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Annex VII

Horizon Europe

Work Programme 2025

8. Climate, Energy and Mobility

Safe, Resilient Transport and Smart Mobility services for passengers and goods

This Destination includes activities addressing safe and smart mobility services for passengers and goods.

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** '*Green transition*', '*Digital transition*' and '*A more resilient, competitive, inclusive and democratic Europe*'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the *'Multimodal systems and services for climate-neutral, smart and safe mobility'*.

The main impacts to be generated by topics under this Destination are:

Connected, Cooperative and Automated Mobility (CCAM)

1. Safe, inclusive, affordable, attractive and accessible door-to-door (incl. shared) mobility for people and goods, including freight services and last-mile deliveries, in all weather conditions, seamlessly integrated with various transportation modes to ensure interoperability and full integration of CCAM solutions into the existing transport ecosystem;

2. Resilient, climate neutral, and sustainable mobility solutions with a reduced carbon footprint leading to greener, less congested, cost-effective and more demand-responsive transport everywhere;

3. Smart mobility services based on user-centric and explainable technologies and services, including digital technologies, advanced satellite navigation services, and smart traffic management (AI enabled when appropriate), considering the diverse needs and behaviours of categories of end-users;

4. Improvement of road safety thanks to the progressive transition of road traffic towards automation and Advanced Driver Assistance Systems (ADAS).

Multimodal and sustainable transport systems for passengers and goods

1. Advanced knowledge base and solutions for climate neutral and resilient infrastructure;

2. More efficient, sustainable, safe and competitive infrastructure construction, maintenance, inspection and monitoring in a "whole life cycle" approach;

3. Existing and new transport infrastructure is designed/adapted to support deployment of new technologies and fuels in view of improving its performance, user experience and safety, support seamless and efficient multimodality and limit transport related emissions;

4. Reduced emissions and increased efficiency and competitiveness of long-haul and regional freight transport and logistics, including the supply chain optimisation.

Safety and resilience

1. Drastic reduction in serious injuries and fatalities in road crashes involving cyclists, pedestrians and users of micro-mobility devices;
2. Predictive framework is established using AI and big data for transport safety;
3. Optimised Human-technology interaction that minimises confusion, distraction and thus collision risks;
4. Enhanced aviation safety under adverse weather conditions.

HORIZON-CL5-2026-01-D6-04: Integration of human driving behaviour in the validation of CCAM systems (CCAM Partnership)

Call: Cluster 5 Call 01-2026 (WP 2025)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [1].

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Validated human behavioural models representing the variety of human driving behaviour in safety-relevant scenarios, shared through a common repository and to be used:
    - to define pass criteria/ assessment criteria for CCAM systems in type approval schemes, consumer testing campaigns and industrial development processes;
    - to design safe, human-like behaviour of CCAM systems that can be anticipated easily by other road users and is acceptable to both occupants and other road users.
- Application of such human behavioural models in the virtual safety validation of CCAM systems to realistically represent the behaviour of human-driven vehicles in closed loop

[1] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

simulations of mixed traffic, thereby reflecting the variety of human driving behaviour, including behaviour in complex real-world and emergency conditions.

Scope: The deployment of CCAM systems in mixed traffic will mean intense interaction with other road users such as the human drivers of other vehicles as well as pedestrians and riders of two-wheelers. These interactions (including implicit and explicit communication) will play a crucial role in the acceptance and thereby the penetration of CCAM systems in future road transport. CCAM systems will have to show safe and human-like driving behaviour, so that their decisions and actions can be anticipated easily by other road users, respecting the variety of typical driving behaviour across different countries as well as the need for CCAM systems to respect traffic rules and support road safety.

This will require validated models of explicit and implicit human driving behaviour to design and validate such system behaviour. These models will be needed in closed loop simulations of CCAM systems in mixed traffic to realistically represent the reactions of human drivers in other vehicles to the behaviour of a CCAM system. Models representing human driving behaviour shall be developed by the projects i4Driving[2] and BERTHA[3] under HORIZON-CL5-2022-D6-01-03[4] for selected fields of application, i.e. they will be calibrated for a limited number of scenarios. Bringing together and building upon the results of these projects – in particular a simulation library and an innovative methodology to account for uncertainty from i4Driving and a scalable, probabilistic driver behavioural model from BERTHA, research is needed to extend the fields of application that these projects are addressing with a focus on representing driver behaviour in a multitude of safety-critical scenarios, considering the variation and statistical distribution of human behavioural patterns and the factors influencing such behaviour, including the parallel execution of non-driving related tasks.

To achieve high degrees of robustness and applicability in a wide range of scenarios, detailed calibration and parameterisation is necessary, as driver behaviour depends on factors such as the road infrastructure, vehicle types, traffic conditions and rules, as well as regional influences and driver experiences / demographics, e.g., gender, age and other relevant social variables. Considering the deviation of average from ideal human driving behaviour, proposed actions must also validate the models for their extended fields of application, going well beyond the applications and degrees of validation accomplished by the above-mentioned projects under HORIZON-CL5-2022-D6-01-03. Proposed actions shall thus raise the technology readiness of these models from TRL 4 to TRL 5. Data for parameterisation and validation should be captured by monitoring real human drivers in driving simulators and/or real traffic considering what is happening inside and outside the vehicle.

Proposed actions shall integrate, to the extent possible, the validated models in the virtual validation and verification approaches as developed in the projects HEADSTART[5] and

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2 Integrated 4D driver modelling under uncertainty, grant agreement ID: 101076165.
3 BEhavioural ReplicaTion of Human drivers for CCAM, grant agreement ID: 101076360.
4 Human behavioural model to assess the performance of CCAM solutions compared to human driven vehicles.
5 Harmonised European solutions for testing automated road transport, grant agreement id: 824309.

SUNRISE[6] and complemented by EU project SYNERGIES[7]. Successful integration needs to be demonstrated in various safety-relevant scenarios as provided by the action(s) funded under HORIZON-CL5-2023-D6-01-02[8]. Models should be shared via the federated data exchange platform for CCAM to be developed by an action under HORIZON-CL5-2025-D6-06[9].

Proposals are encouraged to also explore additional fields of application of validated driver behaviour models, while the integration of relevant expertise from social sciences and humanities (SSH) is expected.

To achieve the expected outcomes, international cooperation is encouraged with research partners in Japan and the United States but also with other relevant strategic partners in third countries. Such cooperation should exploit synergies as far as possible in capturing data for the parametrisation and validation of behavioural models, while considering regional and cultural differences as well as specificities of respective road infrastructures.

This topic implements the co-programmed European Partnership on 'Connected, Cooperative and Automated Mobility' (CCAM). As such, projects resulting from this topic will be expected to report on results to the European Partnership 'Connected, Cooperative and Automated Mobility' (CCAM) in support of the monitoring of its KPIs.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM[10].

Projects funded under this topic are encouraged to explore potential complementarities with the activities of the European Commission's Joint Research Centre's Sustainable, Smart, and Safe Mobility Unit and, where appropriate, establish formal collaboration.

6 Safety assUraNce fRamework for connected, automated mobIlity SystEms, grant agreement ID: 101069573.

7 Real and synthetic scenarios generated for the development, training, virtual testing and validation of CCAM systems, grant agreement ID: 101146542.

8 EU Funding & Tenders Portal (europa.eu)

9 Federated CCAM data exchange platform.

10 See the evaluation methodology here.

HORIZON-CL5-2026-01-D6-13: Safety of Cyclists, Pedestrians and Users of Micromobility Devices

Call: Cluster 5 Call 01-2026 (WP 2025)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [11].

Expected Outcome: Project results are expected to contribute to all the following expected outcomes:

- Improved (compared to the current figures for the locations selected for the pilot testing) road safety (actual and perceived) for pedestrians, cyclists, e-cyclists and users of other micro-mobility devices, considering that the safety of these users is not only at risk from motorised vehicles, but also from their interaction with road users with higher masses or operating speeds (e.g. between e-bikes and pedestrians);

- An in-depth analysis and assessment of the safety associated with the emergence of electrically assisted small vehicles such e-bikes, e-cargo bikes, e-scooters, to be referred

[11] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

to as micromobility modes, that may be shared or own, and are used for personal mobility (e.g. commuting) and the transportation of goods (e.g. parcel delivery);

- Increased (compared to the current figures for the locations selected for the pilot testing) use of active and micromobility modes in all age and socioeconomic groups as a result of improved safety;
- Standardisation guidelines for the authorities (cities authorities, police, and hospitals) on how to report crashes that involve micromobility modes with the objective to avoid under- and/or misreporting;
- Guidelines for the city authorities on how to incorporate micromobility modes in their Sustainable Urban Mobility Plans (SUMPs) and account for the safety and convenience of all road users;
- Development of mitigating solutions for the adverse impact on the safety of cyclists, pedestrians, and other users of the changing car fleet towards bigger and heavier vehicles;
- In depth analysis of the impact of road infrastructure (e.g. design, markings, degradation status, quality, network connectivity) on the safety and comfort of cyclists, pedestrians, and micromobility users and development of mitigation solutions;
- Assessment methodologies to evaluate the safety potential and the effectiveness of advanced safety measures.

Scope: The share of trips made by active modes is increasing, which is in line with the United Nations Sustainable Development Goals. This increase is linked to cities actively placing more focus on the mobility and safety needs of pedestrians, cyclists, e-cyclists and users of other micro-mobility device, which materialises in new regulations, and in new or improved infrastructure. However, pedestrians and cyclists remain heavily affected by crashes. Concurrently, the use of electrically assisted devices (such as e-bikes, e-scooters, e-cargo bikes, mobility systems used by people with disabilities, etc.) – to be referred to as micromobility modes – is increasing exponentially because these modes represent an efficient means of personal mobility, as well as a new and effective mode for the last-mile delivery of goods within the city area. Micromobility modes, shared and owned, have been adopted by commuters, tourists, the elderly, food and goods delivery companies, and come in varying sizes and operating speeds. When their use emerged, micromobility modes were associated with high hospitalisation rates, mainly for the micromobility users themselves, but also pedestrians and cyclists. While efforts have been made to regularise and standardise these vehicles, especially in the case of shared e-scooters, there is still a significant knowledge gap related to the operational safety of these vehicles in cities.

Proposals submitted under this topic should address all of the following aspects:

- Collect and use exposure data when analysing the safety of pedestrians, cyclists, and micromobility users, and identify crash contributing factors and their interactions;

- Provide an extensive analysis of the safety needs, as well as tailored safety measures for cyclists and each type of micromobility mode (e.g. shared e-scooters versus owned e-bikes), while taking into account the trip purpose (e.g. recreational ride versus delivery of goods), and the socioeconomic and demographic characteristics of the users;

- Assess the actual and perceived safety risk of pedestrians and cyclists due to the emergence of micromobility modes that operate at higher speeds and that have increased in size and weight;

- Quantify the impact of the geometric design, quality, and continuity of the cycling infrastructure on the safety of cyclists, pedestrians and micromobility users, considering their increasing demand, operating speeds, and size of vehicles;

- Assess the potential effectiveness of vehicle-to-everything (V2X) technologies in decreasing conflicts and near misses between pedestrians, cyclists and micromobility vehicles, and users and motorised vehicles;

- Identify best practices in the design of bicycles and micromobility vehicles in terms of stability and the avoidance of single crashes, contributing to the underlying development of a draft European regulatory framework on the type-approval of micromobility vehicles or self-certification based on harmonised standards;

- Identify, define and pilot test the following in at least two clearly identified real-life urban environments:

    - new geometric designs of infrastructure to ensure safe, seamless, and comfortable mobility for pedestrians, cyclists and users of micromobility modes while accounting for the increasing demand, higher operating speeds and weight and size of e-bikes, e-scooters and all types of micromobility devices;

    - smart technologies (V2X) to assess their effectiveness in preventing and decreasing conflicts between pedestrians, cyclists, micromobility modes users and motorised traffic;

    - road safety requisites, requirements, rules and/or regulations that could be put in place by local authorities in order to increase the take-up and the safety of active and micromobility modes in all age and socioeconomic groups, by 20% compared to the baseline at the start of the project;

    - development of a comprehensive, real-time information platform for cyclists that includes data on route accessibility, signage, and infrastructure conditions.

Special focus should be paid to supporting the safety of user groups with particular vulnerability including people with disabilities (physical, mental, cognitive, developmental, intellectual, sensory, etc).

Proposals are invited to explain how the work supports local/regional/national authorities' efforts to deliver on the objectives of the Vision Zero Strategy, the Strategic Action Plan on Road Safety and the EU Road Safety Policy Framework 2021-2030 as well as on the integration of road safety policies and programmes in Sustainable Urban Mobility Planning.

Proposals should plan for an active collaboration with the well-recognised initiatives in the field of road safety and urban mobility such as the European Road Safety Observatory and the CIVITAS initiative. In addition, projects awarded under this topic should demonstrate that the proposed approaches build upon the results from previous research actions[12] and liaise and collaborate with the projects that will be selected under topic "HORIZON-MISS-2025-06-CIT-CANCER-01: Walking and cycling: increasing their modal share to reap health benefits and emission reductions and integrating active mobility and micro-mobility devices, with smart technologies and infrastructure".

This topic requires the effective contribution of social sciences and humanities (SSH) disciplines and the involvement of SSH experts and institutions, as well as the inclusion of relevant SSH expertise, to produce meaningful and significant effects enhancing the societal impact of the related research activities, with a focus on human-technology interaction, responsiveness of safety solutions and how this varies across different population groups, and behavioural norms.

[12] E.g. https://cordis.europa.eu/project/id/861570 and https://cordis.europa.eu/project/id/723430 projects

HORIZON-CL5-2026-01-D6-14: Predicting and avoiding road crashes based on Artificial Intelligence (AI) and big data

Call: Cluster 5 Call 01-2026 (WP 2025)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [13].

Expected Outcome: Project results are expected to contribute to all the following expected outcomes:

- Knowledge of high-risk locations along the road network becoming available, before crashes actually occur, enabling road authorities to deploy appropriate countermeasures proactively;
- Predictive identification of safety-critical situations based on data from multiple sources and enabling real-time interventions to avoid crashes;
- Determination of the optimal sample size to allow for reliable real-time crash occurrence prediction;

[13] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

- Enhanced monitoring of traffic flows and incorporation of traffic flow variations and patterns in real-time crash prediction, which will also lead to more effective traffic management by foreseeing unexpected or disruptive events.

Scope: One of the principles of the Safe System Approach is to turn from mainly re-active to pro-active management of road safety, i.e. not to derive needs for intervention primarily from crash investigations, but to intervene before serious crashes happen. The ubiquitous gathering of ever-growing amounts of data and their processing in the digital transport system support this idea providing valuable information on traffic situations and events. Potential data sources include amongst others: smart phones, wearables, connected vehicles, drones, road-side sensors (e.g. camera, radar), etc. Progress in computing power, in the accuracy of location services and in video analytics are further enablers in the processing and analysis of such data in order to identify safety-critical situations or conflicts based on surrogate safety metrics.

In terms of crash prediction modelling artificial intelligence has the potential to identify the underlying risk and the complex relationships between large and diverse datasets which in turn could lead to the identification of crash contributing factors and their interrelations. The identification of these risk factors may then allow predicting safety-critical situations at quantifiable risk levels and guide the proactive implementation of crash avoidance measures, as proposed amongst others by the International Transport Forum at the Organisation for Economic Co-operation and Development (OECD). Ideally, interventions would be feasible in real-time and increase the safety of all road users.

Research should address all the following aspects:

- Development of an artificial intelligence (AI)-enabled digital twin of traffic and infrastructure. This would integrate historical, current, and forecast data, including crowdsourcing and infrastructure sensors, infrastructure topology and condition, along with environmental (e.g. local weather and visibility) and road and traffic conditions. Such a digital twin can allow monitoring and preventively optimising both safety and traffic flow, equally addressing congestion and resilience issues. Results from existing projects like OMICRON[14] could be considered. The proposals should also explore the possibility and usefulness of other type of data such as sociodemographic and economic data, behavioural driving data, data from security cameras, among others that could be provided by third parties (tourism, planned events, demand, etc.);

- Analyse in detail the technical challenges associated with the acquisition and use of adequate and reliable big data from multiple sensors in the road transport system, as well as the process of combining these datasets in ways that are meaningful for proactive road safety analysis;

- Develop methods and tools to predict safety-critical traffic situations at quantifiable risk levels based on real-time and historical data;

[14] https://cordis.europa.eu/project/id/955269

- Account for biases in the datasets and ensure that the developed AI-based models or algorithms are bias-free, so that the safety of all road users will be improved effectively in a fair, non-discriminatory way;

- Analyse in detail also the non-technical challenges associated with this approach and the inherent need to collect and share large amounts of data that can be used to identify and quantify road safety-related risk factors. Ethical, legal and economic issues should be considered and concepts be developed to overcome these challenges in terms of privacy concerns, questions of data ownership, organisational barriers etc;

- Analyse what real-time countermeasures can be taken to reduce instantaneous risk levels for all road users complementary to existing Intelligent Transport Systems (ITS) services;

- Demonstrate the feasibility of such risk predictions and targeted interventions;

- Build consensus among relevant stakeholders on possible routes for deployment in coordination with other ITS services.

Particular attention should be dedicated on establishing interoperability standards for data sharing, through the implementation of the FAIR (Findable, Accessible, Interoperable, and Reusable) data principles and leveraging on already adopted practices especially those in the relevant Common European data spaces.

Ways to leverage valuable complementary data, e.g. metadata from crash databases, should also be explored, as well as links to initiatives for European data spaces.

Research is expected to develop recommendations for updates to relevant standards and legal frameworks. International cooperation is advised, in particular with projects or partners from the US, Japan, Canada, South Korea, Singapore and Australia. Knowledge and experience from other modes where similar approaches are followed in much more controlled environments should be leveraged.