2020 On-line College Tour Automated Driving
Spatial and Transportation Impacts and Meaningful Human Control

Webinar 4 Truck and Platooning

TU Delft

Meaningful Human Control
over automated driving systems

Spatial and Transport Impacts of Automated Driving

NWO

Today

- Microphone and video off

- Questions via chat

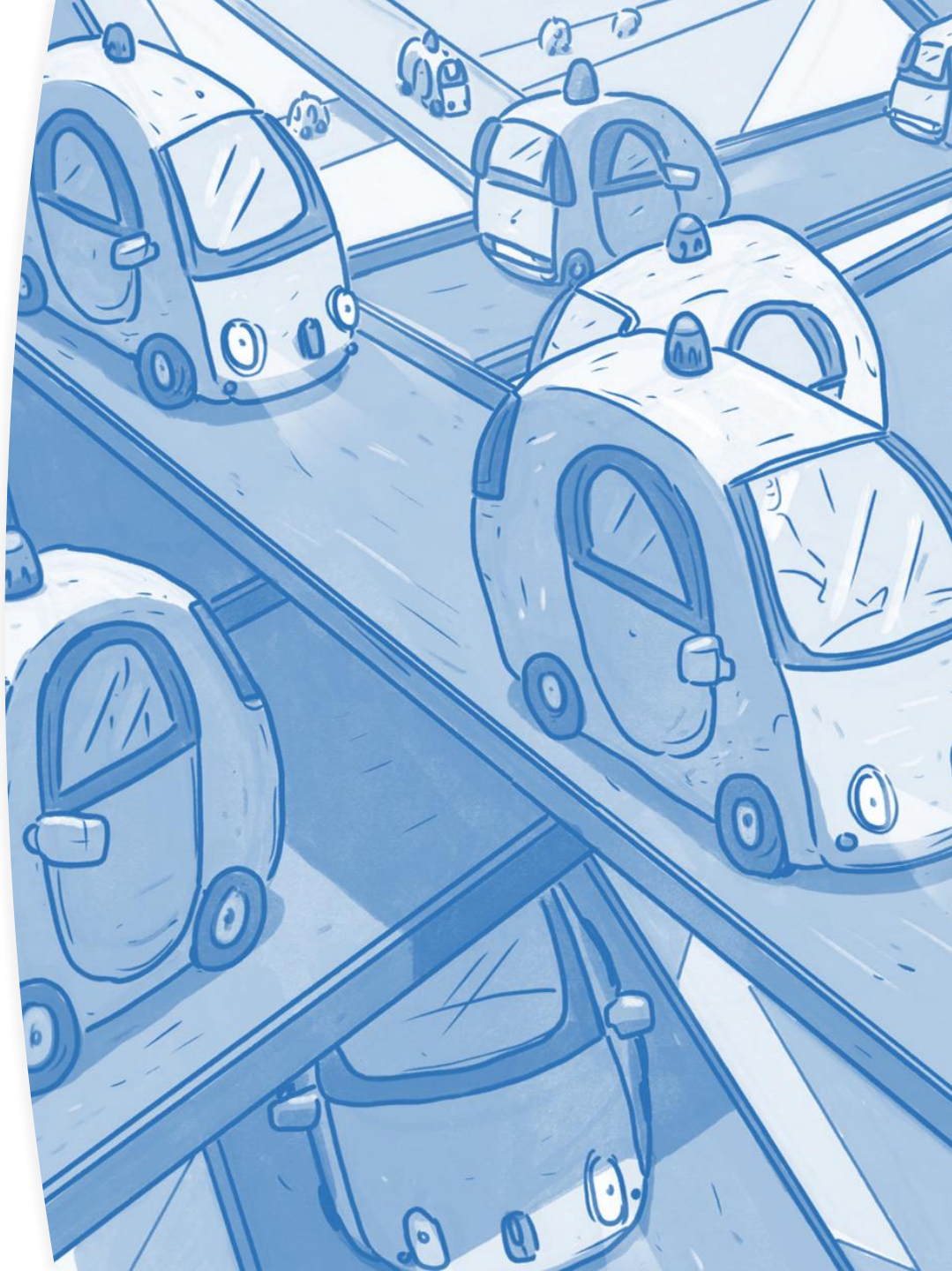
- Presentations

https://stad.tudelft.nl

- Recording

Agenda

15.00 – 15.20	Introduction Tom Alkim – EC perspective
15.20 – 15.40	Anirudh Kishore Bhoopalam - spatial and temporal synchronization of truck platoons
15.40 – 16.00	Simeon Calvert - What does vehicle automation with Meaningful Human Control mean in practice?
16.00 – 16.30	Questions



Introduction

Connected, Cooperative and Automated Mobility (CCAM)

European Perspective

Tom Alkim, Policy Officer, European Commission
DG Research & Innovation, Future Urban & Mobility Systems
STAD / MHC AD on-line college tour, 27 August 2020

Overview

- Connected, Cooperative and Automated Mobility (CCAM)
- Hype and reality
- ODD Framework
- CCAM Partnership
- Ethical Aspects of Connected & Automated Driving

Connected, Cooperative and Automated Mobility

Comprehensive EU approach to support the development and deployment of connected and automated vehicles in Europe

European Commission

Connected, Cooperative and Automated Mobility

CCAM has the potential to make transport:

- Safer: bring down the number of road fatalities and accidents
- Greener: help to reduce harmful emissions from transport by smoothening traffic flow and avoiding unnecessary trips
- More accessible: ensure inclusive mobility access for all

Connected, Cooperative and Automated Mobility

However, a number of challenges have to be addressed:

- Key technologies are still being developed: they need to be safe, tested, validated
- The right legal framework has to be set up and adopted at Member State and EU-level
- CAVs will have to be integrated into the broader transport system and interact with other forms of mobility
- Acceptance and trust in CCAM technology, by users and society, has to be nurtured every step of the way

H2020 calls

- 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

ENSEMBLE

https://platooningensemble.eu/

5 Calls for proposals

2016 2017 2018 2019 2020

European Commission

H2020 projects - SHOW

Developing and testing shared, connected and cooperative automated vehicle fleets in urban areas

❑Real life demonstrations of shared, connected, cooperative, electrified fleets of autonomous vehicles in 20 cities across Europe

❑Large fleet of AVs of all types (buses, shuttles, pods, robo-taxis, cargo vehicles) will be tested on dedicated lanes and in mixed traffic

❑International cooperation

- 11 external stakeholders from US, Singapore, Australia, China, South Korea and Taiwan declared interest to support and collaborate
  - Exchange know-how, lessons learned/best practices
  - Common architectures and KPIs
  - Exchange specific data sets

- Coordinator: UITP
- Consortium: 69 Partners from 12 EU Countries + Switzerland
- Budget: Approx. 36 M€
- Start date: late 2019

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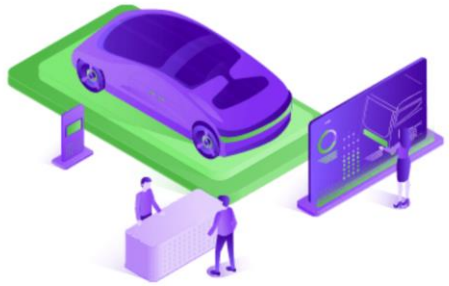


IN BRIEF

Duration: January 2020 – January 2024 (48 months)

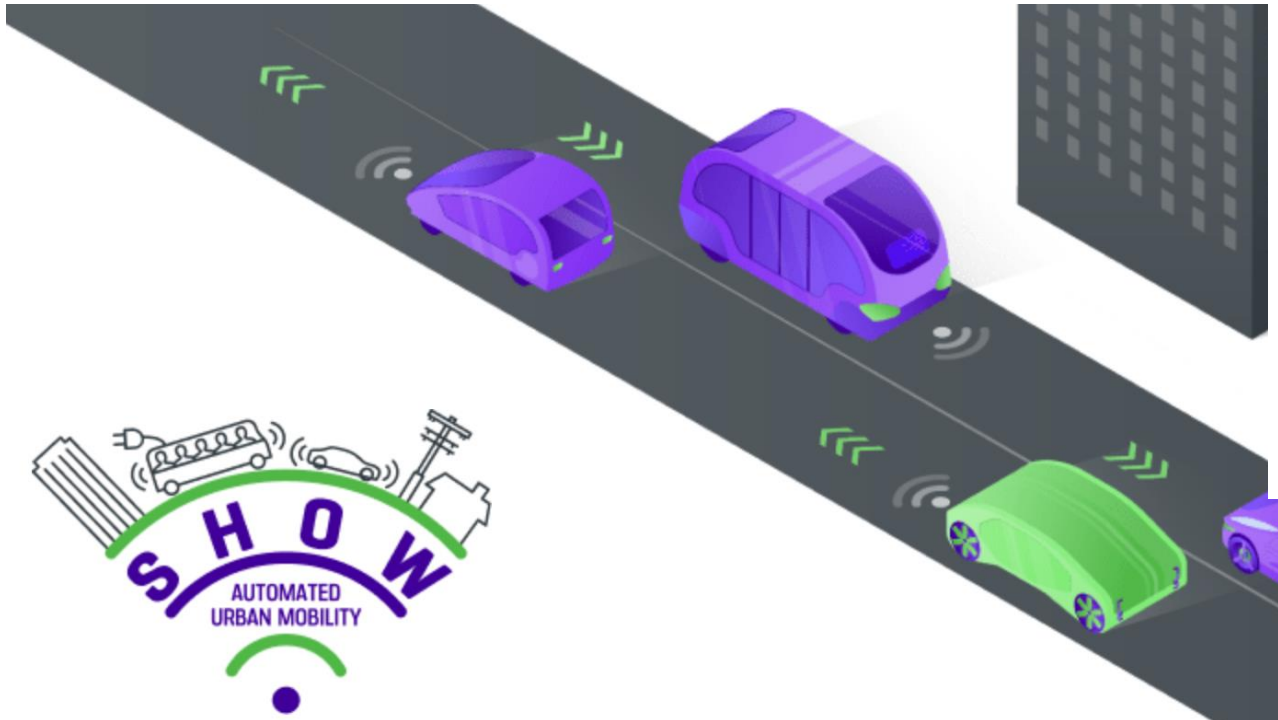
Budget: €30 million

Coordinator: UITP (International Association of Public Transport)

Technical Coordinator: CERTH/HIT (Hellenic Institute of Transport)

Consortium: SHOW includes 69 partners from 13 EU-countries

Global collaboration: SHOW will conduct twinning actions with 11 global organisations from the US, South Korea, Australia, China, Japan, Singapore, among others.



SHOW
AUTOMATED URBAN MOBILITY

SHared automation **O**perating models for **W**orldwide adoption

https://show-project.eu/

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H2020 projects - HADRIAN

Human centred design for the new driver role in highly automated vehicles

- ❑Develop a holistic approach to ensure a smooth and safe interaction between the automated vehicle and their driver and users
- ❑Focus on design of dynamically adjusting HMI concepts taking environmental and driver conditions into account
- ❑Demonstrations of HMI concepts for light to larger passenger vehicles and freight vehicles/trucks
- ❑International cooperation with US and Japan

- Coordinator: Virtual Vehicle (AT)
- Consortium: 16 Partners from 8 EU Countries & Turkey
- Budget: 8 M€
- Start date: late 2019

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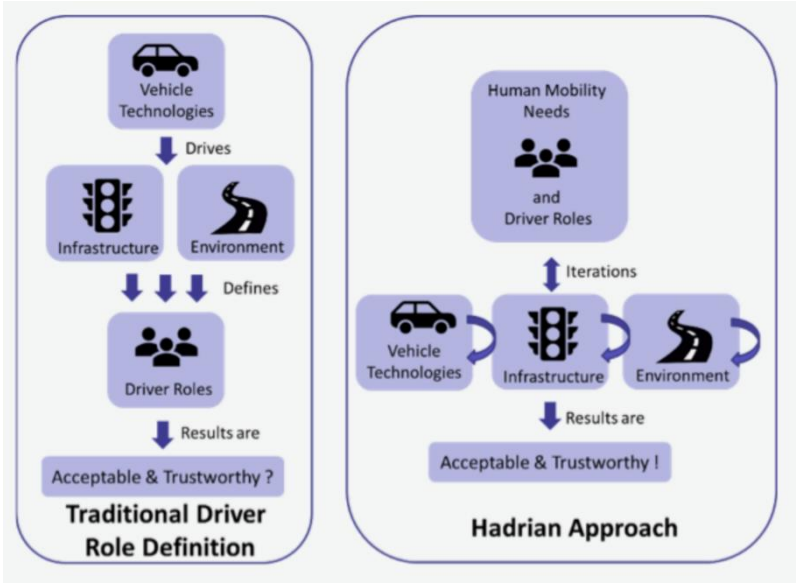
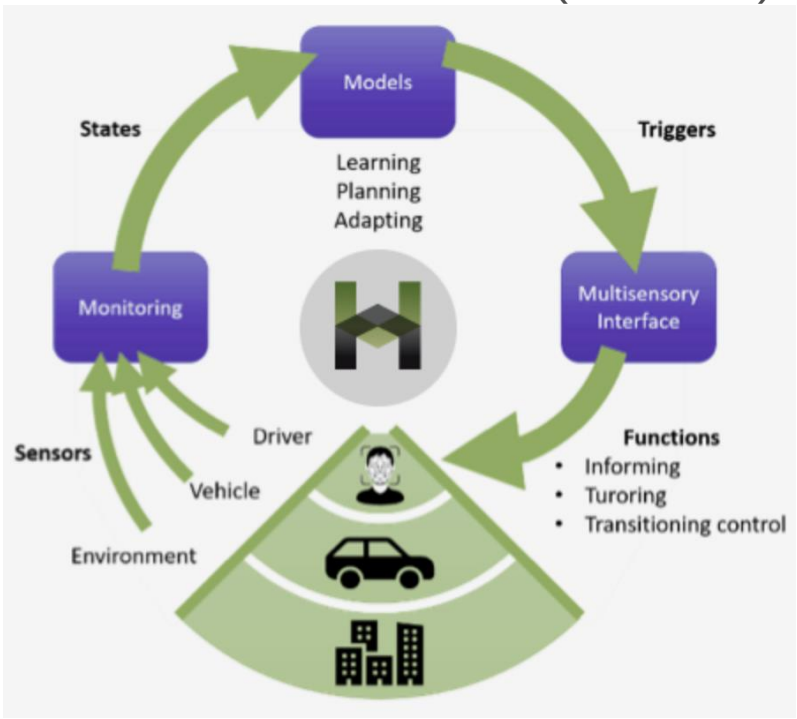


The HADRIAN f-HMI (fluid HMI)



HADRIAN

Holistic Approach for Driver Role Integration and Automation Allocation for European Mobility Needs

VIF – KOMPETENZZENTRUM – DAS VIRTUELLE FAHRZEUG, FORSCHUNGSGESELLSCHAFT MBH	**AT**
UGR – UNIVERSIDAD DE GRANADA	ES
NTUA – NATIONAL TECHNICAL UNIVERSITY OF ATHENS	GR
VDI/VDE-IT – VDI/VDE INNOVATION + TECHNIK GMBH	DE
TEC – FUNDACION TECNALIA RESEARCH & INNOVATION	ES
IKA – RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	DE
BASt – BUNDESANSTALT FUER STRASSENWESEN	DE
CEA – COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR
IESTA – INSTITUT FUR INNOVATIVE ENERGIE & STOFFAUSTAUSCHSYSTEME	AT
NVT – NERVTECH, RAZISKAVE IN RAZVOJ DOO	SI
TUD – TECHNISCHE UNIVERSITEIT DELFT	NL
ASF – ASFINAG – AUTOBAHNEN- UND SCHNELLSTRASSEN-FINANZIERUNGS- AKTIENGESELLSCHAFT	AT
AVL – AVL LIST GMBH	AT
FORD – FORD OTOMOTIV SANAYI ANONIM SIRKETI	TR
USR – UNIVERSITY OF SURREY	UK
PLUS – PARIS-LODRON-UNIVERSITAET SALZBURG	AT

https://hadrianproject.eu/

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H2020 projects – ART-05 & ART-06

Efficient and safe connected and automated heavy commercial vehicles in real logistics operations

Large-scale, cross-border demonstration of highly automated driving functions for passenger cars

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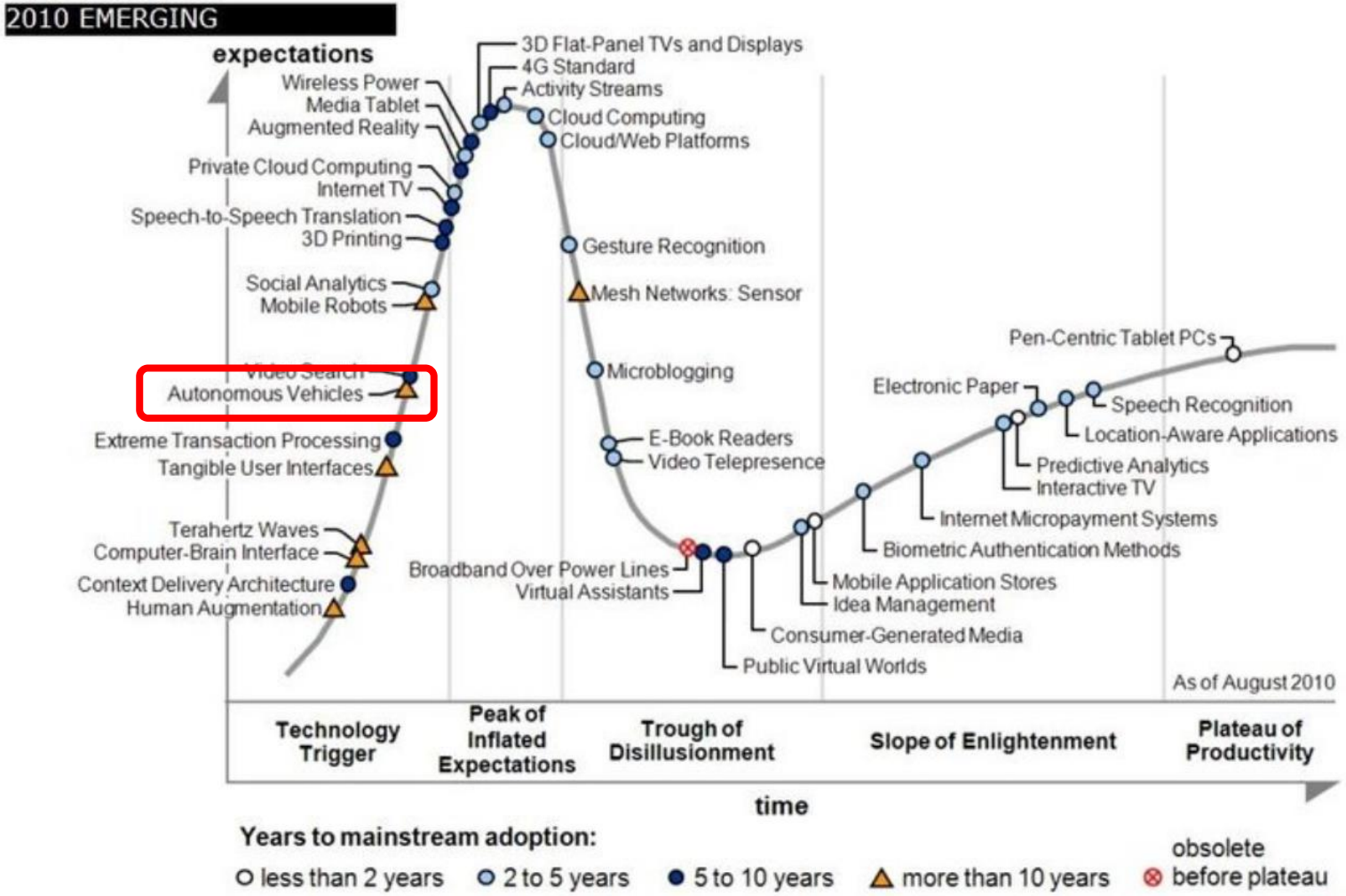
Hype and reality



Gartner

European Commission

European Commission

ODD Framework

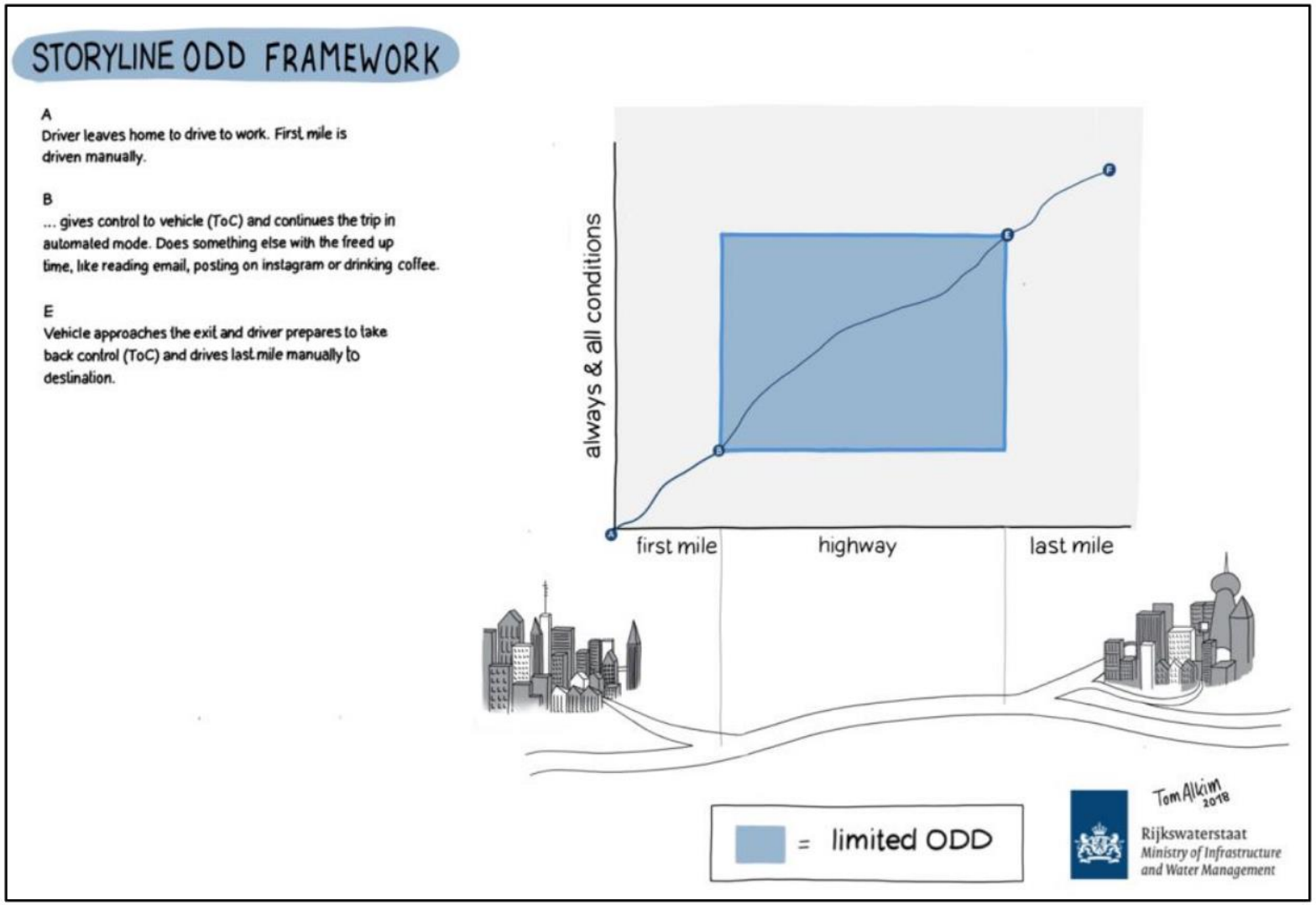


Figure 3: Visual representation of limited ODD

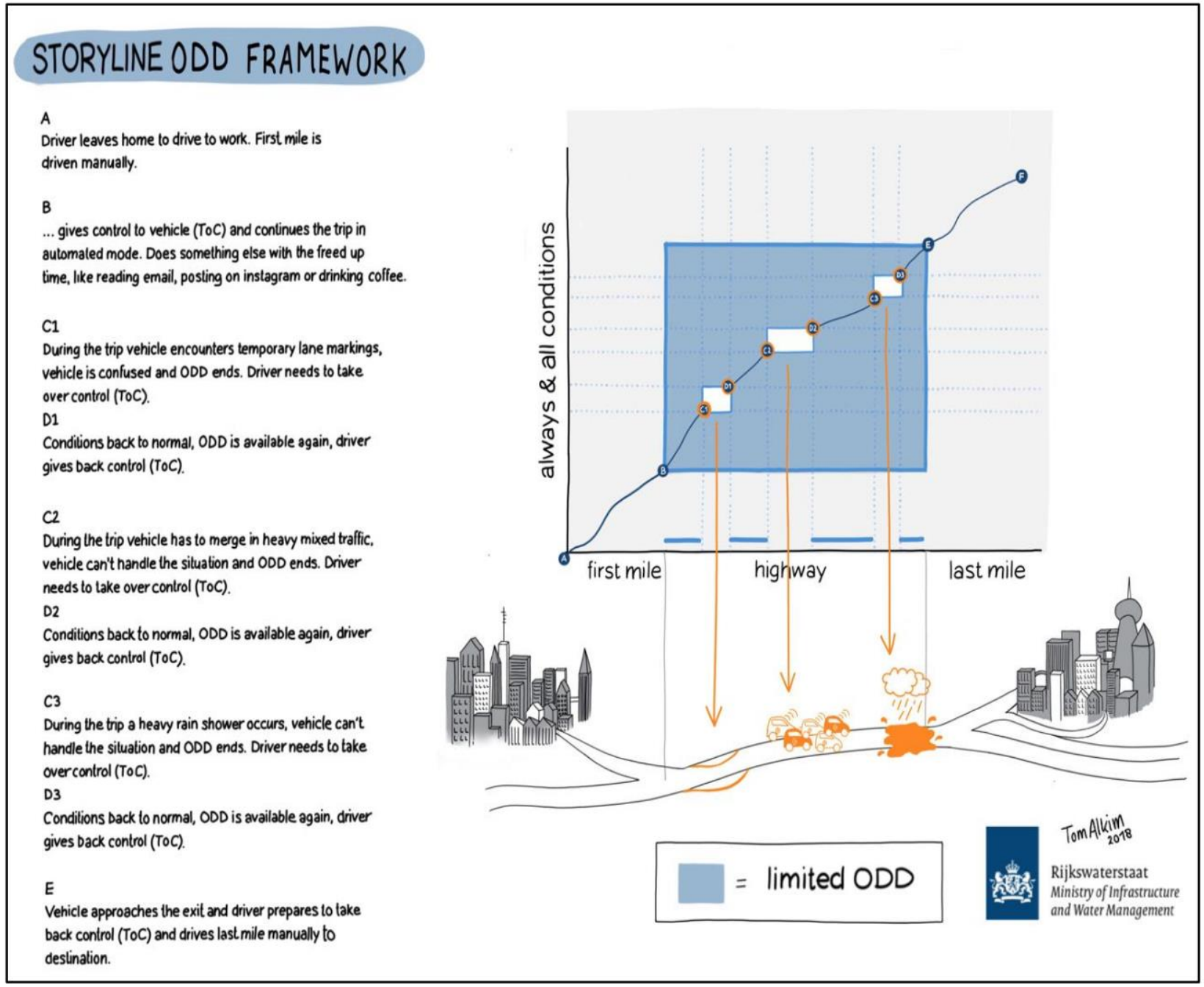
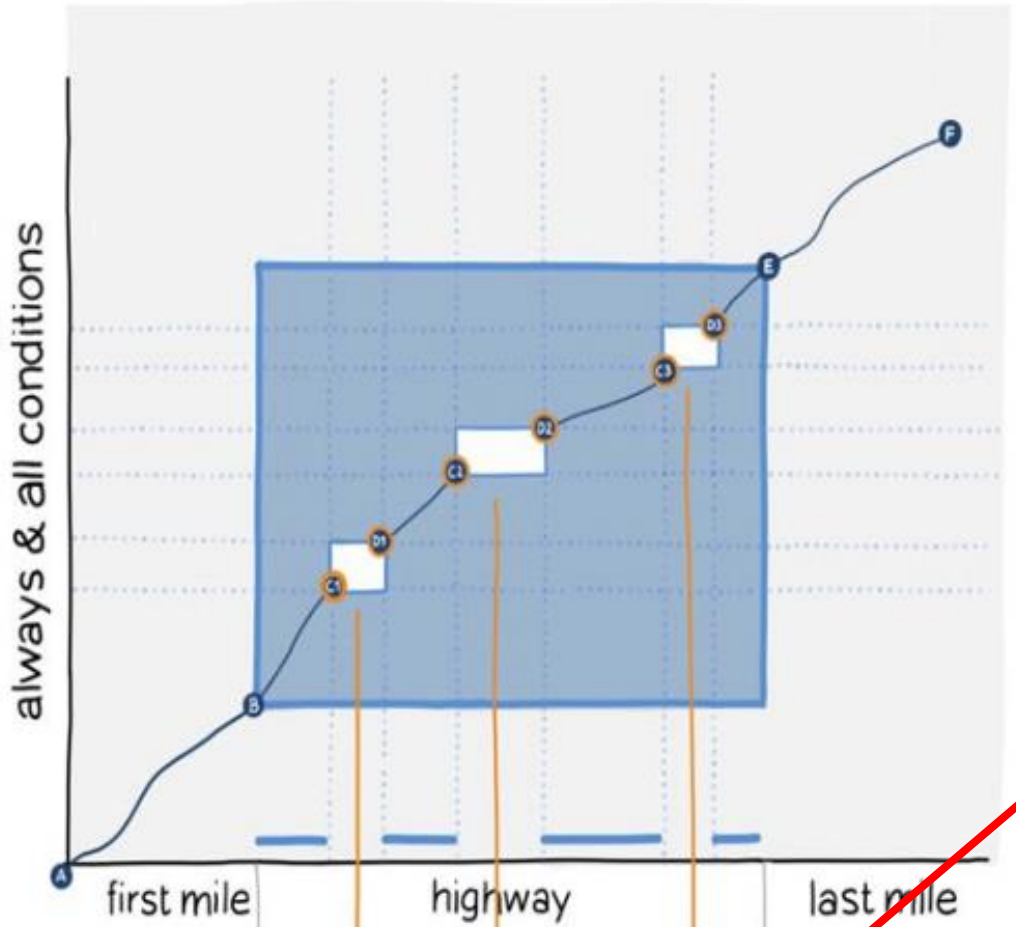


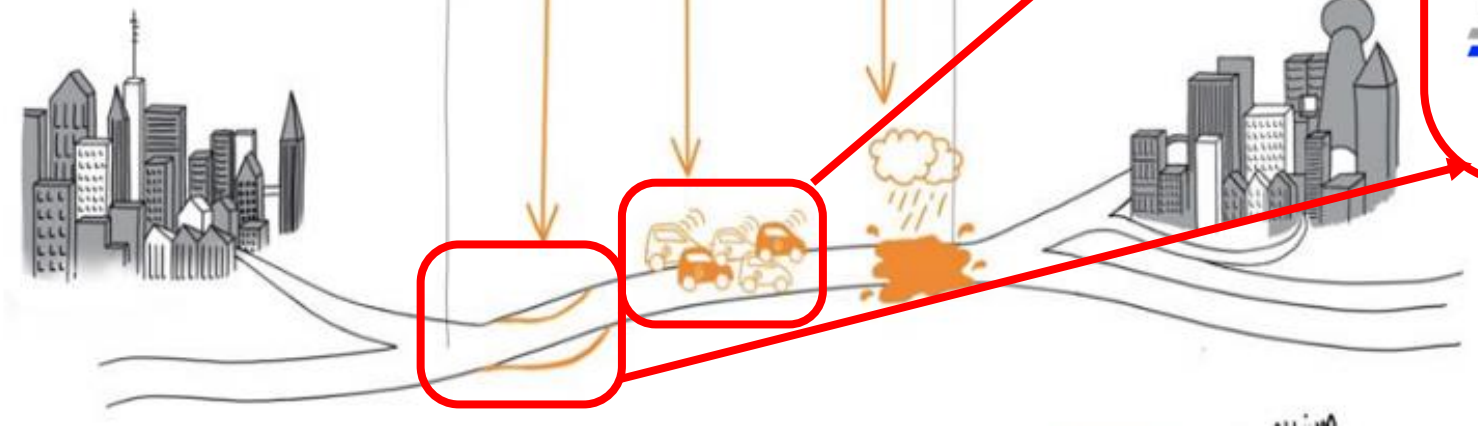
Figure 4: Visual representation of ODD in practice

L3Pilot Driving Automation

ENSEMBLE

SHOW AUTOMATED URBAN MOBILITY





interACT

TrustVehicle

BRAVE

VI-DAS

ADAS&ME

AutoMate

Mediator

CoEXist

INFRAMIX

TransAID

MAVEN

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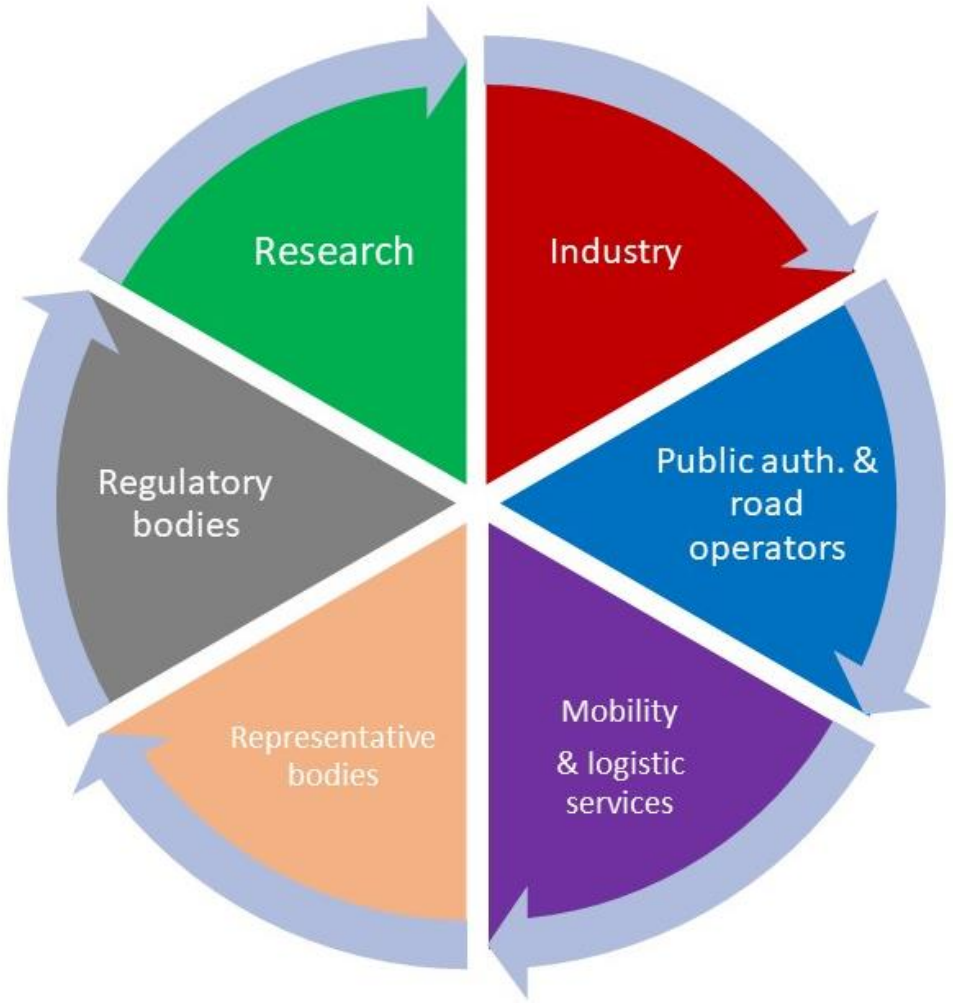
CCAM Partnership

PPP to better align EU R&I efforts in the field of CCAM to:

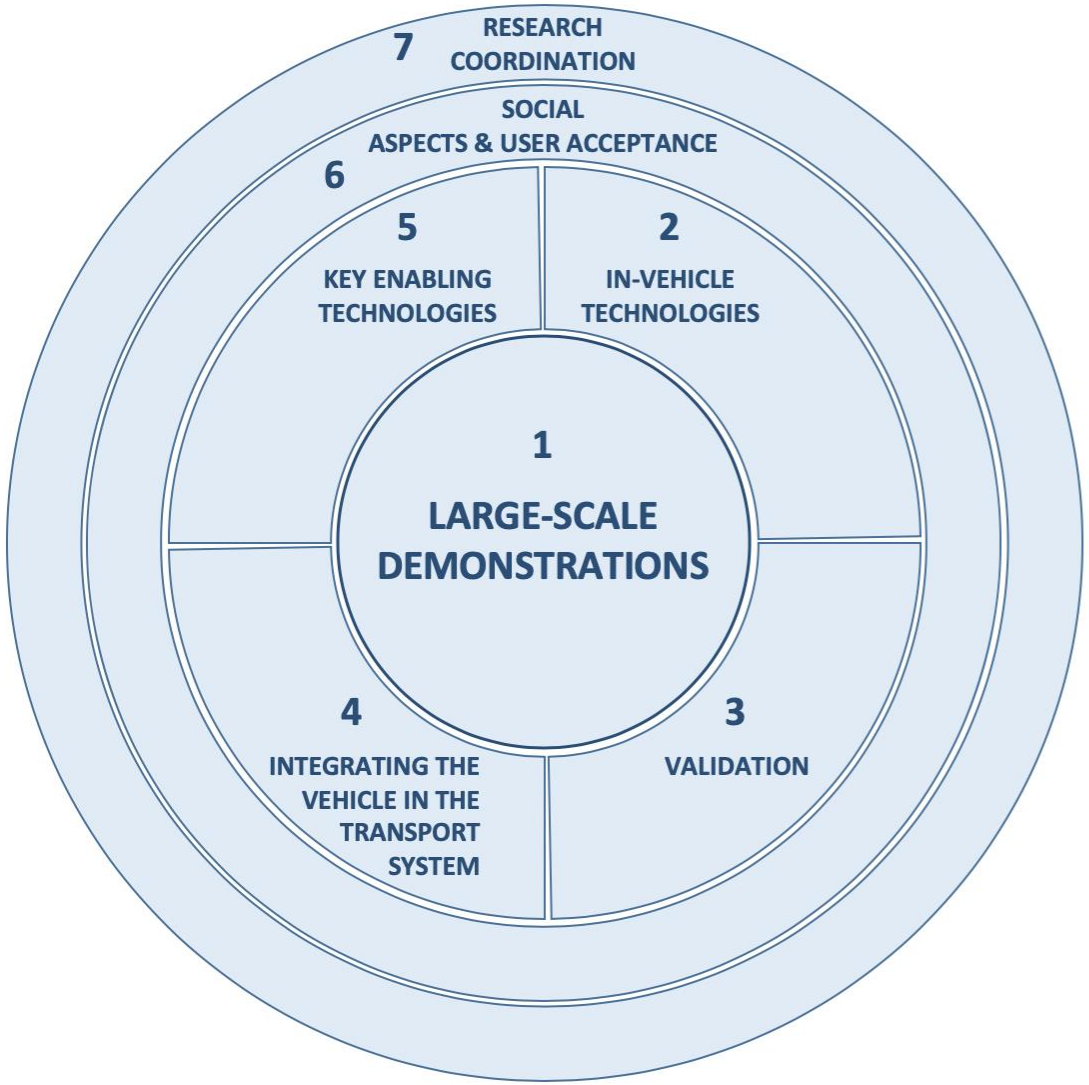
- Improve safety and security of road transport
- Meet societal and market needs, including the inclusiveness and accessibility of mobility and more efficient traffic flows
- Reduce environmental impacts, including congestion, air quality, energy consumption and climate change
- Increase the effectiveness of R&I and accelerate market take-up of innovative solutions, contributing to maintaining and extending industrial leadership.

CCAM Partnership - stakeholders



Industry	- Automotive industry, including supply chain - ITS solutions, telecom providers, connectivity - Data handling and storage industry, ...
Public authorities & road operators	- Cities and regions - Transport authorities, road authorities and operators - Member States
Mobility & logistic services	- Public transport providers - Mobility and logistics service providers - Insurance, maintenance, ...
Representative bodies	- Road users - Stakeholder associations - Road safety, society, the environment, ...
Regulatory bodies	- National, European and international
Research	- Universities - Public research institutes - Private research institutes

CCAM Partnership



CCAM - 7 Clusters

1	Shared automated mobility solutions (11) Highly automated passenger vehicles (13) Automated commercial/freight vehicles (14)
2	Environment perception (1) Passive & active safety (3) On-board decision making (4) Human Factors requirements (6.1)
3	Validation of CCAM systems (5) Validation of Human Factors (6.2)
4	Remote operation and surveillance (7) Physical and digital infrastructure (8) Connectivity / Cooperative Systems (9) Fleet and (mixed) traffic management (12)
5	Cyber-secure electronics (2) Artificial Intelligence (10) Data Storage and sharing (21)
6	Societal needs analysis (15) Socio-economic and environmental impact analysis (16) Workforce development (22)
7	European framework for testing on public roads (17) Data exchange platform (18) EU-wide knowledge base (19) Common evaluation framework (20)

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Ethical Aspects CAD - State of Play

- In June 2019, the independent Expert Group to tackle specific ethical issues raised by driverless mobility was created by the EC (DG RTD)
- 14 experts from the fields of ethics, law, philosophy and connected and automated mobility from all over Europe.
- In June 2020, a report with recommendations was finalised, providing practical support to relevant CAV stakeholders in the safe and responsible transition to connected and automated mobility.

Expert Report - Vision

- Technological progress alone will not be sufficient to realise the potential of CAVs.
- From inception to use, the timely and systematic integration of ethical and societal considerations will be essential:
  - ✓ Achieve alignment between CAVs as an emerging technology and our societal values
  - ✓ For the public to gain trust and acceptance of CAVs.

→ The report uses a Responsible Research and Innovation (RRI) approach.

Expert Report – Structure and next steps

- 20 recommendation hubs, centered around three key themes:
    1. Road safety, risk, dilemmas
    2. Data and algorithm ethics: privacy, fairness, explainability
    3. Responsibility
- In each hub, actionable next steps for policymakers, researchers, CAV manufacturers and deployers
- Publication in September
- EC to agree on an action plan to translate all recommendations into practice

Thank you!

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Keep in touch

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When will we see operational, cross-border, multi-brand truck platooning in Europe?

A: before 2025

B: between 2025-2030

C: after 2030

D: never

Spatial and temporal synchronization of truck platoons

- What kind of considerations do we need to make while planning platoons?
- How can we maximize platooning benefits? Can it be done in a simple yet powerful way?
- How do truck drivers think platooning will affect them?

Anirudh Kishore Bhoopalam

What does vehicle automation with Meaningful Human Control (MHC) mean in practice?

- Consider the importance of operationalising the concept of MHC applicable for practice
- Apply MHC to the case of Truck platooning for evaluation
- Demonstrate an operational example of MHC for AV and infrastructure design

Simeon Calvert

Next webinar Behaviour

- 10th of September
- 15.00 – 16.30 h

- Pablo Nunez Velasco – behaviour when encountering automated vehicles and impact on urban design and traffic safety

- Daniel Heikoop – how to have driver of automated vehicle maintain proper control of the vehicle from human-oriented perspective

- Reanne Boersma – lessons learned from different pilots and demonstrations of automated driving

- Moderated by Peter van der Knaap (SWOV)