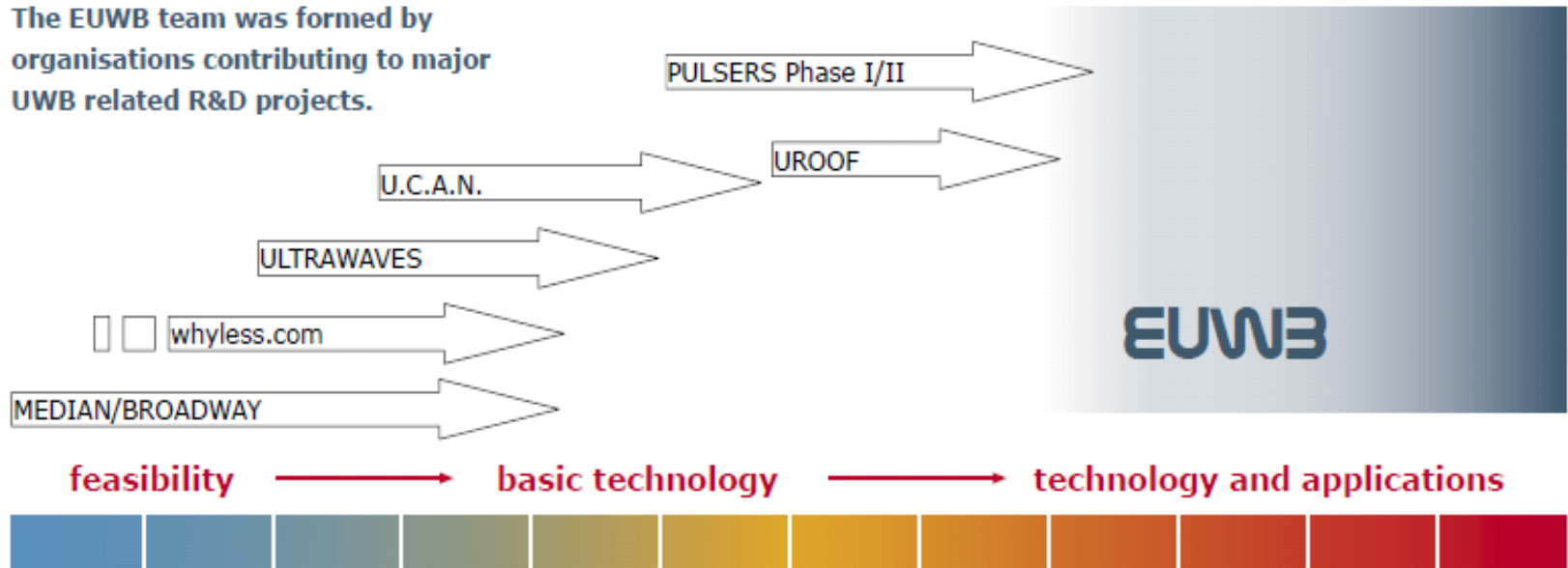
1. Introduction of advanced services and competitive **next generation UWB applications**
2. Further developments **combining UWB-RT with advanced methods of wireless technology** such as cognitive signalling, intelligent multiple antenna and multiband/multimode concepts
3. **Driving international standards 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.

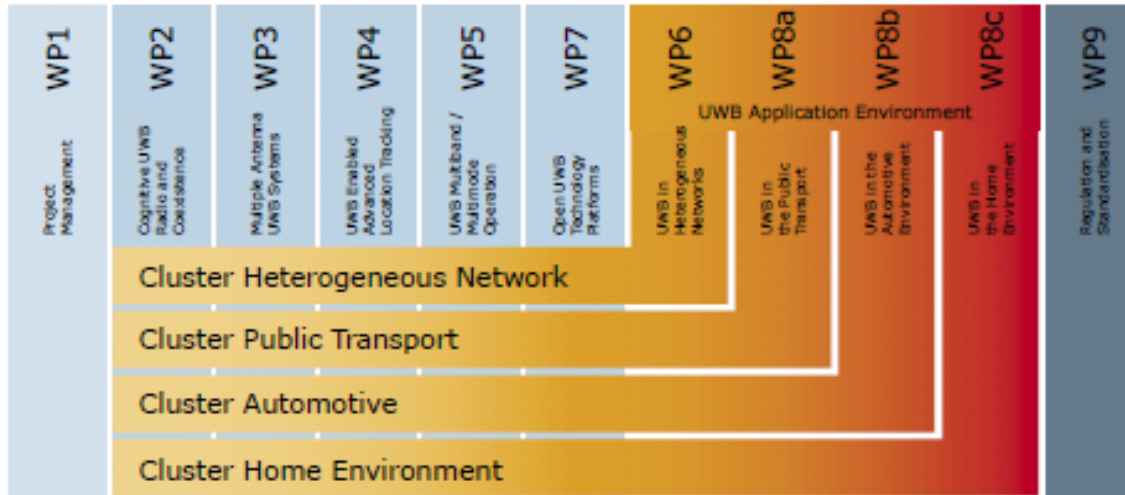


feasibility

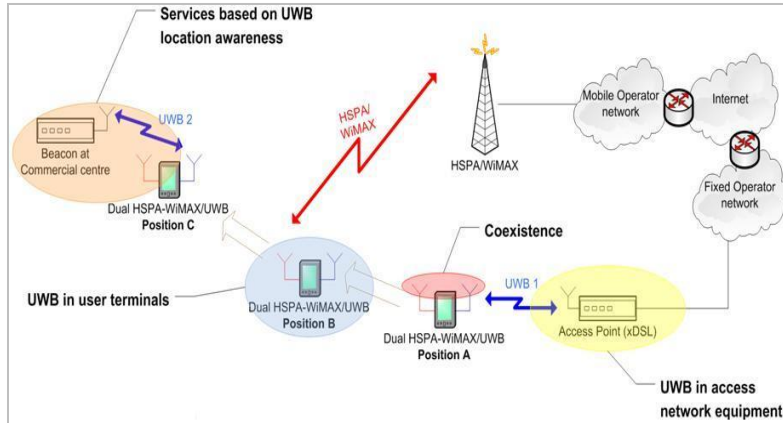
basic technology

technology and applications

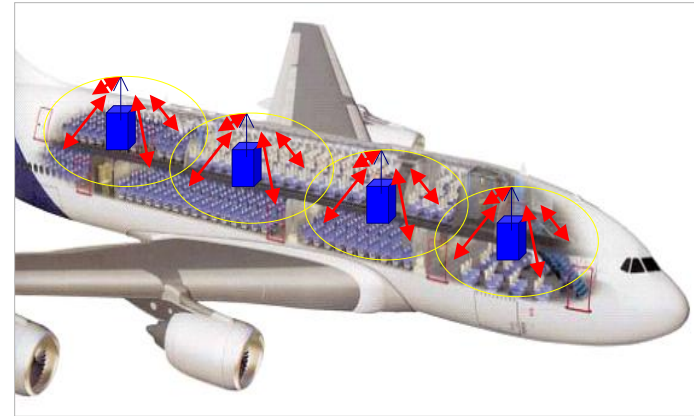
PROJECT STRUCTURE



• Heterogeneous Network



• Public Transport



• Home Environment



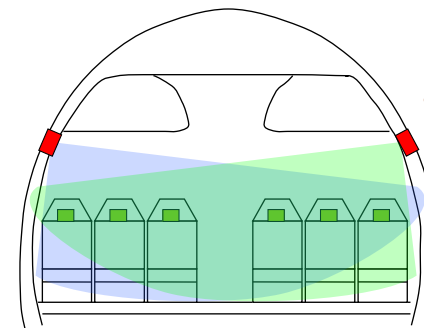
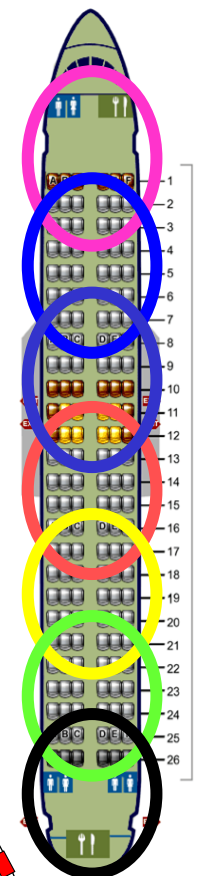
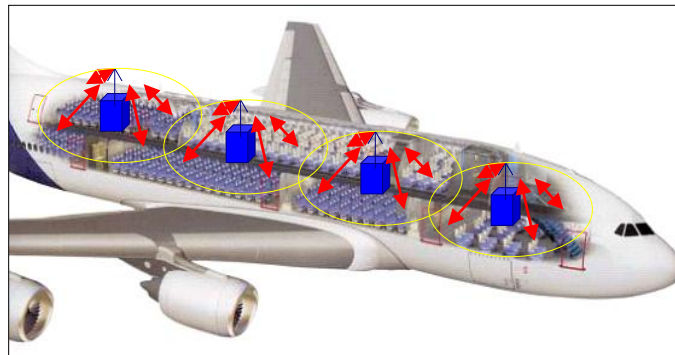
• Automotive



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

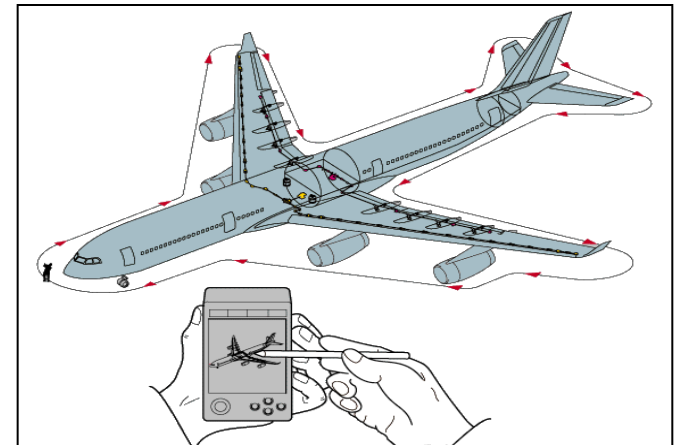


EUWB application area: Public Transport II



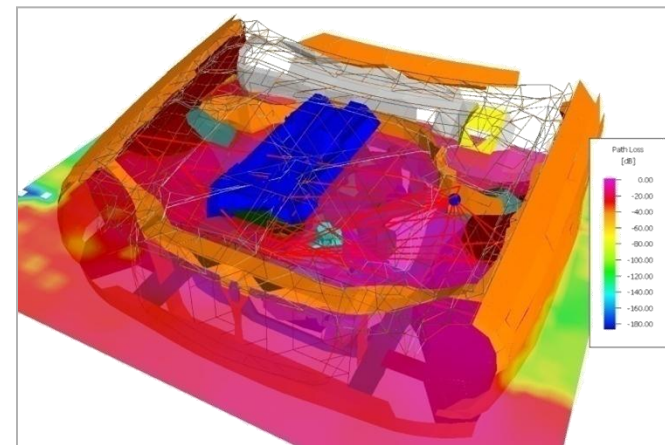
- Wireless cabin and in-flight entertainment
 - High speed broadband content download and streaming into IFE terminals system
 - Next generation cabin management and communication
 - Dynamic tracking of crew members, service and security staff, trolleys, special luggage etc. during operation, maintenance 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

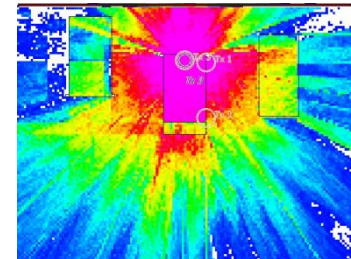
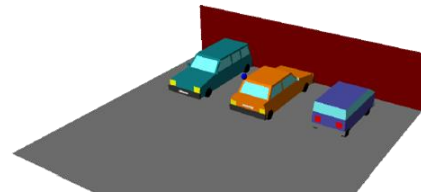
- **Objectives**
 - Reliable data link between sensor and control unit
 - Reduce cable harness complexity
- **Approach**
 - Channel propagation modelling
 - System simulation
 - Verification setup
 - Implementation
 - **Automotive UWB frontends**
 - **Antenna concepts**



Location tracking inside and around vehicles

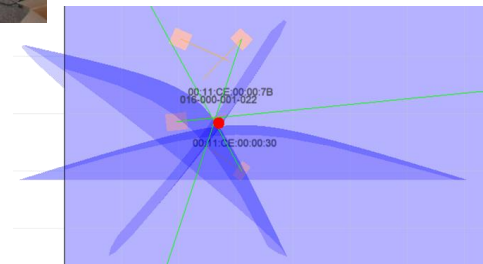
● Objectives

- 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**



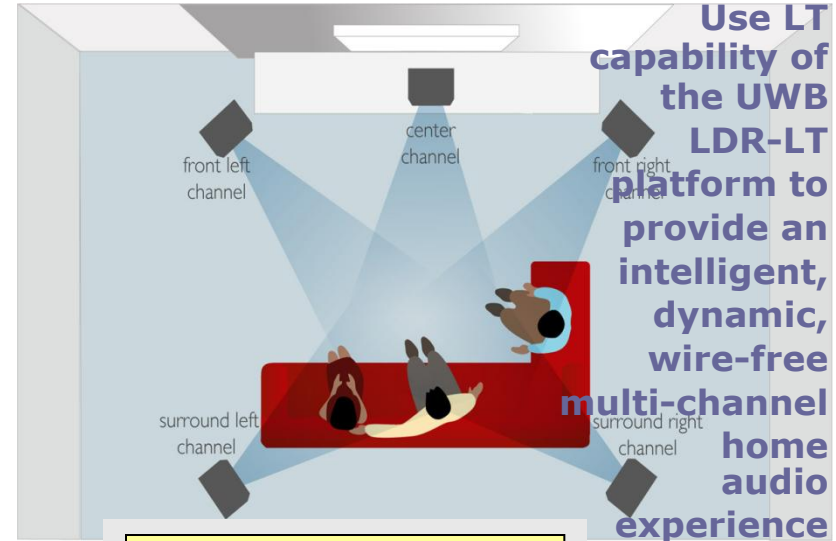
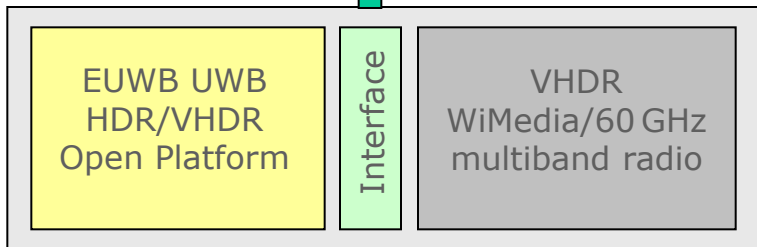
EUWB application area: Home Entertainment



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

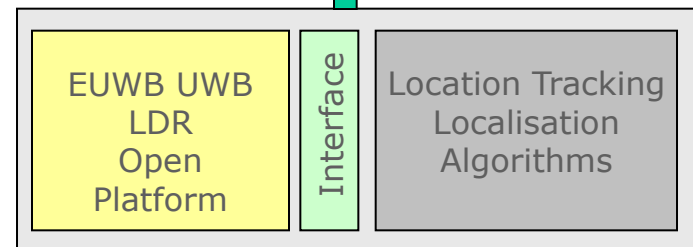
Interface



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

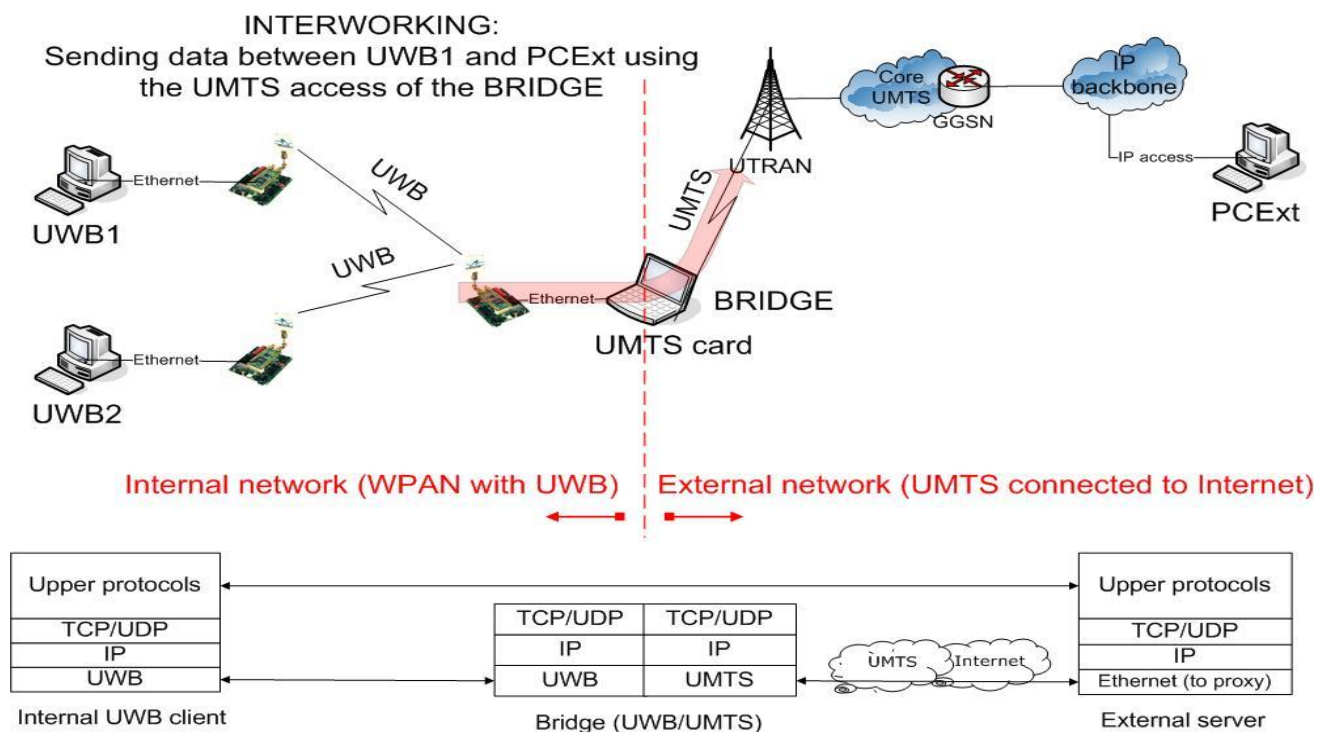
Home Theatre System
Audio Tuning Algorithm

Interface



EUWB application area: Heterogeneous Network I

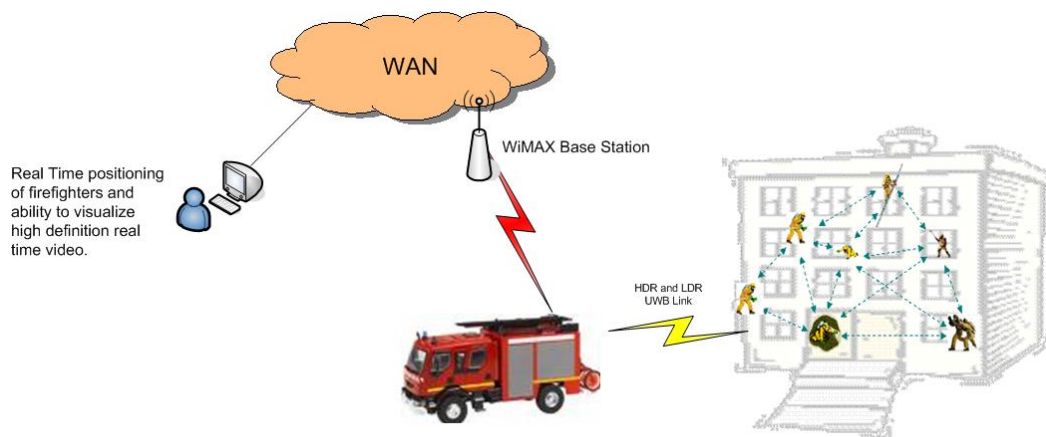
- Provide **new means for convergence of NGNW with ultra high speed short range wireless** access inclusive local hybrid fixed/wireless systems by defining and validating interoperability and coexistence in several heterogeneous scenarios, where multiple and different radio technologies can be present,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



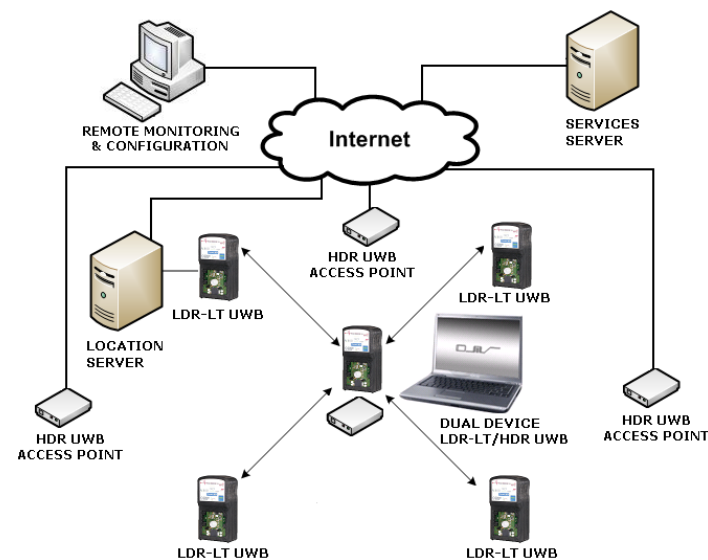
EUWB application area: Heterogeneous Network II

- **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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