

5G-CARMEN: Connected and Automated Road Mobility in the European Union

Jason Sioutis, MSc, MBA

8Bells

Infocom World Conference

26 November 2019, Athens, Greece

Automated and Connected Vehicles

An European-wide effort

- European mobility will drastically change in the next few years
- Growing urbanization, digitalization and automation, are only few of the key indicators
- Vehicles will merge in the digital world: from a vehicle moving from A to B to a vehicle that is connected and with different levels of automation
- The European Member States have signed a letter of intent following the EC initiative for a large-scale collaborative effort in the area of connected and automated driving



Automated and Connected Vehicles

The Objectives

- Harness the concept of ‘Mobility Corridors’ for moving people and goods across Europe
- The key technological enabler is 5G for the implementation of a new concept of connected and automated vehicles
- A vehicle smart-living environment to meet the requirements of mobility in smart cities and in the whole European road network
- Bridge infrastructure gaps across the whole EU including cross-border pilot activities

The Bologna-Munich Corridor

Key Figures

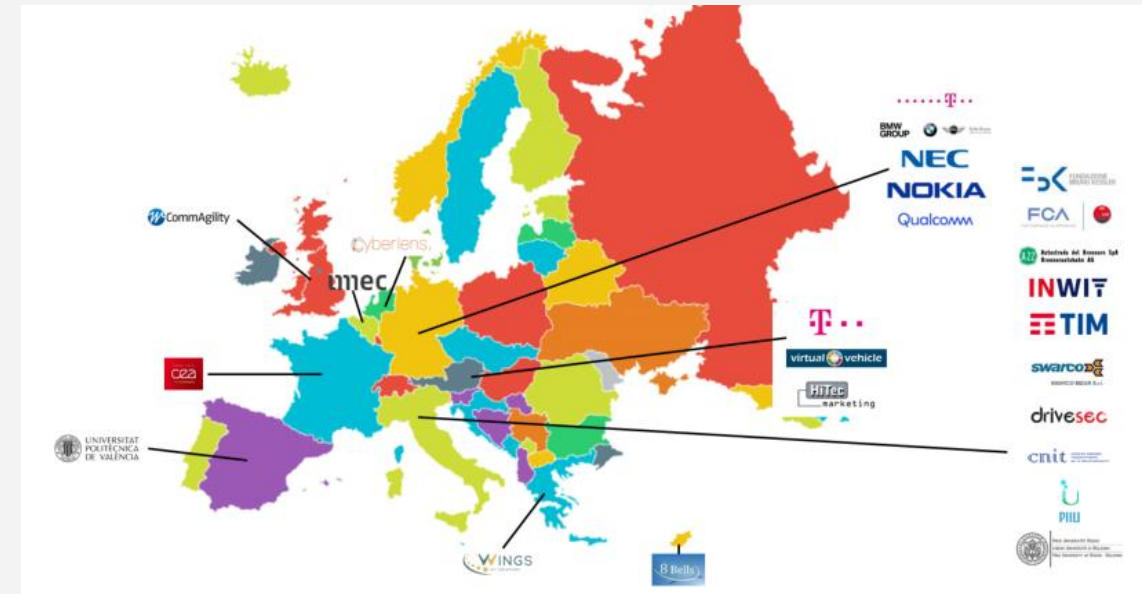
- The corridor between Bologna and Munich is selected as testbed for the cross border trials
- Total length: ~600 Km
- Service stations: ~40
- Interconnects two-major industrial poles
- Three countries covered
 - Italy
 - Austria
 - Germany
- 2 cross-country trials
- 3 single-country trials for pre-integration



5G-CARMEN

Key Figures

- 25 Partners from 10 EU Countries
- Total project budget: 18.9 ME
- Requested Funding: 14.9ME
- Project Duration: 36 Months
- 4 CCAM key use cases to be demonstrated
- 3 Leading telco equipment vendors
- 3 Mobile Network Operators
- 2 Automotive OEMs
- SMEs and Academia
- Explicit Support from EUREGIO Regions



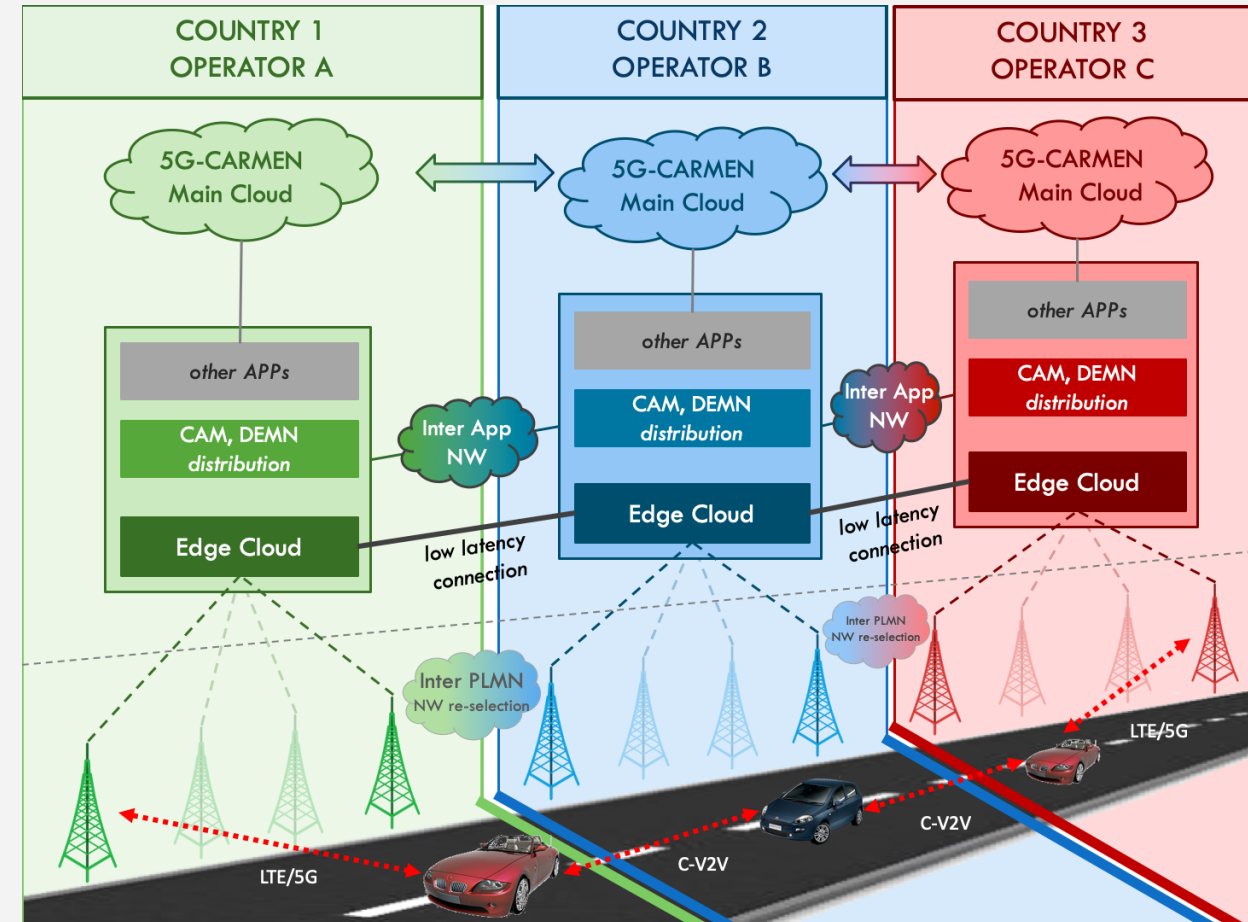
Cross-country Trials

The Vision

- In 2025 vehicles with different levels of automation are 'always' connected

How

- BUILD a large scale 5G testbed to conduct cross-border trials
- DEPLOY a mixture of 5G micro- and macro-cell coverage for ubiquitous V2X connectivity and elastic network performance
- COMPLEMENT existing V2X technologies targeting coexistence and harnessing a heterogeneous radio environment
- ENSURE service continuity and 5G KPI across different borders



Cross-country Trials

Technological Enablers

- ✓ Hybrid radio access network (Including **New Radio**)
- ✓ Service-oriented predictive QoS
- ✓ Secure and multi-domain service orchestration
- ✓ Network slicing
- ✓ Distributed and multi-layer network-embedded cloud
- ✓ Improved positioning and time synchronization

Cross-country Trials

The Use Cases



UC1: Connected vehicle manoeuvre negotiation



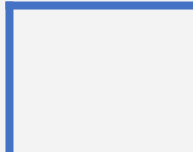
UC2: Connected and automated vehicle SAE L3/L4 manoeuvre negotiation



UC3: Adaptive and prioritised QoE for next generation infotainment



UC4: Vehicles Emissions Control in Sensitive Areas



Jason Sioutis, MSc, MBA
Project manager at 8Bells

jason.sioutis@8bellsresearch.com

