AUTOPILOT

PROYECTO EUROPEO AUTOPILOT

25/04/2017

XVII CONGRESO ESPAÑOL SISTEMAS INTELIGENTES DE TRANSPORTE
MADRID

INDICE

1. INTRODUCCIÓN Y ANTECEDENTES

2. RESUMEN PROYECTO AUTOPILOT

3. TEST-SITE VIGO

4. CONCLUSIONES

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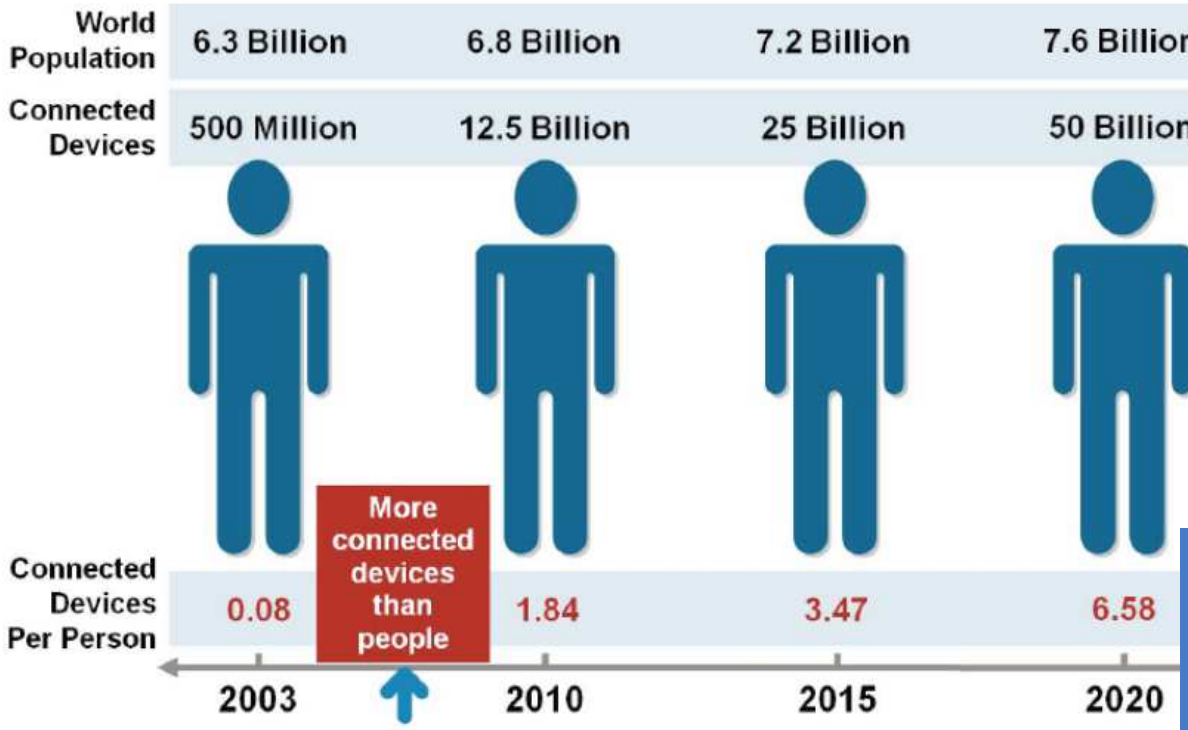
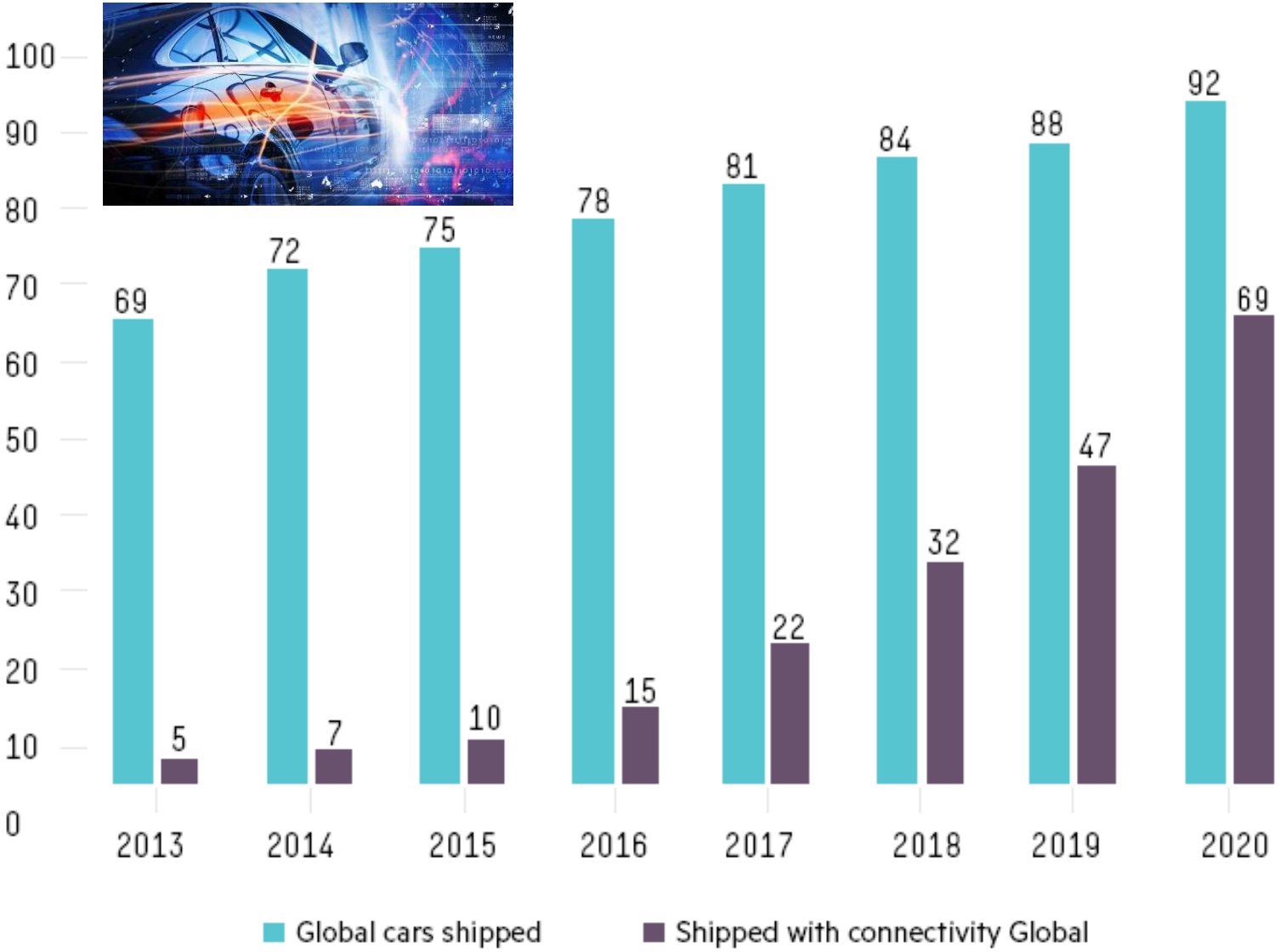
Evolución hacia el Internet de las cosas



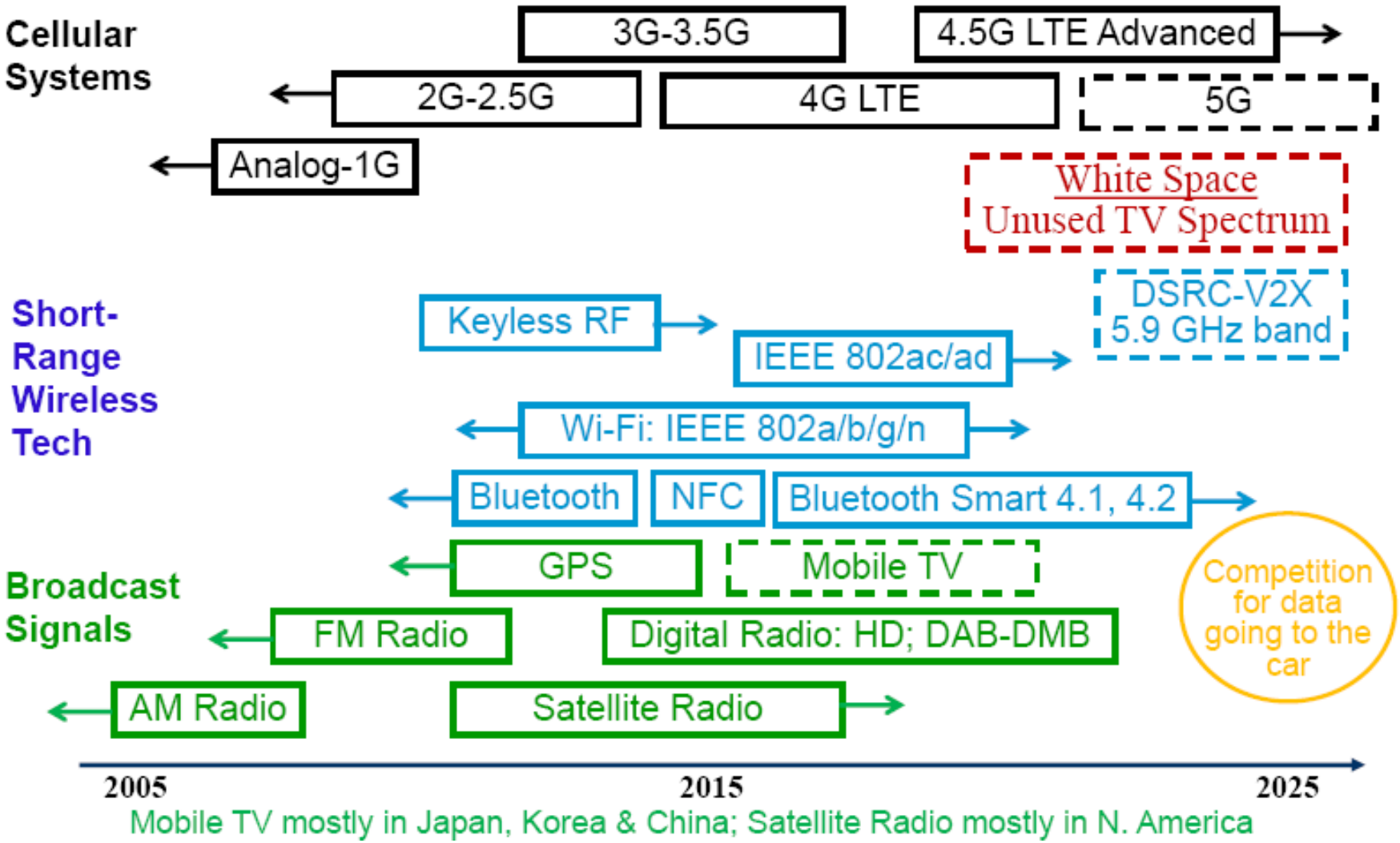
FUENTE: CISCO

Ventas de vehículos conectados



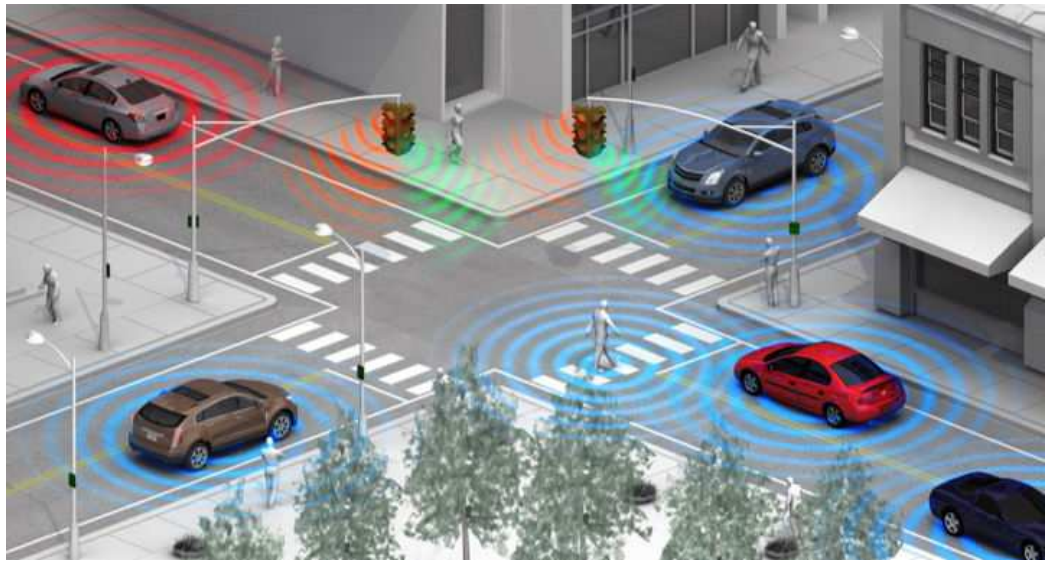
FUENTE: HEWLET PACKARD

Tecnologías de conectividad



FUENTE: IHS AUTOMOTIVE

Principales tendencias en el automóvil

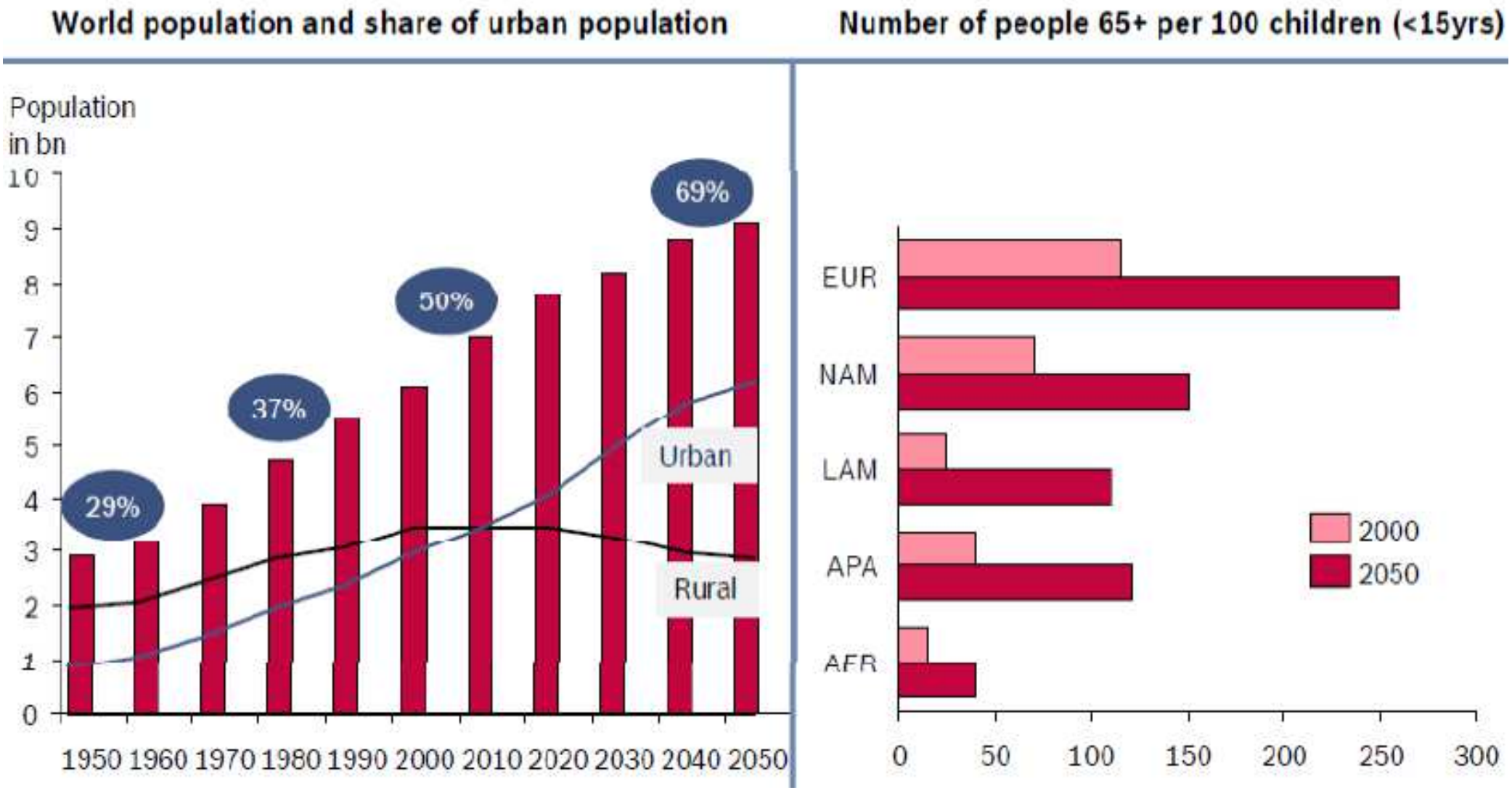


CONECTIVIDAD

HIBRIDACIÓN Y ELECTRIFICACIÓN

CONDUCCIÓN AUTOMATIZADA Y AUTÓNOMA

Demografía y urbanización



FUENTE: BOSCH

Conducción autónoma en los entornos urbanos

INDICE

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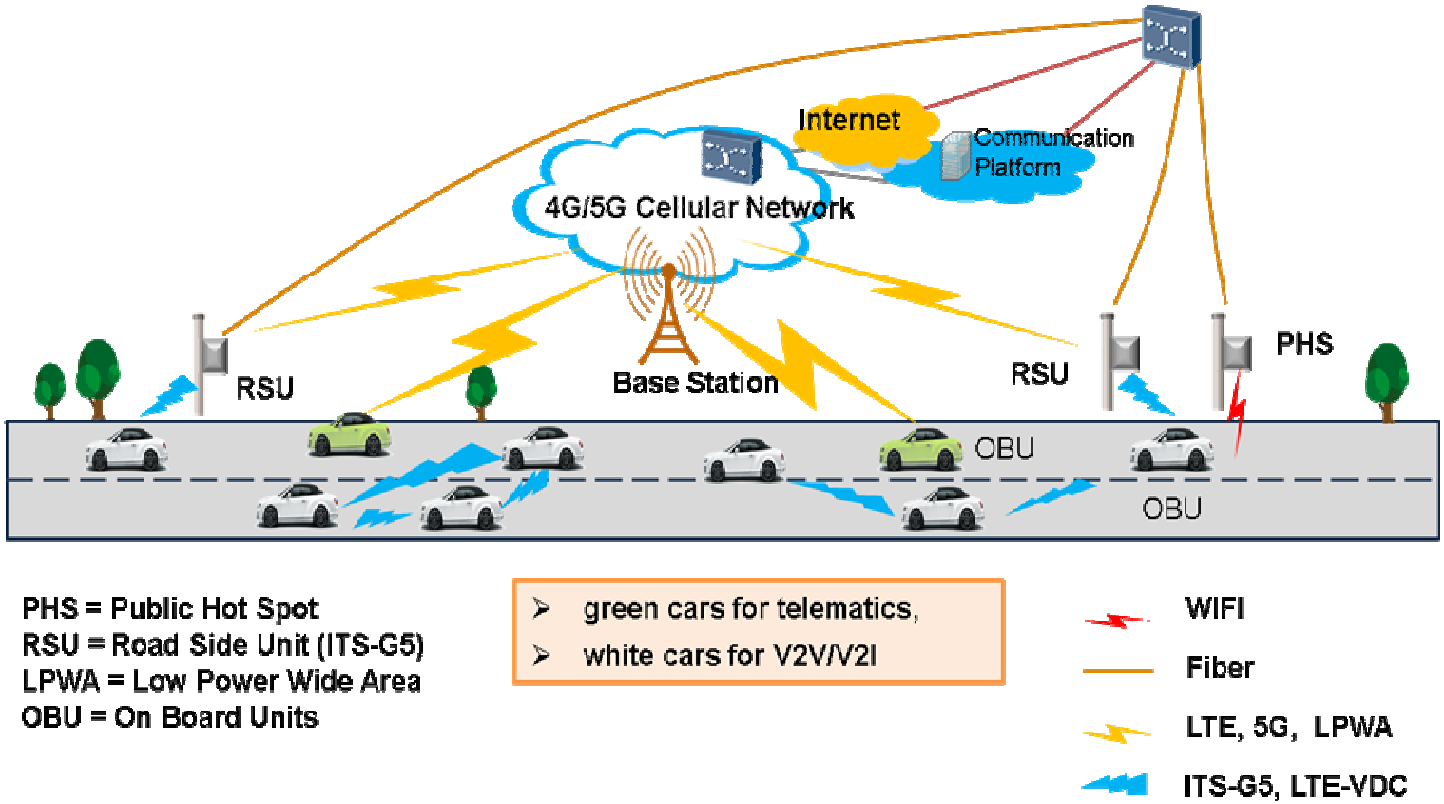
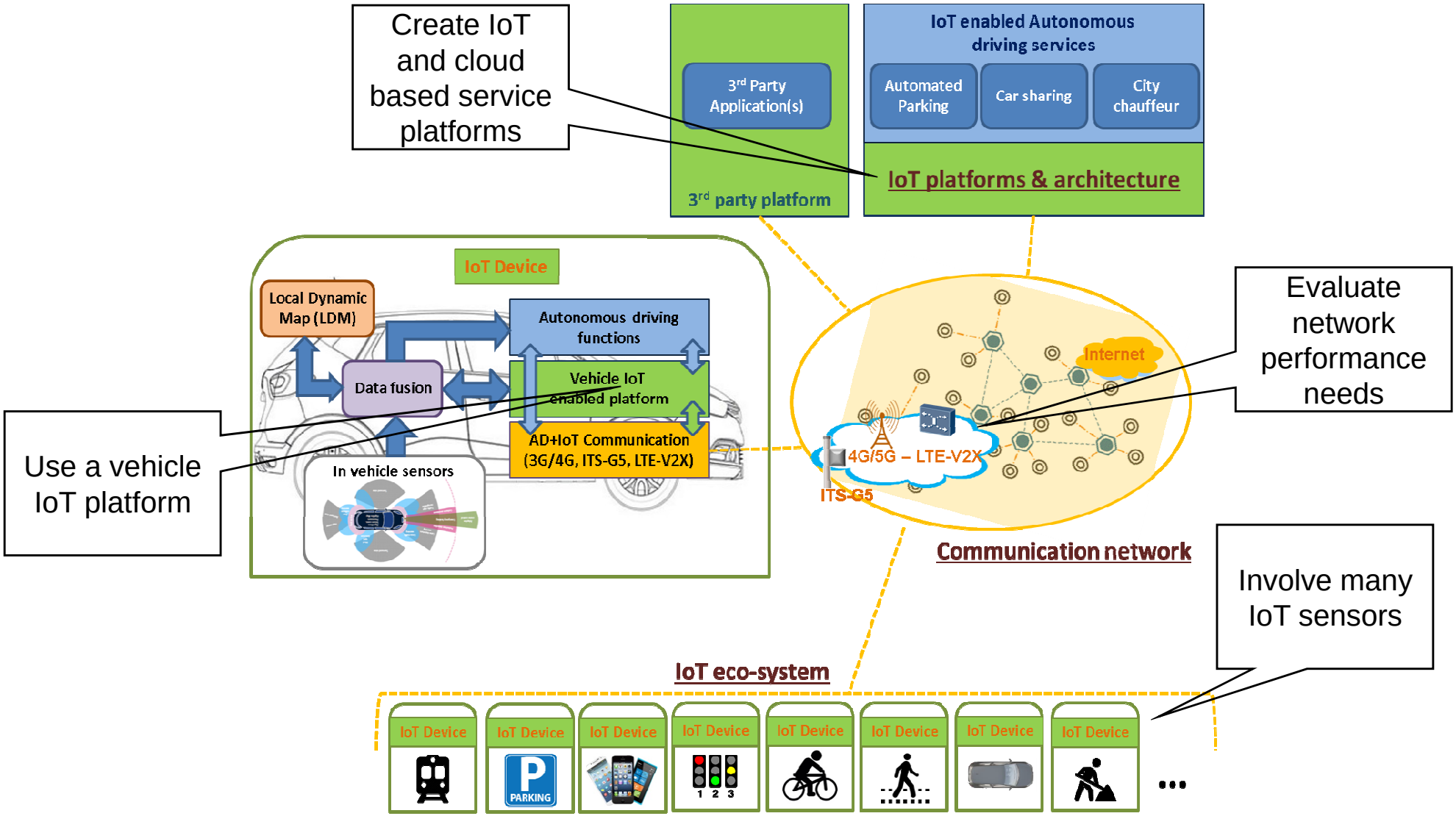
AUTOPILOT – Vehículo como elemento IoT

- IoT information exchanged over a wide range of different networks - especially V2V/V2I: ITS-G5 and LTE-V2X



AUTOPILOT – Concepto global



AUTOPILOT – Concepto global

- The **overall IoT platforms and architecture**, for the provision of automated driving application and services
- The **Vehicle IoT integration and platform** to make the vehicle an IoT device, using and contributing to the IoT
- The **Automated Driving relevant sources of information** (pedestrians, traffic lights …) **becoming IoT devices** and extending the IoT eco-systems providing an enhanced perception of the driving environment
- The communication network **using appropriate and advanced connectivity technology** for the vehicle as well as for the other IoT devices

AUTOPILOT – Test Sites y funciones CAD

Brainport, NL

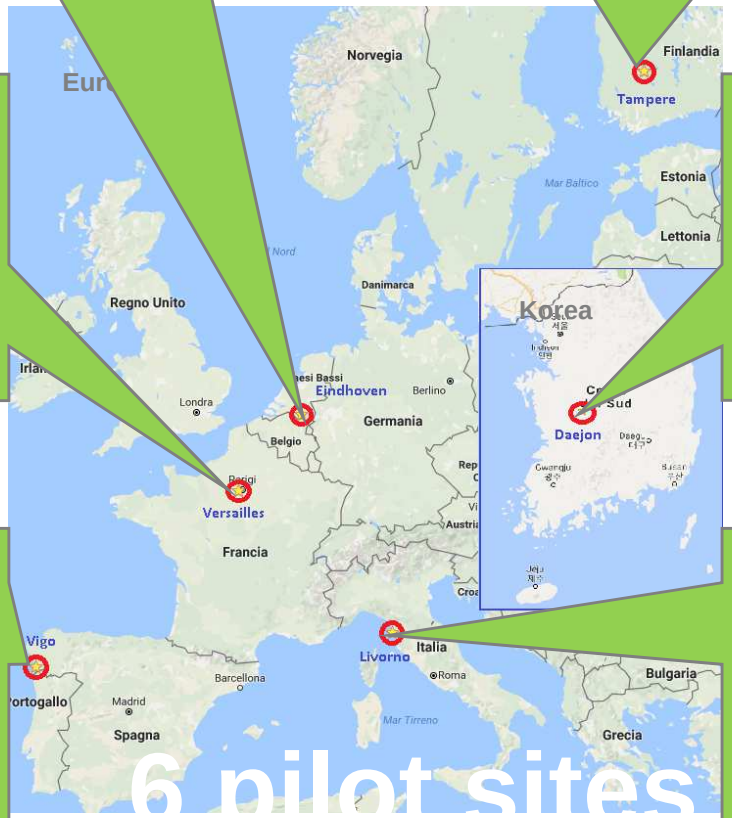
- Automated Valet Parking
- Highway pilot
- Platooning

Tampere, FI

- Automated Valet Parking
- Urban Driving

Versailles, FR

- Automated Valet Parking
- Urban Driving
- Platooning



Daejeon, KR

- Urban Driving

Vigo, SP

- Urban Driving
- Automated Valet Parking

Livorno, IT

- Urban Driving
- Highway pilot

6 pilot sites

Información general del proyecto

5 Large Scale Pilots on IoT are funded by the European Commission

- AUTOPILOT is the Pilot 5: autonomous vehicle in a connected environment
- Innovation Action - 3 Years: 01/01/2017 – 31/12/2019
- 44 beneficiaries – coordinator: ERTICO
- Project costs: €25.425.252 - EU contribution: €19.924.984
- European Commission: DG CONNECT unit E.4 – IoT / H.2 Smart Mobility & living / A.1 Robotics & Artificial Intelligence

European Platforms Initiative

European Large-Scale Pilots Programme

AIOTI

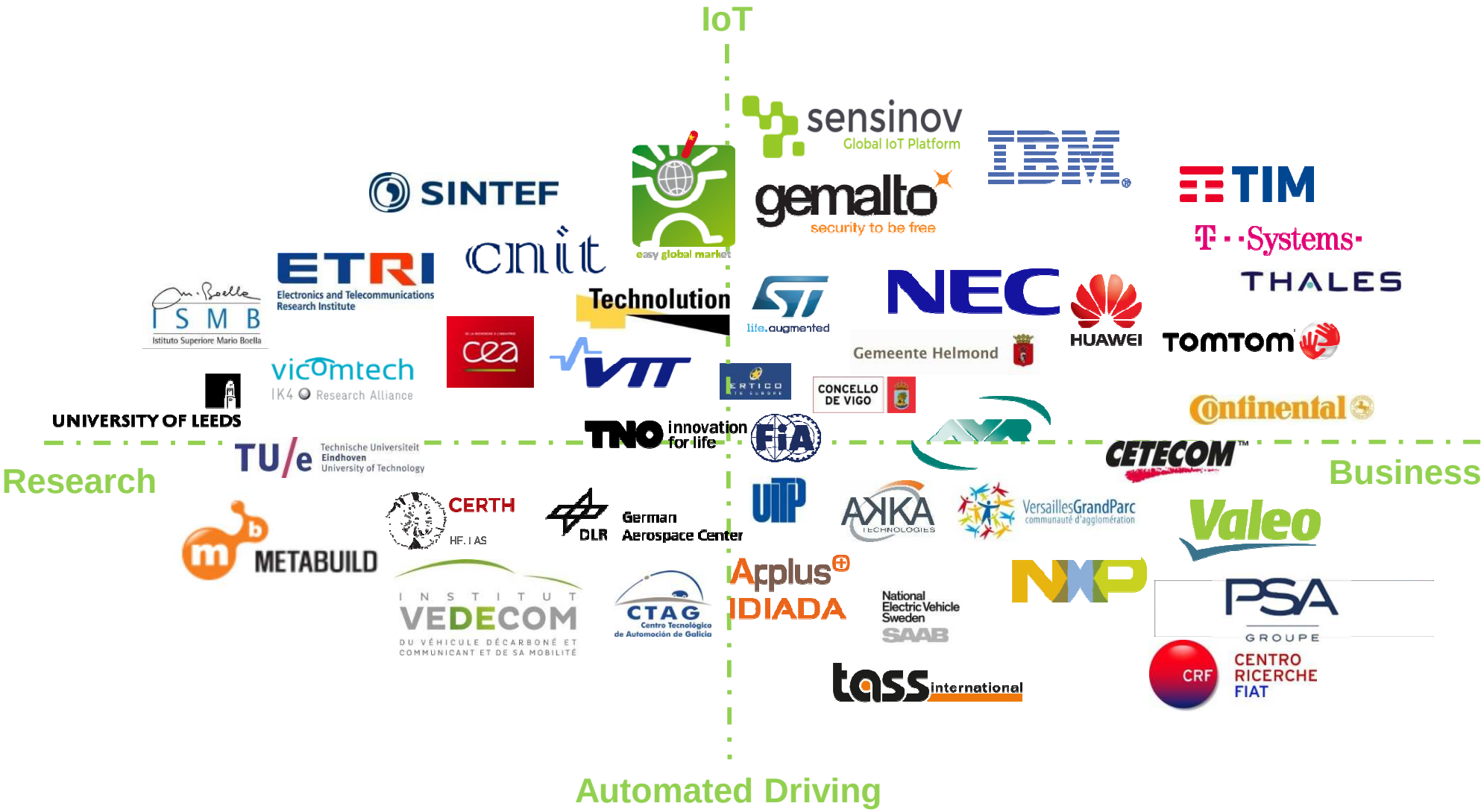
The 5 Large scale pilots are cross coordinated and supported by 2 CSA:

- CREATE-IoT (create-iot.eu)
- U4IoT (www.u4iot.eu)

CREATE-IoT

U4IoT

AUTOPILOT - Partners



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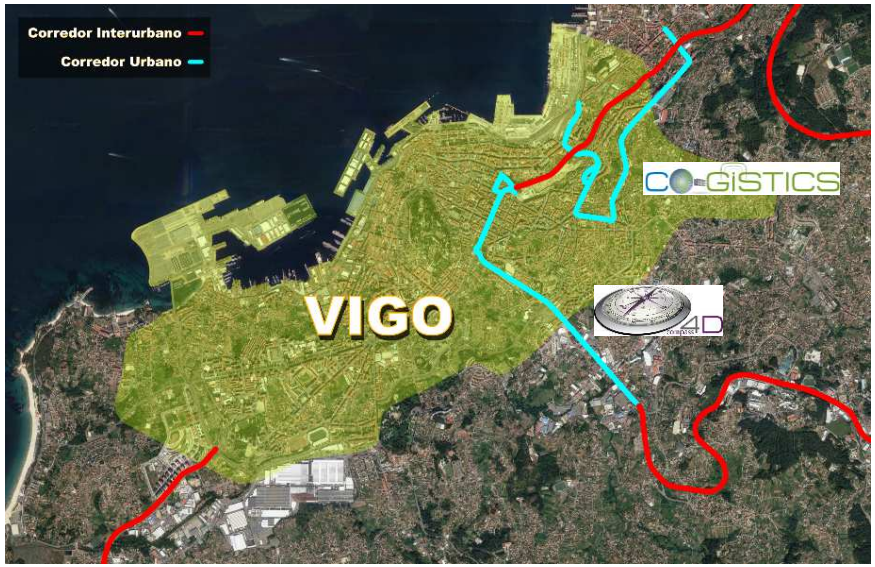
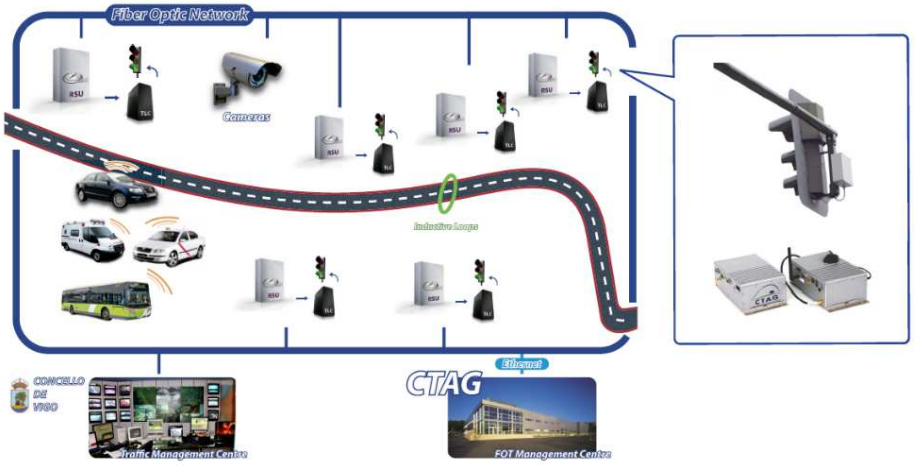
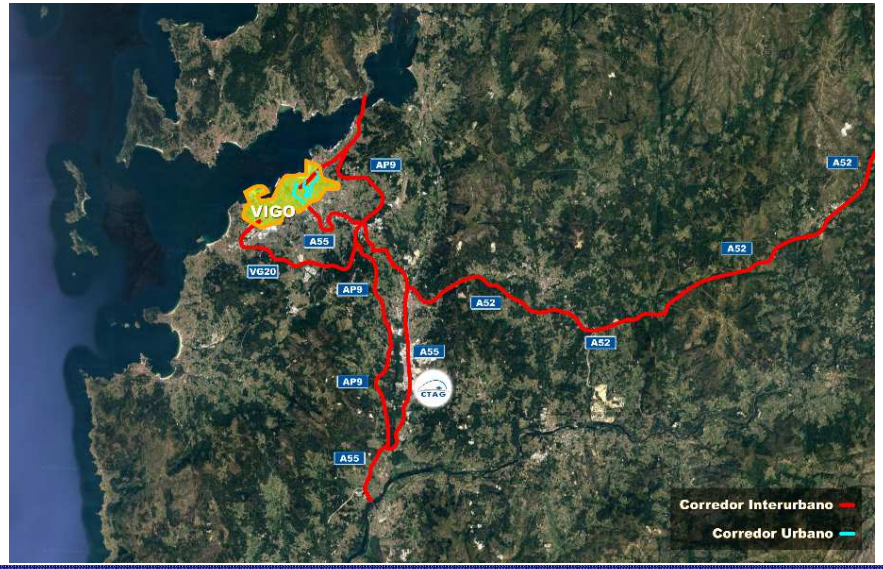
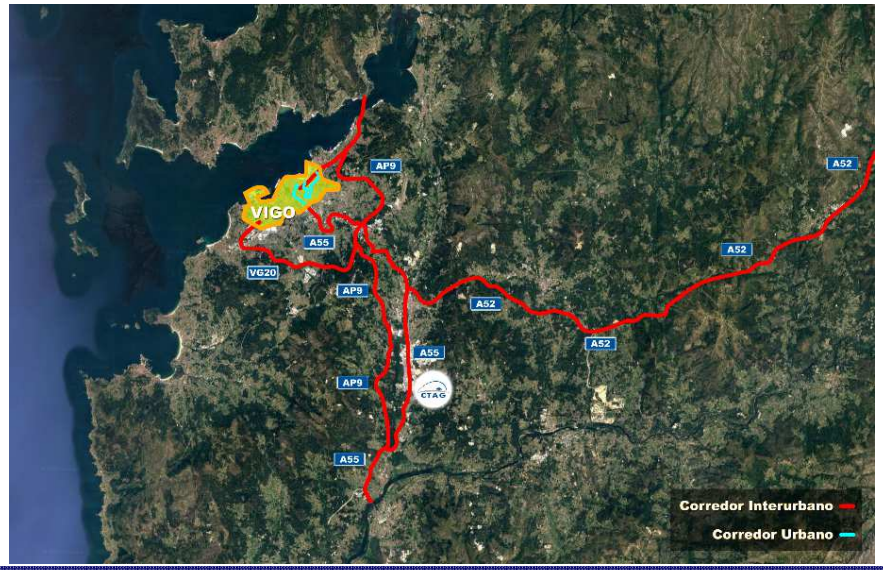
Test-Site SISCOGA

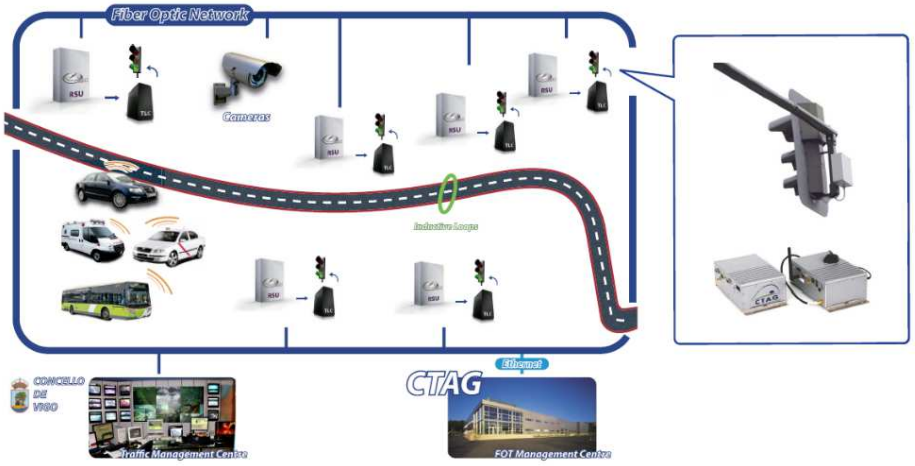






Test-Site SISCOGA



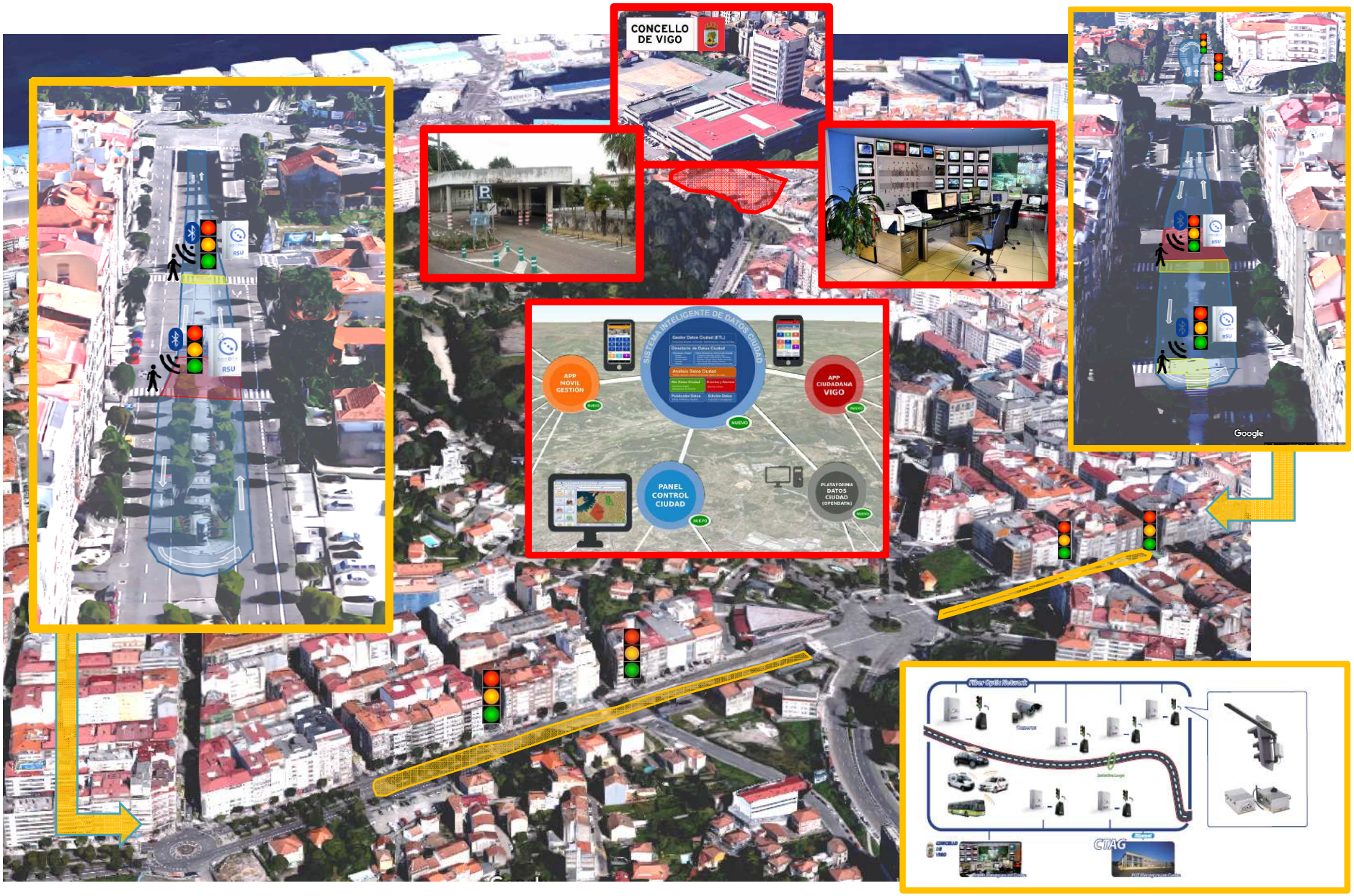


- ITS G5 (50 intersections)
- 3G/4G (LTE-V2X)
- In connection with IoT city platform integrating cameras road sensors
- Centralised in City TMC

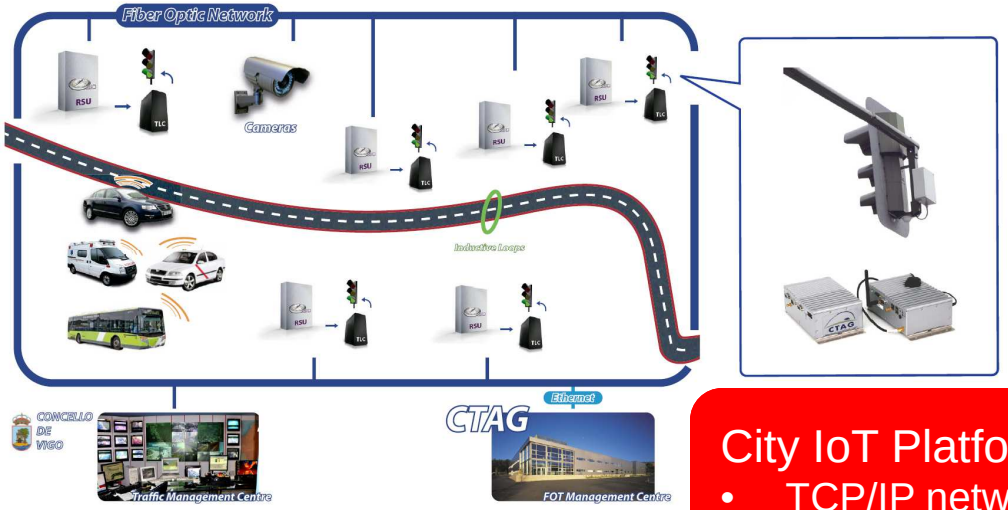
Consorcio

CONCELLO DE VIGO	Traffic Authority Road Enabler	• **Enabling the road infrastructure adaptation and use for piloting AUTOPILOT use cases**
PSA GROUPE	Vehicle Manufacturer	• Wide expertise in C-ITS services, AD functions • **2 vehicles for being automated and equipped with IoT platform.**
CTAG	Test Site Leader	• Developing & testing of automated driving applications • Developing & testing of C-ITS and connected vehicle services • Background in Pilot managing • **1 Vehicles automated with IoT platform**

Resumen Test-Site



Resumen Test-Site



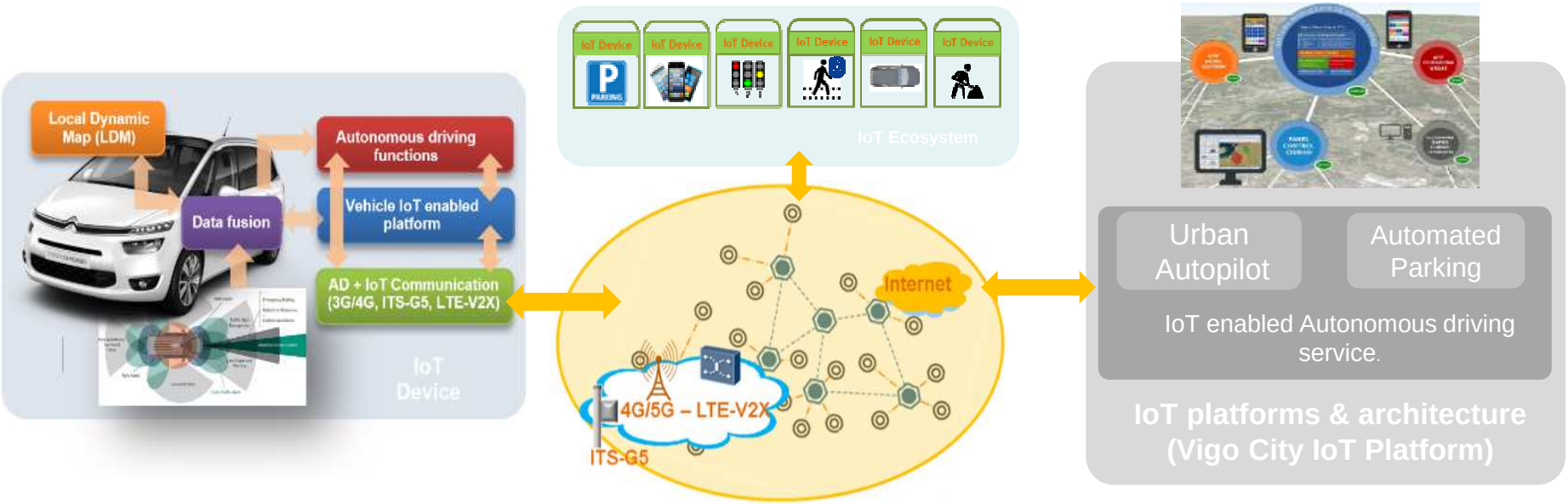
City IoT Platform

- TCP/IP network
- ITS G5
- Cellular 3G/4G
- Bluetooth sensors
- Cameras

On Board IoT Platform

- CAN BUS Connection
- ITS G5
- Cellular 3G/4G LTE-V2X

Plataforma IoT local

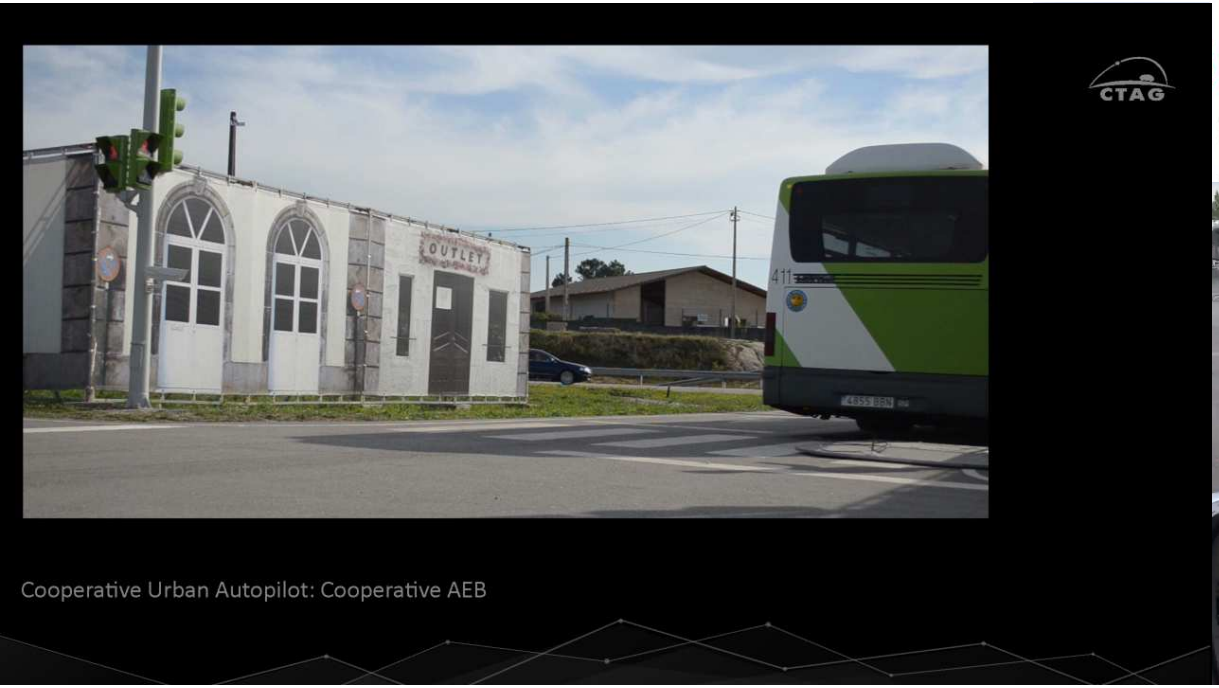


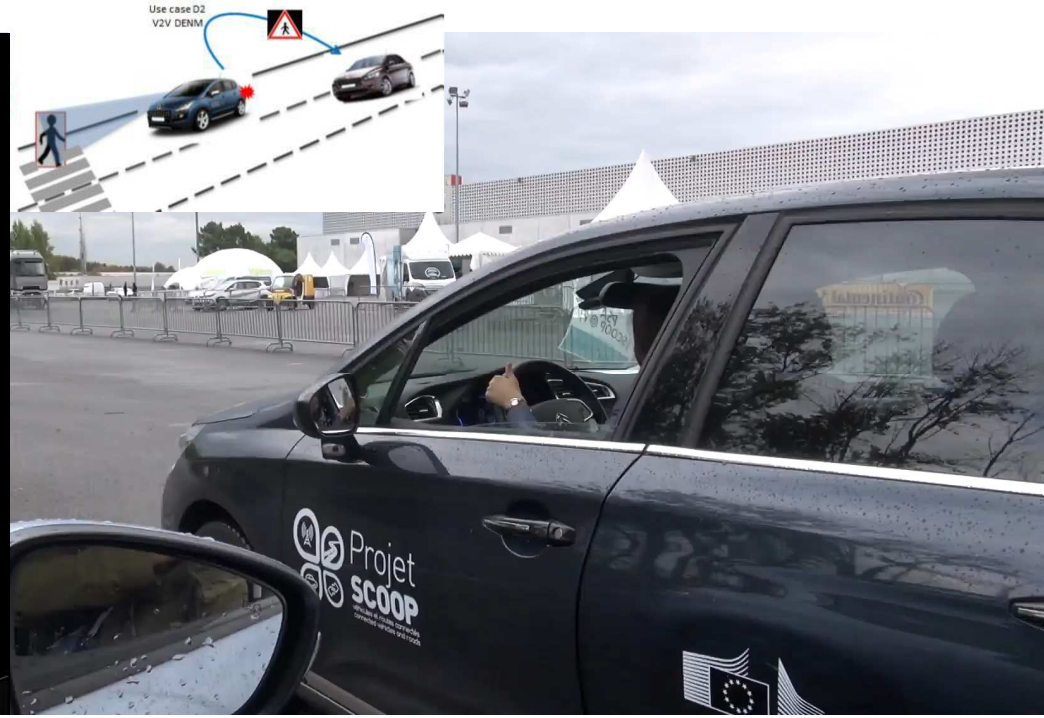
Funciones CAD

- Urban Autopilot with Cooperative Sensing
  - ✓ vehicles circulate in urban roads in autonomous mode **adapting speed to the remaining time of traffic lights** and reacting to potential **warnings provided by TMC**
  - ✓ **IoT aspect:** the vehicle has access to Traffic light status/timing and hazard warnings through real time connection **to infrastructure.**

Funciones CAD

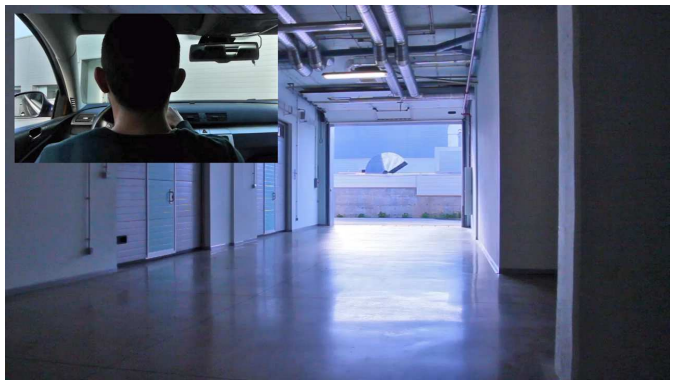
- Urban Autopilot with Cooperative Sensing
  - ✓ Information about hazards as a pedestrian on the road will be sent/received and processed to support AD task.
  - ✓ **IoT aspect:** each vehicle acts as mobile sensor and interchange information with infrastructure and other vehicles. Infrastructure sensors an cameras are integrated in such data interchange

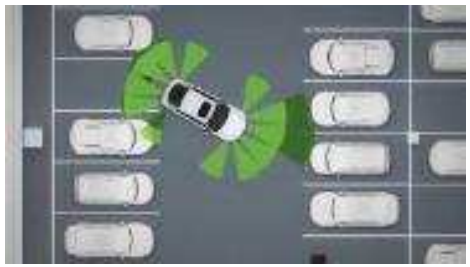




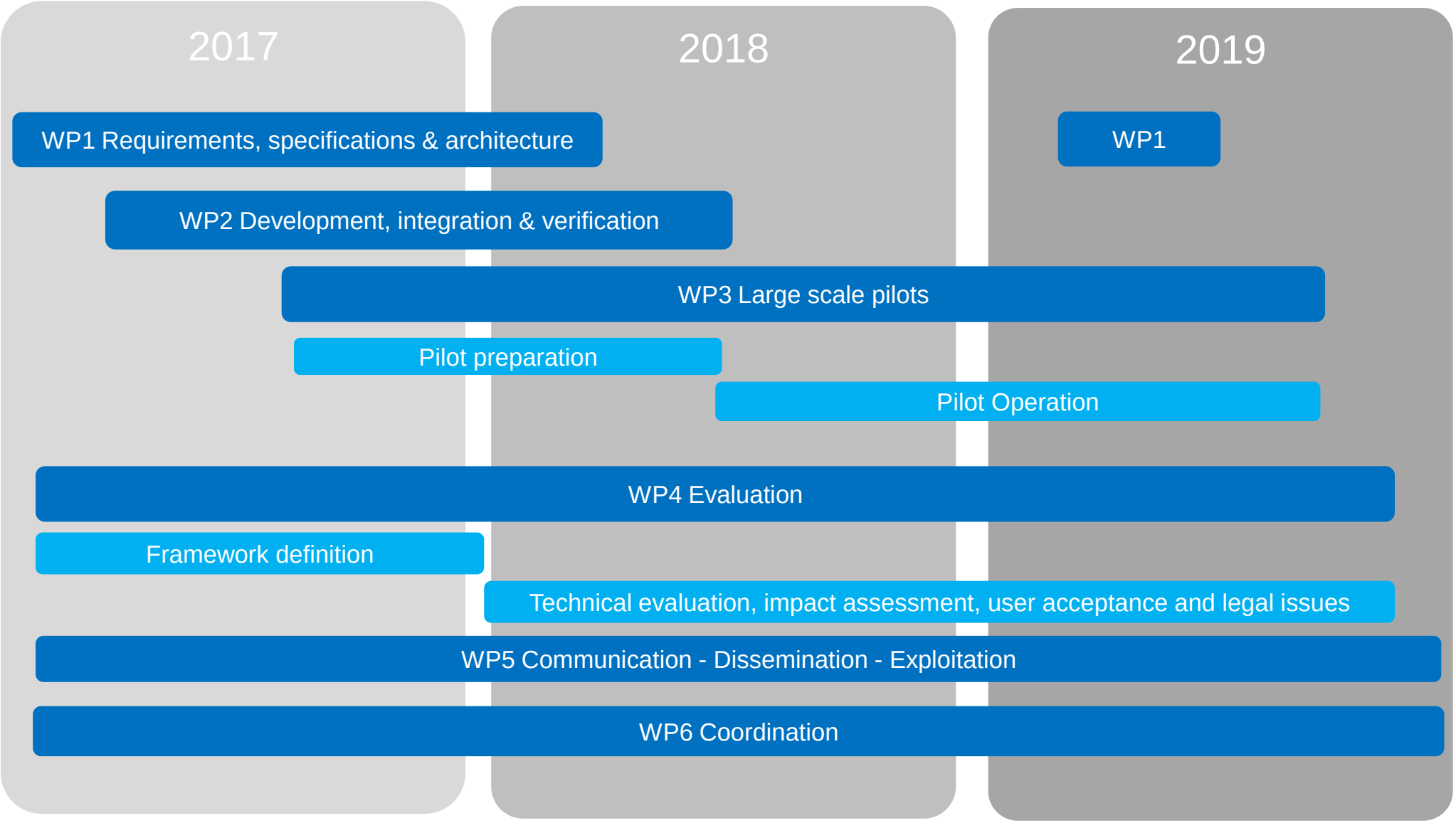
Funciones CAD

- Automated VALET Parking
  - ✓ Autonomous guidance and parking of vehicle inside underground parking lot.
  - ✓ **IoT aspect:** the vehicle stablish connection with parking infrastructure and manoeuvers are supported by information from parking cameras and sensors together with parking mapping and instructions according internal traffic.





Plan de trabajo

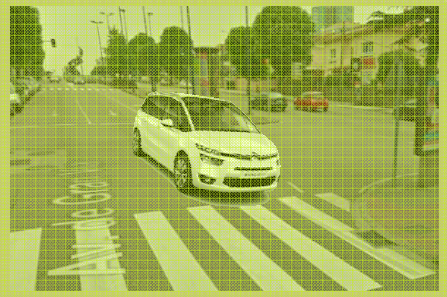


Enfoque metodológico

Expected Achievements

Use case Complexity

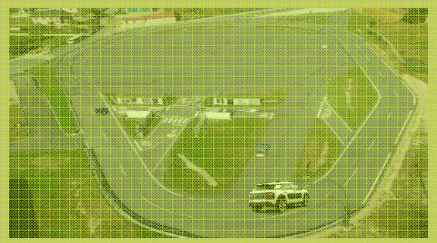
From one single vehicle



To multiple actors

Environmental Control

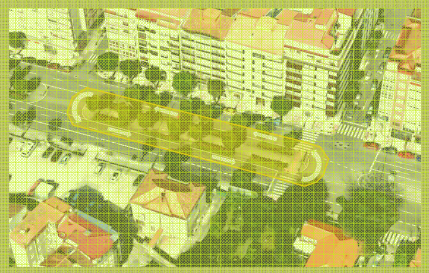
From controlled environment

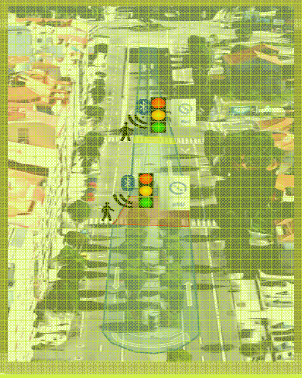


Towards real Traffic

Site Area Extension

From reduced areas





To wider extension

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Muchas Gracias

Conducción Cooperativa (COMPASS4D)

Prioridad vehículos de emergencia

Escenarios y casos de uso de CAD

Automated driving Scenarios

- Urban Driving – Highway pilot – Platooning - Automated Valet Parking

Services for Automated driving

- City chauffeur services for tourists
- Automated driving route optimisation
- Real time car sharing
- Driverless car rebalancing
- HD maps for automated driving vehicles
- Electronic Driving License