European Commission

ARCADE
2nd stakeholder workshop

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European Commission

HORIZON 2020

Overview

- Horizon 2020
- Roadmap on Connected and Automated Transport
- European Platform on large scale testing
- Expert Group on Ethical issues raised by CAD

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

H2020 – R&I projects resulting from 2018 call

	Projects
Testing, validation and certification procedures • Comprehensive testing, validation and certification procedures for highly automated functions for different use cases in various traffic scenarios including cross-border	HEADSTART
Impact Assessment • Assessment of short, medium and long term impacts, benefits and costs of different scenarios for CCAD systems	LEVITATE
Support for networking activities • Explore ways to strengthen cooperation amongst European and international stakeholders • Forum for European and international stakeholders of road automation	connected automated driving.eu ARCADE

More Info on all H2020 ART projects: https://ec.europa.eu/inea/en/horizon-2020/h2020-transport/projects-by-field/automated-road-transport

HEADSTART - Harmonised European Solutions for Testing Automated Road Transport

Objective

❑define testing and validation procedures of CAD functions including:

- key enabling technologies (i.e. communication, cyber-security, positioning)
- cross-linking of all test instances such as simulation, proving ground and real world field tests
- Validation of safety and security performance according to the needs of key user groups (technology developers, consumer testing and type approval)

www.headstart-project.eu

Coordinator: IDIADA
Consortium: 17 Partners
Budget: Approx. 6 M€
Start date: 1 Jan 2019

LEVITATE – Societal level impacts of Connected and Automated Vehicles

Objective:

- build tools to help European cities, regions and national governments prepare for a future with increasing levels of automated vehicles
  - Establish a method for assessing the short, medium and long-term impacts of automated vehicles on mobility, safety, environment, society and other areas (multi-disciplinary methodology)
  - Apply the method to forecast the impact of driverless vehicles in a variety of city environments
  - Develop a web-based Policy Support Tool that will make the LEVITATE impact assessment framework user friendly for public authorities and transport planners

Coordinator: Loughborough University
Consortium: 12 Partners from 6 EU Countries & Norway, Australia, China, US
Budget: Approx. 6 M€
Start date: 1 Dec 2018

https://levitate-project.eu/

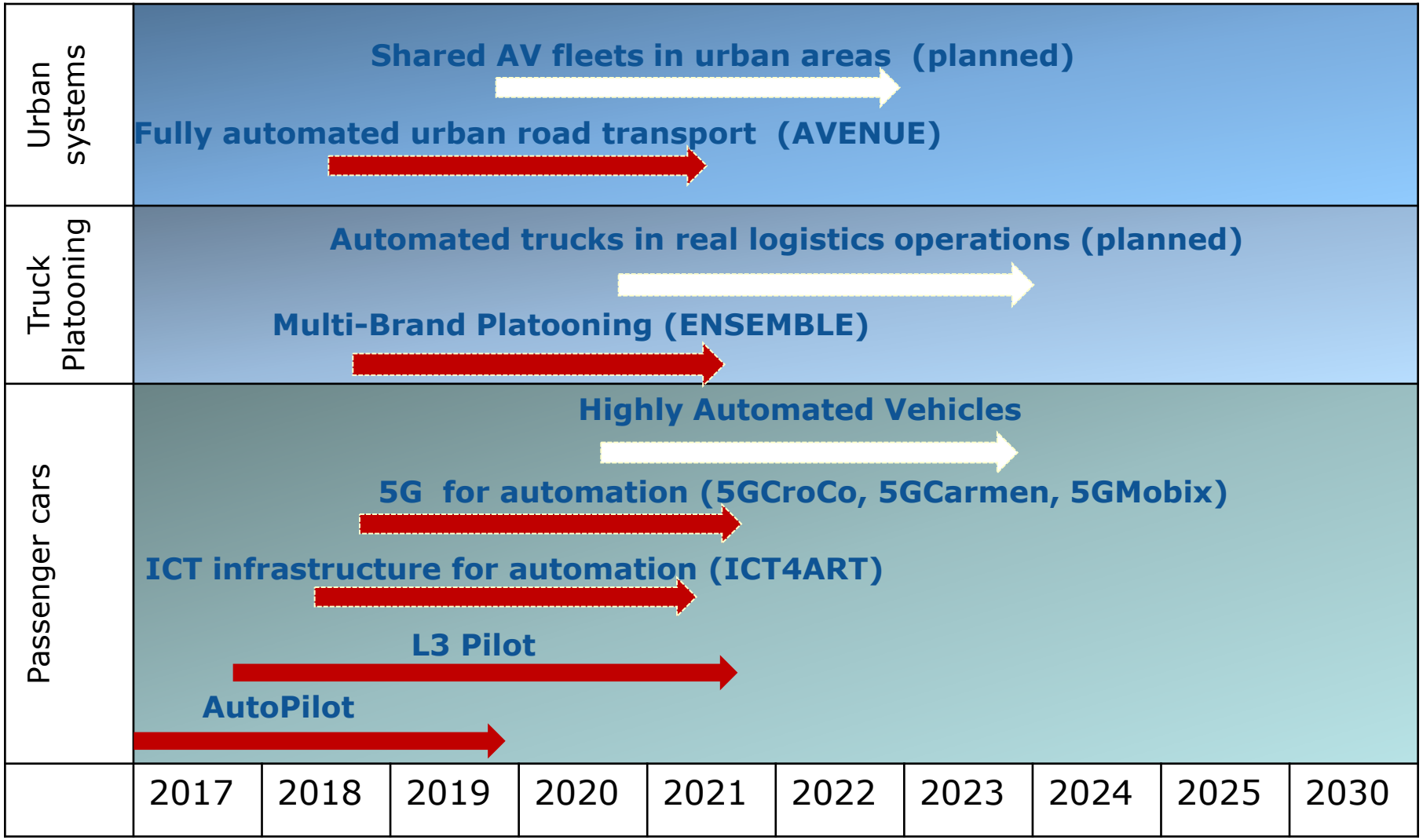
3 ICT 5G cross-border corridor projects

- Launched in November 2018, 36 months duration
- Combined budget of €63M, of which 79% funded under H2020
- Cover 1,000+km highways crossing 8 borders
- Test and demonstrate 5G-enabled CAM applications based in multi-vendor and multi-operators environment and open service platform
- New call by S2 2019 with a €30M budget

5G Corridors for Connected and Automated Mobility

Note: List of corridors is non exhaustive and subject to extensions

H2020 – Ongoing and planned large-scale demos



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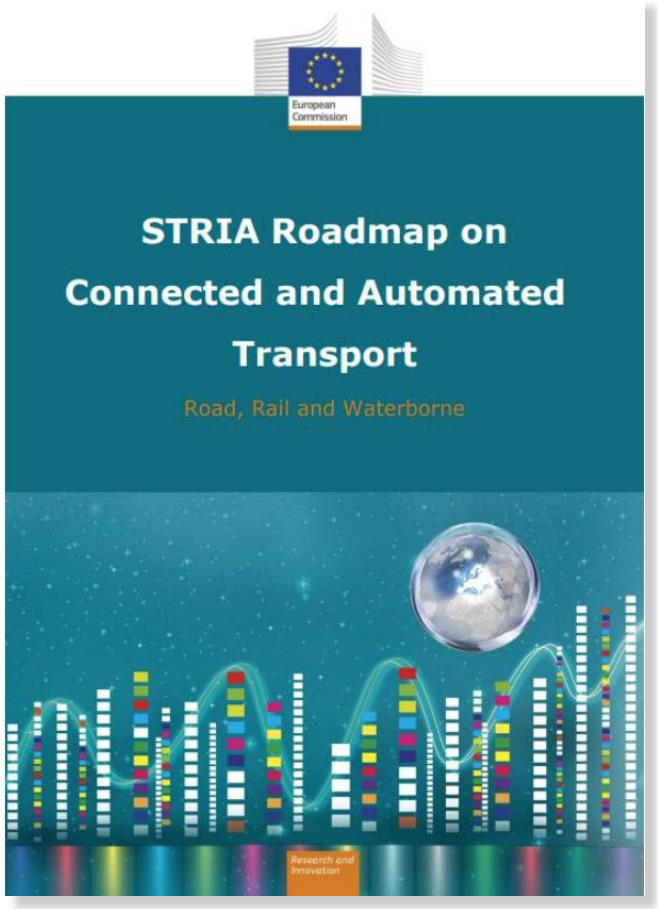
STRIA roadmap on Connected and Automated Transport (CAT)



- 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
https://ec.europa.eu/research/transport/pdf/stria/stria-roadmap_on_connected_and_automated_transport2019-TRIMIS_website.pdf

STRIA roadmap on Connected and Automated Transport (CAT)

Structure

Common introduction (addressing all modes)

R&I roadmap on CAT (rail)

- Policy objectives
- SoA
- Hurdles and opportunities
- Roadmaps & plans
- Programmes & projects
- R&I initiatives
- **Action Plan**
- Conclusions & recommendations

R&I roadmap on CAT (waterborne)

- Policy objectives
- SoA
- Hurdles and opportunities
- Roadmaps & plans
- Programmes & projects
- R&I initiatives
- **Action Plan**
- Conclusions & recommendations

R&I roadmap on CAT (road)

- Policy objectives
- SoA
- Hurdles and opportunities
- Roadmaps & plans
- Programmes & projects
- R&I initiatives
- **Action Plan**
- Conclusions & recommendations

Conclusions & recommendations (cross-modal)

STRIA roadmap on CAT – development process

- **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

Big data, Artificial Intelligence

Shared, automated mobility services

Infrastructure / secure connectivity

Human factors

Socio-economic impacts/ user acceptance

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 ODD

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
- 3.5. 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 (PDI) for enabling increasing levels of automation
- 7.3. Reliable and effective traffic, network and incident management system for CAD
- 7.4. Adequate connectivity (reliability, quality, coverage, security) for higher levels of automation
- 7.5. 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)

Action Plan

- ❑ **Core of the roadmap**
- ❑ **Comprehensive framework of actions for the various R&I initiatives**
- ❑ **Long list of actions including assessments on:**
  - Instruments (RIA, CSA, pilots, etc.)
  - Timings (short, medium, long-term)
  - Responsibilities for implementation (industry, academia, logistics companies, transport operators, etc.)
  - Responsibilities for funding (EU, MS, etc.)

In-vehicle Enablers

Measures	Short	Medium	Long
Fund R&I: perception, safe/secure electronics, decision making			
Co-Fund R&I: perception, s/s electronics, dec. making (ECSEL)			
Carry out evolutionary R&I; contribute to academia-led (R)IAs			
Launch standardization mandates: perception & cyber security			
Fund CSA on establishing a watchdog for cyber secure CAD			

Vehicle Validation

Measures	Short	Medium	Long
Fund CSAs to reach various harmonization objectives			
Launch standardization mandate: testing & validation of CAD			
Support legislation policy: cross border testing, type approval			
Make assessments, provide interfaces and release data			
Finance RIAs: virtual assessment, adaption of validation to AI			

Large Scale Demonstration Pilots to Enable Deployment

Measures	Short	Medium	Long
Foster setup of stakeholder platform on EU CAD testing agenda			
Fund FOTs, demos, living labs for close to market technologies			
Support demos of L 4/5 bus/shuttle systems and goods traffic			
Provide necessary legal framework conditions and exceptions			
Build cross-sectorial networks on business models, cross border			

Shared, connected and automated mobility services for people and goods

Measures	Short	Medium	Long
Run an urban smart mobility and transport challenge			
Establish living labs on transport system integration of shuttles			
Develop fit-for-purpose vehicle and infrastructure technologies			

Socio-economic impacts and user/public acceptance

Measures	Short	Medium	Long
Setup expert group to assess ethical & liability issues of CAD			
Organize a conference to discuss labor market effects of CAD			
Establish an observatory to assess societal impacts of mobility			
Commission EU-wide study on traffic system impacts of CAD			

Human Factors

Measures	Short	Medium	Long
Commission study on interaction between CAVs and road users			
Support harmonization of HMI by industry-wide standards			
Derive requirements in vehicle-user interaction / standardization			
Fund research to explore CAV tele-operation and run living labs			

Physical and digital infrastructure & secure connectivity

Measures	Short	Medium	Long
Establish EU CAD Stakeholder Forum to discuss PDI strategy			
Fund research to prepare the PDI ecosystem for CAD			
Establish, test, validate mechanisms for cyber security of CAVs			
Mandate standardization of fail-operation at limited coverage			
Foster collaboration between traffic management centers in EU			
Establish living labs to showcase feasibility of CAD due to PDI			

Big data, artificial intelligence and their applications

Measures	Short	Medium	Long
Fund collaborative research on data storage & sharing for CAD			
Fund collaborative research on artificial intelligence for CAD			

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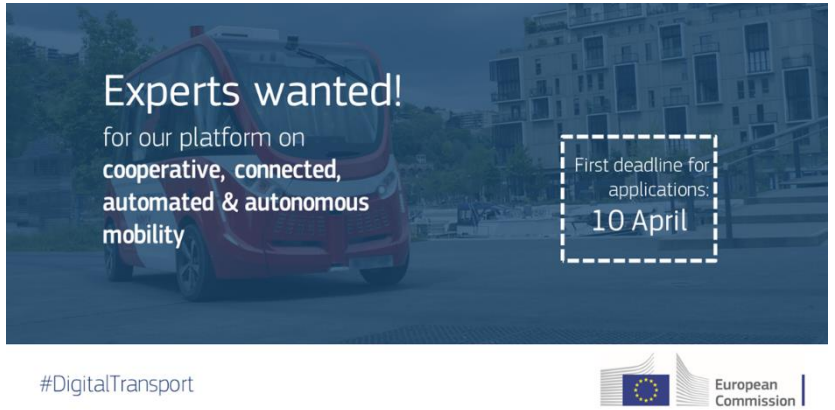
The single EU-wide platform on CCAM

- 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

  Call published**:** https://ec.europa.eu/transport/modes/road/news/2019-02-26-call-applications-single-platform_en
- Continuous call – deadline for first round of applications is the **10th of April 2019**



The single EU-wide platform on CCAM

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

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- **Expert Group on Ethical issues raised by CAD**

Expert Group on ethical issues raised by CAD

- Address legitimate societal and ethical concerns related to automated mobility, which are essential for securing **public acceptance** and **trust** in these vehicles
- Assist policy makers and designers in the safe, sustainable and efficient transition to connected and automated mobility
- The Expert Group will:
  - Study the state-of-the-art research related to ethical questions of automated mobility at international level;
  - Define ethical guidelines for the design, development, demonstration (including real world experimentation such as field-tests and pilots) and deployment of innovative driverless mobility for all user groups in Europe.