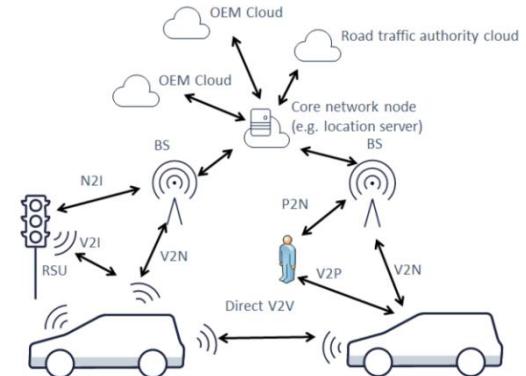




YOUR DEVELOPMENT PARTNER



La connectivitat com habilitador de la mobilitat autònoma

Álvaro Arrúe Lobera

Applus IDIADA

Connected and cooperative vehicle landscape

TODAY

FUTURE

Infotainment

Video

Music

Mobile office

News

Telematics

Parking

Remote vehicle health monitoring

Software updates

eCall

Navigation

Remote driving

Road safety and Efficiency

Basic safety services

Collision avoidance

Traffic lights to vehicles, speed guidance

Road condition to vehicles

Autonomous driving services

Platooning

Cooperative driving, sensor sharing

High-definition map

Technology convergence

Autonomous Vehicle

Operates in isolation from other vehicles by using internal sensors



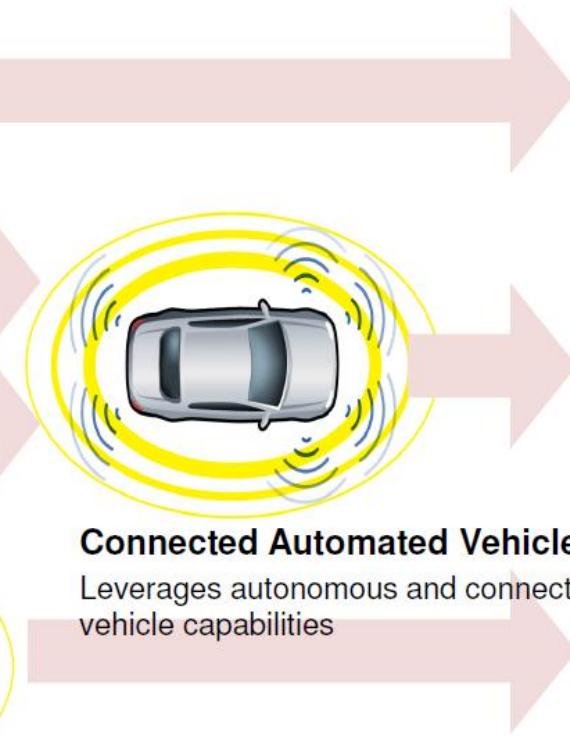
Connected Vehicle

Communicates with nearby vehicles and infrastructure



Connected Automated Vehicle

Leverages autonomous and connected vehicle capabilities



the source : US DOT ITS-JPO

Technology convergence: Cooperative systems

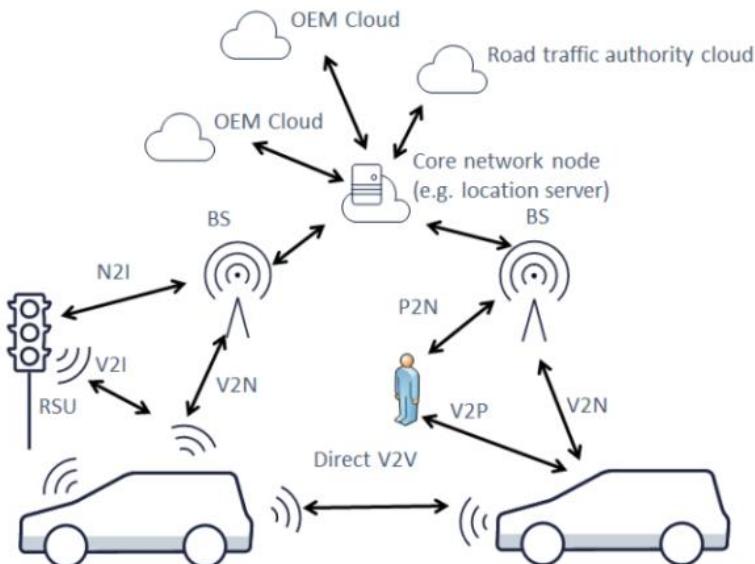
Intelligent Transportation
Systems (ITS)

Connected Car

Cooperative Systems (C-ITS)

Vehicle Control Systems &
Driver Assistance

Automated Car



Cooperative Systems

Enable Vehicle to Vehicle and Vehicle to Infrastructure communications (V2X)

Creates a network of interacting devices (vehicles, pedestrians, infrastructure, cloud)

Enables safety and comfort functions through data exchange

Why connectivity for automation?

Unique capabilities in respect to sensors:

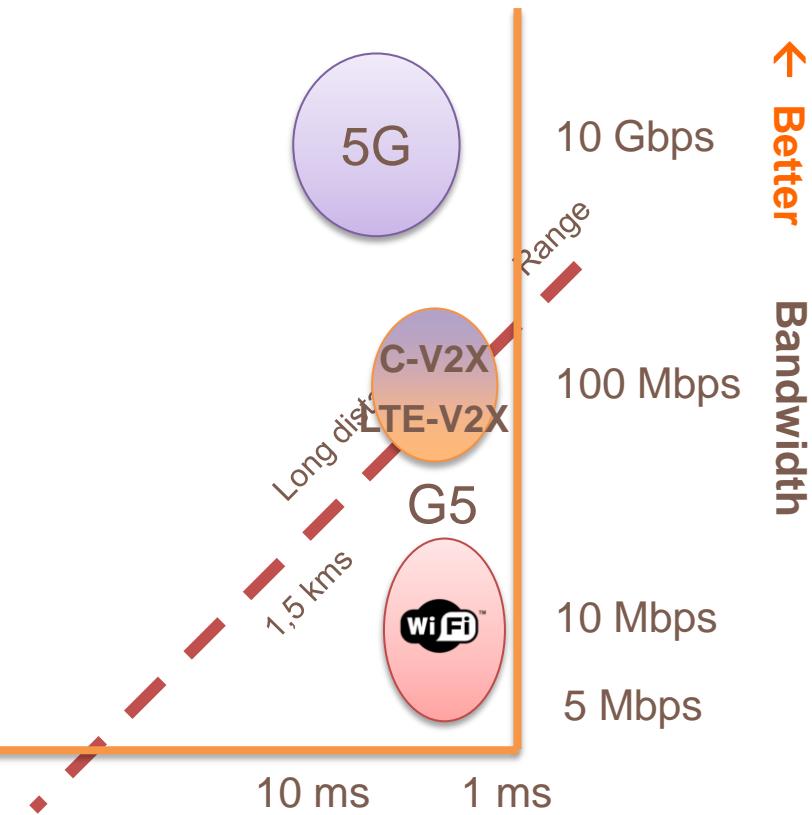
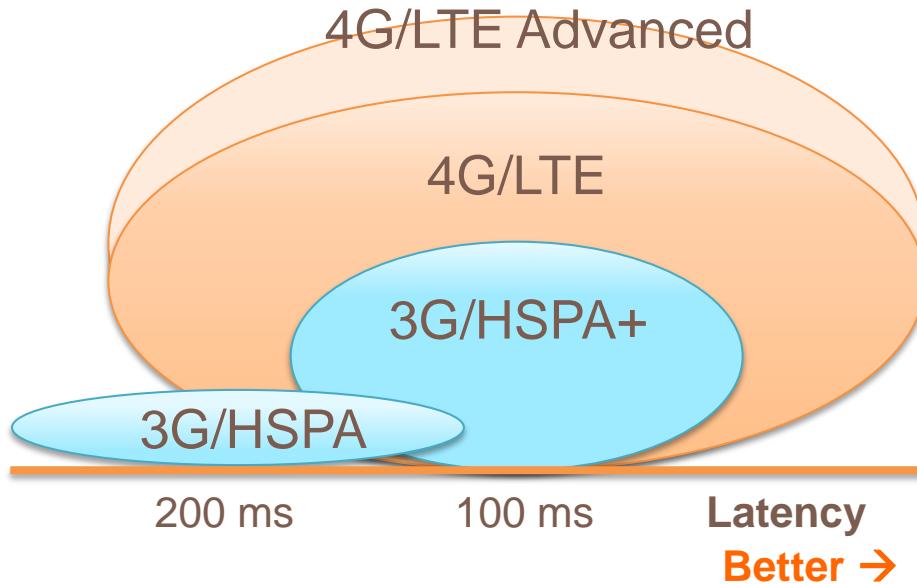
- Identification of objects not directly in the line-of-sight of the vehicle
 - Requires both objects connected
- Insufficient accuracy of sensor data in the long range
 - Limited planning ability
- Enables (complex) ecosystem ← Interaction with external agents:
 - OEM based services
 - 3rd party services
 - Interaction with control centres
- Allows (complex) interactions of AD vehicles
 - Platooning
 - Smart intersections
 - Traffic flow centralised control



Current/future landscape of connectivity

Bandwidth – Latency – Range
of access technologies

2 competing technologies!!!



Connectivity challenges as an enabler of automation

- 1. Develop, test and demonstrate in real-life conditions different applications and functions that assess the feasibility and the readiness level of connectivity including data-sharing**

VRAIN

Vehicular Risk Awareness Intelligent Network

Applus⁺
IDIADA

Connectivity **challenges** as an enabler of automation

1. **Develop, test and demonstrate in real-life** conditions different applications and functions that assess the feasibility and the **readiness level** of connectivity including data-sharing

2. **Standardization** and **interoperability** of connected devices and agreement on the message set needed for automated driving applications: e.g. platooning



Platooning manœuvres in Applus IDIADA Proving Ground



Applus IDIADA's contribution to the COMPANION project



ENSEMBLE

- ⊕ Multi-brand platooning
 - ⊕ 7 EU OEMs
- ⊕ Demonstrate safety
- ⊕ Standardization and interoperability
- ⊕ Open road tests in Catalonia



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824309.

Connectivity **challenges** as an enabler of automation

- 1. Develop, test and demonstrate in real-life** conditions different applications and functions that assess the feasibility and the **readiness level** of connectivity including data-sharing

- 2. Standardization and interoperability** of connected devices and agreement on the message set needed for automated driving applications

- 3. Common framework for testing and validation** of Connected and Automated Vehicles

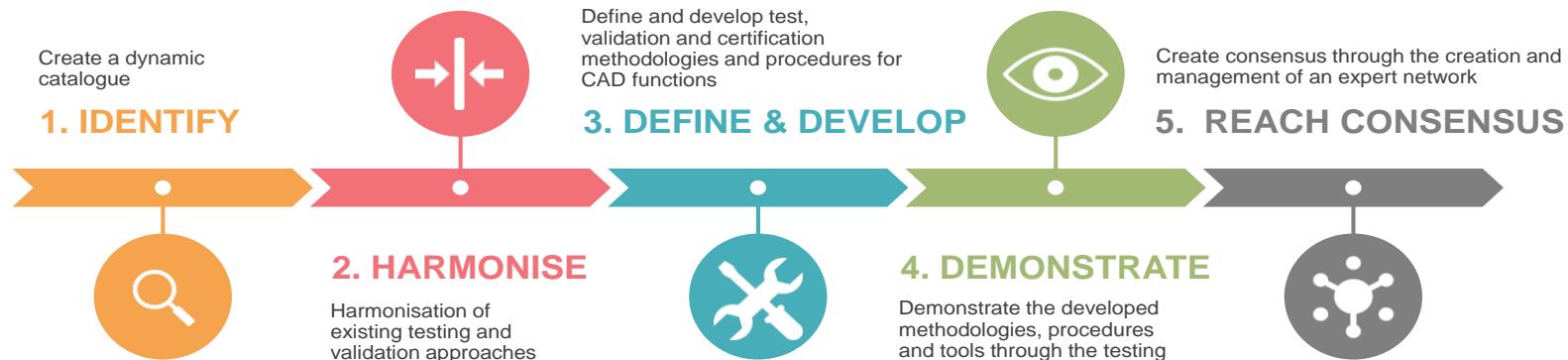
VRAIN V2V (Virtual Development)





HEADSTART will define testing and validation procedures of CAD functions including:

- its key enabling technologies (i.e. **communication, cyber-security, positioning**)
- by cross-linking of all test instances such as simulation, proving ground and real world field tests
- to validate safety and security performance according to the needs of key user groups (technology developers, consumer testing and type approval)



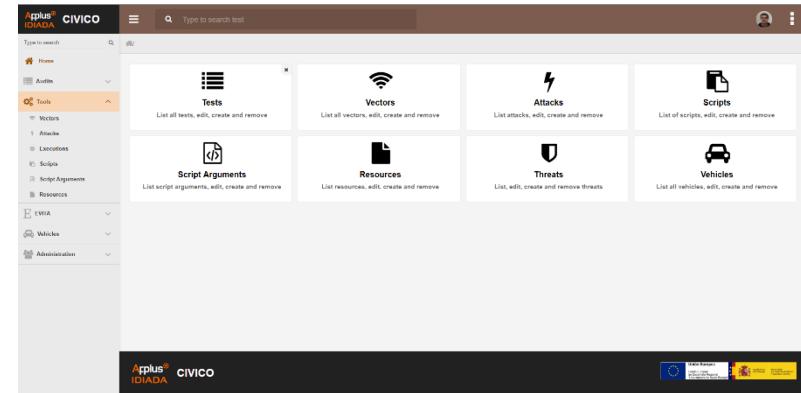
Connectivity **challenges** as an enabler of automation

- 1. Develop, test and demonstrate in real-life** conditions different applications and functions that assess the feasibility and the **readiness level** of connectivity including data-sharing
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- 4. Cyber-security** to make automobiles tamper-proof

CIVICO

Ciberseguridad en los Vehículos COnectados

- ⊕ IDIADA tool to perform cybersec tests and store and analyse all the results in a database
- ⊕ The software developed permits our tool to **automatize the penetration test** performed, optimizing the time required to evaluate vehicles
- ⊕ The tool includes a **Threat Analysis Risk Assessment** to determine the highest risks



Connectivity **challenges** as an enabler of automation

- 1. Develop, test and demonstrate in real-life** conditions different applications and functions that assess the feasibility and the **readiness level** of connectivity including data-sharing
- 2. Standardization and interoperability** of connected devices and agreement on the message set needed for automated driving applications
- 3. Common framework for testing and validation** of Connected and Automated Vehicles
- 4. Cyber-security** to make automobiles tamper-proof
- 5. Support from public authorities and policy makers**

Thank you for your kind attention



Adaptive ADAS to support incapacitated drivers Mitigate Effectively risks through tailor made HMI under automation

Final event: 03/12/2019

Venue: IDIADA test tracks (Santa Oliva)

Results, highlights and demonstrations!

If you are interested please visit www.adasandme.com

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Current/future landscape - IoT

