



Smart Transportation Alliance

STA DP2 2019
**Application of Bluetooth Low-Energy
Urban Networks to Smart Mobility**

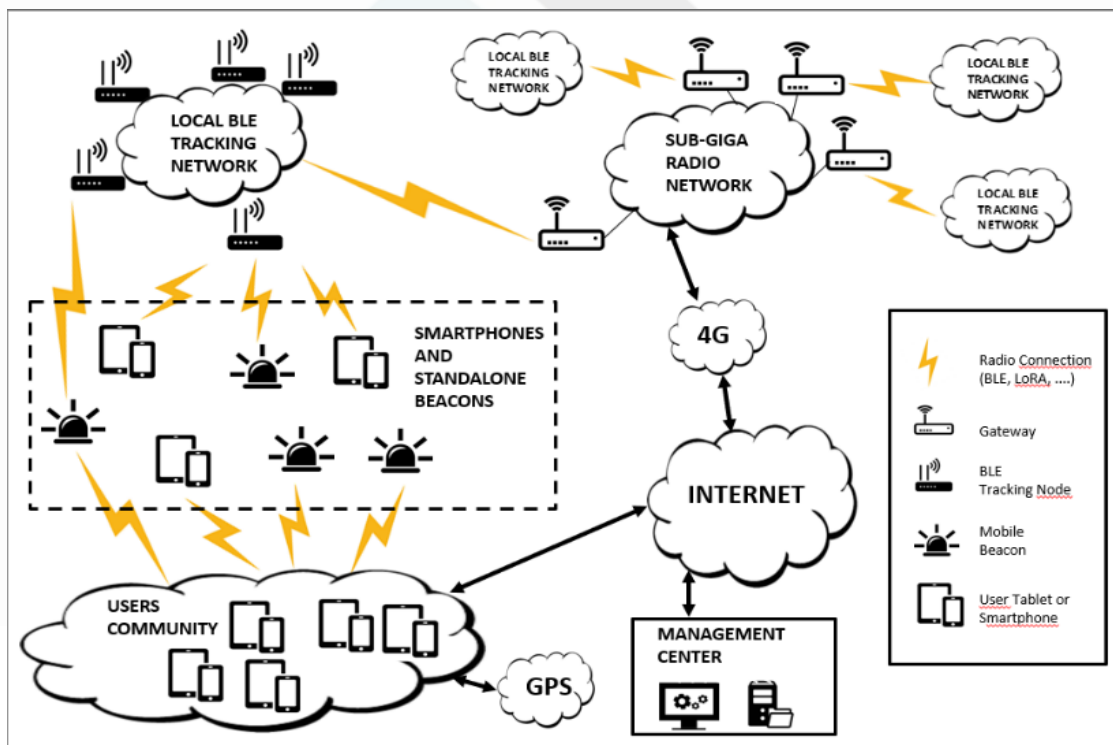
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What is BLEUN?

Bluetooth Low Energy Urban Networks

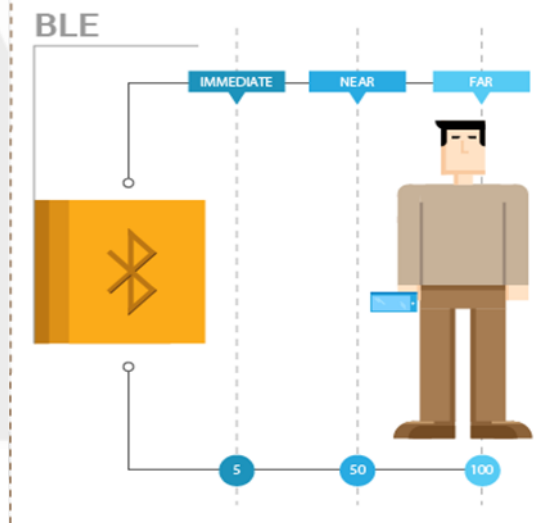
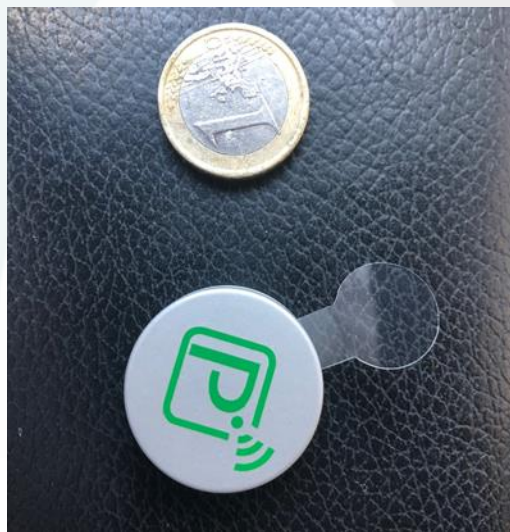
BLEUN uses a BLE tracking nodes network that can detect nearby mobile BLE beacons and calculate its position based on the signal strength. BLE devices require 8,700 times less energy compared to a regular GPS tracker, and have multiple applications such as tracking, wayfinding, proximity information, etc.



BLE Advantages

Bluetooth Low Energy (BLE) is based on standard Bluetooth standard with extremely low power requirements, and offering the following advantages/characteristics:

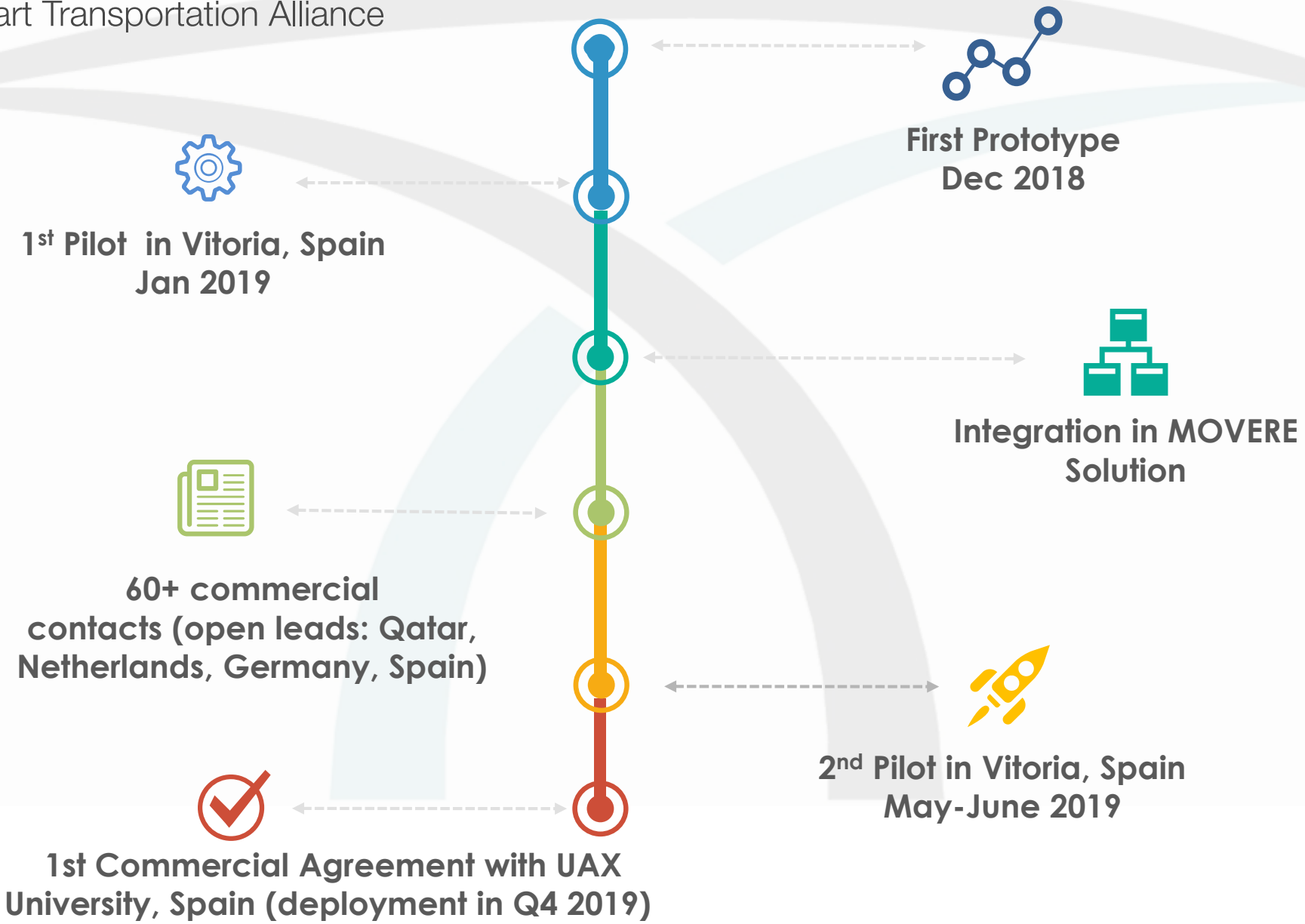
- Battery life of several months on a button cell
- Small size and low cost
- Compatibility with existing devices, such as mobile phones, tablets and computers.
- Positioning accuracy can reach 1-2 meters





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BLEUN Timeline



Pilot



Vitoria-Gasteiz

Basque Country, Spain

BLEUN was piloted in the "Green Parking" facilities managed by TTX partner Intelligent Parking. The parking facilities were used as the main network nodes (gateways) in order to provide extended positioning service to the users.

The pilot involved:

- 2 BLE Node Trackers
- 5 BLE Node Trackers with Solar Panel
- 20 Mobile Beacons (= 20 Beta-Testers)

Deployment



Universidad Alfonso X el Sabio (UAX)

Madrid, Spain

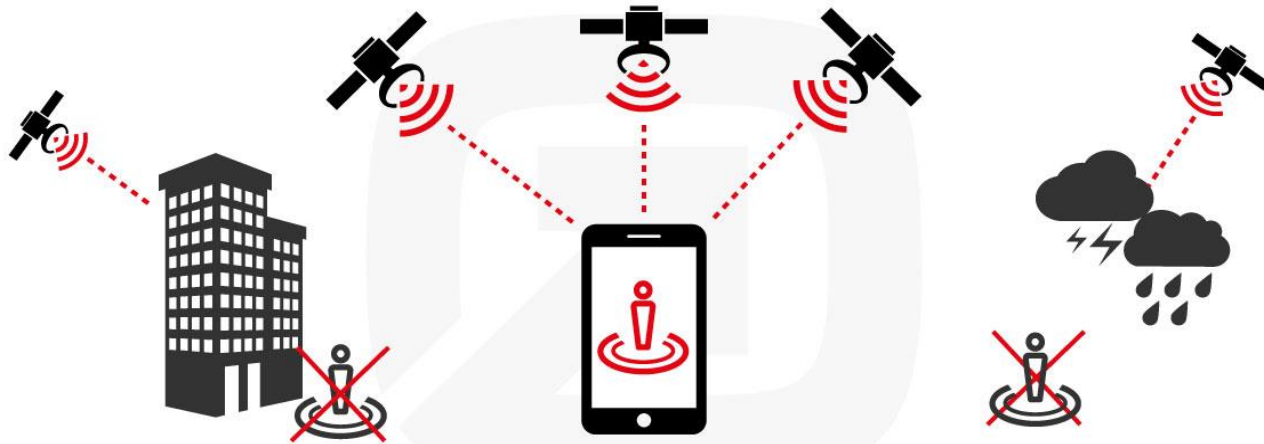
MOVEER incorporates the BLEUN functionality and will be deployed at the UAX University Campus in Madrid. The aim is to provide a Mobility 3.0 alternative between the university and the surrounding public transport hubs.

This deployment includes:

- 50 BLE Node Trackers, 30 Mobile Beacons
- 30 e-bikes
- 50 e-hubs

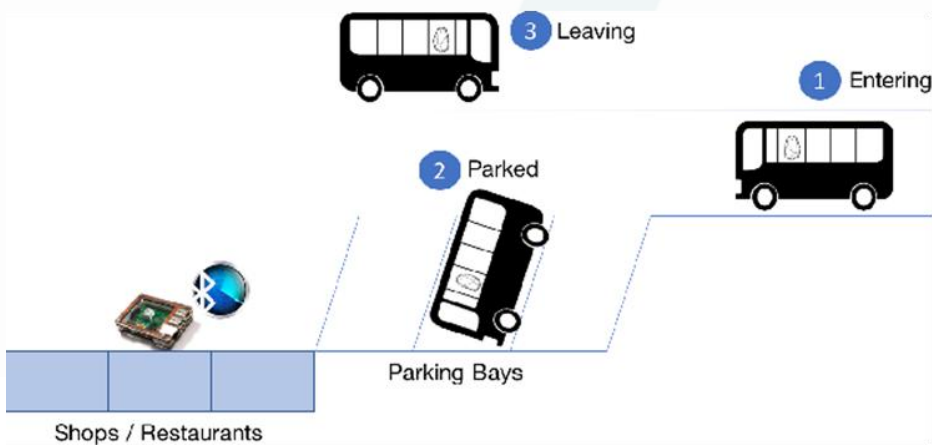
BLE is an interesting alternative to GPS in these uses cases:

- GPS signal not reliable: indoor, surrounded by buildings, bad weather conditions;
- When low energy and low cost are required (long battery life);
- Need to remain independent from GSM operators.



Tracking

- Safety and anti-theft
- Hourly or daily distribution of usage
- Daily trips average
- Percent of vehicles usage/ circulation
- Traffic flow maps (heat maps)



Positioning - Proximity

- Indoor wayfinding
- Improve accuracy outdoors
- Information points
- Access control
- Alerts





Risks and open issues



BLE attenuation when devices are concealed may reduce effectiveness



Battery life lower than estimated by technical specification (yet to be measured)



Google Maps accuracy often low for precise location services



Network extension and density necessary for desired performance may be difficult to achieve



Optimise detection (frequency & attenuation issues)



IT Platform functionalities and position accuracy to be improved



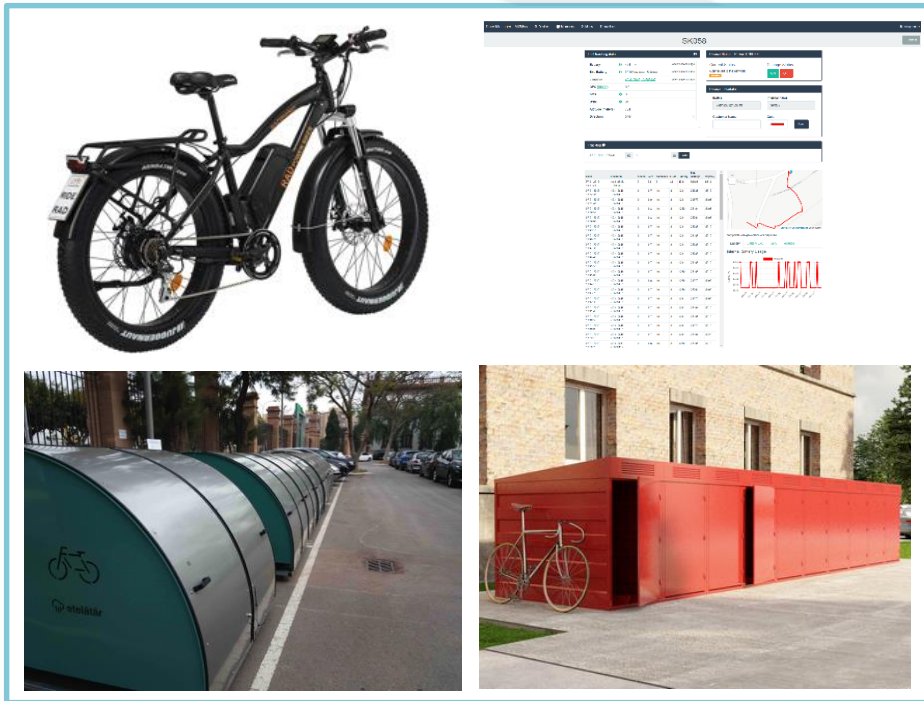
Personal Data Protection & Privacy



Equipment durability and maintenance costs



Premium Peer-to-Peer Electro-Mobility Networks



- Last generation e-bikes with 40-70km range
- Easy portable, closed modular stations (e-hubs) for e-bike storage and charging, reducing risk of theft and vandalism
- Booking and management platform providing real-time information
- Mobile application for user interaction and access control
- Low-energy IoT-based tracking allowing accurate point-to-point mobility, and reducing theft risk



Smart Transportation Alliance

**THANK YOU
FOR YOUR
ATTENTION**

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