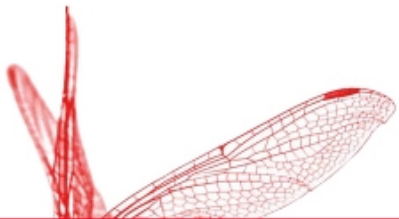




WSN in the Real World

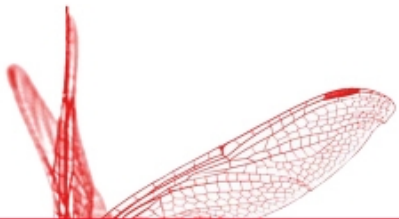
David Gascón - CTO
d.gascon@libelium.com

<http://www.libelium.com>



* Libelium Smart Cities Strategy

- Smart Santander
- Barcelona Smart City
- Zaragoza Smart City



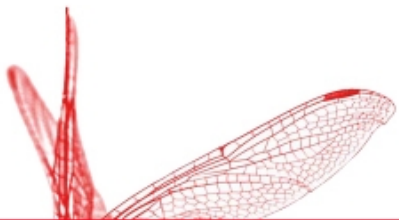
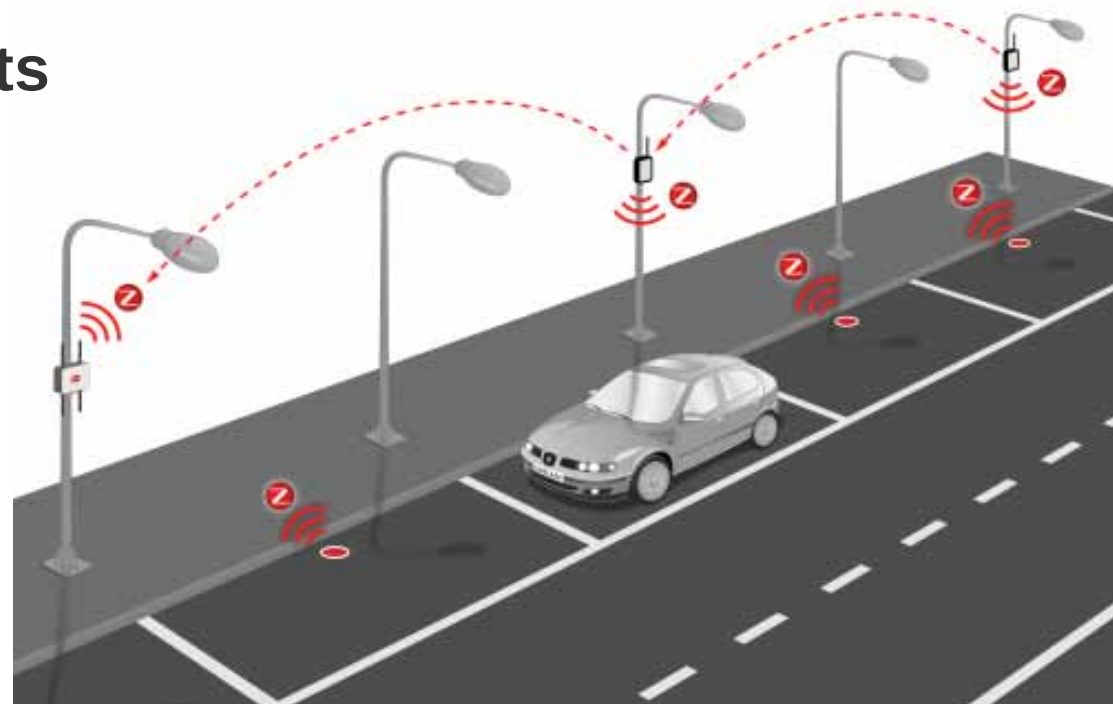
* Smart Santander

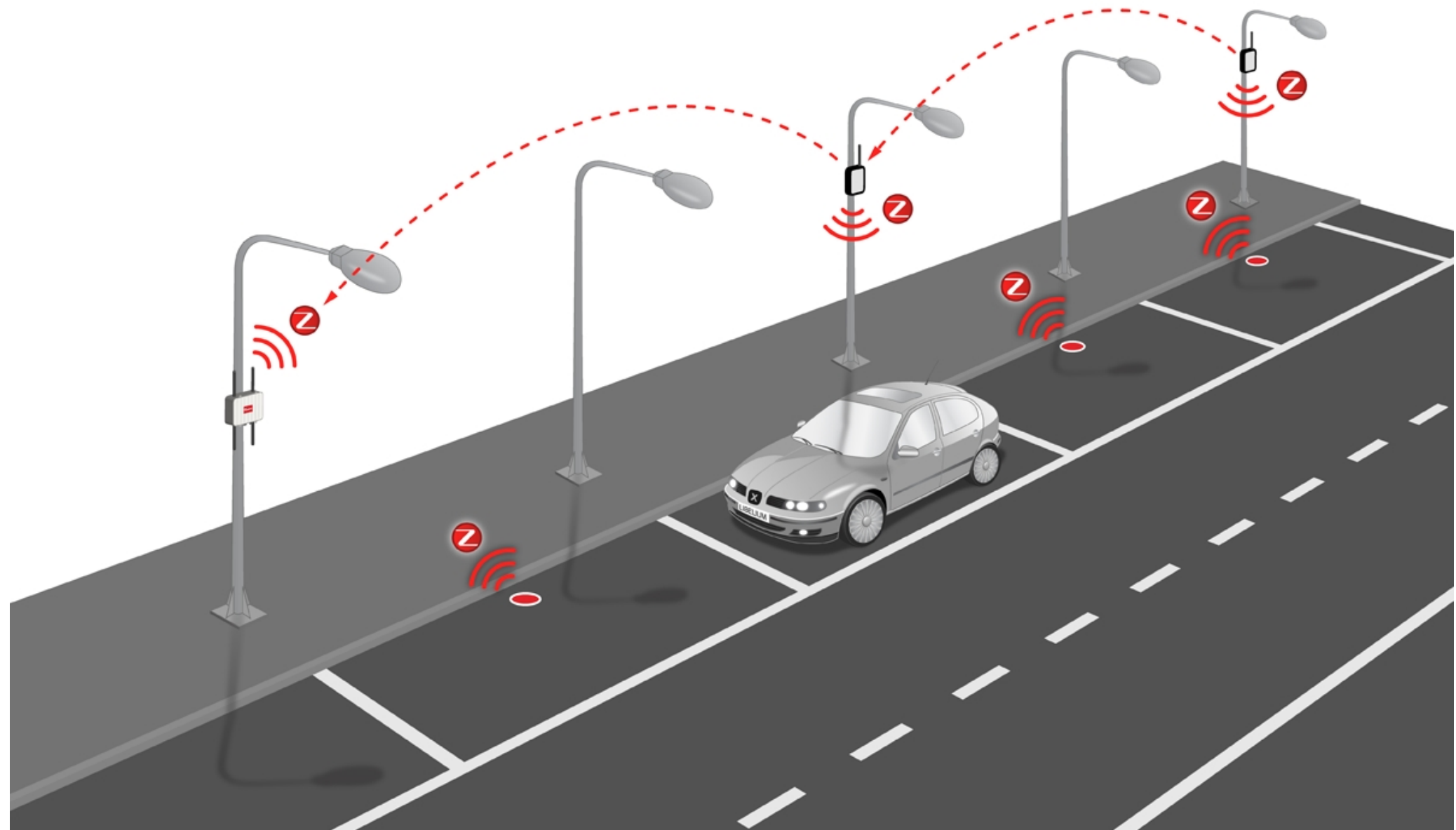
- The biggest real WSN deployment in the world
- 20.000 nodes to be installed
- First call: 1.000 nodes -> Libelium Technology
 - * 400 nodes -> Smart Parking
 - * 600 nodes -> Smart Environment
 - Air Quality: CO
 - Luminosity (street lights system)
 - Noise sensors (dBA)



* Smart Parking

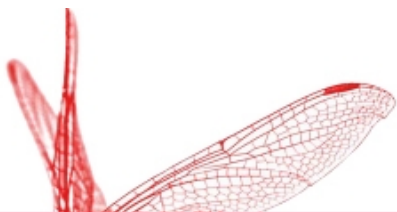
- Vehicle presence detection
- Magnetic field sensors
- 2.4GHz / 868MHz- ZigBee radios
- Router nodes in street lights





* Smart Parking

- Enclosure IP-67 / IK-10
- Plastic (PVC) - No interferences are caused



* Smart Environment

- Acoustic Decibels (dBSPLA)

- * Real time noise maps

- Gas Sensor: CO

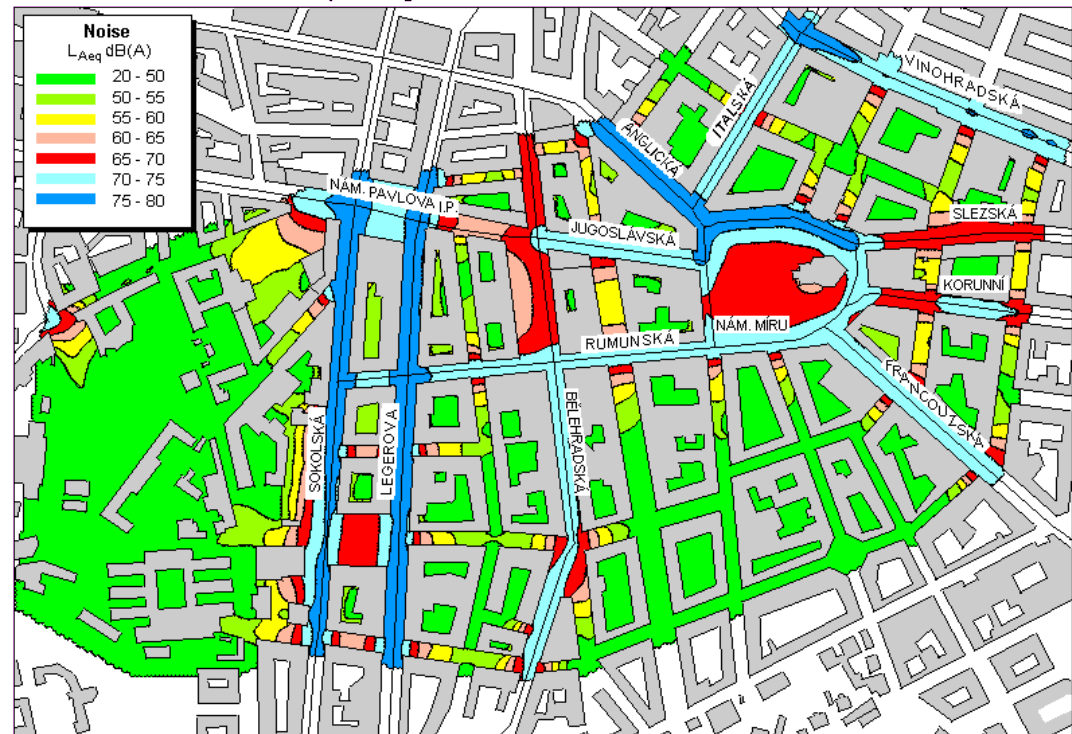
- * Air quality

- Temperature

- Luminosity

- * Efficient lighting system

Traffic-Generated Area Noise Map of Prague 2



Source: IMIP, Enviconsult, JP Soft, Hydrossoft Veleslavín



* Barcelona Smart Environment

- Gas Sensors: CO₂ + NO₂

- * CO₂: pollution - industry

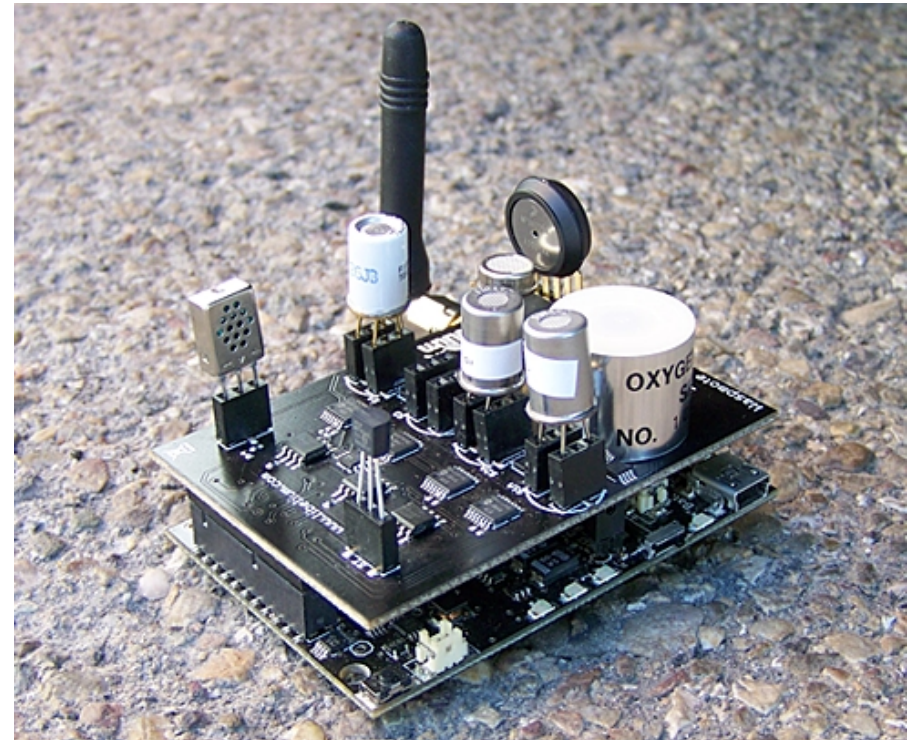
- * NO₂: pollution - vehicles

- Humidity

- * Air quality

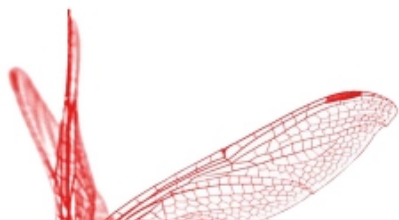
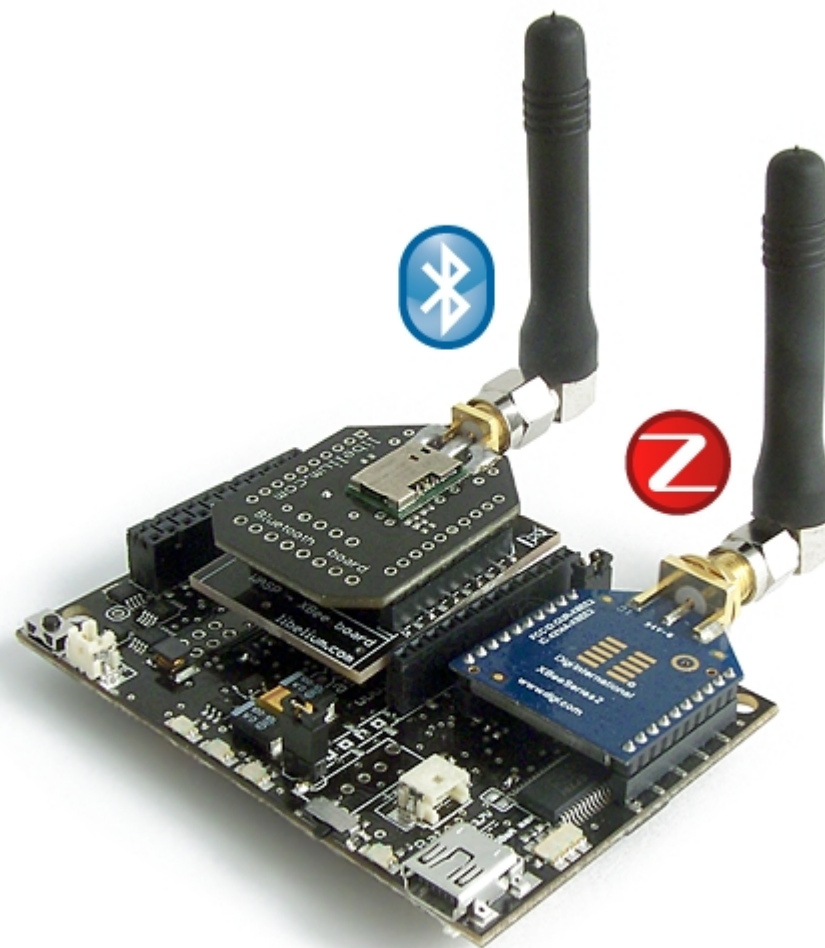
- * Traffic impact

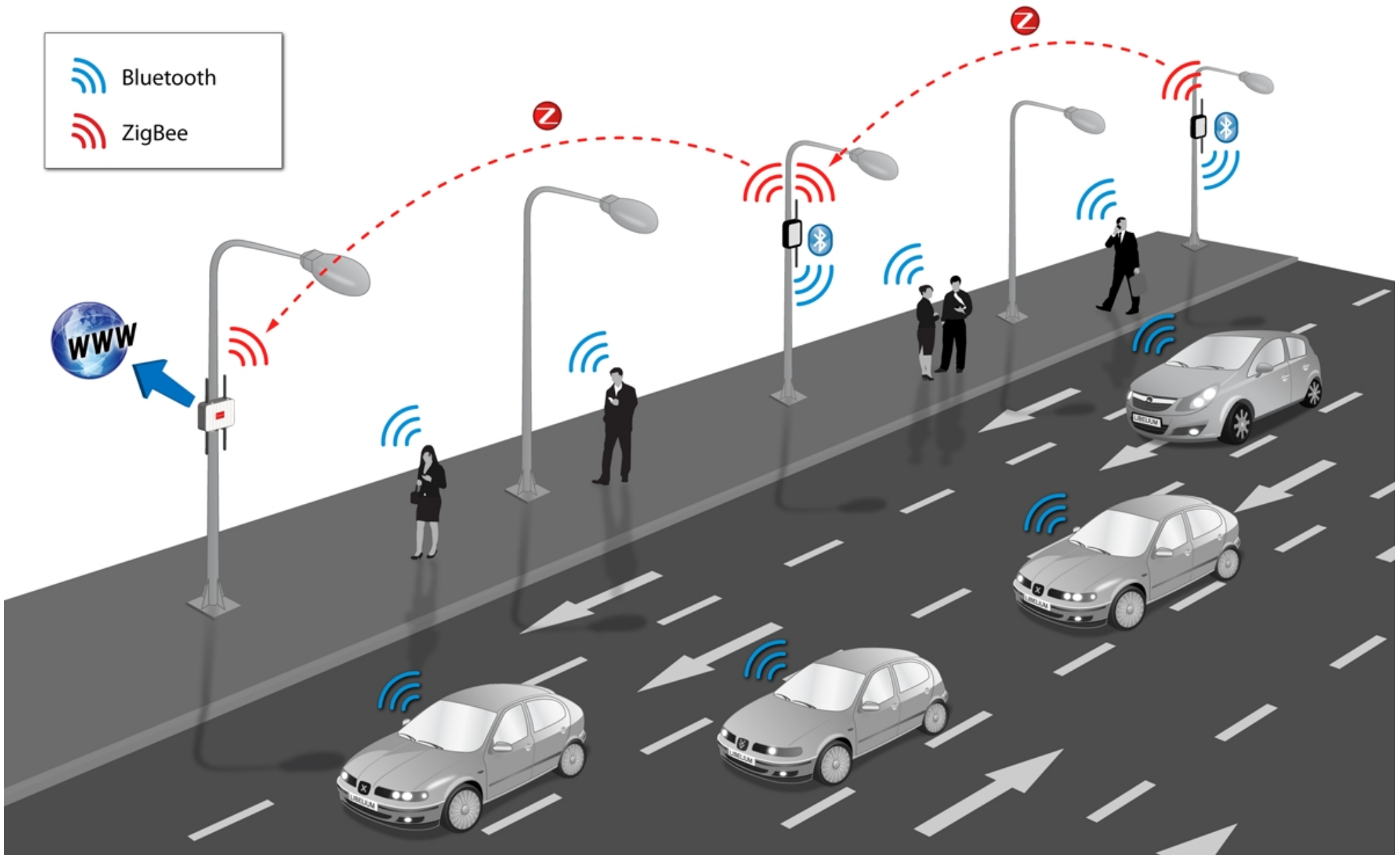
- * CO₂ and NO₂ levels as quality mark of air in cities



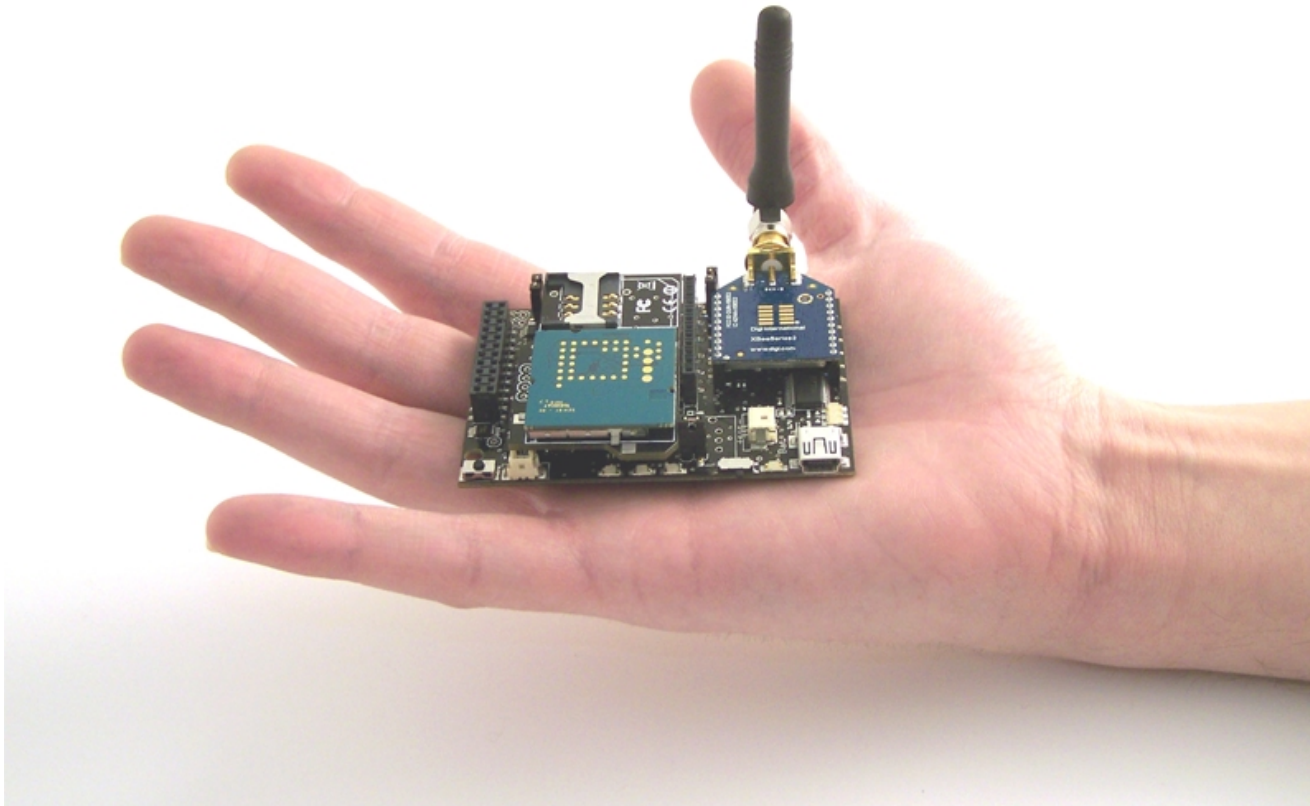
* Vehicle and Pedestrian Traffic Monitoring

- ZigBee + Bluetooth Radios
- Scan for Bluetooth Devices
 - * Hands Free (cars)
 - * Mobile phones (people)
- Send the information using a multihop ZigBee Network

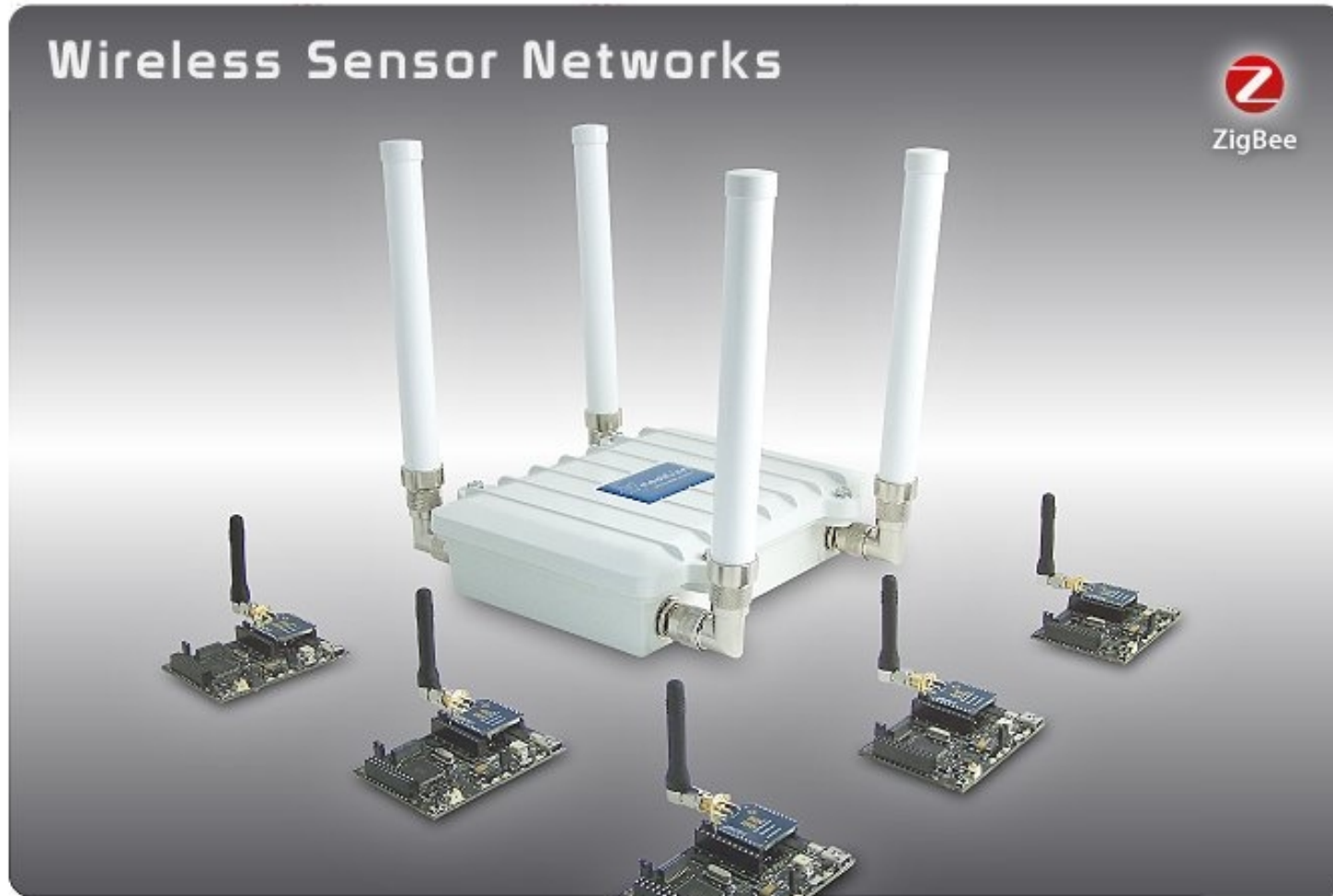


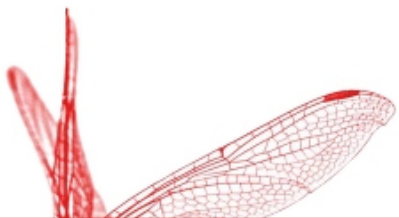
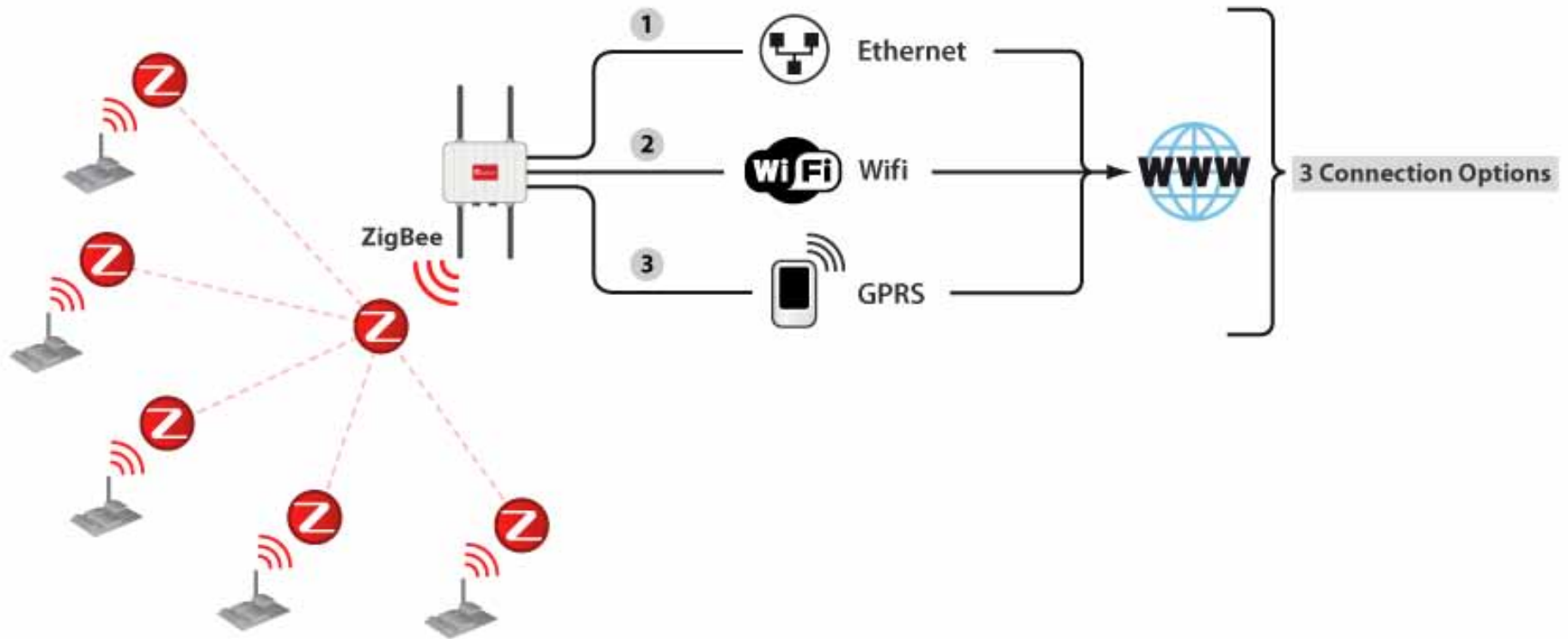


* Waspmote Sensor Platform



* Meshlium ZigBee Gateway







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