Towards cooperated, connected and automated driving in Europe
Which connectivity?

ITU FORUM ON 5G GIGABIT SOCIETY

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AGENDA

1. EU momentum
2. National momentum
3. Connectivity as building block
4. Conclusions
1. European momentum
### FROM PAST TO FUTURE

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<td>Awareness Starts</td>
<td>Automation Starts</td>
<td>Cooperation Starts</td>
<td>Future Mobility</td>
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<td><strong>Cooperative</strong></td>
<td><strong>Connected</strong></td>
<td><strong>Automated</strong></td>
<td><strong>Cooperative, Connected and Automated</strong></td>
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<td>Hybrid ITS G5/LTE-V + 3G/4G</td>
<td>Hybrid + 5G</td>
<td>Hybrid + New technologies</td>
<td>Hybrid + new technologies</td>
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<td>Advanced Driver Assistance System</td>
<td>Some Roads Human Back-up</td>
<td>Most Roads No Human Back-up</td>
<td>Fully Automated</td>
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<td>“I share where I am and what I hear”</td>
<td>“I share what I see”</td>
<td>“We share our intentions”</td>
<td>“We coordinate all manoeuvres”</td>
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Source: European Commission
Nov. 2016: focus on cooperated and connected mobility
https://ec.europa.eu/transport/themes/its/c-its_en

May 2018: focus on automated mobility
https://ec.europa.eu/transport/themes/its/c-its_en
EUROPEAN MOMENTUM

Sept 2016: 5G Action plan

5G PPP
https://5g-ppp.eu/

STRIA roadmap

2. National momentum
NATIONAL MOMENTUM

Various LOI between member states for 5G cross-border corridors to test CCAM

Various Pilot projects
EUROPEAN COMMISSION, MEMBER STATES AND INDUSTRY

- Transport Ministers of the EU-28 member states + Commissioners + our industry
- Common agenda for connected and automated driving. Focus on policy and roll-out

3. Connectivity as building block
CONNECTIVITY ≠ AUTOMATION

Connected vehicle
- Vehicle-to-vehicle
- Vehicle-to-infrastructure
- Vehicle-to-x

Automated vehicle
- Communicates with nearby vehicles and infrastructure; Not automated
- Operates in isolation from other vehicles using internal sensors
CONNECTIVITY POTENTIAL
Examples of C-ITS use cases

Road safety related
- Emergency vehicle approaching
- Slow or stationary vehicle(s)
- Traffic jam ahead warning
- Hazardous location notification

Cooperative traffic efficiency
- Traffic information and smart routing
- Traffic Light Assist (on/off) and Green Light Optimal Speed Advisory (GLOSA) / Time To Green (TTG)
- Road works warning
- Weather conditions

Cooperative local services
- Off street parking information
- Park & Ride information
- Information on AFV fueling & charging stations
- Zone access control for urban areas

V2V, V2P, V2I: ETSI ITS G5 / IEEE 802.11p
(short range)

Or

V2V, V2P, V2I: LTE-V2X (3GPP release 14)
(PC 5 mode 3, mode 4 / short range)

Or

V2N Mobile network
Enabling automation:

- Collaborative mode: example of platooning
- Perception and predication with non-line of sight sensing
- 3D maps/positioning: capital for automation where HMI takes over from driver
- Can add collective intelligence to the transport system
Different types of connectivity technologies each with their pros and cons:

- No one size fits all, depends on use case
- Direct (M2M) or indirect
- Depends also on choice made by the infrastructure manager/road authority/other third parties
- Coverage, speed/latency, security, price
- C-ITS area: interoperability and backward compatibility
- Possible harmful interference in the same spectrum band
4. Conclusions
CONCLUSIONS

- CCAM clear potential as vertical for 5G
- Increased connected data flows/data economy approach
- Coverage and latency needs balanced in function of use case
- Enabler for automation
- Continued dialogue with telecoms/ IT sector (e.g. EATA, 5GAA)
- Price tag for 5G ?

https://www.acea.be/industry-topics/tag/category/connected-and-automated-driving
THANK YOU FOR YOUR ATTENTION

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ACEA MEMBERS
12.6 million Europeans work in the automotive sector

3.3 million jobs in automotive manufacturing

€396 billion in tax revenues (EU15)

€50.1 billion in R&D spending, largest private investor

€90 billion positive net trade contribution