5G the enabler of connected and autonomous vehicles

S. Péan & R. Saracco, EIT Digital
March 21st, 2017
5G the enabler of connected and autonomous vehicles
Parallel session, March 21st (13:30-14:30)

The European leadership in the race to self-driving & connected vehicles
by Stéphane Péan, EIT Digital

Panel discussion with:
- Leandro D’Orazio, FIAT Group
- Mikael Fallgren, Ericsson
- Markus Dillinger, Huwaei

Moderated by Roberto Saracco and Stéphane Péan, EIT Digital

Conclusion
by Roberto Saracco, EIT Digital
1.0 The race to self-driving & connected vehicles
The leadership battle with Silicon Valley

2.0 Europe’s 5G agenda
To support vehicles connectivity
The ITS roadmap challenged by newcomers
*From auto industry to big tech leadership*

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<td>Global promotion</td>
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<td>(infra/veh)</td>
<td>Telematics (veh.)</td>
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<td><strong>Personal navigation /3G</strong></td>
<td><strong>TELECOMS &amp; TECH SUPPLIERS</strong></td>
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<td><strong>DISRUPTIVE PLAYERS</strong></td>
<td><strong>INTERNET</strong></td>
<td><strong>Shared mobility Smartphones /4G</strong></td>
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*Delivering Europe’s Digital Transformation*
1.0 The race to self-driving & connected vehicles
The leadership battle with Silicon Valley
The long path to self-driving vehicles
From utopia to reality

1930s
Autoline Automatic Highway, General Motor

2015
Arma, Navya

2020s?
Cedric, Volkswagen (concept car)
The self-driving vehicles roadmap
Level 3 vehicles on highways by 2020

Source: European Roadmap Smart Systems for Automated Driving, EpoSS, April 2015
The Silicon Valley’s self-driving initiatives
Developing vehicles or software solutions?
The market supports Silicon Valley’s champions

Ensuring large R&D expenditures

Market cap’ or valuation (billion $)

Delivering Europe’s Digital Transformation
The German leadership in automated driving
Highest patents productivity in the world

Why?
AUTOMATED DRIVING FOR
THE PREMIUM SEGMENTS

<table>
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<th>Company</th>
<th>Patent Applications Since 2010</th>
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<tr>
<td>Bosch</td>
<td>545</td>
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<tr>
<td>Audi</td>
<td>292</td>
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<tr>
<td>Continental</td>
<td>277</td>
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<td>GM</td>
<td>246</td>
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<td>Google</td>
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<td>VW</td>
<td>184</td>
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<td>Toyota</td>
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<td>Daimler</td>
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<td>BMW</td>
<td>142</td>
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<td>Ford</td>
<td>103</td>
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Source: Institut der deutschen Wirtschaft, June 2016

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High investment in tech solutions
*From microchips to connectivity*

DATA SERVER ON WHEELS

25GB/h (today) → 4TB/day (2020-)

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Intensifying competition in digital map
HD for automated driving (highways)

Services based on real-time sensor data from multiple vehicle brands

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Google and Apple’s connectivity strategy

Bringing in-car services via smartphones

Open Automotive Alliance (2014)
(50 carmakers)

Android Auto

Apple CarPlay

The Auto Industry Alternative

A new open source software (2017)
to maintain control of vehicle’s data

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2.0 Europe’s 5G agenda
To support vehicles connectivity
The V2X applications
Mainly for safety purposes

Source: Qualcomm
Two current standards to support V2X

Before the rise of 5G ...

IEEE 802.11p (ETSI ITS-G5)
Safety use cases

CELLULAR-V2X (4G-LTE)
Non-safety use cases

Source: EETimes, April 2016
Cooperative ITS deployment
V2X in Japan, soon in US ...

In Europe, deployment in 2019?
5G, much more than higher capabilities

A secure, reliable and flexible orchestration platform

**CAPABILITIES**: extremely high **data rates** – very low **latency** for devices – support of very high **mobility speeds** – massive **connectivity** – lower **energy**

**Ultra dynamic network redistributing connectivity**
(802.11p, Wifi, 3G/4G-LTE)

**Enabling a scalable service experience anytime anywhere**
(Internet of Things)
Europe’s 5G agenda for connected cars
A public/private coordination to accelerate

CRUCIAL POINTS TO ADDRESS
- Technological & regulatory issues
- Roaming interoperability issues
- Infrastructure investment
- Safety and security

5G COVERAGE
Highways & Major Urban Areas

1st 5G cities

5G full deployment

WRC19
frequencies allocation
ITS item in its agenda

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Thank you
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