CCAM
CONNECTED, COOPERATIVE & AUTOMATED MOBILITY

June 2026

CCAM PARTNERSHIP

PERFORMANCE ASSESSMENT AND PROJECTS MONITORING

2024 2025

Full report

fka GmbH

Automated Driving

Summary Report

CCAM Partnership performance assessment and projects monitoring 2024 -2025

Project Number

245490

Customer

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Aachen, June 2026

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IBAN DE 31 3907 0020 0201 339 900
SWIFTCode (BIC) DEUTDEDK 390
Deutsche Bank Aachen BLZ 390 700 20
Account no. 201 339 900

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Summary

The CCAM Partnership monitoring study evaluates the progress and impact of the Connected, Cooperative and Automated Mobility (CCAM) Partnership under Horizon Europe. Based on the assessment of 38 projects, stakeholder consultations, and KPI analysis, the study concludes that the partnership is making solid progress towards its strategic objectives, of the SRIA particularly in vehicle safety, validation methodologies, knowledge sharing, and the development of common evaluation tools.

Several key performance indicators have already been achieved, including zero fatal accidents during project testing and increased adoption of shared methods and best practices. However, challenges remain in areas such as traffic efficiency, largescale deployment, crossborder testing, data sharing, public authority involvement, and societal acceptance. The study also identifies structural gaps in freight logistics, business models, human-machine interaction, software-defined vehicles, and international harmonisation.

The report recommends refining several KPIs, improving data collection through standardized annual reporting, strengthening common validation and evaluation frameworks, encouraging mandatory data sharing, and increasing the involvement of regional and local authorities. It also highlights the need for the CCAM Partnership to take a more active coordination role by fostering collaboration, knowledge exchange, and practical support for projects.

1. Introduction

This report summary presents the methodology and summarised findings of the monitoring study commissioned to evaluate the impact of the Connected, Cooperative and Automated Mobility (CCAM) Partnership. The CCAM Partnership is a coprogrammed Public Private Partnership within the Horizon Europe framework, jointly managed by the European Commission and the CCAM Association. At the same time, the monitoring shall help the projects to critically review and improve their quality and thus to maximize their potential impacts by better collaboration, crossfertilization and valorisation of their results; all this having in mind the projects as building blocks and the bigger picture of the CCAM Partnership as a whole.

The monitoring study evaluates to what level the partnership's operational, specific and general objectives are achieved and to ensure that the means to reach those objectives are consistent. The monitoring gathered the projects' learnings beyond the State of the Art to understand and align their pathways from the programmatic input through the outputs of their activities to their outcomes towards the partnership's potential impacts. The work included stakeholder consultations with project coordinators (of all 38 CCAM projects), desktop research and input from CCAM related key personal. Additionally, recommendations are elaborated for the Partnership. These include recommendations on the Partnership's progress but also recommendations on adaptations of the KPIs defined in the SRIA. The recommendations result from the monitoring activities and the feedback of the CCAM projects.

This document provides a condensed summary of the findings of the monitoring study and recommendations on the findings.

2. CCAM Partnership key performance indicators - overview on key results

The SRIA of the CCAM Partnership defines a set of KPIs to monitor progress towards the partnership's strategic objectives. These 29 KPIs provide a structured framework for tracking developments in research, innovation, stakeholder engagement, and policy alignment within the CCAM ecosystem.

Overall, the CCAM Partnership is demonstrating tangible progress towards its strategic objectives, particularly in areas of safety, validation methodologies, and the adoption of common tools and taxonomies (a complete list of all analysed KPIs is available in the appendix). Notably, GO1 KPI 1, focused on eliminating fatal and severe accidents in test projects, has been successfully achieved, though continued monitoring is crucial. Significant strides have also been made in fostering collaboration and knowledge sharing, as evidenced by the successful attainment of GO4 KPI1 & KPI2, which demonstrate a threefold increase in the utilization of CCAM methods, tools, and best practices across projects. The SUNRISE Safety Assurance Framework (SAF), reflected in the progress toward SO1 KPI1, is poised to unlock safe and largescale deployment of CCAM systems. Furthermore, advancements in functionalities for trustworthy interactions (OO1 KPI1), safety standards recommendations (OO2 KPI2), and the expansion of the Knowledge Base (OO11 KPI1) – alongside the growing adoption of the Common Evaluation Methodology (OO9 KPI1 & KPI2) – highlight key successes. Progress towards increasing regional and local authority involvement (OO8 KPI1) and expanding demonstration sites for people mobility, freight and logistics (OO4 KPI1) is also underway.

However, progress is not uniform across all areas. Several KPIs remain inconclusive or have not yet been fully met. GO2 KPI1, relating to improvements in traffic flow efficiency and emission reduction, requires more comprehensive data collection. Targets for increasing the share of CCAM vehicles in the fleet (GO3 KPI1) and the use of CCAM corridors and demonstration sites (GO3 KPI2 & KPI3) are not yet fully realized, although a 33% improvement has been observed in the use of TEN-T corridors. Assessments of societal acceptance (SO3 KPI1) and incident rates (SO2 KPI1) are ongoing and require further data. The coordination of public and private R&I actions are improving and largescale testing and implementation plans in Europe are shaping (SO4 KPI1). The SRIA has been updated (OO7 KPI2) and progress is being made on emerging knowledge fields (OO10 KPI1). A complete assessment of societal impact (OO5 KPI2) and public awareness (OO6 KPI1) is still pending. SO3 KPI2 and OO5 KPI1 are showing promising results. Data sharing (OO7 KPI1) is working generally. Some projects are still planning and discussing full contribution due to project specific reasons.

The findings consistently demonstrate a vibrant and ambitious ecosystem, driven by a commitment to safety, sustainability, and usercentric design. Projects are actively pushing the boundaries of technology in areas like AI, cybersecurity, and data sharing, whilst simultaneously focusing on real-world implementation through testing, demonstration, and engagement with public authorities. The study also reveals critical structural gaps that must be addressed to move from isolated pilots to scalable deployment, specifically in the areas of freight and last-mile logistics, viable business models, hardware innovation, and the integration of green transition goals.

The monitoring study confirms a strong alignment between individual project objectives and the broader strategic goals outlined in the CCAM SRIA. The collaborative spirit within the community is evident, with many projects actively seeking synergies and sharing knowledge to accelerate progress. All projects are positive to enhance collaborative efforts in the future, particularly in fostering more systematic data exchange and creating truly interoperable solutions. The CCAM Partnership has the role to align upcoming projects and to ensure delivery of core results in a harmonised structure.

3. Recommendations on Key Performance Indicators and the analysis process

Several recommendations emerged during the KPI analysis process. These are based on the analysis process (Which data is available? How reliable is the data?) and the results of the analysis (What does the data mean?).

In the category of General Objectives the safety performance of GO1 is to be assessed by the number of fatal and severe accidents by vehicles under test in CCAM projects as the KPI. In total zero fatal and severe accidents occurred during over 115,000 km of CCAM project testing. Zero fatal/severe accidents during controlled project testing is positive. The target is fully achieved. The number of test kilometres driven during testing of project developments is not yet representative for full safety assurance. It rather concludes the safety of the development process. Looking towards deployment of CCAM systems KPIs for the safety performance of deployed systems needs to be implemented. These socalled Safety Performance Indicators (SPI) are currently under developed by JRC.

For General Objective GO2 (Increased efficiency of transport flows (people and goods) leading to better use of infrastructure capacity and preservation of public space while reducing transport emissions and congestion.) different KPIs are possible (Traffic flow condition, Travel Time Index, Congestion Variability Index, Congested Road/kms, Peak Hour traffic speed). Only 13 out of 38 projects actively monitor traffic flow conditions. Additionally, only two projects provide quantifiable improvements. Today monitoring traffic flow conditions is not a requirement for new CCAM projects. Furthermore, the improvement of traffic flow conditions is not always part of the project goals. It is suggested that monitoring and improving traffic flow conditions is to be emphasized stronger in upcoming project calls as a required project achievement. A more harmonized approach of the measurement of traffic flow and network performance across CCAM projects could therefore be beneficial. This could help facilitate better comparison of results and strengthen the overall evidence base for future development in this area. A common set of minimum performance indicators might be a useful step towards achieving this goal.

Special Objective SO2 (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) is monitored by a KPI related to the number of incidents per 1.000.000 km driven on LargeScale Demo project sites and successfully addressing the causes of these incidents (including malfunctions e.g. false positive detections) from largescale demonstration projects. This indicator has clear limitations. Without comparable exposure data, ODD descriptions and incident definitions, incident rates cannot be used as a robust safetyperformance indicator. The KPI requires a more detailed definition.

The second KPI on Special Objective SO3 (high public acceptance and adoption of CCAM solutions by 2030 with a clear understanding of its benefits and limits as well as rebound effects) is rather difficult to address through a monitoring study, which uses project coordinator interviews as the main source of data collection. Public acceptance needs to be assessed in relation to concrete use cases, service quality, safety perception, accessibility, cost and governance/trust in the operator. It seems to be difficult to summarise the status of the KPI over all different CCAM project activities.

To ensure a robust and actionable understanding of public acceptance, future surveys should prioritize assessing acceptance in relation to concrete use cases (e.g., automated shuttle services, autonomous trucking), service quality expectations, safety perceptions, accessibility needs, cost considerations, and trust in the operating entities.

Better coordination of public and private R&I actions is addressed in Special Objective SO4 with a KPI on active involvement of public and private members of CCAM Partnership and a KPI on number of crossborder projects. The monitoring results show that low crossborder testing is a key policy issue. Crossborder testing should be treated not only as a project activity, but as a governance and regulatory readiness indicator. The limited crossborder activity suggests a need for stronger coordination between authorities. They point to a fundamental need for harmonized governance and standardized procedures to ensure the seamless transition of vehicles across different regulatory environments. Currently the EC is trying to initiate crossborder testing on industry level by its initiative on EC Testbeds.

Operative Objective OO3 is related to common methodologies available to validate the safe system function of CCAM use cases by 2026. The KPI is on the application of methodologies and tools for the safety validation of CCAM, as developed in the CCAM Partnership. Results show already 25% of the CCAM projects apply the SUNRISE validation framework. This common validation framework is central to CCAM. If a common validation framework is to be central to the safety and scalability of CCAM, its uptake must be actively managed rather than left to voluntary adoption. This includes the possibility of requiring alignment with agreedupon validation methods as a prerequisite in future project calls and funding requirements. It is recommended to foster further alignment of methodologies and implementation of these in future upcoming projects.

Operative Objective OO4 follows on the number of largescale demonstrations of user-oriented and well-integrated CCAM solutions for mobility of people and goods in at least 30 demonstration sites across Europe by 2030. The key performance indicator is on the number of demonstration sites with results on user orientation and mobility integration as well as results on new freight and logistics concepts. The given KPI exclusively uses numbers of demonstrations sites. Furthermore, the term "demonstration site" is not defined in size and number of vehicles/demonstrations. The number of demonstration sites is a weak proxy. To fully determine the societal impact and technical maturity of these solutions, the focus must extend beyond the count of sites to include an assessment of their operational scale, the complexity of the operational conditions, and the depth of actual user involvement. Consequently, the success of these demonstrations should not measured solely by whether projects "target" user orientation, but by the extent to which they implement credible measurement frameworks to quantify actual societal benefits. As a recommendation this KPI shall be updated related to a detailed definition of demonstration sites.

Operative Objective OO7 (In 2021, establish a longterm coordination framework for R&I and largescale testing activities) is answered by KPIs on number of projects making datasets available or use data from other projects (e.g. linked through the Knowledge Base) and on regularly updated SRIA of the CCAM Partnership. Related to data sharing only 17 projects plan to make datasets available. Around 10 projects limit data sharing to internal use. This shows that datasharing remains a structural weakness. Without stronger incentives, standards and governance, the Partnership risks losing cumulative learning across projects.

Improved synergies for public and private implementation plans to deploy CCAM solutions by 2027 is the Operative Objective 008. The related indicator is on the involvement of regional and local authorities. Regional and local authority involvement has increased but remains below the 2027 target. Cities and road authorities are not only stakeholders; they are future implementers, operators, regulators and asset owners. Their early and systematic involvement is therefore essential to ensure that technological developments are aligned with operational realities, regulatory requirements, infrastructure planning, public acceptance considerations, and long-term maintenance needs. The fact that a substantial share of projects still does not involve regional or local authorities suggests that opportunities remain to strengthen co-creation and deployment planning from the earliest project stages. Increasing public authority participation would support a smoother transition from research and demonstration activities towards large-scale implementation and help reduce barriers to future market uptake across European regions and cities.

Operational Objective 009 (A common evaluation framework fostering exchange and reuse of R&I results by 2024) is measured by two KPIs. The first KPI is tracking the implementation of the common evaluation methodologies (CEM) and building up a common evidence base using CEM for CCAM demonstration activities. The second KPI is counting the number of projects making reference to common evaluation methodology in their methodology definition, also beyond European projects after finalisation of the CEM. A recommendation out of the monitoring study it to focus not only on the number of projects referencing the CEM, but also on the extent to which it is consistently and rigorously applied in their methodologies for future impact assessment. Incorporating a metric to assess the *quality* of CEM application, in addition to the number of projects referencing it, could ensure its impact on CCAM research and innovation.

Operational Objective 0011 (Expand and disseminate the knowledge base on CCAM solutions during the entire Partnership duration) is tracked by the number and regularity of updates of the CCAM Knowledge Base with projects and high qualitative content providing results and lessons learned. Although the monitoring study shows evidence that the knowledge base is a valuable asset and is being used by most of the CCAM projects, the impact of the knowledge base would be interesting to understand (who uses the knowledge base? how often is it used? for what decisions is it used? does it supports project design, policy, procurement or deployment planning?). It is recommended to adapt the KPI of 0011 to improve future monitoring results and track the impact of the knowledge base in more detail.

Concluding the overall analysis the monitoring study provides a comprehensive overview of the landscape of ongoing connected and automated mobility research and innovation projects within the Horizon Europe framework. Through detailed interviews, extensive data collection, and rigorous analysis, the study has been able to assess progress, identify key achievements, and highlight areas for continued development and refinement. Projects are actively pushing the boundaries of technology in areas like AI, cybersecurity, and data sharing, whilst simultaneously focusing on real-world implementation through testing, demonstration, and engagement with public authorities. However, the study also reveals critical structural gaps that must be addressed to move from isolated pilots to scalable deployment, specifically in the areas of freight and last-mile logistics, viable business models, hardware innovation, and the integration of green transition goals.

It is recommended to adapt the next set of KPIs for FP10 as follows:

- Development of KPIs to measure safety performance of CCAM deployed systems
- Development of a common set of minimum performance indicators might be a useful step towards achieving this goal for traffic flow conditions
- In order to analyse safer transport KPIs related to the number of incidents per 1.000.000 km driven on large scale demo projects require a revision related to the number of LSDprojects implemented by then
- The analysis of traffic flow requires a common set of minimum performance indicators to be provided by each project testing and collecting data
- The KPI on the number of demonstration sites with results on user orientation and mobility integration as well as results on new freight and logistics concepts shall be adapted towards a detailed definition of demonstration sites
- Refinement of the KPI on the expansion and dissemination of the knowledge base on CCAM solutions (0011) to a more detailed level in order to improve future monitoring results and track the impact of the knowledge base in more detail

4. CCAM projects' progress towards key achievements & lessons learned

The collective efforts of all 38 CCAM Partnership projects that were interviewed demonstrate a clear shift towards holistic, integrated approaches to CCAM development. Projects like BERTHA have established foundational elements – a robust driver behaviour model and open data hub – while SYNERGIES is strengthening regulatory preparedness through a federated Scenario Dataspace for AIsupported validation. This emphasis on data integration and validation is echoed by i4Driving's probabilistic modelling framework, enhancing the credibility of virtual safety assessments, and AWARE2ALL's proactive broadening of scenario definitions to encompass diverse road users. SELFY further contributes by delivering a comprehensive cyber-security toolbox, addressing a key impediment to widespread deployment.

Beyond technical advancements, some CCAM projects recognize the importance of societal acceptance and inclusion. SINFONICA, for example, has successfully demonstrated the feasibility of engaging vulnerable groups in the design process, generating valuable insights for inclusive CCAM solutions, a commitment mirrored by OptiPEx's cocreation of passengeraware public transport services.

Progress in infrastructure and connectivity is also evident. PoDIUM has validated the reliable operation of CCAM services in realworld settings, while FRODDO is enhancing perception capabilities in challenging weather conditions. AUGMENTED CCAM is providing practical tools for assessing infrastructure readiness, informing strategic investment decisions, and CONDUCTOR is showcasing the potential for significant CO_2 reduction and economic benefits through AIpowered multimodal coordination.

Recognizing the critical role of secure systems, projects like CONNECT and AITHENA are bolstering trust and security. CONNECT has delivered a trust Assessment Framework enabling costeffective certification, and AITHENA is establishing a methodology for developing Trustworthy AI modules, ensuring transparency and compliance with emerging EU regulations. Efforts are also translating into tangible economic and regulatory advancements. CARMONY anticipates substantial reductions in travel time and associated economic gains, and SUNRISE has taken a crucial step towards enabling the Type Approval and certification of highly automated vehicles, aligning directly with EU regulatory objectives.

The collective experience from numerous projects offers a wealth of valuable insights for future projects. These lessons consistently point towards the necessity of comprehensive planning, inclusive strategies, robust infrastructure, and collaborative approaches for successful CCAM deployment. Foundational to success is robust infrastructure enabling scalable deployment, requiring close collaboration between OEMs and infrastructure providers to facilitate integration and address regulatory hurdles.

Effective data management is also paramount, demanding standardized formats, adherence to Open Data Principles (FAIR), and strict compliance with privacy regulations like GDPR. Validating and refining solutions requires a combined testing approach – integrating real-world pilots with simulations for robustness and costeffectiveness – alongside proactive regulatory engagement to streamline demonstrations.

Beyond technology, success depends on actively involving a diverse range of stakeholders from the project's outset, ensuring solutions are relevant and grounded in realworld needs. This necessitates developing skills taxonomies for workforce reskilling and adopting an adaptive approach with regular feedback loops.

However, technical success is not enough. Truly impactful projects prioritize inclusive engagement and communication. This requires actively involving underrepresented groups through participatory methods, integrating societal perspectives early in the design process to foster acceptance, and employing effective communication strategies – such as prototypes and visual aids – to explain complex ideas in an accessible manner.

Strong project governance with early planning for interoperability and continuous regulatory alignment is essential for building scalable and trustworthy systems. These lessons underscore that successful CCAM deployment requires a holistic, collaborative, and user-centric approach prioritizing technological innovation, societal impact, and long-term sustainability.

Overall, these projects demonstrate a significant contribution to the CCAM Partnership's goals, delivering tangible results that address key EU priorities in safety, sustainability, security, and societal acceptance. The advancements made are paving the way for a more connected, automated, and efficient transportation system across Europe. However, several projects are still in early stages, with further achievements expected as they progress. This summary reflects the key accomplishments and derived lessons learned reported as of the provided data.

4.1. Recommendations on CCAM projects' progress

Although the CCAM projects' progress can clearly be measured and provides an overall positive impression, some recommendations for further improvement can be extracted based on the monitoring study findings.

The selected CCAM projects want more structured collaboration, knowledge sharing, visibility, methodology and support. It is recommended that the CCAM Partnership drives further alignment of methodologies and implementation of these in future upcoming projects. This should be fostered in more technical meetings additionally to the CCAM Partnership's current activities (e.g. room for auxiliary meetings attached to the cluster meetings).

The interaction between the CCAM Partnership, the CCAM CSA projects (FAME and CCAMbassador) and the projects were anaylsed in the monitoring study. The findings describe expectations towards FAME/CCAMbassador and the CCAM Partnership. In detail these expectations are support on knowledge exchange, visibility, data sharing, tools, methodology and coordination. These are areas covered by activities of FAME/CCAMbassador and the Partnership itself. Different supporting meetings and activities (e.g. multicluster meetings) support progress. The conducted interviews

show that the project coordinator expect a more structuredcollaboration, knowledge sharing, visibility, methodology and support. The interaction between the Partnership and supporting activities out of CSAs need to be harmonized. This shall be support by technical content developed in the CSA (e.g. the CEM, the work on harmonization of cross-border regulation).

The outputs of CSA work are seen valuable related to the content, but sometimes too general or insufficiently adapted. There is a need to improve timing, usability and practical relevance of such outputs for ongoing projects. It is recommended to announce at an early stage a clear timing on expected results. If the projects clearly understand what kind of support will arrive at what date, they can incorporate such results in their progress. Such work can include e.g. mandatory data-sharing plans, publicauthority involvement, evaluation design, and postproject exploitation pathways.

5. Practical recommendations from the monitoring study

The monitoring study results met the requirements and achieved to provide statements to all KPIs of all objectives. Nevertheless, some general recommendations emerged from the practical work conduced within the study.

Within the analysis process of the SRIA objectives it became obvious that the KPIs were designed for the SRIA at the time issued. Research and innovation can be planed as a strategic agenda, but progress and results are not known and evolve within the process over time. The KPIs are designed for large-scale implementation. The target of largescale demonstration was expected in the SRIA, but is not fully implemented until today. Therefore, some of the KPIs explicitly targeting largescale demonstration do not provide resilient results since the data is based on single implementation points.

The data collection in the study is based on a bilateral interview process combined with available desktop research data for the initial interviews. In a second round the data was updated via an online questionnaire. Contrasting experiences with the two data collection methods highlight key considerations for future monitoring tasks. Interviews proved effective in gathering detailed, contextual information and facilitating open dialogue for most KPISs of the SRIA, while the questionnaire provided a standardized and efficient means of collecting quantifiable data across all projects. Based on these observations, a mixedmethods approach is one effective strategy for comprehensive monitoring, combining the depth of insight offered by interviews with the breadth and standardization of questionnaires. However, feedback indicated that the current process could be further streamlined to better accommodate participants. It was noted that the twohour interviews and the technical depth of the questionnaire required considerable effort, which coincided with other critical deadlines, such as project reporting and consortium meetings.

To address this, future monitoring should prioritize interviews to ensure data quality and depth, but utilize shorter, more frequent sessions focused on incremental progress. These should be supplemented by targeted, streamlined questionnaires to maintain broad statistical coverage. Furthermore, closer collaboration with the CCAM Partnership is recommended to better align these efforts with the objectives of the Mission call. By refining this mixed-methods approach, the monitoring process will provide a more robust and uptodate overview of the CCAM project landscape.

6. Appendix

KPI & Description	Baseline and Target	Results (preliminary)
GO1 KPI 1 Number of fatal and severe accidents by vehicles under test in CCAM projects.	Baseline: Prospective effectiveness analysis on fatal and severe accidents. Target: Zero fatal and severe accidents caused by vehicles under test in CCAM projects.	Target reached. *Disclaimer*: Not all field tests have been completed yet.
GO2 KPI 1 Traffic flow condition: ▶ Travel Time Index, or ▶ Congestion Variability Index, or ▶ Congested Road/kms, or ▶ Peak Hour traffic speed.	Baseline: Not provided by the SRIA (TBD before the test). Target: Improvement (of the traffic flow).	Inconclusive. Observation of efficiency and safety parameters rather rare. CCAM projects such as IN2CCAM and CONDUCTOR demonstrated measurable improvements in traffic flow efficiency and emission reduction Thus, it remains unclear if the target is reached because only 13 projects are working on this topic and only two projects provide measurable improvement.
GO3 KPI1 Share of new CCAM vehicles based on European innovation in the fleet of new vehicles sold per year.	Baseline: EU, 2021 fleet: ~5% L2, ~0% L3, ~0% L4. US & Japan, 2021 fleet: broadly similar shares (L2 single digits; L3/L4 ~0%). Target: Higher shares of CCAM vehicles in fleet than US and Japan for the years 2023 thru 2029.	Target not reached yet. All regions have grown since 2021, but the US has scaled faster than Europe and Japan.
GO3 KPI2 TEN-T core network corridors' section providing CCAM services.	Baseline: no corridors with operating sections. Target: all 9 core network corridors have sections providing CCAM services by 2030.	Target not reached yet but improvement of 33%. Marginal TENT corridor testing. Three corridors with operating sections.
GO3 KPI3 Number of sites (e.g. cities) implementing CCAM services after successful demonstration by 2030 (resulting from actions under the CCAM partnership).	Baseline: No demonstration Sites yet. Target: At least 30 demonstration sites (e.g. urban nodes) implementing CCAM services after successful demonstration by 2030.	Target not reached yet. Currently, 11 cities have or plan to transfer CCAM services into a real urban context following project activities. However, other projects show promising activities.

KPI & Description	Baseline and Target	Results (preliminary)
G04 KPI1 Methods, tools and taxonomy used by CCAM developers and deployers in decision making.	Baseline: Use of CCAM methods, tools and taxonomy in 2021. Target: Substantial increase in use of CCAM methods, tools and taxonomy.	Target reached. Starting from 2023 with 11 projects, the number increased to 32, representing a threefold increase and covering approximately 84% of the total identified projects (38 projects).
G04 KPI2 Number of CCAM projects participating in conferences and events.	Target: Best practice sharing at the Results from Road Transport Research (RTR) conference and at the EUCAD Conference by all HE CCAM projects. Substantial increase in use of CCAM methods, tools and taxonomy.	Target reached. 79% of CCAM projects (30 out of 38) actively presented their research and innovations at RTR and EUCA. Newest projects (e.g., HIDDEN, CHORUS) were not yet attending in latest RTR and EUCAD conferences.
S01 KPI1 Methodology for safety validation of CCAM systems agreed by stakeholders along the CCAM value chain, authorities and certification bodies to set safety standards for highly automated vehicles operating on public roads.	Baseline: HEADSTART methodology based on national efforts (PEGASUS, VVMethods, MOVE/MOSAR and Street-Wise), international cooperation (SIPAdus, SAKURA) and EU projects (e.g. L3Pilot, ENSEMBLE, HiDrive and SHOW). Target: Agreement on methodology, input to standards by relevant stakeholders by 2026.	Target on track. During a survey on the SUNRISE Final Event, 90% of all target users said it was likely or very likely that the SAF will be used in their future projects or organizations. A promising feedback, that might unlock safe and large-scale deployment of CCAM systems on European public roads. The SUNRISE Safety Assurance Framework (SAF) will continue to develop and be implemented in several ways (e.g., further Development via New Projects, Partner Implementation & Business Growth).
S02 KPI1 Number of incidents per 1.000.000 km driven on Large Scale Demo project sites and successfully addressing the causes of these incidents (including malfunctions e.g. false positive detections) from large scale demonstration projects.	Baseline: Number of incidents observed in current projects. Target: 10% less annually reported incidents per 1.000.000 km driven in projects compared to baseline.	Inconclusive. Very few incidents were reported, no distance travelled provided. However, the careful assumption of a continuation of the current trend allows reasonable optimism.
S03 KPI1 Impact of CCAM use on surrogate effects such as fleet composition (of CAV), number of CAV occupants carried, number of CAV VKT (vehicle kilometres travelled), load factors for goods.	Baseline: Status of MS data from in 2021. Target: 30% improvement of surrogate effects compared to baseline (Baseline available during 2022, choice of surrogate effects starting with states representative group meeting).	Inconclusive. Analysis shows that the majority of CCAM projects are skewed toward technical and safety advancements (e.g., AI perception), with only 21% of the 38 analysed projects directly addressing these surrogate effects.
S03 KPI2 Survey on acceptance.	Baseline: Acceptance survey results from H2020 projects. Target: Increased acceptance in the two next surveys (2025, 2030).	Under further investigation. Survey results, especially for 2030, not fully/yet available. Ongoing Work: Several surveys are still in progress, focusing on valuing time, acceptance measures, and the impact of cultural, geographical, and policy factors. Analysis is ongoing for several studies, with full results expected in the future.

KPI & Description	Baseline and Target	Results (preliminary)
S04 KPI1 Active involvement of public and private members of CCAM Partnership.	To be measured as: Members of CCAM association involved in LSDemos.	Target on track. Currently members of CCAM association are involved in several projects with demonstration activities. The involvement of CCAM Partnership members in the Large-Scale Demonstration project will happen in October 2026 in the EC Call Horizon-CL5-2026-10-D6-01 ("LSDemo"). Currently the project proposal and partner selection is ongoing. The involvement of CCAM Partnership members cannot be evaluated until the proposal is submitted and selected.
S04 KPI2 Number of crossborder projects.	To be measured as: Number of crossborder demonstration/testing projects.	Target on track. Marginal cross-border testing but MODI sets a good example with the world's first autonomous cross-border freight transport.
S04 KPI3 Involvement of MS.	Baseline: 18 States (Member States and Associated Countries) in the first meeting of the CCAM States Representatives Group. Target: 75% of EU member states actively involved in the CCAM States Representatives Group.	Target on track. Considering that the EU currently counts 27 Member States, the participation range corresponds to approximately 59–70% of EU Member States attending the meetings. The KPI can therefore be considered as on track, with participation levels close to the defined target.
O01 KPI1 Number of successfully demonstrated new functionalities for trustworthy interaction between road users, vehicles, infrastructure and services delivered by CCAM projects.	Baseline: results of H2020 projects (TrustVehicle, ADAS&ME, Mediator, AutoMate, SUaaVE, interact, BRAVE, VIDAS?) to build upon, considering latest advances in science and technology, e.g. in human behavioural models, use of virtual and augmented reality etc. Target: Three or more vehicleinternal and/or external new HMI functionalities successfully demonstrated in various traffic scenarios and enabling safe and efficient interplay of CAVs with other road users incl. pedestrians and twowheeler riders.	Target reached. Across the CCAM projects, several projects have developed and demonstrated human–machine interaction (HMI) solutions addressing both internal interaction between automated vehicles and drivers/ occupants and external interaction between automated vehicles and vulnerable road users (VRUs).
O02 KPI1 Number of large-scale demonstrations applying safety standards prepared by CCAM projects.	Baseline: No directly applicable safety standards available. Target: Three or more large-scale demonstrations until 2028 apply safety standards.	Target not reached yet/ on track. So far, no largescale demonstrations have taken place. However, 37% of the projects indicated that they investigate, develop, test, and/or demonstrate features or functionalities applying any new safety standards.

KPI & Description	Baseline and Target	Results (preliminary)
002 KPI2 Availability of safety standards recommendations.	Baseline 2021: No directly applicable safety standards available. Target: 2026, safety standards recommendations available.	Target reached. More than half of the CCAM projects identified gaps in current safety standards. Their key takeaway is to address gaps in infrastructure perception, enhance confidence value handling, validate MEC-enabled services, and establish harmonized crossborder testing frameworks. Standardize cybersecurity across the CCAM ecosystem and focus on harmonized scenario-based validation, AI-driven assurance, interoperable databases, and mixed-traffic safety methodologies for Europe-wide deployment.
003 KPI1 Application of methodologies and tools for the safety validation of CCAM, as developed in the CCAM Partnership.	Baseline: H2020 results on validation methodologies: HEADSTART methodology based on national efforts (PEGASUS, VVMethods, MOVE/MOSAR and StreetWise), international cooperation (SIPAdus, SAKURA) and EU projects (e.g. L3Pilot, ENSEMBLE and HiDrive). Target: All relevant CCAM projects beyond 2026 apply common methodologies and tools for the safety validation of CCAM systems accepted by the relevant stakeholders by 2026.	Inconclusive. 4 projects explicitly mention to use the SAF for safety validation out of 16 projects (~25%) stating to develop, test, or demonstrate any or new safety validation methods or tools in the CCAM context. However, SUNRISE only ended a couple of month ago when the data was gathered by fka.
004 KPI1 Number of demonstration sites with explicit results on user orientation and mobility integration as well as explicit results on new freight and logistics concepts.	Baseline: 0 CCAM projects in 2021. Target: 30 or more demonstration sites for people mobility, freight and logistic by 2030.	Target reached. The CCAM portfolio substantially expanded the planned demonstration landscape, reaching 43 test sites across Europe, surpassing the original target by up to 43%.
005 KPI1 Number of projects targeting assessment of societal impacts.	Baseline: Number of projects addressing societal impacts in the Knowledge Base in 2021: 7 out of 16 characterized as addressing "socioeconomic impact assessment/ sustainability" by ARCADE. Target: All demonstration projects of CCAM Partnership show completed mapping of these aspects.	Target likely reached. Rate increased by around 30 percentage points compared to 2021, growing from 44% (7/16 projects) to 74% (20/27 projects). However, not all demonstration projects are assessing societal aspects.
005 KPI2 Ex-post impact assessment at large-scale demonstrations.	Baseline: Number of projects addressing societal impacts in the Knowledge Base in 2021: 7 out of 16 characterized as addressing "socio-economic impact assessment/ sustainability" by ARCADE. Target: All impact aspects defined are assessed by 2030 (Ex-post impact assessment of large-scale demonstrations).	Target not reached (yet). So far, no large-scale demonstrations have taken place.

KPI & Description	Baseline and Target	Results (preliminary)
006 KPI1 Evolvement of public awareness and perceived benefits with the help of assessment reports of large-scale demos.	Baseline: (Surrogate measures from Eurobarometer 496 2019 and L3 Pilot survey 2021.) Target: By 2030: Public awareness: 100%; Willingness to use: 75%; Willingness to buy: (56% (=doubling)).	Target not reached (yet). Recent EU surveys on digitalisation and artificial intelligence suggest generally high levels of technological acceptance, which may also be interpreted as favourable for public attitudes toward CCAM. Compared to 2023 the number of projects than plan to conduct a survey on the awareness of CCAM services and vehicles, or the willingness to use CCAM services and vehicles increased from 6 to 21. Around 10 surveys have already been conducted and provide evidence that CCAM acceptance is generally positive but conditional.
007 KPI1 Number of projects making datasets available or use data from other projects (e.g. linked through the Knowledge Base).	Baseline: Best practices from Knowledge Base. Target: All CCAM projects make test data and other datasets. (e.g. scenarios, edge cases, etc.) available by 2027.	Target not reached yet. Certainly, many projects are willing to share knowledge, data and/or datasets. However, several projects have not done this so far and only provided a non-binding statement to share. Some projects even declined, sharing entirely which moves the target out of reach. (Sharing restrictions due to proprietary, legal or copyright reasons are granted in this consideration.)
007 KPI2 Regularly updated SRIA of the CCAM Partnership.	Baseline: SRIA and CCAM Partnership established in 2021. Target: Regular updates of the CCAM SRIA.	Target reached. The SRIA has been updated in the course of 2023, what is considered to be the final update.
008 KPI1 Involvement of regional and local authorities.	Baseline: 0 Target: 50 regional and local authorities and their associations participating in at least one CCAM project.	Target not reached yet. Of the planned 50 regional and local authorities and their associations participating in at least one CCAM project, across the analysed projects, approximately 40 local and regional public authorities are involved, including around 28 municipal authorities and 12 regional authorities supporting CCAM planning, pilots and policy development.
009 KPI1 Common evaluation methodologies (CEM) implemented and building up a common evidence base using CEM for CCAM demonstration activities.	Extended Baseline: CEM ready for implementation by 2024.	Target reached. The initial version of the CEM was released in 2025 and has since been cited by approximately 66% of ongoing projects as of 2026.

KPI & Description	Baseline and Target	Results (preliminary)
009 KPI2 Number of projects making reference to common evaluation methodology in their methodology definition, also beyond European projects after finalisation of the CEM.	Baseline: Good practices from the Knowledge Base on evaluation methodologies / Extended Baseline: CEM ready for implementation by 2024. Target: 10 or more projects making reference to common evaluation methodology in their methodology definition, also beyond European projects by 2027.	Target reached. 68% of current projects (2026) stated to reference on CEM. The target of 10 projects referencing the common evaluation methodology by 2027 has been significantly exceeded. A total of 26 projects have already made reference to the methodology, representing 260% of the target.
0010 KPI1 Number of projects developing and implementing new and emerging knowledge fields, such as cyber security, data sharing and AI, into CCAM solutions.	Baseline: Mapping of knowledge fields of the Cosmos project in 1. Quarter 2022. Target: 15 Horizon Europe projects addressing new and emerging knowledge fields like AI and cyber security in CCAM applications by 2027 (no baseline).	Target reached. 76% of the projects (n = 29) stated to be active in new and emerging fields with strong alignment with COSMOS emerging and strategic knowledge fields in AI & Data Analytics and Connectivity & Telecom.
0011 KPI1 Number and regularity of updates of the CCAM Knowledge Base with projects and high qualitative content providing results and lessons learned.	Baseline: Knowledge base in 2020 with 300 projects (covering projects as of 1996). Target: 400 or more projects in total by 2030. Baseline: 50% (all Eastern European countries, Portugal, Luxemburg, Ireland) of all the 26 European countries with projects are significantly underrepresented in the Knowledge Base in 2021 with involvements in less than 8 projects. Eastern countries in particular are involved in average in 3 projects. With few exceptions (US and Japan), no project from outside EU is included in 2021. In 2021, the KB includes initiatives from EU, Norway, Switzerland and UK and very few initiatives involve US, Brazil, Canada, China, Japan, New Zealand, South Korea). Target: Increase the number of CCAM related projects from all Eastern European countries, Portugal, Luxemburg, Ireland and from non-European countries in the Knowledge Base by 2030.	Target reached. The Knowledge Base was last noted to contain about 400+ R&I projects (26 June, 2025), and this number is continuously updated. Eastern European countries in particular are involved in average in approx. 19 projects in 2026. 66 projects from all Eastern European countries, Portugal, Luxemburg, Ireland and 109 from non-European countries can be found on the KB website "Find a project".

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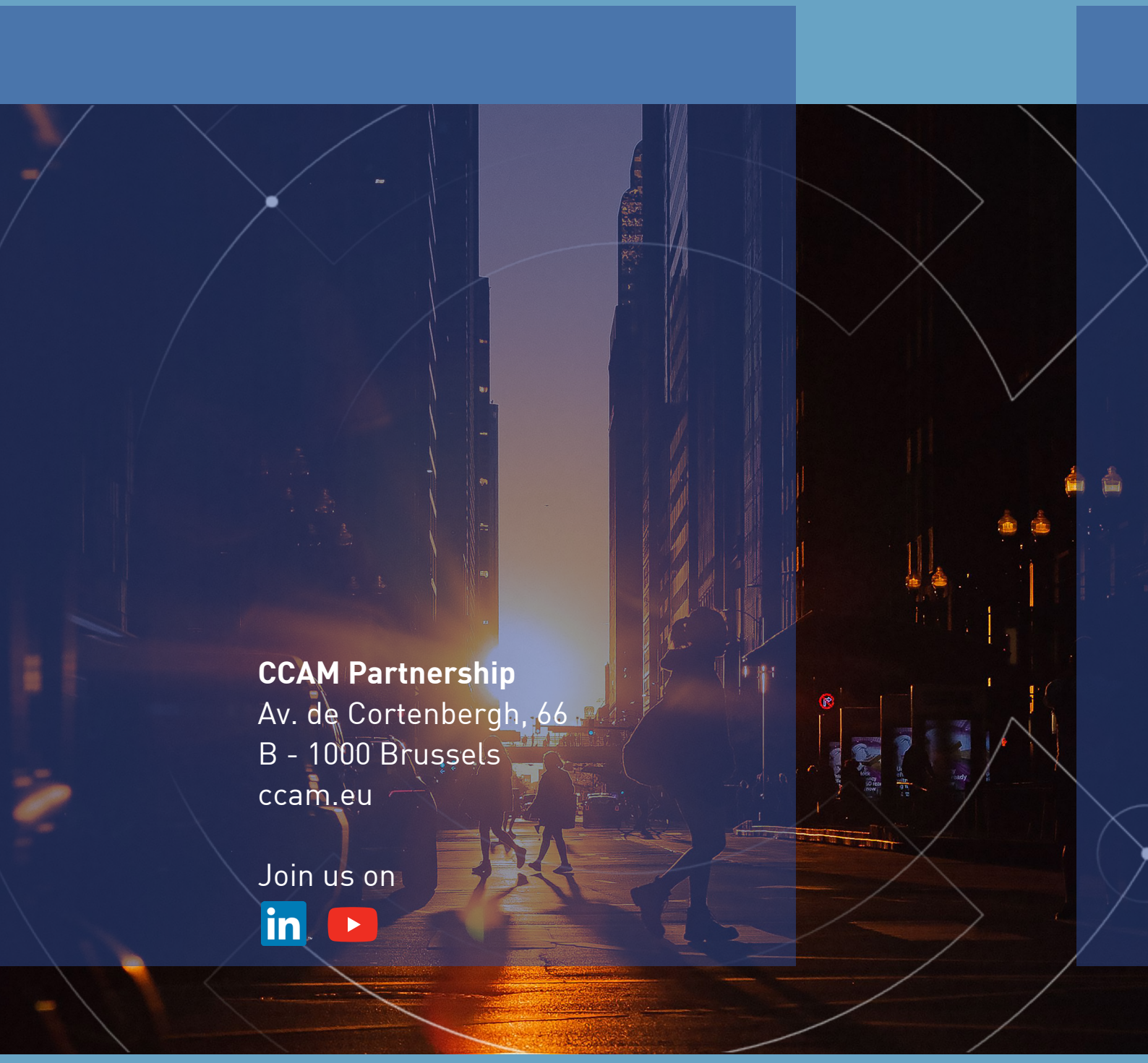

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