EU Perspective on Connected and Automated Driving

EU EIP 4.2 workshop - Turin, 1-2 October 2019

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European Commission
EUCAD2019
Horizon 2020, Horizon Europe
Roadmap on Connected and Automated Transport
European Platform on large scale testing
ODD
Major issues that were discussed

- Safety validation Automated Vehicles
  - How safe do these systems have to be? How safe is safe enough? How can we prove that the new automated driving functions are really safe and reliable?
- Ways to gain trust / societal and user acceptance of CAD systems
- Ethical issues raised by CAD
- Cybersecurity and data protection
  - What needs to be done to secure data flow and communication devices?
- Cooperation:
  - Between public and private stakeholders to agree on long-term strategy at European level
  - Share data on critical scenarios
  - International cooperation for sharing information about research and testing
Exhibition & demonstrations

Conclusions

- We passed the hype of automated vehicles – and realism is settling in.
- Shift from potential and promises to practice and public involvement.
- Compared to the first European Conference on Connected and Automated Driving there is a shift from more technological topics towards non-technology related aspects such as user centric design, ethical issues, etc.
Gartner Hype Cycles 2009 - 2019

Gartner Hype Cycle for Emerging Technologies, 2019

- Exchips
- AI at Scale
- Autonomous Driving Level 5
- Low-Earth-Orbit Satellite Systems
- Edge AI
- Explainable AI
- Personification
- Knowledge Graphs
- Synthetic Data
- Light Cargo Delivery Drones
- Transfer Learning
- Flying Autonomous Vehicles
- Augmented Intelligence
- Nanoscale 3D Printing
- Decentralized Autonomous Organization
- Generative Adversarial Networks
- Decentralized Web
- All Cloud
- Biotech: Cultured or Artificial Tissue
- Immersive Workspaces
- Next-Generation Memory
- 3D Sensing Cameras
- Autonomous Driving Level 4

Time:
- Innovation Trigger
- Peak of Inflated Expectations
- Trough of Disillusionment
- Slope of Enlightenment
- Plateau of Productivity

Plateau will be reached:
- less than 2 years
- 2 to 5 years
- 5 to 10 years
- more than 10 years
- before the plateau

As of August 2019

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EUCAD 2019

Horizon 2020, Horizon Europe

Roadmap on Connected and Automated Transport

European Platform on large scale testing

Expert Group on Ethical issues raised by CAD
Key elements:

- **Safe Mobility**
  - Communication on new road safety policy framework
  - Legislative initiative on vehicle and pedestrian safety
  - Legislative initiative on infrastructure safety management

- **Clean Mobility**
  - Legislative initiatives on CO2 standards for heavy duty vehicles
  - Action Plan for Batteries

- **Connected and Automated Mobility**
  - Legal initiatives establishing a digital environment for information exchange in transport
  - Communication on Automated Mobility
EC Communication on Automated Mobility

- Part of the 3rd Mobility Package (17 May 2018)
- Comprehensive EU approach to support the development and deployment of connected and automated vehicles in Europe

What needs to be done?

- SAFETY
- SOCIETY
- COMPETITIVENESS
- APT LEGAL FRAMEWORK
- SOCIETAL & ETHICAL ASPECTS
- INVESTMENT IN RESEARCH & INNOVATION
H2020 - Calls on "Automated Road Transport"

- **Budget**: € 300 Mio (2014-2020)
- **Focus**
  - Large-scale demos of automated driving systems for passenger cars, trucks and urban transport
  - Safety and end user acceptance
  - Road infrastructure to support automation
  - Traffic management solutions
  - Connectivity for automation
  - Testing and validation procedures
  - Assessment of impacts, benefits and costs of CAD systems
  - Support for cooperation and networking activities
  - Human centered design of AV

5 Calls for proposals 2016 2017 2018 2019 2020

13:40 - 14:40 Parallel Session III

Parallel Session A
Room GASP

Automated Road Transport and Batteries

DT-ART-05-2020:
Efficient and safe connected and automated heavy-duty vehicles in real logistics operations

DT-ART-06-2020:
Large-scale, cross-border demonstration of connected and highly automated driving functions for passenger cars

- EUCAD2019
- Horizon 2020, Horizon Europe
- Roadmap on Connected and Automated Transport
- European Platform on large scale testing
- Expert Group on Ethical issues raised by CAD
Published April 2nd 2019

R&I strategy to support the development and deployment of connectivity and automation technologies for transport

- Concrete list short, medium and long-term R&I Actions
- Other actions to accelerate the deployment
- Fields of cooperation and common actions between Member States, the EC and Industry
- Better coordination of national and multinational funding programs in the area of CAT

https://ec.europa.eu/research/transport
- Developed by EC with the support of Member States and support by experts and stakeholders
- Support from rapporteurs
- Stakeholder workshops (mode-specific)
  - Experts from the Member States
  - Experts from industry and different stakeholder organisations
  - European Commission
- R&I initiatives and Actions for 8 Thematic Areas
STRIA roadmap on CAT – Thematic Areas

- In-vehicle enablers
- Vehicle validation
- Large-scale Demos
- Shared, automated mobility services
- Socio-economic impacts/ user acceptance
- Big data, Artificial Intelligence
- Infrastructure / secure connectivity
- Human factors
# Thematic Areas & R&I initiatives

## 1 In-vehicle enablers
- 1.1 Reliable environment perception to identify and predict all hazards in CAD
- 1.2 Fail-safe operation and cyber security of electronic and software control architectures for CAD
- 1.3 On-board decision making in the OOD

## 2 Vehicle validation
- 2.1. Common testing and validation methodologies ensuring the correct functionality, performance and safety of AV

## 3 Large-scale demo pilots
- 3.1. Deployment of automated passenger vehicles in real traffic conditions for improved safety and efficient road transport
- 3.2. Deployment of automated heavy commercial vehicles in mixed traffic for improved safety and efficient road transport
- 3.3. European experimentation and testing agenda on automated road mobility

## 4 Shared, automated mobility services
- 4.1. Attractive and acceptable shared and automated mobility services for passengers and goods (and combinations thereof)
- 4.2. Integration of shared automated vehicles services with existing urban/regional mobility
- 4.3. Fleet and traffic management of highly and fully automated vehicles

## 5 Socio-economic impacts/user acceptance
- 5.1. Analysis of societal needs, citizen expectations, and public acceptance in relation to CAD
- 5.2. Social impact assessment of connected and automated vehicles
- 5.3. Foster workforce and skills development in digital technologies for CAD

## 6 Human factors
- 6.1. Develop and establish smooth communication and interaction between automated vehicles and their users
- 6.2. Ensure unambiguous communication between vehicles and other (vulnerable) road users
- 6.3. Determination of opportunities and limits of tele-operation for automated vehicles

## 7 Infrastructure and secure connectivity
- 7.1. Physical and digital infrastructure (P&DI) for enabling increasing levels of automation
- 7.2. Reliable and effective traffic network and incident management system for CAD
- 7.3. Adequate connectivity (reliability, quality, coverage, security) for higher levels of automation
- 7.4. Cyber Security of CAD-related operations including data exchange & sharing

## 8 Big data, Artificial Intelligence
- 8.1. New tools and models for storage and sharing of valuable data
- 8.2. Optimised big data for effective design, planning, traffic and mobility management, services and operations
- 8.3. Further development and use of Artificial Intelligence in road vehicles (on and off board)
- EUCAD2019
- Horizon 2020, Horizon Europe
- Roadmap on Connected and Automated Transport
- European Platform on large scale testing
- ODD
Grouping all relevant public and private stakeholders to coordinate open road testing of Cooperative, Connected and Automated Mobility (CCAM) and make the link with pre-deployment activities

Joint activity of DG MOVE, DG CNECT, DG GROW and DG RTD


Continuous call – deadline for first round of applications was the 10th of April 2019

First meeting June 25th and 26th 2019

Second meeting Sept 9th 2019

Next meetings 2019: Nov 5th and 3-4 Dec
Objectives

- develop an EU agenda for testing to better coordinate research, testing, piloting, and pre-deployment activities
- Agree on a common evaluation methodology in order to allow for comparison of results between tests
- facilitate access and exchange of data from testing
- assist the Commission in thematic areas, such as data access and exchange, road transport infrastructure, digital infrastructure, communication technology, cybersecurity, road safety, and legal frameworks, etc.
- provide advice on and support the generation of the work program for a future public private partnership on CCAM
Working Groups

1. Develop an EU agenda for testing
2. Coordination and cooperation of R&I and testing activities
   • Knowledge base
   • Common evaluation methodology
   • Framework for data exchange and lessons learned
3. **Physical and digital road infrastructure**
4. Road Safety
5. Connectivity and digital infrastructure for CCAM
6. Cybersecurity and access to in-vehicle data linked to CCAM
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Figure 3: Visual representation of limited ODD
ODD in the STRIA roadmap

Figure 4: Visual representation of ODD in practice
Smart Mobility, Dutch Reality CAD in the NL

SIP-adus 2018, Tokyo

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13 November 2018

Thank you for your attention!

http://ec.europa.eu/horizon-europe