Workshop on Automation Pilots on Public Roads.
16 Dic 2016. Brussels.

SPANISH APPROACH ON AUTONOMOUS DRIVING

MINISTERIO DEL INTERIOR

DGT Dirección General de Tráfico

DGT

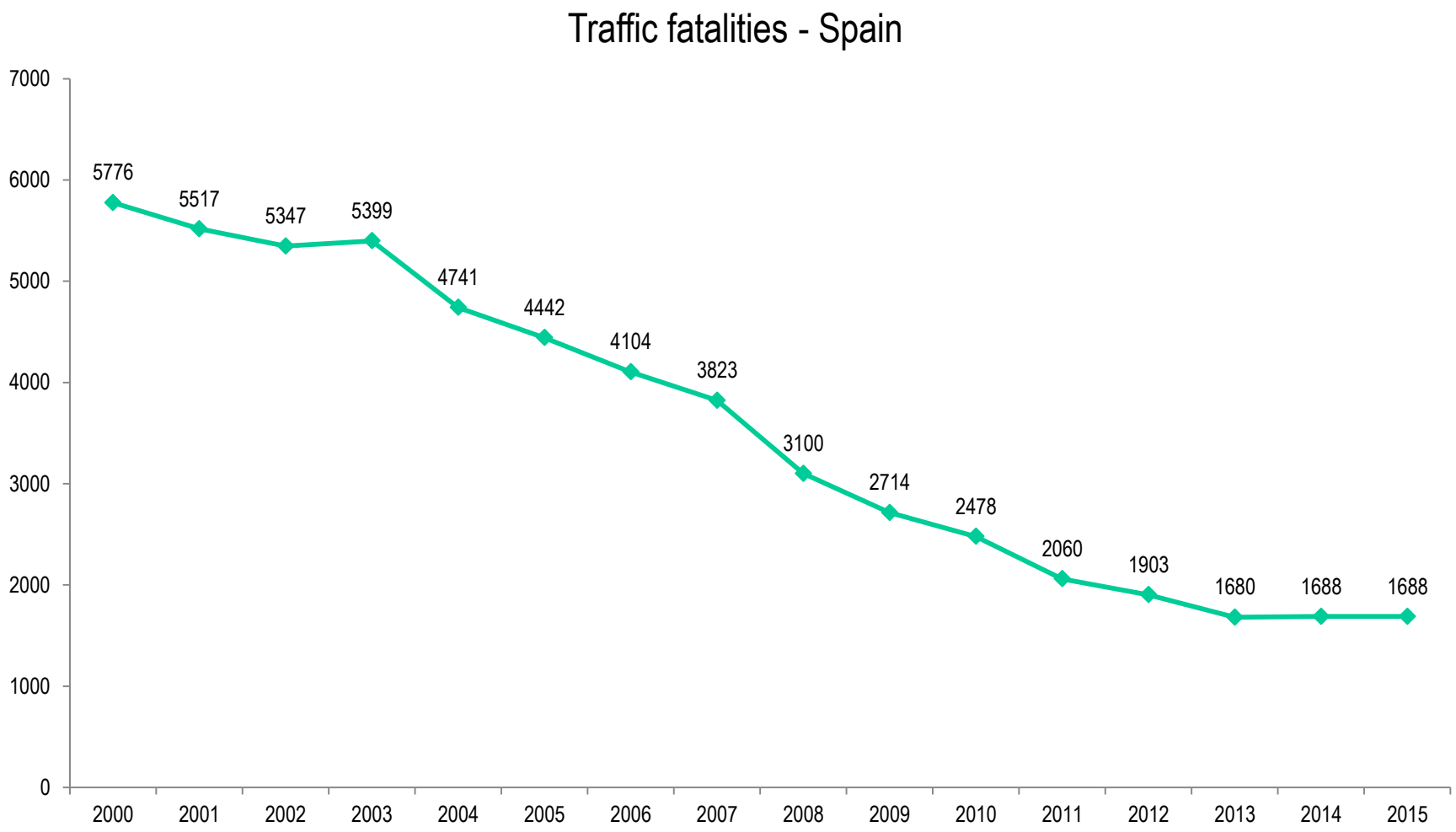
- Directorate General for Traffic (DGT)
- Direct responsibility for:
  - **Promote legislation** in Spain in terms of traffic, vehicles, drivers and mobility.
  - **Traffic management** and **enforcement** (non urban roads).
  - **National access point** for traffic and road safety information.
  - Driving licensing.
  - Coordination of **research** on road safety.
  - **National registers** of drivers, vehicles, and accidents.

Content

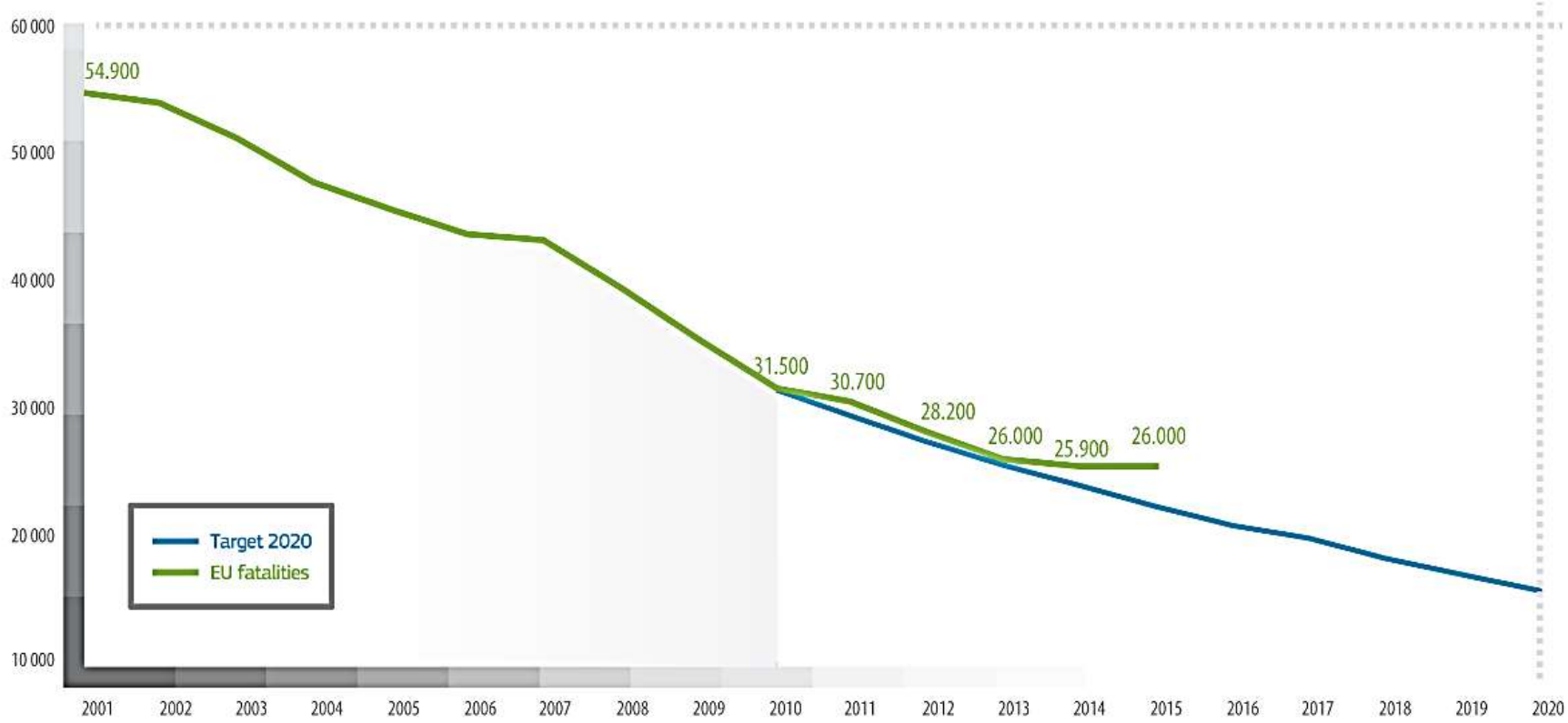
- National & regional strategic plans on Automated Driving (AD).
- Overview of current national large-scale AD activities, test , evironments, funded pilots etc
- Challeges and leassons learned.
- Areas of cooperation.

1.- National & regional strategic plans on Automated Driving (AD).

SPANISH CONTEXT



EUROPEAN CONTEXT



Source: - CARE (EU road accidents database)

OUR VISION

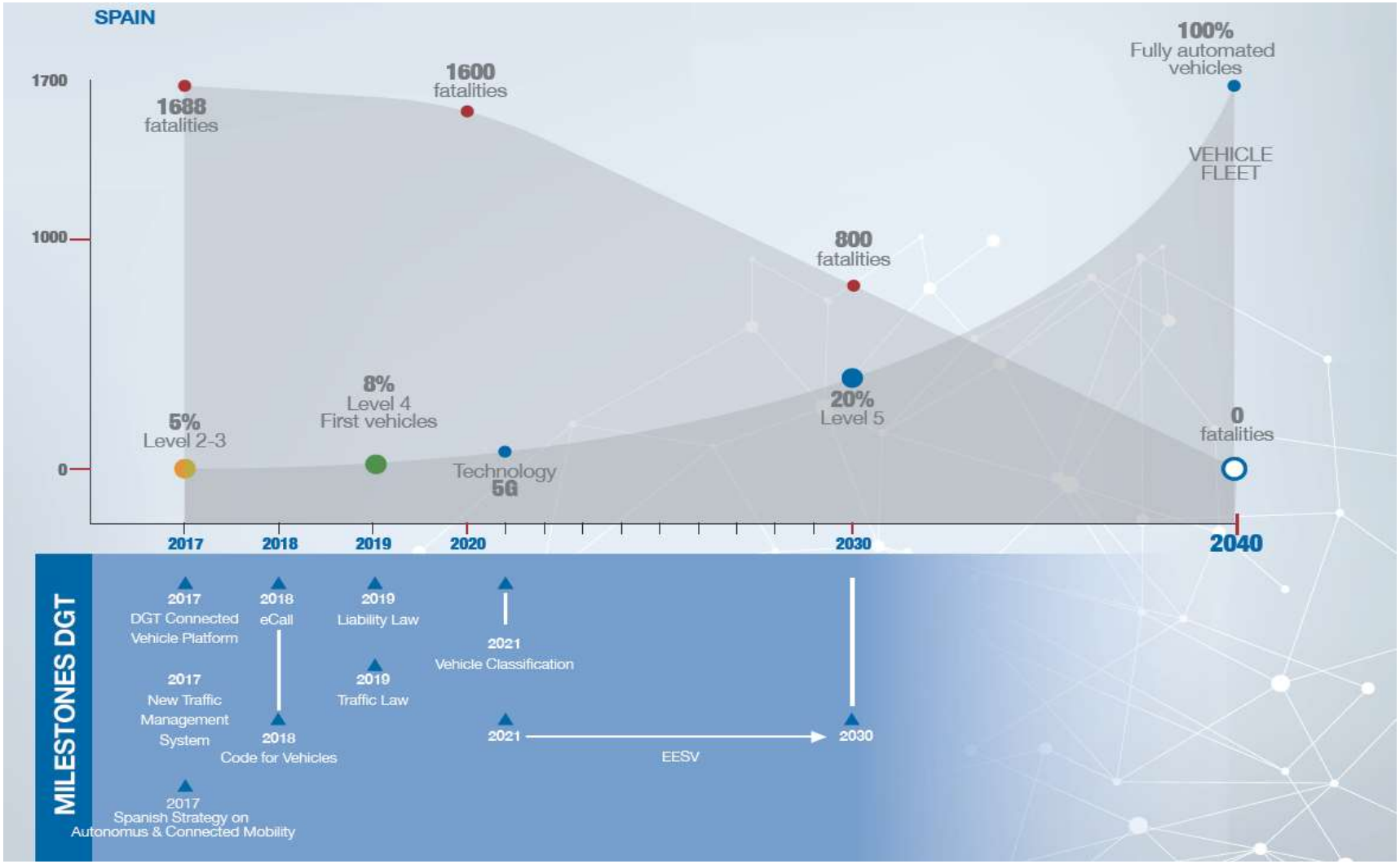
- Ambitious targets
  - 50% reduction in road deaths 2020
    - EU and WHO
  - **Vision zero - SPAIN**
    - Fatalities
    - Injuries
    - Congestion
    - Emissions

AUTONOMOUS DRIVING

The main benefits are:

- Safety
- Efficiency and environmental objectives
- Comfort
- Social inclusion
- Accessibility

Vision on Autonomous & Connected Mobility



STATE OF ART

- The **Spanish automotive industry** is a world reference.
- The companies automakers and components form a tandem recognized prestige in terms of competitiveness and performance
- **Important innovation and research centers**.
- Spain has **signed but not ratified** Vienna Convention.
- Regulatory framework available for the testing and operation of vehicles on public roads (specific for autonomous driving). Autonomous vehicles are **already** being tested in Spain.
- Testing requirements & conditions: flexible, **system certification** or other MS authorisation or certificate.

STRATEGY

- Working groups – legal framework
  - Future of **driving licenses → Less Formation**
  - Insurance and **responsibility**
  - **New Vehicle code** including fully autonomous driving.
- Promoting **real tests** of AD vehicles in Spain/Europe
- **Its <u>not about doing the same things</u>**
  - Connected **traffic cloud services**
  - Active **cooperation** with OEMs.
  - Support UNECE technical regulations → WP29 → **Software certification better than type approval.**
  - Digital and software solutions need a **quicker and smarter legal framework.**
- Current road safety system 1,2 M killed in road accidents.

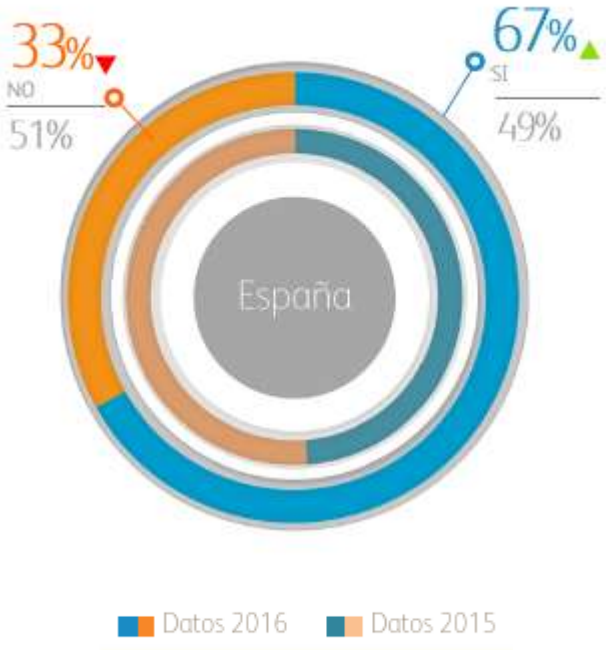
VISION

- **Regulation:**
  - **Neutral:** avoid to block development
  - **Flexible:** adapted to the future
  - **Ambitious:** Societal needs and industrial advancements
  - **Long-term vision:** analyze present and future needs
  - **Open:**
    - Easy to include any need without amendments
    - Participation of R&D centers, industry and stakeholders

2.- Overview of current national large-scale AD activities, test , evironments, funded pilots etc

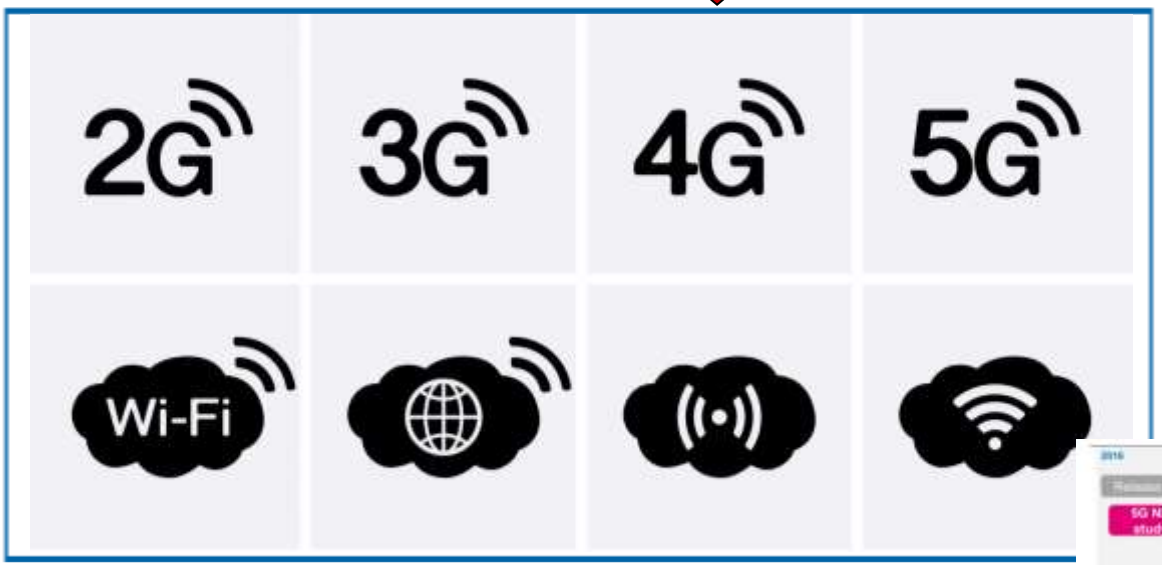
- 67%* of the drivers use Mobility APPs while they are driving

* Foro de Movilidad.2016. Alphabet



V2X COMMUNICATION

- 3G/4G/5G.
- Growing potential of info exchanging.
- Data cost decreasing.



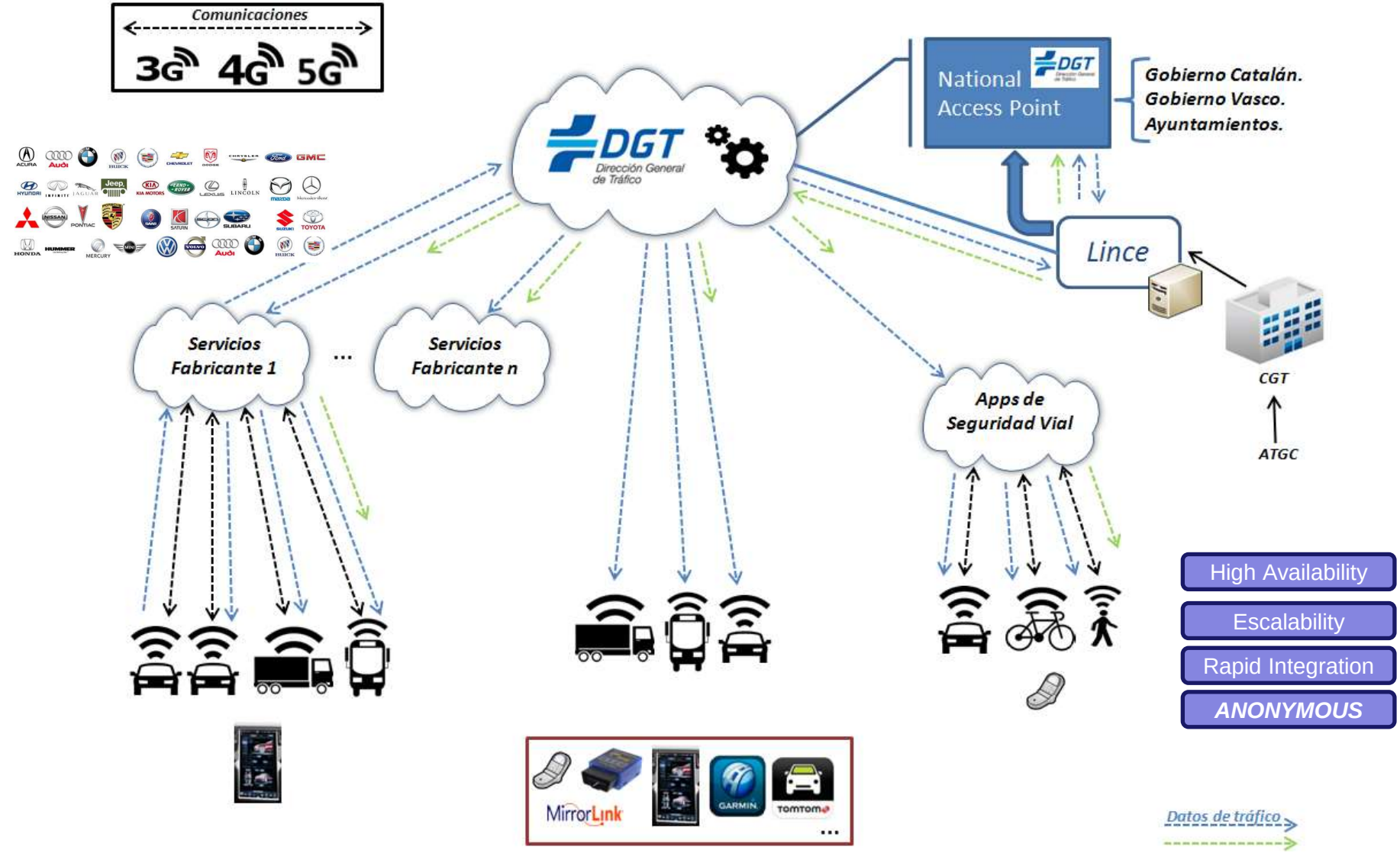
5G for Europe:
An action plan.

Source. Deutsche Telekom. EUCNC 2016 conference

- Mobile network Vs Road Side Units (potential locations)

Source: Opensignal.com

CONNECTIVITY FOR TRAFFIC MANAGEMENT: NEW MODEL



- High Availability
- Escalability
- Rapid Integration
- ***ANONYMOUS***

USE CASES

- UC1: Information by any road users: breakdown, accident, road work, etc…
- UC2: Planned roadworks
- UC3: Info provided by vehicles (lights, wipers, warnings, ESP..). - CAN BUS -
- UC4: Virtual VMS
- UC5: X,Y dynamic event (Abnormal sized vehicles, ambulance, fog etc)
- UC6: X,Y static event (points of interest).
- UC7: Recommended speed. Congestion

Provide services aligned with C-ITS

Day 1 C-ITS services list

Hazardous location notifications:

- Slow or stationary vehicle(s) & traffic ahead warning;
- Road works warning;
- Weather conditions;
- Emergency brake light;
- Emergency vehicle approaching;
- Other hazards.

Signage applications:

- In-vehicle signage;
- In-vehicle speed limits;
- Signal violation / intersection safety;
- Traffic signal priority request by designated vehicles;
- Green light optimal speed advisory;
- Probe vehicle data;
- Shockwave damping (falls under European Telecommunication Standards Institute (ETSI) category 'local hazard warning').

Day 1.5 C-ITS services list

- Information on fuelling & charging stations for alternative fuel vehicles;
- Vulnerable road user protection;
- On street parking management & information;
- Off street parking information;
- Park & ride information;
- Connected & cooperative navigation into and out of the city (first and last mile, parking, route advice, coordinated traffic lights);
- Traffic information & smart routing.

CONNECTIVITY & TRAFFIC MANAGEMENT

DGT & connected vehicle

- Improving opportunity.
- **Win-win models**
- Promote connectivity services to enhance mobility and improve road safety
- Provide/share value info
- No competition
- Hub/Service Platform

Anuncio previo

Número de Expediente 0100DGT29029
Publicado en la Plataforma de Contratación del Estado el 10-10-2016 a las 18:20 horas.

Plataforma de Contratación del Sector Público

Servicio para la creación de la plataforma de vehículo conectado DGT 3.0

- Valor estimado del contrato 4.499.400 EUR.
- Importe 5.444.274 EUR.
- Importe (sin impuestos) 4.499.400 EUR.
- Plazo de Ejecución
  - 48 Mes(es)
- Clasificación CPV
  - 72000000 - Servicios TI: consultoría, desarrollo de software, Internet y apoyo.
- Tipo de Contrato Servicios
- Subtipo Otros servicios

USECASE: COMOBITY – USER PROTECTION

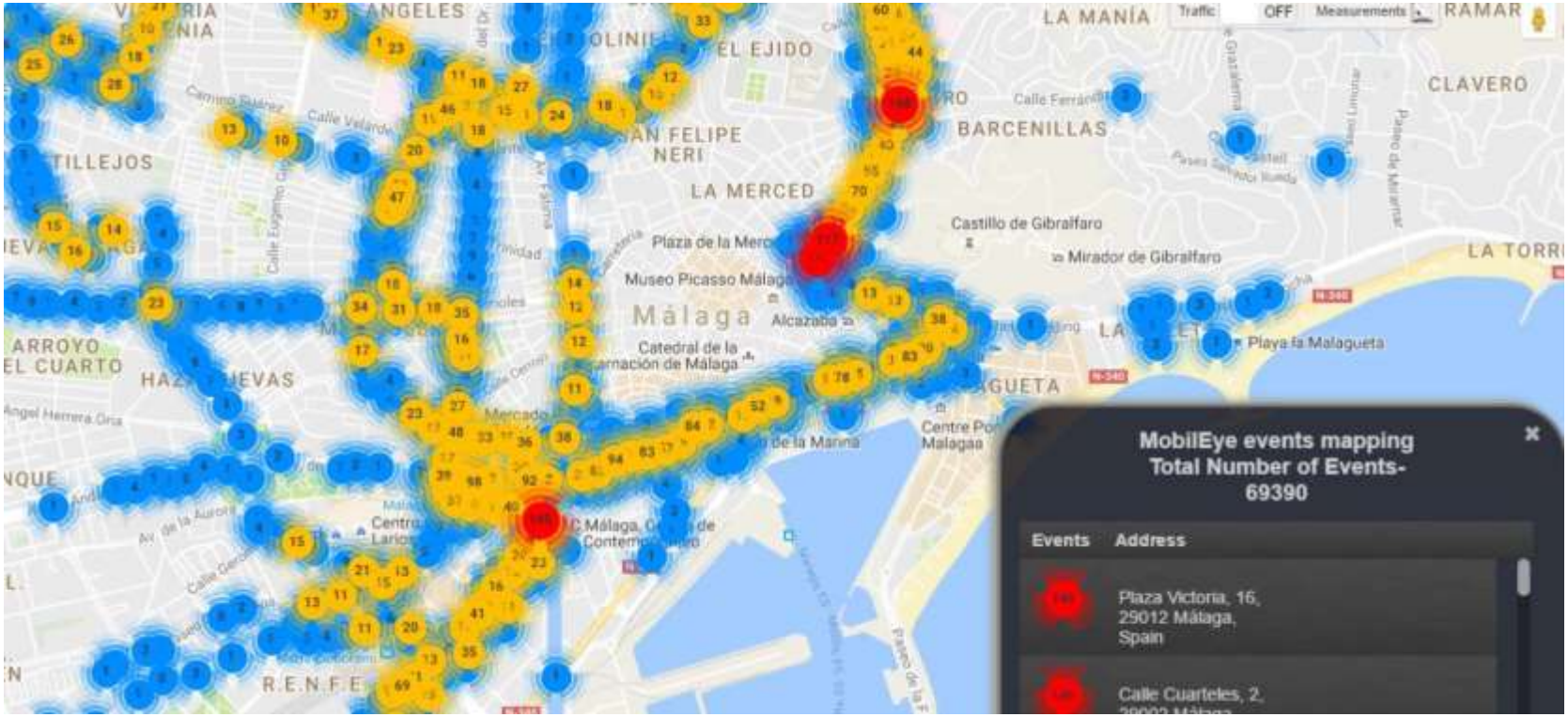
- Comobity (App) that allows:
  - Drivers:
    - To previously know the presence on roads
      - **Cyclist and pedestrians.**
      - **Stopped vehicles**
    - To adapt driving to that presence.
  - Pedestrians, cyclists and others:
    - More protection.

AGREEMENT WITH WAZE

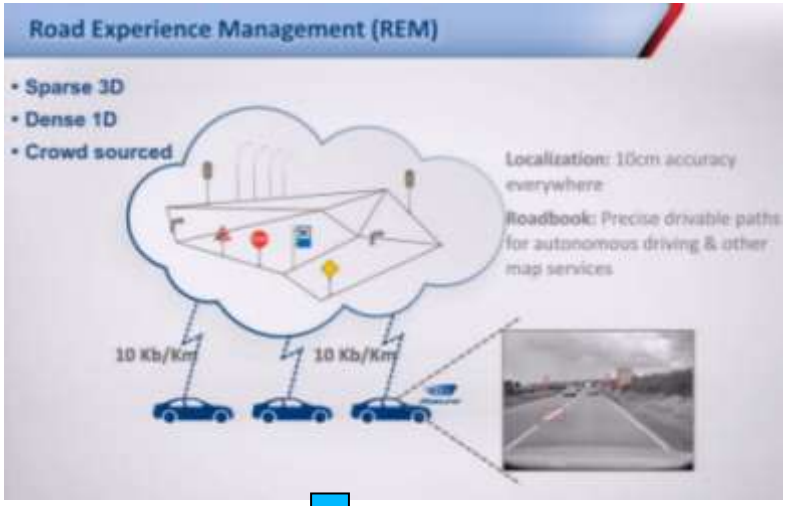
- APP very extended and accepted
- Strategic partner
- Qualified information

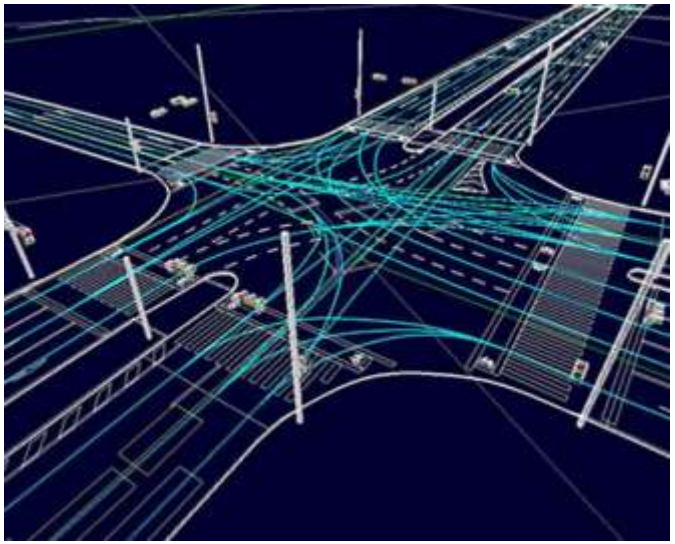
(In integration process)

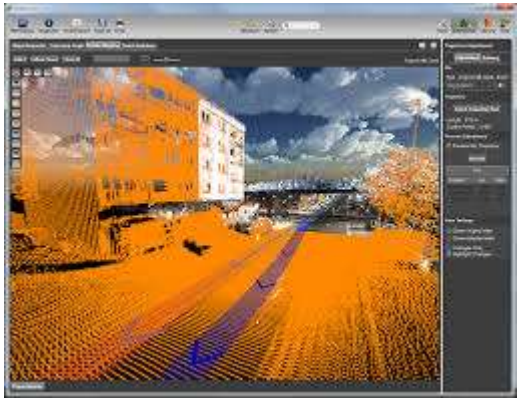
DGT Project in collaboration with **Mobileye** in order to improve the road safety in urban



Mobility Map allocated in the Spanish **Single Access Point** accesible through the http://nap.dgt.es







- ✓ Signals
- ✓ Landmarks
- ✓ Optimal trayectories

Vigo-Madrid (PSA-CITROEN)

COUNTRIES VISITED BY VALEO CRUISE4U

United Kingdom

Germany

Netherlands

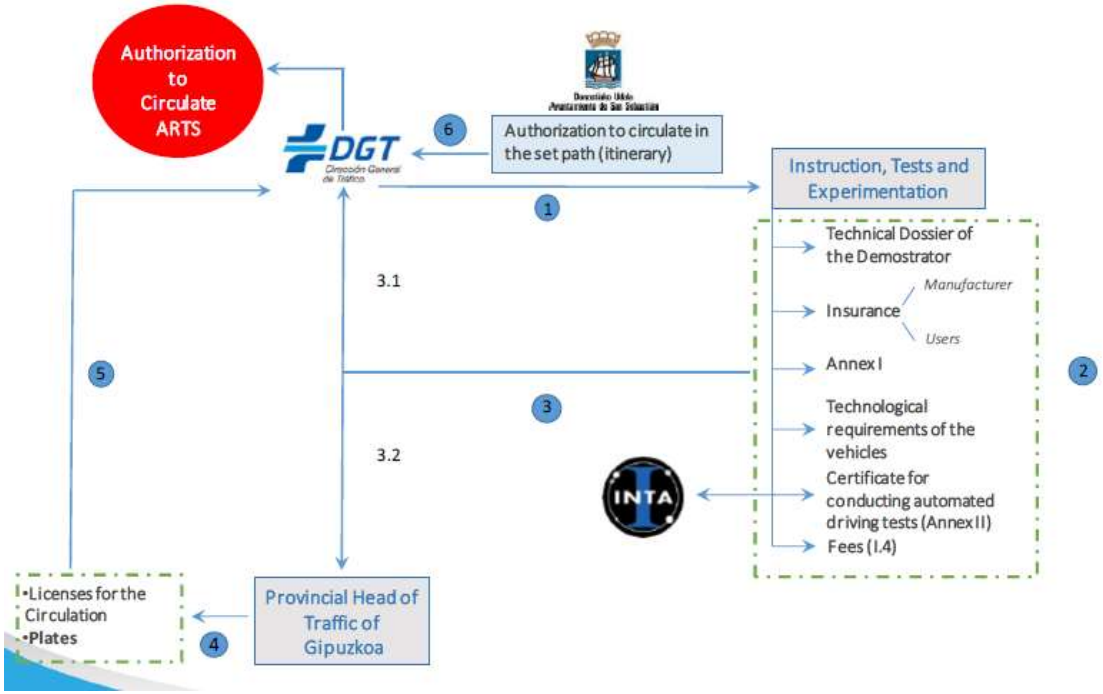
Czech Republic

Spain

France

WP231 - *"San Sebastian" ARTS demonstration*
Location: San Sebastian (Spain)
1/Jun/2016

✓ Process for the authorization



✓ **Expectations:**

- ✓ **No accidents.**
- ✓ **Minimum disturbing.**
- ✓ **No important changes in the infrastructure**
- ✓ **Reduce the use of private cars.**

Barcelona Board Cooperative and Automated Driving is a Public Private Partnership (PPP) led by

- To **create** a **ecosystem** to develop **urban self driving** initiatives taking in account all the involved agents.
- To be one of **top European cities in** urban **self driving**
- To create the infrastructure to **develop**, to **validate** and **test self driving experiences**
- To support world wide companies by using **Barcelona as an Urban Lab**
- To **attract investments** and create new business opportunities

Forum LAB

CATALONIA LIVING LAB

Applus IDIADA

Create a **platform for the development, testing and validation** of vehicle connectivity solutions and automated driving.

Catalogue of **7 test routes** deeply analized:

SARTRE

Safe Road Trains for the Environment

SAfe Road TRains for the Environment

COMPANION

COoperative dynamic forMation of Platoons for sAfe and eNergy-optImized gOods transportatioN

How **platoons** can lead to environmental (**reduced fuel** consumption), **safety** (automated control) and **congestion** improvements (better traffic flow)

AUTOPILOT

AUTOmated driving Progressed by Internet Of Things

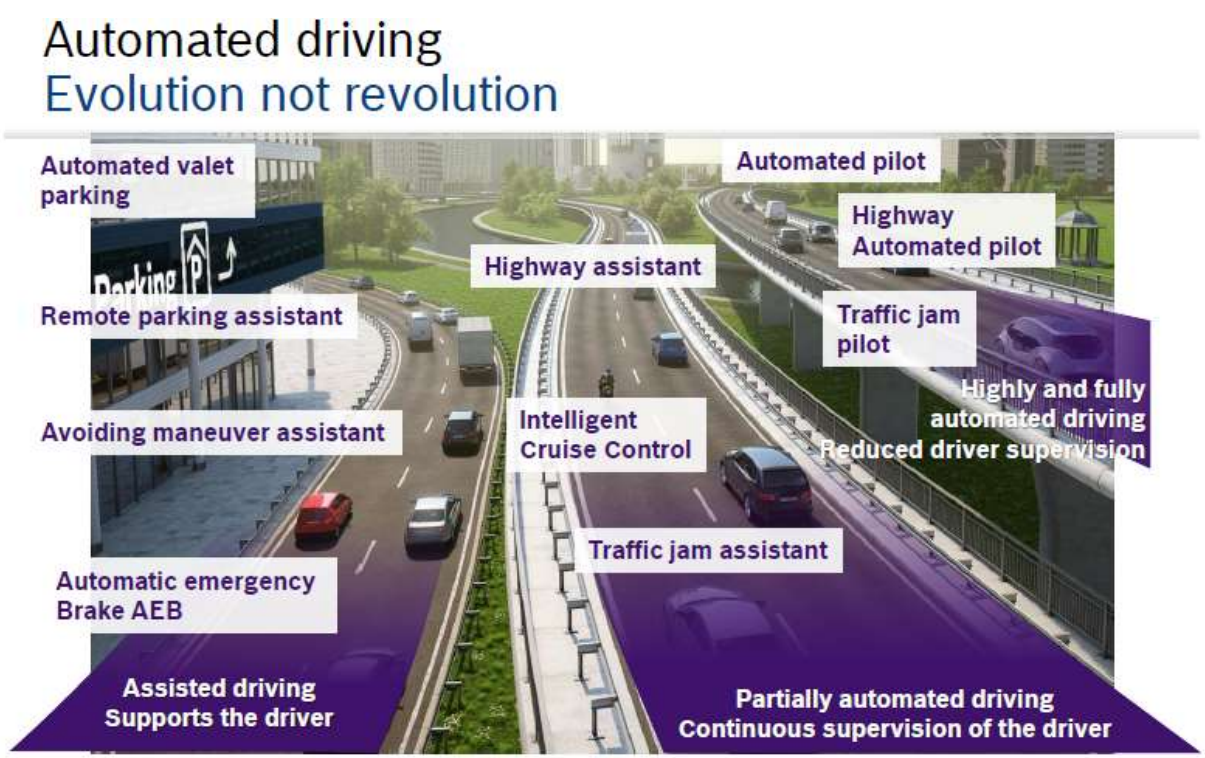
AUTOPILOT brings **IoT into the automotive world to transform connected vehicles into highly and fully automated vehicle**. IoT open vehicle platform and an IoT architecture will be developed based on the existing and forthcoming standards as well as open source and vendor solutions.

3.- Challenges and lessons learned

AUTONOMOUS DRIVING

The **automated driving features are a reality** in nowadays cars:

- Advanced Driver Assistant Systems (ADAS)
- Automated Driving Functions/System (ADF/S)



PRESENT AND FUTURE MOBILITY

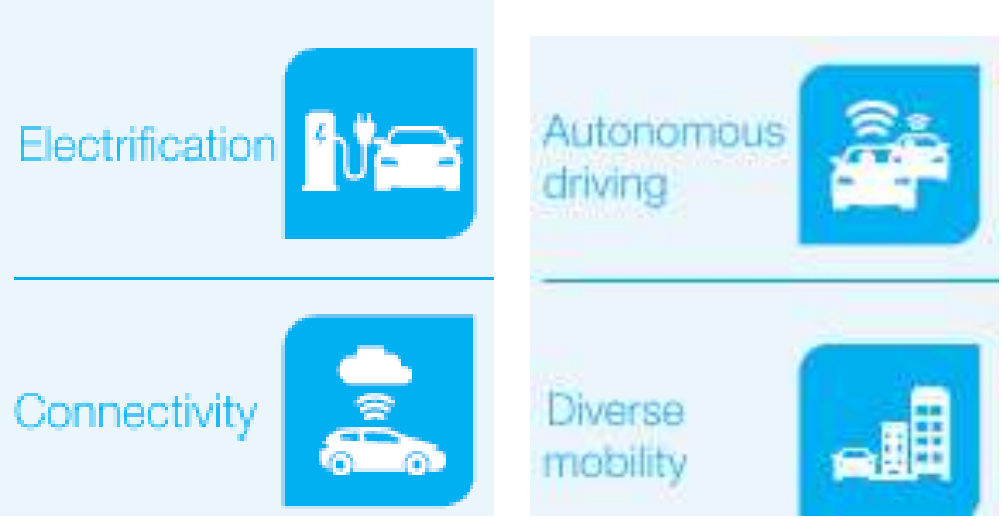
Disruptive change New technologies

Hiper-connected society

New business models & services

Huge benefits:

- Safety
- Comfort
- Efficiency



AUTONOMOUS DRIVING

The economic impact projected for autonomous driving for the years to come ranging up to **€71bn in 2030**.

The estimated global market for automated vehicles is **44 million vehicles by 2030**.

The industrial sector and the legal framework needs to evolve and adapt in a fast pace to stay ahead in global competitiveness.

VEHÍCLE AS DATA SOURCE

- Vehicle as main actor in mobility.
- Data
  - Privacy
  - Big

NEW MODEL FOR TRAFFIC MANAGEMENT

- Floating car data
- New services
- New players/stakeholders
- 5G
- Different sources integration- PLATAFORM

AUTONOMOUS DRIVING

What role has to play a national traffic administration?

- **Neutral.**
- Promote a **stable, open and flexible** regulatory framework.
- **Promote testing** and operations of autonomous cars in real traffic.
- **Attract investments** for national Research institutes and industries.
- Inform of the benefits of Autonomous driving to rise the public acceptance. Demonstrate Reliability, Safety and Robustness of Technology.
- **Principle:** ***Too Much Regulation Could Hurt Innovation***

4.- Areas of cooperation.

AUTONOMOUS DRIVING

Regulation

Legal framework

- UNECE Conv.
- National Traffic Law
- Code for Vehicles
- Insurance and responsibility

Testing

AUTONOMOUS DRIVING

Legal framework

ALWAYS
Taking into account the car industry

UNECE Conventions

- Geneva/Vienna
- Amendments (long term).
- **Interpretation** (short term).

(Spain has not ratified)

National Traffic Law

- No prohibition → Allow
- Interpretation
- Driver & control

Code for Vehicles

- Classification: levels
- Certification
- ODD/OEDR
- Fallback (override)
- Software Assessment: virtual testing

Liability

- Event Data Recorder
- Driver/System

LEGAL ISSUES

IDIADA

INSTRUCTION 15/V-113: ***Authorization to conduct tests or research trials of automated vehicles on roads open to general Traffic.***

- Applicant must provide a **system certification**, complying with the Annex I requirements.
- The autorization procedure is really **swift and flexible**.
- **Mutual recognition** with other Member States

Autonomous vehicles **are being** tested

Future: Type approval → Software certification

LEGAL ISSUES

- **Some concerns** about what drivers will do while vehicle drives in automated mode, especially with respect to level 3 SAE.
  - Driver get progressively confident
  - Finally, the driver get focused on other tasks and the possibility of overriden might not be satisfactory enough.
    - ➢ Approach 1: Law include expreesly what the driver can or can´t do → Enforcement.
    - ➢ <u>Approach 2</u>: With the participation of manufacturers who may require drivers to acknowledge that they understand the limitations.

- We consider that **liability on levels 4 and 5 should be assumed by the manufacturer**.

- Need adapt regulatory framework to include **rules of conduct** (use of mobile phone, drink-driving …)

RELATION WITH INDUSTRY

Listen the stakeholders.

INRIX

here

waze

Social DRIVE

COYOTE

TOMTOM

Thanks for your attention

jordas@dgt.es

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