European Commission

Towards **Cooperative, Connected** and **Automated Mobility**

Contributions of Horizon Europe projects managed by CINEA



European Climate, Infrastructure and Environment Executive Agency

European Climate, Infrastructure and Environment Executive Agency (CINEA)
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Print	ISBN 978-92-95231-51-1	doi: 10.2926/720260	HZ-03-23-141-EN-N
PDF	ISBN 978-92-95231-50-4	doi: 10.2926/686283	HZ-03-23-141-EN-C

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Foreword



I am delighted to introduce this new project brochure on Cooperative, Connected and Automated Mobility (CCAM), which highlights an important area of our work in CINEA, the European Climate, Environment and Infrastructure Executive Agency.

New mobility trends and technologies are driving radical change in our transport systems. This change will have a profound impact on the environment, transport users and businesses. Automated transport is a crucial element in this transformation. It has the potential to reduce road fatalities to near zero, improve accessibility of mobility services and reduce harmful emissions from transport by making traffic more efficient.

The EU is investing substantial financial resources to achieve an intelligent transport network, integrating information and communication technologies with transport infrastructure, vehicles and users. While this creates huge opportunities, it also comes with challenges, such as ensuring the automation of transport in a connected, cooperative and safe way.

To facilitate this radical change, the EU is setting pioneering standards, through, for example, the introduction of regulations on Vehicle General Safety that make the use of some Automated Driving Systems mandatory and establish the legal framework for their approval. This will encourage innovation whilst ensuring safety, and set the conditions for effective deployment of automated vehicles on the road.

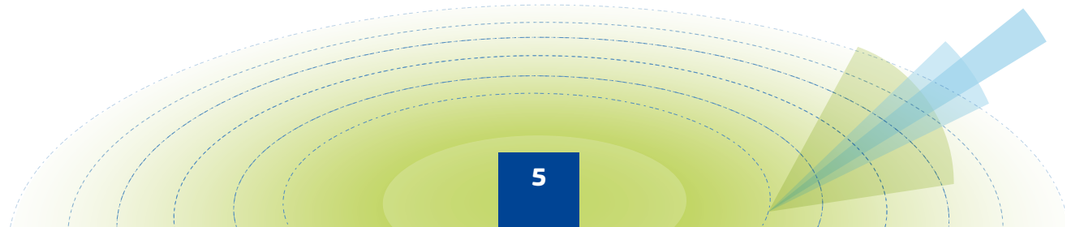
In CINEA, we are responsible for the implementation of a growing number of EU projects that develop, test and exploit innovative solutions funded under the EU's research and innovation programme, Horizon Europe. The EU is contributing around €500 million to support the development and take-up of highly automated and connected driving systems through the programme.

This brochure provides a comprehensive overview of the CCAM projects that are receiving EU funding following their selection under the first two calls of the Horizon Europe programme, in 2021 and 2022. They cover a range of domains, from data ecosystems to infrastructure support, validation methodologies to environmental aspects, and more.

We are proud of the work that the projects have undertaken so far and the contribution that they will make to this unfolding mobility revolution! I hope that you will find this brochure informative and interesting.

Paloma Aba Garrote

CINEA Acting Director



Introduction





Cooperative, connected and automated mobility – driving forward a mobility revolution

Mobility is crossing a new digital frontier with increasing automation and connectivity. This will allow vehicles to "talk" to each other, to the transport infrastructure, and to other transport users. Cooperative, Connected and Automated Mobility (CCAM) is a "game changer" shaping the future of mobility. Driverless vehicles will change our lives, just as steam trains and motor vehicles did before.

Realising the benefits of CCAM

The potential benefits of CCAM technologies are considerable – from improving accessibility to transport for people who cannot drive (e.g. elderly or disabled people) to delivering essential goods when human mobility is restricted (e.g. during pandemics or natural disasters). CCAM will help improve road safety and increase traffic efficiency, ultimately reducing costs and emissions.

In addition to the substantial gains in getting from A to B, these technologies will also deliver vast economic benefits, create new businesses and jobs, and offer opportunities to acquire specialised skills.

Bold vision and ambitious support

In its Communication, "On the road to automated mobility: An EU strategy for mobility of the future", the European Commission underlines the EU's ambition to make Europe a world leader in the introduction of safe, connected and automated mobility.[2]

However, the current pace of technological development is uneven across different Member States and transport modes. In response, the Commission has allocated around €500 million for the funding period 2021-2027 under the EU's research and innovation programme, Horizon Europe, to provide support to projects that accelerate the development and uptake of CCAM technologies and systems. The aim is to "level up the playing field" and minimise fragmentation across the EU, while ensuring a common robust approach to security and data protection issues.

Cluster 5 of the Horizon Europe work programme "Climate, Energy and Mobility" defines the funding topics for CCAM under "Destination 6: Safe, Resilient Transport and Smart Mobility services for passengers and goods". The aim is to support the development of new mobility concepts for passengers and goods – enabled by CCAM – leading to healthier, safer, more accessible, sustainable, cost-effective and demand-responsive transport everywhere.

[2] COM/2018/283 final: On the road to automated mobility: Au EU Strategy for mobility of the future

"Innovation and technology are an indispensable part of every solution we have for our global challenges. One challenge linked to the transport and mobility sector is how to move people while also achieving less pollution, more efficiency and improved connectivity. To make this happen we have to deploy at greatest speed, all the technologies available and invest in further mobility targeted research. To be smarter, we need to share more. Share visions, share ambition, share data and share services."

Adina Vălean

EU Commissioner for Transport

The projects funded so far can be categorised into seven different areas:

1. Data ecosystems
2. Infrastructure support
3. Demonstration
4. Socio-economic and environmental aspects
5. Vehicle technologies
6. Validation methodologies
7. Coordination and support activities

Exploiting synergies

There is much potential to facilitate the large-scale deployment of research results in the field of CCAM through various EU funding programmes such as the Connecting Europe Facility (CEF) for Transport.

CEF focuses on building modern infrastructure – removing bottlenecks, improving cross-border connections, optimising integration of transport modes, enhancing the interoperability of transport services, and ensuring sustainable, efficient and intelligent transport systems (ITS) – that will allow road operators to offer automated mobility services, among others. Technologies developed and tested under Horizon Europe can be deployed at large scale through CEF infrastructure projects.

Harnessing strategic partnerships

The Horizon Europe research topics on automated mobility are co-designed together with the CCAM public-private partnership, and in line with its Strategic Research Innovation Agenda (SRIA) that was established under Horizon Europe. The partnership aims to coordinate European R&I efforts to boost the development and deployment of CCAM technologies and services. The main objectives of the partnership are:

- To obtain validated safety and security, improved robustness and resilience of CCAM technologies and systems;
- To achieve a secure and trustworthy interaction between road users, CCAM and "conventional" vehicles, infrastructure and services to achieve safer and more efficient transport flows (people and goods) and better use of infrastructure capacity;
- To better coordinate public and private R&I actions, large-scale testing and implementation plans in Europe;
- To achieve a high public acceptance and adoption of CCAM solutions by 2030 with a clear understanding of its benefits and limits as well as rebound effects;
- To establish cooperation mechanisms and ensure close interaction when defining R&I actions in order to maximise synergies and avoid overlaps.

Positive impact of CCAM

In addressing many of the challenges facing our current transport system, automation has the potential to bring about a positive impact for transport users, businesses and the environment. Ultimately, through its ambitious research actions, the EU aims to ensure that it seizes the opportunities offered by driverless mobility, while anticipating and mitigating new challenges for society.



CCAM areas of support under Horizon 2020 and Horizon Europe

CCAM areas of support under Horizon 2020 and Horizon Europe

Building on success

The new Horizon Europe projects on Cooperative, Connected and Automated Mobility (CCAM) build on the results obtained from Automated Road Transport (ART) projects funded under the predecessor Horizon 2020 programme.

The infographic shows ongoing and completed ART H2020 projects, as well as ongoing CCAM Horizon Europe projects. These actions are categorised as per different CCAM areas of support.

Horizon Europe projects
Horizon 2020 projects[2]

2 The descriptions for the H2020 projects can be found in the previous CINEA brochure on Automated Road Transport

COORDINATION ACTIVITIES TO FACILITATE KNOWLEDGE EXCHANGE AND FEEDBACK ON EU POLICIES

Networking
Standardisation
Knowledge exchange
Feedback on policy

PROJECTS
FAME
ARCADE, CARTRE

SOCIO-ECONOMIC AND ENVIRONMENTAL ASPECTS TO BETTER UNDERSTAND USER AND CITIZEN NEEDS

User acceptance
Education and training
Ethics
Business models
Impact assessment

PROJECTS
SINFONICA, MOVE2CCAM
DriveToTheFuture, PAsCAL, SUaaVE, Trustonomy, Levitate, WE-TRANSFORM

VALIDATION METHODOLOGIES OF AUTOMATED DRIVING FUNCTIONS WITHIN THE TRANSPORT SYSTEM

Safety assurance
Regulations
Type-approval

PROJECTS
I4DRIVING, SUNRISE
HEADSTART

VEHICLE TECHNOLOGIES TO ENABLE AUTOMATION AND INTERACTIONS WITH THE ENVIRONMENT AND USER

Sensing
Decision-making
Communication

PROJECTS
EVENTS, ROADVIEW, AWARE2ALL
HADRIAN, ICT4CART, EVENTS, VI-DAS, BRAVE, ADASANDME, AutoMate, Trust-Vehicle

INFRASTRUCTURE SUPPORT TO ALLOW THE INTEGRATION OF CCAM VEHICLES IN THE TRANSPORT SYSTEM

Physical and Digital Infrastructure (PDI)
Roadside devices (ITS)
I2V and I2I communication
Traffic management

PROJECTS
AUGMENTED CCAM, CONDUCTOR
INFRAMIX, TransAID, CoEXist, MAVEN, interACT

DEMONSTRATION OF THE TECHNICAL MATURITY OF THE CCAM SOLUTIONS

Logistics
Public transport
Urban and inter-urban environment
Passenger vehicles

PROJECTS
ULTIMO, MODI
AVENUE, L3PILOT, ENSEMBLE, SHOW, AWARD, HI-DRIVE

DATA ECOSYSTEMS TO CREATE A ROBUST CCAM DATA EXCHANGE SYSTEM

Artificial Intelligence
Big Data
Data-sharing architecture
Cybersecurity

PROJECTS
AI4CCAM, AITHENA, SELFY, CONNECT, IN2CCAM, PODIUM



Outreach of CCAM projects funded by Horizon Europe 2021-2022

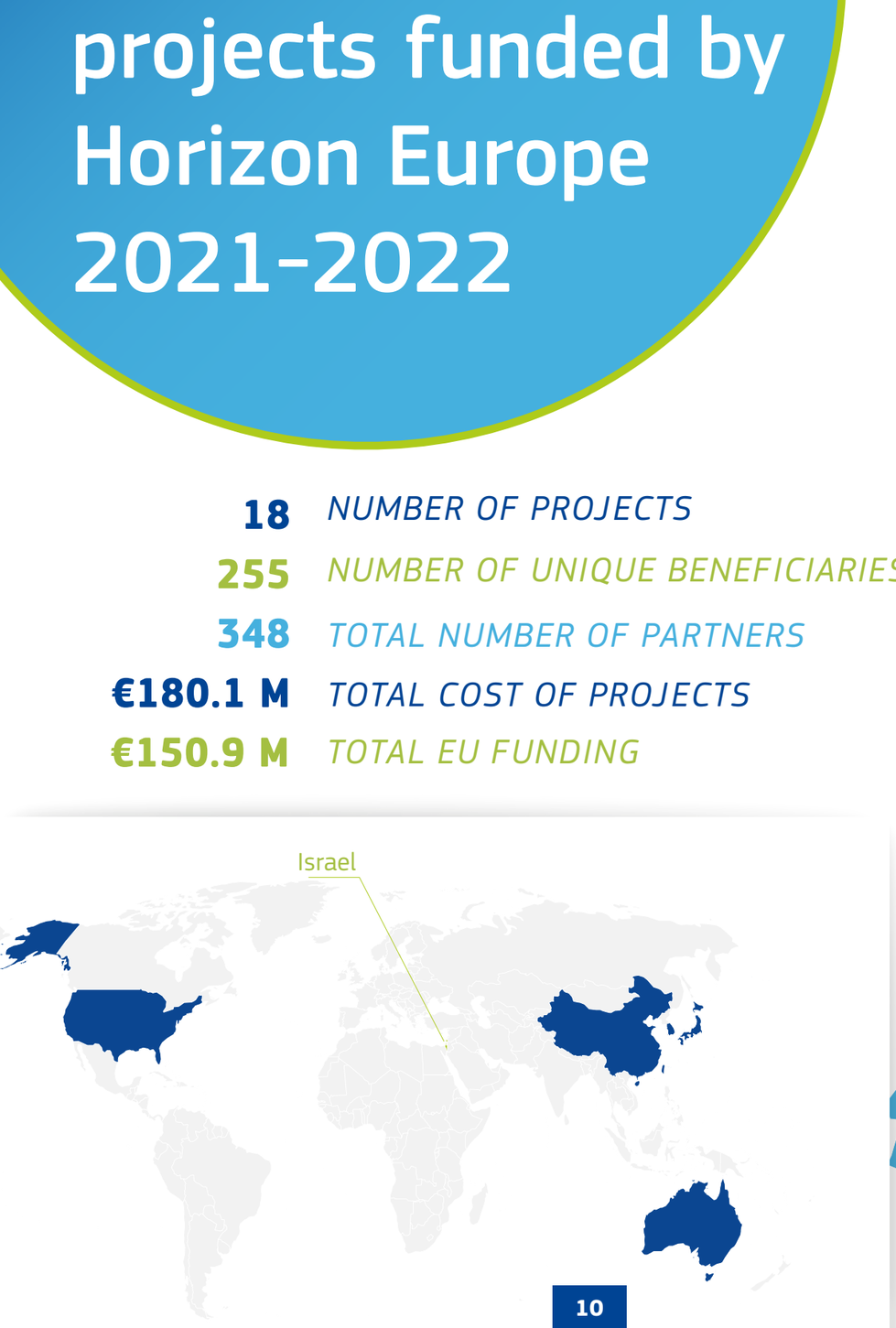
18 *NUMBER OF PROJECTS*

255 *NUMBER OF UNIQUE BENEFICIARIES*

348 *TOTAL NUMBER OF PARTNERS*

€180.1 M *TOTAL COST OF PROJECTS*

€150.9 M *TOTAL EU FUNDING*



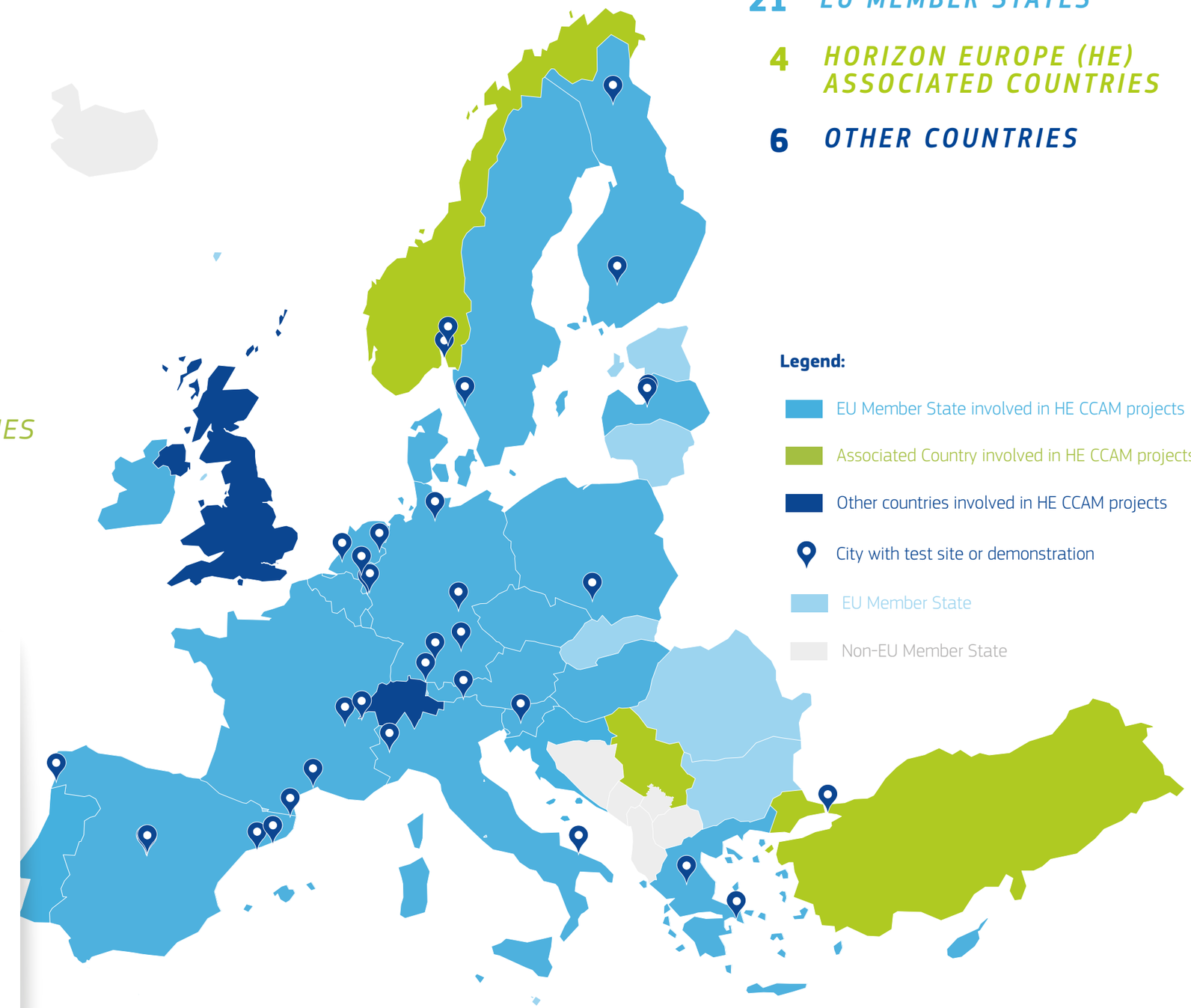
Wide collaboration across borders

PARTNERS FROM

21 *EU MEMBER STATES*

4 *HORIZON EUROPE (HE) ASSOCIATED COUNTRIES*

6 *OTHER COUNTRIES*



Project portfolio



Thematic areas:

1. DATA ECOSYSTEMS
2. INFRASTRUCTURE SUPPORT
3. DEMONSTRATION
4. SOCIO-ECONOMIC AND ENVIRONMENTAL ASPECTS
5. VEHICLE TECHNOLOGIES
6. VALIDATION METHODOLOGIES
7. COORDINATION AND SUPPORT ACTIVITIES

This section sets out an overview ‘at a glance’ of the portfolio of projects financed under the EU’s Horizon Europe programme for research and innovation in the area of Cooperative, Connected and Automated Mobility (CCAM) in 2021-2022. Projects are listed by thematic area.

AI4CCAM

Trustworthy AI for Cooperative, Connected & Automated Mobility

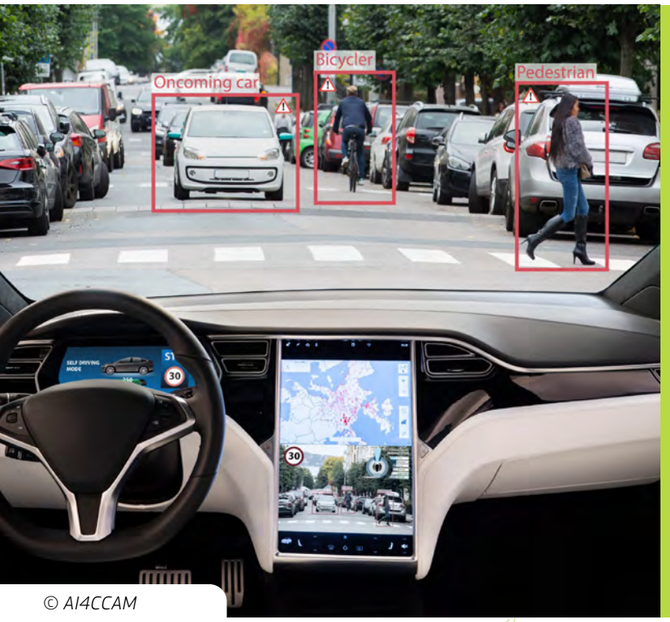
Artificial Intelligence (AI) is one of the key enabling technologies for Connected and Automated Vehicles (CAVs). The AI4CCAM project will develop an open environment for integrating trustworthy-by-design AI models of vulnerable road user behaviour anticipation in urban traffic conditions. While harnessing the potential of AI, this will also take into account its limitations and potential risks.

Leveraging the 'Ethic Guidelines for Trustworthy AI' – developed by the European Commission's High-Level Expert Group on Artificial Intelligence – AI4CCAM will support AI-based scenarios management for the development of pedestrian and cyclist behaviour anticipation models.

The AI4CCAM open environment will include an interoperable digital framework for managing and generating AI-based urban-traffic scenarios in which AI models can be tested. It will host an online participatory space to foster acceptance of AI in automated driving, determine AI risks, and identify biases in datasets and cyber-threats.

The project will also develop simulation scenarios of road users interacting with automated vehicles. These will be evaluated in three use cases covering the whole sense-plan-act paradigm and user acceptance.

The consortium consists of 14 partners from nine EU Member States. One demonstration is planned in Montpellier in France.



© AI4CCAM

COORDINATOR
SIMULA RESEARCH LABORATORY AS (Norway)

PROJECT DURATION
01/01/2023 – 31/12/2025

EU FUNDING
€5,965,630

WEBSITE
https://www.ai4ccam.eu/

AITHENA

AI race for future connected and automated mobility

Connected and Cooperative Automotive Mobility (CCAM) solutions have emerged thanks to novel Artificial Intelligence (AI). This has made outstanding advances with the emergence of sophisticated Deep Learning (DL) methods and the development of autonomous driving technologies. However, these systems have shown the largely unpredictable response of AI components in real life conditions that compromises transparency and interpretability.

In order to gain social acceptance, trustworthy AI is the next mandatory step for the technological development. AITHENA will propose a new methodology that will go beyond accuracy as the sole 'gold standard' to measure AI quality. It will explore aspects as explainability (interpretability of model functioning), privacy preservation (exposure of sensitive data), ethics (bias and behaviour), and accountability (responsibilities of AI outputs).

AITHENA will contribute to building Trustworthy AI in CCAM development and testing frameworks by focusing research on three main AI pillars: data (real/synthetic), models (data fusion, hybrid AI), and testing (physical/virtual XiL set-ups with scalable MLOps).

AITHENA will propose an innovative set of Key Performance Indicators on AI, and explore trade-offs between these dimensions. Data and tools developed by the project will be made available via European data sharing initiatives to foster research on trustworthy AI for CCAM.

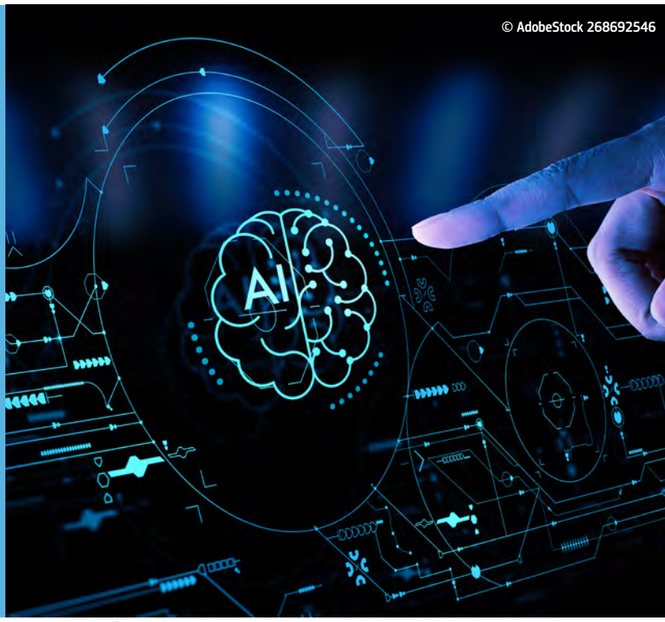
The consortium consists of 17 partners from seven EU Member States and Switzerland. Three test sites will be used: Aachen and Aldenhoven (Germany) and Barcelona (Spain).

COORDINATOR
VICOMTECH (Spain)

PROJECT DURATION
01/11/2022 – 31/10/2025

EU FUNDING
€5,999,548

WEBSITE
https://www.aithena.eu/



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SELFY

Toolbox for more secure, robust and resilient connected vehicles

By 2026, the number of connected cars is projected to reach 50 million in Europe. Safety will be an important feature, as EU regulations will require these vehicles to possess cybersecurity certificates.

The SELFY (SELF assessment, protection and healing tools for a trustworthY and resilient CCAM) project aims to develop a toolbox made up of collaborative solutions focused on situational awareness, cooperative resilience, trust and secure data exchange with the objective to improve the resilience of the CCAM sector.

The project will conduct research and development on algorithms and technologies to build a set of tools to improve CCAM resilience and guarantee data security and privacy when different data is shared. The innovative solutions proposed by the project aim to integrate technological and cybersecurity approaches, such as the fusion of data, cyberattack detection systems and Artificial Intelligence, as well as information and knowledge sharing.

Overall, SELFY's main goal is to promote a safe and secure operation amongst CCAM vehicles and mobility systems and services, enhancing trust and end-user adoption of CCAM solutions.

The consortium consists of 16 partners from six EU Member States, Turkey (Horizon Europe associated country), as well as Australia and Japan.


© AdobeStock 191304174

COORDINATOR
EURECAT (Spain)

PROJECT DURATION
01/06/2022 – 31/05/2025

EU FUNDING
€5,998,899

WEBSITE
https://selfy-project.eu/

CONNECT

Making CCAM more resilient with more trust

CCAM will potentially play an important role in creating safer, and more efficient and comfortable transportation systems. However, in many cases, there is a certain degree of mistrust in terms of safety when it comes to autonomous driving.

The CONNECT project will focus on the convergence of safety and security in CCAM. It aims to facilitate the next generation of Intelligent Transport Systems (ITS) for cooperative autonomous driving applications. The vision of the project is to enhance road safety through perception sharing, path planning, real-time local updates, and coordinated driving. This will support collaborative execution of safety-critical functions towards better services and sharing of vehicle control decisions.

The adoption of 5G (and beyond) and advances in Multi-Access Edge Computing (MEC) require quick interaction between the vehicle and the nearby infrastructure in order to react immediately to any occurring event. This however opens up new security and trust questions. CONNECT will establish a trust management framework, centred on the Zero-Trust concept, which continuously validates every stage of a digital interaction.

Combining the vehicle's systems with information available in the cloud increases the knowledge of the environment and outsources calculations in a trustworthy way. This ultimately helps to speeds up decision-making. CONNECT will provide the fundamental building blocks for establishing the required trust model in this ever evolving environment, thus, contributing to Europe's secure and sustainable digital future.

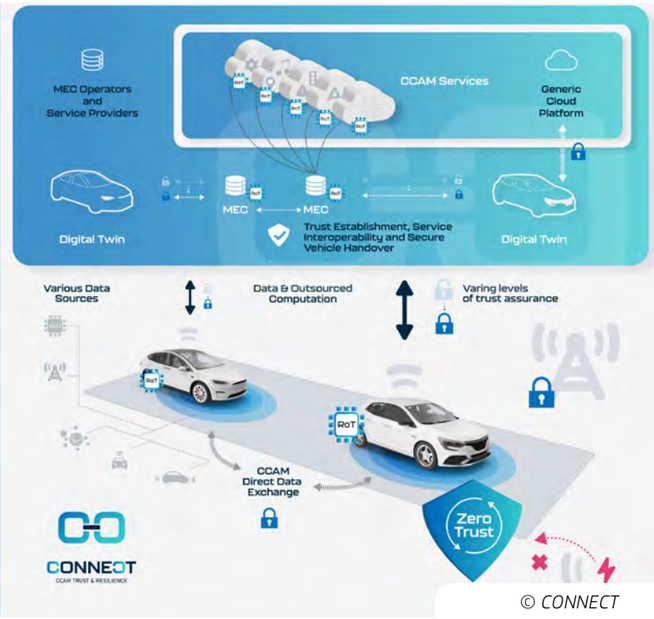
The consortium consists of 17 partners from seven EU Member States, Israel (Horizon Europe associated country), as well as the UK.

COORDINATOR
TECHNIKON (Austria)

PROJECT DURATION
01/09/2022 – 31/08/2025

EU FUNDING
€5,656,644

WEBSITE
https://horizon-connect.eu/



© CONNECT

IN2CCAM

Enhancing integration and interoperability of the CCAM eco-system

Driverless cars, buses and trucks based on artificial intelligence techniques and digital twins will have potential to correct human errors. The IN2CCAM project aims to accelerate the implementation of innovative CCAM technologies and systems for vehicles, infrastructure and users.

The IN2CCAM project will explore three aspects affecting safety and resilience: technologies, regulations, and human factors. Starting from the analysis of the existing CCAM ecosystems, the project will identify physical, digital and operational infrastructure (PDI) requirements. On the basis of these needs, the IN2CCAM will draw up recommendations for closing the existing gaps to facilitate CCAM integration in the transport system. This will also take into consideration the integration and interoperability with existing and new Intelligent Transportation System (ITS) platforms.

The main expected impacts for society are: i) safety reducing the number of road accidents caused by human error); ii) environmental (reducing transport emissions and congestion by easing traffic flow and avoiding unnecessary trips); iii) inclusiveness (ensuring inclusive mobility and equitable access).

Overall, this will contribute to the development of new mobility concepts for passengers and goods - leading to healthier, safer, more accessible, sustainable, cost-effective and demand-responsive transport everywhere.

The consortium consists of 21 partners from nine EU Member States and will implement the digital and operational solutions in six living labs: Tampere (Finland), Trikala (Greece), Turin (Italy), Vigo (Spain), Bari (Italy) and Quadrilatero (Portugal).



© IN2CCAM

COORDINATOR
POLITECNICO DI BARI (Italy)

PROJECT DURATION
01/11/2022 – 31/10/2025

EU FUNDING
€4,979,626

WEBSTE
https://in2ccam.eu/

PODIUM

Accelerating the implementation of CCAM technology

PoDIUM aims to build trust and sustainability for Connected, Cooperative and Automated Mobility (CCAM) and accelerate the implementation of CCAM services. Physical and digital infrastructure (PDI) is key to improving CCAM services. Physical infrastructure elements include road side traffic signs, communication network components and vehicles. Digital components involve traffic rules and regulations, as well as input from roadside, vehicle and user sensors.

PoDIUM will identify and assess the connectivity and cooperation enablers to achieve higher levels of automation and advance important PDI technologies. The necessary enhancements will be validated and evaluated in real traffic conditions in three well-equipped Living Labs in Germany, Italy and Spain. Connected and Automated Vehicles (CAVs), conventional vehicles and Vulnerable Road Users (VRUs) will be integrated with PDIs in all the project's use cases, while data coming from multiple channels and external sources will be used to facilitate the identification of conflictive situations and improve the interaction between road users.

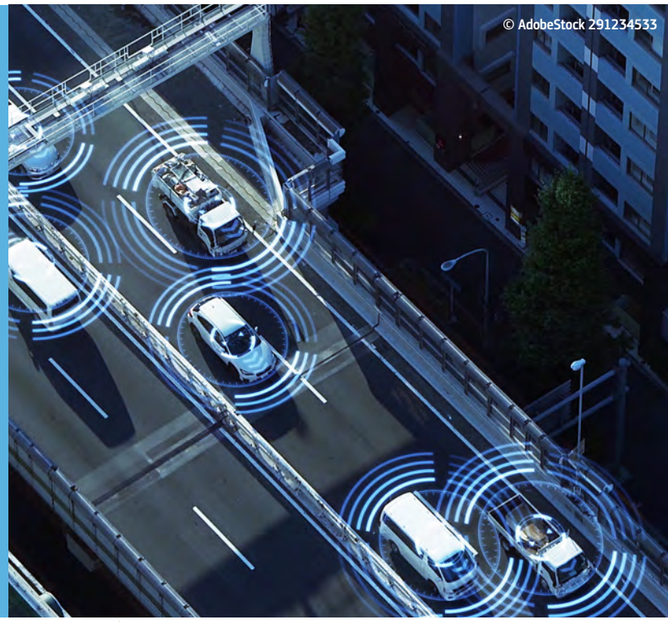
The consortium consists of 28 partners from 10 EU Member States. Five demonstrations are planned: Figueres - Perpignan cross border corridor (France/Spain), Ulm-Lehr (Germany), Turin and Autostrada del Brennero highway tunnel (Italy), and Barcelona (Spain).

COORDINATOR
ICCS (Greece)

PROJECT DURATION
01/10/2022 – 30/09/2025

EU FUNDING
€8,999,890

WEBSITE
https://podium-project.eu/



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AUGMENTED CCAM

Improving physical and digital infrastructure for connected and automated vehicles

Physical and digital infrastructure (PDI) represents a key resource for enabling and supporting the integration of vehicles into the whole transport system. The AUGMENTED CCAM project intends to understand, harmonise and assess adapted and innovative PDI support solutions.

Eleven such solutions will be developed and tested in test sites across three European countries (France, Latvia, and Spain), encompassing a vast spectrum of physical (living labs, closed areas, open traffic highway, urban and peri-urban/rural environments) and virtual test beds.

This will allow for the assessment of different PDI support solutions, including on the safety of the entire transport infrastructure, traffic safety and efficiency, driving behaviour, and the environmental footprint, as well as service reliability, trust and security.

Overall, the project's goal is to speed up the large-scale operation of cooperative, connected and automated mobility solutions for all.

The consortium consists of 27 partners from 11 EU Member States and Switzerland. Eight test sites will be used: Latvia (3), France (3) and Spain (2).


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COORDINATOR
FEHRL (Belgium)

PROJECT DURATION
01/09/2022 – 31/12/2025

EU FUNDING
€8,999,808

WEBSITE
https://augmentedccam.com/

CONDUCTOR

Fleet and traffic management systems for conducting future cooperative mobility

Digitalisation will help connect vehicles with each other and with the road infrastructure, improving traffic safety and efficiency. The CONDUCTOR project will design, integrate and demonstrate advanced, high-level traffic and fleet management that will allow the efficient transport of passengers and goods. The seamless multi-modality and interoperability system will be based on dynamic balancing and priority-based management of automated and conventional vehicles.

CONDUCTOR will build upon state-of-the-art fleet and traffic management solutions in the CCAM ecosystem by developing the next generation of simulation models and tools at different levels, enabled by AI and data fusion. These will enhance the capabilities of transport authorities and operators, thus becoming true conductors of future mobility networks.

The project will apply and test a portfolio of enhanced solutions in complementary environments of different regions under different governance and business models. Moreover, it will foster inter-modality through interoperability between different traffic management systems. The project innovations will lead to smoother urban traffic, lowered pollution, and a higher quality of life.

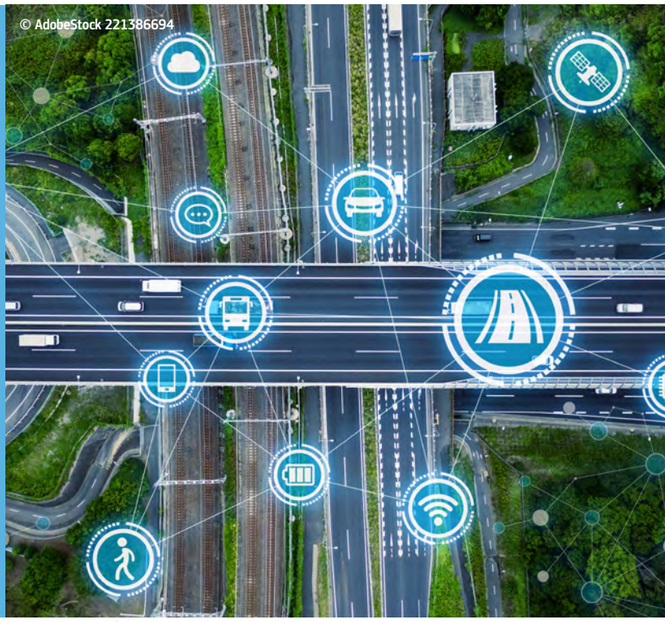
The consortium consists of 16 partners from seven EU Member States. Four demonstrations are planned: Athens (Greece), Almelo (the Netherlands), Ljubljana (Slovenia) and Madrid (Spain).

COORDINATOR
NETCOMPANY-INTRASOFT SA (Luxembourg)

PROJECT DURATION
01/11/2022 – 31/10/2025

EU FUNDING
€4,598,550

WEBSITE
https://conductor-project.eu


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ULTIMO

Advancing sustainable user-centric mobility with automated vehicles

In recent years, many projects and initiatives have been undertaken to deploy and test Automated Vehicles (AVs) for public transportation and logistics. However, despite ambitions, none of these projects have attained as yet a large-scale commercial deployment of transport services. There are many reasons for this, most notably, the lack of: economically viable models, scalability of business models, and, user-oriented services required for large end-user adoption of solutions.

The ULTIMO project will create the very first economically feasible and sustainable integration of AVs for mobility as a service (MaaS) public transportation and logistics as a service (LaaS) urban goods transportation. ULTIMO aims to deploy 15 or more multi-vendor 'Driving automation level 4' per site, in three sites in Europe.

A user-centric holistic approach, applied throughout the project, will ensure that all elements in a cross-sector business environment are incorporated to deliver large-scale on-demand, door-to-door, well-accepted, shared, seamless, integrated and economically viable, CCAM services. ULTIMO is targeting operations without a safety driver on-board, in a fully automated and mission management mode, with the support of innovative user centric passenger services.

The consortium consists of 23 partners from eight EU Member States, Norway (Horizon Europe associated country), and Switzerland. Three demonstrations are planned: Kronach (Germany), Oslo (Norway) and Geneva (Switzerland).



© ULTIMO

COORDINATOR
DEUTSCHEBAHN (Germany)

PROJECT DURATION
01/10/2022 – 30/09/2026

EU FUNDING
€24,198,270

WEBSITE
https://ultimo-he.eu/

MODI

A leap towards driving automation level 4 features

The MODI project aims to accelerate the introduction of highly automated freight vehicles through demonstrations, and by overcoming barriers to the rollout of automated transport systems and solutions in logistics. The logistics corridor from the Netherlands to Norway has been chosen for demonstration activities as the Netherlands, Germany, Denmark, Sweden, and Norway are expected to be among the first movers to implement fully automated vehicles in Europe.

MODI comprises five use cases, each describing a part of the logistics chain in confined areas and on public roads. It identifies what is already possible on an automated driving level without human interaction and what is yet to be developed. The MODI objectives are to:

- Implement new CCAM technology
- Define recommendations for the design of physical and digital infrastructure
- Demonstrate viable business models for connected and automated logistics
- Perform technical and socio-economic impact assessments

Major challenges include regulatory aspects and standardisation, border crossings, access control, charging, coordination with automated guided vehicles, loading/unloading and handover from the public to confined areas. The ambition of MODI is to take automated driving in Europe to the next level by demonstrating complex real-life CCAM use cases and setting examples of business-wise CCAM integration in logistics.

The consortium consists of 34 partners from seven EU Member States and Norway (Horizon Europe associated country). Four demonstrations are planned: Hamburg (Germany), Rotterdam (the Netherlands), Moss (Norway) and Gothenburg (Sweden).

COORDINATOR
ITS Norway (Norway)

PROJECT DURATION
01/10/2022 – 31/03/2026

EU FUNDING
€23,030,095

WEBSITE
https://modiproject.eu/



© MODI

SINFONICA

Towards more inclusive and equitable CCAM

Technological innovation moves quickly in the transport industry. While CCAM is high on research agendas, it often results in solutions that are not tailored to real concerns and expectations of citizens. SINFONICA aspires to make CCAM more accessible, equitable and inclusive.

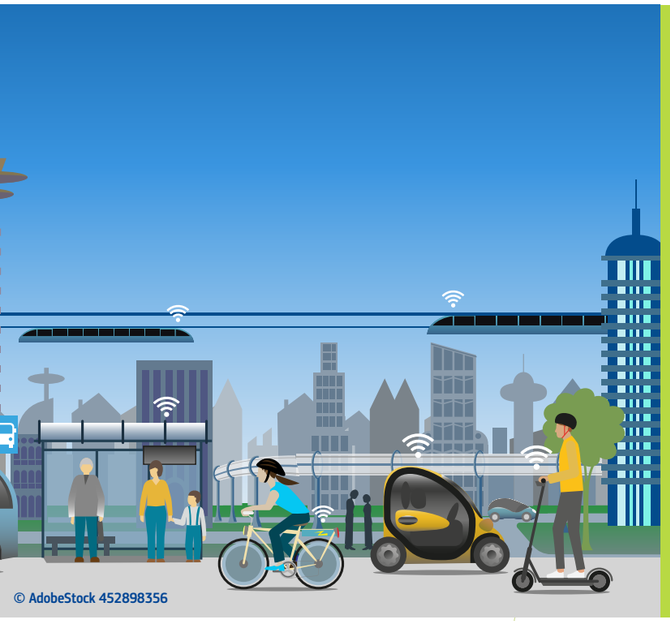
SINFONICA will work with a broad range of research groups to collect, understand and structure their needs and concerns related to CCAM. SINFONICA will use this knowledge to co-create decision support tools for designers and decision makers.

The project will work with a wide community of different user categories and other stakeholders (i.e. citizens, including vulnerable users, transport operators, public administrations, researchers, and vehicle and technology suppliers) to test and verify tools and activities.

SINFONICA will share its knowledge base, results, recommendations and guidelines through interactive tools (the Knowledge Map Explorer and a simulation toolkit). This will facilitate knowledge transfer, and ultimately, a more sustainable and inclusive deployment.

The consortium consists of 14 partners from seven EU Member States and the UK.

Test sites include four distinct areas across Europe: the Dutch province of Noord-Brabant, the West Midlands in the UK, the Greek city of Trikala and the municipality of Hamburg in Germany.



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COORDINATOR
ICOOR (Italy)

PROJECT DURATION
01/09/2022 – 31/08/2025

EU FUNDING
€3,759,724

WEBSITE
https://sinfonica.eu/

MOVE2CCAM

Explaining the transition to connected and automated driving

Mobility is crossing a new digital frontier in terms of connectivity, allowing vehicles to communicate with each other, with infrastructure, and with other transport systems users. However, little is known about the potential impact and implications of integrating CCAM solutions into the mobility system.

The MOVE2CCAM project will explore the impact of CCAM passenger and freight solutions. To do this, it will define use cases, business models and key performance indicators (KPIs) by engaging in co-creation activities with a network of actors across the entire CCAM ecosystem. It will also develop an impact assessment tool to evaluate the effect of CCAM interventions on mobility, society, the economy, public health and the environment.

Case studies for different types of organisations, dialogues, social simulation experiments, virtual reality games, and automated vehicle demonstrations will take place in eight European countries. Data will be collected at a pan-European level to examine the multi-systems impact of CCAM.

Through these activities, the project will provide insights for policy recommendations for the CCAM partnership and Sustainable Urban Mobility Plans (SUMP) and contribute significantly to an improved understanding of the impacts of CCAM.

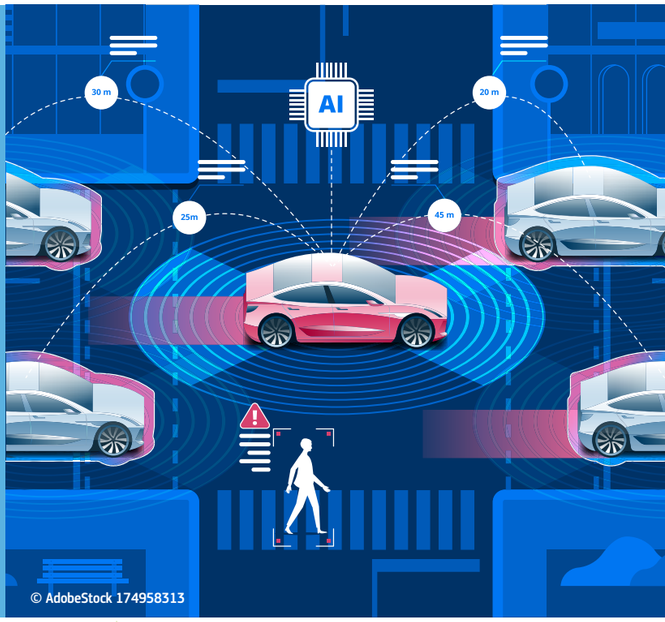
The consortium consists of 10 partners from seven EU Member States, the UK and USA. Three test sites will be used: North Aegean Islands (Cyprus), Helmond (the Netherlands), and Górnośląsko-Zagłębiowska Metropolia (Poland).

COORDINATOR
BABLE SCCs (Germany)

PROJECT DURATION
01/09/2022 – 28/02/2025

EU FUNDING
€2,577,344

WEBSITE
https://www.move2ccam.eu/



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EVENTS

Increasing CAV's ability to face unexpected situations

Unexpected situations faced by the Connected and Automated Vehicles (CAVs) during regular operations are called 'events'. CAVs need to handle these events safely and efficiently. The higher automation level increases the system's ability, as well as its complexity.

The EVENTS project will create a robust and self-resilient perception and decision-making system for CAVs to continue to operate safely and manage complex situations, where normal operations could be disrupted. Within the project, 'events' are clustered under three use cases:

- Interaction with Vulnerable Road Users (VRUs)
- Non-Standard and Unstructured Road Conditions
- Low Visibility and Adverse Weather Conditions

The project aims to create a robust perception and decision-making system for CAVs to manage such challenges and continue to operate safely. An improved minimum risk manoeuvre will be activated when the system cannot handle the event. Concretely, the EVENTS project is seeking to make significant progress in the following areas:

- Reliable perception of objects, and especially VRUs, in complex urban traffic and adverse weather or low visibility conditions
- Improved perception performance, while using cost-efficient sensor suites
- Real-time decision-making for CAVs under non-standard traffic and unstructured road conditions

The consortium consists of 11 partners from seven EU Member States and the UK.



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COORDINATOR
ICCS (Greece)

PROJECT DURATION
01/09/2022 – 31/08/2025

EU FUNDING
€5,534,448

WEBSITE
https://www.events-project.eu/

ROADVIEW

How automated vehicles handle difficult conditions

The evolution of artificial intelligence, communication infrastructure and sensor technologies has enabled exponential growth for the self-driving vehicles industry. Yet, most of these Automated Vehicles (AVs) are tested under optimal weather conditions, raising concerns for road safety under extreme weather conditions.

The ROADVIEW project has the ambition of developing advanced technology for AVs that allows them to perform autonomously under harsh weather conditions. This is an important step in making AVs more widely accepted and adopted, as well as fully realising their potential benefits for safety, efficiency, and the environment.

ROADVIEW will create cost-efficient, in-vehicle perception and decision-making systems that can recognise and predict traffic in adverse weather conditions like rain, fog, or snow. The project partners will work on developing novel systems that can handle challenging edge cases on public roads, such as extreme weather and varying traffic densities.

The outcomes of the project are expected to have a significant European and global impact, especially in areas of mobility, climate, and energy. The goal is to improve road safety for all types of road users and address major challenges of complex traffic scenarios.

The consortium consists of 16 partners from four EU Member States, Turkey (Horizon Europe associated country), as well as Switzerland and the UK. Four demonstrations are planned: Lapland (Finland), Friedrichshafen and Ingolstadt (Germany), and Istanbul (Turkey).

COORDINATOR
HOGSKOLAN I HALMSTAD (Sweden)

PROJECT DURATION
01/09/2022 – 31/08/2026

EU FUNDING
€6,652,916

WEBSITE
https://roadview-project.eu/



© ROADVIEW

AWARE2ALL

Highly automated vehicles tackling safety challenges in mixed road traffic

Imagine reading a book or napping while 'driving' to work in the mornings. This is the future of highly automated vehicles (HAVs) that do not need any human intervention. In this context, the AWARE2ALL project will explore how passengers will actually sit in cars, what activities they will engage in, and how they will 'communicate' with the Human Machine Interaction (HMI) if necessary.

The main objective of AWARE2ALL is to address the new safety challenges posed by the introduction of HAVs in mixed road traffic, through the development of inclusive and innovative safety (passive and active) and HMI (interior and exterior) systems. These systems will reflect the diversity of the traffic and people on the road and demonstrate appropriate improvements for mixed traffic safety.

AWARE2ALL will also propose a common conceptual universal safety framework for considering HMI Over the longer term, the project aims to pave the way towards the deployment of HAVs in traffic, through the development of innovative technologies and corresponding assessment tools and methodologies.

The consortium consists of 17 partners from six EU Member States, and two Horizon Europe associated countries, Turkey and Serbia.



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COORDINATOR
VICOMTECH (Spain)

PROJECT DURATION
01/11/2022 – 31/10/2025

EU FUNDING
€7,999,818

WEBSITE
https://www.aware2all.eu/

I4DRIVING

Supporting virtual assessment of Europe's next-generation mobility

CCAM will transform drivers from isolated entities to users of a shared fleet of vehicles in a fully integrated multi-modal transport system. Ensuring the safety and efficiency of such a system will require extensive simulation of virtually limitless scenarios and consideration of a wealth of human factors including age, disease, driving experience and more.

The i4Driving project aims to develop a new industry-standard methodology for the virtual assessment of CCAM systems based on a credible and realistic human road safety baseline. This will be done by developing a simulation library of human driving behaviour, to account for uncertainty in human behaviours and use cases scenarios, both in critical and non-critical driving situations.

The i4Driving models will support all CCAM stakeholders (e.g., automotive industry and type approval authorities) in the development, testing, verification and validation of automated driving systems. It will provide a realistic representation of the interactions among vulnerable road users, human-driven and automated vehicles (AVs), in a virtual simulation.

The i4Driving methodology will therefore help with the deployment of AVs with a validated level of safety in mixed traffic and more robust, safe and resilient CCAM systems. Ultimately, it will offer a set of building blocks that pave the way for a driving licenses for AVs.

The consortium consists of 17 partners from five EU Member States, Australia, China, Switzerland, the UK and the United States.

COORDINATOR
PANTEIA BV (Netherlands)

PROJECT DURATION
01/10/2022 – 30/09/2025

EU FUNDING
€6,766,959

WEBSITE
https://i4driving.eu/



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SUNRISE

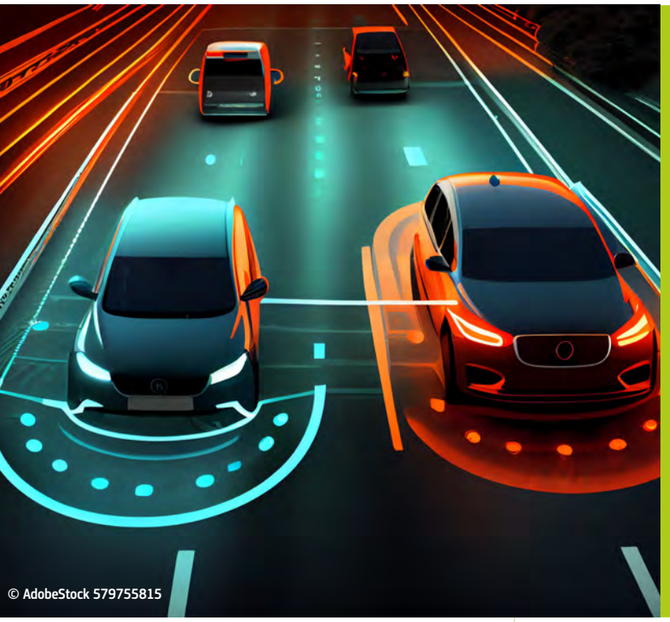
Safety Assurance Framework for CCAM technologies

CCAM technologies must prove safe and reliable in every possible driving scenario. However, this remains a significant challenge because the validation of these systems for higher levels of automation by real test-driving is not possible by conventional methods. Additionally, certification initiatives worldwide struggle to define a harmonised approach for highly automated vehicles.

The SUNRISE project will develop and demonstrate a commonly accepted, extensible Safety Assurance Framework for the test and safety validation of a varied scope of CCAM systems based on HEADSTART and other initiatives. The project will identify the needs of heterogeneous CCAM use cases and define a scenario-based database framework.

The overall goal of SUNRISE is to accelerate the safe deployment of innovative CCAM technologies and systems for passengers and goods by creating demonstrable and positive impact towards safety – aligning with the EU's long-term goal of moving as close as possible to zero road fatalities and serious injuries by 2050 ("Vision Zero").

The consortium consists of 27 partners from 11 EU Member States, Turkey (Horizon Europe associated country), as well as the UK and the United States. One demonstration is planned in L'Albornar in Spain.



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COORDINATOR
IDIADA (Spain)

PROJECT DURATION
01/09/2022 – 31/08/2025

EU FUNDING
€13,455,866

WEBSITE
https://ccam-sunrise-project.eu/

FAME

Creating integrated European framework tools for mobility and transport testing needs

Be it driverless cars or reducing environmental impacts, the cooperative, connected and automated mobility (CCAM) association is responsible for all aspects of mobility and transport in the EU. To improve coordination, the FAME project capitalises on shared knowledge to improve cooperation, consensus building, and data sharing across the CCAM stakeholder community.

The core mission of FAME is to support the European Commission and the CCAM Partnership in coordinating CCAM R&I, testing and evaluation activities in Europe, focusing on the following objectives:

- Enhance the online EU-wide 'Knowledge Base'
- Establish a stakeholder-validated European framework for testing on public roads, including a Common Evaluation Methodology
- Develop a CCAM test data space to establish trusted data sharing between different stakeholders in the CCAM community

Overall, this will enable comparability, complementarity and upscaling of R&I results for future research and testing of CCAM solutions, and facilitate the evaluation of their wider impacts.

FAME builds on the legacy of EU-funded CSAs ARCADE, CARTRE, VRA and FOT-Net projects, which developed harmonised methodologies and large stakeholder networks to build consensus around challenges and requirements for CCAM and testing.

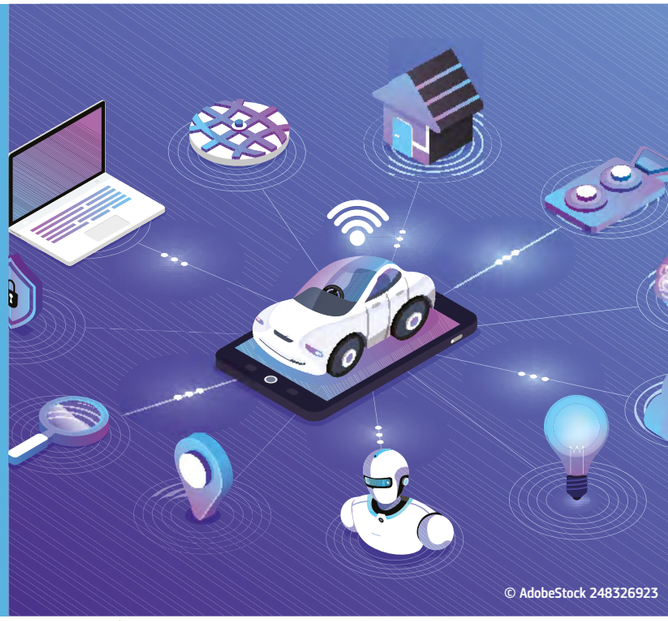
The consortium consists of 23 partners from 11 EU Member States and the UK.

COORDINATOR
ERTICO (Belgium)

PROJECT DURATION
01/07/2022 – 30/06/2025

EU FUNDING
€5,682,500

WEBSITE
https://www.connectedautomateddriving.eu/



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Horizon Europe – support for transport research

Horizon Europe is the EU's ambitious research and innovation funding programme for 2021-2027, with a budget of €95.5 billion.

It is the successor to the Horizon 2020 programme and is designed to tackle climate change, help achieve the UN's Sustainable Development Goals, and boost the EU's competitiveness and growth. The programme facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges.

CINEA is managing and implementing the funding under "Cluster 5: Climate, Energy and Mobility". A cluster is essentially a grouping of topics under Horizon Europe. Cluster 5 focuses on climate action, and improving the sustainability, security, efficiency and competitiveness of the energy and **transport sectors**.

Areas of intervention in relation to transport and mobility include: industrial competitiveness in transport; clean, safe and accessible transport; and smart mobility.

Cluster 5 mobility-related activities are implemented via several partnerships related to transport:

- Co-programmed partnerships (Towards Zero-Emission Road Transport; Batteries; Zero-Emission Waterborne Transport; Connected, Cooperative and Automated Mobility)
- Co-funded partnership (Driving Urban Transitions to a sustainable future), and;
- Institutionalised partnerships (Clean Hydrogen, Clean Aviation, SESAR and Europe's Rail).

CCAM partnership: role and ambition

On 23 June 2021, the European Commission and the CCAM Association signed a Memorandum of Understanding to formally kick-start a Co-Programmed Partnership on Connected, Cooperative and Automated Mobility (CCAM).

The Partnership aims to promote and facilitate pre-competitive research on CCAM by bringing together all actors in the complex cross-sectoral value chain. It will develop and implement a shared, coherent and long-term European research and innovation agenda on CCAM, in line with its Strategic Research Innovation Agenda (SRIA). The objectives of the partnership are to:

- Create a more user-centred and inclusive mobility system – increasing road safety while reducing congestion and negative impacts on the environment;
- Capitalise on knowledge and increase collaboration and in research, testing and demonstration projects to accelerate innovation and implementation of automated mobility;
- Work together at European level to help remove barriers and contribute to the acceptability and efficient roll out of automation technologies and services.

Synergies between transport funding instruments – from research to deployment

Aligning with CEF

Automated transport systems have great potential to fundamentally improve the functioning of our transport systems and contribute to sustainability and road safety goals. But to achieve this, research funding and innovation efforts must be well aligned with the deployment possibilities that other funding EU programmes, such as the Connecting Europe Facility (CEF), can offer.

CINEA implements most of the CEF programme budget – in total €31.65 billion out of the €33.7 billion available for the years 2021 to 2027 (namely €25.81 billion for transport and €5.84 billion for energy, while the European Health and Digital Executive Agency (HaDEA) implements €2.07 billion for digital).

In the transport sector, CEF focuses on upgrading and building modern and safe rail, road, inland waterway and maritime infrastructure – improving cross-border connections and further developing the trans-European transport networks (TEN-T). The goal is to remove bottlenecks, complete missing links and ensure sustainable, efficient and intelligent transport systems (ITS), including automated mobility services.

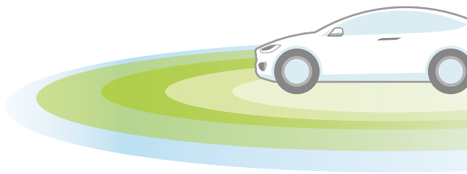
Preparing the road to the future

While funding the deployment of ITS services along the core transport network corridors, CEF also supports the implementation of Cooperative Intelligent Transport Systems (C-ITS), gradually preparing European infrastructure for future automated road transport.

Technologies developed and tested under Horizon Europe can be deployed at large scale through CEF infrastructure projects. Through real-life pilots, C-ITS services are deployed and evaluated, while ensuring interoperability and technical harmonisation across different EU Member States and road operators.

Maximising opportunities

By creating better synergies between programmes, we strive to avoid overlaps and make the most of the opportunities and financing available. Ultimately, this will help to bring new technologies and systems to the market, increase market uptake of innovative transport solutions, and boost the competitiveness of European industry in the road transport sector.



CINEA in Brief

The European Climate, Infrastructure and Environment Executive Agency has been established by the European Commission to implement parts of EU funding programmes for transport, energy, climate action, environment and maritime fisheries and aquaculture.

CINEA has a multinational team, including specialists in project management, financial management, legal affairs and communication.

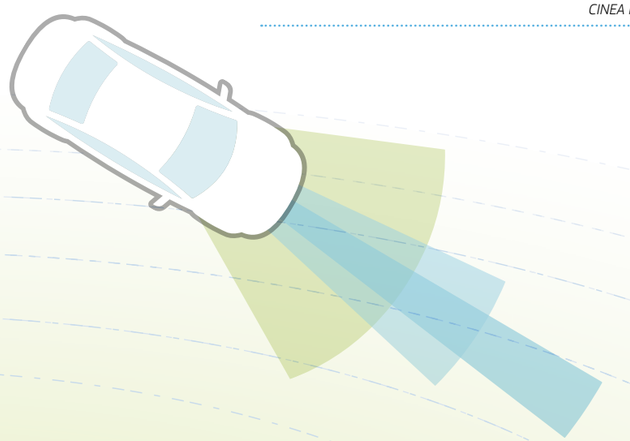
Seven European Commission's Directorates-General oversee CINEA's activities:

- DG Mobility & Transport (MOVE)
- DG Energy (ENER)
- DG Research & Innovation (RTD)
- DG Climate Action (CLIMA)
- DG Environment (ENV)
- DG Maritime Affairs and Fisheries (MARE)
- DG Regional and Urban Policy (REGIO)

Providing added value to beneficiaries

CINEA's long-standing experience in programme management provides the beneficiaries with:

- Simplified access to EU funding opportunities
- Promotion of project results and achievements for increased visibility of EU actions and promotion of the programmes
- Guidance and technical support in project management, financial engineering, public procurement, and environmental legislation in close collaboration with beneficiaries
- Streamlined and harmonised procedures for a better use of EU funds and maximised programme efficiency, such as shorter payment times and faster response rate
- Efficient evaluation procedures, user friendly and transparent call documentation, and customised IT tools to support applicants.



Supporting the European Commission

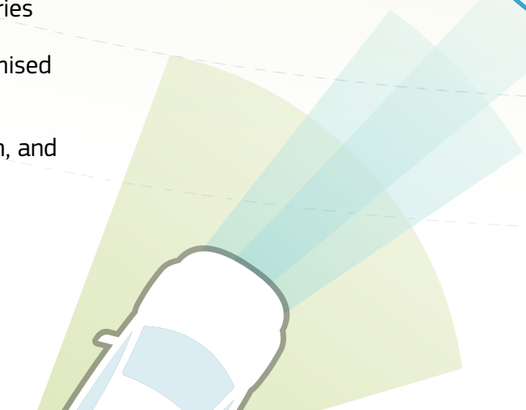
The Agency also supports policy makers and the European Commission by:

- Providing feedback on programme implementation as input to policymaking
- Developing synergies between programmes to bridge the gap between R&I results and infrastructure development
- Bringing innovative ideas, concepts and products to implementation
- Building significant economies of scale

BY 2027
+4,000
PROJECTS

BY 2027
+600
STAFF

BUDGET
2021 - 2027
€65
BILLION



HZ-03-23-141-EN-N

European Climate, Infrastructure and Environment Executive Agency

European Commission
W910
B-1049 Brussels, Belgium
+32 (0)2 299 5252

https://cinea.ec.europa.eu

cinea@ec.europa.eu

@cinea_eu

CINEA - European Climate, Infrastructure and Environment Executive Agency

CINEA - European Commission Executive Agency

ISBN 978-92-95231-50-4
doi: 10.2926/686283

Publications Office