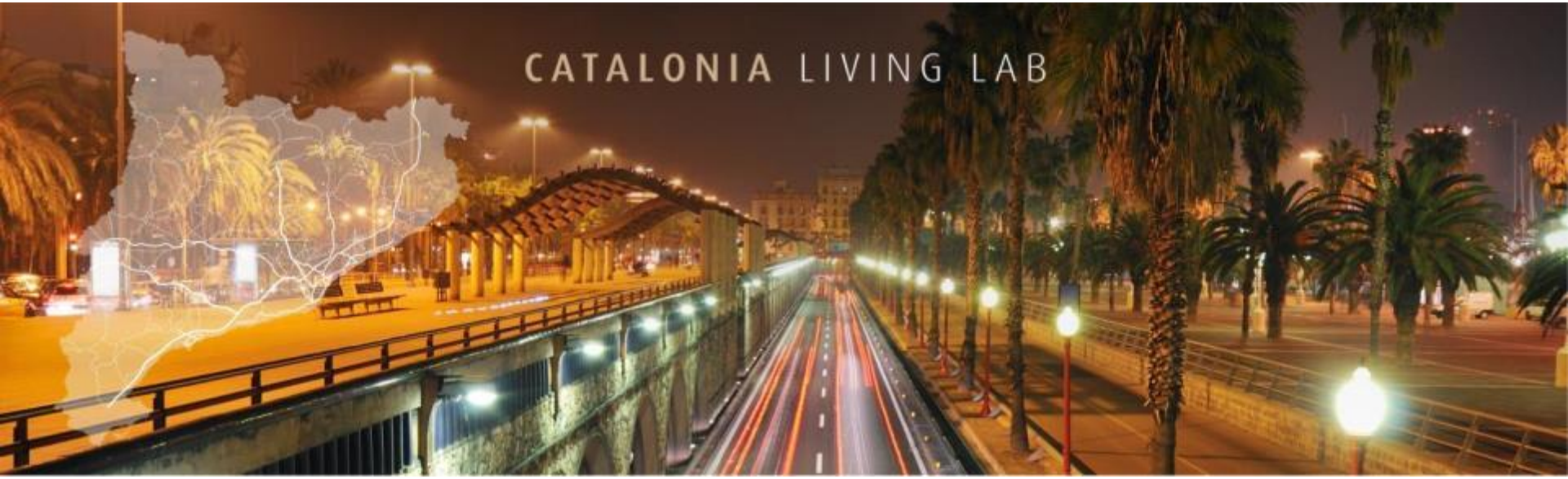

CATALONIA LIVING LAB

The Industrial Forum for the Connected Vehicle and Automated Driving

GSMA Connected Vehicle Forum

12th May 2016

ciac Clúster de la Indústria d'Automoció de Catalunya

Generalitat de Catalunya
Government of Catalonia

MOBILE WORLD CAPITAL BARCELONA

All you need in just one place

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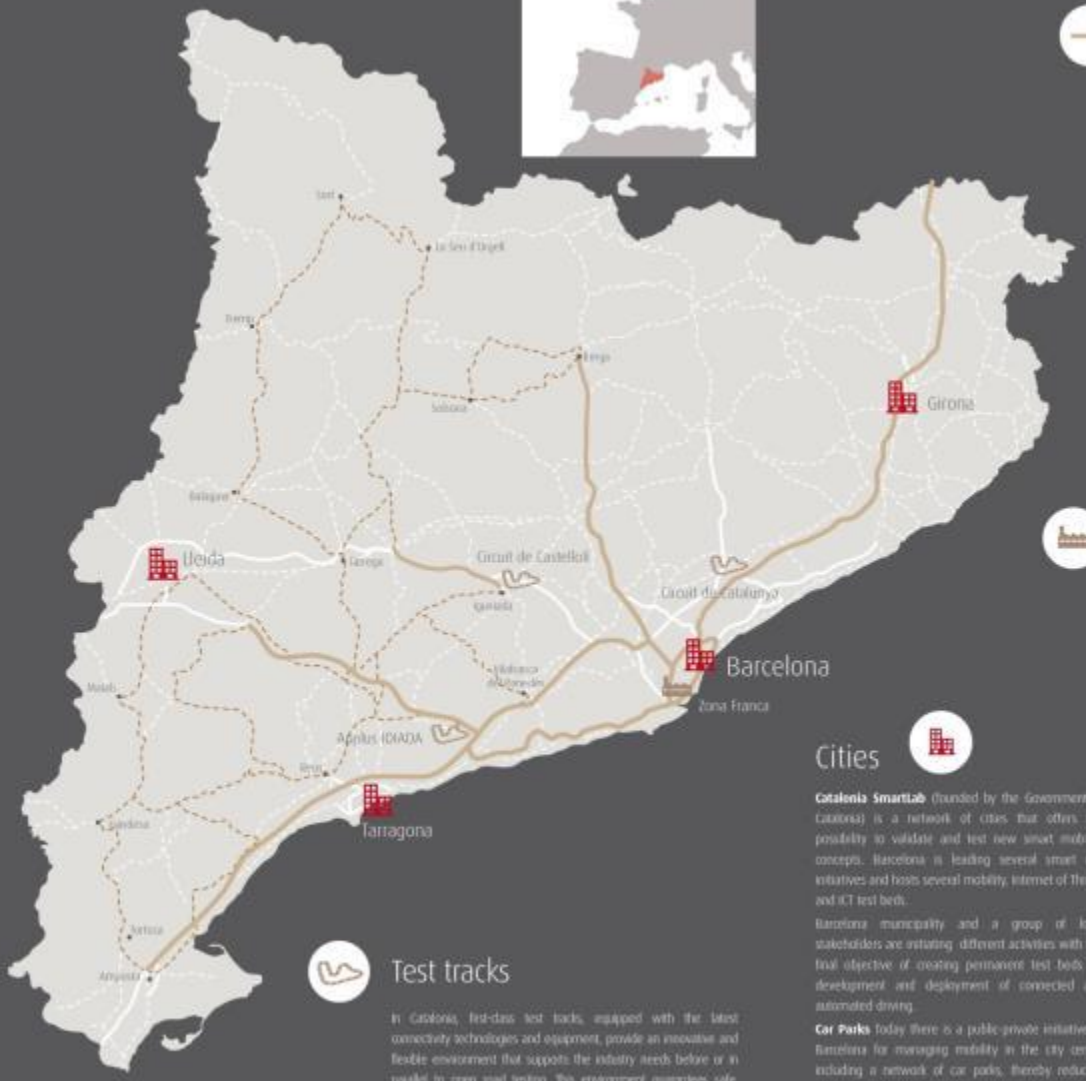

Highways

Several sections of privately-managed highways (AP2 and AP7) are designated to field operational tests under varying traffic densities. Various tests involving connected and automated vehicles have already been successfully conducted. For example, within the activities of the EU-funded SARTRE project (Safe Road Trains for the Environment), in May 2012 a platoon test involved a leading truck followed by several automated passenger cars in normal traffic.

Interurban roads

Catalonia has a wide network of interurban roads in a variety of terrains such as urban, industrial, rural, coastal, mountainous and flat lands. In combination with the active support of governmental institutions, an outstanding environment is created allowing for connected and automated driving activities on dedicated sections of two-way roads.

Industrial and logistics

Zona Franca is an industrial area of 600 hectares just south of Barcelona,housing more than 300 companies in an entrepreneurial and innovative climate. It is situated close to international transport hubs such as the seaport and the airport, and it is connected to the Trans-European Transport (TEN-T) Network. It also houses Catalonia's main freight railway station. It has outstanding communication and logistic services, and provides 27 kilometers of infrastructures to a wide variety of road users. This diverse and dynamic landscape provides an excellent location for connected and automated driving activities related to transport and logistics.

Cities

Catalonia SmartLab (founded by the Government of Catalonia) is a network of cities that offers the possibility to validate and test new smart mobility concepts. Barcelona is leading several smart city initiatives and hosts several mobility, Internet of Things and ICT test beds.

Barcelona municipality and a group of local stakeholders are initiating different activities with the final objective of creating permanent test beds for development and deployment of connected and automated driving.

Car Parks Today there is a public-private initiative in Barcelona for managing mobility in the city centre including a network of car parks, thereby reducing congestion and improving mobility, and providing more information and better access, intermodality, quality service and sustainability. This incative provides a good opportunity for testing connected and automated driving.

Test tracks

In Catalonia, first-class test tracks, equipped with the latest connectivity technologies and equipment, provide an innovative and flexible environment that supports the industry needs before or in parallel to open road testing. This environment guarantees safe, controlled and repeatable conditions needed for development, testing and validation of connected and automated driving functions.

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The Cluster de la Indústria de l'Automoció de Catalunya (CIAC) is a non-profit association open to companies in the automotive sector located in Catalonia involved in R&D activities. The main objective of the association is to strengthen the competitiveness of the automotive industry as the driving force of the Catalan economy. To achieve this, CIAC has designed a strategic plan with a series of short-, medium- and long-term objectives, to ensure the plan's development in the new global industrial sector.

The Industrial Forum for the Connected Vehicle and Automated Driving is a Public Private Partnership (PPP) initiative with the participation of the main automotive and infrastructure stakeholders to facilitate and promote policies and projects that will increase the competitiveness of Catalonia in the field of connected vehicles, cooperative systems and automated driving.

Cities – Catalonia SmartLab

Network of cities for validation and testing of smart mobility concepts

- **Optimum platform for eSIM pilot project in Barcelona with Telefonica, Orange and Vodafone being part of the Mobile World Capital**
- Infrastructure interaction: Possibility of interacting with different communication technologies (2G/3G/LTE, WiFi), sensors and signage
- Road user interaction: VRU, public transport, private transport…

Barcelona Urban Lab

Forum BCN – Cooperative&Automated Driving Center of Excellence

- Urban lab for Cooperative and Automated Driving

- Wide range of cooperative and automated applications
- C-ITS and ADAS systems development and validation

- Many test cases concerning C&A Driving

- Different urban and highway conditions

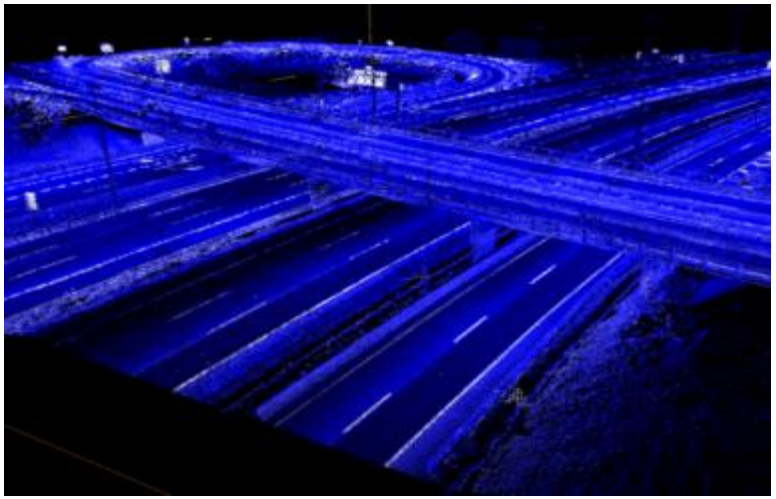
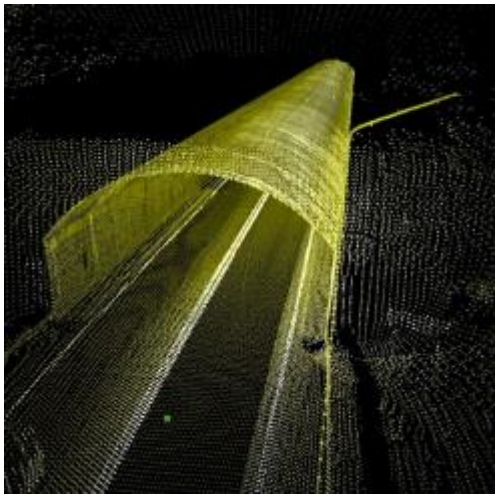
Interurban scenarios and highways

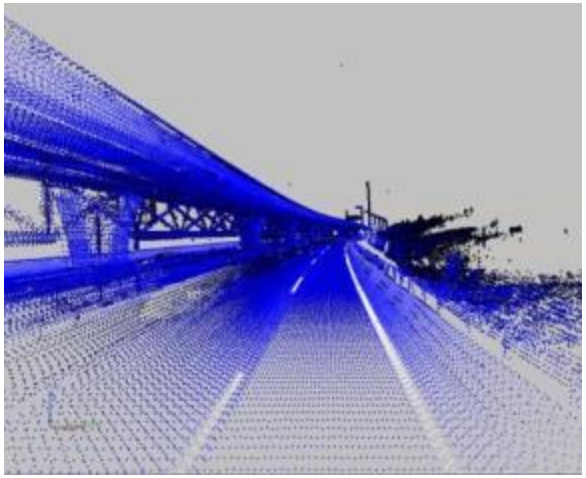
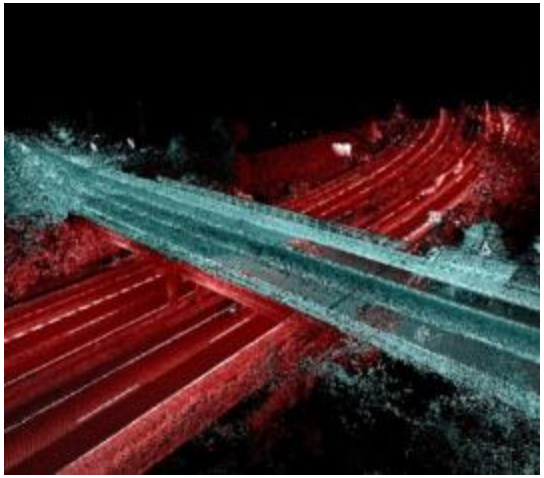
- **New legal framework for the testing of automated driving vehicles in public roads**
- Some specific **routes** and **areas** are being identified to cover testing and development needs related to connected and automated driving
- **GPS tracks** are available for any route
- Possibility for **cross-border** testing on different road types

SARTRE project: open road testing at AP2 Highway

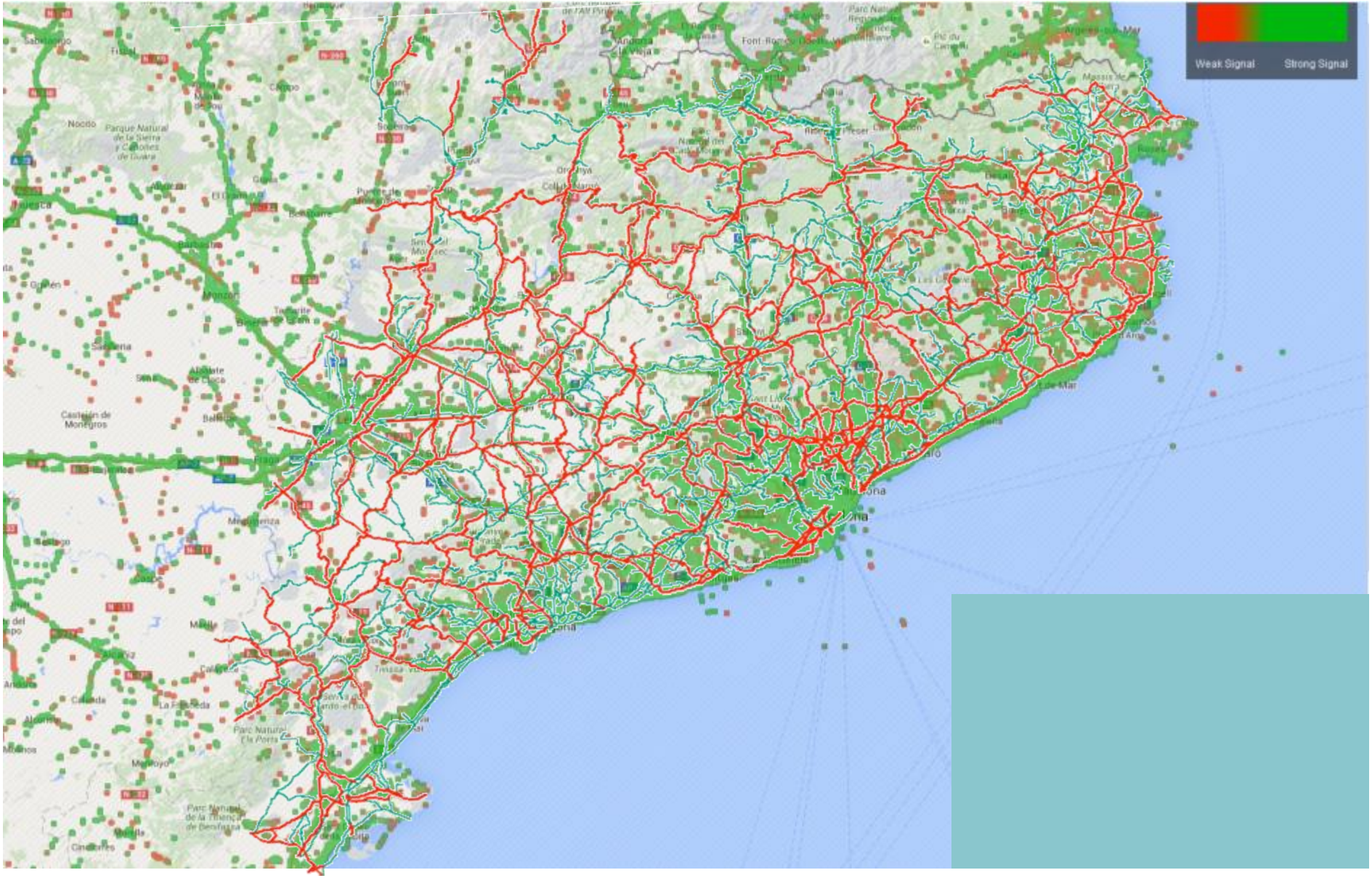
Interurban scenarios: Digital Maps

3D point cloud scanning and images for 6048 km road network including identified and geo-localized road furniture: lane markings, traffic signals, safety barriers…

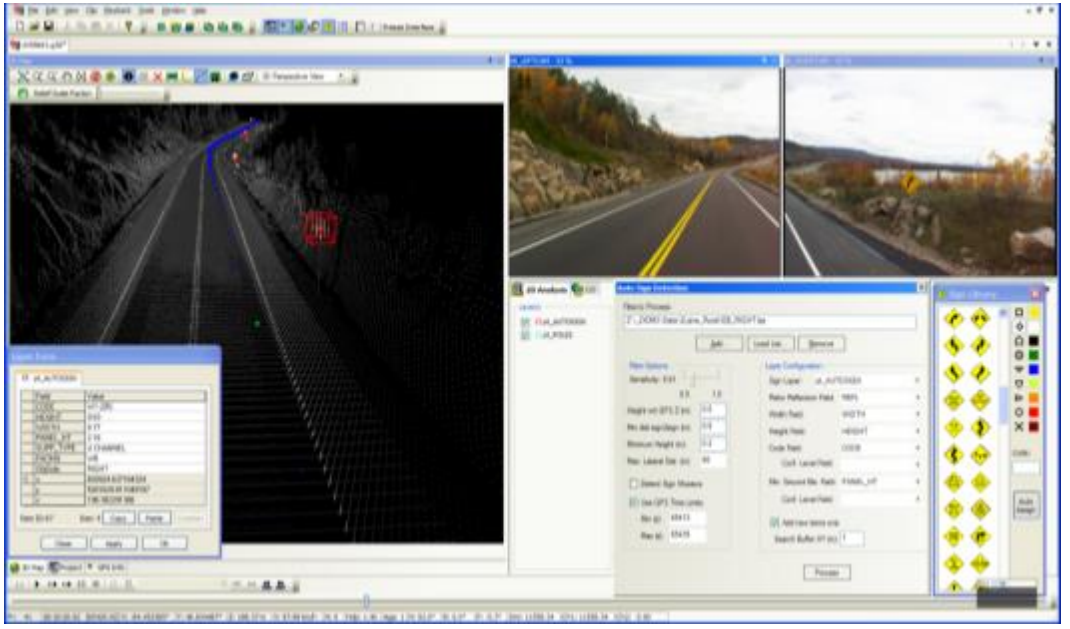
Interurban scenarios: Catalogue of routes

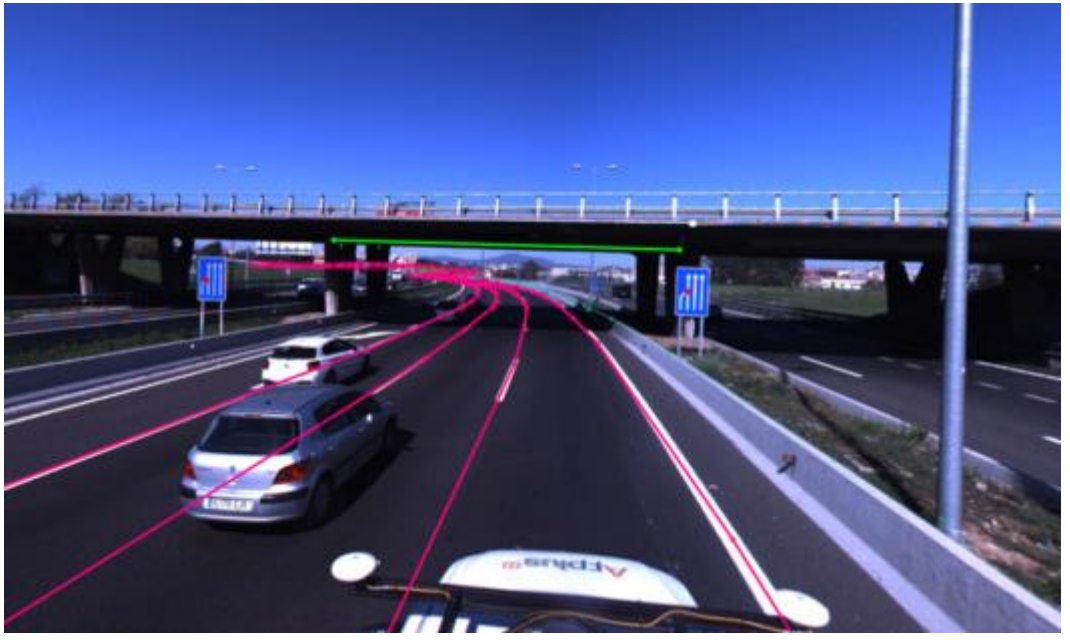


1. Source: opensignal.com

Interurban scenarios: Available data

- Combined INS - GNSS positioning system
- Positioning accuracy 0.10 m
- Road lateral and longitudinal gradient, curve radio
- Lane marking identification
- Traffic signage identification and positioning
- Safety barriers identification
- Periodical information update





Controlled environments

Applus IDIADA

- Independent and multiuser proving ground
- 370 hectares
- All-year-round testing with favorable climatic conditions
- Safe, versatile, comprehensive, repeatable test tracks
- D-GPS full coverage
- ETSI G5 (802.11p) full coverage
- Exclusive mobile network under design

Controlled environments

Lab & Open Air Mobile Test Bed

Complementing ‘real world’ drive tests with replicable, well defined lab tests

Sample Network Configuration – repeat test scenarios until eg. service behaves optimally

Using real mobile networks, non-simulated, with latest features as deployed to operators world-wide

Vehicle functionalities can be tested in a controlled environment using different technologies

Controlled environments

Lab & Open Air Mobile Test Bed – Services & planned deployment

- Conformance Testing
- Interoperability
- Communication Control Unit Testing (Network Integration)
- APP Development V2I (Network Integration) and V2V including LTE Direct
  - Performance assessment
  - Functional validation
- Behaviors & benchmark

Phase 1

Lab testing

Phase 2

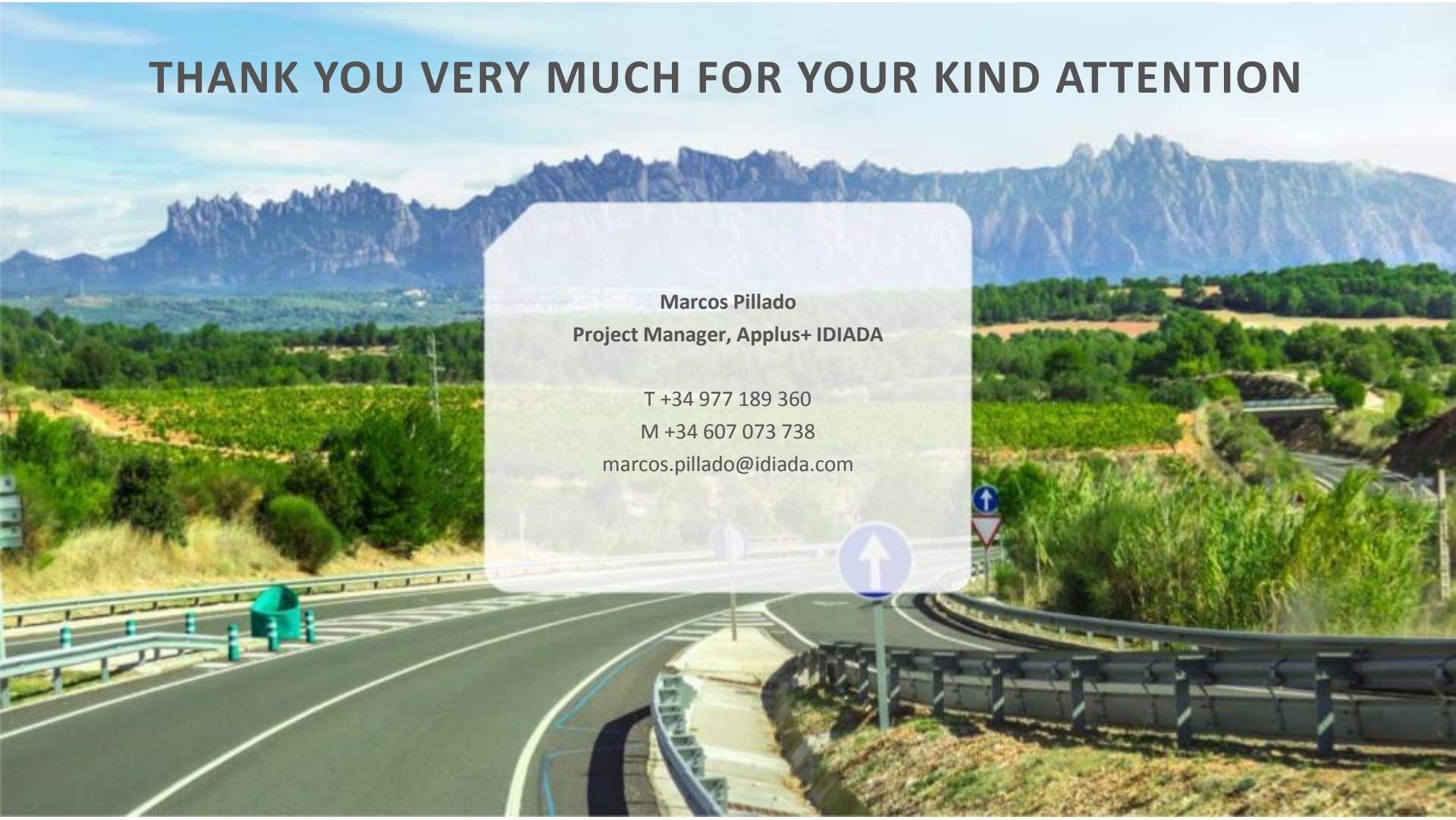
European Network Open Air Test Bed

5G Pilot Network

Phase 3

Worldwide Network Open Air Test Bed

THANK YOU VERY MUCH FOR YOUR KIND ATTENTION



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